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C. WANG

Essays on trends in income distribution and redistribution
in affluent countries and China

Over the last decades, income inequality has increased globally. How do social policies affect this increasing trend? How do international trade and technological progress affect inequality? What is the profile of income inequality in China?

Based on quantitative analyses of determinants of income inequality, this study provides a number of new insights into these questions. Income inequality has increased in the last decades all over the world. Several factors seem to contribute to this trend. Very prominent amongst them is the rising primary income inequality. The dominant income inequality-reducing effect comes from the tax benefit system, which offsets two thirds of the total increase in inequality.

Generally speaking, the transition of welfare states from a traditional to a social investment oriented system does not lead to lower income inequality or poverty. There is also no robust and significant relationship between international trade and technology changes on the one hand, and income inequality on the other.

Determinants of inequality in China are different from those in developed countries. In contrast to the tax benefit system in rich countries, the fiscal system in China does not bring a lower level of income inequality. Another explanation is the household registration system. It brings about a segregated labour market, leading to an uneven distribution of benefits from globalisation and policies.

This is a volume in the series of the Meijers Research Institute and Graduate School of the Leiden Law School of Leiden University. This study is part of the Law School's research program 'Reforming Social Security'.



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C. WANG

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Preface

Rising inequality has been observed in many parts of both developed and developing worlds over the last decades. This can be attributed to several factors such as government redistribution, labour market development and demographic changes. Understanding what roles these factors play is helpful for us to tackle the worsening income distribution. I was fortunate to have spent four years of research on such a stimulating subject, leading to this dissertation that consists of a collection of refereed journal articles and two other papers with one under review and another ready for submission.

I am very grateful to the Department of Economics at Leiden University for providing an excellent environment of academic freedom. In particular, I wish to thank Professors Koen Caminada and Kees Goudswaard for their enthusiastic supervision, encouragement and intellectual inputs. Appreciation also goes to colleagues at the Department of Economics, the Stichting Instituut Gak funded research programme 'Reforming Social Security' and Chinese Scholarship Council for their various assistance.

I am much indebted to Professor Guanghua Wan and other friends at Asian Development Bank (ADB) for an extremely rewarding internship. Furthermore, I am thankful to Stefan Thewissen and Olaf van Vliet for their support and collaborations.

Special thanks go to my parents, family members and friends for their patience, love and blessings throughout my Ph.D life. Finally, to my caring and supportive husband, Liang: my heartfelt thanks. My love, I dedicate this thesis to you.

Table of contents

1	INTRODUCTION	1
2	THE REDISTRIBUTIVE EFFECT OF SOCIAL TRANSFER PROGRAMMES AND TAXES: A DECOMPOSITION ACROSS COUNTRIES	9
2.1	Introduction	9
2.2	Income inequality and the redistributive effects of taxes and transfers across countries	11
2.3	Research method	12
2.3.1	Measuring the redistributive effects of taxes and social transfers	12
2.3.2	Choice of income unit and country data	15
2.4	Inequality and redistribution across countries	16
2.4.1	Inequality across countries	16
2.4.2	The redistributive effect of taxes and transfers	17
2.5	Decomposition of the redistributive effect of social transfers and taxes	19
2.6	Conclusion	25
	<i>Annex 2A Leiden LIS budget incidence fiscal redistribution dataset</i>	29
2A.1	Introduction	29
2A.2	Aim	30
2A.3	Origin of the idea	31
2A.4	Household Income Components List	32
2A.5	Decomposition of the Gini coefficient	37
2A.5.1	Sequential decomposition of the Gini coefficient: partial effects of taxes and transfers	37
2A.5.2	Sequential decomposition of the Gini coefficient: partial effects of different income sources	40
2A.5.3	Choice of income unit	40
2A.5.4	Countries and other measurement issues	41
3	INCOME REDISTRIBUTION IN 20 COUNTRIES	43
3.1	Introduction	44
3.2	Research method	46
3.2.1	Data from Luxembourg Income Study (LIS)	46
3.2.2	Measuring the redistributive effects of direct taxes and social transfers	47

3.2.3	Measuring change over time	50
3.2.4	Focus on total population – including public pension schemes	50
3.3	Empirical results	51
3.3.1	Trends in the distribution of primary and disposable income in LIS countries	51
3.3.2	Redistributive effects of direct taxes and transfers over time	54
3.4	Decomposition of the redistributive effect of social transfers and direct taxes across LIS countries from the mid-1980s to the mid-2000s	55
3.4.1	Relative redistributive effects	55
3.4.2	Absolute change redistributive effect	57
3.4.3	Sensitivity analysis	61
3.5	Conclusion	61
<i>Annex 3A</i>	<i>Trends in inequality and redistribution in 20 LIS countries</i>	63
<i>Annex 3B</i>	<i>Sensitivity analysis for redistribution using different global income inequality indicators</i>	69
<i>Annex 3C</i>	<i>Decomposition of income inequality and redistributive effects of social transfers and direct taxes in 20 LIS countries 1979-2005</i>	77
4	SOCIAL INVESTMENT AND POVERTY REDUCTION: A COMPARATIVE ANALYSIS ACROSS 19 EUROPEAN COUNTRIES	85
4.1	Introduction	86
4.2	Social investment, poverty and income inequality	87
4.2.1	Trends in poverty and income inequality	87
4.2.2	The social investment state	88
4.3	Data and method	91
4.3.1	Poverty rate and income inequality	91
4.3.2	Expenditures on Social investment	92
4.3.3	Control variables	93
4.3.4	Method	95
4.4	Empirical analysis	96
4.4.1	Descriptive statistics	96
4.4.2	Regression results	100
4.4.3	Sensitivity analyses	103
4.5	Discussion and conclusion	107
<i>Annex 4A</i>	<i>Descriptive statistics</i>	109
5	TAKING THE SECTOR SERIOUSLY: DATA, DEVELOPMENTS, AND DETERMINANTS OF SECTORAL EARNINGS INEQUALITY AND EMPLOYMENT	111
5.1	Introduction	112
5.2	Current explanations for rising earnings inequality	113
5.3	A sectoral approach to studying inequality	114

5.4 Data	117
5.4.1 Income definition, sector standardisation, and sample	117
5.4.2 Trends at the country level	118
5.4.3 Decomposition of inequality at the country level	120
5.4.4 Trends in inequality within industries	121
5.4.5 Trends in sectoral levels of employment	125
5.5 Regression analyses of sectoral trends	128
5.5.1 The regression model and data	128
5.5.2 Descriptive statistics for the independent variables	130
5.5.3 Intrasectoral inequality	132
5.5.4 Sectoral employment	133
5.5.5 Sensitivity tests	135
5.6 Conclusions	137
<i>Annex 5A Leiden LIS Sectoral income inequality dataset</i>	141
5A.1 Introduction	141
5A.2 Calculating sectoral earnings inequality and employment	141
5A.2.1 Labour earnings and sample definition	141
5A.2.2 Sectoral classification and country sample	142
5A.3 Codebook and descriptives	144
5A.3.1 Country-level data based on household information	144
5A.3.2 Country-level data based on individual information	145
5A.3.3 Sectoral data based on household information	146
5A.3.4 Sectoral data based on individual information	147
5A.3.5 Comparison to Mahler et al (1999)	148
6 DETERMINANTS OF INCOME INEQUALITY AMONG ELDERLY IN: AUSTRALIA, CANADA, DENMARK, GERMANY, ISRAEL, NORWAY, THE UNITED KINGDOM, AND THE UNITED STATES	155
6.1 Introduction	156
6.2 Income inequality among the elderly	158
6.3 The determinants of income inequality among the elderly	161
6.3.1 Income components	161
6.3.2 Labour market factors	164
6.3.3 Demographics of the elderly	165
6.4 Analytical framework	166
6.5 Simulation results	169
6.6 Discussion	272
<i>Annex 6A Sensitivity analysis for decomposition using different global income inequality indicators</i>	175

7	INCOME INEQUALITY IN CHINA: TRENDS, DETERMINANTS AND PROPOSED REMEDIES	179
7.1	Introduction	179
7.2	Inequality Profiles	181
7.2.1	Profile of Inter-Household Inequality	182
7.2.2	Profile of Regional Inequality	187
7.2.3	The Profile and Importance of the Urban-rural Disparity	191
7.3	Sources or Causes of the Rising Inequalities	194
7.3.1	Institutional Factor: the Hukou System	197
7.3.2	Policy Issues	198
7.3.3	Location or Geographic Factors	199
7.3.4	External Factors: Trade and FDI	199
7.3.5	Other Factors	200
7.4	Suggested Interventions	201
7.4.1	Tackling the urban-rural gaps: Urbanization	201
7.4.2	Tackling regional inequality	202
7.4.3	Hukou reform and social protection	203
7.4.4	Other proposed remedies	203
7.5	Summary and Areas for Future Research	204
	 SAMENVATTING (SUMMARY)	 207
	BIBLIOGRAPHY	215
	CURRICULUM VITAE	233

1 Introduction

This thesis consists of six studies on income inequality, which can be read independently as Chapters 2–7. Jointly they offer a comparative perspective on trends and determinants of inequality in OECD countries and China, which has been lacking in the literature.

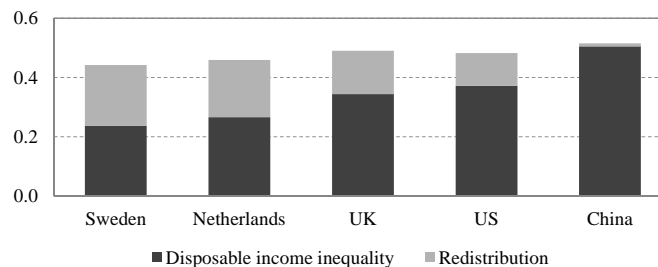
The purpose of this introductory chapter is to provide a general background and motivation for studying income inequality (section 1.1.), which lead to specific research questions to be addressed in this thesis (section 1.2.). This introductory chapter ends with a summary of the major research findings (section 1.3).

1.1 BACKGROUND AND MOTIVATION

This thesis is motivated by the disturbing trend of rising income inequality globally and at more disaggregated levels in many parts of both developed and developing worlds over the last decades (Qureshi and Wan, 2008; OECD, 2008; 2011a; Milanovic, 2005). The trend is robust irrespective of which data (income, asset or expenditure) or inequality measures (the Gini coefficient, the Theil index or other global indicators) are used.

Figure 1.1 shows the Gini estimates for several OECD countries and China. It can be seen that income inequality before taxes and benefits (the sum of disposable income inequality and redistribution) is quite substantial, ranging from 0.442 in Sweden to 0.515 in China.

Figure 1.1 Income Inequality, Selected Countries



Source: Own calculation based on micro data from the Luxembourg Income Study (LIS) database, which provides comparable datasets from various countries.

Such a high level of income inequality requires serious research and policy attention because it can have adverse social, economic and political consequences. First and foremost, high inequality can undermine social stability and is thus detrimental or even destructive to economic and social activities. A lack of such stability deters investment and may incur various costs to the economy. For example, inequality is found to cause crimes (Kelly, 2000). It also has harmful effects on political processes when public opinion differs among income groups (Gilens, 2005; Bartels, 2009). Furthermore, inequality is associated with a decline in trust, civic engagement and participation.

Second, high inequality thwarts economic development as it deprives the poor of educational opportunities and human capital accumulation. For example, inequality leads to ill health and threatens the provision of public goods such as health and police services (see Osberg, Smeeding and Schwabish (2004) for a review of the literature). A greater inequality also induces more redistribution associated with tax finance, which may discourage work effort. Therefore, high inequality impinges on growth by influencing labour use and productivity (Barro, 2000). In addition, it also reduces opportunities to achieve economies of scale for producers who sell to the middle class (Keefer and Knack, 2002).

Third and finally, high inequality means less social mobility. In an unequal society, lower income households or individuals have a similar background, ability and characteristics, creating barriers to the transformation of identity. Consequently, the relatively poor face difficulties in moving up the income ladder (Motiram and Sarma, 2014).

Due to these wide ranging and profound implications, inequality not only has become a popular subject in economic research, it also attracts considerable and increasing public and political attention. For example, in the United States approximately 57 per cent to 66 per cent of the population support a more equitable distribution of wealth, compared with 28 per cent to 35 per cent who are satisfied with the existing situation (Shaw and Gaffey, 2012). The tremendous public interest in Thomas Piketty's (2014) book 'Capital in the Twenty-First Century' forcefully demonstrates how important the subject of income inequality is to many people all over the world.

1.2 RESEARCH QUESTIONS

Having justified the need to study inequality, it is necessary to narrow down the focus for this thesis as the topic of inequality is broad and covers many aspects. Broadly speaking, this thesis focuses on the determinants of income inequality and its changes. More specifically, the following six sets of research questions are addressed.

First, what is the role of social policies? As widely discussed, social policies (e.g. taxes and social transfers) represent an important determinant of income

inequality. As Figure 1.1 demonstrates, different countries share similar levels of primary income inequality (before taxes and transfers) but disposable income inequality differs. Clearly, government redistribution plays a significant role. Of the countries listed in Figure 1.1, the largest redistribution is found in Sweden while the lowest is found in China.

While most studies focus on the overall redistributive impact, some examine the effect of particular social programmes such as pensions, unemployment benefits and so on. However, few studies have compared effects such as these across different countries. Thus, Chapter 2 will document income inequality in 28 OECD countries around 2005 and explore the role played by government redistribution. In particular, efforts will be made to quantify the effects of various social programmes on inequality.

Second, what is the role of redistribution in affecting inequality *over time* in OECD countries? In most OECD countries, income inequality has risen over the past two or three decades, mainly driven by greater inequality in market income (OECD, 2008; 2011). As mentioned earlier, government redistribution can play a significant role in reducing income inequality. However, the literature on 'welfare state retrenchment' that has emerged over the last decades argues that welfare states have become less redistributive. On the contrary, other studies show that welfare states were more redistributive in the 1980s and 1990s (Kenworthy and Pontusson, 2005). This controversy motivates us to examine whether government redistribution has become stronger or weaker over time. Chapter 3 addresses this issue by examining the contributions of taxes and social programmes to inequality changes in a comparative setting.

Third, does the transition from a traditional welfare state to a new social investment state lead to higher inequality and poverty? This question has been at the centre of recent public debate in Europe. The Lisbon Strategy adopted in March 2000 aims at enhancing social cohesion and reducing poverty in the European Union. To achieve this goal, the Lisbon Strategy advocates a transition from the traditional welfare state to a new social investment state. This suggests gradually replacing redistributive social policies by active social policies that promote higher labour participation. Unfortunately, the impact of this transition on poverty rates seems minimal. Some even believe that the transition is partially responsible for the disappointing poverty results. Hence, a fierce scientific debate has emerged, casting doubts on the effectiveness of the social investment strategy. Consequently, Chapter 4 of this thesis attempts to explore the impact of the transition on poverty and income inequality.

Fourth, how do international trade, technological progress and labour market institutions affect income inequality? These driving forces have been put forward to explain the upsurge in inequality, particularly the rising earnings inequality across countries. The increase of imports might impair wages or employment of domestic workers by giving rise to a direct competition with foreign workers. Meanwhile, exports could give room to higher earnings or job creation. With respect to technology change, recent innovations

tend to complement the high-skilled and substitute routine labour by capital, leading to polarisation in the labour market. Chapter 5 will extend the current literature by studying income disparity at the sector level, not just the economy-wide level. This is useful because the impacts of trade, technology and labour institution may differ from sector to sector. For example, sectors with more exposure to the global market may have higher levels of income inequality. To be more precise, Chapter 5 estimates sector earnings inequality in eight developed countries and examines the roles of international trade, technology changes and labour market institutions.

Fifth, what determines the changes in income inequality among the elderly? Despite a large and growing body of literature on inequality for the total or working-age population, scant attention has been paid to income inequality among the elderly. This is regrettable because income distribution among the elderly is an integral component of the overall inequality; its significance grows as aging takes place in OECD and emerging economies. More importantly, the elderly generally earn less than the working-age population; many of them are living entirely on pension income. Under these circumstances, rising income disparity among the elderly may push some of them into poverty. This is particularly relevant in Europe as (public and private) pensions have become less generous in many industrialized countries (Scruggs, Jan and Kuitto, 2014). Accordingly, Chapter 6 focuses on the trend of income inequality among the elderly in eight OECD countries and investigates factors contributing to the changes of this inequality.

Sixth, what is the profile of income inequality in China? Chapter 7 focuses on China, as a case study of developing economies. Pre-reform China is perceived to be an egalitarian society, but income inequality started to rise in the mid-1980s when the government shifted its reform focus from the rural to the urban sector. This shift reinforced the adverse impact of the open-door strategy on regional inequality as the strategy came with preferential policies biased toward the coastal region. China represents a good case study as it differs from OECD countries in terms of growth rate and development status whereas there are similarities as well: rising income inequality and aging. In terms of causes or drivers of inequality, unlike OECD countries, China has a segregated labour market because of the household registration system (*hukou* system), which discriminates against rural labour. Understandably a full-scale comparative study between OECD countries and China is beyond the scope of this thesis, but Chapter 7 will provide a non-exhaustive literature review on China's inequality trends and determinants, and suggests government interventions. In particular, questions addressed in this chapter include: what are the profiles of interhousehold inequality, regional inequality and urban-rural disparity in China, and what are the possible sources or causes of these inequalities?

1.3 MAIN FINDINGS

This section provides answers to the research questions discussed in the previous section.

Chapter 2 investigates income distribution and redistributive effects attributed to social transfers and taxes across 28 OECD countries around 2004, based on the micro household income data from the Luxembourg Income Study (LIS). With respect to redistributive effects, our budget incidence analysis indicates that taxes and social benefits cause the Gini coefficient to drop from 0.462 to 0.299 on average, which is a reduction of 35 per cent. Social transfers account for 85 per cent of the total redistribution, while taxes account for 15 per cent. The largest redistribution was found for Belgium, Hungary and Finland, whereas Mexico, Korea and the United States showed limited overall redistributive effects. As far as social programmes are concerned, in most countries two dominant income components account for 50 to 60 per cent of the total reduction in income inequality: 1) the public old-age pensions and the survivors' scheme, and 2) the income taxes. All other social benefit programmes appear to have limited redistributive effects in all countries, although unemployment compensation benefits do have some effect.

Chapter 3 examines inequality changes from around 1985 to the mid-2000s across 20 LIS countries, with a special focus on redistribution attributed to social transfers and direct taxes. Results show that despite the rising income inequality, the tax benefit systems in the mid-2000s were more effective in reducing inequality than those in the mid-1990s. The public old-age pensions and the survivors' scheme contributed 60 per cent to the increase of redistribution during the period of 1985–2005. Social assistance accounted for 20 per cent, and the benefits for sickness, occupational injury and disease, and disability accounted for around 12 percent of the total increase in redistribution. Other transfers (child/family benefits, maternity and other family leave benefits, military/veterans/war benefits, and other social insurance benefits) accounted for 22 per cent of the total increase in redistribution. By contrast, direct taxes slowed down redistribution by 16 per cent during 1985–2005.

Chapter 4 analyzes the distributional effects of shifts in the expenditures from traditional welfare state programmes to social investment policies in 19 European countries in 1997–2007, using pooled time-series cross-section data from the OECD database and Eurostat. The results suggest that these shifts are not associated with higher or lower poverty rates. This finding, however, does not necessarily support the argument that the disappointing poverty rates across Europe are partially attributable to a greater focus on new welfare state programmes. As Cantillon (2011) and Marx, Vandenbroucke and Verbist (2012) have pointed out, the rise in employment has not been as beneficial to jobless households as it has been to households where at least one person was already employed. One possible explanation lies in the fact that the shifts in expendi-

tures between traditional and social investment policies have been relatively limited so far.

Chapter 5 divulges sectoral trends in income inequality and employment, complementing the literature on rising earnings inequality at the country level. Using the most recent sectoral data from LIS for eight countries between 1985 and 2005, our pooled cross-sectional time-series analysis indicates that inequality varies significantly between sectors and earnings inequality has increased in a majority of sectors. Regarding inequality drivers, little evidence is found to support associations between earnings inequality and trade or technological progress. Concerning labour market institutions, the union coverage rate at the country level is negatively associated with sectoral earnings inequality, which supports the hypothesis that waning trade power leads to higher inequality.

Based on micro data from LIS, Chapter 6 studies income inequality among the elderly and analyzes its changes in eight OECD countries from around 1995 to around 2005. It was found that on average, income inequality among the elderly increased moderately from a Gini of 0.280 to 0.291 over a period of about a decade, with the largest rise observed in Australia. The main contributor to the increase in inequality are the changes in earnings distribution. This is followed by changes in private pension income. By contrast, changes in the share of public pensions exert stronger inequality-reducing effects over time. Overall, the change in demographic structure of the elderly plays a negligible role in explaining the trend of rising inequality. Considerable variations exist across countries. In Canada, Denmark and Germany, changes in both private and public pensions become more inequality-reducing. In the United States they become more inequality-increasing, though. The change in the share of households where the head of the household or their spouse is employed, contributes to a higher income disparity in Australia, Denmark and Germany. The changes in earnings distribution accelerate the growing inequality in all countries except Israel. The change in the share of people above 75 years of age contributed to a higher inequality in Norway, and the changes in the share of single households brought about a rise in inequality in Israel but a reduction in inequality in Norway and the United States.

Chapter 7 provides a literature review on China's income inequality. In pre-reform China, egalitarian distribution was only implemented in the urban sector and within production teams of the rural sector. Thus, sizable income inequality existed, largely attributable to urban-rural gaps and disparities within the rural sector. Economic reforms broke the 'iron rice bowl' in the urban areas and the egalitarian distribution within production teams. Consequently, within-rural and within-urban inequalities have been increasing until recently. However, the overall inequality declined in the first several years of reform due to the narrowing of the urban-rural gap, which represents a dominant component of the overall inequality. From the mid-1980s until the

early 2000s, inequalities along all dimensions in China exhibited increasing trends.

Chapter 7 also pins down the main causes or sources of worsening income distribution in China. First, there is the *hukou* system that discriminates against rural labour, preventing many more potential migrants to share the growth dividends in urban or coastal areas (Zhao, 1999; Zhang and Zhou, 2012). Therefore, it represents a cause of enlarged urban-rural and regional income gaps. Second, policy issues such as China's regional development policies and the opening up of the coastal cities play a role. Moreover, the fiscal system in China is disequalizing, contributing to regional inequality. Third, geography matters. Coastal provinces benefit from location advantages for exports, better infrastructure and more human capital although the inland areas have more natural resources and higher population growth rates (Lu 2008). A fourth cause are external factors (trade and FDI), which have contributed to the rapid increase in inland-coastal disparity.

2 | The redistributive effect of social transfer programmes and taxes: a decomposition across countries [■]

ABSTRACT

The aim of this paper is to offer detailed information of the redistributive impact of social transfer programmes and taxes in 28 OECD countries, employing data that have been computed from the Luxembourg Income Study's micro-level database. We find that the welfare states on average reduce inequality by 35 percent. Social benefits have a much stronger redistributive impact than taxes. As far as social programmes are concerned, public pensions account for the largest reduction in income inequality, although the pattern is diverse across countries. To a lesser extent, social assistance, disability and family benefits also contribute to smaller income disparities.

Key words: income redistribution, benefit, taxation, welfare state, OECD

2.1 INTRODUCTION

The growing interest in national and cross-national differences in earnings and income inequality has produced a wide range of studies (see Gottschalk and Smeeding, 1997; Brandolini and Smeeding, 2007; OECD, 2008 and 2011; Lambert et al, 2010 and Immervoll and Richardson, 2011). An important development has been the launching of the Luxembourg Income Study (LIS) in which microdatasets from various countries have been 'harmonised'.¹ Consequently it is possible to study income inequality across countries (see

■ This chapter is co-authored by Koen Caminada and Kees Goudswaard, and is published as: C. Wang, K. Caminada, and K. Goudswaard (2012), 'The redistributive effect of social transfer programs and taxes: a decomposition across countries', *International Social Security Review* 65(3), pp. 27-48. An extended version of this paper appeared as Department of Economics Research Memorandum 2011.02, and LIS Working Paper #567 (Awarded the best LIS Working Paper of 2011). An earlier version was presented at LIS Aldi Harenaars Memoria Lecture, Luxembourg, Luxembourg, 4 July 2012. We gratefully acknowledge Instituut Gak and the Chinese Scholarship Council for their financial contribution to this project. We thank Palvolgyi Balazs, Jim Been, When-Hao Chen, Marike Knoef, Arnaldur Sölvi Kristjánsson, Susan Kuivalainen, Judith Niehues, and Olaf van Vliet for useful suggestions and for comments on earlier drafts and presentations of this paper.

1 See survey information LIS at <http://www.lisdatacenter.org/>.

Atkinson et al, 1995). However, the improvement in methods of measurement and in empirical knowledge is in contrast with the lack of insight into causes of changes in inequality over time.² This should perhaps not come as a surprise as the distribution of income in a country is the outcome of numerous decisions made over time by households, firms, organizations and the public sector. One could think of an almost infinite number of micro-level causes for differences and changes in income inequality (Gottschalk and Smeeding, 2000, Förster, 2000). The increasing income inequality observed for most – but not all – Western economies over the last decades has coincided with many structural changes in the economic system. For many countries the main forces behind growing disposable income inequality are the growth of inequality of earned market income, demographic changes, changes in household size and composition, and other endogenous factors. Atkinson (2000:17) concludes that we should not expect the same development in all countries, because the distribution of income is subject to a wide variety of forces (which may differ over countries). The evolution of income inequality is not simply the product of common economic forces: it also represents the impact of institutions and national policies.

In this paper, we focus on the effect of social transfers and taxes in redistributing income. Our expectation is that social transfers are mainly directed to lower income groups, while income taxes are mainly paid by the rich, and therefore both will have an impact on income (re)distribution. We use the traditional budget incidence approach – despite some methodological problems we will address – to study the combined effects of taxes and transfers on the income (re)distribution. The distribution of primary or wage and salary income is compared with the distribution of income after tax and after social transfers. We present empirical results by analysing absolute levels of income inequality across countries for the most recent data year available (around 2004) for 28 OECD countries.

Empirical studies on the redistributive effect of welfare states suffer from a lack of data. Recently this has changed by the work of Mahler and Jesuit (2006) and Jesuit and Mahler (2010) using LIS data. The Luxembourg Income Study offers micro-data on public and private sources of income that are comparable, detailed and accurate. Using the LIS data set, it is possible to estimate direct redistribution for most developed countries.

We elaborate on and update the work of Jesuit and Mahler. But in addition, we undertake a more detailed study which allows us to decompose income redistribution through the welfare state into the redistributive impact of specific social transfers and taxes. We develop a budget incidence simulation model

2 OECD (2008) summarizes trends and driving factors in income distribution and poverty on the basis of a harmonized questionnaire of OECD Member Countries (i.e., distribution indicators derived from national micro-economic data).

to investigate to what extent several social transfers and taxes reduce income inequality in 28 OECD countries around 2004.

The paper is organized as follows. In the second section we briefly summarize literature on the redistributive effect of taxes and transfers. Our research method is presented in the third section. The fourth section provides a descriptive analysis of inequality and redistribution across 28 countries. The empirical results of our detailed decomposition of the redistributive effect of social transfers and taxes across countries are presented in the fifth section. Finally, we draw some conclusions.

2.2 INCOME INEQUALITY AND THE REDISTRIBUTIVE EFFECTS OF TAXES AND TRANSFERS ACROSS COUNTRIES

A number of studies analyze income distribution across countries, indicating that the role of social policy (taxes and transfers) is important in the magnitude of redistributing income.³ Korpi and Palme (1998) used data from LIS to study different types of welfare states. They illustrated that social transfers are important for reducing income inequality. They make a distinction between the redistributive effect of programme size and the extent to which they are targeted to low-income groups.⁴ They indicate that it is less likely that targeting will reduce inequality. This paradox arises because targeted programmes will only have the support of a small and isolated political base. Comprehensive programmes, on the other hand, will have a much broader support. Jesuit and Mahler (2004) conclude that redistribution is more strongly related to the size of social programmes than to their target efficiency. Bradley et al (2003) divide the welfare states into three categories (Social Democratic, Christian Democratic and Liberal Democratic) to study government redistribution and distributive profiles of taxes and transfers. Their results indicate that welfare generosity does not have a significant effect on pre-tax and pre-transfer income inequality, but does have a positive impact on the total redistribution of incomes. Kenworthy and Pontusson (2005) examined the trend in market income inequality and redistribution in OECD countries in the 1980s and 1990s. They find a sizeable increase in market income inequality. But redistribution through the welfare state also increased in most countries, which (partly) compensated the rise in market inequality.

Most studies focus on overall redistribution. Others have examined in more detail the redistributive effect of several social programmes (Plotnick, 1984, Ferrarini and Nelson, 2003). Goudswaard and Caminada (2010) studied the

3 Among others, Brandolini and Smeeding (2007), Atkinson and Brandolini (2001), Smeeding (2000, 2004 and 2008), Gottschalk and Smeeding (1997 and 2000), Atkinson (2003), Ervik (1998), O'Higgins et al (1990).

4 See also Caminada and Goudswaard (2010).

effect of public and private social programmes. They conclude that a shift from public to private social programmes may affect the redistributive impact of the welfare state. In a recent study, Immervoll and Richardson (2011) show that tax-benefit systems are now less effective at reducing inequality compared with the mid-1990s for the majority of the 12 countries (and on average) for whom suitable long run data was available. After the mid-1990s, reduced redistribution has been the main driver of widening income gaps. Looking at different parts of the redistribution system, they conclude that social benefits have a much stronger redistributive impact than social contributions or taxes.

This paper mainly elaborates on Jesuit and Mahler (2004) and Mahler and Jesuit (2006). They divide government redistribution into several components: the redistributive effects from unemployment benefits, from pensions, and from taxes and performed an empirical exercise for 13 countries with LIS-data around the years 1999/2000. On average, taxes and transfers in these countries cause a drop in the Gini coefficient from 0.432 to 0.271, which is a reduction by 37 percent.⁵ Social transfers account for around 75 percent of total inequality reduction and taxes for around 25 percent. Next, Jesuit and Mahler decompose social transfers into pensions, unemployment and other programmes. Pensions appear to cause 56 percent of total redistribution through social transfers, while the unemployment programmes account for 11 percent and other programmes account for 40 percent of inequality reduction. This study provided relatively new insights. However, the data used are not very recent, the number of countries is small and only two specific social programmes are included in the analysis. In this paper we will make further steps on these points.

2.3 RESEARCH METHOD

2.3.1 Measuring the redistributive effects of taxes and social transfers

Usually, the impact of social policy on income inequality is calculated in line with the work of Musgrave, Case and Leonard (1974), i.e. statutory or budget incidence analysis. A standard analysis of the redistributive effect of taxes and income transfers is to compare pre-tax-transfer income inequality and post-tax-transfer income inequality (OECD 2008: 98). Our measure of the redistributive impact of social security on inequality is straightforwardly based on formulas developed by Kakwani (1986) and Ringen (1991):

5 The Gini coefficient of equivalised disposable household income is used often as a summary measure of income distribution. Equivalised household income is income adjusted to reflect differences in household needs through an equivalence scale (the square root elasticity). The Gini coefficient lies between 0 (no inequality) and 1 (maximum inequality).

Redistribution by taxes and social transfers = primary income inequality – disposable income inequality

This formula is used to estimate the reduction in inequality produced by taxes and social transfers, where primary income inequality is given by a summary statistic of pre-tax, pre-transfer incomes and disposable income inequality is given by the same summary statistic of disposable equivalent incomes. When calculating inequality indices for both primary and disposable income, people are ranked by their primary and disposable incomes respectively, so that the re-ranking effect is included in our results (see Plotnick, 1984; the same method is applied by Immervol and Richardson, 2011). Table 2.1 presents the framework of accounting income inequality and redistribution through various income sources.

Table 2.1 The income inequality and redistribution accounting framework

Income components	Income inequality and redistributive effect
Gross wages and salaries + Self-employment income + cash property income + Occupational and private pensions + Private transfers + Other cash income = Primary income	Income inequality before social transfers and taxes
+ Social security cash benefits	- Redistributive effect of social transfers
= Gross income	= Income inequality before taxes
- Pay Roll (Mandatory payroll taxes) - Income taxes	- Redistributive effect of taxes
= Disposable income	= Income inequality after social transfers and taxes

Note: For France, Greece, Hungary, Italy, Mexico, and Spain, the value of gross market income in the dataset is not available. Instead, we use net market income which is the sum of net wages and salaries, self-employment income and cash property income.

The budget incidence analysis is not without problems; see a critical survey of efforts to measure budget incidence by Smolensky et al (1987). The pre-transfer inequality is compared to the post-transfer inequality keeping all other things equal – namely, assuming unchanged household and labour market structures, thus disregarding any possible behavioral changes that the situation of absence of social transfers would involve (Frick et al, 2000; Palme, 1996). However, behavioral responses may obviously be important. It is likely that in the absence of social transfers more people will work (more) thereby earning higher incomes. Kim (2000b) showed that both the generosity and efficiency of the tax/transfer system may influence the level of pre-tax-transfer income inequality. Budget incidence calculations can therefore only be seen as an approximation of the redistributive effects because the assumption that agents behave similar in situations with and without social transfers and social security. This implies that estimates for redistribution through taxes and

transfers should be regarded as upper bounds. Despite this problem, analyses on statutory and budget incidence can be found for decades in literature on public finance.⁶

With respect to the inequality measure we use the Gini coefficient. The change in the Gini between pre- and post-government income reflects redistribution through taxes and transfers.

We sequentially decompose the Gini coefficient in order to calculate the partial redistributive impact of transfers and taxes; see Wang and Caminada (2011a) for details. The results obtained for the specific transfers and taxes are corrected for the ordering effect.⁷

The sequential accounting decomposition approach has been, among others, advocated by Kakwani (1986) and is also followed by Jesuit and Mahler (2004) and Mahler and Jesuit (2006), Immervoll et al (2005) and Whiteford (2008). Other techniques of the decomposition of the Gini coefficient by income source can be found in the literature as well; see e.g. Lerman and Yitzhaki (1985), Stark et al (1986), Kim (2000a). In the literature two techniques of decomposing inequality are distinguished; the *sequential accounting decomposition* and the *factor source decomposition* approach. When comparing both approaches, they lead to the same estimates of disposable income inequality, but to contradictory results with respect to the importance of benefits for redistributing income (see Fuest et al, 2010). Inequality analysis based on the *sequential accounting decomposition* approach (as applied in this article) suggests that benefits are the most important factor reducing inequality in the majority of countries. The *factor source decomposition* approach, initiated by Shorrocks (1982), however, suggests that benefits play a negligible role and sometimes even contribute slightly positively to inequality. On the contrary, here taxes and social contributions are by far the most important contributors to income inequality reduction. Fuest et al (2010) explain these partly contradictory results. The most important difference between the two approaches is that the accounting approach applies tax benefit instruments sequentially, whereas the decomposition approach accounts for them simultaneously. See also Kammer et al (2012).

Although both approaches are used in the literature, studies analyzing the impact of tax benefit instruments based on the standard sequential account-

6 See for example Musgrave and Tun Thin (1948), Gillespie (1965), Kakwani (1977), Reynolds and Smolensky (1977), Mitchell (1991), OECD (2008), Caminada and Goudswaard (2001 and 2002).

7 The ordering of programs has influence on the results when using the sequential accounting decomposition method. The partial redistributive effect of a specific social transfer will be highest (smallest) when computed as the first (last) social program. We corrected for this effect as follows. We consider every specific social transfer as the first program to be added to primary income and every direct tax as the first tax to be subtracted from gross income. In that case, the sum of all partial redistributive effects amounts to (a little) over 100 percent. So we rescaled the redistributive effects of each program by applying an adjustment factor, which is defined as the overall redistribution (100%) divided by the sum of all partial redistributive effects of all programs (a little over 100%).

ing approach generally find rather intuitively straight forward results, i.e. that benefits are the most important source of inequality reduction. We follow this sequential decomposition approach, which fits in a strand of recent empirical literature.

2.3.2 Choice of income unit and country data

The unit of analysis is an important issue in income distribution studies. It is evident that the ultimate source of concern is the welfare of the individual. However, an individual is often not the appropriate unit of analysis. E.g. children and spouses working at home do not have recorded income, but may nevertheless be enjoying a high standard of living as a result of income sharing with parents/spouses. Traditionally, studies have used the household income per capita (or per member) measure to adjust total incomes according to the number of persons in the household. The last decades, equivalence scales have been widely used in the literature on income distribution (see Figini, 1998). An equivalence scale is a function that calculates adjusted income from income and a vector of household characteristics. Equivalence elasticity (E) is a measure for the economies of scale. E varies between 0 and 1. The larger E , the smaller are the economies of scale assumed by the equivalence scales.

Equivalence scale elasticity for the LIS database is set around 0.5. This implies that in order to have an equivalent income of a household of one person where income is 100, a household of two persons must have an income of 140 to have equivalent incomes. Alternatively a one-person household must have 70 percent of the total income of a two-person household to have equivalent income. In our comparative analysis we use this equivalence scale of LIS, where E is around 0.5. However, it has been shown that the choice of equivalence scales affects international comparisons of income inequality to a wide extent. Alternative adjustment methods would definitely affect the ranking of countries, although the broad pattern remains the same⁸ (Atkinson et al, 1995:52). In line with LIS, Gini coefficients are based on incomes which are bottom coded at 1 percent of disposable income and top coded at 10 times the median disposable income.

In the empirical literature, the selection of countries and data-years differ due to the consideration of data quality. We apply a cross-national analysis using comparable income surveys for all OECD countries in the LIS data base. LIS micro data seems to be the best available data for describing how income inequality and the redistributive effects of taxes and transfers vary across

8 We compared the Gini coefficients and total redistribution of 20 LIS-OECD common countries using LIS data with the square root equivalence scales, with the Gini coefficients of the OECD database using slightly different equivalence scales. The general pictures from both datasets are almost the same.

countries (Nolan and Marx, 2009). In this paper we restrict ourselves to the latest data year available (around 2004) to analyze redistribution of social transfers and taxes.

From nearly 300 variables in the dataset, we choose those related to household income (all kinds of income sources), total number of persons in a household and household weight (in order to correct for sample bias or non-sampling errors) to measure income inequality and the redistributive effect across countries. In line with LIS convention and the work of Mahler and Jesuit (2006), we have eliminated observations with zero or a missing value of disposable income from LIS data. Household weights are applied for the calculation of Gini coefficients.

2.4 INEQUALITY AND REDISTRIBUTION ACROSS COUNTRIES

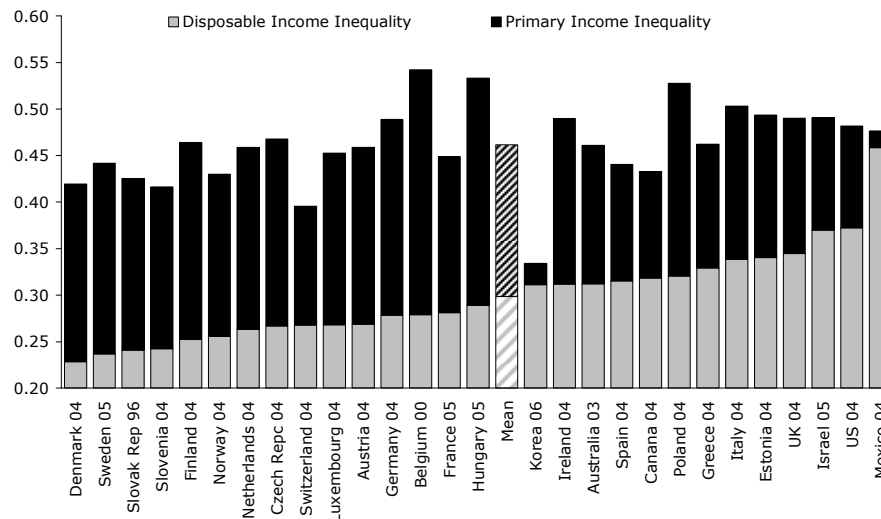
2.4.1 Inequality across countries

This section reviews the evidence on cross national comparisons of annual disposable income inequality for 28 nations around the mid-2000s. This section is mainly descriptive and relies on the empirical evidence from LIS for the levels of income inequality around the mid-2000s. Figure 2.1 shows the Gini coefficients. Countries are listed in order of their Gini of disposable income from smallest to largest. A wide range of inequality exists across the OECD countries. The lowest income inequality is found in the Nordic countries, while Mexico and the US are the most unequal nations.

With respect to income inequality after social transfers and taxes, Denmark, Sweden, Slovak Republic and Slovenia have low values around 0.24, in line with the results in OECD (2008). These countries are followed by 11 countries (Finland, Norway, Netherlands, Czech Republic, Switzerland, Luxembourg, Austria, Germany, Belgium, France and Hungary) with Gini coefficients between 0.25 and 0.30. Above average inequality is found in 13 countries (Korea, Ireland, Australia, Spain, Canada, Poland, Greece, Italy, Estonia, the United Kingdom, Israel, the United States and Mexico).

The pattern of primary income inequality (before social transfers and taxes) is quite different from disposable income inequality. Belgium and Hungary have below average levels of inequality of disposable income, but the highest level of primary income inequality, with values around 0.55. Korea has a very low level of primary income inequality, but above average inequality of disposable income. The redistributive effect of taxes and social transfers differ considerably across these countries. The highest level of redistribution is found in Belgium, Hungary and Finland, while redistribution is very small in Korea and Mexico.

Figure 2.1 Disposable and primary income inequality across LIS countries around 2004 (Gini coefficients)



Source: own calculations based on LIS

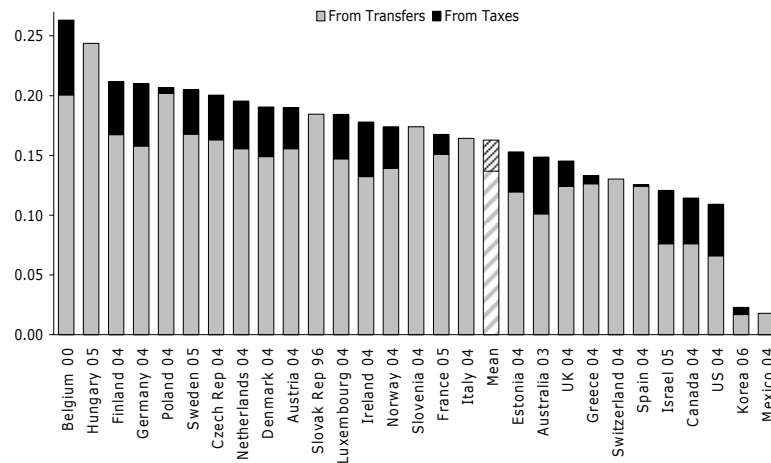
2.4.2 The redistributive effect of taxes and transfers

Several studies focused on the impact of income components on overall inequality (Shorrocks, 1983; Lerman and Yitzhaki, 1985; Jenkins, 1995; Breen et al, 2008). These suggest that income taxes and social benefits are important sources of reducing household income inequality. Figure 2.2 shows the overall redistribution across countries (in terms of reduction of the Gini coefficient) and the disaggregated effects of social transfers and taxes. On average, transfers and taxes reduce the Gini coefficient from 0.462 to 0.299, that is by around 35 percent (see Figure 2.1).

Figure 2.3 shows the relative redistributive effects of transfers and taxes. It should be noted, however, that LIS income surveys contain income taxes and mandatory payroll taxes, but no indirect taxes. For some countries – Hungary, Italy, Mexico, Slovak Republic and Slovenia – data of taxes are not available in the dataset. For the other 23 countries social transfers on average account for a share of 81 percent in the total reduction of inequality, while taxes take account for 19 percent of total reduction of income inequality. Taxes are important in equalizing incomes only in a few countries: the United States, Israel, Canada and Australia. In the other countries, taxes account for less than 30 percent of total redistribution. Note that the partial effect of taxes is negative for Switzerland. The tax system in Switzerland is in fact regressive, which is caused by the offsetting effect of regressive payroll tax (Kenworthy, 2009) and tax competition (Feld, 1999). In this country it appears to be difficult to levy

redistributive taxes from the rich and mobile persons to the poor. In general, our analysis confirms earlier studies: social benefits have a much stronger redistributive impact than taxes.

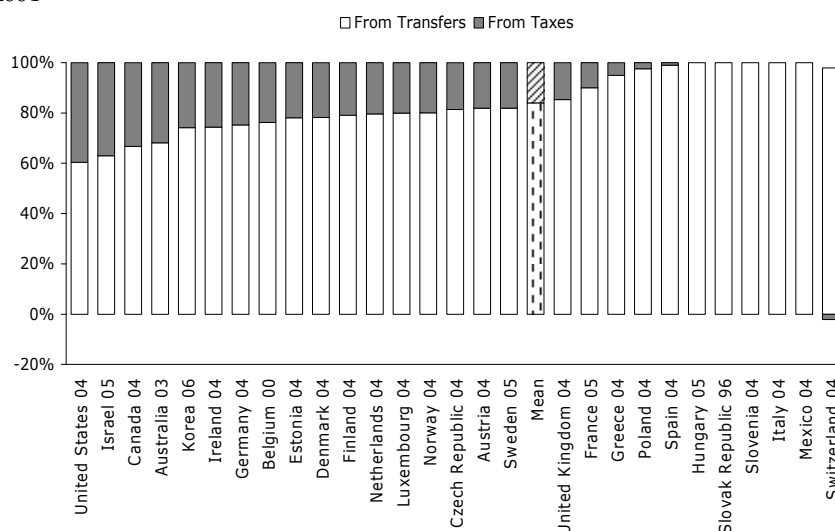
Figure 2.2 Redistributive effect of taxes and transfers across LIS countries around 2004 (reductions in Gini coefficients)



Note: For Hungary, Italy, Mexico, Slovak Republic and Slovenia data for taxes are not available.

Source: Own calculations based on LIS

Figure 2.3 Relative redistributive effect of taxes and transfers across countries around 2004



Note: For Hungary, Italy, Mexico, Slovak Republic and Slovenia data for taxes are not available.

Source: Own calculations based on LIS

2.5 DECOMPOSITION OF THE REDISTRIBUTIVE EFFECT OF SOCIAL TRANSFERS AND TAXES

This section provides detailed results of the redistributive effect of welfare state regimes across a selection of 28 countries based on the most recent wave of LIS. LIS data allow us to decompose the trajectory of the Gini coefficient from primary to disposable income inequality in several parts: we will distinguish 11 different social benefits, income taxes and social contributions in our empirical investigation. We calculate the (partial) redistributive effects for the following programmes: sickness benefits, occupational injury and disease benefits, disability benefits, state old-age and survivors benefits, child/family benefits, unemployment compensation benefits, maternity and other family leave benefits, military/veterans/war benefits, other social insurance benefits, social assistance cash benefits, near-cash benefits,⁹ mandatory payroll taxes and income taxes.

The treatment of pensions needs special attention. Public pension plans are generally seen as part of the safety net, generating large antipoverty effects.

⁹ All forms of transfers that are in-kind payments (i.e. they are tied to a specific requirement such as school attendance), but have a cash equivalent value equal or nearly equal to the market value, including near-care housing benefits. See LIS Variable Definition List on <http://www.lisdatacenter.org/pretechdoc.htm>.

So, state old-age pension benefits will be included in our analysis on redistribution. But countries differ to a large extent in public versus private provision of their pensions (OECD, 2008:120). Occupational and private pensions are not redistributive programmes per se, although they too have a significant effect on redistribution when pre-tax-transfer inequality and post-tax-transfer inequality are measured at one moment in time, particularly among the elderly.¹⁰ The standard approach treats contributions to government pensions as a tax that finances the retirement pensions paid out in the same year, while contributions to private pensions are effectively treated as a form of private consumption. This may affect international comparisons of redistribution effects of social transfers and taxes. Overcoming this bias requires a choice: should pensions be earmarked as market income or as a transfer? We deal with this bias rather pragmatically by following the LIS Household Income Variables List: occupational and private pensions are earmarked and treated as market income.

To illustrate the idea of decomposing disposable income inequality, Table 2.2 presents the results of our accounting exercise for the mean of all 28 countries; additional information is given for the means of two sub-samples of countries (see below). Interestingly, the public old age and survivor pensions account for 50% of total redistribution. The disability scheme (7%), social assistance (8%) and child and family benefits (6%) have some impact on the income distribution. Other social benefits seem to have a rather limited redistributive effect; together they account for 14 percent of total redistribution. Obviously, most of these other programmes have a smaller size, which may (partly) explain their smaller contribution to income redistribution. Income taxes account for another 15 percent of total redistribution, but payroll taxes do not have any redistributive impact.

10 See Van Vliet et al (2012a) for such an analysis. Preferably, however, the redistributive effects of occupational and private pensions should be analysed on a life time basis.

Table 2.2 Decomposition of disposable income inequality for 28 countries around 2004

	Mean 28 countries		Mean 23 countries		Mean 20 countries	
	Gini		Gini		Gini	
(a) Gini primary income	0.462		0.460		0.461	
(b) Gini disposable income	0.299		0.295		0.293	
Overall redistribution (a-b)	0.163		0.164		0.168	
<i>Partial effects</i>	<i>share</i>		<i>share</i>		<i>share</i>	
<i>Transfers</i>	0.137	85%	0.134	81%	0.133	79%
Sickness benefits	0.002	1%	0.003	2%	0.003	2%
Occupational injury and disease benefits ^a	0.001	0%	0.001	0%	0.001	1%
Disability benefits ^b	0.011	7%	0.012	8%	0.013	8%
State old-age and survivors benefits ^c	0.081	50%	0.075	46%	0.071	42%
Child/family benefits ^d	0.010	6%	0.011	6%	0.011	7%
Unemployment compensation benefits ^e	0.007	4%	0.008	5%	0.007	4%
Maternity and other family leave benefits ^f	0.003	2%	0.002	1%	0.002	1%
Military/veterans/war benefits	0.001	0%	0.001	0%	0.001	0%
Other social insurance benefits ^g	0.006	4%	0.006	4%	0.007	4%
Social assistance cash benefits ^h	0.013	8%	0.012	7%	0.013	8%
Near-cash benefits ⁱ	0.003	2%	0.004	2%	0.004	2%
<i>Taxes</i>	0.026	15%	0.030	19%	0.034	21%
Mandatory payroll taxes ^j	0.001	0%	0.001	0%	0.001	0%
Income taxes	0.024	15%	0.030	18%	0.034	20%
<i>Overall redistribution</i>	0.163	100%	0.164	100%	0.168	100%

- a) Short-term occupational injury and disease benefits, Long-term occupational injury and disease benefits.
b) Disability pensions, and Disability allowances.
c) Universal old-age pensions, Employment-related old-age pensions, Old-age pensions for public sector employees, Early retirement benefits, and Survivors pensions.
d) Child allowances, Advance maintenance, and Orphans allowances.
e) Unemployment insurance benefits, (Re)training allowances, and Placement/resettlement benefits.
f) Wage replacement, Birth grants, Child care leave benefits, and Maternity and other family leave benefits.
g) Invalid career benefits, Education benefits, and Child care cash benefits.
h) General social assistance benefits, Old-age and disability assistance benefits, Unemployment assistance benefits, and Parents assistance benefits.
i) Near-cash food benefits, Near-cash housing benefits, Near-cash medical benefits, Near-cash heating benefits, Near-cash education benefits, and Near-cash child care benefits.
j) Mandatory contributions for self-employment, and Mandatory employee contributions.

Notes:

- Countries: Hungary, Italy, Mexico, Slovak Republic and Slovenia are excluded in mean-23 because data for taxes are not available; further more France, Greece and Spain are excluded in mean-20 because we had to use the net value of market income instead of gross market income.
- Using the sample of absolute value of 28 (23 and 20) countries, we applied bootstrap technique for standard errors. The result shows that all means of the Gini coefficients and partial redistributive effects are significant except for the redistribution of mandatory payroll taxes because it varies remarkably across countries (from -0.011 to 0.008).

Source: own calculations based on LIS

It should be noted that our results could be affected by including several countries with missing data elements in the trajectory from primary to disposable income. For example, for five countries data for taxes are not available (i.e. Hungary, Italy, Mexico, the Slovak Republic and Slovenia). Excluding these countries indicate that the share of taxes in total redistribution will be slightly higher (19% instead of 15%), while the partial effect of transfers will be somewhat lower (81% instead of 85%). Similar exercise has been done based for only 20 countries, excluding three additional countries (i.e. France, Greece and Spain), where net market income is used rather than gross market income. The results do hardly change when these countries are excluded, leaving our

conclusion unaltered: the state old-age and survivors benefits play a major role in total redistribution. Moreover, note that payroll taxes do not have any redistributive impact, independent of the selection of countries (28, 23 or 20).

We have done the accounting exercise presented in Table 2.2 for all 28 countries. Table 2.3 presents the results for groups of countries. We clustered the countries according to Esping-Anderson types of welfare states (Esping-Anderson and Myles, 2009).

Table 2.3 Decomposition of income inequality and redistributive effect of social transfers and taxes around 2004

			Partial effects (shares)															

Table 2.3 Decomposition of income inequality ... (continued)

			Partial effects (shares)											

Note: Hungary, Italy, Mexico, Slovak Republic and Slovenia are excluded in mean-23 because data for taxes are not available; further more France, Greece and Spain are excluded in mean-20 because we had to use the net value of market income instead of gross market income.

Source: Own calculations based on LIS; in some countries a specific benefit scheme does not exist and/or data may not be available in LIS (reported as '-')

In most countries two dominant income components account for above 50 to 60 percent of total reduction in income inequality: the public old age pensions and the survivors scheme, and the income taxes. Of course, the dominant effect of old age pensions makes sense, since the elderly have in general no income from work. Also, in most countries public pensions benefits are flat rate, which implicates a strong redistributive impact. However, cross country differences are huge. For example, in Southern European countries the public old age benefits account for over 80 percent of total redistribution, while these figures are much lower for English-speaking countries (20-34%), for Nordic countries (31-48%), for Continental European countries (47-57%) with the exception of Switzerland (79%), and for Central Eastern European countries (54-70%) with the exception of Slovenia (79%).

In English-speaking Countries except the United Kingdom income taxes play a major role (above 30%) compared to other countries. The United States is a special case, because the income tax contributes for a relatively large part (38%) to the reduction of income inequality between primary and disposable incomes. Their earned income tax credit (EITC) is targeted towards the poor, which makes the US tax system rather progressive. Also the redistributive effect of social assistance in the English-speaking countries is relatively high in a comparative setting (9-28%), with Australia as an exception.¹¹

Child and family benefits are important in English-speaking countries (6-13%), in Continental European countries (4-12%), and in Central Eastern European countries (5-12%). In Nordic countries also a variety of other social programmes contribute to the reduction of inequality, especially the disability scheme (9-15%). All other social benefit programmes appear to have rather limited redistributive effects in all countries, although the unemployment compensation benefits do have some effect too.

The group of other OECD countries is rather mixed. A common element is that state old age and survivor pensions account for (much) less than 50 percent of total redistribution.

2.6 CONCLUSION

In this paper, we have investigated income distribution and redistributive effects attributed to social transfers and taxes across 28 OECD countries around 2004, based on the micro household income data from LIS. Since one of the functions of many national social protection systems is to reduce income inequality, this may provide relevant information for policy makers. Different

11 This result for Australia may at least in part be driven by the classification of benefits in the LIS data set. Social assistance cash benefits appear to be recorded as unemployment insurance benefits. More in general, the classification of benefits may affect our results to some extent.

social policies bring different types of welfare systems, leading to various outcomes in the income distribution. Among the countries listed in this paper, Denmark and Sweden have the smallest income disparity, while Mexico and the United States have the largest. Generally speaking, European countries – especially Nordic and Continental welfare states – achieve lower levels of income inequality than other countries.

With respect to redistributive effects, our budget incidence analysis indicates that the pattern is diverse across countries. On average, taxes and social benefits cause a drop in the Gini coefficient from 0.462 to 0.299, that is a reduction by 35 percent. The largest redistribution is found for Belgium, Hungary and Finland, while Mexico, Korea and the United States show rather limited overall redistributive effects. On average, social transfers account for 85 percent of total redistribution, while taxes account for 15 percent. In the United States, a relative large part of redistribution comes from taxes, while the tax system in Switzerland is regressive. But in all countries social benefits play a dominant role in reducing initial income disparities.

The main contribution of this paper is that the redistributive impact of the welfare state is disentangled into specific programmes for the OECD countries for which the data are available. As far as social programmes is concerned, in most countries two dominant income components account for above 50 to 60 percent of total reduction in income inequality: the public old age pensions and the survivors scheme, and the income taxes. In Southern European countries the public old age benefits even account for over 80 percent of total redistribution, while these figures are much lower for English-speaking countries (20-34%), for Nordic countries (31-48%), for Continental European countries (47-57%), and for Central Eastern European countries (54-70%). In English-speaking countries income taxes play a major role in redistribution (above 30%), compared to other countries (with the exception the United Kingdom). Also the redistributive effect of social assistance and child and family benefits in the English-speaking countries are relatively high in a comparative setting (9-28%). In Nordic Countries also a variety of other social programmes contribute to the reduction of inequality, especially the disability scheme (9-15%). All other social benefit programmes appear to have rather limited redistributive effects in all countries, although the unemployment compensation benefits do have some effect too.

Our analysis is restricted to one moment in time. However, LIS data allow comparison of fiscal redistribution across the developed countries over the last three decades. To that end we have created time-series across countries of detailed fiscal redistribution between the 1970s and the mid-2000s.¹² Future research can employ these data in addressing several important issues. Changes (in the generosity) of welfare states can be linked to changes in the fiscal

12 This 'Leiden LIS Budget Incidence Database on Fiscal Redistribution Across Countries' is available at www.hsz.leidenuniv.nl. See Wang and Caminada (2011b) for details.

redistribution. Best-practices among countries can be identified and analyzed in more detail. In exploring the causes and effects of welfare state redistribution in the developed world, the literature has increasingly moved towards more disaggregated measures of social policy. This data set allows an in depth analysis on programmes' size and the extent to which they are targeted toward low-income groups.

Annex 2A

Leiden LIS budget incidence fiscal redistribution dataset

2A.1 INTRODUCTION

Chapter 2 is based on the Leiden LIS Budget Incidence Fiscal Redistribution Dataset. This data set offers a number of measures of fiscal redistribution in the developed countries, drawing upon data from 177 Luxembourg Income Study surveys conducted in 36 countries between 1967 and 2006. In this dataset we have computed five kinds of results, namely income inequality before social transfers and taxes, income inequality after social transfers and taxes, the overall redistributive effect, the partial effect of redistribution by several social transfers and the partial effect of redistribution by several income taxes (see for a specification below). Specifically, we have computed:

- 1) A measure of overall fiscal redistribution, as reflected in the difference between the Gini indexes of pre-tax-transfer primary income and post-tax-transfer disposable income. We offer measures of both absolute fiscal redistribution ($Gini_{pri} - Gini_{dpi}$) and relative fiscal redistribution $((Gini_{pri} - Gini_{dpi}) / Gini_{pri})$.
- 2) The shares of absolute and relative fiscal redistribution resulting from direct taxes and social transfers.
- 3) The average size of social transfers as a proportion of households' pre-tax income, and a summary index of the degree to which transfers are targeted toward low-income groups. Our measure ranges from -1.0 (the poorest recipient receives all transfer income) to +1.0 (the richest recipient receives all transfer income).
- 4) A measure of the extent of fiscal redistribution that is associated with several taxes and transfers (codes refer to LIS Household Income Components List; see Annex A1 below):
 - Sickness benefits (V16)
 - Occupational injury and disease benefits (v17)
 - Disability benefits (v18)
 - State old-age and survivors benefits (v19)
 - Child/family benefits (v20)
 - Unemployment compensation benefits (v21)

- Maternity and other family leave benefits (v22)
- Military/veterans/war benefits (v23)
- Other social insurance benefits (v24)
- Social assistance cash benefits (v25)
- Near-cash benefits (v26)
- Mandatory payroll taxes (v7+v13)
- Income taxes (v11)

In measuring income, we have employed an equivalency scale that divides household size by the square root of the number of household members, weighting households by the number of members they include. As to missing data, we have included households which report zero primary income (i.e., all of their income is derived from the state) but have excluded households that report zero disposable income. We have employed standard LIS top- and bottom-coding conventions, top-coding income at 10 times the median of non-equivalised income and bottom-coding income at 1 percent of equivalised mean income. A description of the decomposition method of Gini coefficient is given in Section 2A.5.

A more detailed description of these data and method is available in Chen Wang and Koen Caminada, 'Disentangling income inequality and the redistributive effect of social transfers and taxes in 36 LIS countries', *Leiden Department of Economics Research Memorandum #2011.02*, 2011). Please cite this working paper when referring to the data set, along with the web address www.hsz.leidenuniv.nl. You may also refer to Leiden Department of Economics Research Memorandum #2011.02 for additional details.

2A.2 AIM

Leiden LIS Budget Incidence Fiscal Redistribution Dataset presents the disentanglement of income inequality and the redistributive effect of social transfers and taxes in 36 LIS countries for the period 1970-2006 (Waves I – Wave VI of LIS). This dataset allow researchers and public policy analysts to compare fiscal redistribution across developed countries over the last three decades. Research may employ these data in addressing several important research issues. Among the most commonly addressed questions in the empirical literature on the welfare state concerns the sources of variance across countries and over time in the extent and nature of fiscal redistribution. Changes (in the generosity) of welfare states can be linked to (changes in the fiscal redistribution). Best-practice among countries can be identified and analyzed in more detail. In exploring the causes and effects of welfare state redistribution in the developed world, the literature has increasingly moved towards more disaggregated measures of social policy, an enterprise in which the Leiden LIS Budget Incidence Fiscal Redistribution Dataset, with its detailed data on

taxes and a large number of individual social benefits, offers a rich source of information.

Research could focus on households with very low income as well – those in poverty. The budget incidence approach based on LIS data allows researchers to employ all kind of cross-national analyses. How well is social expenditure targeted to the poor? Moreover, with LIS data on fiscal redistribution research is able to analyze differences in anti-poverty approaches of countries (Europe versus the United States) and/or to judge the effectiveness of poverty reduction by taxes and transfers across countries.

The assembled databank of fiscal redistribution can be used by scholars and policy analysts to study the effects of different kind of programmes on poverty, income adequacy in retirement, and the distribution of economic well-being generally.

2A.3 ORIGIN OF THE IDEA

The original database on Fiscal Redistribution based on LIS data was initiated by Jesuit and Mahler in 2004 (LIS Working Paper #392). Leiden Budget Incidence Fiscal Redistribution Dataset refines, updates and extent their Fiscal Redistribution approach. LIS data allowed us to decompose the trajectory of the Gini coefficient from primary to disposable income inequality in several parts: the dataset distinguish 11 different benefits and several income taxes and social contributions across countries.

Jesuit and Mahler divided overall government redistribution only into 3 components: the redistributive effects from unemployment benefits, from pensions, and from taxes. They applied their empirical exercise for 13 countries with LIS-data around the years 1999/2000. The launch of Leiden LIS Budget Incidence Fiscal Redistribution Dataset covers many more benefits and taxes, is applied to a much wider range of 36 countries using the most recent LIS data available.

Table 2A.1 Comparison to LIS Fiscal Redistribution Dataset (2008)

	LIS Fiscal Redistribution Dataset	Leiden LIS Budget Incidence Fiscal Redistribution Dataset
Assembled Launch / Year Last update # Countries	Jesuit and Mahler August 2005 -- updated July 2006 February 2008 13	Wang and Caminada August 2011 August 2011 36
Countries	Australia, Belgium, Canada, Denmark, Finland, France, Germany, Netherlands, Norway, Sweden, Switzerland, United Kingdom, United States	Australia, Austria, Belgium, Brazil, Canada, Colombia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Guatemala, Hungary, Ireland, Israel, Italy, Korea, Luxembourg, Mexico, Netherlands, Norway, Peru, Poland, Romania, Russia, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Taiwan, United Kingdom, United States, and Uruguay.
# LIS Waves Time-series # LIS Datasets	I, II, III, IV and V 1979-2002 59	I, II, III, IV, V and VI 1979-2006 177
Redistribution from	Unemployment benefits Pensions Direct taxes	Sickness benefits (v16) Occupational injury and disease benefits (v17) Disability benefits (v18) State old-age and survivors benefits (v19) Child/family benefits (v20) Unemployment compensation benefits (v21) Maternity and other family leave benefits (v22) Military/veterans/war benefits (v23) Other social insurance benefits (v24) Social assistance cash benefits (v25) Near-cash benefits (v26) Mandatory payroll taxes (v7+v13) Income taxes (v11)
LIS Working Paper Availability	LIS Working Paper #392 http://www.lisdatacenter.org/resources/other-databases/	LIS Working Paper # 567 www.hsz.leidenuniv.nl
Reference	V.A. Mahler and D.K. Jesuit, 'Fiscal redistribution in the developed countries: new insights from the Luxembourg Income Study', <i>Socio-Economic Review</i> 4 (2006): 483–511.	Chen Wang and Koen Caminada, 'Disentangling income inequality and the redistributive effect of social transfers and taxes in 36 LIS countries', <i>Leiden Department of Economics Research Memorandum</i> #2011.02.

2A.4 HOUSEHOLD INCOME COMPONENTS LIST

Below we provide the household income components list of LIS, by variable name and meaning. More specific explanation of the data can be found in the user-friendly LIS website (<http://www.lisdatacenter.org/>). In the Leiden Budget Incidence Fiscal Redistribution Database household income is divided into 8 parts: wages and salaries, self-employment income, property income, occupational and private pensions, social security cash benefits, private transfers, other cash income and income tax (and employee social security contributions). In each part, there are more specific income sources, which is very helpful for studies focusing on different elements of income. For instance, v4 and v5 show self-employment income; v16 – v26 report social security cash benefits; v7, v11 and v13 provide income taxes and mandatory payroll taxes. There are also four kinds of widely used income definitions: factor income, market income, gross income and disposable income. Table 2A.2 provides household aggregated income sources. Using those aggregated variables, it is more convenient to process and present income distribution results.

In this Leiden Budget Incidence Fiscal Redistribution Database we compute five kinds of results, namely income inequality before social transfers and taxes, income inequality after social transfers and taxes, the overall redistributive effect, the partial effect of transfer redistribution and the partial effect of redistribution by several transfers and income taxes (see for a specification in Table 2A.2). In calculating pre-government income inequality, we use primary income, which consists of market income (mi), Alimony/child support (v34), regular private transfers (v35) and other cash income (v36); in calculating post-government income, we use net disposable income (dpi). In order to obtain redistributive effect, besides the variables mentioned above, we use total social transfers (SOCTRANS), mandatory payroll taxes (PAYROLL) and income taxes (v11). For some countries (Belgium, France, Greece, Hungary, Italy, Mexico, Peru, Russia, Spain, Uruguay), we use net wages and salaries (v1net) instead of gross wages and salaries (v1) as a component of market income ($v1+v4+v5+v8+v32+v33$), due to v1 is not available in the dataset. In addition, we use the number of persons in a household (D4) and household weight (HWEIGHT) in LIS dataset so as to obtain equivalised income and weighted results.

Special attention needs the treatment of pensions (v19, v32 and v33). Public pension plans are generally seen as part of the safety net, generating large antipoverty effects through transfers and taxes (contributions). So, state old-age pension benefits will be included in our analysis on redistribution (v19). But countries differ to a large extent in public versus private provision of their pensions (OECD, 2008:120). Occupational and private pensions (v32+v33) are not antipoverty programmes per se, although they too have a significant effect on redistribution when pre-tax-transfer inequality and post-tax-transfer inequality are measured at one moment in time, particularly among the elderly. The standard approach treats contributions to government pensions as a tax that finances the retirement pensions paid out in the same year, while contributions to private pensions are effectively treated as a form of private consumption. This may affect international comparisons of redistribution effects of social transfers and taxes. Overcoming this bias requires a choice: should pensions be earmarked as market income or as a transfer? We deal with this bias rather pragmatically by following LIS Household Income Variables List: occupational and private pensions are earmarked as and threaded as market income; see Table 2A.2 and Table 2A.3).

Table 2A.2 Income distribution indicator list

Income Distribution Indicator	Redistribution Measurement	Specific Income Source
Gini (pri)	Gini (pri)-Gini (pri+trans)	Primary Income (V1+V4+V5+V8+V32+V33+V34+V35+V36)
Transfers Redistribution		Primary Income + social transfers (V1+V4+V5+V8+V32+V33+V34+V35+V36+V16+V17+V18+V19+V20+V21+V22+V23+V24+V25+V26)
Gini (pri+trans)	Gini (pri+trans)-Gini (dpi)	Primary Income + social transfers (V1+V4+V5+V8+V32+V33+V34+V35+V36+V16+V17+V18+V19+V20+V21+V22+V23+V24+V25+V26)
Taxes Redistribution		Net disposable Income (V1+V4+V5+V8+V32+V33+V34+V35+V36+V16+V17+V18+V19+V20+V21+V22+V23+V24+V25+V26-V7+V13-V11)
Gini (dpi)	Gini (pri)-Gini (dpi)	Net disposable Income (V1+V4+V5+V8+V32+V33+V34+V35+V36+V16+V17+V18+V19+V20+V21+V22+V23+V24+V25+V26-V7+V13-V11)
Overall Redistribution		Net disposable Income (V1+V4+V5+V8+V32+V33+V34+V35+V36+V16+V17+V18+V19+V20+V21+V22+V23+V24+V25+V26-V7+V13-V11)

Source: LIS

Table 2A.3 Household income variables in LIS dataset

<i>Wages and salaries</i>	V1/V1NET	<i>Gross wages and salaries / Net wages and salaries</i>	V1 / V1NET
<i>Self-employment income</i>	V4	<i>Farm self-employment income</i>	V4
	V5	<i>Non-farm self-employment income</i>	V5
<i>Income tax and employee social security contributions</i>	V7	<i>Mandatory contributions for self-employment</i>	V7 + V13
	V13	<i>Mandatory employee contributions</i>	<i>Mandatory payroll taxes</i>
	V11	<i>Income taxes</i>	V11
<i>Property income</i>	V8S1	<i>Interest and dividends</i>	V8 <i>Cash property income</i>
	V8S2	<i>Rental income</i>	
	V8S3	<i>Private savings plans</i>	
	V8S4	<i>Royalties</i>	
	V8SR	<i>Cash property income n.e.c.</i>	
<i>Social security cash benefits</i>	V16	<i>Sickness benefits</i>	V16
	V17S1	<i>Short-term occupational injury and disease benefits</i>	V17 <i>Occupational injury and disease benefits</i>
	V17S2	<i>Long-term occupational injury and disease benefits</i>	
	V17SR	<i>Occupational injury and disease benefits n.e.c.</i>	V18 <i>Disability benefits</i>
	V18S1	<i>Disability pensions</i>	
	V18S2	<i>Disability allowances</i>	
	V18SR	<i>Disability benefits n.e.c.</i>	V19 <i>State old-age and survivors benefits</i>
	V19S1a	<i>Universal old-age pensions</i>	
	V19S1b	<i>Employment-related old-age pensions</i>	
	V19S1c	<i>Old-age pensions for public sector employees</i>	
	V19S1r	<i>Old-age pensions n.e.c.</i>	
	V19S3	<i>Early retirement benefits</i>	
	V19S4	<i>Survivors pensions</i>	
	V19SR	<i>State old-age and survivors benefits n.e.c.</i>	
	V20S1	<i>Child allowances</i>	V20 <i>Child/family benefits</i>
	V20S2	<i>Advance maintenance</i>	
	V20S3	<i>Orphans allowances</i>	
	V20SR	<i>Child/family benefits n.e.c.</i>	
	V21S1	<i>Unemployment insurance benefits</i>	V21 <i>Unemployment compensation benefits</i>
	V21S2	<i>(Re)training allowances</i>	
	V21S3	<i>Placement/resettlement benefits</i>	
	V21SR	<i>Unemployment compensation benefits n.e.c.</i>	
	V22S1	<i>Wage replacement</i>	V22 <i>Maternity and other family leave benefits</i>
	V22S2	<i>Birth grants</i>	
	V22S3	<i>Child care leave benefits</i>	
	V22SR	<i>Maternity and other family leave benefits n.e.c.</i>	
	V23	<i>Military/veterans/war benefits</i>	V23
	V24S1	<i>Invalid carer benefits</i>	V24 <i>Other social insurance benefits</i>
	V24S2	<i>Education benefits</i>	
	V24S3	<i>Child care cash benefits</i>	
	V24SR	<i>Other social insurance benefits n.e.c.</i>	
	V25S1	<i>General social assistance benefits</i>	V25 <i>Social assistance cash benefits</i>
	V25S2	<i>Old-age and disability assistance benefits</i>	
	V25S3	<i>Unemployment assistance benefits</i>	
	V25S4	<i>Parents assistance benefits</i>	
	V25SR	<i>Social assistance cash benefits n.e.c.</i>	
	V26S1	<i>Near-cash food benefits</i>	V26 <i>Near-cash benefits</i>
	V26S2	<i>Near-cash housing benefits</i>	
	V26S3	<i>Near-cash medical benefits</i>	
	V26S4	<i>Near-cash heating benefits</i>	

	V26S5	Near-cash education benefits		
	V26S6	Near-cash child care benefits		
	V26SR	Near-cash benefits n.e.c.		
Occupational and private pensions	V32S1a	Mandatory occupational pensions	V32S1 Occupational pensions	V32 Private occupational and other pensions
	V32S1b	Voluntary occupational pensions		
	V32S1r	Occupational pensions n.e.c.		
	V32S2	Mandatory individual retirement pensions		
	V32SR	Private occupational and other pensions n.e.c.		
	V33	Public sector occupational pensions		
				V33
Private transfers	V34	Alimony/child support		V34
	V35S1	Regular transfers from relatives		V35 Regular private transfers
	V35S2	Regular transfers from private charity		
	V35SR	Regular private transfers n.e.c.		
Other cash income	V36	Other cash income		V36

Source: LIS

Table 2A.4 Household aggregated income variables in LIS dataset

SELF1	Self-employment income V4 + V5
EARNING	Earnings V1 + SELF1 (V4+V5)
EARNNET	Net earnings V1NET + SELF1 (V4+V5)
FI	Factor income EARNING (V1+V4+V5) + V8
FINET	Net factor income EARNNET (V1NET+V4+V5) + V8
PENSIOI	Occupational pensions V32 + V33
MI	Market income FI (V1+V4+V5+V8) + PENSIOI (V32+V33)
MINET	Net market income FINET (V1NET+V4+V5+V8) + PENSIOI (V32+V33)
OTHSOCI	Social insurance transfers excl V19-V21 V16 + V17 + V18 + V22 + V23 + V24
SOCI	Social insurance transfers OTHSOCI (V16+V17+V18+V22+V23+V24) + V19 + V20 + V21
MEANSI	Social assistance transfers V25 + V26
SOCTRANS	Social transfers SOCI (V16+V17+V18+V19+V20+V21+V22+V23+V24) + MEANSI (V25+V26)
PRIVATI	Private transfers V34 + V35
TRANSI	Transfer income SOCTRANS (V16+V17+V18+V19+V20+V21+V22+V23+V24+V25+V26) + PRIVATI (V34+V35)
GI	Gross income MI (V1+V4+V5+V8+V32+V33) + TRANSI (V16+V17+V18+V19+V20+V21+V22+V23+V24+V25+V26+V34+V35) + V36
GINET	Net income MINET (V1NET+V4+V5+V8+V32+V33) + TRANSI (V16+V17+V18+V19+V20+V21+V22+V23+V24+V25+V26+V34+V35) + V36
PAYROLL	Mandatory payroll taxes V7 + V13
DPI	Net disposable income GI (V1+V4+V5+V8+V16+V17+V18+V19+V20+V21+V22+V23+V24+V25+V26+V32+V33+V34+V35+V36) - PAYROLL (V7+V13) - V11

Source: LIS

2A.5 DECOMPOSITION OF THE GINI COEFFICIENT

2A.5.1 Sequential decomposition of the Gini coefficient: partial effects of taxes and transfers

The Gini coefficient is expressed as follows (cf. Jenkins, 1999; updated 2010):

$$G = 1 + (1/n) - [2/n^2 \mu] \sum_{i=1}^n (n-i+1)y_i, \quad i = 1, 2, \dots, n \quad (1)$$

In formula (1), n denotes number of individuals, μ denotes average income of individuals, and y_i presents income of individual i . The level of Gini coefficient is given by number of individuals, average income of individuals. Using expression (1), we are able to decompose the Gini coefficient of primary income into the Gini coefficient of disposable income and the redistributive effects of transfers and taxes. Income (inequality) can be measured with or without transfers and/or taxes.

$$y_i = y_i^{pri} + \alpha B_i - \beta T_i, \quad i = 1, 2, \dots, n, \quad \alpha, \beta \in \{0, 1\} \quad (2)$$

y_i^{pri} , B_i and T_i denote primary income of individual i , total transfer of individual i and total taxes of individual i , respectively. Depending on α and β , Individual income is determined by the sum of all cash incomes, such as wages, salaries, welfare benefits, public and private pensions, child and family allowances and so on, where we focus on social transfers and direct taxes. When $\alpha = 0$ and $\beta = 0$, the resulting inequality measure presents the Gini coefficient before taxes and transfers; if $\alpha = 1$ and $\beta = 1$, the measure corresponds to the Gini coefficient after taxes and transfers; if $\alpha = 0$ and $\beta = 1$ the measure shows the Gini coefficient after taxes but before transfers, which displays a world without social transfers. For $\alpha = 1$ and $\beta = 0$, inequality after transfers, but before taxes is measured.

In a more general expression, individual income can be shown as formula (3), consisting of primary income, at most m kinds of transfers and p types of taxes. B_{ik} show the k^{th} transfer of individual i , and T_{il} presents the l^{th} tax of individual i . When $\alpha_k = 1$, $\alpha_{-k} = 0$ ($\alpha_j = 0$ ($j \neq k$))) and $\beta_l = 0$, individual income includes primary income plus the k^{th} transfer; when $\alpha_k = 1$, $\beta_l = 1$ and $\beta_{-l} = 0$ ($\beta_q = 0$ ($q \neq l$))), individual income contains primary income plus all the transfers and the l^{th} tax, we explain why we choose this order later.

$$y_i = y_i^{pri} + \sum_{k=1}^m \alpha_k B_{ik} - \sum_{l=1}^p \beta_l T_{il}, \quad i = 1, 2, \dots, n, \quad k = 1, 2, \dots, m, \quad l = 1, 2, \dots, p, \quad \alpha_k, \beta_l \in \{0, 1\} \quad (3)$$

This allows us to calculate inequality (Gini) without a certain kind of transfers or tax, and consequently the partial redistributive effect of that transfer or tax. Likewise the redistributive effects of all income components within the trajec-

ory between primary income inequality and disposable income inequality (like unemployment benefits, old age pension benefits, disability benefits, social assistance, income taxes, mandatory social contributions) can be calculated based on this formula.

We take a budget incidence approach to measure the redistributive effect of the welfare state, and we focus on the redistribution between individuals or households at one moment in time (not over the lifecycle). We apply the Reynolds-Smolensky (1977a and 1977b) measure of the redistributive impact of taxes and transfers to present the reduction in Gini coefficient from primary income (pri) to disposable income (dpi). The redistributive effect L can be expressed as (c.f. Creedy and Ven, 2001):

$$L = G_{pri} - G_{dpi} \quad (4)$$

L and G are the redistributive effect and the Gini coefficient of primary or disposable income. When moving from the pre-tax-transfer to the post-tax-transfer distribution, the re-ranking effect, R , is taken into account (Atkinson, 1979 and Plotnick, 1981):

$$R = G_{dpi} - C_{dpi} \quad (5)$$

Where C denotes the concentration coefficient. However, when income level is ranked by primary income rather than by disposable income, the re-ranking effect will be absent ($R=0$). The total redistributive effect can be disentangled in several partial effects:

$$L_B = G_{pri} - G_{pri+B} \quad (6)$$

$$L_T = G_{pri+B} - G_{dpi} \quad (7)$$

L_B and L_T represent the partial redistributive effect of all benefit transfers B , and the partial redistributive effect of all taxes and social contributions T . Consequently, the decomposition in formula (6) and (7) will offer us a quantitative measure for the reduction in the Gini by social programmes in a country.

In order to assess the effects of taxes and benefits on the overall redistribution we apply a sequential decomposition technique. This division is somewhat arbitrary since the choice of benchmark income affects the outcome. Applying the redistribution from, say, taxes on gross income rather than market income alters the outcome to some extent. Since taxes are levied on gross income (market income plus benefits), the redistributive effects may be underestimated. Nevertheless the logic of this decomposition of Gini is that taxes are applied to gross income and benefits to market income. This approach has been, among others, advocated by Kakwani (1986).

Our sequential decomposition approach of income inequality follows studies by Jesuit and Mahler (2004) and Mahler and Jesuit (2006), with inequality indices accounted sequentially in order to determine the effective distributional impact of different income sources. Other techniques of the decomposition of the Gini coefficient by income source can be found in the literature as well; see e.g. Lerman and Yitzhaki (1985), Stark et al (1986), Kim (2000a), Creedy and Ven (2001). For example the well-known Lerman and Yitzhaki's method derives the marginal impact of various income sources on overall income inequality.¹³ Fuest et al (2010) explore the redistributive effects of different tax benefit instruments in the enlarged European Union (EU) based on two families of approaches. When comparing both approaches, they lead to the same estimates of disposable income inequality, however, both lead to somewhat contradictory results with respect to the importance of benefits for redistributing income. Inequality analysis based on the *sequential accounting decomposition* approach suggests that benefits are the most important factor reducing inequality in the majority of countries (e.g. Immervoll et al, 2005; Mahler and Jesuit, 2006; Whiteford, 2008). The *factor source decomposition* approach, suggested by Shorrocks (1982), however, suggests that benefits play a negligible role and sometimes even contribute slightly positively to inequality (e.g., Jenkins 1995; Jäntti 1997; Burniaux et al 1998). On the contrary, here taxes and social contributions are by far the most important contributors to income inequality reduction. Fuest et al (2010) explain these partly contradictory results. The most important difference between the two approaches is that the accounting approach applies tax benefit instruments sequentially, whereas, the decomposition approach accounts for them simultaneously.

Although both approaches are used in the literature, studies analyzing the impact of tax benefit instruments based on the standard sequential accounting approach generally find rather intuitively straight forward results, i.e. that benefits are the most important source of inequality reduction in European countries. In order to assess the effects of taxes and benefits on the overall redistribution we (therefore) apply the sequential decomposition technique in line with the comparative work of Mahler and Jesuit (2006), and recent studies by Kristjánsson (2011) and Kammer and Niehues (2011). This choice for an sequential approach is somewhat arbitrary, but fits in a strand of empirical literature that systematically illustrate that social transfers significantly improve the economic conditions of families, especially in European countries, and that the distribution of disposable incomes in these societies become more equal with the existence of these types of provisions.

13 See for 'descogini' in STATA (Lopez-Feldman, 2006).

2A.5.2 Sequential decomposition of the Gini coefficient: partial effects of different income sources

In order to disentangle the inequality even further by income source, the redistributive effect of several benefit transfers and taxes can be represented by formula (8) and (9):

$$L = G_{pri} - G_{dpi} \quad (4)$$

$$L_{Bk} = G_{pri} - G_{pri+B_k} \quad (8)$$

$$L_{Tl} = G_{pri+B} - G_{pri+B-T_l} \quad (9)$$

L , L_{Bk} , L_{Tl} and represent the overall redistributive effect, the partial redistributive effect of a specific kind of transfer B_k , and the partial redistributive effect of an income tax T_l . Consequently, the decomposition in formula (8), and (9) will offer us a quantitative measure for the reduction in the Gini by social programmes in a country.

It should be noted that the results to be obtained could be affected by the ordering effect, but we will correct for this. For example, the partial redistributive effect of a specific social transfer will be highest (smallest) when computed as the first (last) social programme; see equation 3. The partial effects of these transfers in total redistribution could be computed in several orders. We consider every specific social transfer as the first programme to be added to primary income distribution, and every direct tax as the first tax to be subtracted from income after (all) transfers. In that case, the sum of all partial redistributive effects amount (a little) over 100 percent. We rescaled the redistributive effects of each programme by applying an adjustment factor, which is defined as the overall redistribution given by formula (4) (100%) divided by sum of all partial redistributive effects of all programmes (over 100%), in order to correct for an over-estimated effect.

2A.5.3 Choice of income unit

The unit of analysis is an important issue in income distribution studies. It is evident that the ultimate source of concern is the welfare of the individual. However, an individual is often not the appropriate unit of analysis. E.g. children and spouses working at home do not have recorded income, but may nevertheless be enjoying a high standard of living as a result of income sharing with parents/spouses. How to solve the problem of the key question of the unit of analysis?

Traditionally, studies have used the household income per capita (or per member) measure to adjust total incomes according to the number of persons

in the household. The last decades, equivalence scales have been widely used in the literature on income distribution (see Figini, 1998). An equivalence scale is a function that calculates adjusted income from income and a vector of household characteristics. The general form of these equivalence scales is given by the following expression:

$$W = \frac{D}{S^E},$$

where W is adjusted income, D is income (disposable income), S is size (number of persons in households) and E is equivalence elasticity. E varies between 0 and 1. The larger E , the smaller are the economies of scale assumed by the equivalence scales. Equivalence scales range from $E=0$ (no adjustment or full economies of scale) to $E=1$ (zero economies of scale). Between these extremes, the range of values used in different studies is very large, strongly affecting measured inequality.

Equivalence scale elasticity for the LIS database is set around 0.5. This implies that in order to have an equivalent income of a household of one person where D is 100, a household of two persons must have an income of 140 to have equivalent incomes. Alternatively a one-person household must have 70 percent of the total income of a two-person household to have equivalent income. In our comparative analysis we use this equivalence scale of LIS, where E is around 0.5. However, it has been shown that the choice of equivalence scales affects international comparisons of income inequality to a wide extend. Alternatively adjustment methods would definitely affect the ranking of countries, although the broad pattern remains the same (Atkinson et al, 1995:52).

2A.5.4 Countries and other measurement issues

In empirical literature, the selection of countries and data-years differ due to the consideration of data quality. We apply a cross-national analysis using comparable income surveys for all countries of LIS around 2004. LIS micro data seems to be the best available data for describing how income inequality and the redistributive effects of taxes and transfers vary across countries (Nolan and Marx, 2009; Smeeding, 2008). LIS data contains information for 36 countries for one or more than one year of data (from wave I to wave VI), allowing researchers to make comparisons in a straightforward manner, and the information is still updating and expanding. This paper uses the data of all countries in LIS. In this paper we restrict ourselves to the latest data year available (around 2004) to analyze redistribution of social transfers and taxes. Countries included in the LIS project come from Europe, North America, the Far East and Australia: Australia, Austria, Belgium, Brazil, Canada, Colombia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece,

Guatemala, Hungary, Ireland, Israel, Italy, Korea, Luxembourg, Mexico, Netherlands, Norway, Peru, Poland, Romania, Russia, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Taiwan, the United Kingdom, the United States, and Uruguay.

From nearly 300 variables in the dataset, we choose those related to household income (all kinds of income sources), total number of persons in a household and household weight (in order to correct sample bias or non-sampling errors) to measure income inequality and the redistributive effect across countries. In line with LIS convention and the work of Mahler and Jesuit (2006), we have eliminated both observations with zero or a missing value of disposable income from LIS data. Household weights are applied for calculation of Gini coefficients.

It should be noted that there have been controversial arguments regarding the issues in the measurement of income inequality. These arguments have their own merits and shortcomings, and there has been little professional consensus among researchers with regard to the theoretical superiority of a particular way of measuring inequality. Moreover, the availability of reliable data restricts the possibilities for conducting empirical research, which is especially problematic in cross-national studies. The aim of this database is *not* to review definitional issues that arise in assessing the extent of, and change in, income inequality in Western industrialized countries. We simply refer to a vast literature on the sensitivity of measured results to the choice of income definitions, inequality indices, appropriate equivalence scales, and other elements that may affect results in comparative research.¹⁴

14 See Wang and Caminada (2011a).

3 | Income redistribution in 20 countries over time [■]

ABSTRACT

In most OECD countries, the gap between rich and poor has widened over the past decades. The present study analysed whether and to what extent direct taxes and social transfers contribute to this trend. The study contributes to the literature by disentangling several parts of fiscal redistribution in a comparative setting. We used micro-data from the Luxembourg Income Study to examine household market inequality and redistribution from transfers and taxes for 20 countries from the mid-1980s to the mid-2000s. The contribution of each programme was estimated using a sequential accounting budget incidence decomposition technique. We observed a sizeable increase in primary household inequality, but tax-benefit systems have offset two-thirds of the average increase in primary income inequality. The public old-age pensions attributed 60 per cent to the increase in redistribution, while social assistance accounted for 20 per cent. Direct taxes slowed down redistribution by 16 per cent.

Key words: inequality, redistribution, social income transfers, welfare states, OECD countries

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3.1 INTRODUCTION

In most OECD countries, income inequality has risen over the past two or three decades (OECD, 2008, 2011). The widening of the income distribution has been driven mainly by greater inequality in market income from the mid-1980s to the mid-1990s. Market income inequality also rose from the mid-1990s to the mid-2000s, but at a slower pace. Several explanations of income inequality have been introduced by comparative researchers in sociology, economics and political science (among others Atkinson, 1996; Brandolini and Smeeding, 2009; Chevan and Stokes, 2000; Gustafsson and Johansson, 1999; Kuznets, 1955; McCall, 2001). One of the main driving forces behind the disposable income distribution is the reduction of inequality through the tax-transfer system (Atkinson and Brandolini, 2001; Brandolini and Smeeding, 2007, 2009; Caminada and Goudswaard, 2001, 2010; Danziger, Haveman and Plotnick, 1981; Gottschalk and Smeeding, 1997, 2000; Smeeding, 2000, 2004). The overall redistributive effect can be divided into redistribution by transfers and by taxes, or even into more detail (Caminada and Goudswaard, 2001; Caminada, Goudswaard and Wang, 2012; Ferrarini and Nelson, 2003; Fuest, Niehues, and Peichl, 2010; Kristjánsson, 2011; Plotnick, 1984; Wang, Caminada, and Goudswaard, 2012). In the mid-2000s, the average redistributive effect achieved by public cash transfers was twice as large as that achieved through household taxes, although the United States, for example, stands out for achieving a greater part of redistribution by taxes (OECD, 2008, 2011; Whiteford, 2010; Wang et al, 2012). The tax and transfer system was able to offset part of the rise in market income inequality over the last 25 years.

The present study examined in detail changes in the redistributive effects of taxation and income transfers to households. The extensive literature on 'welfare state retrenchment' that has emerged over the last decades seems to imply that welfare states have become less redistributive. However, recent studies and data show, to the contrary, that most welfare states became more redistributive in the 1980s and 1990s (see also Kenworthy and Pontusson, 2005). Welfare states have not compensated completely for the rise in inequality of market income among households, but most have done so to some degree. By and large, welfare states have worked the way they were designed to work. It is markets, not redistribution policies that have become more inegalitarian. It should be noted here that because tax-benefit systems are generally progressive, one could expect that higher market income inequality automatically leads to more redistribution, even without policy actions (Immervoll and Richardson, 2011).

Under the circumstance of increasing income inequality and public expenditure cuts in the 1980s and 1990s, attention needs to be paid to the design of welfare states. How good is the tax-benefit system as a whole and its programmes in narrowing income distribution? What is the trend of redistribution over time?

In a recent study, Immervoll and Richardson (2011) examined the impact of tax and transfer systems on income inequality in the past 25 years and across countries. They found that in most countries tax-benefit policies offset some of the large increases in market income inequality, although such policies appear to have become less effective at doing so since the mid-1990s. However, Immervoll and Richardson's analysis did not cover the total population, but was restricted to the working-age population. They excluded the largest government transfer programme – public pensions. Especially this programme has a strong redistributive impact (Wang et al, 2012).

Mahler and Jesuit (2006) divided government redistribution into several components: the redistributive effects from unemployment benefits, pensions and taxes, and performed an empirical exercise with LIS-data from about 1980 through the early 2000s. Their study provided relatively new insights. However, the data used were not very recent and only two specific social programmes and direct taxes were included in the analysis. There have also been other cross-national studies examining redistributive effects, which, however, have often been based on smaller and/or less disaggregated datasets (see. e.g. Goñi, López, and Servén, 2008; Lefèbvre, 2007; OECD, 2008).

This study makes a contribution in the area of measurement, a topic that is often undervalued in the literature. We computed the changes in the redistributive effects of different social programmes and direct taxes among the total population over time (cf. Wang et al, 2012). At the programme level, we examined the redistributive trends of sickness benefits, disability benefits, state old-age and survivors benefits, child/family benefits, unemployment compensation benefits, social assistance cash benefits, other social insurance benefits, mandatory payroll taxes and income taxes. We used the data from the Luxembourg Income Study (LIS) and analysed the tax-benefit distributional effects across 20 LIS countries from the mid-1980s to the mid-2000s. The redistributive effect of each programme was measured sequentially using a budget incidence approach. Our contribution to the literature is that we provide trends of the redistribution across countries at programme level. We did not analyse the causes of changes in the redistributive impact of social programmes and taxes.

The article is organised as follows. It begins by presenting our research method and data. It then presents the results of a cross-country comparison. In the subsequent section, we decompose total redistribution through the tax-benefit system into the redistributive effects of 11 social transfers and several direct taxes from the mid-1980s to the mid-2000s in a comparative setting. The final section concludes the article.

3.2 RESEARCH METHOD

3.2.1 Data from Luxembourg Income Study (LIS)

The growing interest in national and cross-national differences in earnings and income inequality (over time) has produced a wide range of studies (see Brandolini and Smeeding, 2007; Gottschalk and Smeeding, 1997; Immervoll and Richardson, 2011; Lambert, Nesbakken and Thoresen, 2010; OECD, 2008, 2011). An important development was the launching of LIS in which micro datasets from various countries were ‘harmonised’; see survey information LIS at <http://www.lisdatacenter.org/>.¹ Consequently, it is possible to study income inequality across countries and over time (see Atkinson, Rainwater and Smeeding, 1995). LIS micro data seem to be the best available data for describing how income inequality and the redistributive effects of direct taxes and transfers vary across countries and over time (Nolan and Marx, 2009; Smeeding, 2004), providing the information of 11 different benefits and several income taxes and social contributions in a comparative setting.²

There exist several detailed national studies of redistribution trends. International comparisons tend to focus on specific parts of the tax-benefit system. Multi-country comparative studies that consider the entire tax-benefit system are rare. Point-in-time comparisons are sometimes thought problematic as large institutional differences between countries, notably in terms of the balance between public and private provision or cash transfers versus benefits in-kind, make it difficult to interpret country differences in terms of a particular portion of the redistribution system. However, this was less of an issue when we focused on comparing changes across countries, as overall institutional setups (as well as measurement choices in the underlying data) tend to vary less over time than they do cross-nationally.

From nearly 300 variables in the LIS dataset, we chose those related to household income (all kinds of income sources), total number of persons in a household and household weight (in order to correct for sample bias or non-sampling errors) to measure income inequality and redistribution across countries. In line with LIS convention and the work of Mahler and Jesuit (2006), we eliminated observations with zero or a missing value of disposable income from LIS data. The present study used the data of 20 LIS countries, with at least

1 In mid-2011 the LIS unveiled an entirely new harmonisation template dividing the income concept for post-tax and post-transfer income into two variables: income for post-tax and post-transfer income including non-monetary household income besides cash household income (DHI), and disposable income including only cash household income (DPI). This article used the template generating the income concept DPI.

2 LIS surveys do not take into account indirect taxes in the trajectory primary to disposable income, such as sales or value added taxes which are generally considered more regressive than direct taxes.

three data points (around 1985, 1995 and 2005).³ We distinguished two groups of countries (based on data quality). For 12 countries, full information was available on the whole trajectory from primary income to disposable income: Australia, Canada, Denmark, Finland, Germany, Israel, Netherlands, Norway, Sweden, Switzerland, the United Kingdom and the United States. For another 8 countries, data was available only on an after-tax basis: Belgium, France, Ireland, Italy, Luxembourg, Mexico, Poland and Spain.

First, we present a global picture of redistribution for all 20 countries over time; then we move to a more elaborated decomposition analysis of redistribution over time for 12 countries for which full information is available. Our analysis concentrates mainly on these 12 countries with full information of transfers and direct taxes within the trajectory from primary income to disposable income for the period around 1985–2005.

We used the Gini coefficient as an overall measure of income inequality.⁴ Household weights were applied for the calculation of Gini coefficients; the equivalence scale is the square root of the number of household members (LIS' equivalence scale). Another measurement decision made in the present study concerned top and bottom coding. We bottom-coded datasets at 1 per cent of equivalised mean income and top-coded at 10 times the median of non-equivalised income for the nation sample (cf. Gottschalk and Smeeding 1997, p. 661).

3.2.2 Measuring the redistributive effects of direct taxes and social transfers

Usually, the impact of social policy on income inequality is calculated in line with the work of Musgrave, Case and Leonard (1974), that is, statutory or budget incidence analysis. A standard analysis of the redistributive effect of taxes and income transfers is to compare pre-tax-transfer income inequality and post-tax-transfer income inequality (OECD 2011). Our measure of the redistributive impact of social security on inequality was straightforwardly based on formulas developed by Kakwani (1986) and Ringen (1991):

$$\text{Redistribution by direct taxes and social transfers} = \text{primary income inequality} - \text{disposable income inequality}.$$

3 Wang and Caminada (2011b) assembled a database for all 171 datasets in LIS (all 36 countries from wave 0 to wave VI), allowing researchers to make comparisons of redistribution in a straightforward manner (see Leiden LIS Budget Incidence Fiscal Redistribution Dataset, posted at the website of LIS cross-national data center Luxembourg, <http://www.lisdatacenter.org/resources/other-databases/>).

4 It could be argued that the Gini coefficient is rather sensitive to the middle part of the income distribution compared with other indicators. We reported a sensitivity analysis using other inequality indicators.

This formula was used to estimate the reduction in inequality produced by direct taxes and social transfers. Primary income inequality was measured by a summary statistic of pre-tax, pre-transfer incomes and disposable income inequality was measured by the same summary statistic of disposable equivalent incomes. When calculating inequality indices for both primary and disposable income, we ranked people by their primary and disposable incomes, respectively, so that the re-ranking effect was included in our results (see Plotnick, 1984; the same method was applied by Immervoll and Richardson, 2011, and by Wang and Caminada, 2011a). Table 3.1 presents the framework for accounting income inequality and redistribution through various income sources.

Table 3.1 The income inequality and redistribution accounting framework.

Income components	Income inequality and redistributive effect
Gross wages and salaries + Self-employment income + cash property income + Occupational and private pensions + Private transfers + Other cash income = Primary income	Income inequality before social transfers and taxes
+ Social security cash benefits	-/- Redistributive effect of social transfers
= Gross income	= Income inequality before direct taxes
-/- Pay Roll (Mandatory payroll taxes)	-/- Redistributive effect of direct taxes
-/- Income taxes	
= Disposable income	= Income inequality after social transfers and taxes

Note: For 12 countries (Australia, Canada, Denmark, Finland, Germany, Israel, the Netherlands, Norway, Sweden, Switzerland, the United Kingdom and the United States), complete information was available for the entire tax-benefit system in LIS. For another 8 countries (Belgium, France, Ireland, Italy, Luxembourg, Mexico, Poland and Spain), we used net wages and salaries instead of gross wages and salaries where gross variables were not available for all data years in LIS.

Source: Wang and Caminada (2011b)

The budget incidence analysis is not without problems; see a critical survey of efforts to measure budget incidence by Smolensky, Hoyt and Danziger (1987). The pre-transfer inequality was compared with the post-transfer inequality keeping all other things equal. Household and labour market structures were assumed unchanged, thus disregarding any possible behavioural changes that the situation of absence of social transfers would involve (Frick, Büchel and Krause, 2000) and inducing a behavioural feedback to the redistributive system (Bergh, 2005). However, behavioural responses could obviously be important. It is likely that in the absence of social transfers, more people will work (more), thereby earning higher incomes. Kim (2000b) showed that both the generosity and efficiency of the tax/transfer system could influence the level of pre-tax-transfer income inequality. There is also empirical work

addressing these problems, using various measurement strategies (see. e.g. Jesuit and Mahler, 2010). Budget incidence calculations can therefore be seen only as an approximation of the redistributive effects because of the assumption that agents behave similarly in situations with and without social transfers and social security. This implies that estimates for redistribution through taxes and transfers should be regarded as upper bounds. Despite this problem, literature on public finance has for decades contained analyses of statutory and budget incidence (see e.g. Gillespie, 1965; Kakwani, 1977a, 1977b; Musgrave and Tun Thin, 1948; OECD, 2008, 2011; Reynolds and Smolensky, 1977a, 1977b).

We sequentially decomposed the Gini coefficient in order to calculate the partial redistributive impact of transfers and direct taxes (see Wang and Caminada, 2011a, for details). The results obtained for the specific transfers and taxes were corrected for the ordering effect.⁵ The sequential accounting decomposition approach was advocated by Kakwani (1986), among others, and was followed by Mahler and Jesuit (2006), Immervoll et al (2005) and Whiteford (2008). Other techniques for the decomposition of the Gini coefficient by income source can be found in the literature as well (see e.g. Kim, 2000a, and Lerman and Yitzhaki, 1985). In the literature, two techniques for decomposing inequality are distinguished; *sequential accounting decomposition* and *factor source decomposition*. When comparing both techniques, they lead to the same estimates of disposable income inequality, but to contradictory results with respect to the importance of benefits for redistributing income (see Fuest et al, 2010, and Kanbur, 2006). Inequality analysis based on the *sequential accounting decomposition* technique (as applied in the present study) suggests that benefits are the most important factor in reducing inequality in the majority of countries. The *factor source decomposition* technique, initiated by Shorrocks (1982), suggests, however, that benefits play a much smaller role, and that taxes and social contributions are more important contributors to income inequality reduction. Fuest et al (2010) explained these partly contradictory results. The most important difference between the two techniques is that the accounting technique applies tax benefit instruments sequentially, whereas the decomposition technique accounts for them simultaneously (see also Kammer and Niehues, 2011). We followed the sequential decomposition

5 The ordering of programmes has an influence on the results when using the sequential accounting decomposition method. The partial redistributive effect of a specific social transfer will be highest (smallest) when computed as the first (last) social programme. We corrected for this effect as follows. We considered every specific social transfer as the first programme to be added to primary income, and every direct tax as the first tax to be subtracted from gross income. In that case, the sum of all partial redistributive effects amounts to a little over 100 per cent. We therefore rescaled the redistributive effects of each programme by applying an adjustment factor, which is defined as the overall redistribution (100%) divided by the sum of all partial redistributive effects of all programmes (a little over 100%).

technique, which fits in with a strand of empirical literature, among which is the recent OECD-work.

3.2.3 Measuring change over time

In line with Kenworthy and Pontusson (2005), we believe that it is more informative to measure changes in inequality in absolute terms (the ending value minus the beginning value) rather than in percentage terms (absolute change divided by the beginning value). Absolute measures of change may be easier to interpret than relative measures. The problems with relative measures are especially complex when comparing changes over time in redistribution, as the relative measure becomes ‘percentage change in percentage change’. It is straightforward to measure redistribution as the absolute difference between inequality before and after direct taxes and transfers, and to measure change in redistribution as the difference in these amounts between two points in time.

3.2.4 Focus on total population – including public pension schemes

Unlike most existing studies, this study explicitly focused on the total population instead of the non-elderly population (those aged 15–64) only. Indeed, restricting the analysis to the non-elderly would avoid some of the problems inherent to comparisons of incomes between people who are at different stages in their lives. For instance, an essential function of old-age pensions is to redistribute intertemporally over the life cycle, in which case a focus on the non-elderly helps in understanding the most important elements of inter-personal redistribution. However, in our view the largest government transfer programme, public pensions, should not be excluded from the analysis. Public pension plans are generally seen as part of the safety net, generating large antipoverty effects. Therefore, state old-age pension benefits were included in our analysis on redistribution. Occupational and private pensions are not redistributive programmes per se, although they also have a significant effect on redistribution among the elderly (Van Vliet et al, 2012). The standard approach treats contributions to government pensions as a tax that finances the retirement pensions paid out in the same year, while contributions to private pensions are effectively treated as a form of private consumption. This

may affect international comparisons of redistribution effects of social transfers and taxes.⁶

Overcoming this bias requires a choice: Should pensions be earmarked as market income or as a transfer? We dealt with this bias rather pragmatically by following the LIS Household Income Variables List: Occupational and private pensions were earmarked and treated as market income.

3.3 EMPIRICAL RESULTS

3.3.1 Trends in the distribution of primary and disposable income in LIS countries

This section reviews the evidence on cross-national comparisons of primary and disposable income inequality across 20 nations over time. In order to give a general idea, the countries are clustered around 1985, 1995 and 2005, respectively, showing the average trends of inequality and redistribution (see Table 3.2).

⁶ The sequential accounting budget incidence technique does not take into account the extent to which public pensions can substitute for private arrangements (see e.g. Whiteford, 2008). In public pension systems, pensioners are assigned zero primary incomes. Therefore, compared with countries with more weight on private arrangements, inequality in primary incomes and redistributive effects might be overestimated.

Table 3.2 Trends in income inequality and redistribution, from around 1985 to around 2005.*

	Gini Primary Income			Gini Disposable Income			Absolute Fiscal Redistribution		
	around 1985	around 1995	Change 85-05 %	around 1985	around 1995	Change 85-05 %	around 1985	around 1995	Change 85-05
Australia (85-03)	0.420	0.464	0.041	0.293	0.308	0.019	0.126	0.156	0.023
Belgium (85-00)	0.414	0.462	0.048	0.227	0.266	0.039	0.187	0.195	0.008
Canada (87-04)	0.393	0.424	0.031	0.288	0.289	0.001	0.105	0.136	0.031
Denmark (87-04)	0.398	0.421	0.023	0.254	0.218	-0.036	0.144	0.203	0.059
Finland (87-04)	0.332	0.384	0.052	0.209	0.217	0.008	0.123	0.168	0.045
France (81-05)	0.364	0.487	0.123	0.288	0.288	0.000	0.076	0.199	0.123
Germany (84-04)	0.444	0.450	0.006	0.265	0.270	0.005	0.179	0.180	0.001
Ireland (87-04)	0.500	0.493	-0.007	0.328	0.336	0.008	0.172	0.157	-0.015
Israel (86-05)	0.449	0.474	0.025	0.308	0.336	0.028	0.142	0.139	-0.003
Italy (86-04)	0.425	0.454	0.029	0.306	0.338	0.032	0.119	0.116	-0.003
Luxembourg (85-04)	0.377	0.388	0.011	0.237	0.235	-0.002	0.140	0.153	0.013
Mexico (84-04)	0.446	0.487	0.041	0.445	0.477	0.032	0.001	0.010	0.009
Netherlands (83-04)	0.435	0.420	-0.015	0.260	0.257	-0.003	0.176	0.162	-0.014
Norway (86-04)	0.352	0.400	0.048	0.233	0.238	0.005	0.119	0.162	0.043
Poland (86-04)	0.365	0.527	0.162	0.271	0.318	0.047	0.094	0.208	0.114
Spain (80-04)	0.416	0.501	0.085	0.318	0.353	0.035	0.098	0.148	0.050
Sweden (87-05)	0.428	0.460	0.032	0.218	0.221	0.003	0.211	0.239	0.028
Switzerland (82-04)	0.381	0.376	-0.005	0.309	0.307	-0.002	0.071	0.068	-0.003
UK (86-04)	0.476	0.503	0.027	0.303	0.344	0.041	0.173	0.158	-0.015
USA (86-04)	0.434	0.473	0.039	0.338	0.365	0.027	0.096	0.108	0.012
Mean-20	0.412	0.452	0.040	0.285	0.299	0.014	0.128	0.153	0.025
Mean-12	0.412	0.437	0.025	0.273	0.281	0.008	0.139	0.157	0.018
Mean-8	0.413	0.475	0.062	0.303	0.327	0.024	0.111	0.148	0.037

* The exact years for which data are available vary slightly across countries.

Note: For 12 countries, complete tax and benefit information was available in LIS. For the remaining 8 countries (in *italics*), net wages and salaries were used because gross variables were not available for all data years in LIS.

Source: Wang and Caminada (2011b), and own calculations.

On average, income inequality increased markedly. This increase was stronger during the first decade. The widening of income gaps was driven by rising inequality in the distribution of primary income, which was partly offset by public cash transfers and households direct taxes. In the second decade, the rising of primary income inequality and disposable income inequality were in parallel.

Primary-income inequality has been the main driver of inequality trends in disposable incomes (OECD, 2011, pp. 268–271), but did redistribution policies have a substantial effect as well? Between the mid-1980s and the mid-2000s, redistribution systems compensated two-thirds of the increase in primary-income inequality. The upward trend in primary-income inequality continued after the mid-1990s, although at a lower rate. In absolute terms, redistribution increased across countries. Over the two decades as a whole, primary-income inequality rose by about 0.054, while redistribution rose 0.036. Direct taxes and transfers now reduced inequality by about 35 per cent, which is more than in the mid-1980s (31%).

Country-specific results are also presented in Table 3.2. Tax-benefit systems in Belgium⁷, Finland, Germany, Poland and Sweden achieved the greatest reduction in inequality, lowering the Gini value by 20 points or more in the mid-2000s, while the smallest redistributive effect was seen in Mexico, the United States and Canada (less than 12 points).

Through the entire period, disposable income inequality became significantly larger in Belgium, Finland and Israel, whereas it decreased in Denmark, France, Ireland, Spain and Switzerland. In the period 1985–1995, higher disposable income inequality was ‘caused’ mainly by higher primary income inequality (although primary income inequality declined in Ireland, the Netherlands and Switzerland). In this period, government redistribution offset the widening of income gaps through public cash transfers and household taxes either in full (e.g. Canada, Denmark, France and Germany) or in part (in all other countries studied).

Cross-country variance has increased since the mid-1990s. Primary income inequality increased markedly in Belgium and Finland, and to a lesser extent in Germany, Israel, Italy, Luxembourg, the Netherlands, Norway and Switzerland, while it was almost stable in Australia, Canada, Denmark, Ireland, Poland and the United States. Primary income inequality decreased in France, Mexico, Spain, Sweden and the United Kingdom between 1995 and 2005. Disposable income inequality increased in all countries except for France, Ireland, Mexico, Spain and Switzerland. A large part of this rise of income inequality was offset by redistribution through direct taxes and transfers. Israel was an outlier due to both increasing primary income inequality and declining redistribution since

7 Belgium (2000) seems to be an outlier. We noticed that there are many zeros of net wages and salaries in the dataset.

equality. In contrast to the results in Immervoll and Richardson (2011), we did not find that tax-benefit policies had become less effective in redistribution since the mid-1990s when the total population (instead of the working-age population) was taken into account. Thus, the claim that reduced redistribution is a main driver of widening income gaps since the mid-1990s must be toned down.

3.3.2 Redistributive effects of direct taxes and transfers over time

Table 3.3* highlights that the trend of overall redistribution was mainly caused by transfers. From the mid-1980s to the mid-1990s, total redistribution increased, driven by the stronger redistributive effect of transfers. The average total redistribution increased by 0.036 point in 20 LIS countries from around 1985 to around 2005.

Table 3.3 Redistribution across 20 LIS countries over time, from around 1985 to around 2005.*

Country	Redistribution				Partial effects: change 1985-2005	
	around 1985	around 1995	around 2005	Change 1985-2005	from transfers	from taxes
Australia (85-95-03)	0.126	0.156	0.149	0.023	0.030	-0.007
Belgium (85-95-00)	0.187	0.195	0.263	0.076	0.014	0.063
Canada (87-94-04)	0.105	0.136	0.114	0.010	0.007	0.003
Denmark (87-95-04)	0.144	0.203	0.191	0.047	0.033	0.014
Finland (87-95-04)	0.123	0.168	0.212	0.089	0.098	-0.009
France (81-94-05)	0.076	0.199	0.168	0.092	0.075	0.017
Germany (84-94-04)	0.179	0.180	0.210	0.031	0.023	0.008
Ireland (87-95-04)	0.172	0.157	0.178	0.006	0.005	0.002
Israel (86-97-05)	0.142	0.139	0.121	-0.021	0.000	-0.021
Italy (86-95-04)	0.119	0.116	0.165	0.046	0.046	0.000
Luxembourg (85-94-04)	0.140	0.153	0.184	0.044	0.007	0.037
Mexico (84-96-04)	0.001	0.010	0.018	0.017	0.017	0.000
Netherlands (83-94-04)	0.176	0.162	0.196	0.020	0.020	0.000
Norway (86-95-04)	0.119	0.162	0.174	0.055	0.051	0.004
Poland (86-95-04)	0.094	0.208	0.207	0.113	0.108	0.005
Spain (80-95-04)	0.098	0.148	0.126	0.028	0.026	0.001
Sweden (87-95-05)	0.211	0.239	0.205	-0.006	-0.003	-0.002
Switzerland (82-92-04)	0.071	0.068	0.128	0.056	0.077	-0.021
UK (86-95-04)	0.173	0.158	0.145	-0.028	-0.012	-0.015
USA (86-94-04)	0.096	0.108	0.109	0.013	0.013	0.000
Mean-20	0.128	0.153	0.163	0.036	0.032	0.004
Mean-12	0.139	0.157	0.163	0.024	0.028	-0.004
Mean-8	0.111	0.148	0.164	0.053	0.037	0.016

* The exact years for which data are available vary slightly across countries.

Note: For 12 countries complete tax and benefit information is available in LIS. For the remaining 8 countries (in *italics*), net wages and salaries were used because gross variables were not available for all data years in LIS.

Source: Wang and Caminada (2011b), and own calculations.

From the mid-1980s to the mid-1990s, total redistribution increased in all countries except the Netherlands and the United Kingdom. Redistribution by transfers also increased in all countries except Italy, the Netherlands and the United Kingdom. Redistribution achieved by the tax system fell in all countries but rose in Canada, Denmark, Finland and the United States.

From the mid-1990s to the mid-2000s, the patterns of redistribution across countries were more diverse, both in overall redistribution and in tax and transfers redistribution. In this decade, total redistribution fell in many countries but increased significantly in Belgium, Finland, Germany, Italy, Luxembourg and the Netherlands, and to a lesser extent in Ireland and Norway. The trends of transfer redistribution across countries followed the total redistribution pattern.

3.4 DECOMPOSITION OF THE REDISTRIBUTIVE EFFECT OF SOCIAL TRANSFERS AND DIRECT TAXES ACROSS LIS COUNTRIES FROM THE MID-1980S TO THE MID-2000S

3.4.1 Relative redistributive effects

How have the redistributive effects of the different parts of welfare states altered over time and across countries? This section shows trends of detailed redistributive effects across a selection of those 12 LIS countries with complete information on taxes and benefits. We decomposed the trajectory of the Gini coefficient from primary to disposable income inequality in several parts (see Caminada et al, 2012). We calculated the following (partial) redistributive effects over time, based on the LIS household income components list: sickness benefits, occupational injury and disease benefits, disability benefits, state old-age and survivors benefits, child/family benefits, unemployment compensation benefits, maternity and other family leave benefits, military/veterans/war benefits, other social insurance benefits, social assistance cash benefits, near-cash benefits, mandatory payroll taxes and income taxes.

As explained earlier, we included state old-age pension benefits in the analysis because they are part of the safety net and generate significant reduction in poverty and income inequality. Occupational and private pensions were not taken into account.

It should also be noted that the finer is the breakdown among programme types in LIS, the greater are the problems of comparability across countries. The reason is that many narrowly based programmes can supplement or substitute for one another, with the result that essentially the same redistributive process can be categorised differently from one country to another, depending on the design of the programme. For example, state support for children can be realised through flat-rate family allowances, tax credits, means-tested public assistance or some combination of these.

To illustrate the idea of decomposition from primary to disposable income inequality, Table 3.4 reports the trends of redistributive effects of the different parts of tax-benefit system averaged for 12 LIS countries from the mid-1980s to the mid-2000s.⁸

Table 3.4 Decomposition of disposable income inequality for 12 countries from the mid-1980s to the mid-2000s: averages by periods.

	Gini around 1985	Gini around 1995	Gini around 2005	Change 85-05
(a) Gini primary income	0.412	0.437	0.454	+0.043
(b) Gini disposable income	0.273	0.281	0.292	+0.018
Overall redistribution (a-b)	0.139	0.157	0.163	+0.024
Partial effects	Share	Share	Share	Change
<i>Transfers</i>	71%	73%	77%	+7 points
Sickness benefits	2%	1%	2%	+1 points
Occupational injury and disease benefits ^a	5%	0%	1%	-4 points
Disability benefits ^b	5%	6%	8%	+3 points
State old-age and survivors benefits ^c	34%	31%	38%	+4 points
Child/family benefits ^d	6%	7%	6%	0 points
Unemployment compensation benefits ^c	6%	8%	5%	0 points
Maternity and other family leave benefits ^f	1%	1%	2%	+1 points
Military/veterans/war benefits	1%	1%	1%	0 points
Other social insurance benefits ^g	2%	4%	3%	0 points
Social assistance cash benefits ^h	9%	8%	8%	-1 points
Near-cash benefits ⁱ	1%	4%	3%	+2 points
<i>Taxes</i>	29%	27%	23%	-7 points
Mandatory payroll taxes ^j	1%	1%	0%	-1 points
Income taxes	28%	26%	22%	-6 points
Overall redistribution	100%	100%	100%	

a) Short-term occupational injury and disease benefits, Long-term occupational injury and disease benefits; Occupational injury and disease benefits.

b) Disability pensions; Disability allowances; Disability benefits.

c) Universal old-age pensions; Employment-related old-age pensions; Old-age pensions for public sector employees; Old-age pensions.; Early retirement benefits; Survivors pensions; State old-age and survivors benefits.

d) Child allowances; Advance maintenance; Orphans allowances; Child/family benefits.

8 It should be noted that our results are hardly affected by the ordering effect. The partial redistributive effect of a specific social transfer will be highest (smallest) when computed as the first (last) social programme. A sensitivity analysis showed that changing the order of adding a specific benefit to primary income (or subtracting tax from gross income) did change the partial effect of this transfer (or tax) in total redistribution only slightly. Considering a specific social transfer as the last (instead of the first) programme to be added to primary income distribution changes the computed partial redistributive effect up to 1%-point at the highest.

e) Unemployment insurance benefits; (Re)training allowances; Placement/resettlement benefits; Unemployment compensation benefits.

f) Wage replacement; Birth grants; Child care leave benefits; Maternity and other family leave benefits.

g) Invalid carer benefits; Study grants and scholarships; Child care cash benefits; Other social insurance benefits.

h) General social assistance benefits; Old-age and disability assistance benefits; Unemployment assistance benefits; Parents assistance benefits; Social assistance cash benefits.

i) Near-cash food benefits; Near-cash housing benefits; Near-cash medical benefits; Near-cash heating benefits; Near-cash education benefits; Near-cash child care benefits; Near-cash benefits.

j) Mandatory contributions for self-employment; Mandatory employee contributions.

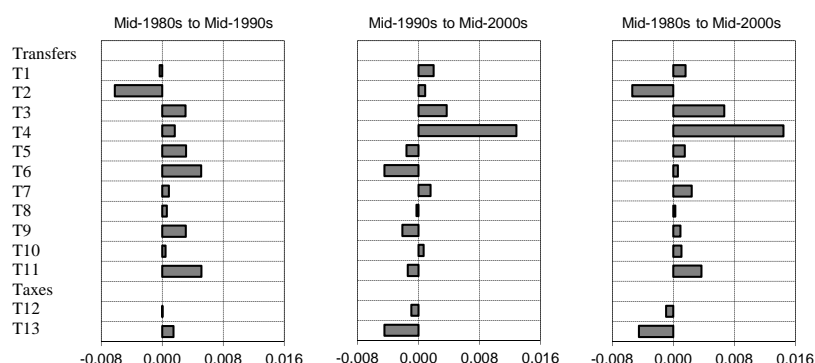
Note: 12-country-average; Australia, Canada, Denmark, Finland, Germany, Israel, Netherlands, Norway, Sweden, Switzerland, the United Kingdom, and the United States.

Source: Own calculations based on LIS.

3.4.2 Absolute change redistributive effects

From a policy perspective, comparisons of absolute changes in redistribution are often more appealing than comparisons of shares. Figure 3.1 highlights differences in redistributive effects of 13 transfers and direct taxes on the average level of 12 LIS countries across different periods.

Figure 3.1 Trends in the redistributive effects of 13 types of transfers and direct taxes for 12 countries (point changes in the Gini coefficient)



- T1 Sickness benefits
- T2 Occupational injury and disease benefits
- T3 Disability benefits
- T4 State old age and survivors benefits
- T5 Childfamily benefits
- T6 Unemployment compensation benefits
- T7 Maternity and other family leave benefits
- T8 Militaryveteranswar benefits
- T9 Other social insurance benefits
- T10 Social assistance cash benefits
- T11 Near cash benefits
- T12 Mandatory payroll taxes
- T13 Income taxes

Source: Own calculations based on LIS.

In the decade from the mid-1980s to the mid-1990s, the dominant pattern was that of more redistribution. This was especially evident for state old-age and survivors benefits, unemployment compensation benefits, near cash benefits and child and family benefits. Less redistribution was generated by occupational injury and disease benefits. In this decade overall redistribution increased by 0.017 point for our 12-country-average.

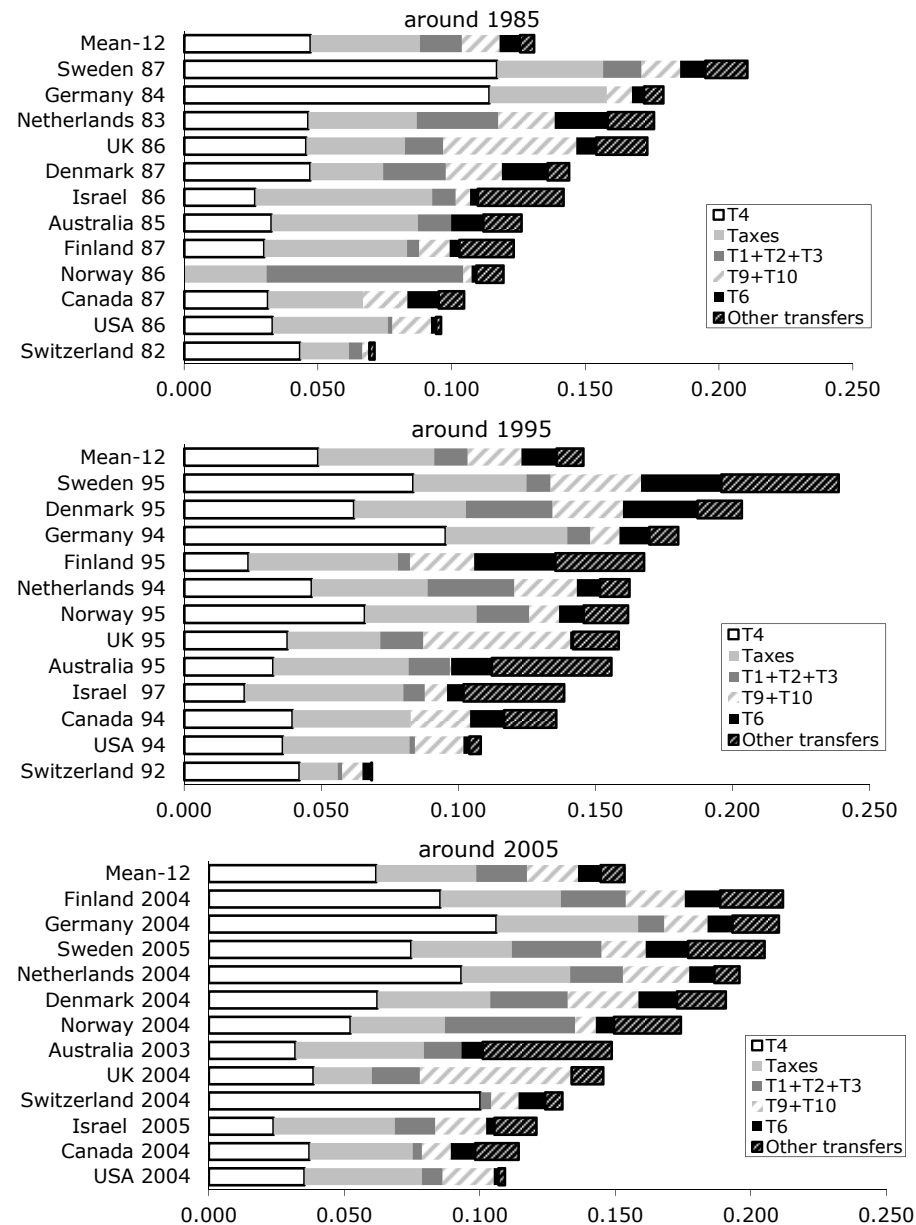
In the second decade between 1995 and 2005, redistribution as a whole was rather stable. We observed a decline especially for unemployment compensation benefits and income taxes. However, redistribution increased in this period rather strongly for state old-age and survivors benefits, and to a lesser extent for disability benefits. The average change in total redistribution during this decade was only 0.006 point.

Over the entire period 1985–2005, there was more diversity in patterns. A significant increase of redistribution could be attributed to the state old-age and survivors benefits and disability benefits, whereas less redistribution came via occupational injury and disease benefits, mandatory payroll taxes and income taxes. The cumulative change in total redistribution during the entire period was around 0.024 points.

With respect to trends in the redistributive effects of several social programmes across countries, the results were diverse. Figure 3.2 presents how the redistributive effect of each social programme changed over time across 12 LIS countries. Countries were ranked in order of their redistribution from highest to lowest. Here, we focused on only five grouped social transfer schemes and on taxes:

- a) T4: state old-age and survivors benefits;
- b) T1+T2+T3: benefits for sickness, occupational injury and disease, disability;
- c) T9+T10: social assistance cash benefits, near-cash benefits;
- d) T6: unemployment compensation benefits;
- e) Other transfers (child/family benefits, maternity and other family leave benefits, military/veterans/war benefits, other social insurance benefits);
and
- f) Taxes (income taxes and mandatory payroll taxes).

Figure 3.2 Decomposition of redistribution of social transfers and direct taxes in 12 LIS countries 1985-2005.



Source: Own calculations based on LIS.

State old-age and survivors benefits attributed most to redistribution in the majority of the countries (around one-third of redistribution). From the mid-1980s to the mid-1990s, the main pattern was a stable or declining contribution of these programmes to redistribution, except for Canada, Denmark, Norway and the United States. In the last decade, the pattern changed: redistribution increased in seven countries and decreased in Canada, Norway and Sweden. The contribution of the old-age and survivors programme increased during this decade. Overall, state old-age and survivors benefits accounted for around 60 per cent of the total increase in redistribution among our 12-country-average between 1985 and 2005.

Social assistance benefits, the main form of income support for jobseekers who do not qualify for other benefits, represented a relatively high share of total redistribution compared with other benefits because this programme is specifically targeted to low-income groups. Higher levels of inequality reduction in the mid-1990s were achieved compared with earlier years in all countries. During the period 1995–2005, redistribution fell only in Canada, Finland, Norway and Sweden. Overall, social assistance and near-cash benefits accounted for 20 per cent of the total increase in redistribution among our 12-country-average between 1985 and 2005.

The redistributive effect of benefits for sickness, occupational injury and disease, and disability varied across countries. Throughout the entire period, it rose in Canada, Germany, the United Kingdom and the United States, and declined in the Netherlands and Norway. Other countries experienced an increase (decrease) before the mid-1990s and then a decrease (increase) until the mid-2000s. Overall, benefits for sickness, occupational injury and disease, and disability accounted for around 12 per cent of the total increase in redistribution.

During the first decade, the redistributive effect of unemployment compensation benefits increased in most countries except for the Netherlands and the United Kingdom, while it declined slightly in most countries in the period 1995–2005 (with the Netherlands, Switzerland and the United States as exceptions). The overall contribution of unemployment benefits to the total increase in redistribution was modest.

Among the other transfers, there was a sharp increase in redistribution for Australia and Sweden in the period 1985–1995 due to child/family benefits, maternity and other family leave benefits, military/veterans/war benefits, and other social insurance benefits in those countries. This variety of family-related benefits accounted for 22 per cent of the total increase in redistribution among our 12-country-average between 1985 and 2005.

Direct taxes attributed less to redistribution in the period 1985–2005, on average. However, cross-country differences were large. In Australia, Finland, Israel, Sweden, Switzerland and the United Kingdom, the redistributive capacity of taxes declined, whereas in Canada, Denmark, Germany and Norway there was more redistribution.

3.4.3 Sensitivity analysis

The literature shows that different indicators of income inequality are sensitive to different parts of the income distribution (among others, see Atkinson et al, 1995; Föster, 2000; Hauser and Becker, 1999; Lambert, 1993). In order to offer a broader picture of the redistributive effect of income transfers, we employed not only the Gini coefficient, but also other widely used indicators, namely Atkinson's index ($\alpha=1.0$ and $\alpha=0.5$), Mean Log Deviation and Theil index. Indicators more sensitive to the middle part of the income distribution are the Gini coefficient, Atkinson's index ($\alpha=0.5$) and Theil index, while Atkinson's index ($\alpha=1.0$) and Mean Log Deviation are relatively more sensitive to the changes in the lower tail of the income distribution.

We performed a sensitivity analysis for four countries (Germany, the Netherlands, Sweden and the United States) from around 1985 to around 2005 (see Caminada et al, 2012, for details). We found that all indicators followed the same pattern in each country, as far as the total redistribution was concerned; the largest redistribution was given by Mean Log Deviation, the lowest by the Atkinson's index ($\alpha=0.5$). For the partial redistributive effects at a given moment in time, we found some differences for the various indicators. The highest redistribution always came from state old-age and survivors benefits, but the share of direct taxes and social assistance benefits changed slightly depending on the indicators used. The trends of decomposed redistribution were again quite similar.

To sum up, in most cases the empirical result was hardly affected by using different global income inequality indicators. However, especially when the social programme was targeted towards a certain group, for instance the lower tail of the income distribution, the results varied slightly, depending on the indicator used.

3.5 CONCLUSION

Different welfare systems and different social policies lead to varying outcomes in changes of income inequality. The present study investigated income distribution and redistribution attributed to social transfers and direct taxes across 20 LIS countries from around 1985 to the mid-2000s, based on the micro household income data from LIS. We provided trends of primary and disposable income inequality, overall and disaggregated redistributions by social programmes in a comparative way, across many more countries than have been studied before, offering an accurate, detailed picture of redistribution of incomes through direct taxes and transfers across social welfare states.

We applied a sequential budget incidence analysis and found that the welfare states on average reduced inequality by one-third around 2005. Social benefits had a much stronger redistributive impact than taxes. As far as social

programmes were concerned, public pensions accounted for the largest reduction in income inequality, although the pattern was diverse across countries. To a lesser extent, social assistance, disability and family benefits also contributed to smaller income disparities.

We observed a sizeable increase in primary household inequality in all 20 countries over the last 25 years, with the exception of Ireland. In most countries, the extent of redistribution had increased as a whole, too. Tax-benefit systems have offset two-thirds of the increase in primary income inequality.

In contrast to earlier studies (Immervoll and Richardson, 2011; OECD, 2011), we did not find that tax-benefit policies had become less effective in redistribution since the mid-1990s. Among the total population, both primary income inequality and redistribution continued to rise after the mid-1990s. As a result, the tax-benefit systems in the mid-2000s were even more effective at reducing inequality compared with the mid-1990s.

We found that within rising overall redistribution, the public old-age pensions and the survivors scheme attributed 60 per cent to the increase of redistribution during the entire period 1985–2005. Social assistance accounted for 20 per cent, and the benefits for sickness, occupational injury and disease, and disability accounted for around 12 per cent of the total increase in redistribution among our 12-country-average. Other transfers (child/family benefits, maternity and other family leave benefits, military/veterans/war benefits, and other social insurance benefits) accounted for 22 per cent of the total increase in redistribution. On the contrary, direct taxes slowed down redistribution by 16 per cent during 1985–2005.

This empirical analysis did not show why benefits and direct taxes had become more or less redistributive. It can be expected that, as market income inequality rises, the tax-benefit systems will automatically have a more redistributive impact because of the progressivity built into these systems. However, also policy changes and demographic changes will certainly explain a part of the changes in redistribution. Future research should shed light on the impact of specific policy reforms and demography in changing the redistributive effect of welfare states. Finally, LIS surveys do not take into account indirect taxes which are generally considered more regressive than direct taxes. The extent of reliance on indirect taxes varies a good deal across the countries under study, with European countries especially reliant on value added taxes.

Annex 3A

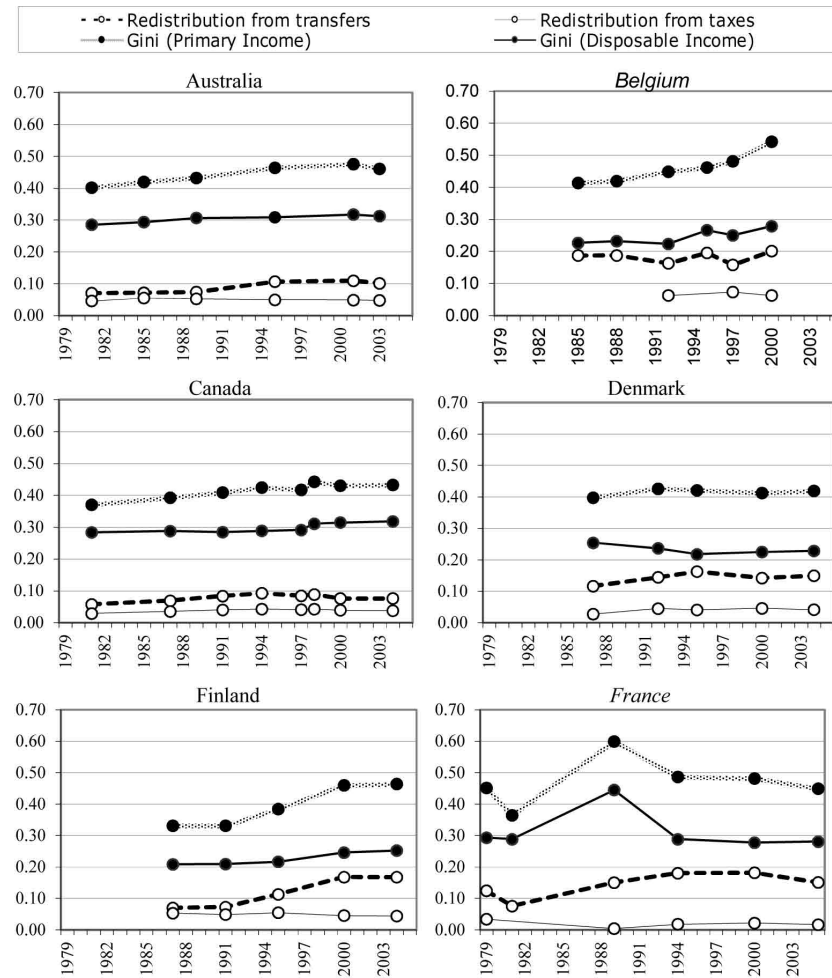
Trends in inequality and redistribution in 20 LIS countries

Figure 3A.1 illustrates the trends of overall redistribution, redistribution by transfers and redistribution by direct taxes for all 20 LIS country, 1979-2005. In all countries, the trend in total redistribution was mainly driven by transfer redistribution. The redistribution achieved by public cash transfers was more than twice as large as that achieved through direct taxes, except for Canada, Israel, and the United States.

From the mid-1980s to the mid-1990s, total redistribution increased in all countries except the Netherlands and the United Kingdom. Redistribution by transfers also increased in all countries except Italy, the Netherlands and the United Kingdom. Redistribution achieved by the tax system fell in all countries but rose in Canada, Denmark, Finland and the United States.

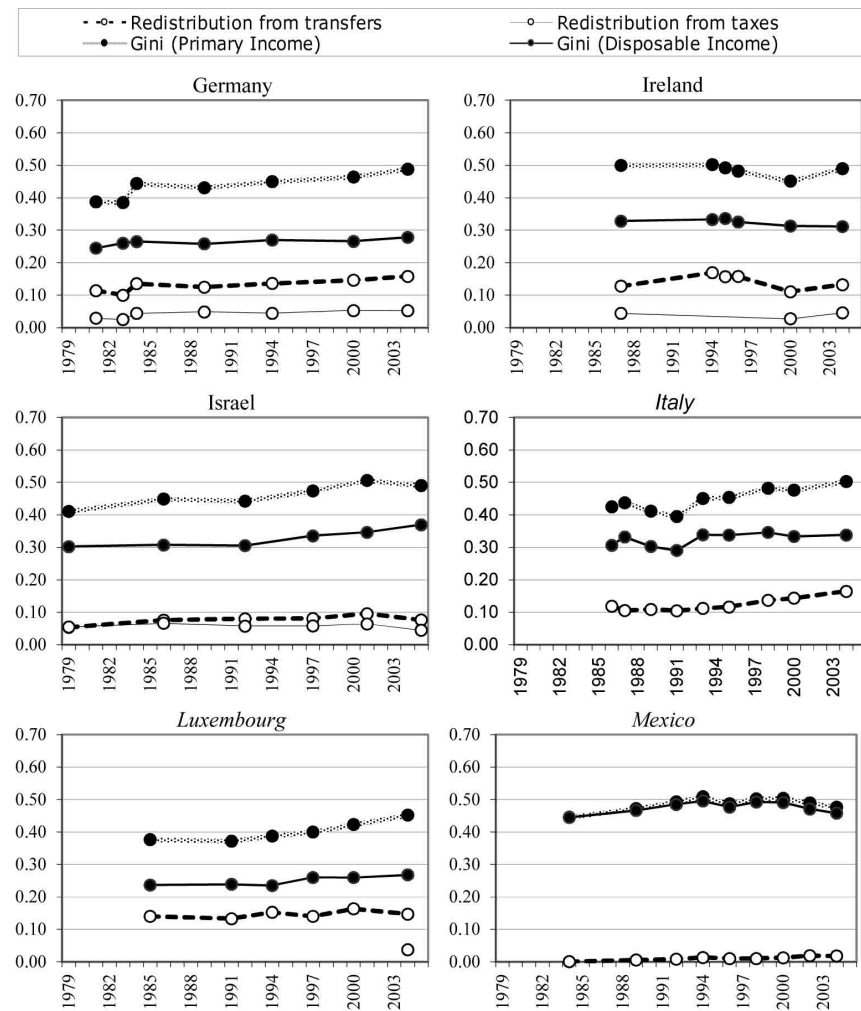
From the mid-1990s to the mid-2000s the patterns of redistribution across countries are more diverse, both in overall redistribution and in tax and transfers redistribution. In this decade, total redistribution fell in many countries but increased significantly in Belgium, Finland, Germany, Italy, Luxembourg and the Netherlands, and to a lesser extent in Ireland and Norway. The trends of transfer redistribution across countries followed the total redistribution pattern. However in Ireland and Luxembourg, the decrease of transfer redistribution did not lead to a decreasing total redistributive effect, because of the rising redistribution through the tax system in those countries. See figure 3A.1.

Figure 3A.1 Trends in inequality and redistribution in 20 LIS countries, 1979-2005



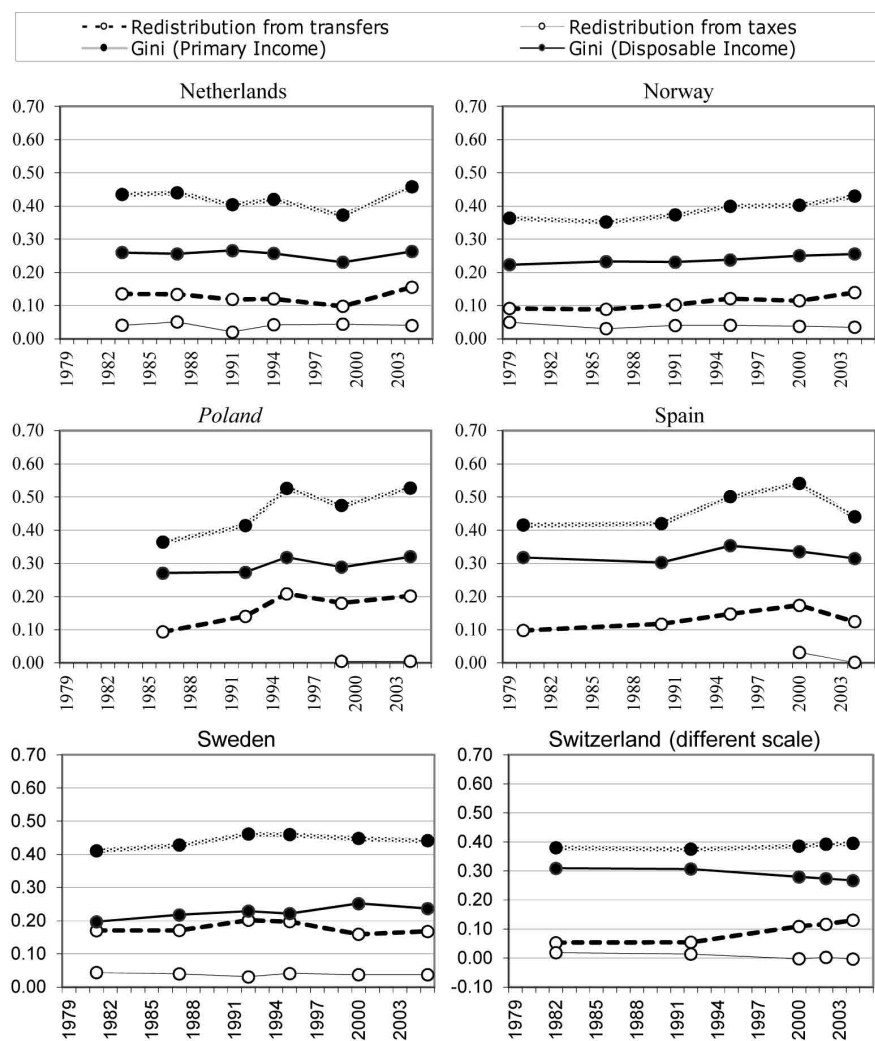
Source: Wang and Caminada (2011b), and own calculations

Figure 3A.1 Trends in inequality and redistribution in 20 LIS countries, 1979-2005 (continued)



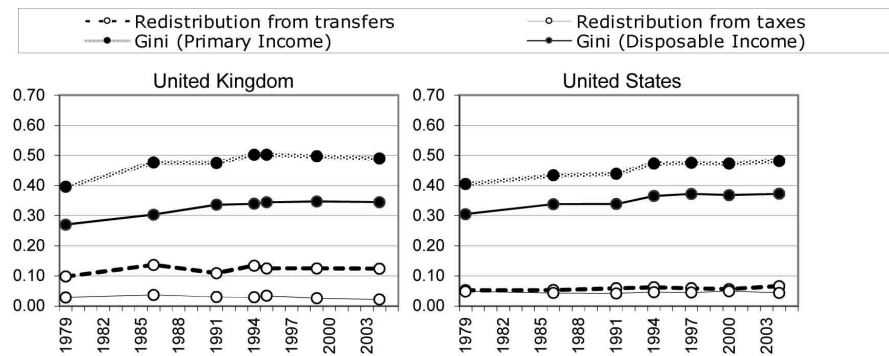
Source: Wang and Caminada (2011b), and own calculations

Figure 3A.1 Trends in inequality and redistribution in 20 LIS countries, 1979-2005
(continued)



Source: Wang and Caminada (2011b), and own calculations

Figure 3A.1 Trends in inequality and redistribution in 20 LIS countries, 1979-2005 (final)



Note: For 12 countries full tax and benefit information is available in LIS. For other 8 countries (marked *italic*) net wages and salaries are used because gross variables are not available for all data years in LIS.

Source: Wang and Caminada (2011b), and own calculations.

Annex 3B

Sensitivity analysis for redistribution using different global income inequality indicators

Literature shows that different indicators of income inequality are sensitive to different parts of the income distribution.⁹ In order to offer a broader picture of the redistributive effect of income transfers, we not only use the Gini coefficient, but also other widely used indicators, namely Atkinson's index ($\alpha=1.0$ and $\alpha=0.5$), Mean Log Deviation and Theil index. Indicators more sensitive to the middle part of the income distribution are the Gini coefficient, Atkinson's index ($\alpha=0.5$) and Theil index, while Atkinson's index ($\alpha=1.0$) and Mean Log Deviation are relatively more sensitive to the changes in the lower tail of the income distribution. The figures below show the results of the sensitivity analysis on the partial redistributive effects of income transfers for 4 countries (Germany, the Netherlands, Sweden and the United States) from around 1985 to around 2005.

This sensitivity analysis is presented in three dimensions. The first dimension is the redistributive effect across countries at one moment in time, which is shown in Figure 3B.1. It presents the level of redistribution in Germany, the Netherlands, Sweden and the United States around 2005. In each country, all indicators follow the same pattern; the largest redistribution is given by Mean Log Deviation, the lowest by the Atkinson's index ($\alpha=0.5$). The second dimension concerns the partial redistributive effects at one moment in time across countries in Figure 3B.2. Here, we see some differences for the various indicators. The highest redistribution always comes from state old-age and survivors benefits (T4), but the share of taxes and social assistance benefits (T9+T10) slightly changes depending on the indicators used. Thirdly, the trends of decomposed redistribution are similar using different indicators in most cases, although there are some exceptions; see Figure 3B.3, 3B.4, 3B.5 and 3B.6.

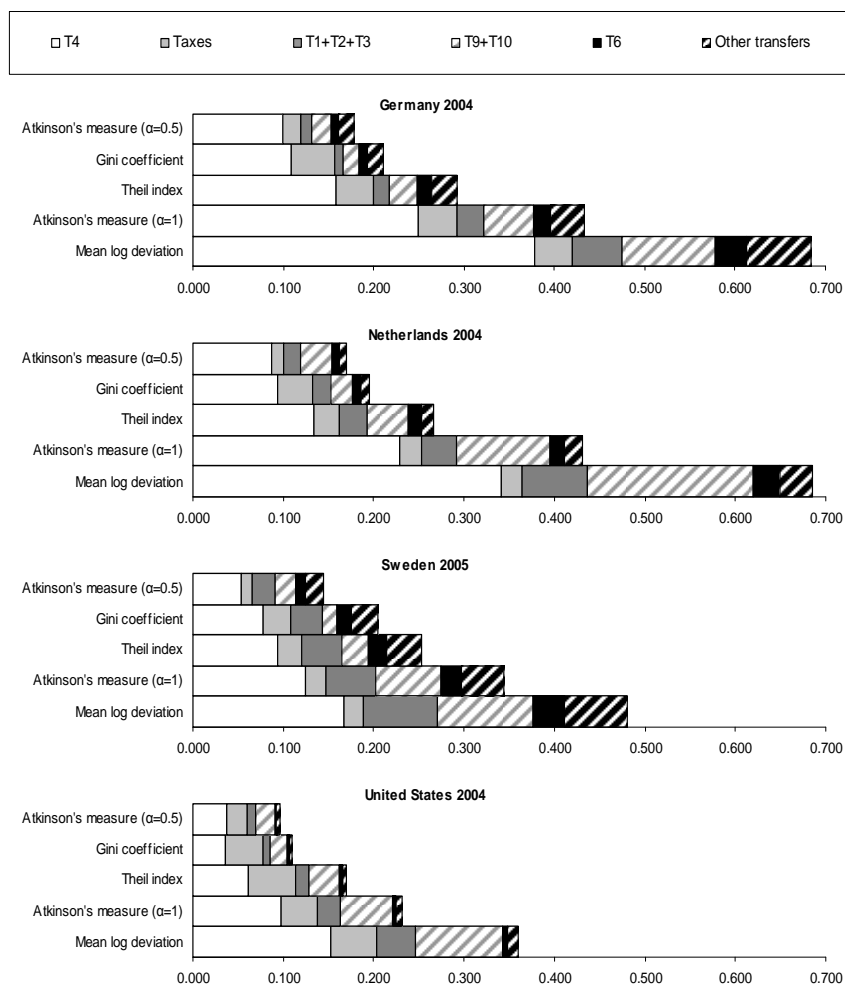
To sum up, in most cases the empirical result is hardly affected by using different global income inequality indicators. However, especially if the social programme is targeted towards a certain group, for instance the lower tail of the income distribution, the results vary slightly, depending on the indicators used.

⁹ Among others, see Atkinson et al (1995), Föster (2000), Hauser and Becker (1999) and Lambert (1993).

Social programmes presented in the Figure below are listed here:

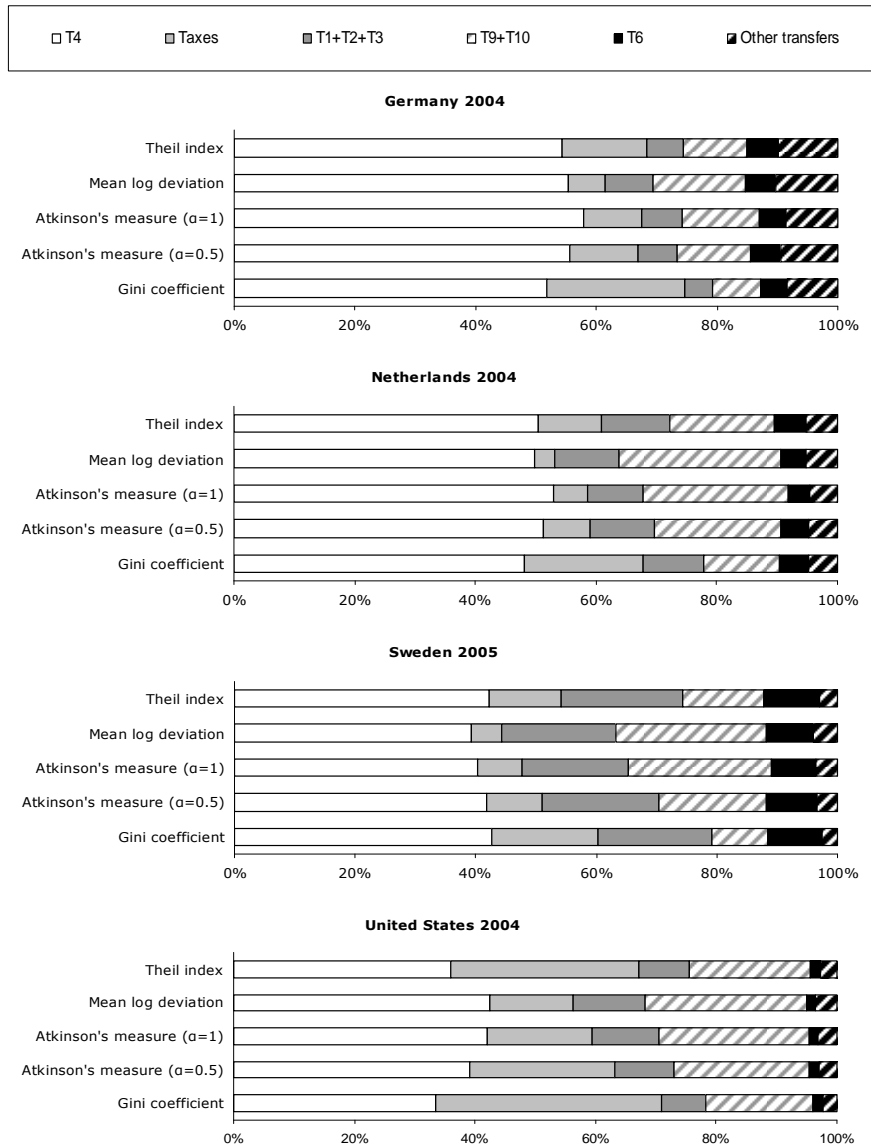
- T4: state old-age and survivors benefits;
- T1+T2+T3: benefits for sickness, occupational injury and disease, and disability;
- T9+T10: social assistance cash benefits, near-cash benefits;
- T6: unemployment compensation benefits;
- Other transfers (child/family benefits, maternity and other family leave benefits, military/veterans/war benefits, other social insurance benefits); and
- Taxes (income taxes and mandatory payroll taxes).

Figure 3B.1 Trends in inequality and redistribution in 20 LIS countries



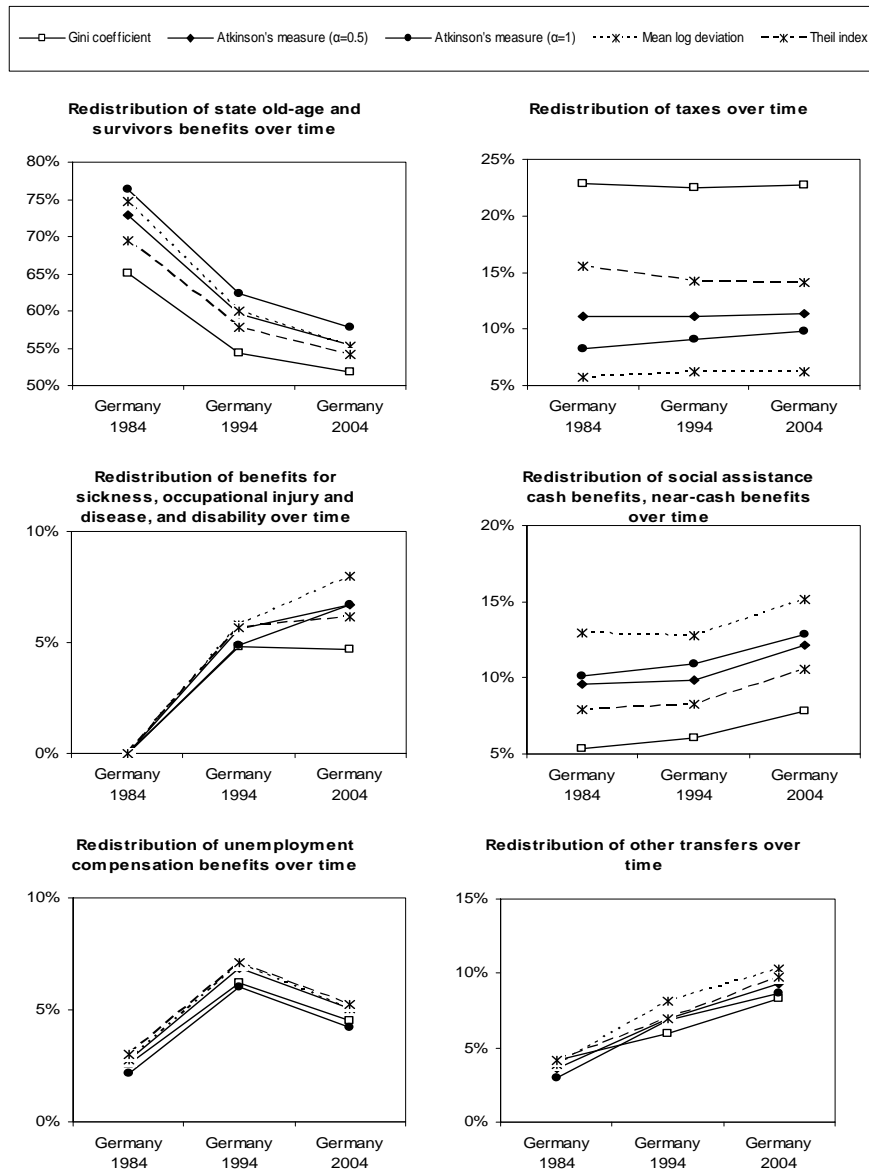
Source: Caminada, Goudswaard and Wang (2012), and own calculations.

Figure 3B.2 Sensitivity analysis for partial redistributive effects around 2005 (shares)



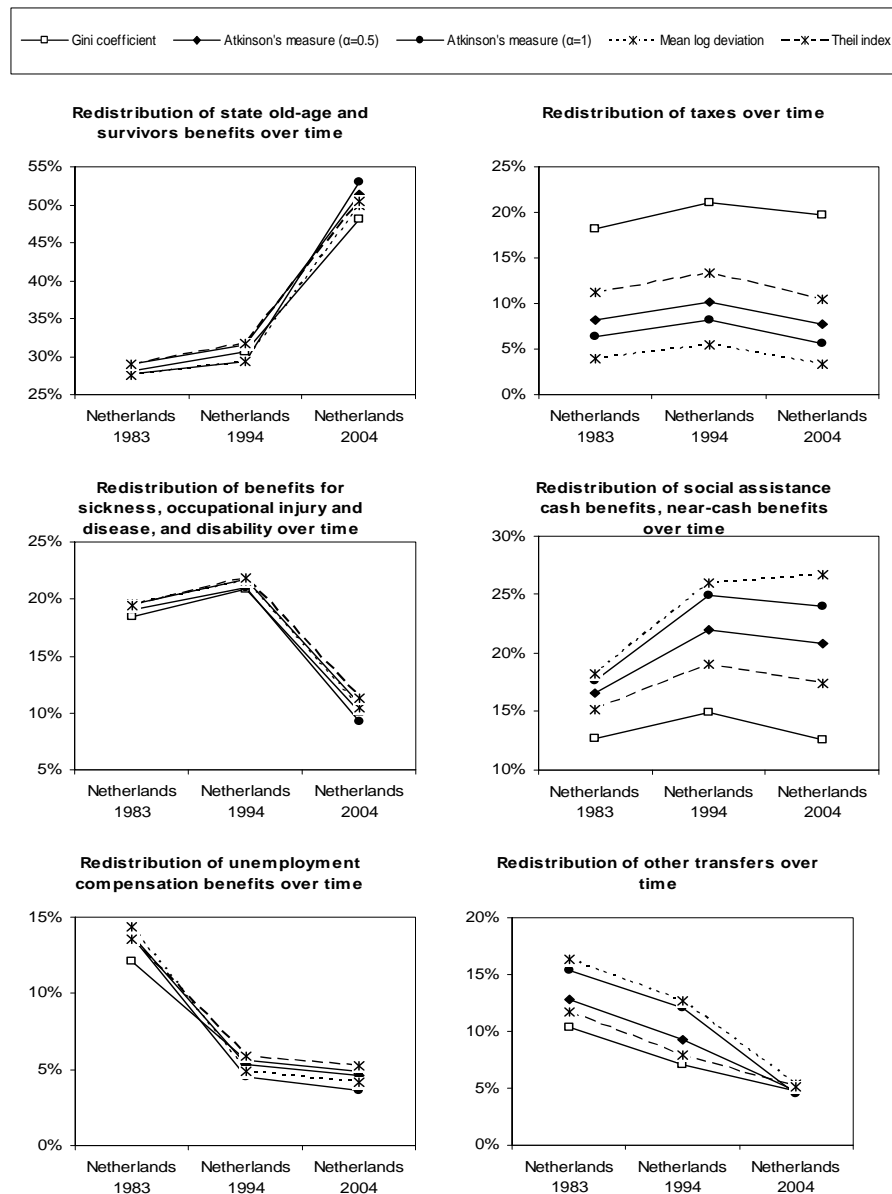
Source: Caminada, Goudswaard and Wang (2012), and own calculations

Figure 3B.3 Sensitivity analysis for partial redistributive effects in Germany over time



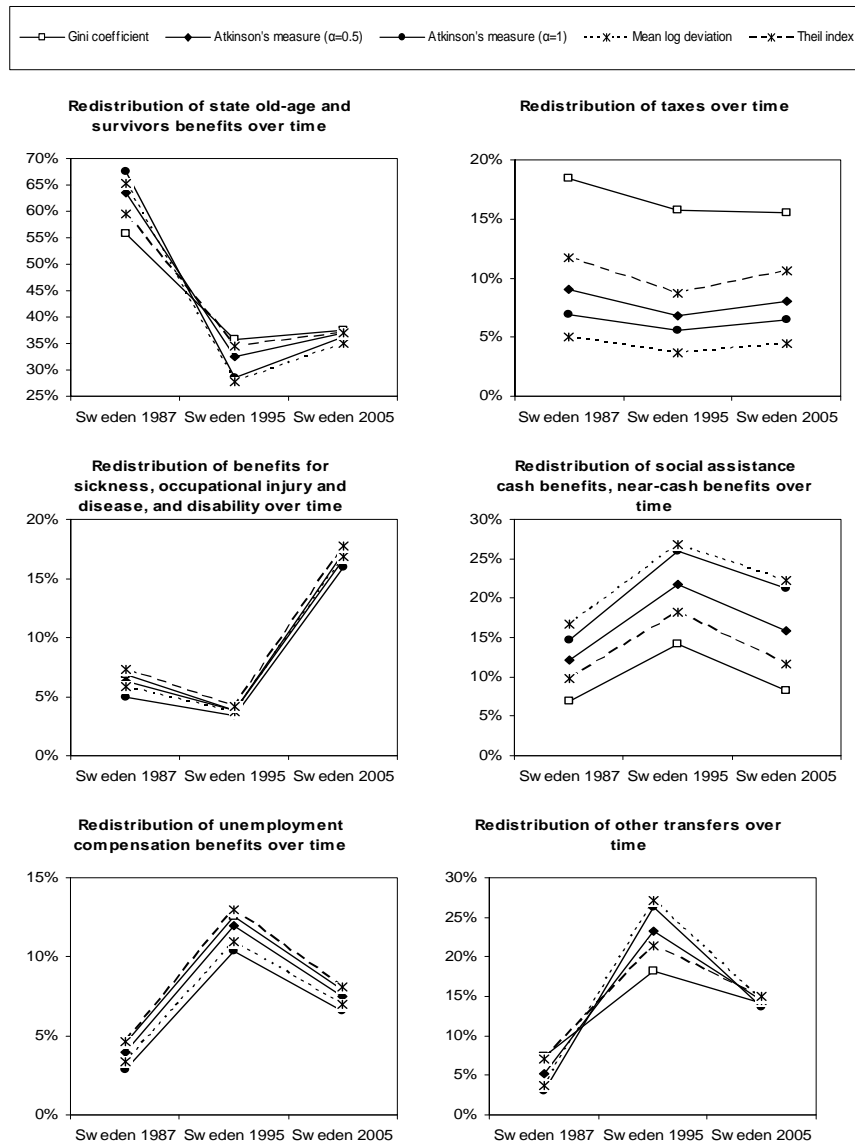
Source: Caminada, Goudswaard and Wang (2012), and own calculations.

Figure 3B.4 Sensitivity analysis for partial redistributive effects in the Netherlands over time



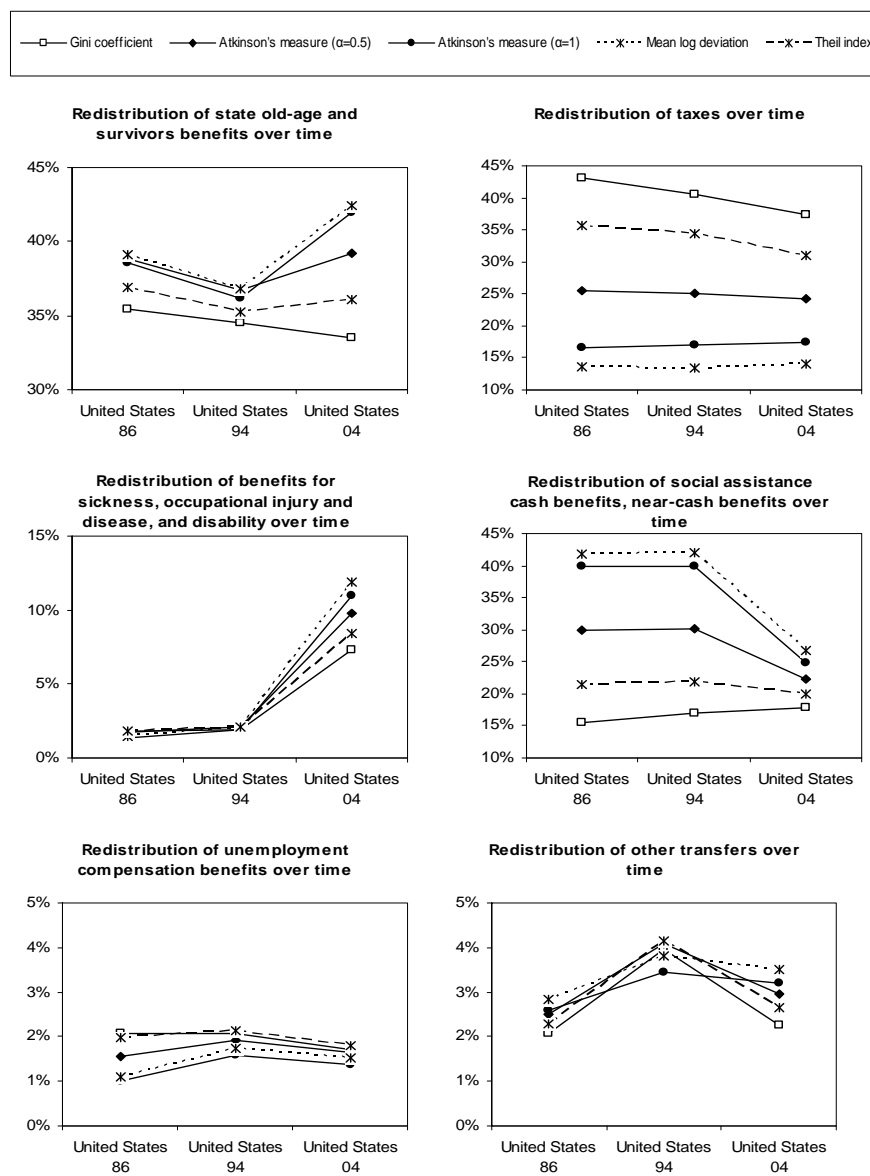
Source: Caminada, Goudswaard and Wang (2012), and own calculations.

Figure 3B.5 Sensitivity analysis for partial redistributive effects in Sweden over time



Source: Caminada, Goudswaard and Wang (2012), and own calculations.

Figure 3B.6 Sensitivity analysis for partial redistributive effects in the United States over time



Source: Caminada, Goudswaard and Wang (2012), and own calculations.

Annex 3C

Decomposition of income inequality and
redistributive effects of social transfers and direct
taxes in 20 LIS countries 1979-2005

Annex 3C Decomposition of income inequality and redistributive effects of social transfers and direct taxes in 20 LIS countries 1979-2005

		Partial effects ^a																		
Country	Year	Relative Redistribution (a-b)/a*100	Absolute redistribution (a- b)	(b) Gini disposable income	(a) Gini primary income	Transfers	Sickness benefits	Occupational injury and disease benefits	Disability benefits	State old-age and survivors benefits	Child/family benefits	Unemployment compensation benefits	Maternity and other family leave benefits	Military/veterans / war benefits	Other social insurance benefits	Social assistance cash benefits	Near-cash benefits	Taxes	Mandatory payroll taxes	Income taxes
Australia	1981	29%	0.116	0.285	0.401	0.070	0.002	0.001	0.006	0.031	0.006	0.009	-	0.007	0.009	-	-	0.046	-	0.046
	1985	30%	0.126	0.293	0.420	0.071	0.002	0.002	0.008	0.033	0.006	0.012	-	0.001	0.008	-	-	0.055	-	0.055
	1989	29%	0.126	0.307	0.432	0.073	0.002	0.001	0.009	0.024	0.005	0.010	-	0.009	0.002	0.010	-	0.052	-	0.052
	1995	34%	0.156	0.308	0.464	0.107	0.001	0.001	0.012	0.032	0.025	0.015	0.001	0.010	0.007	0.000	-	0.049	-	0.049
	2001	33%	0.158	0.317	0.475	0.109	0.000	0.003	0.013	0.033	0.020	0.009	0.015	0.009	0.008	0.000	-	0.049	-	0.049
Belgium	2003	32%	0.149	0.312	0.461	0.101	0.000	0.002	0.012	0.032	0.020	0.008	0.012	0.008	0.008	0.000	-	0.047	-	0.047
	1985	45%	0.187	0.227	0.414	0.187	0.013	0.002	-	0.108	0.028	0.030	-	-	0.001	0.004	0.000	0.000	-	0.000
	1988	45%	0.188	0.232	0.420	0.188	0.013	0.002	0.003	0.108	0.027	0.033	-	-	0.001	0.001	0.000	0.000	-	0.000
	1992	50%	0.226	0.224	0.449	0.163	-	-	0.016	0.102	0.020	0.024	-	-	-	0.001	-	0.063	0.013	0.050
	1995	42%	0.195	0.266	0.462	0.195	0.001	0.001	0.013	0.121	0.022	0.030	0.000	-	-	0.005	0.001	0.000	-	0.000
Canada	1997	48%	0.231	0.250	0.481	0.158	-	0.001	0.013	0.103	0.015	0.021	-	-	-	0.004	0.001	0.073	0.008	0.065
	2000	49%	0.263	0.279	0.542	0.201	0.002	0.000	0.006	0.153	0.013	0.021	0.000	-	-	0.004	0.001	0.063	0.063	-
	1981	23%	0.086	0.284	0.370	0.058	-	-	-	0.026	0.005	0.009	-	-	0.004	0.014	-	0.029	-	0.029
	1987	27%	0.105	0.288	0.393	0.069	-	-	-	0.031	0.004	0.012	-	-	0.006	0.017	-	0.035	-	0.035
	1991	30%	0.124	0.285	0.409	0.084	-	-	-	0.034	0.004	0.017	-	-	0.009	0.020	-	0.040	-	0.040
Denmark	1994	32%	0.136	0.289	0.424	0.093	-	-	-	0.040	0.009	0.012	-	-	0.010	0.022	-	0.043	-	0.043
	1997	30%	0.126	0.291	0.417	0.085	-	-	-	0.041	0.010	0.008	-	-	0.010	0.016	-	0.041	-	0.041
	1998	30%	0.132	0.311	0.442	0.089	-	0.003	-	0.039	0.012	0.009	-	-	0.005	0.020	-	0.043	-	0.043
	2000	27%	0.115	0.315	0.430	0.076	-	0.003	-	0.037	0.011	0.007	-	-	0.005	0.013	-	0.039	-0.002	0.041
	2004	26%	0.114	0.318	0.433	0.076	-	0.003	-	0.037	0.012	0.009	-	-	0.005	0.011	-	0.038	-0.002	0.040
Denmark	1987	36%	0.144	0.254	0.398	0.117	0.006	-	0.017	0.047	0.006	0.017	-	-	0.002	0.021	-	0.027	0.000	0.027
	1992	45%	0.190	0.236	0.426	0.144	0.007	-	0.020	0.053	0.007	0.027	-	-	0.007	0.024	-	0.045	0.000	0.045
	1995	48%	0.203	0.218	0.421	0.163	0.007	-	0.025	0.062	0.008	0.027	0.004	-	0.005	0.016	0.010	0.041	0.000	0.041
	2000	46%	0.188	0.225	0.413	0.142	0.006	-	0.022	0.061	0.007	0.014	0.002	0.000	0.005	0.016	0.008	0.046	0.001	0.045
	2004	45%	0.191	0.228	0.419	0.149	0.006	-	0.022	0.062	0.007	0.014	0.003	0.000	0.007	0.016	0.010	0.042	0.000	0.041

Annex 3C Decomposition of income inequality and redistributive effects of social transfers and direct taxes in 20 LIS countries 1979-2005 (continued)

		Partial effects ^a																		
Country	Year	Relative Redistribution (a-b)/a*100	Absolute redistribution (a-b)	(b) Gini disposable income	(a) Gini primary income	Transfers	Sickness benefits	Occupational injury and disease benefits	Disability benefits	State old-age and survivors benefits	Child/family benefits	Unemployment compensation benefits	Maternity and other family leave benefits	Military/veterans / war benefits	Other social insurance benefits	Social assistance cash benefits	Near-cash benefits	Taxes	Mandatory payroll taxes	Income taxes
Finland	1987	37%	0.123	0.209	0.332	0.073	0.002	0.000	0.002	0.030	0.008	0.004	0.003	0.005	0.004	0.011	-	0.053	0.002	0.051
	1991	37%	0.122	0.210	0.331	0.073	0.002	0.000	0.003	0.025	0.013	0.008	0.004	0.004	0.002	0.014	-	0.049	0.003	0.046
	1995	44%	0.168	0.217	0.384	0.113	0.002	0.001	0.002	0.023	0.020	0.030	0.004	0.004	0.004	0.016	0.008	0.054	0.008	0.046
	2000	46%	0.214	0.246	0.460	0.168	0.002	0.002	0.021	0.079	0.012	0.014	0.007	0.003	0.004	0.016	0.007	0.046	0.004	0.041
France	2004	46%	0.212	0.252	0.464	0.168	0.003	0.002	0.019	0.085	0.011	0.013	0.007	0.002	0.004	0.015	0.007	0.044	0.004	0.040
	1979	35%	0.159	0.294	0.452	0.125	-	-	-	0.076	0.020	-	-	-	-	0.029	-	0.034	-	0.034
	1981	21%	0.076	0.288	0.364	0.076	-	-	0.003	0.009	0.021	0.006	-	-	0.002	0.020	0.015	0.000	-	-
	1989	26%	0.154	0.445	0.599	0.150	-	-	0.001	0.091	0.022	0.017	-	-	0.003	0.003	0.013	0.004	-	0.004
Germany	1994	41%	0.199	0.288	0.487	0.180	0.003	-	0.010	0.110	0.020	0.015	0.001	0.000	0.002	0.004	0.016	0.018	-	0.018
	2000	42%	0.204	0.278	0.481	0.182	0.003	-	0.007	0.106	0.018	0.014	0.003	0.001	0.002	0.012	0.016	0.022	-	0.022
	2005	37%	0.168	0.281	0.449	0.151	0.003	-	0.006	0.078	0.018	0.015	0.002	0.001	0.002	0.012	0.015	0.017	-	0.017
	1981	37%	0.143	0.245	0.388	0.114	-	0.012	-	0.079	0.008	0.002	0.002	0.005	0.000	0.002	0.006	0.029	-0.002	0.031
Ireland	1983	32%	0.125	0.260	0.385	0.100	-	0.001	0.001	0.077	0.005	0.005	0.000	0.002	0.003	0.005	-	0.025	-0.003	0.028
	1984	40%	0.179	0.265	0.444	0.135	-	-	-	0.114	0.007	0.005	0.000	-	-	0.006	0.003	0.044	-0.003	0.046
	1989	43%	0.173	0.258	0.431	0.125	-	0.001	0.007	0.102	0.006	0.005	0.001	0.003	-	0.004	0.003	0.048	-0.003	0.051
	1994	40%	0.180	0.270	0.450	0.136	-	0.002	0.007	0.095	0.006	0.011	0.002	0.002	-	0.007	0.003	0.044	0.001	0.043
Ireland	2000	43%	0.199	0.266	0.464	0.146	-	0.001	0.010	0.101	0.011	0.009	0.002	0.001	0.001	0.008	0.003	0.052	-0.002	0.054
	2004	43%	0.210	0.278	0.489	0.158	-	0.001	0.009	0.106	0.013	0.009	0.002	0.001	0.002	0.011	0.005	0.052	0.002	0.050
	1987	34%	0.172	0.328	0.500	0.128	0.009	0.000	0.009	0.020	0.012	0.016	0.000	-	0.003	0.058	-	0.044	0.003	0.041
	1994	34%	0.169	0.333	0.502	0.169	0.006	0.000	0.013	0.048	0.013	0.009	0.000	-	-	0.076	0.005	0.000	-	-
Ireland	1995	32%	0.157	0.336	0.493	0.157	0.005	0.000	0.012	0.047	0.013	0.007	0.000	-	-	0.067	0.005	0.000	-	-
	1996	33%	0.158	0.325	0.483	0.158	0.005	0.001	0.014	0.046	0.014	0.011	0.000	-	-	0.063	0.004	0.000	-	-
	2000	31%	0.138	0.313	0.451	0.111	0.004	0.001	0.012	0.043	0.008	0.006	0.000	-	-	0.033	0.002	0.027	0.027	0.027
	2004	36%	0.178	0.312	0.490	0.132	0.005	0.000	0.007	0.034	0.020	0.007	0.000	-	0.002	0.049	0.008	0.046	0.004	0.042

Annex 3C Decomposition of income inequality and redistributive effects of social transfers and direct taxes in 20 LIS countries 1979-2005 (continued)

Country	Year	Partial effects ^a																		
		Relative Redistribution (a-b)/a*100	Absolute redistribution (a-b)	(b) Gini disposable income	(a) Gini primary income	Transfers	Sickness benefits	Occupational injury and disease benefits	Disability benefits	State old-age and survivors benefits	Child/family benefits	Unemployment compensation benefits	Maternity and other family leave benefits	Military/veterans / war benefits	Other social insurance benefits	Social assistance cash benefits	Near-cash benefits	Taxes	Mandatory payroll taxes	Income taxes
Israel	1979	26%	0.108	0.303	0.411	0.054	-	-	0.004	0.021	0.018	-	0.000	0.002	0.005	0.003	0.001	0.055	-0.003	0.058
	1986	32%	0.142	0.308	0.449	0.076	-	0.000	0.008	0.027	0.023	0.003	-	0.002	0.007	0.005	0.000	0.066	0.004	0.062
	1992	31%	0.138	0.305	0.443	0.080	0.005	-	0.006	0.022	0.015	0.006	-	-	0.019	0.006	-	0.058	0.003	0.055
	1997	29%	0.139	0.336	0.474	0.081	-	-	0.008	0.022	0.021	0.006	-	-	0.016	0.008	-	0.058	0.001	0.057
	2001	32%	0.160	0.346	0.506	0.096	-	0.001	0.011	0.024	0.023	0.008	-	0.001	0.003	0.024	-	0.064	0.004	0.061
Italy	2005	25%	0.121	0.370	0.491	0.076	-	0.001	0.014	0.024	0.012	0.003	-	0.001	0.003	0.019	-	0.045	0.003	0.042
	1986	28%	0.119	0.306	0.425	0.119	-	-	-	0.111	-	-	-	0.000	0.000	-	-	0.000	-	-
	1987	24%	0.105	0.332	0.437	0.105	-	0.000	0.019	0.078	-	-	-	0.000	0.000	0.008	-	0.000	-	-
	1989	26%	0.109	0.303	0.412	0.109	-	0.000	0.016	0.087	-	-	-	0.001	0.000	0.006	-	0.000	-	-
	1991	27%	0.105	0.290	0.395	0.105	-	0.001	0.013	0.084	-	-	-	0.000	0.000	0.007	-	0.000	-	-
Luxemb.	1993	25%	0.112	0.339	0.450	0.112	-	0.001	0.011	0.088	-	-	-	0.000	0.000	0.011	-	0.000	-	-
	1995	26%	0.116	0.338	0.454	0.116	-	0.001	0.014	0.090	-	0.004	-	0.000	0.000	0.007	-	0.000	-	-
	1998	28%	0.137	0.346	0.483	0.137	-	0.002	0.015	0.109	-	0.003	-	0.001	0.000	0.006	-	0.000	-	-
	2000	30%	0.143	0.333	0.443	0.143	-	0.002	0.012	0.116	-	0.003	-	0.000	0.000	0.010	-	0.000	-	-
	2004	33%	0.165	0.338	0.465	0.165	-	0.002	0.007	0.137	0.005	0.003	-	0.001	0.000	0.010	-	0.000	-	-
Mexico	1985	37%	0.140	0.237	0.377	0.140	0.000	0.003	0.022	0.096	0.014	0.002	0.000	-	0.001	0.002	-	0.000	-	-
	1991	36%	0.133	0.239	0.372	0.133	0.002	-	0.019	0.089	0.013	0.000	0.000	0.001	0.002	0.007	-	0.000	-	-
	1994	39%	0.153	0.235	0.388	0.153	0.001	-	0.019	0.101	0.018	0.002	0.001	0.001	0.002	0.010	-	0.000	-	-
	1997	35%	0.140	0.260	0.400	0.140	0.002	0.002	0.021	0.079	0.017	0.003	0.002	0.001	0.007	0.007	-	0.000	-	-
	2000	39%	0.163	0.260	0.423	0.163	0.001	0.002	0.021	0.105	0.020	0.002	0.005	0.000	0.001	0.007	-	0.000	-	-
	2004	41%	0.184	0.268	0.452	0.147	0.001	-	0.015	0.097	0.021	0.008	-	-	0.000	0.005	0.001	0.037	0.037	-
	1984	0%	0.445	0.001	0.446	0.446	-	-	0.000	0.001	-	-	-	-	0.000	-	-	0.000	-	-
	1989	1%	0.466	0.006	0.472	0.466	-	-	0.000	0.006	-	-	-	-	0.000	-	-	0.000	-	-
	1992	2%	0.485	0.008	0.485	0.485	-	-	0.000	0.008	-	-	-	-	0.000	-	-	0.000	-	-
	1994	3%	0.495	0.013	0.495	0.495	-	-	-	0.007	-	-	-	-	0.007	-	-	0.000	-	-
	1996	2%	0.487	0.010	0.487	0.487	-	-	0.000	0.006	-	-	-	-	0.004	-	-	0.000	-	-
	1998	2%	0.492	0.010	0.492	0.492	-	-	0.000	0.007	-	-	-	-	0.003	-	-	0.000	-	-
	2000	3%	0.491	0.013	0.491	0.491	-	-	0.000	0.006	-	-	-	-	0.007	-	-	0.000	-	-
	2002	4%	0.471	0.019	0.471	0.471	-	-	-	0.007	-	-	-	-	0.003	0.009	-	0.000	-	-
	2004	4%	0.458	0.018	0.458	0.458	-	-	-	0.007	-	-	-	-	0.003	0.007	-	0.000	-	-

Annex 3C Decomposition of income inequality and redistributive effects of social transfers and direct taxes in 20 LIS countries 1979-2005 (continued)

Country	Year	Partial effects ^a																		
		Relative Redistribution (a-b)/a*100	Absolute redistribution (a-b)	(b) Gini disposable income	(a) Gini primary income	Transfers	Sickness benefits	Occupational injury and disease benefits	Disability benefits	State old-age and survivors benefits	Child/family benefits	Unemployment compensation benefits	Maternity and other family leave benefits	Military/veterans / war benefits	Other social insurance benefits	Social assistance cash benefits	Near-cash benefits	Taxes	Mandatory payroll taxes	Income taxes
Netherl.	1983	40%	0.176	0.260	0.435	0.135	-	-	0.031	0.046	0.012	0.020	-	-	0.005	0.021	-	0.040	0.004	0.036
	1987	42%	0.184	0.256	0.440	0.134	-	-	0.031	0.042	0.010	0.012	-	-	0.005	0.026	0.008	0.051	0.002	0.048
	1991	34%	0.139	0.266	0.405	0.119	0.003	-	0.026	0.047	0.009	0.009	-	-	0.000	0.017	0.008	0.020	-	0.020
	1994	39%	0.162	0.257	0.420	0.120	0.001	-	0.030	0.047	0.011	0.009	-	-	0.000	0.017	0.006	0.042	-0.005	0.047
	1999	38%	0.142	0.231	0.373	0.098	0.001	-	0.021	0.050	0.008	0.004	-	-	0.000	0.009	0.004	0.044	0.001	0.043
Norway	2004	43%	0.196	0.263	0.459	0.156	0.002	-	0.018	0.093	0.006	0.009	-	-	0.003	0.019	0.005	0.040	-	0.040
	1979	39%	0.141	0.223	0.364	0.091	-	0.082	-	-	0.007	-	-	-	-	-	0.002	0.050	0.005	0.044
	1986	34%	0.119	0.233	0.352	0.089	-	0.074	-	-	0.008	0.002	-	-	0.002	0.002	0.001	0.031	0.005	0.025
	1991	38%	0.142	0.231	0.374	0.102	-	-	0.018	0.062	0.011	-	-	-	0.002	0.007	0.001	0.040	0.005	0.035
	1995	40%	0.238	0.238	0.400	0.121	-	-	0.019	0.066	0.012	0.009	0.001	-	0.003	0.007	0.004	0.041	0.007	0.034
Poland	2000	38%	0.152	0.250	0.402	0.114	0.006	0.000	0.023	0.054	0.009	0.004	0.008	-	0.003	0.004	0.002	0.038	0.003	0.034
	2004	41%	0.174	0.256	0.430	0.139	0.022	0.000	0.026	0.052	0.011	0.007	0.009	-	0.005	0.006	0.002	0.035	0.003	0.032
	1986	26%	0.094	0.271	0.365	0.094	-	0.000	0.024	0.052	0.002	-	0.001	-	0.016	-	-	0.000	-	-
	1992	34%	0.141	0.274	0.414	0.141	-	-	0.093	0.093	0.020	0.027	0.001	-	-	-	-	0.000	-	-
	1995	40%	0.208	0.318	0.527	0.208	-	-	0.071	0.089	0.017	0.020	0.000	-	0.002	0.009	-	0.000	-	0.000
Spain	1999	39%	0.186	0.289	0.475	0.181	0.001	-	0.049	0.103	0.009	0.009	0.002	-	0.001	0.005	0.000	0.005	0.000	0.006
	2004	39%	0.207	0.320	0.527	0.202	0.001	-	0.044	0.126	0.014	0.006	0.002	-	-	0.008	0.000	0.005	0.000	0.005
	1980	24%	0.098	0.318	0.416	0.098	-	-	-	-	-	-	-	-	0.098	-	-	0.000	-	-
	1990	28%	0.117	0.303	0.420	0.117	-	-	0.018	0.076	-	0.015	-	-	0.001	0.006	0.001	0.000	-	-
	1995	29%	0.148	0.353	0.501	0.148	0.001	0.001	0.019	0.098	0.003	0.009	0.000	-	0.002	0.012	0.000	0.000	-	-
Sweden	2000	38%	0.205	0.336	0.541	0.174	0.001	0.000	0.016	0.137	0.001	0.003	0.000	-	0.001	0.013	0.000	0.031	0.031	0.001
	2004	29%	0.126	0.315	0.441	0.124	0.003	-	0.009	0.100	0.001	0.011	-	-	0.001	0.000	0.000	0.001	-	0.001
	1981	52%	0.214	0.197	0.411	0.170	0.011	-	-	0.108	0.006	0.006	0.004	-	0.002	0.006	0.026	0.044	-0.003	0.047
	1987	49%	0.211	0.218	0.428	0.171	0.014	-	-	0.117	0.008	0.010	0.007	-	0.001	0.014	0.000	0.040	-0.002	0.041
	1992	50%	0.229	0.232	0.462	0.202	0.012	-	-	0.113	0.010	0.024	0.011	-	0.004	0.008	0.020	0.031	-	0.031
2000	1995	52%	0.239	0.221	0.460	0.198	0.008	-	0.001	0.084	0.010	0.029	0.009	-	0.023	0.011	0.022	0.041	-	0.041
	2000	44%	0.196	0.252	0.448	0.159	0.013	0.002	0.017	0.070	0.009	0.017	0.006	-	0.007	0.008	0.011	0.037	0.001	0.036
	2005	46%	0.237	0.242	0.442	0.168	0.011	0.002	0.020	0.075	0.008	0.016	0.008	-	0.012	0.007	0.009	0.037	0.001	0.036

Annex 3C Decomposition of income inequality and redistributive effects of social transfers and direct taxes in 20 LIS countries 1979-2005 (continued)

		Partial effects ^a																		
Country	Year	Relative Redistribution (a-b)/a*100	Absolute redistribution (a-b)	(b) Gini disposable income	(a) Gini primary income	Transfers	Sickness benefits	Occupational injury and disease benefits	Disability benefits	State old-age and survivors benefits	Child/family benefits	Unemployment compensation benefits	Maternity and other family leave benefits	Military/veterans / war benefits	Other social insurance benefits	Social assistance cash benefits	Near-cash benefits	Taxes	Mandatory payroll taxes	Income taxes
Switzerl.	1982	0.381	0.309	0.307	0.071	19%	0.053	-	0.005	0.043	-	0.001	-	0.000	0.002	0.002	-	0.018	0.000	0.018
	1992	0.376	0.307	0.068	0.068	18%	0.055	0.001	0.000	0.042	-	0.003	-	0.000	0.006	0.006	0.001	0.014	-0.002	0.016
	2000	0.386	0.280	0.106	28%	28%	0.109	0.001	0.000	0.088	0.006	0.004	-	0.000	0.001	0.007	0.000	-0.003	-0.012	0.009
	2002	0.393	0.274	0.119	30%	30%	0.117	0.002	0.000	0.094	0.006	0.005	-	0.000	0.001	0.006	0.000	0.002	-0.017	0.019
	2004	0.395	0.268	0.128	32%	32%	0.130	0.001	0.002	0.100	0.005	0.010	-	0.000	0.001	0.010	0.000	-0.003	-0.010	0.007
UK	1979	0.396	0.270	0.126	32%	32%	0.098	0.001	0.001	0.045	0.013	0.006	0.002	0.000	0.002	0.017	0.003	0.028	0.004	0.024
	1986	0.476	0.303	0.173	36%	36%	0.136	0.002	0.001	0.046	0.014	0.007	0.001	0.000	0.003	0.038	0.012	0.037	0.005	0.032
	1991	0.475	0.336	0.139	29%	29%	0.109	0.001	0.001	0.039	0.009	0.002	0.000	0.000	0.004	0.038	0.000	0.030	0.005	0.025
	1994	0.502	0.339	0.163	32%	32%	0.134	0.000	0.001	0.040	0.010	0.003	-	0.001	0.004	0.031	0.026	0.029	0.005	0.024
	1995	0.503	0.344	0.158	32%	32%	0.125	0.001	0.001	0.038	0.011	0.001	0.000	0.000	0.005	0.033	0.020	0.034	0.006	0.028
USA	1999	0.497	0.347	0.150	30%	30%	0.125	0.000	0.001	0.039	0.010	0.001	0.000	0.001	0.003	0.028	0.023	0.026	0.004	0.022
	2004	0.490	0.345	0.145	30%	30%	0.124	0.000	0.000	0.039	0.008	0.000	0.000	0.000	0.001	0.003	0.034	0.022	0.005	0.017
	1979	0.405	0.305	0.100	25%	25%	0.052	-	0.001	0.025	-	0.002	-	0.004	-	0.011	0.004	0.048	0.000	0.049
	1986	0.434	0.338	0.096	22%	22%	0.053	-	0.002	0.033	-	0.002	-	0.002	-	0.011	0.004	0.043	0.000	0.043
	1991	0.439	0.338	0.101	23%	23%	0.059	-	0.002	0.034	-	0.003	-	0.002	-	0.013	0.005	0.042	0.001	0.041
20 country-average around 1985	1994	0.473	0.365	0.108	23%	23%	0.062	-	0.002	0.036	-	0.002	-	0.001	0.003	0.011	0.007	0.046	0.001	0.045
	1997	0.476	0.372	0.103	22%	22%	0.059	-	0.001	0.037	-	0.002	-	0.002	-	0.013	0.005	0.045	-0.001	0.046
	2000	0.473	0.368	0.105	22%	22%	0.056	-	0.001	0.034	0.000	0.001	-	0.002	0.000	0.009	0.003	0.049	-0.001	0.050
	2004	0.482	0.372	0.109	23%	23%	0.066	-	0.001	0.035	0.000	0.002	-	0.002	0.000	0.014	0.005	0.043	0.000	0.044
	around 1985	0.412	0.285	0.128	31%	31%	0.101	0.002	0.004	0.048	0.009	0.007	0.001	0.001	0.001	0.008	0.012	0.002	0.001	0.026
12 country-average around 1985	around 1995	0.452	0.299	0.153	34%	34%	0.127	0.002	0.000	0.062	0.011	0.012	0.001	0.001	0.004	0.013	0.005	0.026	0.001	0.025
	around 2005	0.467	0.304	0.163	35%	35%	0.133	0.003	0.001	0.074	0.010	0.009	0.002	0.001	0.003	0.013	0.004	0.032	0.005	0.028
	around 1985	0.412	0.273	0.139	34%	34%	0.098	0.002	0.007	0.047	0.008	0.008	0.001	0.001	0.003	0.012	0.002	0.041	0.001	0.039
	around 1995	0.437	0.281	0.157	36%	36%	0.114	0.002	0.000	0.049	0.011	0.013	0.002	0.001	0.006	0.013	0.007	0.042	0.001	0.041
	around 2005	0.454	0.292	0.163	36%	36%	0.126	0.004	0.001	0.062	0.009	0.008	0.003	0.001	0.004	0.013	0.005	0.037	0.000	0.036
8 country-average	around 1985	0.413	0.303	0.111	27%	27%	0.105	0.003	0.001	0.050	0.010	0.007	0.000	0.000	0.016	0.010	0.002	0.005	0.000	0.005
	around 1995	0.475	0.327	0.148	31%	31%	0.146	0.002	0.000	0.083	0.012	0.011	0.000	0.000	0.001	0.014	0.003	0.002	0.000	0.002
	around 2005	0.485	0.321	0.164	33%	33%	0.143	0.002	0.000	0.092	0.011	0.009	0.001	0.000	0.001	0.012	0.003	0.026	0.013	0.015

Note: For 12 countries full tax and benefit information is available in LIS. For other 8 countries (marked *italic*) net wages and salaries are used because gross variables are not available for all data years in LIS.

^a Including the ordering effect of social programmes. We consider every specific social transfer as the first programme to be added to primary income and every direct tax as the first tax to be subtracted from gross income. In that case, the sum of all partial redistributive effects amounts to (a little) over 100 percent. We rescaled the redistributive effects of each programme by applying an adjustment factor, which is defined as the overall redistribution (100%) divided by the sum of all partial redistributive effects of all programmes (a little over 100%).

Source: Wang and Caminada (2011b), and own calculations

4 | Social investment and poverty reduction: A comparative analysis across 19 European countries[■]

ABSTRACT

The European Commission urges the member states of the European Union to better reflect social investment in the allocation of resources and the general architecture of social policy. However, the effectiveness of social investment in terms of poverty reduction has been subject of a fierce debate in the recent academic literature, because of the disappointing poverty trends since the adoption of the Lisbon Strategy in 2000. A prominent explanation in the welfare state literature is that the social investment strategy could be responsible for the disappointing poverty trend, because social investment policies are less redistributive than traditional social policies. To date, there are only a few systematic comparative empirical analyses on the outcomes of social investment policies. This paper contributes to the social investment literature by empirically analyzing the distributional effects of shifts from traditional welfare state arrangements to social investment policies in 19 European countries for the period 1997-2007. Our results suggest that the social investment strategy has not been successful in reducing poverty. However, the detrimental effect of social investment policies described in some specific cases in the literature cannot be generalized across a larger group of European countries.

Key words: social investment, poverty, income inequality, active labour market policy, EU welfare states

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4.1 INTRODUCTION

In February 2013, the European Commission *urged* the member states of the European Union to 'Better reflect social investment in the allocation of resources and the general architecture of social policy' (European Commission, 2013: 9). The member states have committed themselves to social investment through the adoption of the Lisbon Strategy in March 2000, in which they agreed upon a more equal society with more social cohesion and less poverty. In order to reach that goal, the Lisbon Strategy promoted a transition from the traditional welfare state to a new social investment state. This transition implied reforming redistributive social policies to activating social policies which are aimed at higher labour market participation. The commitment to social investment policies was reconfirmed through the adoption of the Europe 2020 strategy by the European Council in June 2010.

Despite the adoption of the ambitious goal by the European Council, it has been found that the achievement on poverty rates is disappointing. Hence, these findings have triggered a fierce debate about the effectiveness of the social investment strategy. Moreover, it has been argued that the focus on social investment policies is even partially responsible for the disappointing poverty rates (Cantillon, 2011; Vandenbroucke and Vleminckx, 2011; Morel et al, 2012). To date, the empirical insight in the relationship between social investment policies and poverty is rather limited. In this respect, Van Kersbergen and Hemerijck (2012: 489) conclude that 'it is unclear what the impact of the social investment strategy has been or is likely to have on income distribution and poverty' and Cantillon (2011: 445) concludes that 'further empirical analysis of the relationship between financial poverty and the capacity of social policies for social investment and redistribution is therefore needed.' A first group of empirical studies reveals that social investment policies may have detrimental redistributive effects (Ghysels and Van Lancker, 2011; Cantillon and Van Lancker, 2012; Van Lancker and Ghysels, 2012). Since these studies are focused on specific policies in one or two countries, it is difficult to assess whether the findings can account for a more general relationship between social investment policies and disappointing poverty rates across European countries. In contrast, Vaalavuo (2013) demonstrates that public spending on social investment is more equal or pro-poor than traditional social spending, based on a comparative study across six countries. However, because the focus of Vaalavuo's study is on year only, a linkage between the disappointing poverty trends and the welfare state transformations across European countries cannot be ruled out either. The aim of the present study is to examine the relationship between the developments in social investment policies and the variation in poverty and income inequality across countries and over time. First, we examine to what extent poverty rates and income

inequality have increased in the period 1997-2007, relying on EU ECHP/SILC¹ data. Indeed, in many countries poverty rates have increased since the beginning of the 2000s, but there is substantial variation across countries. Subsequently, we examine the extent to which the variation in poverty rates and income inequality levels is related to social investment policies using data from the OECD Social Expenditure database (2012a). To examine the relative importance of expenditures on social investment policies as an explanatory factor, the study relies on pooled time series regression analyses. This approach enables us to control for a number of other determinants highlighted in the extensive body of literature on income inequality and poverty, such as demographic factors, labour market trends, and globalization (e.g. Atkinson, 2003; Mahler, 2004; Brandolini and Smeeding, 2007; OECD, 2011; Kenworthy, 2011; Caminada, Goudswaard and Koster, 2012).

The remainder of the paper is structured as follows. In section 2, the relationship between social investment policies and poverty is discussed. Then, the data, measures and method are described in section 3. Subsequently, section 4 presents descriptive statistics, the results of the regression analyses and sensitivity analyses. Section 5 concludes the paper.

4.2 SOCIAL INVESTMENT, POVERTY AND INCOME INEQUALITY

4.2.1 Trends in poverty and income inequality

It has been well documented that levels of poverty and income inequality have increased in most European countries over the last two decades (OECD, 2008; Brandolini and Smeeding, 2009; OECD, 2011). Economists, sociologists and political scientists put forward several explanations for the developments in poverty rates and income inequality. Generally, these explanations can be categorised in three, often interrelated, types of factors: demographic developments, labour market trends and changes in government redistribution (OECD, 2008: 288-292).

Demographically, changes in the relative size of certain groups in the total population such as older people and tendencies to a smaller average household size can influence the distribution of household incomes. Labour market trends affect the changes in the household income distribution in a number of ways (Lemieux, 2008). For example, the variation in earnings inequality across countries and over time is a function of the variation in factors such as the exposure to globalisation and labour market institutions. With respect to the latter, Checchi and García-Peñalosa (2008) find for instance that stricter employment protection is negatively related to income inequality. Finally, changes in government redistribution contribute to changes in income distribution.

1 EU Household Panel survey (ECHP) and Statistics on Income and Living Conditions (SILC).

In the period from the mid-1980s to the mid-2000s, tax-benefit systems have offset rising market income inequality substantially through redistribution (Kenworthy and Pontusson, 2005; OECD, 2008 and 2011; Whiteford, 2010, Wang and Caminada, 2011a; Caminada, Goudswaard and Wang, 2012). Social transfers are responsible for the largest share of this redistribution.² Hence, reforms of welfare state arrangements because of the social investment strategy may have considerable effects on poverty and income inequality.

4.2.2 The social investment state

The social investment approach includes public policies which are aimed at both investing in human capital development and making efficient use of human capital in terms of labour market participation. As such, welfare state programmes should contribute to a skilled and flexible labour force, which can easily adapt to a constantly changing knowledge-based economy (Morel et al, 2012). Vandenbroucke and Vleminckx (2011) place the social investment approach in a broader paradigm of the 'new welfare state', that consists of three dimensions. The first one is the new-risk dimension. New social risks can be defined as 'the risks that people now face in the course of their lives as a result of the economic and social changes associated with the transition to a post-industrial society' (Taylor-Gooby, 2004: 2). They include reconciling work and family life, single parenthood, having a frail relative, possessing low or obsolete skills, and insufficient social insurance coverage. Old social risks include unemployment, old age, ill health, sickness and disability, and the financial burden of raising children (Bonoli, 2006; Vandenbroucke and Vleminckx, 2011).³ In the paradigm of the new welfare state, the new social risks should be addressed by new welfare state programmes. The second dimension of the new welfare state is the investment dimension. Public resources should be spent on investments in human capital rather than at passive cash transfers. The third dimension is the service dimension, implying that welfare states should follow the Scandinavian example and become more service-oriented and less transfer-oriented.

2 The average redistributive effect achieved by public cash transfers was twice as large as that achieved by household taxes (OECD, 2008 and 2011; Whiteford, 2010, Wang and Caminada, 2011a; Wang et al, 2012).

3 Taylor-Gooby also defines increases in the private provision of social services as a new social risk. However, the evidence on the distributional effects of shifts from public to private social security is rather mixed. Goudswaard and Caminada (2010) find evidence that the redistributive effect of private social security is smaller than that of public social security. In contrast, Van Vliet et al, (2012a) do not find evidence that shifts from public to private pension provision lead to higher levels of poverty and income inequality among older people.

The intention of the European social investment agenda was to get people out of poverty by moving them into work. Hence, Vandenbroucke and Vleminckx (2011) argue that 'active welfare state' would actually be a more accurate term than 'social investment state'. Indeed, active labour market policies (ALMPs) form an important part of the social investment state (Bonoli, 2012). In this respect, it should be noted that the overarching policy objectives have been shifted from combating unemployment to increasing employment (Hemerijck, 2013). As such, the European agenda has been successful, as most European countries reformed their labour market policies towards a more activating approach and employment rates have increased in most of those countries (Van Vliet and Koster, 2011; Van Rie and Marx, 2012). Research by Nelson and Stephens (2012) suggests that the changes in ALMPs and employment rates are related to each other, as they find a positive relationship between expenditures on ALMPs and employment rates, while accounting for confounding factors.

However, a decade after the introduction of the Lisbon Strategy, it has been observed that the European social investment policies have failed to achieve its goals in terms of lower poverty rates (Cantillon, 2011). Despite the fact that European countries experienced rather favorable conditions such as moderate economic growth and increased employment rates, poverty rates have not declined but stagnated or even increased. One explanation for this observation that has been put forward in the literature is that employment growth does not necessarily result in lower relative poverty shares. The rise in employment has not been as beneficial for the jobless households as for the households where at least one person was already in work (Marx et al, 2012; Cantillon, 2011).⁴ However, based on an extensive decomposition analysis, Corluy and Vandenbroucke (2012) found that the correlation between the share of jobless households and poverty rates depends strongly on the definition of jobless households. Furthermore, Cantillon (2011) argues that the disappointing poverty trends can at least partially be attributed to the difficult transition from traditional welfare state policies to new social investment policies. In the literature, two explanations for this negative effect of social investment policies have been formulated (Cantillon, 2011; Vandenbroucke and Vleminckx, 2011; Morel et al, 2012).

The first explanation presumes that the shift in focus from old social risks to new social risks and investment in human capital has moved away resources from traditional passive welfare state programmes to new active welfare state programmes which are relatively less redistributive. For example, Ghysels

4 In addition, Pintelon et al (2013) indicate that social risks such as unemployment are mediated by social background. Therefore, the focus of social investment policies on individual responsibility could generate new forms of marginalization, while the social investment perspective is actually aimed at minimizing the intergenerational transfer of poverty (Jenson, 2012).

and Van Lancker (2011) demonstrate that in the Belgian region of Flanders public resources on childcare or parental leave programmes tend to flow to higher income groups, mainly double-income families with better educational backgrounds and a higher earnings capacity, the so-called Matthew effect. As noted by several scholars before (Kenworthy, 2008; Atkinson, 2010; Lundvall and Lorenz, 2012), these detrimental consequences illustrate that the distributive effects of welfare state programmes depend on their particular institutional design and complementarities. In contrast, Vaalavuo (2013) shows for six European countries that new social spending benefits low-income groups more than high-income groups. Nevertheless, empirical research shows that new welfare state programmes such as child/family and parental leave programmes are generally less redistributive than traditional programmes such as old-age benefits, social assistance benefits and unemployment benefits (Wang and Caminada, 2011a; Wang, Caminada and Goudswaard, 2012). The traditional programmes play an important role in reducing income inequality, because most of them are targeted to the poor.

A second reason why the social investment strategy would be partially responsible for the increased poverty rates is that the focus on activation and 'making work pay' has implied that unemployment benefit programmes have become less generous. In many European countries, net income replacement rates of unemployment benefits have decreased (Van Vliet et al, 2012b) and eligibility conditions have become stricter (Immervoll and Richardson, 2011). Empirical research indicates that the redistributive effect of unemployment benefits has declined in many European countries (Caminada, Goudswaard and Wang, 2012). Hence, the income protection for the working-age population out of work has decreased.

In summary, it has been argued that social investment policies have contributed to increasing employment rates, but not to reducing poverty rates. As the work-poor households benefited less from the employment growth than the work-rich households, the income inequality between the work-poor and the work-rich households increases. However, European policy makers expect that higher employment rates would lead to lower levels of poverty and income inequality and the existing empirical evidence on this effect is mixed. Furthermore, the trends of increasing poverty and income inequality would be strengthened by the shift towards less redistributive welfare state programmes, as new risk-programmes mainly benefit work-rich households, while the income protection for work-poor households declines (Vandenbroucke and Vleminckx, 2011). Therefore, Cantillon (2011: 440) concludes that the 'shift from passive social protection to activation and investment has been even more problematic than anticipated and is arguably partially responsible for disappointing poverty trends.' As the distributive effects of new welfare state programmes depend on their institutional contexts, which vary across countries and over time, it is an empirical question whether shifts from traditional

welfare state programmes to activation and investment programmes have contributed to increased poverty rates.

4.3 DATA AND METHOD

4.3.1 Poverty rate and income inequality

To examine the distributional effects of shifts from traditional welfare state policies to social investment policies, the study relies on two indicators provided by Eurostat (2011): poverty rate and income inequality.⁵ Income inequality, based on the equivalised disposable income, is measured by the Gini coefficient. As our poverty indicator we use the percentage of people who live below the poverty line of 60 per cent of median equivalised disposable income of the total population. This indicator is a relative poverty line, indicating at-risk-of-poverty relative to the standard of living in each country. As such, it gives a detailed representation of income inequality for the lower part of the income distribution. The poverty line of 60 per cent (PL 60) is used as an official poverty measure by the European Council.⁶ Social investment policies are mainly targeted at the working-age population and at the youth. However, if social expenditures have been shifted from traditional welfare state policies to social investment policies, the social investment strategy could have distributional effects for the total population. Therefore, we analyze poverty trends for both the population younger than 65 and the total population. A well-known limitation of these Eurostat data is a break in the time series.⁷ However, to examine developments in poverty and inequality for a relatively large group of EU countries, these are the best data at hand and they are regularly used in pooled time series regression analyses (e.g. Dafermos and Papatheodorou, 2013). Sensitivity analyses discussed below indicate that the results of the analyses are not biased by this break.

5 It should be noted that most Eurostat income data refers to the income in the year before the survey year, except for the United Kingdom where the calculation is based on the current income and Ireland where the calculation is based on a floating 12-month reference period, that is the 12 months preceding the date of interview. Hence, to let the years of the poverty and income inequality data correspond with the data years of the other variables, we use the data of the year prior to the survey year.

6 In 2010, the European Council agreed upon the use of some other indicators in addition to the PL 60.

7 Until 2001, data were provided by the ECHP. Since 2005 all EU-15 countries provide data from the new EU-SILC. During the transitional period poverty indicators were provided by national sources which were harmonised ex-post as closely as possible with EU-SILC definitions by Eurostat. Despite the fact that most EU-SILC variables are defined in the same way as the corresponding ECHP variables, some differences arise.

4.3.2 Expenditures on Social investment

Most comparative studies on welfare states use social expenditures as a measure when analyzing longitudinal welfare state developments across different countries. To examine to what extent resources have been shifted from 'old' welfare state arrangements to 'new' social investment policies, the study relies on data from the OECD Social Expenditure Database (OECD 2012a) and the OECD Education Statistics Database (OECD 2012e). These databases contain social expenditure data on both traditional welfare state programmes and social investment policies. With respect to the measurement of social investment, the study builds on the approach laid down by Vandenbroucke and Vleminckx (2011). They classify the spending categories in the OECD databases into 'new' and 'old' social expenditures. The new welfare state expenditures are linked to new social risks and the social investment paradigm, whilst the old expenditures are linked to old social risks. Hence, new social expenditures consist of public expenditures on parental leave (covering both maternity and maternity leave), elderly care (covering residential care and home-help services), child care (covering day-care and home-help services, and pre-primary education), ALMPs (covering employment services and administration, training, job-rotation and job-sharing, employment incentives, supported employment and rehabilitation, and direct job creation) and primary and secondary education. Old social expenditures include public health expenditures, retirement pensions (covering both 'old age' (including 'early retirement') and 'survivor' cash benefits) and other social transfers (covering family benefits, incapacity-related benefits, unemployment benefits, income maintenance, and other cash benefits).⁸ Subsequently, we take the ratio of new social expenditures to the sum of old and new social expenditures. This measure provides an indication of shifts in budgetary resources from old to new social spending.

In cross-national analyses at the macro-level, social expenditure indicators have some limitations (De Deken, 2013). First, differences in the composition of social expenditures with respect to new and old welfare state programmes can indicate deliberate choices to spend more on certain programmes, but they may also reflect variation in demographic and socio-economic trends across countries. In particular the expenditures on public health and retirement pensions (both old expenditures) and on elderly care (new social expenditure) may be simply a function of the relative share of older people. In the sensitivity analyses discussed below, we examine the sensitivity of our results for these spending categories. Second, expenditures do not indicate institutional characteristics of welfare state programmes. With regard to labour market policies for instance, expenditures give an indication of the financial efforts on labour

8 See Vandenbroucke and Vleminckx (2011: 463-464) for a detailed description of these expenditures.

market training and public employment services, but not of benefit sanctions (Van Vliet, 2010). Third, differences in taxation of social benefits are not taken into account. Ideally, net expenditures, after tax, on new and old welfare state programmes are used, but internationally comparable data for those welfare state programmes are unfortunately not available for a longer period.

4.3.3 Control variables

The models explicitly control for a number of other determinants of poverty and income inequality. First, we include a number of socio-economic variables. To control for the negative effect of the overall generosity of welfare states on poverty and income inequality (Brady 2005£» Kenworthy 1999£» Møller et al, 2003), we include total social expenditure as a percentage of GDP using data from the OECD (2012a).⁹ The logarithm of GDP per capita is included in the model to control for the economic development of a country. In some studies (e.g. Galor and Zeira, 1993; Alesina and Rodrik, 1994) it has been found that economic growth is related to less inequality. However, in other studies (e.g. Li and Zou, 1998; Forbes, 2000) a positive relationship between growth and inequality has been found, suggesting that there is a trade-off between growth and inequality.¹⁰ Data on real GDP per capita are taken from the OECD (2012b). For the employment rate, the study relies on data from the OECD (2012c).¹¹ Since stimulating employment rates is an important goal of the social investment strategy, we also examine the endogeneity of employment rates. Furthermore, the age composition of the population plays a role in the income (re)distribution (Lam, 1997; Gustafsson and Johansson, 1999). Therefore, we include the percentage of the population aged 65 and over and aged 15 and younger, using data from the OECD (2012c).

Furthermore, the study controls for the possible impact of globalisation. The linkages between international economic integration and income distributions have been analyzed extensively (Çelik and Basdas, 2010; Figini and Görg, 2006; Thewissen et al, 2013; Zhou et al, 2011). From the Stolper-Samuelson theorem, we should expect that the exposure to international markets leads

9 The correlation between the ratio New/(New+Old) social expenditure and the total expenditure is 0.26.

10 See also Thewissen (2013).

11 Another relevant control variable could be the unemployment rate. In the first place, high unemployment rates can be expected to have an effect on poverty rates and on income inequality. In the second place, when increases in social expenditures fall short of increases in the number of benefit recipients, this might have negative consequences for the incomes of unemployed people and for the income inequality. Because of the high correlation between the employment rate and the unemployment rate (> 0.7 (negative)), only the employment rate is included. As a robustness check, we also ran the regressions with the unemployment rate instead of the employment rate, which did not alter the results for the social investment variables (reported later).

to a higher skill demand in affluent democracies, which causes higher income inequality. To account for the effect of globalisation, two measures are included, namely trade openness and financial openness. The first variable is measured as the sum of imports and exports as a percentage of GDP. The second variable is measured as the sum of inward and outward flows of foreign direct investment (FDI) as a percentage of GDP. For both measures, the study relies on OECD data (2012d).¹²

Finally, two variables are included to account for labour market institutions, namely employment protection legislation and labour unions. The effects of these labour market institutions are *a priori* ambiguous (Checchi and García-Peñalosa, 2008). On the one hand, these institutions could lead to higher wages and less wage dispersion for employees and therefore they could be expected to reduce income inequality. Yet, on the other hand, these institutions could increase the differences between employees with permanent contracts (insiders) and employees with temporary contracts or unemployed people (outsiders). To measure the strength of trade unions, the study relies on union density data from the OECD Labour Force Statistics (OECD, 2012c). For the strictness of EPL, we rely on an indicator that is provided by the OECD (2009). The indicator covers regular and temporary employment. It is calculated as a weighted average of sub-indicators of employment regulation, such as legislative provisions setting conditions under which a dismissal is justified, procedural inconveniences that an employer may face during a dismissal process, notice and severance pay provisions and the restrictions on the hiring of temporary employment by firms.¹³ The indicator is normalized to a scale from 0 to 6 where a higher score indicates stricter employment regulation.¹⁴

12 For FDI, we interpolated the data for missing observations in some countries such as Belgium and Slovakia. The main results do not alter if we leave out FDI.

13 The indicator includes six sub-measures for restrictions on the hiring of temporary employment: valid cases for the use of fixed-term contracts, the maximum number of successive fixed-term contracts, the maximum cumulated duration of successive fixed-term contracts, the types of work for which temporary work agency employment is legal, restrictions on the number of renewals and the maximum cumulated duration of temporary work agency contracts.

14 A limitation of this indicator is that some characteristics of EPL may be not fully reflected. For instance, since notice periods and severance pay are not legally regulated in some countries, they might be provided by collective agreements or contractual extensions. Because there is no detailed information about such contractual provisions, the EPL index often relies on minimal requirements as provided by labour law. Another disadvantage is the lack of incorporation of judicial practices deviating from the minimal legal requirements (OECD, 2004). Despite these limitations, the index is a conventional summary measure to analyse a relatively large number of countries over a longer period.

4.3.4 Method

To examine the relationship between social investment policies and poverty, we run a number of pooled time series cross-section regression analyses. The estimations are based on the following type of equation:

$$I_{it} = \alpha + \beta' X_{it} + \delta' Z_{it} + \mu_i + \lambda_t + \varepsilon_{it} \quad (1)$$

Here, I is the dependent variable poverty (PL60) or income inequality (the Gini coefficient) for country i in year t . X contains variables describing social policies, namely expenditure on old social programmes, on new social programmes and new welfare spending relative to old welfare spending. Z represents the control variables, including total social expenditure, employment rate, real GDP per capita, the share of people aged 65 and over relative to the total population, the share of people aged 15 and younger relative to the total population, trade union density, and trade and financial openness. To account for the fact that the variation in poverty and income inequality may be related to unobserved country- and year-specific effects, country (i) and year (t) effects are modeled by μ and λ respectively. With the inclusion of country-specific effects, the estimator is focused on the variation within countries. Differences in the levels of the variables between countries are not taken into account with this estimator. As such, the aim of the estimations is to test whether increases in poverty and inequality are associated with social expenditure shifts within countries, rather than analyzing associations between expenditure levels and poverty levels across countries.¹⁵ To correct for autocorrelation, the error term ε is allowed to follow an AR(1)-process. Furthermore, panel-corrected standard errors are applied to correct for panel heteroskedasticity and simultaneous spatial correlation (Beck and Katz, 1995).

The study includes 19 European countries for which a reasonable number of observations is available – Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, the Netherlands, Norway, Poland, Portugal, Slovak Republic, Spain, Sweden, and the United Kingdom. Below, we examine the sensitivity of the results for the country selection.

¹⁵ Estimation results without country-specific effects are discussed in the section on sensitivity analyses.

4.4 EMPIRICAL ANALYSIS

4.4.1 Descriptive statistics

Data on poverty and income inequality are presented in Table 4.1. On average, the levels of poverty and income inequality increased between 1997 and 2007. More specifically, also in the years after 2000, the period in which the Lisbon Strategy has been implemented, poverty and income inequality increased. Hence, the increases in the poverty rates in the majority of the European countries are in line with the disappointing poverty trend that has been observed by Cantillon (2011). Furthermore, there is quite some variation across countries. The level of income inequality has increased in most but not all the countries. Interestingly, Austria and France have faced a moderate increase in income inequality, while the poverty rate has decreased. The largest decreases in income inequality are observed in Spain and Ireland while the largest decrease in poverty is found in Portugal. Finland and Sweden faced strong increases in both measures, but they still belong to the countries with the lowest levels of poverty and income inequality.¹⁶

¹⁶ The correlation between the Gini coefficient and poverty rate with respect to the total population is 0.88.

Table 4.1 Trends of poverty rates and income inequality, 1997-2007

	Poverty (PL60)					Income inequality (Gini coefficient)				
	1997	2000	2003	2007	Change 97-07	1997	2000	2003	2007	Change 97-07
Austria	13.0	12.0	12.8	12.4	-0.6	0.240	0.240	0.258	0.262	0.022
Belgium	14.0	13.0	15.1	14.7	0.7	0.270	0.280	0.261	0.275	0.005
Czech Republic	-	8.0	10.4	9.0	-	-	0.250	0.260	0.247	-
Denmark	10.0	10.0	10.9	11.8	1.8	0.200	0.220	0.239	0.251	0.051
Finland	9.0	11.0	11.0	13.6	4.6	0.220	0.270	0.255	0.263	0.043
France	15.0	13.0	13.6	12.7	-2.3	0.280	0.270	0.282	0.292	0.012
Germany	11.0	11.0	12.2	15.2	4.2	0.250	0.250	0.261	0.302	0.052
Greece	21.0	20.0	20.2	20.1	-0.9	0.350	0.330	0.330	0.334	-0.016
Hungary	-	11.0	13.5	12.4	-	-	0.250	0.276	0.252	-
Ireland	19.0	20.0	20.5	17.2	-1.8	0.330	0.300	0.306	0.313	-0.017
Italy	18.0	19.0	19.1	18.7	0.7	0.310	0.290	0.332	0.310	0.000
Netherlands	10.0	11.0	10.7	10.5	0.5	0.250	0.270	0.269	0.276	0.026
Norway	-	11.0	10.8	11.4	-	-	-	0.252	0.251	-
Poland	-	16.0	20.5	16.9	-	-	0.300	0.356	0.320	-
Portugal	21.0	20.0	20.4	18.5	-2.5	0.370	0.370	0.378	0.358	-0.012
Slovak Republic	-	-	13.5	10.9	-	-	-	0.262	0.237	-
Spain	18.0	19.0	21.7	19.6	1.6	0.340	0.330	0.307	0.313	-0.027
Sweden	8.0	9.0	11.3	12.2	4.2	0.210	0.240	0.230	0.240	0.030
United Kingdom	18.0	19.0	18.0	18.6	0.6	0.300	0.320	0.340	0.326	0.026
Mean 14	14.6	14.8	15.5	15.4	0.8	0.280	0.284	0.289	0.294	0.014
Mean 19	-	-	15.1	14.5	-	-	-	0.287	0.285	-

Note: Mean 14 countries excludes Czech Republic, Hungary, Norway, Poland and Slovak Republic. For some countries, data years are around 1997 (Denmark and Sweden, 1996), around 2000, around 2003 (Czech Republic, Germany, Hungary, the Netherlands, Poland and Slovak Republic, 2004), or around 2007.

Source: Eurostat SILC-database (Eurostat, 2011) and own calculations.

Table 4.2 presents the developments in social expenditures on new and old welfare state programmes. On average, the expenditures on new welfare state programmes slightly increased, whilst the expenditures on old welfare state programmes remained constant. Hence, new spending as a share of total social expenditures increased on average, albeit to a limited extent. New social expenditures as a share of total social expenditures rose on average from 24 per cent in 1997 to 24.4 per cent in 2007. More interestingly, there is substantial variation in the development of new social expenditures as a share of total social expenditure across countries. In some countries, such as the Netherlands and Spain, new spending increased and old spending decreased, which resulted in increases in the new social spending as a share of total spending. However, in a number of other countries, the relative shift towards more new social expenditures was the result of the fact that the increases in new expend-

itures were larger than the increases in old expenditures.¹⁷ This was for instance the case in Belgium, Hungary, Italy and the United Kingdom. Hence, the average figures suggest that there have been shifts from old social expenditures to new social expenditures. However, only in a few countries the relative shifts towards more new social expenditures were the result of shifts in resources from traditional welfare state programmes to social investment policies. Other countries have spent relatively more on social investment policies as well, but they have not decreased redistributive social transfers.

Furthermore, the decreases of both the standard deviation and the coefficient of variation show that the dispersion of new social expenditures – both as a percentage of GDP and as a share of the sum of new and old expenditures – has declined. This indicates that the expenditures on new welfare state policies have converged across the EU countries. The data show that also old social expenditures have converged.

17 In Sweden and Finland, the relative shift towards more new social expenditures was the result of the fact that the decreases in new social expenditures were smaller than the decreases in old social expenditures.

Table 4.2 Expenditures on new and old welfare state policies, 1997-2007

	New social expenditures as % of GDP			Old social expenditures as % of GDP			New/(New+Old) expenditure ratio (%)		
	1997	2007	Change 97-07	1997	2007	Change 97-07	1997	2007	Change 97-07
Austria	6.4	5.6	-0.8	24.5	24.2	-0.3	20.8	18.8	-2.0
Belgium	4.3	7.0	2.7	22.8	23.2	0.4	15.8	23.2	7.4
Czech Republic	4.8	5.1	0.3	17.2	16.5	-0.7	21.8	23.6	1.9
Denmark	11.8	10.2	-1.6	18.9	18.5	-0.3	38.4	35.4	-3.0
Finland	8.5	7.4	-1.1	22.8	19.6	-3.2	27.2	27.3	0.1
France	7.4	7.3	-0.1	24.2	24.3	0.0	23.4	23.1	-0.3
Germany	5.7	4.7	-1.0	23.7	22.3	-1.4	19.4	17.4	-1.9
Greece	3.9	3.1	-0.8	16.4	19.3	3.0	19.2	13.8	-5.4
Hungary	5.4	6.3	0.8	17.7	19.2	1.5	23.5	24.6	1.1
Ireland	4.9	4.7	-0.2	11.8	14.5	2.7	29.2	24.3	-4.9
Italy	4.3	4.9	0.6	21.9	23.3	1.4	16.3	17.4	1.0
Netherlands	6.0	7.3	1.4	18.7	16.0	-2.7	24.2	31.4	7.2
Norway	9.0	7.9	-1.1	16.0	15.2	-0.7	36.1	34.2	-1.9
Poland	4.7	5.0	0.3	19.4	18.5	-0.9	19.7	21.4	1.7
Portugal	4.4	4.9	0.5	16.1	21.2	5.1	21.5	18.8	-2.8
Slovak Republic	4.0	4.1	0.1	16.8	14.1	-2.7	19.2	22.5	3.3
Spain	4.7	5.6	0.9	19.4	18.9	-0.5	19.3	22.8	3.4
Sweden	11.6	10.4	-1.2	21.0	18.7	-2.4	35.5	35.8	0.3
United Kingdom	4.9	6.4	1.6	14.8	16.4	1.5	24.7	28.2	3.5
Mean	6.1	6.2	0.1	19.2	19.2	0.0	24.0	24.4	0.5
Standard deviation	2.4	1.9	-0.5	3.5	3.2	-0.3	6.6	6.3	-0.3
Coefficient of variation	0.4	0.3	-0.1	0.2	0.2	0.0	0.3	0.3	0.0

Note: For some countries, data years for expenditures are around 1997 (Belgium, 1998; Hungary, 1999; Poland, 2000; Slovak Republic, 1999; United Kingdom, 1998) or around 2007 (Greece, 2005; Hungary, 2006).

Source: OECD Social Expenditure Database (OECD, 2012a) and own calculations.

4.4.2 Regression results

The descriptive statistics presented above do not indicate a clear pattern between increased poverty rates and expenditure shifts towards new welfare state programmes. In some of the countries where the poverty rates increased, such as Belgium, the share of total social expenditure on new programmes has been increased. However, in other countries where the poverty rates increased in that period, such as Denmark, the share of new social expenditure has actually been decreased.

We analyze the variation with regression analyses on the 19 European countries over the years 1997-2007. Table 4.3 presents the results. Old social expenditure as a percentage of GDP is negatively and significantly related to poverty and income inequality and poverty. Consistent with our expectations based on the literature, this suggests that higher expenditures on traditional welfare state programmes are associated with less poverty and income inequality. Comparable results can be observed for the total financial efforts on welfare state programmes. Total social expenditure is negatively and significantly related to poverty. However, the coefficient is not significantly associated with income inequality.

With respect to new social expenditure as a percentage of GDP, the results do not indicate significant effects on poverty and income inequality. The Models 3 and 7 show a positive and significant coefficient for new social expenditure as percentage of total social expenditure. These results suggest that relative expenditure shifts from traditional welfare state programmes to new welfare state programmes are related to higher levels of poverty and income inequality. However, Models 4 and 8 show that when total social expenditure is added to the models to control for the overall welfare state generosity, the coefficients for the share of new social expenditure remain positive, but they are not significant anymore. In summary, the results provide at most very weak evidence for the explanation put forward in the literature that increased poverty rates are partly attributable to the stronger focus on new welfare state programmes.¹⁸

As to employment rates, the results indicate a negative association with income inequality, suggesting that higher labour participation decreases income inequality. With respect to poverty, three of the four models show a positive and significant effect. This result is remarkable, but it is in line with the argument that increasing employment does not necessarily result in lower relative poverty rates. The positive coefficient is probably inherent to the measurement

18 Activation is a key element of the social investment strategy. Therefore, we examined also expenditures on ALMPs instead of new social expenditure. ALMP expenditure relative to passive labour market policy expenditure and ALMP expenditure as a share of total (active and passive) labour market policy expenditure are both positively and insignificantly associated with income inequality and poverty.

of the concept of relative poverty. If employment growth increases the median income, more households with a low income fall below the poverty threshold, even though their incomes did not decline.

Turning to the demographic variables, the results indicate that larger shares of the population aged 65 and above are positively related to poverty and income inequality. As in many countries older people hardly have any income from work and most of their incomes are from pensions and government transfers (Brown and Prus, 2003), larger shares of older people imply higher levels of poverty and inequality. Furthermore, the results indicate that union density is negatively and significantly associated with income inequality. This indicates that countries with stronger labour unions have more compressed wage distributions. The models for poverty show a negative but insignificant relation with union density.

Regarding the index for EPL, the results show a positive and significant effect for three of the four models for poverty. The fourth model and the models for income inequality show positive coefficients, but they do not reach significance. Taken together, the results provide weak evidence for a positive effect of employment protection. This suggests that strict employment protection leads to a segmented labour market with relatively high degrees of income inequality between insiders and outsiders. For GDP per capita, the share of the population aged 15 and younger, FDI and trade, the regressions yield no significant effects.

Table 4.3 Panel data regressions of poverty, income inequality and new social expenditures

	Poverty (60% of median income)				Income inequality (Gini coefficient)			
	M1	M2	M3	M4	M5	M6	M7	M8
Old social expenditure (% of GDP)	-0.450*** [-5.60]				-0.315* [-1.92]			
New social expenditure (% of GDP)	-0.253 [-1.04]				0.262 [0.80]			
New/(New+Old) social expenditure ratio			0.116** [2.13]	0.019 [0.35]			0.173** [2.08]	0.120 [1.30]
Total social expenditure (% of GDP)		-0.365*** [-3.77]		-0.383*** [-3.96]		-0.230 [-1.47]		-0.184 [-1.25]
Employment rate	0.058** [2.52]	0.050 [1.49]	0.083*** [2.89]	0.073*** [3.14]	-0.220*** [-3.18]	-0.257*** [-3.56]	-0.195*** [-2.85]	-0.206*** [-3.05]
GDP per capita	0.869 [0.18]	2.430 [0.64]	-1.106 [-0.23]	-0.188 [-0.04]	-1.519 [-0.21]	3.851 [0.71]	-2.089 [-0.30]	-1.659 [-0.24]
People under 15 (% of total population)	0.014 [0.05]	0.177 [0.51]	0.089 [0.31]	0.026 [0.09]	0.703 [1.46]	0.993** [2.30]	0.751 [1.53]	0.714 [1.45]
People over 65 (% of total population)	0.489** [1.79]	0.644* [1.81]	0.453 [1.60]	0.494* [1.79]	0.929* [1.74]	1.137** [2.38]	0.929* [1.74]	0.936* [1.76]
Union density	-0.046 [-0.78]	-0.045 [-0.69]	-0.128 [-1.57]	-0.060 [-0.92]	-0.293** [-2.11]	-0.231 [-1.59]	-0.335*** [-2.46]	-0.298*** [-2.15]
FDI (% of GDP)	-0.012 [-0.63]	-0.012 [-0.69]	-0.006 [-0.32]	-0.012 [-0.61]	0.023 [0.93]	0.021 [0.81]	0.025 [1.05]	0.023 [0.94]
Trade (% of GDP)	0.018 [0.96]	0.017 [0.91]	0.034** [2.00]	0.023 [1.18]	-0.038 [-1.08]	-0.044 [-1.43]	-0.029 [-0.91]	-0.036 [-1.05]
Employment protection legislation	0.678 [1.52]	0.995** [2.43]	0.789** [2.29]	0.789* [1.76]	0.236 [0.30]	0.456 [0.59]	0.435 [0.57]	0.304 [0.38]
Constant	2.958 [0.05]	-21.297 [-0.44]	6.925 [0.12]	9.666 [0.17]	48.689 [0.59]	-14.773 [-0.23]	42.968 [0.55]	45.220 [0.55]
Time dummy	yes	Yes	yes	yes	yes	yes	yes	yes
Country dummy	yes	Yes	yes	yes	yes	yes	yes	yes
No. of observation	154	162	154	154	150	158	150	150
No. of country	19	19	19	19	19	19	19	19
Rho	0.266	0.291	0.335	0.298	0.142	0.198	0.135	0.142
Adj R-sq	0.937	0.921	0.928	0.934	0.916	0.899	0.914	0.916

Note: OLS regressions; unstandardised coefficients; t-values in parentheses; Prais-Winsten transformation [AR (1) disturbances]; Rho represents the coefficient of the auto-correlation of the error term, ranging from 0 to 1. * significant at 10%; ** significant at 5%; *** significant at 1%.

4.4.3 Sensitivity analyses

We perform a number of sensitivity analyses. Given the focus of social investment policies, it could be argued that social investment policies mainly affect the youth and the working age population. Therefore, we also examine the distributional effects of expenditure shifts for the population below 65 years old. In these analyses, the expenditures public health and retirement pensions (both old expenditures) and on elderly care (new social expenditure) are excluded from the expenditure ratios, because these programmes are targeted at people aged 65 and over. For the population below 65 years old only data on poverty are available. The estimations presented in Table 4.4 show that the results for the people below 65 are in line with the results for the total population presented above. Old social expenditure and total social expenditure yield a negative and significant association. Model 11 shows that new social expenditure as a share of total social expenditure is positively and significantly associated with poverty. Again, when total social expenditure is added, the coefficient for the share of new social expenditure is not significant anymore (Model 12).¹⁹

Furthermore, we run the regressions with unemployment rates as independent variable instead of employment rates. Although the employment rate is a more relevant variable in the literature on the relationship between social investment policies and poverty, the unemployment rate is arguably a better control variable for the fact that social expenditures do not only reflect policy changes, but that they are partly driven by the number of benefit recipients. The analyses show that the results for the social investment policies remain unchanged.²⁰ Furthermore, unemployment rates are positively and significantly related to income inequality, which suggests that higher unemployment rates result in higher levels of income inequality. Unemployment rates are not significantly related to poverty rates.

Subsequently, we examine the sensitivity of the results with respect to the endogeneity of employment rates. After all, policy makers devote more budgetary resources to social investment policies to stimulate employment. Therefore, we run two-stage least square regression analyses. GDP per capita, EPL, trade and FDI are excluded from the main model and used as instruments for the employment rate.²¹ The results indicate that shifts from old to new

¹⁹ Gini coefficients are only available for the total population.

²⁰ Regression results are available upon request.

²¹ We use several tests to examine the validity of these instruments. The under identification test (Anderson canonical correlations LM statistic) shows that the excluded instruments are correlated with the endogenous regressors. The weak identification test (Cragg-Donald Wald F statistic) also shows that the instruments and regressors are correlated. As to the overidentification test, the Sargan-Hansen statistic indicates that the instruments are valid instruments.

welfare state expenditures are not significantly related to poverty and income inequality.

Next, we account for the fact that our analyses are based on unbalanced panels, due to a number of missing observations. This is especially the case for the Central and Eastern European countries and for the Nordic countries with regard to the poverty and inequality measures. Particularly the missing observations for the Nordic countries could lead to biased results as Denmark, Finland, Norway and Sweden have above average expenditures on social investment policies and below average inequality and poverty levels. To examine the sensitivity of the results for these country groups, we first run the regressions without the Czech Republic, Hungary, Poland and the Slovak Republic. The results are largely in line with the findings presented earlier, showing no positive and significant relationship between new social expenditures and poverty and income inequality. Secondly, we run the regressions without the Nordic countries. The results are presented in Table 4.5. Interestingly, new social expenditure, both as a percentage of GDP and as a share of total social expenditure, is positively and significantly related to poverty and income inequality. These results suggest that the relationship between expenditure shifts and poverty differs across countries and welfare state types. For the Nordic countries, the analyses provide no evidence for a relationship between a trend towards more new social expenditure and increasing poverty rates. For other European countries, the results provide some empirical support for the linkage between stagnating or increasing poverty trends and shifts in expenditures to new welfare state programmes.

To further analyze the variation between countries, we run the analyses without country fixed-effects, focusing on the differences in the levels of the variables. Now, new social expenditure – both as a percentage of GDP and as a share of total social expenditure – is negatively and significantly associated with poverty and income inequality. This indicates that, keeping other factors constant, countries with high levels of new social expenditure have low levels of poverty and income inequality. These results do not support the argument that new social spending is less redistributive than old social spending, but they do not imply that increases of new social spending within a certain country result in lower poverty rates either.

Finally, we examine the dependence of the results on breaks in the Eurostat data for poverty and income inequality. Until 2001, data were provided by the ECHP. Thereafter, Eurostat started to use EU-SILC data. Despite the fact that most variables are defined in the same way in the two data sets, some differences arise, which could influence our results. Although the main models presented above already control for this data break to some extent by means of the year dummies, we also run the analyses with a dummy variable for the ECHP period. All the results presented in Table 4.3, Table 4.4 and Table 4.5 are replicated and the coefficient for the ECHP dummy variable is not significant, suggesting that our results do not suffer from the data break.

Table 4.4 Panel data regressions of poverty below age 65

	M9	Poverty (60% of median income)	M11	M12
Old social expenditure (% GDP)	-0.719*** [-5.70]			
New social expenditure (% GDP)	-0.132 [-0.42]			
New/(New+Old) social expenditure ratio				
Total social expenditure (% GDP)		-0.163 [-1.47]	0.087*** [2.61]	0.058 [1.54]
Employment rate	-0.092*** [-2.20]	-0.154*** [-2.67]	-0.087** [-2.10]	-0.212** [-2.27]
GDP per capita	-3.079 [-0.71]	0.889 [0.24]	-4.683 [-1.09]	-0.103*** [-2.76]
People under 15 (% of total population)	-0.485 [-1.34]	-0.286 [-0.74]	-0.336 [-1.00]	-4.550 [-1.03]
Union density	-0.130 [-1.48]	-0.088 [-1.12]	-0.198** [-2.29]	-0.466 [-1.23]
FDI (% of GDP)	0.018 [0.80]	0.013 [0.62]	0.022 [1.09]	-0.163** [-1.97]
Trade (% of GDP)	0.001 [0.05]	0.000 [0.02]	0.009 [0.68]	0.018 [0.86]
Employment protection legislation	-0.239 [-0.33]	-0.321 [-0.56]	0.031 [0.05]	0.001 [0.07]
Constant	67.445 [1.54]	25.074 [0.58]	72.921* [1.65]	-0.114 [-0.16]
Time dummy	yes	yes	yes	81.621* [1.78]
Country dummy	yes	yes	yes	yes
No. of observation	145	153	145	yes
No. of country	19	19	19	145
Rho	0.241	0.292	0.255	19
Adj. R-sq	0.927	0.897	0.924	0.253
				0.926

Note: Public health expenditures and retirement pensions are excluded from Old social expenditures; expenditures on elderly care are excluded from New social expenditure. OLS regressions; unstandardised coefficients; t-values in parentheses; Prais-Winsten transformation [AR (1) disturbances].

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 4.5 Panel data regressions of poverty, income inequality and new social expenditures (without Nordic countries)

	M13	Poverty (60% of median income)			Income inequality (Gini coefficient)				
	M13	M14	M15	M16	M17	M18	M19	M20	
Old social expenditure (% of GDP)	-0.328* [-1.85]				-0.304 [-1.05]				
New social expenditure (% of GDP)	0.505** [2.10]				0.956** [2.27]				
New/(New+Old) social expenditure ratio									
Total social expenditure (% of GDP)									
Employment rate	0.097** [2.40]	-0.178 [-1.15]	0.179*** [3.09]	0.158*** [2.91]		-0.229 [-0.79]	0.281*** [2.94]	0.263*** [2.90]	
GDP per capita	-0.935 [-0.16]	0.063 [1.49]	0.119*** [3.33]	-0.080 [-0.47]		-0.273*** [-4.10]	-0.192*** [-2.91]	-0.065 [-0.21]	
People under 15 (% of total population)	-0.322 [-0.52]	3.681 [0.86]	-0.580 [-0.10]	-0.542 [-0.09]		1.870 [0.27]	-7.195 [-0.79]	-7.190 [-0.78]	
People over 65 (% of total population)	0.712 [1.43]	0.007 [0.02]	-0.229 [-0.42]	-0.259 [-0.44]		0.218 [0.33]	-0.477 [-0.70]	-0.512 [-0.66]	
Union density	0.018 [0.19]	0.852** [1.98]	0.740* [1.66]	0.720 [1.54]		0.981* [1.85]	0.659 [1.19]	0.639 [1.09]	
FDI (% of GDP)	0.008 [0.40]	0.029 [0.34]	-0.004 [-0.04]	0.004 [0.04]		-0.162 [-0.59]	-0.178 [-1.14]	-0.168 [-1.20]	
Trade (% of GDP)	0.021 [0.79]	0.018 [0.84]	0.027 [1.32]	0.024 [0.95]		0.034 [0.82]	0.033 [1.03]	0.032 [1.00]	
Employment protection legislation	0.789 [1.26]	0.928* [1.85]	0.889 [1.55]	0.843 [1.39]		-0.041 [-0.91]	-0.042 [-1.13]	-0.045 [-1.01]	
Constant	11.243 [0.14]	-42.722 [-0.71]	-4.291 [-0.06]	-0.940 [-0.01]		-0.275 [-0.29]	-0.218 [-0.23]	-0.275 [-0.28]	
Time dummy	yes	yes	yes	yes		18.736 [1.11]	115.335 [1.09]	118.692 [0.98]	
Country dummy	yes	yes	yes	yes		yes	yes	yes	
No. of observation	119	127	119	119		125	117	117	
No. of country	15	15	15	15		15	15	15	
Rho	0.364	0.327	0.382	0.368		0.059	0.067	0.070	
Adj R-sq	0.936	0.914	0.935	0.935		0.904	0.903	0.903	

Note: OLS regressions; unstandardised coefficients; t-values in parentheses; Prais-Winsten transformation [AR (1) disturbances] ; Rho represents the coefficient of auto-correlation of the error term, ranging from 0 to 1.

* significant at 10%; ** significant at 5%; *** significant at 1%

4.5 DISCUSSION AND CONCLUSION

With the adoption of the Lisbon Strategy in March 2000, a more equal society with social cohesion and less poverty was agreed upon by the member states of the European Union. In order to reach that goal, a transformation was promoted that implied reforming traditional welfare state policies into activating social policies. The underlying intention was to reduce poverty by increasing employment. Despite the fact that employment rates increased in many countries, poverty rates stagnated and in some countries even increased. In the social investment literature it has been argued that these disappointing poverty trends are partly attributable to the social investment approach because of two reasons (Cantillon, 2011). First, because of the focus on the social investment approach, resources have been shifted from traditional redistributive welfare state policies to relatively less redistributive new-risk policies. Second, traditional welfare state programmes have become less generous to make them more activating.

This study contributes to the social investment and income inequality literature by empirically analyzing the distributional effects of shifts in the expenditures on traditional welfare state programmes and social investment policies in 19 European countries for the period 1997-2007, using pooled time series cross-section analyses. Our results suggest that shifts in resources from traditional welfare state policies to new social investment policies are not associated with lower poverty rates. However, the results provide no convincing empirical evidence for the argument that the disappointing poverty rates across Europe are partially attributable to a greater focus on new welfare state programmes either (Cantillon, 2011). One explanation for this finding might be that the magnitude of the shifts in expenditures between old and new social policies has been relatively limited. In line with the findings of Hudson and Kühner (2009), our data show that in only a few countries the expenditures on new welfare state programmes had been increased at the expense of traditional welfare state spending.

Another explanation for our finding might be that there is no generalizable relationship between new welfare state policies and poverty and income inequality at the macro level because of a number of reasons. First, the distributive effect of new welfare state programmes strongly depends on the specific policy context and on the socio-demographic structure of a country (Vaalavuo, 2013). Hence, the detrimental effect of social investment policies that has been found in a number of specific cases (e.g. Van Lancker and Ghysels, 2012) simply cannot be generalized across a broader range of European countries and over time. Instead, our results indicate that for countries other than the Nordic welfare states, there might be a positive relationship between expenditure shifts towards new welfare state programmes and stagnating or even increasing poverty trends. Further research should provide more insight in the country-specific associations between social investment policies and poverty

trends. Second, empirical research at the macro-level has some considerable limitations regarding the institutional characteristics of welfare state programmes such as eligibility conditions. Third, it might be the case that it is still too early to expect either poverty-reducing or poverty-increasing effects of the social investment strategy. Since some policies, for instance in the area of education, will only – if any – yield effect in the long run, future evaluations should shed more light on the pros and cons of the social investment state.

Annex 4A

Descriptive statistics

Table 4A.1 Descriptive statistics, 19 European countries, 1997 to 2007

Indicator	N	Mean	SD	Min	Max	Data source
Poverty (60% of median income)	168	14.83	3.92	8.00	21.70	Eurostat(2011)
The Gini coefficient of disposable income	164	28.75	3.98	21.00	38.10	Eurostat(2011)
New social expenditure	193	6.38	2.13	2.47	11.87	OECD(2012a)
New-ALMPs social expenditure	193	5.58	1.80	2.23	10.10	OECD(2012a)
Old social expenditure	203	19.30	3.31	11.10	25.60	OECD(2012a)
New/Old	193	33.60	11.55	14.20	62.40	OECD(2012a)
(New-ALMPs)/Old	193	29.40	9.92	12.80	53.60	OECD(2012a)
ALMPs/Old	203	4.12	2.55	0.35	11.84	OECD(2012a)
New/(Old+New)	193	24.63	6.13	12.50	38.40	OECD(2012a)
(New-ALMPs)/(New-ALMPs+Old)	193	22.29	5.64	11.40	34.90	OECD(2012a)
ALMP expenditure (% of GDP)	209	0.78	0.48	0.07	2.44	OECD(2012a)
ALMPs per unemployed / GDP per capita	209	25.86	21.44	1.62	135.20	OECD(2012a), OECD(2012c)
ALMPs/(ALMPs+PLMPs)	209	40.15	11.93	13.70	72.00	OECD(2012a)
Employment rate	209	64.96	7.21	50.70	78.28	OECD (2012c)
Logarithm of GDP per capita	209	10.15	0.34	9.24	10.80	OECD(2012b)
Share of people aged 15 and less	209	17.31	2.00	13.45	23.09	OECD(2012c)
Share of people aged 65 and over	209	15.41	2.07	10.85	20.23	OECD(2012c)
Trade union density	209	35.92	20.43	7.62	82.19	OECD(2012c)
FDI (% of GDP)	202	9.26	7.513	0.48	37.85	OECD(2012d)
Trade (% of GDP)	209	91.45	37.77	46.59	184.40	OECD(2012f)
Employment protection legislation	209	2.12	0.75	0.60	3.67	OECD(2012c)

ABSTRACT

Studies using a country-level approach to examine developments and determinants of earnings inequality neglect the substantial variation in inequality patterns across sectors. A sectoral approach can also shed light on possible determinants of rising inequality, as sectors differ widely in their exposure to trade and technological change, whereas changes in labour market institutions would predict a more uniform rise in levels of intrasectoral inequality. This paper delineates trends in sectoral earnings inequality and employment for eight OECD countries between 1985-2005 using a new database. Decompositions show that country-level earnings inequality and its rise are mainly consequences of inequality within rather than between sectors. Cross-sectional pooled time-series analyses indicate lower employment shares in sectors more exposed to import. No evidence is found for relations between intrasectoral inequality and international trade or skill-biased technological change. Waning trade union power at the country level is associated with higher levels of sectoral earnings inequality.

Key words: inequality, wages, globalisation, technological change, trade unions, income distribution

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5.1 INTRODUCTION

A widely observed phenomenon in social sciences is the gradual and widespread increase in earnings inequality within developed countries (Atkinson, 2003; Alderson, Beckfield, and Nielsen, 2005; Kenworthy and Pontusson, 2005; Brandolini and Smeeding, 2009; Immervoll and Richardson, 2011; Iversen and Soskice, 2013). In the political economy literature three explanations are generally put forward for this upsurge in inequality at the country level: increased international trade, technological change, both arguably disadvantageous to the low-skilled, and changes in labour market institutions, in particular weakening employment protection legislation and union power (e.g., Alderson and Nielsen, 2002; Mahler, 2004; Koeniger, Leonardi and Nunziata, 2007; Oliver, 2008; OECD, 2011a; Alderson and Doran, 2013; Oesch, 2013; Wren, 2013).

Even though substantial attention has been given to inequality trends at the country level, there is a knowledge gap on developments within countries across different sectors. It would help our understanding of the manifestation of inequality if we would know whether earnings dispersion at the country level is a consequence of earnings differences between industries, or intra-sectoral earnings dispersion. Second, a sectoral design provides insight into possible drivers of inequality, as it allows us to differentiate between the three aforementioned explanations. If international trade or technological change indeed are explanations for rising inequality, then sectors more exposed to these trends should have higher levels of inequality, unless workers are perfectly mobile across sectors, an unrealistic assumption given persistent wage differences between sectors and the existence of labour market frictions (Krueger and Summers, 1988; Estevez-Abe, Iversen and Soskice, 2001; Mares, 2005). When sectors follow comparable inequality trends over time, this would correspond more to the theory that changing labour market institutions, set at the national level, are the main driver of inequality.

This study describes trends in labour earnings inequality and employment at the sectoral level in eight OECD countries between 1985 and 2005 based on a new database (Wang, Thewissen and Van Vliet, 2014). The level of intra-sectoral inequality differs substantially across sectors, which indicates that a substantial part of the manifestation of inequality is overlooked or ignored when studies are confined to country-level inequality trends only. Using cross-sectional pooled time-series analyses we test whether international trade, technological change, or developments in labour market institutions can explain variations in inequality and employment across sectors in countries over time. For the first two factors sectoral data are available, allowing us to differentiate between the three theoretical explanations.

Our contributions to the political economy literature on inequality are threefold. First, our sectoral design is relatively new, allowing us to locate inequality at a more detailed level across sectors, countries, and time. Second, compared to studies examining possible determinants of rising inequality by

means of a sectoral design in multiple countries at two moments (Mahler et al 1999; OECD, 2011a, Oesch, 2013; Michaels et al, forthcoming), we seek to contribute by building a new sectoral database with more detailed information over time. Third, as opposed to the sectoral studies examining skill wage gaps rather than inequality per se (OECD, 2011a; Michaels et al, forthcoming), we take into account sectoral earnings and employment developments separately. Compared to Mahler et al (1999), who also construct sectoral inequality measures, we base our findings on individual rather than household earnings, so that we can more accurately attribute earnings and employment information to sectors.

The remainder of the paper is structured as follows. Section 5.2 discusses the three main explanations of rising country-level inequality. In Section 5.3 we apply these theories to the sectoral level and we motivate our shift towards the sector in tracing inequality. Next, in Section 5.4, we describe our dataset and show trends across countries, sectors, and time. We decompose the level and growth of country-level inequality into inequalities within and between sectors. In Section 5.5 we conduct cross-sectional pooled time-series regressions to empirically test the three theoretical explanations. Section 5.6 concludes.

5.2 CURRENT EXPLANATIONS FOR RISING EARNINGS INEQUALITY

Three explanations for the widespread trend of widening earnings at the country-level are regularly put forward, namely, increasing international trade, skill-biased technological change, and weaker labour market institutions (Atkinson, 2003; Oliver, 2008; Brandolini and Smeeding, 2009; Oesch, 2013).

The amount of international trade increased substantially during the last decades, in particular between developed and developing countries (Harrison, McLaren and McMillan, 2011). The Stolper-Samuelson theorem predicts that when countries engage into trade, the production factors that are relatively abundant gain. In developed countries, where high-skilled workers are relatively more abundant, engaging into trade will lead to a higher skill demand, whilst the low-skilled will suffer from the increased competition with developing countries with a relative abundance of low-skilled labour (Van Reenen, 2011; Hellier and Chusseau, 2013). Mahler (2004) and Mahler et al (1999) differentiate between effects of import and export on the earnings distribution. Import might impair the wages or employment possibilities of domestic workers by putting them into direct competition with foreign workers. When mainly the low-skilled jobs are prone to outsourcing to low-wage countries, import has a direct effect on the earnings distribution. For export, the opposite might hold as it could give room for higher earnings or job creation.

Country-level studies generally report insignificant associations between trade integration and inequality (Mahler, 2004; Harrison et al, 2011; OECD, 2011a). Also sectoral studies report insignificant associations between their

sectoral indicators of trade integration and earnings inequality (Mahler et al, 1999), the skill wage gap (OECD, 2011a; Michaels et al, forthcoming), or employment differences for high versus low-skilled employees (Oesch, 2013). Yet, sectors more exposed to import saw a relative decrease in the number of total and low-skilled jobs. A number of studies also incorporate financial flows (FDI) and outsourcing or trade in intermediates (see for an overview Hellier and Chusseau, 2013), for which some evidence of inequality-enhancing effects are presented (Alderson and Nielsen, 2002; Dreher and Gaston, 2008).

A second prevalent theory is that current technological innovation complements the high-skilled, whilst it substitutes routine labour by capital (Goldin and Katz, 2008; Van Reenen, 2011). The theory plays a central role in the wage literature, using skill demand or the skill wage gap as dependent variable. The wage literature reports evidence for skill-biased technological change leading to polarisation in the labour market, though the analyses are mainly limited to the US (Autor, Levy and Murnane, 2003; see for an overview e.g., Hellier and Chusseau, 2013; Oesch, 2013). Also in sectoral studies positive correlations between the skill wage gap and technological change, measured by the information and communications technology (ICT) propensity from EU-KLEMS, are reported (OECD, 2011a). Michaels et al (forthcoming) find that industries with the greatest growth in ICT propensity were also the ones with the strongest growth in wages for the highly educated workers. The lowly educated were largely unaffected by this rise in ICT, whilst demand for middle educated workers fell in industries with the greatest growth in ICT intensity.

A third branch of the literature addresses changes in labour market institutions as the main cause of growing earnings dispersion in the developed world. In particular the weaker influence of trade unions and changes in employment protection legislation are put forward in the empirical literature (Mahler, 2004; Koeniger et al, 2007; Oliver, 2008; OECD, 2011a; Wren, 2013). From these studies it can be hypothesised that more centralised and coordinated wage bargaining processes lead to more compressed wages. Furthermore, the literature generally provides two effects of employment protection legislation on earnings inequality. On the one hand, strict legislation brings employees in a strong bargaining position for employees and therefore results in low wage dispersion. However, this will mainly apply to employees with a permanent contract. Therefore, stricter legislation can lead to a dual labour market with relatively high degrees of wage earnings inequality between the segments.

5.3 A SECTORAL APPROACH TO STUDYING INEQUALITY

Compared to a country-level study, in a sectoral research design the number of observations increases and industry-specific differences can be taken into account. In case there are differences in the degree to which sectors are exposed to factors that potentially drive inequality – which is indeed the case as shown

later – these differences in exposure will cause variations in effects on earnings or employment per sector, unless there is perfect labour mobility between sectors. Only in the situation of perfect labour mobility between sectors are production factors rewarded identically which would spread out across the economy.¹

Evidence for imperfect labour mobility comes from persistent wage differences between sectors that cannot be explained by (observable) composition effects (Krueger and Summers, 1988; Dickens and Katz, 1987). These persistent differences may be a result of labour market frictions, such as search costs in looking for jobs (Mortensen and Pissarides, 1999), job and industry specific human capital (Estevez-Abe et al, 2001), or institutions such as employment protection legislation that depress labour mobility (Hellier and Chusseau, 2013). Artuc et al (2008) and Artuc and McLaren (2010) report heterogeneous distributional effects of trade resulting from limited factor mobility. They find that it takes around eight years before a wage effect of a trade shock in a liberalising sector spreads out across the economy.

To our knowledge only a few studies examine possible determinants of rising inequality by means of a sectoral design in multiple countries over time. Mahler et al (1999) analyse earnings inequality within sectors using LIS household data, whereas OECD (2011a) and Michaels et al (forthcoming) calculate skill wage gaps from EU-KLEMS data.² Oesch (2013) studies total and low-skilled employment sizes, and upskilling measured as the change in share of high-skilled minus low-skilled workers at the sectoral level within Germany and the UK for 33 sectors based on LFS and SOEP data. All these studies analyse sectoral exposure to trade, whereas only OECD (2011a) and Michaels et al (forthcoming) take possible effects of technological change into consideration. As far as we know there are no studies examining effects of labour market institutions on sectoral inequality, although there is a branch of literature examining differences in redistributive preferences across sectors (Scheve and Slaughter, 2004; Mares, 2005; Rehm, 2009). The aforementioned sectoral studies (Mahler et al, 1999; OECD, 2011a; Oesch, 2013; Michaels et al, forthcoming) also do not take labour market institutions at the country level into account in their regressions. A number of institutions are set at the national level, such as strictness of employment protection legislation. Yet, the impacts of others, such

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- 1 Our study should be seen as complementary to the branch of literature using heterogeneity in occupations and tasks rather than sectors to examine consequences of technological change and trade (e.g., Autor et al, 2003; Goos et al, 2009; Rehm, 2009; Oesch, 2013). These studies are of particular interest when examining which types of jobs are prone to outsourcing or computerisation and what consequences this might have on for instance demand for redistribution, but occupations are arguably a less relevant categorisation for calculating inequality, our point of departure.
 - 2 We were able to replicate the findings from Mahler et al (1999), who also employ LIS data, with our own data using their sample of countries and periods and inequality indicators (available upon request).

as unions, might well differ per sector, but unfortunately, no sectoral information is available with sufficient detail in a comparative setting over time. Pinto and Beckfield (2011) show that union membership differs between individuals working in services versus those working in industry between 2002-2008 using European Social Survey data, and that this gap in membership differs per country. For the US more detailed information on union membership for a longer period is available. Kristal (2013) reports a negative association between union membership and labour's share of national income for two-digit and four-digit industries. Nevertheless, these studies use union membership which seems a rough proxy for union influence in a European context, where laws or other practices extend coverage to non-union members.

In our approach we take the widely observed rise in earnings inequality at the country level as our point of departure. Hence, we calculate inequality indicators rather than wage bill shares. Yet, we base our main calculations on individual rather than household information, to avoid the problem of attributing earnings or employment information from the spouse or other relatives to the sector in which the household head is working, since the other household members might work in a different sector.

We elaborate on existing sectoral studies in two ways. First, we contribute by creating a new database on inequality and employment at the sectoral level that contains sectoral data over a longer period rather than for only two moments in time. This allows us to examine variations over time while taking into account industry-specific and country-specific developments. As a second contribution to existing sectoral studies, we explicitly explore both sectoral earnings and employment developments. For a sectoral design this is of particular importance. For example, when all low-skilled move to sectors less exposed to trade or technological change with lower earnings whilst all high-skilled congregate in exposed sectors characterised by higher earnings, then earnings inequality at the country level will increase whereas the levels of intrasectoral earnings inequality will decrease. Third, we take into account developments in labour market institutions at the country level.

Our sectoral design also has limitations. First, there might be dependencies between industries. In addition, certain confounding factors that might have an effect on both trade, technology, or institutions, and on sectoral earnings and employment, such as product market developments, are not included in the model, even though we control for unobserved sectoral trends. Therefore, the empirical results should be interpreted as associations rather than causal evidence.

5.4 DATA

5.4.1 Income definition, sector standardisation, and sample

For our sectoral approach we calculate indicators for earnings inequality and employment, standardised across countries, periods, and sectors. This dataset is available online (Wang, Thewissen and Van Vliet, 2014), as is a more detailed description of the data (Thewissen, Wang and Van Vliet, 2013). It is constructed on the basis of the Luxembourg Income Study (LIS) micro data, elaborating on Mahler et al (1999). We restrict the sample to individuals aged between 25 and 54, which are those people most dependent on earnings as source of income. Since we are interested in labour earnings inequality, we only include income from wages and salaries or self-employment, omitting income from other sources such as interest and rent, and we do not adjust the wages for taxes or social contributions.³ We follow standard LIS top- and bottom coding conventions. As explained above, we base our calculations on individual data and we apply individual weights to the earnings and employment indicators.

Sectors are standardised based on the ISIC 3.0 classification. We distinguish between nine sectors at the two-digit level, and we further break down the manufacturing and transport and telecommunication sector into twelve sub-sectors using the three-digit level, as in Mahler et al (1999), OECD (2011a), and Michaels et al (forthcoming), see Table 1.⁴

3 We refer to our income definition as ‘earnings’, which corresponds to ‘labour income’ in the LIS template. Earnings of both part-time and full-time workers are included, see also our sensitivity tests.

4 No further breakdown in the community services sector is possible with LIS micro data for a sufficient number of country-period observations. The community sector consists of people working in public administration, education, health and social work, and other community and personal service activities.

Table 5.1 Country, period, and sector sample

Country	Period	Sectors (ISIC)
1. Czech Republic	1996, 2004	1. Agriculture and fishing
2. Denmark	1987, 1992, 1995, 2000, 2004	2. Mining and quarrying
3. Finland	1987, 1991, 1995, 2000, 2004	3. Manufacturing
4. Germany	1984, 1989, 1994, 2000, 2004	31. Man. food
5. Ireland	1994-1996, 2004	32. Man. textile
6. Sweden	1987, 1992, 2000, 2005	33. Man. wood
7. UK	1986, 1999, 2004	34. Man. paper
8. US	1986, 1991, 1994, 2000, 2004	35. Man. chemicals
		36. Man. minerals
		37. Man. metals
		38. Man. machinery
		39. Man. transport
		30. Man. other
		4. Utilities
		5. Construction
		6. Wholesale and hotels
		7. Transport and telecommunications
		71. Transport
		72. Telecommunications
		8. Finance, real estate, business
		9. Community services

Note: We combine the 1994-1996 waves for Ireland where we recalculate the earnings information to 1995 levels using information on inflation from the World Bank (2012).

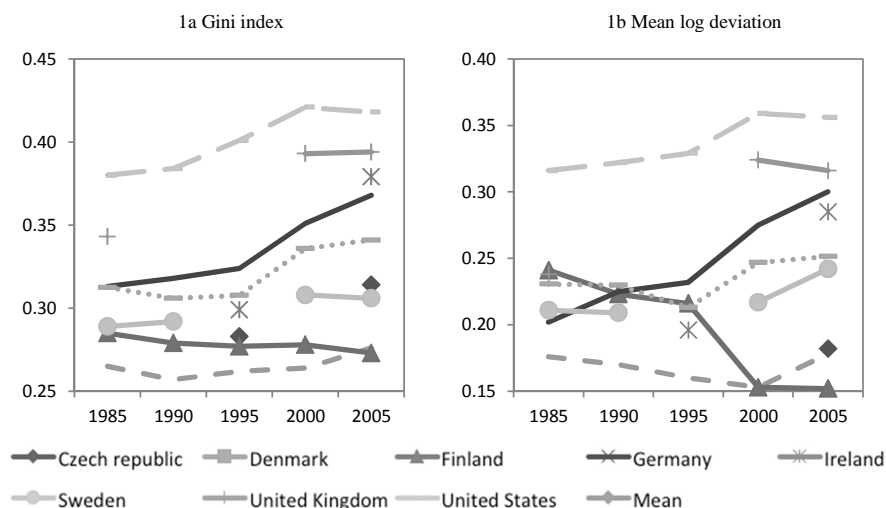
Sectoral information is available for eight OECD countries, allowing us to compose an unbalanced panel of five periods of five years between around 1985 and around 2005.⁵ We have 31 waves containing a total of 651 observations at the sectoral level. The correlation between the relative employment size of sectors from our calculations based on LIS data and the sectoral indicators from OECD STAN (2011b) is 0.97, providing a reliability estimate of our dataset.

5.4.2 Trends at the country level

We begin by showing the trends in inequality at the country level for our sample and earnings definition, see Figure 5.1. We make use of two indicators; the mean log deviation is more sensitive to fluctuations at the bottom end of the distribution, whereas the Gini coefficient is more sensitive to changes across the mean of the distribution (Atkinson, 1970).

⁵ We exclude Spain, Belgium, and Poland, as not enough detailed information on earnings or technological change is available.

Figure 5.1 Earnings inequality at the country level 1985-2005



Note: Mean: unweighted arithmetic average for the available observations of that period

Source: Thewissen, Wang and Van Vliet (2013)

Consistent with the existing country-level literature, inequality is higher in the Anglo-Saxon countries than in the Northern countries. Earnings are growing further apart within countries over time (Alderson et al, 2005; Brandolini and Smeeding, 2009; Immervoll and Richardson, 2011; OECD, 2011a; Alderson and Doran, 2013; Wang, Caminada and Goudswaard, 2013). We see a particularly strong upsurge in earnings inequality in Germany, also documented elsewhere (Fuchs-Schündeln, Krueger and Sommer, 2010). Part of this might be due to the unification as the LIS waves of 1984 and 1989 are based on West Germany only.

By and large the Gini coefficient and the mean log deviation show comparable trends over time, although the latter exhibits a more erratic course. A noticeable exception to this is Finland, where the Gini index shows a gradual descent whilst the mean log deviation drops rather abruptly from 1995 to 2000. During this period the earnings inequality at the bottom end of the distribution decreased rapidly, whilst inequality at the top half of the distribution actually rose (see also Cowell and Fiorio, 2011).⁶ Due to these opposite dynamics the Gini index decreased less rapidly than the mean log deviation.

⁶ Inequality shifts at the top end of the distribution are captured by the GE(2) which shows a rising pattern, results of which are available upon request.

5.4.3 Decomposition of inequality at the country level

We decompose the level and change of earnings inequality at the country level into a part resulting from earnings differences between sectors, and a part stemming from earnings differences within sectors (intrasectoral inequality). We use the mean log deviation since this indicator does not leave a residual. Intrasectoral inequality is calculated as the sum of the mean log deviation in all separate sectors weighted by the number of individuals working in the sector relative to the total number of working individuals. The between-sector part is the weighted sum of the arithmetic mean earnings in the distinct sectors as a fraction of the mean earnings of the total population.⁷ Sectors are defined at the two-digit level, and the three-digit level for the manufacturing and transport and telecommunications sectors.⁸

7 The decomposition is defined as:

$$MLD = \sum_{k=1}^g v_k \sum_{j=1}^n \frac{w_{kj}}{\sum_{j=1}^n w_{kj}} \log \left(\frac{\bar{y}_k}{y_{kj}} \right) + \sum_{k=1}^g v_k \log \left(\frac{\bar{y}_k}{\bar{y}} \right)$$

with sectors indexed $\{k = 1, \dots, g\}$ weighted by their share of employed individuals v_k where the sector includes the individuals indexed $\{j = 1, \dots, n\}$ with earnings y_{kj} , weight w_{kj} , and arithmetic mean earnings \bar{y} . The first element on the right-hand side is inequality within industries, and the second consists of inequality between industries (see text). See also Kampelmann (2009) which contains an appendix with a decomposition of the mean log deviation that can be transposed to ours. The differences over time are defined as:

$$MLD_{2005} - MLD_{1985} = (Within_{2005} + Between_{2005}) - (Within_{1985} + Between_{1985}) = Within_{2005} - Within_{1985} + Between_{2005} - Between_{1985}.$$

8 Of course, the share of inequality between groups depends on the number of distinguished groups. As an extreme case, the share of between-group inequality becomes 100 per cent when every individual is defined as a separate group. Yet, for our study with a relatively small number of sectors in comparison to the number of households, the results are not that sensitive to the number of sectors that are defined. As an example, if we differentiate between 9 rather than 19 industries by taking the manufacturing and transport and telecommunication sector at the aggregated rather than at the disaggregated level, the share of within-sector inequality for the United States in 2005 only rises from 96.2 to 97.0 per cent.

Table 5.2 Decomposition of inequality within and between sectors over time

	Level of mean log deviation			Share of mean log deviation due			Difference 2005-1985 in mean		
	at the country level			to within-sector inequality (%)			log deviation over time		
	1985	1995	2005	1985	1995	2005	Total	Within	Between
Czech Republic	.	0.145	0.182	.	92.4%	96.0%	0.037 ^a	0.040 ^a	-0.004 ^a
Denmark	0.176	0.160	0.178	95.4%	95.4%	96.5%	0.002	0.004	-0.002
Finland	0.241	0.216	0.152	87.6%	91.8%	93.7%	-0.090	-0.069	-0.020
Germany	0.202	0.232	0.300	95.0%	94.9%	94.1%	0.098	0.091	0.008
Ireland	.	0.196	0.285	.	93.5%	93.6%	0.089 ^a	0.083 ^a	0.006 ^a
Sweden	0.211	.	0.238	95.3%	.	96.1%	0.027	0.027	-0.001
United Kingdom	0.246	.	0.316	94.5%	.	92.8%	0.070	0.060	0.009
United States	0.316	0.329	0.341	95.1%	95.3%	96.2%	0.025	0.028	-0.002
Average	0.232	0.213	0.249	93.8%	93.9%	94.9%	0.032	0.033	-0.001

Note: We differentiate between 19 industries: all two-digit sectors apart from the manufacturing and transport and telecommunications sectors, for which we utilise the subsectors. The average is the unweighted arithmetic average for the available observations of that period. ^a Difference between 2005 and 1995.

Source: Own calculations by author based on LIS (2013)

5.4.4 Trends in inequality within industries

To analyse patterns of the level of intrasectoral inequality, we use the Gini coefficient, which is the most frequently used inequality measure in the literature. In addition, it can be corrected for underestimation bias in case of small sample sizes (roughly from $n < 30$) by multiplying it by $\frac{n}{n-1}$, called the first order correction (Deltas, 2003). For the regressions we also use the mean log deviation at the sectoral level.⁹

We first pool data from all available periods to compare the levels of inequality across industries and countries in Table 5.3. The rank of each observation at the sectoral and subsectoral level is placed between brackets. The bottom row shows the unweighted average level of intrasectoral inequality per country ('country average'), and the right column displays the unweighted average level of inequality for each sector ('sector average').

From Table 5.3 we can see the importance of the sector in understanding earnings inequality. The difference between the highest and lowest level of intrasectoral inequality within countries is on average at least as high as the

⁹ The correlation between the first-order corrected Gini index and the MLD at the sectoral level is 0.89.

difference between the highest and lowest level of country-level inequality.¹⁰ Thus, at the sectoral level within countries, there is as much spread in levels of earnings dispersion as there is at the country level. This implies that a substantial part of the manifestation of inequality is ignored in a country-level approach.

The importance of the sector becomes even more noticeable when we look at the rankings of levels of intrasectoral inequality within each country. This shows that there are only a few differences between countries in their sectoral levels of inequality. Agriculture, wholesale, and the financial sector ubiquitously stand out as sectors with high relative levels of sectoral inequality, shown by low rankings and a sectoral level of inequality higher than its country average.¹¹ The opposite holds for mining, utilities, and the manufacturing of transport and metals.

There are only a few differences between countries in their relative levels of intrasectoral inequality. In Czech Republic earnings are more equally distributed in agriculture. At the subsectoral level, we can see that there are country differences in ranking of inequality within other manufacturing, transport, and telecommunications.

10 The countries with the most equally and unequally distributed earnings are Denmark (0.257) and the United States (0.421); their level of inequality differs by 0.164 Gini points for the full sample. If we first average the degree of intrasectoral inequality across countries, then we find that mining has the most equally distributed earnings (0.223), whilst agriculture has the most unequally distributed earnings (0.394); a difference of 0.170 Gini points. If we instead first calculate per country the difference between the sectors with most equally and unequally distributed earnings and then take the average, we come to an even higher difference of 0.210 Gini points.

11 The high level of earnings inequality within agriculture can partly be explained by the use of individual rather than household earnings information. Using household information the level of inequality drops from 40.4 to 35.7, whereas for the other sectors the inequality based on individual and household information are at par on average. The regression results are not sensitive to the inclusion of agriculture.

Table 5.3 Pooled earnings inequality across sectors and countries

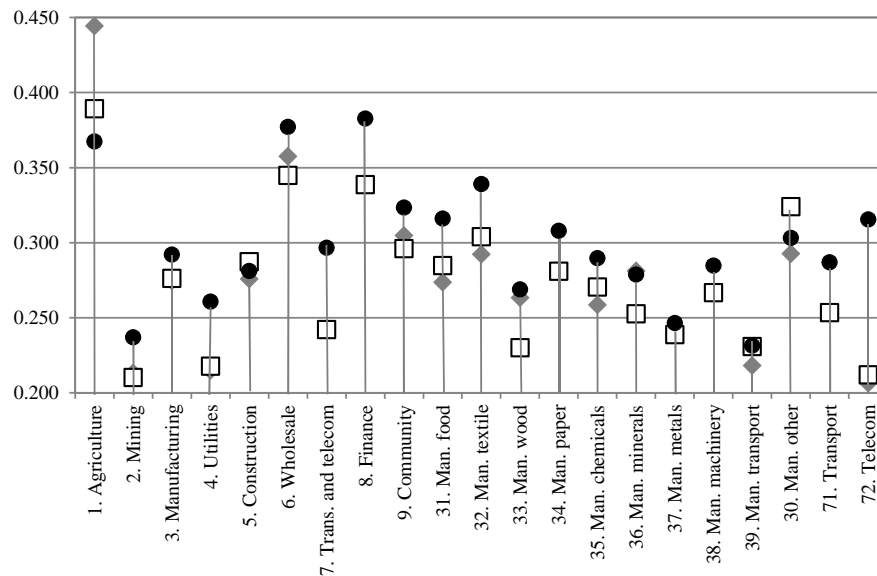
	CZE	DNK	FIN	DEU	IRL	SWE	GBR	USA	Sector average
<i>Sectoral level</i>									
1. Agriculture	0.280 (5)	0.356 (1)	0.493 (1)	0.357 (3)	0.410 (1)	0.402 (1)	0.381 (3)	0.470 (1)	0.394 (1)
2. Mining	0.211 (9)	0.211 (8)	0.225 (8)	0.192 (9)	0.164 (9)	0.169 (9)	0.294 (8)	0.322 (8)	0.223 (9)
3. Manufacturing	0.285 (3)	0.230 (5)	0.236 (6)	0.294 (5)	0.289 (6)	0.255 (5)	0.316 (7)	0.360 (5)	0.283 (5)
4. Utilities	0.243 (8)	0.190 (9)	0.220 (9)	0.231 (8)	0.238 (8)	0.202 (8)	0.274 (9)	0.288 (9)	0.236 (8)
5. Construction	0.261 (6)	0.228 (6)	0.263 (4)	0.274 (6)	0.311 (5)	0.221 (7)	0.332 (6)	0.360 (5)	0.281 (6)
6. Wholesale	0.353 (1)	0.293 (3)	0.292 (3)	0.402 (1)	0.376 (2)	0.330 (3)	0.420 (1)	0.435 (2)	0.363 (2)
7. Trans. and telecom	0.260 (7)	0.223 (7)	0.233 (7)	0.268 (7)	0.247 (7)	0.253 (6)	0.336 (5)	0.331 (7)	0.269 (7)
8. Finance	0.339 (2)	0.298 (2)	0.300 (2)	0.386 (2)	0.371 (3)	0.334 (2)	0.401 (2)	0.427 (3)	0.357 (3)
9. Community	0.280 (4)	0.249 (4)	0.257 (5)	0.327 (4)	0.325 (4)	0.290 (4)	0.375 (4)	0.395 (4)	0.312 (4)
<i>Subsectoral level</i>									
31. Man. food	0.324 (2)	0.228 (4)	0.231 (3)	0.324 (3)	0.266 (8)	0.277 (2)	0.337 (4)	0.364 (4)	0.294 (3)
32. Man. textile	0.336 (1)	0.254 (1)	0.284 (1)	0.324 (3)	0.289 (4)	0.259 (4)	0.356 (1)	0.388 (1)	0.311 (1)
33. Man. wood	0.256 (9)	0.189 (12)	0.222 (6)	0.244 (12)	0.276 (7)	0.217 (10)	0.296 (9)	0.369 (3)	0.259 (9)
34. Man. paper	0.318 (3)	0.228 (5)	0.221 (7)	0.346 (2)	0.289 (4)	0.254 (7)	0.327 (6)	0.345 (6)	0.291 (4)
35. Man. chemicals	0.293 (4)	0.238 (2)	0.231 (4)	0.263 (8)	0.278 (6)	0.266 (3)	0.299 (8)	0.344 (7)	0.277 (6)
36. Man. minerals	0.258 (8)	0.228 (5)	0.195 (11)	0.301 (5)	0.308 (2)	0.217 (10)	0.262 (11)	0.323 (9)	0.261 (8)
37. Man. metals	0.260 (6)	0.196 (11)	0.208 (9)	0.252 (9)	0.222 (11)	0.211 (12)	0.271 (10)	0.318 (10)	0.242 (11)
38. Man. machinery	0.255 (10)	0.223 (8)	0.227 (5)	0.292 (6)	0.300 (3)	0.257 (5)	0.322 (7)	0.347 (5)	0.278 (5)
39. Man. transport	0.229 (12)	0.199 (9)	0.172 (12)	0.251 (10)	0.213 (12)	0.218 (9)	0.242 (12)	0.303 (12)	0.228 (12)
30. Other man.	0.260 (6)	0.225 (7)	0.208 (10)	0.379 (1)	0.322 (1)	0.279 (1)	0.339 (3)	0.387 (2)	0.300 (2)
71. Transport	0.250 (11)	0.230 (3)	0.239 (2)	0.274 (7)	0.255 (9)	0.257 (6)	0.333 (5)	0.342 (8)	0.272 (7)
72. Telecom	0.291 (5)	0.198 (10)	0.215 (8)	0.244 (11)	0.223 (10)	0.246 (8)	0.341 (2)	0.306 (11)	0.258 (10)
Country average	0.278	0.234	0.246	0.296	0.284	0.258	0.326	0.358	0.285

Note: First order corrected Gini index, full sample, pooled across periods. Sector average: arithmetic average of sectoral earnings inequality per sector. Country average: arithmetic average of sectoral earnings inequality per country. Number between brackets: sectoral or subsectoral inequality level ranking within a country

Source: Wang, Thewissen and Van Vliet (2014)

As the differences between countries in their levels of intrasectoral inequality are relatively small, we pool the sectoral levels for all countries and examine the developments over time in Figure 2.¹² Mirroring the trend at the country level, sectoral earnings in general have become more dispersed over time. Still, inequality decreased in agriculture, which has the highest level of earnings inequality on average. Also within the manufacturing of minerals subsector inequality reached its top around 1985. In only four sectors, next to the two aforementioned also construction and manufacturing other, earnings were more dispersed in 1985 or 1995 than in 2005.

Figure 5.2 Trends of sectoral earnings inequality over time



Note: First order corrected Gini index, average for a sector and period across available countries
Source: Thewissen, Wang and Van Vliet (2013)

Particularly interesting is the comparison between the manufacturing sector, exposed to trade, and the sheltered community sector. Contrary to what we would expect from the application of the Stolper-Samuelson theorem at the sectoral level, we see on average higher levels and a stronger increase of inequality in the sheltered community sector than in the manufacturing industry.

12 The figure barely changes if we restrict the sample to the four countries for which we have data for all periods (Denmark, Germany, Finland, and the US). Inequality within the manufacturing of minerals in 1985 then becomes more pronounced.

5.4.5 Trends in sectoral levels of employment

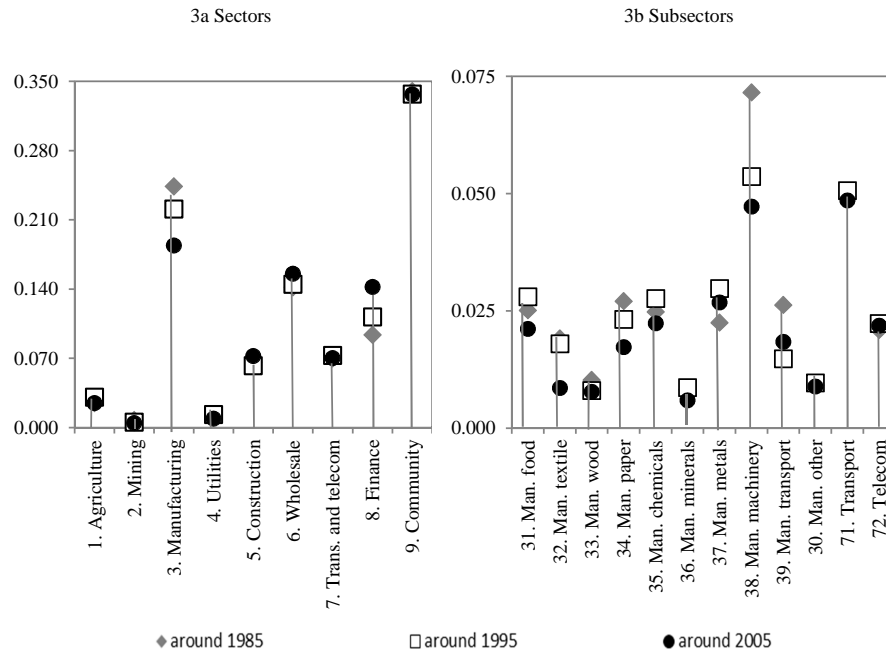
Increased inequality at the country level could also be a result of employment shifts between sectors or job loss in certain sectors (see also Atkinson, 2003; Kenworthy and Pontusson, 2005). Even though the LIS database allows for the standardised calculation of sectoral earnings inequality for multiple countries over time, unfortunately, it is not possible to track individual employment shifts over time. This is due to the fact that the LIS database is a time series rather than a panel at the individual level.

Using a number of proxies we try to depict employment effects at the sectoral level in an indirect fashion. First, we use our own LIS-based data (Wang, Thewissen and Van Vliet, 2014) to calculate the relative employment size of sectors to map total labour shifts between sectors. The relative employment size is defined as the number of persons engaged per industry divided by the total number of persons engaged in a country.

In general, the sectoral employment sizes appear to be relatively stable over time, as shown in Figure 5.3 pooled across countries.¹³ Most clearly perceptible is the drift in employment from manufacturing, in particular the manufacturing of machinery, towards the financial sector (see also Oesch, 2013). We can also discern a minor reduction in employment in agriculture and mining, whereas a small increase is observable in construction and wholesale. There is hardly any fluctuation in the largest sector, the community sector.

13 For 1985 data are missing for a number of sectors, causing the sum of all relative employment sizes to differ from 1 for this period. The ratios presented in Figure 5.3 are corrected for this overestimation. Restricting the figure to the four countries for which data are available for all periods only causes minor shifts.

Figure 5.3 Trends of relative employment size over time



Note: Relative employment size, average for a sector and period across available countries

Source: Wang, Thewissen and Van Vliet (2014)

For the relative employment size the differences between countries are again small.¹⁴ In Czech Republic still a little over one in three persons is employed in agriculture, mining, or manufacturing, compared to less than one in four for the other countries. The community sector is relatively large in Finland and Denmark (around 40.0% compared to 31.0% on average in the other countries). The Anglo-Saxon countries are characterised by a comparatively extensive financial sector (around 14.0% compared to 10.6%). The manufacturing industry, in particular the manufacturing of transport, metal, and chemicals, is relatively large in Germany (29.7% versus 20.3%).

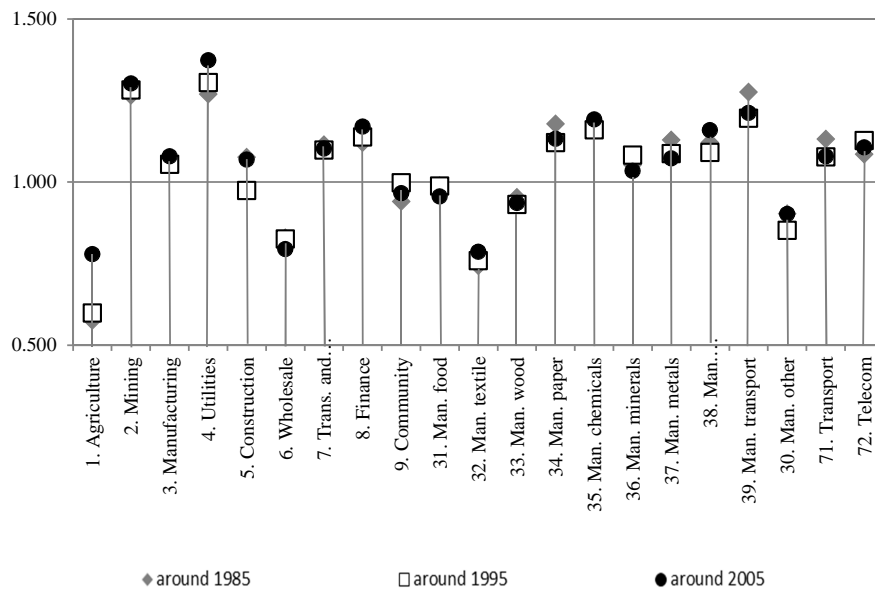
As a second employment indicator, following Mahler et al (1999) who coin this inequality between sectors, we also calculate the relative median earnings, defined as the sectoral median labour earnings divided by the national median labour earnings. When job loss mainly occurs at the lower end of the earnings distribution in a sector, we should see an increase in the sectoral relative median earnings.

¹⁴ Results are available upon request, see also Thewissen, Wang and Van Vliet (2013).

Figure 5.4 shows that there are few fluctuations in relative median earnings over time, pooled across countries.¹⁵ This seems to suggest that the loss of employment within the manufacturing sector was not concentrated at the low end of the earnings distribution. The largest change took place in agriculture, where the (low) earnings went up significantly between 1995 and 2005. Apparently, in agriculture individuals at the lower end of the earnings distribution saw an increase in their earnings, as indicated by an increase in relative median earnings combined with a decrease in earnings inequality. Also within the mining and utilities industry, homogeneous sectors with low earnings dispersion and a decreasing employment size, we can see increasing median earnings.

Figures 3 and 4 display that both the relative employment size and median earnings of the community sector have been stable over time. From this we infer that it is not likely that low-skilled labour was shed in sectors exposed to trade, and that subsequently this labour went to the sheltered community sector, as could be hypothesised from the Stolper-Samuelson theorem.

Figure 5.4 Trends of relative median earnings over time



Note: Relative median earnings, average for a sector and period across available countries

Source: Wang, Thewissen and Van Vliet (2014)

15 Restricting the figure to the four countries for which data are available for all periods only causes minor shifts.

Also for the relative median earnings there are few country-level differences.¹⁶ Mining, utilities, transport and telecommunications, and finance pay relatively well in all countries. On the contrary, earnings are uniformly low in agriculture, followed by the manufacturing of textile and wholesale. The sectoral median earnings for the manufacturing industry are below 1 for Czech Republic and Ireland (0.95 and 0.97), whilst only in these two countries the median earnings are above 1 in the community sector (1.04 and 1.06). Principally in Finland the relative median earnings are low in agriculture (0.45 to 0.71 on average for the other countries), whilst earnings are above average for mining in the UK (1.59 to 1.25) and utilities in Ireland (1.71 to 1.28). Within the manufacturing industry the differences between countries are even smaller.

5.5 REGRESSION ANALYSES OF SECTORAL TRENDS

5.5.1 The regression model and data

Our database consists of country-industry data, which allows us to exploit variation within countries across industries and over time. Following Bassanini *et al* (2009), we estimate the following equation using OLS:

$$\text{inequality}_{ijt} = \beta_0 + \beta \text{trade}_{ijt} + \gamma \text{techn}_{ijt} + \text{instit}_{it} \delta + X_{it} \mu + \varphi_i \theta + \varphi_j \theta + \varepsilon_{ijt} \quad (1)$$

Our main dependent variable is earnings inequality within sector j , country i , and period t . Employment effects are explored using the relative employment size and relative median earnings at the sectoral level as dependent variables.¹⁷

For sectoral exposure to international trade (βtrade_{ijt}) we use the OECD STAN database (2011b) where we calculate trade values in percentage of sectoral added value. We differentiate between import and export as advocated by Mahler (2004). Unfortunately no distinction is possible between trade among developed and trade between developed and developing countries, nor is there sufficient information on sectoral foreign direct investment.¹⁸ For our sectoral indicator of technological progress ($\gamma \text{techn}_{ijt}$) we follow OECD (2011a) and Michaels *et al* (forthcoming) and use the share of compensation of ICT capital

¹⁶ Results are available upon request, see also Thewissen, Wang and Van Vliet (2013).

¹⁷ All dependent variables are multiplied by 100 in the regressions to enhance readability of the coefficients in the tables.

¹⁸ Our regressions do not provide evidence for inequality-enhancing effects of inward or outward FDI (available upon request).

in total capital compensation from EU-KLEMS (2011).¹⁹ The rise of ICT could potentially affect a large segment of the workforce and its adoption took place during a relatively brief period (Goldin and Katz, 2008). This indicator should be seen as a proxy to gauge technological change, as technological change exhibits itself in multiple fashions, many of which are unobservable (OECD, 2011a). Acknowledging its limitations, it is the best sectoral indicator available for comparisons across countries and time.²⁰

To test the waning labour market institutions hypothesis, we add a vector of institutional variables at the country level ($\text{instit}_{it}\delta$). We take a measure of overall employment protection legislation from OECD data (2009). Visser (2011) provides us with data on union coverage, defined as the proportion of employees covered by wage bargaining agreements, and the level of wage coordination, where a higher number indicates a more centralised level of wage bargaining. The vector $X_{it}\mu$ contains two common control variables measured at the country level, namely, the unemployment rate and real GDP per capita divided by 100, from the OECD National Accounts (2012). The relationship between GDP per capita and inequality is strongly contested in both causal directions (see *e.g.*, Thewissen, forthcoming) but it corrects for effects from possible differences in economic development between countries. Inclusion of the country-level unemployment rate can be seen as a rough control for labour market efficiency differences between countries.

We also control for unobserved industry-specific developments, such as the fact that industries might be exposed to different demand dynamics in their product markets, by including interactions of sector dummies and the trend ($\phi\theta$). The set ($\phi\theta$) includes interaction terms of the country dummies and the trend, to control for unobserved effects that have comparable effects on earnings within different industries at the country level. Standard errors are clustered at the country level to allow for general forms of heteroskedasticity and autocorrelation within countries.

19 The sectoral definition in EU-KLEMS differs slightly from the one in LIS. There is only information available for the individual sectors 'machinery n.e.c.' and 'electrical and optimal equipment', and for 'wholesale and retail trade' and 'hotels and restaurants' rather than the aggregates we use, namely, the manufacturing of machinery, and wholesale. We transform the EU-KLEMS indicators to these aggregate sectors by taking the average ICT intensity of the two respective individual sectors, weighted by the share of the gross value added at current basic prices from EU-KLEMS data of the respective sector. We use data from 1993 for Sweden 1992. Calculations are available upon request.

20 See Michaels et al (forthcoming) for a discussion of the strengths and weaknesses of this indicator. In the sensitivity analyses reported below, we examine alternative indicators of technological progress.

5.5.2 Descriptive statistics for the independent variables

Table 5.4 shows that the degree to which sectors are exposed to international trade and ICT intensity differs substantially. Also the increase over time in international trade differs per sector. The largest increase took place in the manufacturing of textile and manufacturing of transport; in mining import rose significantly while exports remained stable. The amount of international trade barely rose in the utility sector.

As can also be seen from Table 5.4, for a number of sectors no data on international trade are available. Of particular importance are the community sector, which can be expected to be relatively sheltered against international trade, and the financial sector, in which the relative employment size grew relatively fast.²¹

Also for the levels and developments of ICT propensity we can see differences between sectors. The starkest increases took place in other manufacturing, telecommunications, and mining. The ICT propensity decreased sharply in agriculture, which is fully due to high values in Germany around 1985.²² Minor reductions occurred in the manufacturing of wood, minerals, and transport.

21 The results are comparable if we calculate the relative employment size in percentages of the total employment size of the sectors which are included in the regressions rather than all sectors (available upon request).

22 These extreme values for Germany drop out in the regressions as no data on export and import are available for 1985 and 1990. Without Germany the ICT propensity in agriculture in 1985 decreases to 0.02, causing the average ICT propensity in 1985 to drop to 0.12.

Table 5.4 Trends in international trade and technological change at the sectoral level

	Import (% sectoral value added)			Export (% sectoral value added)			Share of ICT in total capital compensation (%)		
	1985	1995	2005	1985	1995	2005	1985	1995	2005
<i>Sectoral level</i>									
1 Agriculture	21.15 ^a	33.15	47.85	22.57 ^a	21.43	25.81	0.19	0.02	0.03
2 Mining	285.94 ^a	223.97	459.81	46.72 ^a	35.01	49.97	0.03	0.05	0.11
3 Manufacturing	91.63	114.36	144.40	88.25	132.12	167.30	0.10	0.09	0.12
4 Utilities	3.13 ^a	2.23	3.79	1.06 ^a	1.30	5.47	0.04	0.05	0.05
5 Construction	.	.	.	.	.	.	0.06	0.28	0.12
6 Wholesale	.	.	.	.	.	.	0.19	0.16	0.18
7 Transport and telecommunications	.	.	.	.	.	.	0.23	0.20	0.26
8 Finance	.	.	.	.	.	.	0.09	0.10	0.12
9 Community	.	.	.	.	.	.	0.14	0.16	0.18
<i>Subsectoral level</i>									
31 Man. food	50.75	57.56	81.07	59.80	100.24	83.18	0.07	0.07	0.09
32 Man. textile	208.18	249.14	503.79	95.18	161.39	264.39	0.07	0.07	0.13
33 Man. wood	65.16	73.67	83.37	72.08	86.08	81.69	0.08	0.06	0.07
34 Man. paper	31.15	58.10	54.91	64.57	87.59	83.03	0.14	0.13	0.16
35 Man. chemicals	130.61	135.74	166.18	96.18	131.70	188.81	0.06	0.06	0.09
36 Man. minerals	41.20	44.93	65.52	30.37	55.16	63.09	0.09	0.07	0.07
37 Man. metals	87.43	111.04	123.94	72.77	95.02	111.63	0.07	0.08	0.13
38 Man. machinery	124.23	177.30	209.20	109.38	181.77	239.74	0.16	0.14	0.17
39 Man. transport	174.15	269.00	424.87	120.47	171.65	245.23	0.26	0.13	0.20
30 Other man.	75.77	87.87	132.52	66.65	95.82	110.70	0.09	0.12	0.26
71 Transport	.	.	.	.	.	.	0.13	0.14	0.15
72 Telecommunications	.	.	.	.	.	.	0.30	0.29	0.40
Average	99.32	117.00	178.66	67.57	96.88	122.86	0.12	0.12	0.15

Note: Import and export are expressed in % of sectoral value added, pooled for countries for which data are available. ^a Data from 1990. The average is the unweighted arithmetic average for the available observations of that period.

Source: Import and export from OECD STAN, share of ICT in total capital compensation from EU-KLEMS.

Table 5.5 summarises the country-level data for the incorporated set of institutions per country. On average the union coverage rate decreased and employment protection legislation became less strict. Finland and Sweden are the only countries in which the union coverage rate increased over time. In the UK and Ireland employment protection legislation became (somewhat) stricter. There is not much fluctuation in the level of wage coordination within countries over time. In Sweden wage coordination became more decentralised whereas it became more centralised in Denmark (see for a further discussion on this Thewissen, Wang and Van Vliet, 2013).

Table 5.5 Trends in institutions at the country level

Country	Union coverage rate (%)			Level of wage coordination			Employment protection legislation		
	1985	1995	2005	1985	1995	2005	1985	1995	2005
Czech Republic	.	60.0	43.5	.	2	2	.	1.90	1.90
Denmark	83.0	84.0	83.0	3	3	4	2.40	1.50	1.50
Finland	77.0	82.2	90.0	4	3	4	2.33	2.16	2.02
Germany	78.0	72.0	64.3	4	4	4	3.17	3.09	2.12
Ireland	.	60.0	54.6	.	5	5	.	0.93	1.11
Sweden	85.0	94.0 ^a	94.0	4	3 ^a	3	3.49	2.24 ^a	2.24
UK	64.0	36.1	34.7	1	1	1	0.60	0.60	0.75
US	19.9	17.4	13.8	1	1	1	0.21	0.21	0.21
Average	65.9	63.2	59.7	2.8	2.8	3.0	1.88	1.58	1.48

Note: ^a Data from around 2000. The average is the unweighted arithmetic average for the available observations of that period. Level of wage coordination is divided into: 5 = economy-wide bargaining, 4 = mixed industry- and economy-wide bargaining, 3 = industry-level bargaining with no (standard) pattern setting, 2 = mixed industry- and firm-level bargaining, 1 = fragmented or no bargaining

Source: Union coverage and level of wage coordination from Visser (2011), employment protection legislation from OECD

5.5.3 Intrasectoral inequality

As shown in Table 5.6 no evidence is found for the hypothesis that international trade leads to higher intrasectoral earnings inequality. The only borderline significant result is the negative association between export and the first order corrected Gini index, which suggests that sectors more exposed to export actually have a more compressed earnings structure. The sectoral ICT propensity is insignificant in all regressions, providing no evidence for the skill-biased technological change hypothesis.

The union coverage rate is consistently significant and its negative sign corresponds to our hypothesis that stronger trade unions are associated with lower earnings inequality. The level of wage coordination is significant only for the Gini index regressions, whereas employment protection legislation becomes significant in the regressions with the mean log deviation as the dependent variable. We find mixed evidence for significant associations between the unemployment rate at the country level and sectoral inequality. It might be that when the unemployment rate is high, people with earnings at the lower end of the distribution are most prone to job loss resulting in lower earnings inequality, or that starters with relatively low earnings postpone entry to the labour market (Elsby, Hobijn and Sahin, 2010).

Table 5.6 Panel data regressions for earnings inequality within sectors

	First order corrected Gini index		Mean log deviation	
	(1)	(2)	(3)	(4)
<i>Sectoral data</i>				
Import	-0.002 (0.354)		-0.000 (0.876)	
Export		-0.008* (0.066)		-0.009 (0.155)
Share of ICT	1.311 (0.494)	0.672 (0.774)	0.676 (0.771)	0.353 (0.886)
<i>Country level data</i>				
Union coverage rate	-0.138*** (0.002)	-0.136*** (0.001)	-0.230*** (0.002)	-0.225*** (0.002)
Level of wage coordination	-1.070** (0.012)	-0.973** (0.017)	-0.533 (0.525)	-0.421 (0.608)
Employment protection legislation	1.089 (0.228)	1.054 (0.217)	3.129*** (0.008)	3.076*** (0.006)
Unemployment rate	-0.195** (0.039)	-0.177** (0.050)	-0.019 (0.879)	-0.001 (0.993)
Real GDP per capita/100	-0.006 (0.532)	-0.007 (0.496)	-0.020 (0.435)	-0.020 (0.430)
Constant	36.735*** (0.000)	36.633*** (0.000)	29.025*** (0.004)	28.883*** (0.004)
<i>N</i> * <i>T</i> * <i>I</i>	345	345	345	345
<i>Adjusted R</i> ²	0.628	0.630	0.429	0.431

Note: OLS with country*period and sector*period fixed effects, full sample, 1985-2005, clustered standard errors. Significance levels are noted by *** (1 per cent), ** (5 per cent), or * (10 per cent). The constant is allowed to vary at the sectoral level

Source: First order corrected Gini index and mean log deviation from Thewissen, Wang and Van Vliet (2013), import and export from OECD STAN, share of ICT in total capital compensation from EU-KLEMS, union coverage and level of wage coordination from Visser (2011), all other data from OECD

5.5.4 Sectoral employment

Increased inequality at the country level could also be a consequence of employment loss, in particular at the bottom end of the earnings distribution (Atkinson, 2003; Kenworthy and Pontusson, 2005). We first use the relative employment size of a sector as our dependent variable. If trade and technological change were associated with job loss, we should expect a negative association with the relative employment size of the sector. Second, median earnings should go up if job loss mainly occurred for people at the lower end of the earnings distribution. As the sectoral employment indicators are expressed in percentages relative to the national level so that they average out to around 100 at the country level, the institutional and control variables at the country level lose their interpretation. The country-level variables are therefore left out of the regressions, although the results are not affected by their inclusion.

We can see in columns 1 and 2 of Table 5.7 that import is negatively associated with the relative employment size of industries.²³ We can infer from this that the relative number of jobs has decreased in sectors more exposed to import. This is in line with the hypothesis that trade leads to job loss in import-competing sectors, and it corresponds to the sectoral findings for Germany and the UK of Oesch (2013). A causal interpretation does not seem warranted, however, since it could be that less productive sectors have shed labour and increased imports to fill these gaps. From the results we can conclude that for a given sector, an increase in import of 1 percentage point of the sectoral value added is on average associated with a 0.002 percentage point lower relative employment size in a period, holding constant the control variables.

The results provide no evidence for job creation in sectors with a large export fraction. In addition, the finding that the ICT propensity is insignificant in all regressions does not correspond with the skill-biased technological change job loss hypothesis. The fact that we find a decline in employment in import-competing industries combined with no significant association with technological progress is in line with the industrial findings from Autor, Dorn, and Hanson (2013) for the US.

Table 5.7 Panel data regressions for the relative employment size

	Relative employment size		Relative median earnings	
	(1)	(2)	(3)	(4)
Import	-0.002*** (0.008)		-0.016* (0.054)	
Export		0.001 (0.421)		0.014 (0.504)
Share of ICT	0.706 (0.138)	0.380 (0.487)	3.208 (0.741)	0.407 (0.968)
Constant	2.495*** (0.000)	2.450*** (0.000)	103.473*** (0.000)	102.716*** (0.000)
$N \times T \times I$	336	336	345	345
Adjusted R^2	0.627	0.606	0.663	0.653

Note: OLS with country*period and sector*period interaction effects, full sample, 1985-2005, clustered standard errors. Significance levels are noted by *** (1 per cent), ** (5 per cent), or * (10 per cent). The constant is allowed to vary at the sectoral level

Source: Relative employment size from OECD STAN and Wang, Thewissen and Van Vliet (2014), import and export from OECD STAN, share of ICT in total capital compensation from EU-KLEMS

23 The number of observations decreases as we leave out the UK 1986, for which data are missing for a number of individual industries which would induce an upward bias to the relative employment sizes of individual industries as we would underestimate total employment size (the denominator). The only difference when including UK 1986 is that ICT propensity becomes significant at the 10 per cent for the import regression. The results are fully comparable if we would also exclude waves for which information on a subsector within the manufacturing industry is missing (in addition to UK 1986 also SWE 1992; DNK 1987 and 1992).

In case that low wage jobs for low-skilled workers have disappeared we should expect higher relative median earnings in sectors that became more exposed to international trade or more skill intensive. Yet, the regression presented in column 3 of Table 5.7 actually shows a negative association between import and the relative median earnings, albeit only significant at the 10 per cent level.²⁴ This finding indicates that the diminution of employment found in the former regressions is not associated with job loss for the low-skilled, which is not in line with our hypothesis that trade hurts the lowly skilled. An alternative explanation is that sectors responded to import with wage moderation to remain competitive, so that relative median earnings did not go up.

5.5.5 Sensitivity tests

We perform multiple tests to examine the sensitivity of our findings; the results are available as supplementary information. We first use different specifications or data sources for our dependent variables. Results are fully comparable when we use data from OECD STAN (2011b) on the relative employment size. Import is still found to be negatively associated with the relative employment size with a coefficient of comparable size significant at the 1 per cent level.²⁵ Next, we inspect whether our results are robust to different household definitions. We recalculate earnings and employment for household heads only, most likely a more homogeneous group in which part-time work is less widespread. There are still no signs of inequality-enhancing effects of trade or technological change. The positive association between employment protection legislation and inequality becomes significant in all inequality regressions, while the level of wage coordination is no longer significant in any regression. Import remains to have a significant association with the relative employment size, whereas the significance between import and the relative median earnings disappears. The results are fully comparable to the ones presented above when we include household heads and their spouses. When we base our regressions on equalised household earnings rather than individual information, as Mahler et al (1999) did, a number of changes appear. We still do not find inequality-enhancing effects of trade, but in all regressions there is a positive association between the ICT propensity and within-sector inequality. In addition, the EPL index is positive and the level of wage coordination is negative in all regressions. Import still has a negative association with the relative employment size, while

24 For these regressions we do not exclude the country/period observations for which data on individual industries are missing, as there is no clear upward or downward bias when a certain industry is not included in the calculation of median earnings at the country level. Results are fully comparable if we exclude UK 1986, or in addition to this Sweden 1992 and Denmark 1987 and 1992.

25 The coefficient is with -0.00136 slightly less negative than the one found with LIS data (-0.00160).

the association between import and relative median earnings disappears. Thus, based on household level data we do find evidence for skill-biased technological change. Nevertheless, the original calculations based on individual data are preferable as with household-level information earnings of the spouse or other household members are attributed to sectors in which they were not necessarily made.

As a second set of sensitivity tests, we use different indicators or specifications for trade and technological change. Our results by and large remain comparable when we restrict our sample from 1995 onwards, when trade between developed and developing countries mainly increased. Export becomes insignificant and so does the union coverage rate for the mean log deviation, and the level of wage coordination. Next, we use different sectoral indicators for technological change, namely, the contribution of ICT capital to value added growth from EU-KLEMS and R&D spending relative to the sectoral value added from OECD STAN.²⁶ The results remain similar; export is no longer significantly associated with the first order corrected Gini index when R&D spending is used as technological change indicator. Interactions of labour market institutions and the sectoral indicators (import, export, and ICT intensity) are generally insignificant, providing no evidence that the country-level labour market institutions mitigate the effects of international trade or technological change on earnings inequality.

As a third sensitivity test, we control for supply effects. As Goldin and Katz (2008) argue, it is not only the increased demand for high-skilled labour that may explain increased earnings inequality, changes in the supply are relevant too. Inclusion of the share of hours worked by low-skilled, medium-skilled, and high-skilled workers at the sectoral level from EU-KLEMS data does not have consequences for our results and the shares of hours worked are generally insignificant.²⁷ The same holds when we run regressions with the average years of total schooling for the total population aged 25 and over from Barro and Lee (2013) as a measure of total supply of skills available at the country level. In addition, we include the average hours worked per sector from EU-KLEMS data in our regressions to control for sectoral differences in the prevalence of part-time work.²⁸ Export is no longer significantly associated with the first order corrected Gini index, the EPL index becomes significant in all four regressions while the level of wage coordination is no longer significant. The average hours worked is insignificant in all regressions.

26 For the contribution of ICT capital to value added growth data for Ireland 1995 are taken from the Groningen Growth and Development Centre. For the R&D spending we use data from 2001 for Denmark 2000, and data from 1987 for the UK and US 1986.

27 Due to data availability for the US the data are based on the SIC rather than NAICS sectoral classification, which should have negligible consequences.

28 Data from EU-KLEMS are complemented with OECD STAN data on total hours worked by employees divided by the number of employees for the US 2000 and 2004.

Fourth, we test for effects of our selected sample of sectors. The results remain firm when we exclude industries in which the number of included individuals in the LIS micro data is below 30, or when we include the community sector by assuming that no trade took place by replacing the zeros for missing values. Also from a more general test, excluding sectors one by one, we find that import remains significantly associated with the relative employment size. The coefficient becomes twice as large (-0.003) when the mining sector is excluded. The significant association between the union coverage rate and earnings inequality is also robust to the exclusion of sectors, whilst the relationships between export and the first order corrected Gini coefficient and between import and relative median earnings disappear frequently.

Last, we allow for more lenient specifications by excluding the interactions of country dummies and the time trend, sector dummies and the trend, or both, or by including fixed effects at different levels rather than interactions. This comes at a high price, as it makes the results more susceptible to unobserved heterogeneity bias. There are still no signs of inequality-enhancing effects of international trade or technological change. Without the country and time trend interactions or country dummies the institutions become significant in all regressions with earnings inequality as dependent variable. Again, the initially found negative significant association between import and the relative median earnings and between export and the first order corrected Gini index disappear regularly.

All sensitivity tests considered, the relationships between import and the relative employment size, and the union coverage rate and sectoral earnings inequality remain firm. The associations between export and the first order corrected Gini index, and between import and the relative median earnings, that were significant at the 10 per cent level only, disappear frequently. There are no indications of inequality-enhancing effects of trade.

5.6 CONCLUSIONS

This paper aims to contribute to our understanding of developments and causes of earnings inequality by using new sectoral data for eight countries between 1985 and 2005. Our paper shows the importance of taking into account sectoral trends for our understanding of earnings inequality. In fact, there is on average as much spread in intrasectoral levels of inequality within countries, as there is in levels of country-level inequality between countries. In addition, the same intrasectoral trends can be found in our set of included countries. Agriculture, wholesale, and the financial sector ubiquitously stand out as the sectors with the most unequally distributed earnings, whereas mining, utilities, and the manufacturing of metals and transport are characterised by low levels of earnings dispersion in all countries. Hence, these results suggest that a

substantial part of the manifestation of inequality is overlooked or ignored when studies confine themselves to country-level inequality trends only.

Our decomposition shows that the level and the increase of inequality at the country level is by and large determined by intrasectoral inequality developments, instead of earnings differences between sectors. Intrasectoral earnings inequality has increased in the vast majority of sectors, although the rise differs per sector. In the sector with the highest level of inequality, agriculture, there is actually a trend towards more equalisation. From our comparison of the relative employment sizes of industries over time we see an employment shift from the manufacturing industry towards the financial sector.

Our sectoral design allows us to differentiate between three explanations put forward to explain rising inequality at the country level. By means of cross-sectional pooled time-series we do not find evidence for associations between international trade and earnings inequality, in line with other sectoral studies (Mahler et al, 1999; OECD, 2011a; Michaels et al, forthcoming). Yet, the reported results denote that the employment size has decreased in sectors that are more exposed to import, corresponding to findings for the UK and Germany (Oesch, 2013). No further evidence is found that this job loss has occurred at the bottom end of the earnings distribution. This corresponds to the hypothesis that trade can lead to job loss, even though the results do not suggest that this job loss took place at the bottom end of the earnings distribution where most low-skilled workers are located. Indeed, our finding that job loss is not biased towards the low-skilled is consistent with the fact that we do not find evidence that trade leads to inequality. Causal interpretations of these results do not seem warranted, since it could be that less productive sectors have shed labour and increased imports to fill these gaps, leading to a negative association between imports and relative employment size. In addition, sectors might have responded to import competition with wage moderation to remain competitive, causing a negative association between imports and the relative median earnings.

Our regressions with intrasectoral inequality as the dependent variable point to labour market institutions as important variables. This corresponds to our observation that levels of intrasectoral inequality increased in almost all sectors. The union coverage rate at the country level is found to be negatively associated with sectoral earnings inequality, which corresponds to the hypothesis that waning trade union power is an explanation for rising inequality (e.g., Koeniger et al, 2007). These results are robust to different sensitivity analyses. Further analysis using sectoral data on union coverage rates could provide more insight into how trade unions' influence works its way into sectoral earnings differences – unfortunately, such data are not available with sufficient detail for our set of countries over time (e.g., Pinto and Beckfield, 2011; Kristal, 2013).

The regression results are not in line with the skill-biased technological change hypothesis, as we do not find significant associations between several

indicators of technological progress and any of the dependent variables. Michaels et al (forthcoming) report effects of technological progress for a larger group of countries, but their study is focused on polarisation in skill demand rather than earnings inequality, and that they only use two periods over time. It therefore seems relevant to further analyse in what way polarisation seeps through to inequality at the sectoral level.

Methodologically, with our sectoral approach the number of observations increases and (unobserved) industry-specific developments can be taken into account. Yet, the regressions do not provide causal evidence on the effects of international trade, technological change, and labour market institutions on earnings inequality. Other confounding factors, in particular in product markets, can be expected to affect both earnings and employment, as well as trade and technology opportunities. There could also be dependencies between sectors that have not been taken into account in this study. In addition, individual labour market transitions cannot be tracked directly by means of the used database, which opens up an interesting avenue for further research. Acknowledging these limitations, the analyses presented here encourage a sectoral approach in understanding inequality, in which heterogeneity between sectors is accounted for. As there is as much variation in levels of intrasectoral inequality within countries as there is between levels of country-level inequality, the sectoral dimension is crucial for our understanding of the manifestation of earnings inequality. In addition, a sectoral approach could help our theoretical understanding of inequality and its causes, as there are clear differences in the degree to which sectors are exposed to factors that potentially drive inequality, in particular, technological change and international trade. Indeed, our sectoral approach points to the direction of trade unions having an equalising effect on earnings, whereas no support is found for international trade or technological change, two popular explanations for rising inequality.

Annex 5A

Leiden LIS sectoral income inequality dataset

5A.1 INTRODUCTION

The Leiden LIS Sectoral Income Inequality Dataset contains information on multiple indicators of earnings inequality and employment within 9 sectors and 12 subsectors for 12 developed countries and 49 LIS waves between 1969 and 2005. We provide additional information of earnings and employment at the country level. This dataset draws upon data from the Luxembourg Income Study (LIS) micro dataset, which is a time series of household survey data containing information on earnings and employment, standardised across countries. The Leiden LIS Sectoral Income Inequality Dataset allows researchers and public policy analysts to compare sectoral earnings inequality and employment levels across developed countries over the last three decades, based on a standardised classification of sectors across countries and periods. The data can be linked to other sectoral databases, for instance to the OECD Structural Analysis (STAN) database. The database extends the work of Mahler, Jesuit, and Roscoe (1999) who calculate sectoral earnings inequality in 10 countries around the years 1985 and 1990. The full list of variable definitions can be found in Table 5A.14.

5A.2 CALCULATING SECTORAL EARNINGS INEQUALITY AND EMPLOYMENT

5A.2.1 Labour earnings and sample definition

We calculate annual earnings both at the household and individual level. We follow the earnings and sample definitions of Mahler *et al* (1999), that is, we only include income from wages and salaries or self-employment. Income from other sources, such as interest and rent, is excluded. Also excluded are public benefits and income taxes. For all calculations we apply standard LIS top- and bottom coding conventions, with 1 per cent of (for household inequality: equivalised) mean earnings as our bottom, and ten times the median (for household inequality: non-equivalised) earnings as our top boundary.

We restrict our sample to ‘prime age workers’, people aged between 25 and 54 with nonzero earnings following Mahler *et al* (1999). This is the part of the population that is for its income most dependent on earnings from labour. In addition, this group probably has the strongest labour market

attachment as their earnings are less affected by retirement and schooling decisions (Atkinson *et al*, 1995; Mahler *et al*, 1999). Based on this sample, we calculate the earnings inequality using household earnings (following Mahler *et al*, 1999) and using individual earnings for multiple sample definitions.

For the calculations based on household earnings, we correct for differences in household size using the square root equivalence scale. We apply household weights as standard in LIS.¹ We follow Mahler *et al* (1999) by defining households as working in a particular sector if the household head is working in this sector.²

Yet, a problem with using household earnings is that the members of a household might work in different sectors, so that earnings are attributed to sectors in which they were not necessarily made. Therefore, we also calculate inequality based on individual earnings. We use the personal weights³ and we distinguish between three groups of individuals where we again only include people aged between 25 and 54 with nonzero earnings:

1. Household heads;
2. Household heads and spouses;
3. All individuals.

Here, we attribute the individual earnings to the sector in which the specific individual is working.⁴

We also show the absolute and relative number of households and individuals classified in a sector, both weighted and unweighted, and their weighted absolute and median earnings. The LIS weightings are used to transpose the sample indicators to the population level. In this case, the population is the total number of households or individuals with the age and earnings restriction.

Contrary to Mahler *et al* (1999), we do not include sectoral information for disposable income and the amount of redistribution, as taxes and transfers are set at the national level so that these regulations do not differ between sectors.

5A.2.2 Sectoral classification and country sample

We standardise the classification of sectors based on the International Standard of Industrial Classification (ISIC) rev. 3.0 at the two digit level. The manufacturing and transport and telecommunication sector are further broken down using the ISIC 3.0 three digit level, as can be seen in Table 5A.1.

1 HWEIGHT in LIS.

2 D16 in LIS.

3 PPOPWGT in LIS.

4 IND1_C in LIS.

Table 5A.1 Sectoral definitions based on the ISIC 3.0 codes

No.	Sector	ISIC rev. 3.0 code
1	Agriculture, hunting, forestry and fishing	C01T05
2	Mining and quarrying	C10T14
3	Manufacturing	C15T37
31	Food products, beverages and tobacco	C15T16
32	Textiles, textile products, leather and footwear	C17T19
33	Wood and products of wood and cork	C20
34	Pulp, paper, paper products, printing and publishing	C21T22
35	Chemical, rubber, plastics and fuel products	C23T25
36	Other non-metallic mineral products	C26
37	Basic metals and fabricated metal products	C27T28
38	Machinery and equipment	C29T33
39	Transport equipment	C34T35
30	Manufacturing n.e.c. and recycling	C36T37
4	Electricity, gas and water supply	C40T41
5	Construction	C45
6	Wholesale and retail trade – restaurants and hotels	C50T55
7	Transport and telecommunications	C60T64
71	Transport and storage	C60T63
72	Post and telecommunications	C64
8	Finance, insurance, real estate and business services	C65T74
9	Community, social and personal services	C75T99

In the LIS database multiple sectoral definitions are used across countries and waves, such as ISIC 2.0, or NAICS for the US. To consistently classify industries, we recompute all classification schemes to the ISIC 3.0 definitions. In general this did not require much interpretation, although sometimes some sectors needed to be excluded (mainly when no distinction was made between C34T35 Manufacturing of transport equipment and C36T37 Manufacturing n.e.c. and recycling). Seven classification dummies are included. The classification scheme is included as a separate worksheet in the dataset.

As displayed in Table 5A.2, for twelve developed countries data at the sectoral level are available. Contrary to Mahler *et al* (1999), we include Austria, Belgium, Czech Republic, Ireland, Poland, and Spain. Yet, we leave out Australia, Canada, Italy, and the Netherlands for which the data does not have enough detail to calculate inequality for a sufficient number of sectors – only when certain sectors are combined data are available.

The three waves in italics in Table 5A.2, the 2000 waves for Belgium, Ireland, and Spain, are based on net earnings. The calculations for Germany in 1984 and 1989 are based on West-Germany. For Ireland, three consecutive waves with only few observations, 1994-1996, have been combined (with YEAR=1994-1996) where earnings information has been recalculated to 1995 levels using information on inflation from the World Bank. Due to the higher

number of surveyed people, we recommend to use this combined observation for 1994-1996 instead of the observations for the separate years. The inclusion of Spain, and to a lesser extent Belgium, requires caution as the number of surveyed people is low, leading to possibly inaccurate inequality estimations.

Table 5A.2 Country and wave sample

Country	Available waves
Austria	2004
Belgium	1995, 2000
Czech Republic	1996, 2004
Denmark	1987, 1992, 1995, 2000, 2004
Finland	1987, 1991, 1995, 2000, 2004
Germany	1984, 1989, 1994, 2000, 2004
Ireland	1994, 1995, 1996, 1994-1996, 2000, 2004
Poland	1986, 1992, 1995, 1999, 2004
Spain	1995, 2000
Sweden	1981, 1987, 1992, 2000, 2005
UK	1969, 1979, 1986, 1999, 2004
US	1979, 1986, 1991, 1994, 1997, 2000, 2004

For a number of variables information is missing for Austria, Belgium, Poland, Spain, the waves with net earnings, the individual waves 1994-1996 for Ireland, Sweden 1981, UK 1969 and 1979, and the US 1979 and 1997. Thus, for these variables a total of 31 waves and 639 observations are available.

One possible application of this dataset is to use the data in panel data analysis. The waves can be included in an unbalanced panel dataset of five year periods, for instance from around 1985 to around 2005. This leads to the exclusion of the UK 1969 and 1979, Sweden 1981, and the US 1979 and 1997, and the three individual years 1994, 1995, and 1996 for Ireland.

5A.3 CODEBOOK AND DESCRIPTIVES

Now we show definitions and descriptives of our main variables. In the summary statistics we exclude the individual waves 1994, 1995, and 1996 for Ireland, but we do use the combination 1994-1996. Thus, in the descriptives a maximum of 47 waves are included.

5A.3.1 Country-level data based on household information

The dataset contains a number of indicators at the country level based on household information. The first two columns in Table 5A.3 show the sum of unweighted (SUM) and weighted (SUMW) number of individuals within

included households in the calculations at the sectoral level in the respective wave. Next, GINIC shows the level of equivalised earnings inequality as measured by the Gini indicator, pooled for all households part of our sectoral sample. P50C gives us the weighted median household earnings. Its summary statistics are not shown here as the indicator is expressed in national currency and current prices, making it not internationally comparable.

Table 5A.3 Country-level indicators based on household information

Variable name	SUM	SUMW	GINIC
Mean	10,574	30,751,966	0.320
Standard dev.	11,136	53,294,823	0.049
Minimum	497	4,606	0.249
Maximum	39,944	176,450,466	0.455
No. waves	47	31	47

Thus, the average country-wave observation Gini is 0.320 based on household information.

5A.3.2 Country-level data based on individual information

The following country-level indicators are included in the database constructed on the basis of individual information. Table 5A.4 shows the sum of the unweighted number of individuals using the three groups of individuals (SUMALL for all individuals, SUMHS for household heads and spouses, and SUMH for household heads only). Table 5A.5 shows the same information but then for the weighted frequencies.

Table 5A.4 Unweighted individual frequencies at the country level

Variable name	SUMALL	SUMHS	SUMH
Mean	18,013	16,495	10,353
Standard dev.	24,201	20,649	13,842
Minimum	743	511	363
Maximum	124,760	109,999	72,308
No. waves	44	44	44

Table 5A.5 Weighted individual frequencies at the country level

Variable name	SUMWALL	SUMWHS	SUMWH
Mean	20,338,100	18,132,199	11,958,302
Standard dev.	28,467,058	24,668,276	16,126,149
Minimum	1,140,132	943,437	569,594
Maximum	89,010,701	76,499,922	49,259,582
No. waves	31	31	31

Next, Table 5A.6 summarises the level of inequality for the sample based on all individuals, using a number of indicators. We report the Gini (GINIALLC), the mean log deviation (GE0ALLC), the Theil index (GE1ALLC), and the Atkinson index with inequality aversion parameter $\alpha = 0.5$ (AT05ALLC). The dataset also contains information on the median individual earnings for the three sample definitions (P50ALLC, P50HSC, and P50HC), for which summary statistics are not shown here as they are expressed in national currency and current prices.

Table 5A.6 Individual earnings inequality at the country level

Variable name	GINIALLC	GE0ALLC	GE1ALLC	AT05ALLC
Mean	0.322	0.234	0.193	0.098
Standard dev.	0.050	0.063	0.059	0.027
Minimum	0.257	0.152	0.125	0.066
Maximum	0.416	0.346	0.328	0.152
No. waves	31	31	31	31

5A.3.3 Sectoral data based on household information

Now we move to sectoral data based on household information. In Table 5A.7 we show descriptives for the unweighted and weighted number of households per sector (FREQ and WFREQ respectively). Next, RELFREQ shows the weighted relative employment size of a sector, defined as the number of households classified in a sector divided by the total number of households (WFREQ/SUMW * 100%). The relative employment size maps sectoral employment shifts relative to the total labour market per country, sector, and over time. As an example, the average sector contains 665 households.

Table 5A.7 Frequencies and relative employment size based on household information

Variable name	FREQ	WFREQ	RELFREQ
Mean	665	1,924,483	6.413
Standard dev.	1,354	5,608,224	7.562
Minimum	2	22	0.139
Maximum	13,115	50,300,000	40.373
No. observ.	960	639	639

Next, Table 5A.8 summarises descriptives for sectoral earnings inequality for multiple indicators based on equivalised household information. We report the Gini (GINI), the P90/P10 ratio (P90P10), the mean log deviation (GE0), the Theil index (GE1), and the Atkinson index with inequality aversion parameter $\alpha = 0.5$ (AT05). The Gini coefficient is to a certain extent sensitive to the sample size for which the Gini is calculated. For the Gini bootstrapped standard errors

with 250 repeats are calculated (BSSE250) to provide a confidence interval of the level of inequality.

Deltas (2003) shows this for different cumulative distributions, using Monte Carlo simulations. When the sample size becomes lower, the Gini starts to underestimate the 'true' inequality level. Deltas calculates that by multiplying the Gini by $N / (N - 1)$, which he calls the first order correction, the underestimation bias is significantly reduced. As for some industries, in particular mining and wood manufacturing, the number of people interviewed is often low, we include his first order procedure by calculating GINIFOC as the $GINI * FREQ / (FREQ - 1)$. We use the unweighted frequencies here as the bias arises from the number of people interviewed (the sample).

Last, we show the relative median wage (BETWEEN), a measure of inequality between rather than within industries, calculated as the sectoral median wage divided by its counterpart at the national level (P50/P50C). Again, summary statistics for the P50 are not shown here as the indicator is expressed in national currency and current prices, so that it is not internationally comparable.

Table 5A.8 Earnings inequality based on household information

Variable name	GINI	GINIFOC	BSSE250	P90P10	GE0	GE1	AT05	BETWEEN
Mean	0.289	0.294	0.022	4.918	0.175	0.153	0.076	1.087
Standard dev.	0.062	0.069	0.019	12.813	0.099	0.099	0.036	0.192
Minimum	0.095	0.119	0.002	1.813	0.027	0.027	0.013	0.091
Maximum	0.608	1.216	0.304	360.243	1.514	0.858	0.457	1.980
No. observ.	960	960	960	960	960	960	960	960

5A.3.4 Sectoral data based on individual information

The first three columns of Table 5A.9 summarise the unweighted number of persons classified in a sector for the three groups of individuals. Columns 4-6 provide the same information for the weighted number of persons.

Table 5A.9 Frequencies based on individual information

Variable name	FREQALL	FREQHS	FREQH	WFREQALL	WFREQHS	WFREQH
Mean	1,078	988	637	1,245,758	1,113,643	755,462
Standard dev.	3,031	2,738	1,669	3,321,328	2,917,900	1,832,553
Minimum	4	2	1	1201	1,201	974
Maximum	42,064	37,096	24,418	28,600,000	25,300,000	15,100,000
No. observ.	900	900	900	639	639	639

Table 5A.10 describes the weighted relative employment size of a sector, defined as the number of individuals classified in a sector divided by the total number of individuals for the three groups of individuals.

Table 5A.10 Relative employment size based on individual information

Variable name	RELFREQALL	RELFREQHS	RELFREQH
Mean	0.062	0.062	0.064
Standard dev.	0.084	0.085	0.078
Minimum	0.001	0.001	0.001
Maximum	0.438	0.440	0.386
No. observ.	639	639	639

Next, we show in Table 5A.11 the Gini for the three groups of individuals, both the 'normal' one and the first-order corrected version, which decreases bias due to small sample size.

Table 5A.11 Gini based on individual information

Variable name	GINIALL	GINIHS	GINIH	GINIALLFOC	GINIHSFOC	GINIHFOC
Mean	0.281	0.280	0.263	0.282	0.284	0.268
Standard dev.	0.075	0.076	0.075	0.076	0.078	0.078
Minimum	0.078	0.078	0.078	0.083	0.083	0.082
Maximum	0.597	0.601	0.594	0.654	0.845	0.750
No. observ.	900	900	899	900	900	899

Table 5A.12 provides information on the mean log deviation or GE(0) and the weighted relative median wage for the three groups of individuals. These are again calculated by dividing the sectoral median wage by its counterpart at the country level. Again, summary statistics for the sectoral median wage themselves are not shown here because they are expressed in national currency and current prices and therefore not internationally comparable.

Table 5A.12 GE(0) and relative median wage based on individual earnings

Variable name	GE0ALL	GE0HS	GE0H	BETWEENALL	BETWEENHS	BETWEENH
Mean	0.185	0.184	0.165	1.050	1.048	1.017
Standard dev.	0.112	0.115	0.114	0.194	0.195	0.185
Minimum	0.010	0.010	0.010	0.159	0.151	0.145
Maximum	1.099	1.143	1.130	1.925	1.844	2.767
No. observ.	638	638	638	639	639	639

5A.3.5 Comparison to Mahler et al (1999)

Comparing to Mahler et al (1999), we extend the dataset of sectoral earnings inequality in three ways as can be seen in Table 5A.13. Firstly, we calculate

earnings inequality for 12 countries and between 1969 and 2005, while Mahler *et al* (1999) provide data for 10 countries and between 1984 and 1992. Secondly, we include more inequality measures. Mahler *et al* only calculate the P90/P10 whilst we also include the Gini, the Atkinson index ($\alpha = 0.5$), the mean log deviation (GE(0)), and the Theil index (GE(1)) for household earnings. Next to calculations based on household information, we calculate the GE(0) and Gini using individual information, which allows us to more carefully attribute earnings to sectors. In addition, we follow the first order correction to reduce the underestimation bias by low sample size.

Table 5A.13 Comparison to Mahler *et al* (1999)

	Mahler <i>et al</i>	Leiden LIS Sectoral Income Inequality Dataset
Launched	1999	June 2013
Last update	1999	June 2013
No. of countries	10	12
Countries	Australia, Canada, Denmark, Finland, Germany, Italy, the Netherlands, Sweden, UK, and US	Austria, Belgium, Czech Republic, Denmark, Finland, Germany, Ireland, Poland, Spain, Sweden, UK, and US
LIS waves	II and III	I, II, III, IV, V, and VI and 0 for UK
Time series	1984-1992	1969-2005
Total no. of included LIS waves	18	49
ISIC scheme	ISIC 2.0	ISIC 3.0
Income unit	Equivalised household earnings	- Equivalised household earnings - Individual income using three individual definitions
Earnings definition	- income from wages and salaries or self-employment - disposable income - redistribution	- income from wages and salaries or self-employment
Within sector earnings inequality indicators	For household earnings: - P90/P10 For individual earnings: None	For household earnings: - Gini - Gini with first order correction (Deltas, 2003) - Atkinson index ($\epsilon = 0.5$) - P90/P10 - Mean log deviation (GE(0)) - Theil index (GE(1)) For individual earnings: - Gini - Gini with first order correction (Deltas, 2003) - Mean log deviation (GE(0))
Between sector inequality	- Sectoral median earnings / country median earnings	- Sectoral median earnings / country median earnings - Sectoral employment size / country employment size

Table 5A.14. Full variable list

Variable name	Definition
Identifiers	
COU	Country abbreviation
CNTRY	Country code
YEAR	LIS survey year
PERIOD	Period number {1, ...6} (for panel data analysis, with six periods of each around five years between 1980-2005)
INDUS	Sectoral code based on ISIC rev. 3.0
CLASSIFICATION	Full sectoral name based on ISIC rev. 3.0
Industry classification scheme	
ISIC 3	Dummy for ISIC 3.0 (ISIC 3=1 if the LIS micro data (variable D16) of that wave is classified based on ISIC 3.0)
ISIC 2	Dummy for ISIC 2.0 (ISIC 2=1 if the LIS micro data (variable D16) of that wave is classified based on ISIC 2.0)
SIC	Dummy for SIC (SIC=1 if the LIS micro data (variable D16) of that wave is classified based on SIC)
OLD NAICS	Dummy for old NAICS classification (OLD NAICS=1 if the LIS micro data (variable D16) of that wave is classified based on an older version of NAICS classification)
NEW NAICS	Dummy for new NAICS classification (NEW NAICS=1 if the LIS micro data (variable D16) of that wave is classified based on the new version of NAICS classification)
Other	Dummy for other classification schemes (OTHER=1 if the LIS micro data (variable D16) of that wave is classified based on none of the aforementioned classification schemes)
NET EARN	Dummy indicating waves for which net earnings are used
WGD	Dummy for West Germany (WGD=1 for Germany 1989, 1994)
Country level data based on household information	
SUM	Total number of individuals within households with household head aged 25-54 with nonzero household earnings classified in a sector
SUMW	Total weighted number of individuals within households with household head aged 25-54 with nonzero household earnings classified in a sector
GINIC	Gini for households with household head aged 25-54 with nonzero household earnings classified in a sector
P50C	Weighted median household earnings with household head aged 25-54 with nonzero household earnings classified in a sector in national currency, current prices
Country level data based on individual information	
SUMALL	Total number of all individuals aged 25-54 with nonzero earnings classified in a sector
SUMHS	Total number of household heads and spouses aged 25-54 with nonzero earnings classified in a sector
SUMH	Total number of household heads aged 25-54 with nonzero earnings classified in a sector
SUMWALL	Total weighted number of individuals aged 25-54 with nonzero earnings classified in a sector
SUMWHS	Total weighted number of household heads and spouses aged 25-54 with nonzero earnings classified in a sector
SUMWH	Total weighted number of household heads aged 25-54 with nonzero earnings classified in a sector
GINIALLC	Gini for all individuals aged 25-54 with nonzero earnings classified in a sector
GE0ALLC	Mean log deviation for all individuals aged 25-54 with nonzero earnings classified in a sector
GE1ALLC	Theil index for all individuals aged 25-54 with nonzero earnings classified in a sector
AT05ALLC	Atkinson's index (0.5) for all individuals aged 25-54 with nonzero earnings classified in a sector
P50ALLC	Weighted median earnings for all individuals aged 25-54 with nonzero earnings classified in a sector in national currency, current prices

P50HSC	Weighted median earnings for household heads and spouses aged 25-54 with nonzero earnings classified in a sector in national currency, current prices
P50HC	Weighted median earnings for household heads aged 25-54 with nonzero earnings classified in a sector in national currency, current prices

Sectoral data based on household information

FREQ	Number of households with household head aged 25-54 with nonzero earnings
WFREQ	Weighted number of households with household head aged 25-54 with nonzero earnings
RELFREQ	Weighted relative sectoral employment size: $WFREQ / SUMW * 100\%$
GINI	Sectoral Gini (without first order correction) of households with household head 25-54 with nonzero household earnings
GINIFOC	Sectoral Gini first order corrected based on Deltas (2003): $FREQ / (FREQ - 1) * GINI$, of households with household head 25-54 with nonzero household earnings
BSSE250	Bootstrapped standard errors of the sectoral Gini (without first order correction) with 250 repeats
P90P10	Sectoral P90/P10 ratio of households with household head 25-54 with nonzero household earnings
GE0	Sectoral mean log deviation of households with household head 25-54 with nonzero household earnings
GE1	Sectoral Theil index of households with household head 25-54 with nonzero household earnings
AT05	Sectoral Atkinson index with parameter $\epsilon = 0.5$ of households with household head 25-54 with nonzero household earnings
P50	Weighted sectoral median earnings with household head aged 25-54 with nonzero household earnings, national currency, current prices
BETWEEN	Weighted relative sectoral median wage or inequality between sectors: $P50 / P50C$

Sectoral data based on individual information

FREQALL	Number of all individuals aged 25-54 with nonzero earnings
FREQHS	Number of household heads and spouses aged 25-54 with nonzero earnings
FREQH	Number of household heads aged 25-54 with nonzero earnings
WFREQALL	Weighted number of all individuals aged 25-54 with nonzero earnings
WFREQHS	Weighted number of household heads and spouses aged 25-54 with nonzero earnings
WFREQH	Weighted number of household heads aged 25-54 with nonzero earnings
RELFREQALL	Weighted relative sectoral employment size, all individuals: $WFREQALL / SUMWALL * 100\%$
RELFREQHS	Weighted relative sectoral employment size, household heads and spouses: $WFREQHS / SUMWHS * 100\%$
RELFREQH	Weighted relative sectoral employment size, household heads: $WFREQH / SUMWH * 100\%$
GINIALL	Sectoral Gini (without first order correction) for all individuals aged 25-54 with nonzero earnings
GINIHS	Sectoral Gini (without first order correction) for household heads and spouses aged 25-54 with nonzero earnings
GINIH	Sectoral Gini (without first order correction) for household heads aged 25-54 with nonzero earnings
GINIALLFOC	Sectoral Gini first order corrected based on Deltas (2003): $FREQALL / (FREQALL - 1) * GINIALL$, all individuals aged 25-54 with nonzero earnings
GINIHSFOC	Sectoral Gini first order corrected based on Deltas (2003): $FREQHS / (FREQHS - 1) * GINIHS$, household heads and spouses aged 25-54 with nonzero earnings
GINIHFOC	Sectoral Gini first order corrected based on Deltas (2003): $FREQH / (FREQH - 1) * GINIHS$, household heads aged 25-54 with nonzero earnings
GE0ALL	Sectoral mean log deviation for all individuals aged 25-54 with nonzero earnings
GE0HS	Sectoral mean log deviation for household heads and spouses aged 25-54 with nonzero earnings
GE0H	Sectoral mean log deviation for household heads aged 25-54 with nonzero earnings
P50ALL	Weighted median individual earnings for all individuals aged 25-54 with nonzero earnings, national currency, current prices

P50HS	Weighted median individual earnings for household heads and spouses aged 25-54 with nonzero earnings, national currency, current prices
P50H	Weighted median individual earnings for household heads aged 25-54 with nonzero earnings, national currency, current prices
BETWEENALL	Weighted relative sectoral median wage or inequality between sectors, all individuals: P50ALL / P50ALLC
BETWEENHS	Weighted relative sectoral median wage or inequality between sectors, household heads and spouses: P50HS / P50HSC
BETWEENH	Weighted relative sectoral median wage or inequality between sectors, household heads: P50H / P50HC

6 | Determinants of income inequality among the elderly in 8 countries[■]

ABSTRACT

A major concern in an ageing society is the well-being of elderly people, which to a large extent depends on the income distribution of the elderly, including its mean and dispersion or inequality. While the issue of inequality in general has become a popular subject of research and public interest, only a few studies have focused on the determinants of income inequality among the elderly in a comparative setting over time. To fill in this gap, this chapter examines determinants of the income distribution among the elderly in 8 OECD countries, namely Australia, Canada, Denmark, Germany, Israel, Norway, the United Kingdom and the United States, based on micro data from LIS from around 1995 to around 2005. For this purpose, various counterfactuals were constructed and simulated. The results show that income inequality among the elderly has increased and is mainly associated with changes in the distribution of earnings, followed by changes in the distribution of private pensions. Public pensions have become more inequality-reducing over time in most of the countries that were studied. Finally, the demographic structure of the elderly played a negligible role in driving income distribution among the elderly.

Key words: income inequality, elderly, inequality decomposition

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6.1 INTRODUCTION

The bulk of income distribution studies focus on the total or working-age population,¹ with only scant attention being paid to income inequality among the elderly.² This is regrettable as the latter has been reported to be high and rising. For example, according to the OECD Income Distribution database (2014), in 1995 in the United States the Gini ratio was 0.360 for pensioners aged 65 and above compared with a Gini of 0.351 for the working-age population. In Australia, the Gini for the elderly was 0.260 in 1995 but increased to 0.303 in 2004, converging fast to the Gini for the working-age population (0.305).

The significance of studying inequality among the elderly is threefold. First, as a subpopulation group, their inequality affects the overall distribution. In other words, if everything else would remain constant, changing income gaps among the elderly would lead to changes in a society's total inequality. Second, even if inequality among the elderly does not change it becomes more important when the population share of the elderly grows, as is happening in many countries. In that case, discovering the determinants of inequality among the elderly becomes increasingly crucial for containing the overall inequality. Finally, the elderly generally earn less than the working-age population. Also, pensions have become less generous in many industrialized countries according to Scruggs' pension generosity index (Scruggs, Jahn and Kuitto, 2014). For any population subgroup with a low average income, high or rising inequality will imply absolute poverty for some of its members. Elderly poverty, like all other poverty, is not acceptable and one solution to this poverty problem is to change the income distribution, even in the absence of more resources to support the elderly. This naturally requires identification of the determinants of income inequality among the elderly.

The role of pensions in affecting income inequality among the elderly has been examined by Kohl (1992), Pestieau (1992) and Behrendt (2000). However, little information has been provided on its magnitude across countries. Obviously, the main source of income for the working-age population is direct earnings from the labour market. The well-being of the elderly relies primarily on public and/or private pensions, though. Thus, the distribution of pensions is expected to be a dominant factor in determining income inequality among the elderly. Goudswaard and Caminada (2010) found that private social security arrangements generally entail less income redistribution than public social transfers. This is due to the fact that public pensions are mostly based on income-related funding and flat-rate benefits whereas private pensions are based on a link between contributions paid and benefits received. However,

1 For example, OECD, 2008; Brandolini and Smeeding, 2009; McCall and Percheski, 2010; Atkinson and Morelli, 2011; OECD, 2011a; Wang et al, 2012; and Thewissen et al, 2013.

2 For example, Coder et al, 1989; Crystal and Shea, 1990; Moore and Pacey, 2001; Engelhardt and Gruber, 2004; Smeeding et al, 2008.

Van Vliet et al (2012a) found that more expenditures on private pensions are not associated with higher levels of income inequality among the elderly over time and across countries.

In addition to pensions, labour market factors and demographics may also affect the income distribution among the elderly. For example, welfare state reforms such as the elimination of mandatory retirement ages enable the elderly to earn more from work and increase their income share from earnings. People working beyond the official retirement age are usually richer than those living on pensions only. With respect to the demographic structure of the elderly, Disney and Whitehouse (2002) showed that in general income tends to be lower at higher ages.

In this context, it is relevant to ask what the trend of income inequality among the elderly is; what role public and private pension have played over time; and how changes in the distribution of earnings, household working status and household composition influence the income inequality among the elderly. Motivated by these questions, the aim of this paper is to uncover the influence of public and private pensions. This publication contributes to the literature in three respects. First, it will quantify the influence of public versus private pensions, labour market and demographic factors on income inequality among the elderly over time across countries, holding other factors constant. As such this paper offers a cross-country overview and detailed information regarding income inequality among the elderly. These factors include changes in the composition of pensions (public versus private), the household working status and household composition. Second, the profile of income inequality among the elderly is constructed for a number of countries, offering a comparative perspective on income inequality among the elderly. Third, we apply a new decomposition approach developed by Chen and Corak (2008) and Fortin et al (2010). With this method, several counterfactual income distributions are simulated to identify various determinants of income inequality among the elderly. The major data source for this paper is the Luxembourg Income Study (LIS), which allows estimation of not only gross and disposable income, but also of income components such as public and private pensions, earnings, social transfers and property income. Moreover, it provides information on households' and individuals' labour market situation and the demographic status of the elderly.

This paper is structured as follows. The next section presents trends in income inequality among the elderly across 8 countries over time (1995-2005). Section 6.3 discusses possible inequality determinants and their impact, which are divided into three broad sets: income composition (mainly public and private pensions), labour market and demographic factors. The research methodology is outlined in section 6.4. Empirical results can be found in section 6.5, along with a sensitivity analysis. Section 6.6 presents the conclusions.

6.2 INCOME INEQUALITY AMONG THE ELDERLY

The analyses are based on micro data from LIS, which provide comprehensive detailed information with respect to income components, labour market status and demographic information. All the variables have been “harmonised” by LIS to make the information comparable among countries. This study pays attention to eight OECD countries (namely Australia, Canada, Denmark, Germany, Israel, Norway, the United Kingdom and the United States) based on data availability. For these countries LIS has information on both private and public pensions from around 1995 (wave IV in LIS) to 2005 (wave VI in LIS).³ All variables have been “harmonised” by LIS, so they are comparable across countries.

The elderly are defined as individuals aged 65 and above, including the household head, spouse and other relatives living in the household. Assuming resource pooling within families, the square root of the number of family members is applied as the equivalence scale as in LIS. The Gini coefficient is used as a global measure for income inequality. To reduce the influence of outliers, the analysis follows the top and bottom coding procedure of LIS, i.e. observations larger than 10 times the median of the non-equivalised income are set to equal to 10 times this median income and observations smaller than 1 percent of the equivalised mean income are set to equal to 1 percent of the equivalised mean income. As a sensitivity check, other global income inequality indicators are also used, namely the Atkinson’s Index ($\alpha=0.5$), Theil Index (GE (1)), Mean Log Deviation (GE (0)) and the ratio of the income at the 90th percentile to the income at the 10th percentile (P90/P10).

Table 6.1 illustrates the income inequality among elderly people in the countries under study and how it has changed from the mid-1990s to the mid-2000s. The main pattern is that income inequality among the elderly increased during this period, which is in line with the trends observed in the OECD income inequality database. On average across our 8 countries, the Gini coefficient increased from 0.280 to 0.291, i.e. by 0.011 points. The largest rise occurred in Australia while a lesser increase can be seen in the United States and Canada. On the contrary, as an outlier, Israel experienced inequality decline. Around 1995 and 2005, high Gini estimates for the elderly were observed in Israel and the United States (more than 0.350). Meanwhile, Denmark and Norway had Gini coefficients lower than 0.250. These findings are robust to the inequality indicators used, except for the P90/P10 indicator, which decreased in Norway and the United Kingdom. However, this indicator only focuses on two deciles (tails of the distribution) rather than capturing the whole income distribution, which is not Lorenz-consistent (using all data

3 Australia (1995, 2003); Canada (1994, 2004); Denmark (1995, 2004); Germany (1994, 2004); Israel (1997, 2005); Norway (1995, 2004); the United Kingdom (1995, 2004) and the United States (1994, 2004).

points). Thus, P90/P10 may show a different pattern compared to other global indicators.⁴

⁴ In Norway, the ratio of the equivalised income at the 90th percentile to the 50th percentile (P90/P50) decreased (from 1.69 to 1.62) while the ratio of the equivalised income at the 10th percentile to the 50th percentile (P10/P50) increased (from 0.64 to 0.65) from 1995 to 2004. In the United Kingdom, both P90/P50 and P10/P50 decreased with the former declining faster (from 2.11 to 1.96) than the latter (from 0.64 to 0.60).

Table 6.1 Disposable income inequality among the elderly, 1995-2005

Country	Around 1995						Around 2005						Change 95-05					
	Year	Gini	A(0.5)	GE(1)	GE(0)	P90P10	Year	Gini	A(0.5)	GE(1)	GE(0)	P90P10	Gini	A(0.5)	GE(1)	GE(0)	P90P10	
Australia	1995	0.260	0.057	0.121	0.119	2.833	2003	0.295	0.077	0.172	0.159	3.138	0.035	0.020	0.052	0.040	0.305	
Canada	1994	0.256	0.054	0.118	0.105	2.901	2004	0.269	0.059	0.128	0.118	3.116	0.013	0.005	0.010	0.013	0.215	
Denmark	1995	0.207	0.039	0.089	0.073	2.290	2004	0.216	0.044	0.102	0.081	2.317	0.009	0.005	0.013	0.009	0.027	
Germany	1994	0.258	0.055	0.113	0.114	3.151	2004	0.268	0.060	0.131	0.119	3.162	0.010	0.005	0.018	0.005	0.011	
Israel	1997	0.377	0.115	0.252	0.237	5.566	2005	0.367	0.106	0.223	0.224	5.538	-0.010	-0.009	-0.029	-0.013	-0.028	
Norway	1995	0.232	0.048	0.108	0.093	2.663	2004	0.242	0.057	0.137	0.103	2.503	0.010	0.009	0.029	0.010	-0.160	
UK	1995	0.292	0.070	0.156	0.137	3.281	2004	0.293	0.073	0.164	0.144	3.265	0.001	0.003	0.008	0.007	-0.016	
US	1994	0.360	0.106	0.224	0.232	5.138	2004	0.377	0.117	0.254	0.256	5.475	0.018	0.011	0.030	0.024	0.337	
mean-8		0.280	0.068	0.148	0.139	3.478		0.291	0.074	0.164	0.150	3.564	0.011	0.006	0.016	0.012	0.086	

Note: Bootstrap standard errors of the Gini coefficients vary across countries and survey years, and generally the 95% interval is plus 1 percentage point, except for Israel in 1997 (standard error is 0.011).

Source: Own calculations using micro data from LIS.

6.3 THE DETERMINANTS OF INCOME INEQUALITY AMONG THE ELDERLY

Following OECD (2008: 282-292), there are three broad sets of factors affecting the income distribution: the composition or components of income, demographics and labour market factors.

6.3.1 Income components

The gross income of the elderly consists of public pensions, private pensions, earnings, other public transfers, private transfers and cash property income. On average, pensions and earnings account for more than 70% and 10% of gross income, respectively (Table 6.2). Thus, this paper will focus on changes in the distribution of pensions, and on earnings. In general, public pensions are supposed to generate more redistribution of income compared to private pension schemes. Public pensions are usually pay-as-you-go systems, with flat-rate benefits, based on income-related contributions while private pensions are usually funded systems where the contributions paid are related to benefits based on previous earnings. Therefore, as a rule, public pensions are assumed to generate more redistribution than private pensions. Pensions are expected to play an important role in determining income inequality among elderly people across countries (see Van Vliet et al, 2012a). Moreover, maturation of voluntary private pension schemes may have increased the share of private pensions. In the last decades, the rise of female labour force participation has automatically increased the coverage of private pensions.

The transition from public to private pensions, if any, can be measured by changes in the amount of public and private benefits received by elderly people. Since elderly people usually do not have much income from work, public pensions are their main source of income. As a result, income support from the social programmes plays an important role in reducing income inequality among elderly people. As private pension plans are based on a link between contributions paid and benefits received, they do not contain elements of income redistribution (Van Vliet et al, 2012a). Private pensions are generally less redistributive than public social security (Goudswaard and Caminada, 2010).

Following the definition of LIS, public pensions consist of universal old-age pensions, employment-related old-age pensions, old-age pensions for public sector employees, early retirement benefits, and survivors pensions,⁵ while private pensions include mandatory occupational pensions, voluntary occupational pensions, mandatory individual retirement pensions, occupational

5 As part of the state old-age and survivors benefits, survivors pensions are not directly targeted, but also benefit the elderly.

pensions for public sector employees and other pensions.⁶ Besides pensions, other income sources such as earnings, other public transfers, private transfers and property income also influence the income distribution among elderly people.

Table 6.2 shows the income components of the gross income of the elderly from 1995 to 2005 across 8 countries. On average, most gross income of the elderly comes from public pensions (56.6% around 1995 and 55.7% around 2005), followed by private pensions (14.3% around 1995 and 16.4% around 2005), earnings (11.7%), other public transfers (8.7%) and property income (8.2%), while private transfers only make up less than 1% of the gross income. The largest share of public pensions exists in Germany (above 77%), both around 1995 and 2005, whereas the lowest share is found in Israel and Australia (below 50%). As for private pensions, the highest share is found in Israel and the United Kingdom (over 20%), whilst the lowest share is found in Germany (less than 5%).

Throughout the entire period under study, the share of private pensions in the gross income increased by 2.09% points on average whilst the share of public pensions declined by 0.86% points, showing a small shift from public to private pensions. However, there is variation across countries. The shift is quite obvious in Canada, Denmark and the United Kingdom with an increase in private pensions and a decrease in public pensions. In Australia, Germany, Israel and Norway, the increase in private pensions has been faster than the rise of public pensions. However, in the United States, the share of private pensions dropped while the share of public pensions rose. In terms of the magnitude of change, both the largest increase in private pensions and the largest decline in public pensions are observed in Canada; other income components of pensioners in Canada were rather stable over time.

Moreover, the share of earnings increased by 0.15% points on average, with the largest rise taking place in the United States, but a moderate drop was seen in Australia, Germany, Israel, Norway and the United Kingdom. The levels of other public transfers and private transfers were rather stable over time while the share of property income decreased by 1.37% points from around 1995 to around 2005 (see Table 6.2).

6 According to the information provided by LIS, public pensions include state old-age and survivors benefits. Private pensions consist of private occupational pensions, mandatory individual retirement pensions, private occupational and other pensions, and public sector occupational pensions. It should be noted that the categories of public and private pensions are troublesome. They cannot be fully distinguished from each other due to the data availability.

Table 6.2 Income components (shares) of equivalised gross income among elderly people, 1995-2005

Country	Around 1995							Around 2005							Change 95-05						
	Year	Public pensions	Private pensions	Earnings	Other public transfers	Private transfers	Cash property income	Year	Public pensions	Private pensions	Earnings	Other public transfers	Private transfers	Cash property income	Public pensions	Private pensions	Earnings	Other public transfers	Private transfers	Cash property income	
Australia	1995	46.7%	10.7%	13.1%	16.7%	0.3%	12.5%	2003	48.7%	13.3%	12.4%	13.4%	0.4%	11.8%	2.02%	2.63%	-0.66%	-3.26%	0.04%	-0.77%	
Canada	1994	55.5%	16.0%	11.9%	5.9%	1.5%	9.2%	2004	49.3%	24.3%	13.1%	4.7%	1.5%	7.2%	-6.26%	8.33%	1.23%	-1.21%	-0.03%	-2.06%	
Denmark	1995	63.4%	12.9%	7.0%	10.1%	0.6%	6.0%	2004	62.5%	16.1%	8.2%	8.4%	0.5%	4.3%	-0.86%	3.23%	1.23%	-1.73%	-0.10%	-1.77%	
Germany	1994	77.3%	3.9%	8.5%	4.2%	0.4%	5.7%	2004	77.7%	4.5%	7.3%	4.3%	0.2%	6.1%	0.39%	0.52%	-1.23%	0.17%	-0.21%	0.36%	
Israel	1997	42.2%	22.6%	18.6%	10.1%	1.1%	5.4%	2005	43.1%	24.9%	17.8%	8.1%	1.1%	5.0%	0.94%	2.27%	-0.83%	-2.09%	0.09%	-0.38%	
Norway	1995	63.1%	13.4%	10.6%	6.3%	0.1%	6.4%	2004	63.3%	14.9%	8.7%	7.6%	0.3%	5.3%	0.16%	1.49%	-1.95%	1.22%	0.14%	-1.06%	
UK	1995	50.2%	20.4%	7.9%	11.7%	0.3%	9.6%	2004	46.0%	22.3%	7.6%	16.4%	0.4%	7.2%	-4.14%	1.89%	-0.25%	4.74%	0.08%	-2.32%	
US	1994	54.2%	14.4%	15.7%	4.4%	0.3%	11.1%	2004	55.0%	10.7%	19.3%	6.3%	0.4%	8.2%	0.86%	-3.63%	3.64%	1.91%	0.17%	-2.94%	
Mean		56.6%	14.3%	11.7%	8.7%	0.6%	8.2%		55.7%	16.4%	11.8%	8.6%	0.6%	6.9%	-0.86%	2.09%	0.15%	-0.03%	0.02%	-1.37%	

Note: Other public transfers include occupational injury and disease benefits, disability benefits, child/family benefits, unemployment compensation benefits, maternity and other family leave benefits, other social insurance benefits, social assistance cash benefits and near-cash benefits. Private transfers include alimony/child support, regular private transfers and other cash income. Cash property income includes interest and dividends, rental income, private savings plans, royalties and cash property income.

Source: Own calculations using micro data from LIS.

6.3.2 Labour market factors

Another broad set of factors affecting the income distribution of the elderly is related to the labour market (OECD, 2008: 289). From the mid-1990s to the mid-2000s, welfare state reforms led to significant changes in the labour market status of the elderly. In the United States, for instance, the post-2000 increase in labour force participation of the elderly is related to the elimination of mandatory retirement ages, a decrease in the pension replacement rate, a move from defined-benefit to defined-contribution pensions, and a decline in the coverage of post-retirement health insurance for workers in the private sector (Munnell and Sass 2009: 35-60). The distribution of earnings among the elderly also changed. Take Denmark in the period 1997-2007, for example, where the biggest change in earnings occurred among the 60-64 year olds and to a lesser extent among the 70-74 year olds (Larsen and Pedersen, 2012). Hungerford et al (2001) pointed out that earnings may become a more important source of retirement income in the future because of changes in the retirement earnings test for social security beneficiaries.

In this paper, labour market factors are represented by two variables: a dummy variable indicating whether the household head and spouse are both employed, either the household head or the spouse is employed or neither of them is employed,⁷ and the annual earnings they obtain. Haider and Loughran (2001) found that employment of the elderly in the United States correlates positively with health, education and wealth. Therefore, if rich elderly people have more earnings and a higher chance to work, income dispersion among the elderly would be larger. The reverse would be true if healthier elderly people in lower income groups have a higher chance to earn more. Larsen and Pedersen (2012) showed that in Denmark employment rates for elderly people aged 60-64 increased in the period from around 1995 to around 2005 while they were rather stable for the group of people aged 65 and above.

Labour market factors also reflect broader forces such as the business cycle, economic integration, technological changes and globalization. Many of these factors are independent of government transfers, but there could certainly be important interactions between the structure of social policy and labour supply, particularly among low income groups in the working-age population and to a much lesser extent among elderly people.

7 The current labour force status distinguishes between the employed, the unemployed, and those not in the labour force. People are considered employed during the reference period if they carried out any type of employment duties – even if it was just one occasional hour of paid work or irregular unpaid family work.

6.3.3 Demographics of the elderly

Finally, changes in demographic structures of the elderly may affect their income inequality. Three variables can be used in the empirical analysis: the proportion of households with a household head above 75 years old, whether the elderly people are living alone or not, and whether the household head attended university or higher education. The latter factor is measured by using a binary variable implying whether the household head's education level is tertiary or above.⁸

The ageing effect is captured by the first variable. In general, at a specific moment the income of elderly people tends to decline with age for several reasons (Disney and Whitehouse 2002). First, the pensions of the elderly are determined by their past earnings, which tend to be higher for younger cohorts with a higher real lifetime income than older cohorts. Second, many old-aged pensioners are women, who live longer than men and could be poorer than older men. Third, because of the immaturity of contribution-based pension-schemes, earlier contributors may not have accumulated sufficient entitlements for a 'full' pension. Fourth, partial non-indexation of pension benefits income may hamper older cohorts more than younger pensioners over the years. Fifth, a small number of younger elderly who are still working are relatively more well off than their elder counterparts. Sixth, as the lifecycle hypothesis implies, older pensioners will have a lower income from savings than younger pensioners if they have spent down their assets. However, older cohorts could also be richer because old-aged survivors typically have higher financial, housing and pension wealth than those who die young.

A single household living arrangement affects elderly income distribution in two ways. On the one hand, a single pensioner tends to have a higher equivalised income than married couples where one partner has an incomplete contribution history. This is the case for most continental European systems in particular, where the amount of social security is fully based on contribution and earnings (OECD, 2001; Whitehouse, 2002a, 2002b). This differs from the flat-rate benefit systems implemented in Denmark and the United Kingdom. On the other hand, assuming that household resources are shared among family members, income inequality would be lower when less elderly people are living alone. For example, suppose an elderly man with both a public and private pension is living with an elderly woman having only a public pension. In that case their income is shared within their family, in other words their income is redistributed within the family. This leads to a lower income inequality in society than if both of them would live separately. Therefore, a lower share of single households may result in lower income inequality.

8 For example, tertiary education level or higher in the United States combines those with associate degrees, bachelor's degrees and advanced degrees (master's, professional school, or doctorate).

The third variable, education, is positively associated with earnings (Blundell et al, 2005). Thus, better educated households usually have a higher income after retirement. Furthermore, a higher education enhances the probability of remaining at work and the chances of becoming self-employed (Robinson and Sexton, 1994). Obviously, when the higher education level is located more in the upper part of the income distribution, income inequality becomes larger (over time).

6.4 ANALYTICAL FRAMEWORK

The aim of this analysis is to examine the relative influences of public versus private pensions, demographic and labour market factors on the overall changes in income inequality among elderly people in 8 countries. In order to gauge its net impact on income distribution, we need to estimate what the income inequality among elderly people would have been conditional on the other factors in the earlier period. The starting point is to develop a counterfactual income distribution based on all impacts being constant around 1995, except for one specific factor. This counterfactual income distribution allows us to derive the income inequality indicator among elderly people around 2005 if all factors except for the one under study had remained the same. The impact of changes in single households on income inequality among the elderly that we would like to examine, is the difference between the counterfactual income inequality indicator and the actual income inequality indicator. In order to develop the counterfactual income distribution, this study follows the approach offered by DiNardo et al (1996), Fortin et al (2010), and Chen and Corak (2005; 2008), which consists of two methods: reweighting and rank-preserving exchange.

This approach belongs to a family of budget incidence analyses in line with the work of Musgrave, Case and Leonard (1974); see also Wang, Caminada and Goudswaard (2012). It assumes that individuals behave the same in the presence or absence of a particular factor. (Frick et al, 2000; Palme, 1996). In reality, people's behaviour usually changes when a variable disappears or emerges, e.g. public or private pension income is present or absent. Government policies also change over time and it is almost impossible to incorporate policy impacts into any analytical framework. Therefore, the results and research findings of this paper are indicative only and must be interpreted with caution.

As introduced by DiNardo et al (1996), the reweighting procedure replaces the marginal distribution of a factor (or factors) in period 0 with its counterpart in period 1 using a reweighting factor:

$$\phi(X) = \frac{dF_{X1}(X)}{dF_{X0}(X)} \quad (1)$$

where $dF_{x0}(X)$ is the marginal distribution in period 0, $dF_{x1}(X)$ is the marginal distribution in period 1, and $\phi(X)$ is the reweighting factor, the ratio of two multivariate marginal distribution functions (of the covariates X). This allows us to simulate a counterfactual income distribution using a probit model to estimate the counterfactual weight and decompose the impact of changes in multiple factors on the income distribution. This approach can be applied both to averages and global indicators of income inequality (Gini coefficients) and is used by, among others, Chen and Corak (2005; 2008), Chiquiar and Hanson (2005) and Daly and Valletta (2006).

The reweighting method can be used to isolate the impact of a binary variable or categorical variables (with more than 2 categories) as well as continuous variables. Let us consider the binary variable S that defines whether an elderly individual lives alone or not ($S = 1$ indicates a single elderly household and $S = 0$ indicates other living arrangements). The density of year-1995-equivalised incomes $f_{95}(y)$ can be expressed as the weighted sum of the densities of elderly people living in a single household and elderly people living in other household types:

$$f_{95}(y) = \Pr_{95}(S=1)f_{95}(y|S=1) + \Pr_{95}(S=0)f_{95}(y|S=0) \quad (2)$$

Suppose that the share of elderly people living in a single household has increased from 10% in 1995 to 20% in 2005. To examine the influence of this change over time, each observation can be reweighted according to the percentage change in the share of each group. Therefore, every single-household elderly individual in 1995 should be up-weighted by 2 (that is $0.20/0.10$) and every elderly person in another type of household should be down-weighted by 0.889 (that is $0.80/0.90$). After reweighting, the counterfactual density function is:

$$f_{95}^*(y) = \phi(S=1)\Pr_{95}(S=1)f_{95}(y|S=1) + \phi(S=0)\Pr_{95}(S=0)f_{95}(y|S=0) \quad (3)$$

where the reweighting factor is

$$\phi(S) = \frac{dF_{95}(S)}{dF_{05}(S)} = S \cdot \frac{\Pr_{05}(S=1)}{\Pr_{95}(S=1)} + (1-S) \cdot \frac{\Pr_{05}(S=0)}{\Pr_{95}(S=0)} \quad (4)$$

For non-binary variables, the reweighting procedure can be implemented by pooling data from the two years under study and using a probit model to obtain the reweighting factor.

Then, the counterfactual income distribution can be simulated with the adjusted weights equal to the reweighting factor multiplied by the original weight. The impact of changes in single elderly households can be computed by comparing the Gini estimate based on the counterfactual with the actual Gini coefficient in 1995.

Chen and Corak (2008) note that the reweighting method assumes that the distribution of the characteristics does not affect the distribution of the outcome variable. For example, the influences of all of the demographic factors and some of the labour market factors are assumed constant. This is a rather bold assumption and unrealistic for the purpose of isolating the impacts of earnings or pensions on income inequality among elderly people. This is because the equivalised income of elderly people derives mostly from pension and labour income and the welfare system and labour market have undergone significant changes over time. Consequently, the rank-preserving exchange method will be used when assessing the impacts of earnings and pension variables.

The rank-preserving exchange approach maps the variable that needs to be fixed in a certain rank of the income distribution in one period to the same rank of the income distribution in the other period. It can be applied to simulate the impact of changes in earnings, private and public pensions on income distribution among the elderly, conditional on other factors. In the case of public pensions, for example, this approach involves subtracting each elderly person's equivalised public pensions from his or her total equivalent disposable income in 1995 and adding back the amounts in 2005 from the same income rank. That is:

$$I_{95}^* = I_{95} - Pubpen_{95} + Pubpen_{05} \quad (5)$$

where I_{95}^* is the counterfactual equivalised income of the elderly people in 1995, I_{95} is the actual equivalised income of the elderly people in 1995, and $Pubpen_{95}$ and $Pubpen_{05}$ are the equivalised public pensions of the elderly people in 1995 and 2005, respectively. In the empirical application, all elderly people are first ranked from lowest to highest by equivalised income and divided into equally sized groups, considering household sampling weights.⁹ Now, the median incomes within each percentile in 1995 can be computed. Then, for the same percentile rank, the equivalised public pensions are subtracted in 1995 and replaced with the variable in 2005. The resulting counterfactual income distribution is the distribution holding all factors at the same level as in 1995, with the exception of public pensions. The difference between income inequality based on the distributions of I_{95}^* and I_{95} is the contribution of changes in the public pension's distribution to the changes in income inequality from 1995 to 2005.

To recap, the reweighting method will be applied to analyze the impacts of all demographic factors (share of households with the household head above 75 years old, education level of the household, and single household) and some of the labour market factors (household working status). For other factors such

⁹ The number of groups is determined by the sample size. The larger the number of groups, the less the bias of the global income inequality indicator that arises from the grouping.

as annual earnings, public and private pensions, the rank-preserving exchange approach is used.

It should be noted that the applied decomposition method may produce a residual term due to two reasons. First, other factors that were not taken into account could play a role. Second, residuals arise due to overlap when variables measuring partial decomposition effects reflect the same effects. It is common to find such residuals with this decomposition approach (see Chen and Corak, 2005; 2008, OECD, 2011a, chapter 5).

6.5 SIMULATION RESULTS

Table 6.3 shows the impact on income inequality among the elderly of the composition of pension income, labour market factors and demographic factors from 1995 to 2005 in 8 countries. On average, income inequality as indicated by Gini increased by 0.011, mainly contributed by labour market factors (+0.020), especially the distribution of earnings, and to a lesser extent by the changes in the distribution of private pensions (+0.003). However, this increase was offset by the effect of the public pension system (-0.012). Furthermore, demographic factors play a negligible role. This is because cohorts entering old-aged groups look like individuals that were originally part of the elderly group.

However, there is large variation across countries. Conditional on other labour market and demographic factors, in all countries except the United States (private and public) pensions had a partially equalizing effect on income inequality among the elderly. In Australia, Israel, Norway, the United Kingdom and the United States, private pensions contributed to the rise in income inequality. Interestingly, public pensions became more redistributive in 2005 compared to 1995 in all countries except Canada.

Labour market factors led to a higher income inequality in all studied countries except Israel. The household working status had an inequality-increasing effect in Australia, Denmark and Germany. Changes in the distribution of earnings also led to higher inequality in all countries except Israel.

As for demographic factors, the change in the share of people above 75 years old is associated with higher income inequality in Israel and Norway, but lower inequality in Australia and Germany. Elderly people living in single family households do not cause increased inequality except in Denmark, Germany and Israel. University attendance of the household head in elderly households does not influence the income distribution among the elderly.

As tabulated in the last row of Table 6.3, the residual (i.e. unexplained or overlapping effects) is rather small, on average around 0.001 or 9% of the total change in inequality. The residual captures the impacts of omitted variables and the possible overlapping of one or more variables. For example, the effect of changes in the decision to work on income inequality may be different in

the presence or absence of changes in pensions. Fortunately, the residual is relatively small. Over 90% of inequality changes are accounted for by our analyses.

The model's explanatory power differs across countries. It is pretty good for some countries, namely Australia, Denmark, Germany, Israel and the United States. Over 70% of inequality changes were taken into account for these countries. However, it is less robust for the United Kingdom. Its rather large residual suggests that important factors may have been neglected. However, it should be noted that the UK is a special case: the change in the Gini over time was very small (+0.001), so partial decomposition effects can be troublesome.

To explore the sensitivity of the results to global inequality measures, the above exercise was repeated using other inequality indicators: Mean Log Deviation, Theil Index and Atkinson's Index ($\alpha=0.5$). See the annex 6A for details. In general, the results do not seem to be sensitive to the indicator that is used. For all indicators, public and private pensions were found to be more inequality-reducing over time and labour market factors more inequality-increasing. Demographic factors played a negligible role. However, in some cases the results are sensitive to the inequality measure used. For example, Mean Log Deviation and Atkinson's Index ($\alpha=0.5$) are more sensitive to lower income groups. Therefore, in the United States the effect of public pensions became stronger over time, i.e. more inequality-reducing when MLD was used than when the Gini was used.

Table 6.3 Decomposition of changes in income inequality among the elderly, 1995-2005 (Gini coefficient)

	Australia (1995, 2003)	Canada (1994, 2004)	Denmark (1995, 2004)	Germany (1994, 2004)	Israel (1997, 2005)	Norway (1995, 2004)	United Kingdom (1995, 2004)	United States (1994, 2004)	Average
1. Income inequality among the elderly									
Around 1995	0.260	0.256	0.207	0.258	0.377	0.232	0.292	0.360	0.280
Around 2005	0.295	0.269	0.216	0.268	0.367	0.242	0.293	0.377	0.291
Change	0.035	0.013	0.009	0.010	-0.010	0.010	0.001	0.018	0.011
2. Contribution to changes in income inequality among the elderly									
2a. Private/Public mix of pensions									
Private pensions	-0.006	-0.001	-0.008	-0.015	-0.015	-0.003	-0.028	0.001	-0.009
Public pensions	0.011	-0.003	-0.006	-0.003	0.002	0.011	0.001	0.006	0.003
	-0.018	0.002	-0.002	-0.013	-0.018	-0.015	-0.029	-0.005	-0.012
2b. Labour market factors									
Household working status	0.046	0.011	0.017	0.024	-0.001	0.018	0.023	0.021	0.020
Annual earnings	0.005	0.000	0.002	0.002	0.000	0.000	0.000	0.000	0.001
	0.041	0.011	0.015	0.022	-0.001	0.018	0.023	0.021	0.019
2c. Demographic factors									
Share of people above 75 years old	-0.001	0.000	0.001	0.000	0.004	0.000	0.000	-0.003	0.000
Single household	-0.001	-0.001	0.000	-0.001	0.001	0.003	0.000	0.000	0.000
University attendance of household head	-0.001	0.000	0.001	0.001	0.003	-0.003	0.000	-0.002	0.000
	0.000	0.000	0.000	0.000	-	0.000	-	0.000	0.000
Residual	-0.004	0.003	-0.001	0.002	0.003	-0.004	0.006	-0.001	0.001

Note: Information on education is not available for Israel and the United Kingdom.

Source: Derived by the author using micro data from LIS

6.6 DISCUSSION

Income inequality in OECD countries has increased in the last decades. To a large extent this is due to changes in income composition, labour market and demographic factors. Literature examining the links between the trend of rising income inequality and its driving forces mainly focus on income inequality among the total or prime-age population. This study concentrates on the well-being of the elderly, providing information on the extent to which these factors contribute to the changes in income inequality among the elderly in 8 OECD countries from around 1995 to around 2005.

During this period, the overall income inequality among elderly people in these countries increased slightly, with Australia showing the highest increase and the United States and Canada showing a less prominent increase, while income inequality in Israel declined. By simulating counterfactual income distributions of the elderly, this study found that on average the majority of the increase can be attributed to labour market factors, especially the distribution of earnings, and to a lesser extent to changes in the composition of public versus private pensions. The empirical analysis indicates that (on average across countries) higher inequality caused by private pensions was compensated for by changes in the distribution of public pensions. In line with an earlier study (Van Vliet et al, 2012a), the shift from public to private pensions does not (yet) seem to create higher levels of income inequality among the elderly. Furthermore, demographic factors play a negligible role in changes in income inequality among the elderly during the period and countries under study.

The changes in income inequality among the elderly are attributable to several factors. Private pensions contribute to higher income inequality among the elderly in 2005 compared to 1995, except in Canada, Denmark and Germany. Public pensions have become more redistributive over time, except in Canada. With respect to demographic factors, the share of people above 75 years old is associated with less income inequality in Israel and Norway but has a slightly negative impact in Australia and Germany. The share of elderly people living in a single family household does not drive the outcomes except for those in Germany and Israel. With regard to labour market factors, changes in the distribution of earnings lead to a larger income inequality in all countries under study except Israel. In addition, there is a positive effect of the household working status on income inequality among the elderly in Australia, Denmark and Germany.

These results lead to the policy suggestion that tackling poverty and income inequality among the elderly should focus on their earnings' distribution. In addition, the changes in the mix of public versus private pensions do not seem to result in higher income inequality among the elderly. However, these findings should be interpreted with caution since our decomposition approach only considers the partial equilibrium or static state rather than global equi-

brium or the dynamic situation. Future work should shed more light on the income inequality among the elderly, and improve the decomposition method to reduce the influence of alternative explanations (= minimize residuals).

Annex 6A

Sensitivity analysis for decomposition using
different global income inequality indicators

Table 6A.1 Decomposition of changes in income inequality among the elderly, 1995-2005 (Mean Log Deviation, Theil Index and Atkinson's index (a=0.5))

	Australia (1995, 2003)		Canada (1994, 2004)		Denmark (1995, 2004)		Germany (1994, 2004)		Average						
	MLD	GE(1) A(0.5)	MLD	GE(1) A(0.5)	MLD	GE(1) A(0.5)	MLD	GE(1) A(0.5)	MLD	GE(1) A(0.5)					
1. Income inequality among the elderly															
Around 1995	0.119	0.121	0.057	0.105	0.118	0.054	0.073	0.089	0.039	0.114	0.113	0.055	0.139	0.148	0.068
Around 2005	0.159	0.172	0.077	0.118	0.128	0.059	0.081	0.102	0.044	0.119	0.131	0.060	0.150	0.164	0.074
Change	0.040	0.052	0.020	0.013	0.010	0.005	0.009	0.013	0.005	0.005	0.018	0.005	0.012	0.016	0.006
2. Contribution to changes in income inequality among the elderly															
2a. Private/Public mix of pensions	0.004	0.005	0.001	0.000	-0.004	-0.001	-0.009	-0.023	-0.007	-0.022	-0.016	-0.009	-0.009	-0.003	-0.003
Private pensions	0.011	0.017	0.006	-0.003	-0.006	-0.002	-0.007	-0.013	-0.004	-0.004	-0.004	-0.002	0.003	0.006	0.002
Public pensions	-0.008	-0.012	-0.005	0.004	0.003	0.001	-0.002	-0.010	-0.003	-0.017	-0.013	-0.007	-0.011	-0.009	-0.005
2b. Labour market factors	0.045	0.077	0.027	0.010	0.012	0.005	0.015	0.031	0.010	0.025	0.031	0.013	0.018	0.031	0.011
Household working status	0.004	0.004	0.002	0.000	0.000	0.000	0.001	0.002	0.001	0.002	0.001	0.001	0.001	0.001	0.000
Annual earnings	0.042	0.073	0.025	0.010	0.012	0.005	0.013	0.029	0.009	0.023	0.030	0.012	0.017	0.030	0.011
2c. Demographic factors	0.001	0.001	0.000	0.000	0.001	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.001	0.001	0.000
Share of people above 75 years old	0.001	0.000	0.000	-0.001	0.000	0.000	0.000	0.000	0.000	-0.002	-0.001	-0.001	0.000	0.001	0.000
Single household	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.001	0.000	0.002	0.001	0.001	0.000	0.001	0.000
University attendance of household head	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Residual	-0.010	-0.031	-0.008	0.003	0.001	0.001	0.003	0.004	0.002	0.003	0.002	0.001	0.002	-0.013	-0.002

Note: MLD = Mean Log Deviation; GE(1) = Theil Index; A(0.5) = Atkinson's index (a=0.5). Information on education is not available for Israel and the United Kingdom.

Source: Own calculation using micro data from LIS

Table 6A.1 Decomposition of changes in income inequality among the elderly, 1995-2005 (Mean Log Deviation, Theil Index and Atkinson's index (a=0.5)), continued

	Israel (1997, 2005)			Norway (1995, 2004)			United Kingdom (1995, 2004)			United States (1994, 2004)			Average		
	MLD	GE(1)	A(0.5)	MLD	GE(1)	A(0.5)	MLD	GE(1)	A(0.5)	MLD	GE(1)	A(0.5)	MLD	GE(1)	A(0.5)
1. Income inequality among the elderly															
Around 1995	0.237	0.252	0.115	0.093	0.108	0.048	0.137	0.156	0.070	0.232	0.224	0.106	0.139	0.148	0.068
Around 2005	0.224	0.223	0.106	0.103	0.137	0.057	0.144	0.164	0.073	0.256	0.254	0.117	0.150	0.164	0.074
Change	-0.013	-0.029	-0.009	0.010	0.029	0.009	0.007	0.008	0.003	0.024	0.030	0.011	0.012	0.016	0.006
2. Contribution to changes in income inequality among the elderly															
2a. Private/Public mix of pensions	-0.011	-0.002	-0.004	0.002	0.039	0.009	-0.023	-0.026	-0.012	-0.011	0.003	-0.001	-0.009	-0.003	-0.003
Private pensions	0.009	0.006	0.003	0.012	0.040	0.011	0.001	0.003	0.001	0.003	0.009	0.003	0.003	0.006	0.002
Public pensions	-0.019	-0.007	-0.007	-0.010	0.000	-0.002	-0.024	-0.029	-0.012	-0.014	-0.007	-0.004	-0.011	-0.009	-0.005
2b. Labour market factors															
Household working status	0.005	-0.001	0.000	0.008	0.010	0.005	0.025	0.040	0.014	0.010	0.045	0.013	0.018	0.031	0.011
Annual earnings	0.005	-0.001	0.000	0.008	0.010	0.005	0.025	0.040	0.014	0.010	0.045	0.013	0.017	0.030	0.011
2c. Demographic factors															
Share of people above 75 years old	0.004	0.008	0.003	0.004	0.004	0.001	0.000	0.000	0.000	-0.003	-0.004	-0.001	0.001	0.001	0.000
Single household	0.003	0.005	0.002	-0.001	-0.001	-0.001	0.000	0.000	0.000	-0.003	-0.003	-0.001	0.000	0.001	0.000
University attendance of household head	-	-	-	0.000	0.000	0.000	-	-	-	0.000	0.000	0.000	0.000	0.000	0.000
Residual	-0.011	-0.034	-0.008	-0.004	-0.025	-0.007	0.005	-0.005	0.000	0.029	-0.014	0.001	0.002	-0.013	-0.002

Note: Information of education is not available in Israel and the United Kingdom.

Source: Derivation by the author using micro data from LIS

7 | Income Inequality in China: Trends, Determinants and Proposed Remedies[■]

ABSTRACT

The issue of income inequality in China has attracted world-wide attention, leading to a sizable literature. This paper attempts to provide a non-exhaustive literature review on China's inequality trends and determinants, and suggested government interventions. It discusses profiles of income inequality along three dimensions: inter-household disparity, regional divide and urban-rural gaps. This is followed by exploring driving forces of rising inequality in China, including the notorious *hukou* system, policy biases, location or geographic factors, globalization, education and so on. Finally, the paper summarizes and proposes government interventions for containing or reducing income inequality in China. Important areas for future research are also suggested in the final section of the paper.

Key words: China; Income distribution; Inequality

7.1 INTRODUCTION

Pre-reform China is perceived to be an egalitarian society despite the existence of significant urban-rural gap and inequality across rural households. In 1978, China began her reforms with the introduction of the agricultural production responsibility system. Under this system, farming land was decollectivized and allocated to individual households based on household labour force and household size. Any surplus above the state taxes and procurement quota were kept by individual farmers rather than pooled for distribution across households as in the past. These introduced incentives into the rural economy which

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were previously absent, leading to inclusive growth due to fairly equal distribution of land (Wan 2007).

Inequality¹ started to rise in the mid-1980s when the government shifted its reform focus to the urban sector (Wan 2008a, 2008b). Faster urban growth implies enlarging urban-rural gap. Meanwhile, urban production relies more on investment and fixed assets such as machinery and equipment which, unlike farm land, were not divisible. These assets were leased or sold to a minority when state- or collective-owned enterprises were reformed, causing inequality hikes among urban residents. It is important to point that the investment or asset-induced inequality tends to self-reinforced itself overtime. Finally, the open-door strategy implemented around mid-1980s raised regional inequality as it came with preferential policies biased towards the coastal region, which already has location and cultural advantages² to engage in international trade and attract foreign direct investment (FDI).

Consequently, China went from a relatively egalitarian society to one of the most unequal countries in the world within a short period of three decades. According to Wan and Sebastian (2011), there were still more than 100 million Chinese who merely survived on no more than \$1.25 a day (purchasing power parity or PPP-adjusted) in 2008. In the same year, the number of the poor living under \$2.0/day (PPP-adjusted) is estimated to be 336 million. On the other hand, China had 960,000 millionaires in 2010, each with more than 10 million Yuan (\$1.6 million) in personal wealth. In 2011, there were 146 billionaires in China, each with more than \$1 billion of assets.³

The high and rising inequality has many profound repercussions. It has dampened domestic consumption, having generated pressures on China's exports and contributed to the trade imbalance. As noted by Milanovic (2005), inequality trends and patterns in China determine, to a large extent, the profile and changes of the global inequality and poverty. From the perspective of the Chinese government, high inequality undermines social cohesion and political stability. Some of the widely reported crimes were related to inequality (Tian, Wan and Huo, 2009). Historically, lessons abound where unequal distributions led to civil unrest and government demises.

In addition, the growth effects on poverty reduction become smaller when inequality is high. In other words, the same growth rate leads to larger poverty reduction, the more equal a society is. In a highly unequal economy, growth benefits may accrue to the rich only, with little impact on poverty. On the other hand, rising inequality offsets poverty-reducing impacts of growth (Zhang and Wan, 2006). This is because any given poverty reduction can be de-

1 In this paper, the words of gap, divide and disparity are used as synonymies of inequality.

2 Coastal residents are known to be more business-minded and have more trade and entrepreneurship skills. Most overseas Chinese are from the coastal areas and they provide a significant share of FDI.

3 www.chinadaily.com.cn/bizchina/2012-02/07/content_14549447.htm.

composed into growth and redistribution effects. The redistribution effect is poverty-increasing if distribution worsens, and vice versa. As Wan (2008c) demonstrates, redistribution is more important than growth in combating poverty in China.

Finally, rising inequality hinders economic growth in China (Wan, Lu and Chen, 2006). Besides the various arguments presented in the preceding two paragraphs, high inequality means those at the bottom of the society cannot afford investment in financial or human capital. Also, health as a major component of human capital is shown to be adversely affected by inequality (Li and Zhu, 2006). Moreover, high inequality exerts pressure for redistribution which may distort incentive mechanisms in the economy and induce considerable transaction cost. Worst of all, high inequality may have strengthened and be reinforced by the ally between the rich and the politically powerful, eroding efficiency, equity and even justice.

It is thus not surprising that inequality has been ranked among the top three socio-economic issues in China for many years. In response, the Chinese government launched the Great Western Development Strategy in 2000 to tackle the regional divide. This is followed, in the mid-2000s, by the “socialist new countryside development” movement to reduce urban-rural gaps. In 2006, “building a harmonious society” became a central development goal in the 11th Five-Year Plan, 2006–2010. More recent interventions include expansion of social protection to the rural population, improvement of the living conditions of migrant workers, and increases in public funding on education and health services. In November 2013, the Third Plenum of the 18th Central Committee of the Chinese Communist Party outlined a systematic approach to improve income distribution through reforms in areas including the household registration system (*hukou*), social protection, access to public services, taxation, and governance.

This paper aims at providing a non-exhaustive literature review on China’s inequality trends and determinants, and suggested government interventions. Section 7.2 will focus on inequality profiles, starting with inter-household disparity, then regional divide and urban-rural disparity. Section 7.3 presents research findings on drivers or causes of these inequalities. This is followed by a summary of suggested policy interventions in Section 7.4. Section 7.5 concludes.

7.2 INEQUALITY PROFILES

To construct an inequality profile, the popular Gini and/or Theil index are commonly estimated using observations on consumption, income or salary. In theory, the finest unit of a distribution study is an individual. The individual or inter-person inequality consists of inter-household and within-household gaps. In practice, however, the finest unit is usually a household, particularly

when analyzing inequalities in developing economies, owing to the lack of data for individuals. The inter-household inequality encompasses regional or urban-rural inequalities as its components. In this section, we will start with inter-household disparity and then move on to regional inequality and urban-rural gaps.

7.2.1 Profile of Inter-Household Inequality

To date, no official estimates of inter-household inequality exist for consecutive years over a long period as the central government does not permit release of China's household survey data collected by the National Bureau of Statistics (NBS). This is why early literature on China's income distribution largely focused on regional disparity or urban-rural gaps.

In 1986, the Chinese Academy of Social Sciences surveyed 5000 urban households in 28 provinces and 5000 rural households in 10 provinces.⁴ After data cleaning up, 7464 household observations (3811 urban and 3653 rural) were used by Hussain, Lanjouw and Stern (1994) to derive the earliest inter-household inequality estimates for China. They computed the Theil indices for urban (0.0931) and rural (0.1805) China. Both indices were found to be dominated by the intra-provincial component. Inter-provincial components only accounted for 5% (urban) and 15% (rural) of the total. They also estimated Gini indices for individual provinces, ranging 0.19-0.22 for urban provinces, and 0.19-0.28 for rural provinces. It is not surprising that urban inequalities were lower than the rural counterparts as the egalitarian distribution was only applicable in urban China in the pre-reform period. Clearly, these findings are subject to considerable sampling errors as the survey sample is far too small for China.

In 1988, the first spell of the Chinese income distribution project (later known as the China Household Income Project or CHIP) was conducted.⁵ The project covered 10,258 rural and 9,009 urban households. The sampling framework follows that of the National Bureau of Statistics (NBS). Different survey instruments and different sampling strategies were used for urban and rural areas because of the difference in the composition of urban and rural incomes (Eichen and Zhang, 1993). The CHIP widens the definition of income to include noncash income such as in-kind payments and agricultural products for self-consumption. Based on this data set, Khan, Griffin, Riskin, and Zhao (1992) produced the first comprehensive Gini estimates: 0.382 for China, 0.338 for rural China and 0.233 for urban China. They also decomposed the Gini es-

4 There are 34 province-level administrative units in China, including 23 provinces, 5 autonomous regions, 4 metropolitan municipalities, and 2 special districts (HK and Macao).

5 CHIP was initiated by the Chinese Academy of Social Sciences and later transferred to Beijing Normal University.

timates by income sources. The results indicate that the most important sources of nation-wide income inequality are urban wages and in-kind subsidies to urban workers, contributing 36% and 32% to the nation-wide Gini estimate, respectively. For urban inequality, the two most important contributors are wage (34%) and housing subsidies (24%). On the other hand, income from production activities explains more than 60% of rural income inequality.

By now, the CHIP provides household data for 1988, 1995, 2002 and 2007. Rural-to-urban migrants were added to the 2002 and 2007 CHIP. In 2007, the sample sizes increased to 13,000 rural households, 10,000 urban households, and 5,000 rural-to-urban migrant households. Using 1988 and 1995 CHIP data, Zhao (2001) and Gustafsson and Li (2001) discovered increases in inequality. The latter study concluded that the rise in inequality is general, not limited to a particular region or population group. Li, Lou, and Sicular (2011) analyzed the 2002 and 2007 CHIP data, showing that when rural-to-urban migrant are included the 2002 Gini estimate drops slightly to 0.460 from 0.462. The same happens to the 2007 Gini estimate: 0.483 with migrants included and 0.487 without migrants.

Other studies using the CHIP data include Griffin and Zhao (1993), Khan and Riskin (1998 and 2005), Gustafsson and Li (1998 and 2001), Zhao (2001), Li and Wang (2005), Sicular, Yue, Gustafsson and Li (2007), Gustafsson, Li and Sicular (2010), and Li et al (2011).

Ravallion and Chen (2007) obtained yearly Gini coefficient for 1980-2001 using grouped income data published by the NBS (various years). Lin et al (2010) followed the similar approach. As tabulated in Table 7.1, both studies came up with two sets of estimates: one with and one without adjusting income observations by spatial price differences. Since the affluent regions have higher prices, such an adjustment leads to smaller inequality estimates, as Wan (2001) discovered earlier. The upward bias is about 15 percent according to Ravallion and Chen (2007) or Lin et al (2010), but much larger according to Sicular, Yue, Gustafsson, and Li (2007). In addition to using different data, Sicular et al (2007) used disaggregated deflators to capture price differences between urban and rural areas in each province and also among provinces while the other two studies only differentiated urban and rural China.

In early 2013, the Chinese government released official Gini estimates for years 2003-2011, which were later updated.⁶ The NBS estimates show a broadly stable trend. Inequality peaked in 2008 with a Gini estimate of 0.491, and has since been declining marginally each year, reaching its lowest level of 0.473 in 2013. Whether this represents the beginning of the end of worsening income distribution is debatable.

Table 7.1 presents eight sets of estimates of the Gini coefficient for inter-household inequality in China. The World Income Inequality Database (WIID) set was collected from different publications and may be based on different

6 http://www.stats.gov.cn/english/PressRelease/201401/t20140120_502079.html.

datasets, which could explain why they vary considerably from one year to another. The Gini estimates from the World Development Indicators (WDI) database are inconsistent because post-1989 estimates are expenditure- or consumption-based, while the earlier estimates are income-based. Further, WDI estimates are likely to be biased downwards as they are weighted averages of rural and urban estimates. Technically, such weighted averages fail to consider the urban-rural gap, which have been rather substantial. Consequently, these two sets of estimates will be discarded hereafter. Among the remaining six sets of estimates, two were obtained after adjusting for spatial price differences. Since most researchers, particularly the government, do not consider spatial price differences, it seems appropriate to focus on the unadjusted estimates. Note, however, that the adjusted and unadjusted share the same trends.

Table 7.1 Inter-household Inequality for Whole China: Gini Estimates

Year	WDI ^a	Ravallion and Chen (2007)		WIID	CHIP ^b	Lin et al (2010)		NBS
		Data not adjusted by spatial price index	Data adjusted by spatial price index			Data not adjusted by spatial price index	Data adjusted by spatial price index	
1978	...	...	...	0.317	...	...	...	...
1979	...	...	...	...	...	...	...	...
1980	...	...	...	...	...	...	...	...
1981	0.291	0.310	0.280	...	...	...	...	...
1982	...	0.285	0.259	...	...	...	...	...
1983	...	0.283	0.260	0.284	...	...	...	...
1984	0.277	0.291	0.269	...	...	...	...	...
1985	...	0.290	0.265	0.224	...	...	...	...
1986	...	0.324	0.292	...	...	...	...	...
1987	0.299	0.324	0.289	...	...	...	...	...
1988	...	0.330	0.295	0.382	0.395	...	...	...
1989	...	35.2	0.318	...	...	...	...	...
1990	0.324	0.349	0.316	...	...	0.345	0.287	...
1991	...	0.371	0.331	0.341	...	...	...	...
1992	...	0.390	0.342	...	...	...	...	...
1993	0.355	0.420	0.367	...	...	...	...	...
1994	...	0.433	0.376	...	...	...	...	...
1995	...	0.415	0.365	0.290	0.469	0.397	0.329	...
1996	0.357	0.398	0.351	0.390	...	...	...	...
1997	...	0.398	0.350	...	...	...	...	...
1998	...	0.403	0.354	...	...	...	...	...
1999	0.392	0.416	0.364	...	...	...	...	...
2000	...	0.438	0.385	0.390	...	0.411	0.347	...
2001	...	0.447	0.395	...	...	...	...	...
2002	0.426	...	...	0.454	0.468	...	...	...
2003	...	...	...	0.449	...	...	...	0.479
2004	...	...	...	...	...	...	...	0.473
2005	0.425	...	...	...	...	0.457	0.388	0.485
2006	...	...	...	...	...	...	...	0.487
2007	...	...	...	...	0.497	...	...	0.484
2008	0.426	...	...	...	...	...	...	0.491
2009	0.421	...	...	...	...	...	...	0.490
2010	...	...	...	...	...	...	...	0.481
2011	...	...	...	...	...	...	...	0.477
2012	...	...	...	...	...	...	...	0.474
2013	...	...	...	...	...	...	...	0.473

Note: ... = data not available, WIID = World Income Inequality Database of UNU-WIDER.

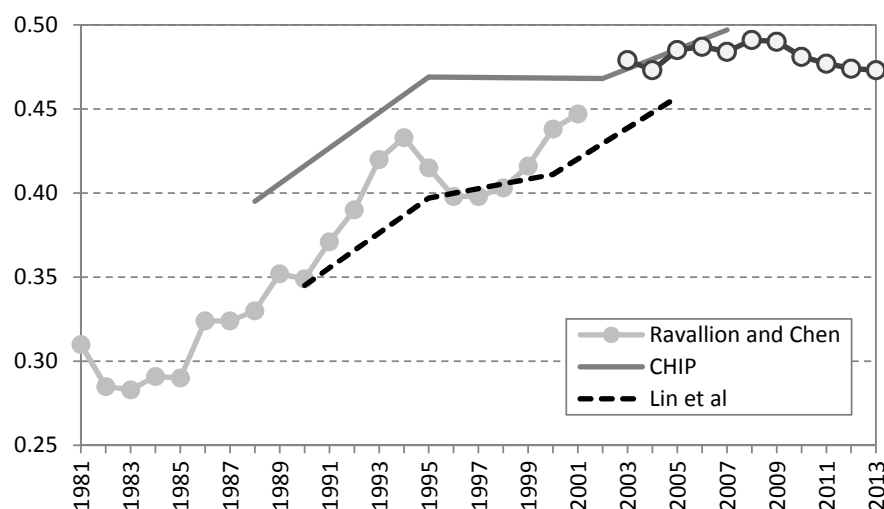
^aBased on income (1981-1987) and consumption (1990-2009); ^bChina Household Income Project.

Sources: Gustafsson, Li, and Sicular (2010) and Li, Luo, and Sicular (2011) for CHIP data; Lin et al (2010); Ravallion and Chen (2007); National Bureau of Statistics, *Provincial Statistical Yearbooks* in various years; World Bank, *World Development Indicators*.

The four sets of estimates in columns 3, 6, 7, 9 of Table 7.1 are compatible. Ravallion and Chen (2007) and Lin et al (2010) used NBS data in grouped form. The CHIP data piggy-backed the NBS surveys. However, the inequality estimates based on the CHIP data are consistently larger and Lin et al consistently smaller than other estimates. The discrepancies can be attributed to the approximation Lin et al (2010) used to obtain unit-record data from grouped data. The CHIP data have a smaller coverage or sample size than the data used by others.

Figure 7.1 plots the four compatible sets of inequality estimates, all showing a rising trend of income inequality. It is interesting to note that the unadjusted estimates of Ravallion and Chen (2007) appear to be fairly consistent with the official estimates. Thus, one can combine the two sets of estimates to form a more complete time series. Doing this shows that income inequality declined at the onset of economic reform until the mid-1980s and since then has been rising amid some fluctuations. Over a short period of 30 years inequality as indicated by the Gini coefficient grew by more than 50% from 0.283 in 1983 to 0.491 in 2008 or 0.473 in 2013.

Figure 7.1 Gini Coefficients based on Household Survey Data



Note: Gini coefficients from Ravallion and Chen (2007) and Lin et al (2010) are based on non-adjusted data. CHIP = Chinese Household Income Project; NBS = National Bureau of Statistics.

Sources: Gustafsson, Li, and Sicular (2010) and Li, Luo, and Sicular (2011) for CHIP data; Lin et al (2010); Ravallion and Chen (2007). National Bureau of Statistics, *Provincial Statistical Yearbooks*.

Apart from these nation-wide estimates, researchers attempted to estimate inter-household inequality at the sub-national level. These studies all using the CHIP data include Zhao (2001) and Li et al (2011) on rural inequality, and Khan, Griffin, and Riskin (2001), Demurger, Fournier, and Li (2006), and Li et al (2011) on urban inequality. Zhao (2001) found that the Gini coefficient

for rural China rose from 0.338 in 1988 to 0.416 in 1995. This inequality dropped to 0.354 in 2002 and 0.358 in 2007 (Li et al 2011). Turning to urban inequality, Khan et al (2001) estimated the Gini coefficient to be 0.233 in 1988 and 0.332 in 1995. Demurger et al (2006) accounted for spatial price differences and their Gini estimates are 0.191 in 1988, 0.298 in 1995, and 0.284 in 2002. Li et al (2011) produced Gini estimates of 0.331 in 2002 and 0.340 in 2007.

7.2.2 Profile of Regional Inequality

Balanced regional development has been a major government goal in China for hundreds of years. This is not surprising as under-development of border areas has been considered a major threat to national security or sovereignty. Looking back at China's long history, the authority has frequently encountered revolutions or uprisings arising from unequal distributions and relied on border prosperity to enhance national sovereignty.⁷ Also, regional inequality is closely related to ethnic tensions. Today, around 75 percent of China's minorities live in the poor inland areas which are home to only 22 percent of the national population. Rising regional gaps may undermine national unity. This is one of the major considerations underlying the massive west development campaign launched in late 1999.

Regional inequality usually refers to inter-province gaps. Lardy (1978) estimated coefficient of variation (CV) using provincial data on gross value of industrial output (GVIO) for years 1952, 1957 and 1974. The results showed declining inequality. There are two problems with this analysis. The coefficient of variation (CV) is not an appropriate inequality measure as it violates the important transfer axiom which states that any progressive transfer leads to reduction in inequality. Also, the variable of GVIO used to represent living standard or welfare failed to include agricultural output, which occupied a large proportion of national output until late 1970s. To rectify the second problem, Paine (1981) compiled gross value of agricultural output data for 1952 at the provincial level, and discussed inter-provincial output differentials. However, he did not estimate inequality by any indices.

Lyons (1991) extended the work of Lardy (1978) by estimating CVs and standard deviations (SDs) using provincial accounts data from 1952 to 1987. Instead of gross output, he used the variables of per capita consumption and net material product (NMP).⁸ He found that the CV of net material product declined from 1952 to 1967, was stable from 1967 to 76 and resumed the

7 China had frequently been invaded, particularly from the north and west. Border prosperity was expected to nurture loyalty of border residents and could help raise border population which formed the basis for national defense.

8 This is equivalent to value added in the first or secondary industry. Service sector was not considered to produce material outputs.

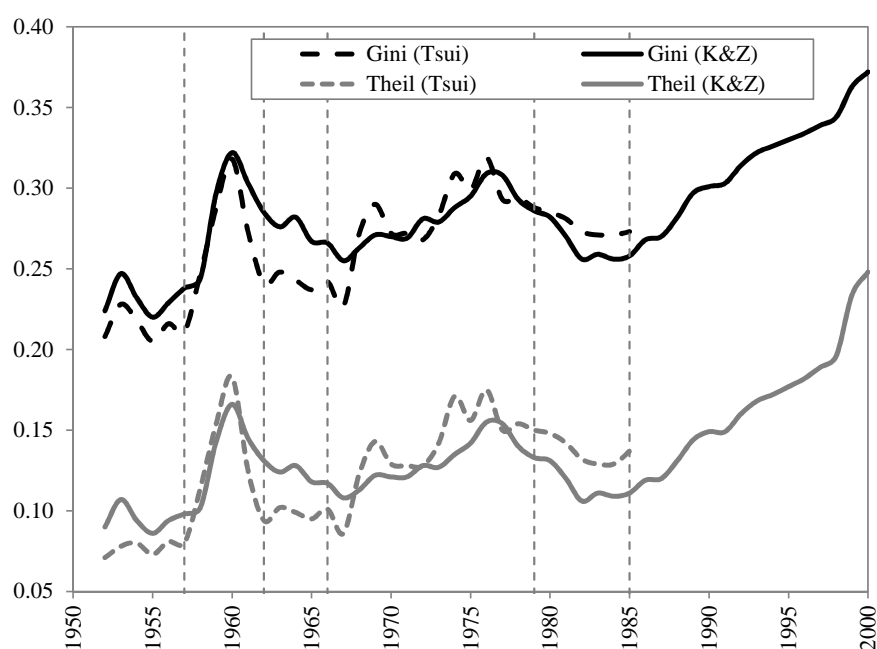
declining trend over 1976-1987. On the other hand, SDs increased almost continuously since 1962, accelerating in the 1980s. This is not surprising as SD is not only scale-dependent but also mean-dependent. It is very rare to use SD to measure inequality. When the consumption variable is used, its CV displayed a clear downward trend over the period under study, at least until the early 1980s.

Tsui (1991) employed the Gini, the Theil and CV indices to estimate regional inequality over 1952-1985, using NMP and NIU (national income utilized) data. Discrepancies in inequality based on these two data sets reflect the redistributive effects of government transfers (T) as $NIU = NMP_{agri} + NMP_{nonagri} + T$. Regional inequality had no apparent long-term trend before the 1970s but had since been increasing, and not surprisingly, government transfers led to lower inequality. The inequality trends by different indicators are very similar, which is understandable as inequality estimates based on different inequality indicators are highly correlated (Sharrocks and Wan 2005).

Kanbur and Zhang (2005) updated regional inequality estimates using consumption data from 1953 to 2000. This period can be divided into six sub-periods: (1) Pre-socialism (1949-56), (2) the Great Leap Forward and the Great Famine (1957-61), (3) Post-famine recovery (1962-65), (4) Cultural Revolution (1966-78), (5) Rural reform (1979-84), and (6) Post-rural reform and opening up (1985-2000).

Figure 7.2 plots the estimates by Tsui (1991) and Kanbur and Zhang (2005). Their estimates share a similar trend, including peaks. While Kanbur and Zhang's estimates are slightly higher during the first and third periods, estimates from both studies became almost identical for the period of Cultural Revolution. For the post-reform period, Tsui's estimates became higher. Figure 7.2 demonstrates an overall upward trend of regional inequality in China. It was low during the early years of the communist rule but increased sharply during the Great Leap Forward, peaking in 1960. It then started steady declining till the post-famine recovery. The Cultural Revolution saw inequality rises, peaking before the start of the rural reform. Possible reasons include the disruption of central planning, stagnation of agricultural regions and continued industrialization push in the Northeast and the East (Zhang and Zou, 2012).

Figure 7.2 Regional Inequality in China



In the first few years of the post-reform period, regional inequality declined because of the improvements in agricultural productivity and procurement prices of grains. Rapid development of the township and village enterprises (TVEs) also helped boost rural income (Zhou, Dillon and Wan, 1992). Fast rural growth led to the narrowing of the urban-rural gap, a large component of overall regional inequality (Wan 2007). But regional inequality rose from mid-1980s, by which time, reform focus was shifted to urban areas while the impacts of the household production responsibility system leveled off.⁹ Meanwhile, region-biased policies were instituted to attract foreign direct investment and promote trade in coastal areas. In 2000, regional inequality reached its highest level in the People's Republic era.

The latest regional inequality estimates are provided by Wan (2013), as shown in Figure 7.3. Wan (2013) used income data (net income for rural residents and disposable income for urban residents) at provincial level to estimate the Theil index over 1978-2010. Again, Figures 7.2 and 7.3 share a

⁹ The household production responsibility system was the very first step in igniting China's reforms. It replaced the inefficient commune system by allocating land to individual farmers and households who became decision makers for agricultural production, marketing and output distribution. By the end of 1986, all households in rural China adopted the household production responsibility system.

broadly similar trend for the overlapping years although the Theil index of Wang and Wan (2014) are more conservative than Kanbur and Zhang (2005). Also, Kanbur and Zhang's estimates are consistently on the uptrend for the latest period while Wang and Wan's Theil values exhibited a downward trend from 1994 to 1998. The decrease in inequality from 1995 to 1998 can be attributed to the major reform to the taxation system in 1994 which corrected some of the regional imbalances, the provincial governor grain-bag responsibility system¹⁰ implemented in 1995 (Wan and Zhou, 2005) which helped raise rural income, and the Asian financial crisis which adversely affected the rich regions more.

Figure 7.3 Regional Inequality in China: Theil Index

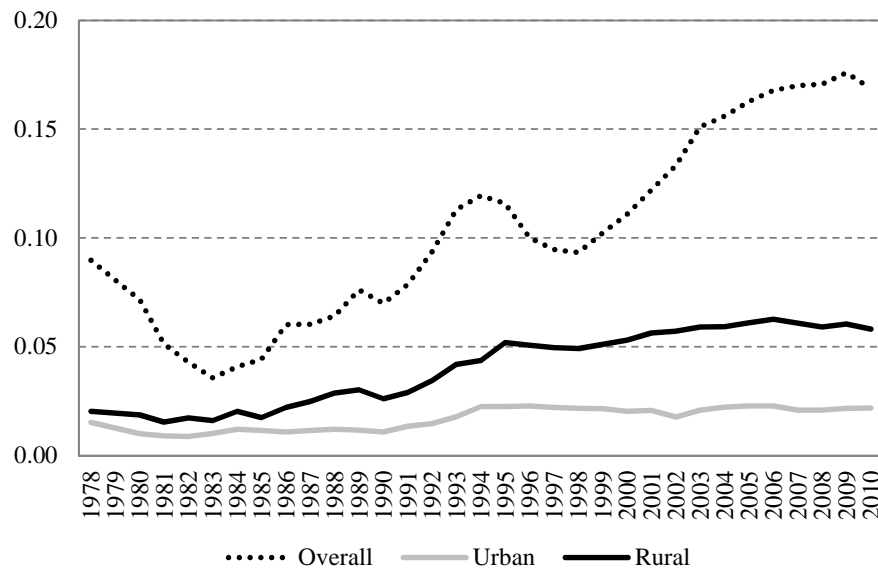


Figure 7.3 also shows regional inequality within rural and urban China. Very much like the inter-household inequality, rural inequality across provinces has always been higher than the urban counterpart. However, unlike the inter-household inequality where urban inequality has been growing faster and approached the rural counterpart, regional inequality within rural China has diverged away from the urban counterpart.

10 Introduced for food security reasons and also called the "rice bag" system, it mandates that provincial leaders are responsible for maintaining an overall balance of grain supply and demand within their provinces, stabilizing grain production area, output, and stocks, and using local reserves to regulate grain markets and stabilize grain prices." (OECD, 1999).

A commonly-discussed component of regional inequality is the east-central-west divide. China's provinces are often classified into three groups geographically.¹¹ How important is this divide to total regional inequality? As demonstrated by Wan (2007), this divide contributed around 30% to total regional inequality and the contribution is fairly stable over time. Another widely-discussed component of the regional inequality is the coast-inland disparity, where the central and west provinces are merged to form the inland area and the east is taken as the coastal area. In addition to its location advantages, the latter has had better infrastructure and economic bases even before the reform (Song, Chu and Cao, 2000). These were exacerbated from mid-1980s when the opening up strategy was implemented, providing the coastal provinces with favorable fiscal, investment and taxation policies. Consequently, the coast-inland gap increased over time. According to Zhang and Zhang (2003), the coast-inland ratio in terms of per capita GDP rose from 1.12 in 1985 to 1.45 in 1998. In terms of per capita domestic capital investment, the ratio increased by 26 percent, from 1.2 in 1985 to 1.52 in 1998.

7.2.3 The Profile and Importance of the Urban-rural Disparity

Urban-rural gap is a common feature in many developing economies (Shorrocks and Wan, 2005). However, it takes on special significance in China because of the notorious *hukou* system, which prevents free movement of population, especially between urban and rural areas. This institutional segregation naturally aggravates the urban-rural divide. Nolan (1979) pioneered the study on urban-rural gaps in China, based on average income and consumption data from Guangdong, Guangxi, Hubei and Zhejiang in 1955 and 1956. Considerable efforts were made by Nolan (1979) to understand the rational or justifications for these gaps. Since the *hukou* system was established in late 1958, it is not surprising that the gaps documented in Nolan (1979) were not very large, but increased substantially after 1958. For example, the urban-rural consumption ratio reached 3.1 in 1959 (Yang and Zhou, 1999).

Using 1986 and 1988 data from the NBS, Kwong (1994) estimated urban-rural income ratios for 29 provinces. Based on his computations, the urban-rural income ratios were high in the poor regions in 1986, reaching 6.91 in Xizang (Tibet), and 5.51 in Gansu. In the same year, the ratios were only 1.7 and 1.81 in Shanghai and Beijing, respectively. This pattern was maintained in 1988 but the ratios worsen for 23 out of the 29 provinces, e.g., rising to 7.55

11 The West includes Sichuan, Shannxi, Guizhou, Xinjiang, Tibet, Yunan, Gansu, Qinghai, and Ningxia. The Central includes Heilongjiang, Jilin, Inner-Mongolia, Shanxi, Henan, Anhui, Jiangxi, Hubei, and Hunan. The East includes Beijing, Tianjin, Liaoning, Shanghai, Hebei, Shandong, Zhejiang, Jiangsu, Fujian, Guangdong, Hainan, and Guangxi (Zhang and Zou, 2012).

in Xizang and 1.75 in Shanghai. For China as a whole, the ratio increased by almost 4 percent, from 3.27 in 1986 to 3.39 in 1988.

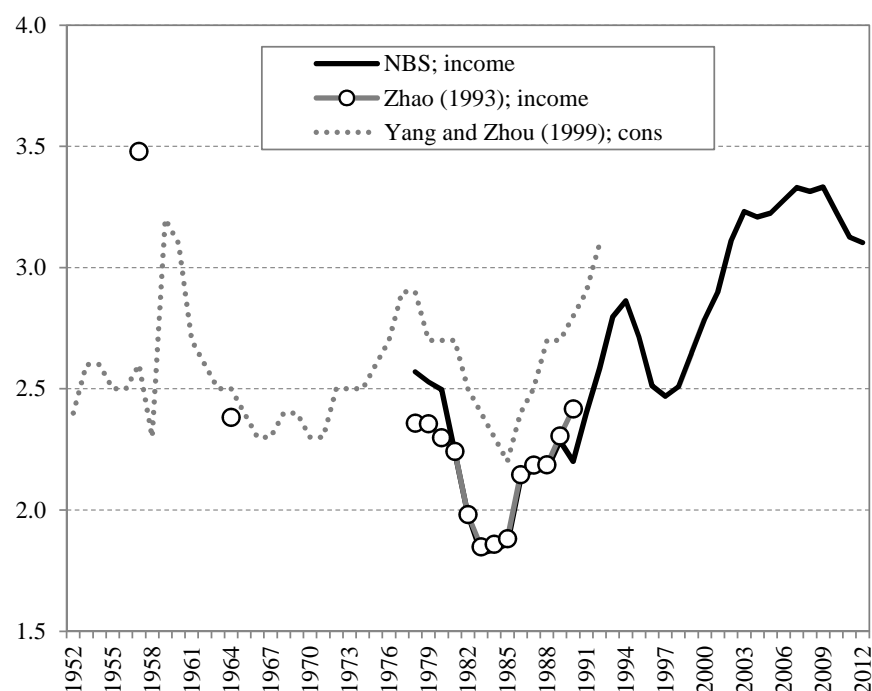
Zhao (1993) explored urban-rural income gaps over 1978-1990 and found a v-shaped trend: a reduction in the early 1980s, followed by fast increases. As discussed elsewhere in this paper, two factors can explain the early decline: the rise in the procurement prices for cereals and faster improvement in farming productivity than in urban productivity. The widening of the gap after mid-1980s was due to the shift of reform focus to urban sectors and waning effects of policy shocks to the rural economy. Instead of income, Yang and Zhou (1999) explored urban-rural consumption ratios. They found that the ratio reached its lowest level of 2.2 in 1985 and started increasing since then. Using the 1995 and 2002 CHIP data, Sicular et al (2007) computed the urban-rural income ratios. Adding housing-related income (an income component not included in the NBS definition),¹² the urban-rural income ratio rose from 3.11 in 1995 to 3.18 in 2002. These values are 10 percent and 6 percent higher than those with housing-related income excluded. After adjusting for spatial price differences, the ratio became 2.24 in 1995 and 2.27 in 2002.

Wan, Ye and Zhuang (2012) obtained urban-rural income ratios for individual provinces for the period 1978-2009. The ratio declined from 1978 to 1985 but has generally risen since 1985. The correlation between the overall inequality and the urban-rural ratio is quite visible. In particular, the ratio was low for 1983 and 1984, forcefully demonstrating the impact on rural income of government support in terms of grain price rises in the early years of China's reform. The declines after mid-1990s can be attributed to the introduction of the so-called "provincial governor grain bag responsibility system". Despite this policy shock, the urban-rural income ratio maintained a generally increasing trend until 2009. At the national level, the ratio almost doubled from 1.9:1 in 1985 to 3.3:1 in 2009.

Figure 7.4 shows the ratio of average urban disposal income over average rural net income from 1952 to 2012 and the urban-rural consumption ratio from 1952 to 1992. Clearly, the gaps had widened since the mid-1980s. It was close to 3 in 1995 and moved beyond 3 since 2002. By international standards and even after various adjustments such as spatial price deflation and including migrants in the urban sample, China's urban-rural inequality is high (Sicular et al, 2007).

12 This refers to the imputed rental value of owner-occupied housing and imputed subsidies on publicly-owned rental housing.

Figure 7.4 China's urban-rural income and consumption ratios, 1952-2012



Sources: National Bureau of Statistics (various years); urban-rural consumption ratio from Yang and Zhou (1999).

China's urban-rural income gap has a distinct regional dimension. It is present in all provinces, rich or poor, eastern, central, or western. In 2007, it was largest in western and eastern China, 3.85 and 3.44, respectively. Sicular (2013) observed that between 2002 and 2007, excluding large municipalities such as Beijing and Shanghai, this ratio rose by a remarkable 43 percent in the east, as compared to 27 percent in central China, and only 3 percent in the west. The reason for these regional differences merits further investigation.

It is worth noting that Figures 7.1-7.4 share a similar trend. This highlights the importance of the urban-rural gap in constituting both regional and inter-household inequalities. In fact, it is possible to gauge the contribution of the urban-rural gap to the total regional and nation-wide inter-household inequalities. For example, according to Wan (2007), China's urban-rural income gap has been a central factor underlying regional income inequality, contributing 70-80% to total regional inequality. Using the NBS data of cities and counties for the year 1994, Lee (2000) found that the urban-rural disparity accounted for 26 percent of overall regional inequality in per capita GVIAO, and 37.7 percent in per capita consumption. These contributions are smaller than those produced by Wan (2007) and Liu (2010). Similar to Wan (2007), Liu (2010)

showed that in terms of regional income inequality the contribution of the urban-rural gap was 57.98% in 1997, increasing over time and reached 72.84% in 2006. In terms of regional consumption inequality, the gap contributed no less than 75% over the entire period of 1995-2006, reaching as high as 79.460% in 2006.

The contribution of the urban-rural gap to total inter-household inequality was investigated by Sicular et al (2007), using the CHIP data. Without adjusting for spatial price differences, the urban-rural gap accounted for about 40% of regional income inequality in 1995, rising to 45 percent in 2002. Adjusting for spatial price differences, however, reduces the contribution noticeably, to less than 30 percent in 1995 and about 30–32 percent in 2002. This is consistent with Gustafsson and Li (1998) who concluded that if average income in rural and urban was equalized, holding inequality within urban and rural unchanged, almost one-third of inequality in China would disappear.

7.3 SOURCES OR CAUSES OF THE RISING INEQUALITIES

Despite a growing literature on China's inequality, there continues to be a lack of analytical research on sources or causes of the rising inequality in China. In particular, little is known about the relative importance of potentially relevant contributing factors. Following the recent advance of the regression-based inequality decomposition technique (see Wan (2004) for a review), research outputs are emerging which quantify sources of rising inequality in China (Wan and Zhou, 2005; Chen, Wan and Lu, 2010) and elsewhere (Gunatilaka and Chotikapanich, 2009).

At the outset, the famous Kuznets curve is dismissed as a way to explain the rising inequality in China because it heavily relies on the key assumption that population flow from low-inequality sector into high-inequality sector. In China, however, the inequality in the urban sector has been low relative to the rural counterpart although urban inequality has been rising, approaching the level of rural inequality. In addition, labour mobility has been restricted due to the *hukou* system. Clearly, the theory or mechanism underlying the Kuznets hypothesis contradicts realities and cannot explain rising inequality in China.

To gauge the determinants of inequality, several approaches can be employed. The conventional decomposition of Shorrocks (1982) breaks down the overall inequality into the within-group (e.g., within-rural and within-urban) and between group (e.g., urban-rural) components. The latter is often taken as the contribution of the grouping variable. Tsui (1993) applied this decomposition to the 1982 county- and city- level data on gross value of industrial and agricultural output (GVIAO). He found that the between province component constituted only 36% of the total. Grouping the data into rural and

urban areas, the total inequality consists of 52% from urban-rural gaps, 40% from within-rural gaps and 8% from within-urban gaps.

Using the same approach, Kanbur and Zhang (1999), Bhalla, Yao and Zhang (2003) and Wan (2007) confirm the dominance of the rural-urban component in total regional inequality. However, this component is found to be increasing over time by Wan (2007) but stable by Kanbur and Zhang (1999). On the contrary, the contribution of the inland-coastal gaps to total regional inequality is found to be stable over time by Kanbur and Zhang (1999) but increasing by Wan (2007). These different results may arise from the use of different data. Generally speaking, income data used by Wan (2007) is better than GDP or other gross output variables as a wellbeing measure.

Figure 7.5a provides an update to Wan (2007). It shows the dominance of the urban-rural component throughout the entire period. Figure 7.5b confirms the constancy of the east – central-west divide in terms of its contribution to total regional inequality, implying that it is a less important contributor relative to the urban-rural gap.

Figure 7.5a Contribution of Urban-rural Gap to Regional Inequality in China, 1980-2009

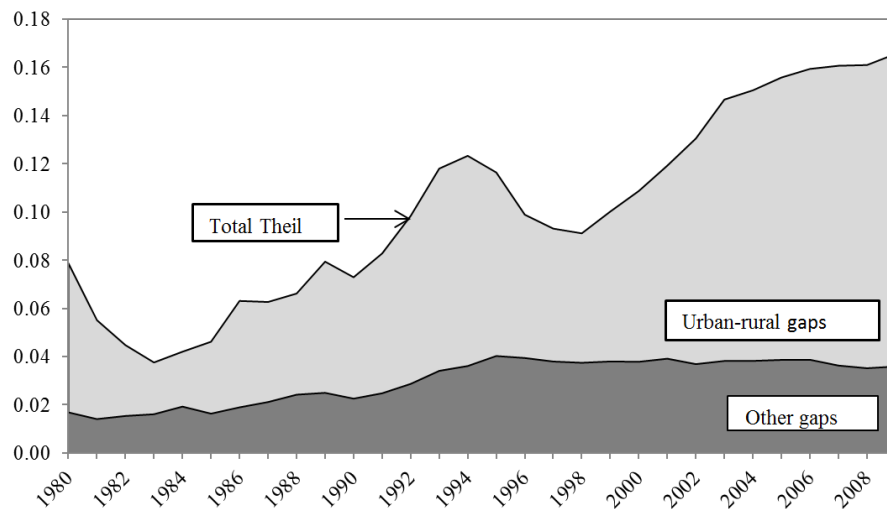
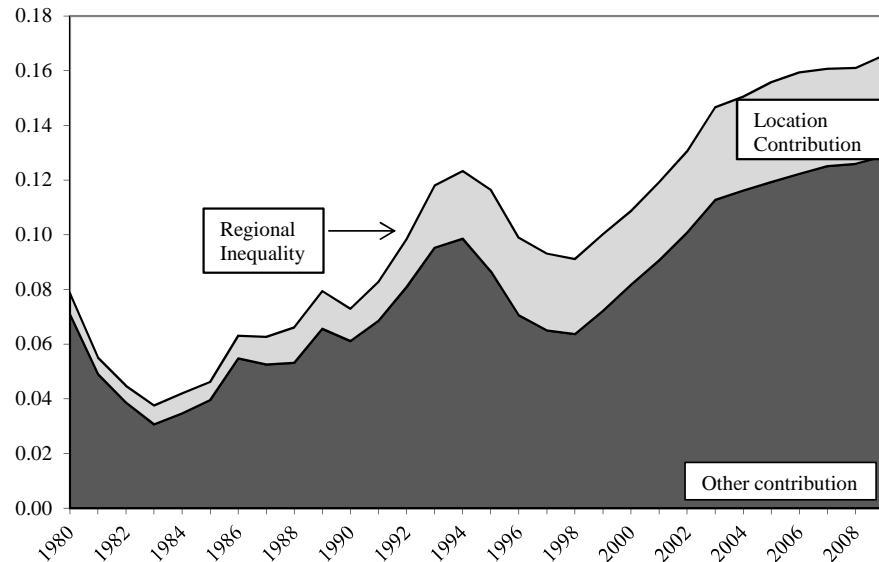


Figure 7.5b Contribution of Location to Regional Inequality in China, 1980-2009



However, the conventional decomposition is problematic for identify fundamental determinants of inequality. For example, if one uses gender to group a sample and find a very large between-sex component, this component cannot be exclusively attributed to gender discrimination unless everything else remains the same for the male and female sub-sample. If males possess higher human capital, its impact on income would be captured by the between component. In other words, the between group component is usually contaminated.

The approach of conditional convergence modelling requires estimation of growth regressions, with variables such as location, physical and human capital, infrastructure, institutions and policies controlled for (Chen and Fleisher 1996). These conditioning variables, which represent the heterogeneous steady states, are considered to drive income inequality. Ding, Haynes and Liu (2008) provide evidence on conditional convergence in China over the period 1986 to 2002. According to them, it would take 40-60 years to eliminate half of the gap between the lagging and leading regions. Nevertheless, a vital deficiency of this approach is that one cannot rank inequality determinants in terms of their contributions to total inequality. In fact, this approach does not really measure or model inequality itself.

The regression-based inequality decomposition of Wan (2004) allows both identification of driving forces of income inequality and quantification of their contributions to total inequality. This approach permits use of any inequality index, any model specification, and the contributions always adding to 100 percent. In the empirical part of Wan (2004), a combined Box-Cox and Box-

Tidwell income-generating function was estimated, which was used to quantify the contributions of dependency ratio, capital input, education land, TVEs and other variables to inequality.

Assuming all markets are complete with full factor mobility, inequality would be low in the long run. However, markets in China are fragmented (Poncet, 2003; Fu 2004; Zhang and Zou, 2012), far from being perfectly integrated and competitive. There are many barriers to factor mobility. Apart from local protectionism (Zhang and Zou, 2012), the most notorious institutional barrier is the household registration or *hukou* system (Cai, Wang and Du, 2002), to which we now turn.

7.3.1 Institutional Factor: the Hukou System

The household registration or *hukou* system was established in 1958 and remains effective today. Until the mid-1990s, *hukou* was reinforced by grain and other rations thus little labour mobility could occur. Consequently, rural labour surplus in China, unlike elsewhere, could not migrate to the cities despite faster urban growth since mid-1980s. The same holds for regional development and cross-region migration. The abolishment of grain rations in late 1993 made labour mobility possible, leading to the emergence of rural-to-urban and regional migration. However, these migrants, in the order of 260 million today, mostly do not have urban *hukou*.

In addition to being discriminated on the labour market, migrants without the urban *hukou* are denied most basic social services and benefits including pension, unemployment and health insurances. Also, *hukou* interacts with other policy factors in raising inequality. Even today, migrants have little chance to gain employment in government or monopoly industries which usually pay well. Whalley and Zhang (2007), by simulating a general equilibrium model, confirm the significant role of *hukou* in preventing labour mobility. Bao, Bodvarsson, Hou and Zhao (2011) demonstrate that a 1% increase in the perceived probability of securing *hukou* will induce 11.85% increase in the migration rate whereas average provincial migration rate was 3.775 for 1985 to 1990, 3.589 for 1995-2000, 3.655 for 2000-2005.

Clearly, *hukou* prevents many more potential migrants to share the growth dividends in urban or coastal areas (Zhao, 1999; Zhang and Zhou, 2012). Therefore, it represents a cause of enlarged urban-rural and regional income gaps. Conversely, migration is expected to help moderate these gaps as it not only offers migrant workers better job opportunities or allows them to share urban outputs, but also helps lessen the pressure of land shortage in the rural areas and allows those left behind with more work and investment opportunities (Zhu and Luo, 2010). Moreover, remittance from migrants helps raise rural income and promote investment and consumption in rural China (Sicular, 2013).

However, Sicular et al (2007) noted that overall inequality shows no clear upward or downward trend as the migrant population share increases. They argue that migrants tend to have characteristics more similar to urban residents (younger, better educated, smaller households), so relocation of this subset of rural population does not significantly alter the urban–rural gap as much as would movement of “average” rural residents. But, their inference holds constant all other things and does not take into account the effects of migration on incomes of those remaining behind in rural areas or those with urban *hukou*. Also, Ito (2008) suggested that the removal of *hukou* may not help eradicate rural–urban inequality, because migration may lead to the decline of the rural industrial sectors. It is not clear if the decline of TVE (town and village enterprises) in terms of its output share in the rural economy from 52% in 1995 to 28% in 2000 as documented by Ito (2008) is caused by migration. The decline can be driven by firm relocations or competition of urban industries.

7.3.2 Policy Issues

China’s regional development policies and the opening up of the coastal cities contributed directly to the rising inequalities (Zhang and Zou, 2012). Preferential investment, taxation and banking policies for the coastal region expedite its economic growth and technological leadership. Industrial agglomeration then took place. By comparison, it was not until 1991 that the government opened up inland areas. By then, the inland area may have already lost the capability to compete with the coast (Feng, 2004).

The fiscal system in China is dis-equalizing. Before the reforms, China had a highly centralized fiscal system where the central government alone prepared budget and collected revenue. Even the state-owned enterprises (SOEs) were part of state finance. After the major decentralization reform to the fiscal system in 1994 (Lin and Liu, 2000) aiming at arresting the free fall of the ratio of government revenue to GDP and the share of central government in the total government revenue (Wang 1997), fiscal disparities have increased (Zhao, 2009). In 1995, the government introduced the equalization grant to curb the fiscal disparity. Unfortunately, the grants and other discretionary transfers failed to redistribute resources. The grants, instead of targeting the poorer provinces, were used to reward local governments who are loyal to the upper governments (Shen et al 2012).

Now, China has one of the most decentralized fiscal systems in the world, particularly on the spending side. More than half of all expenditure takes place at the sub-provincial level. Poor areas have very little tax collection and hence cannot fund basic social services. The richest province has more than 8 times the per capita public spending than the poorest province. The situation is worse at the sub-provincial level. The richest county, the level that is most important for service delivery, has about 48 times the level of per capita spending of

the poorest county (Dollar and Hofman 2008). These differences in public spending translate into differences in social outcomes such as health and school enrolment rate, with profound implications for current and future inequalities.

The *hukou* related urban biases represent another determinant of inequality (Yang 1999). For example, rural households received much less transfers and subsidies than urban households. Although removing the agriculture tax in 2006 is a step in the right direction, tax and subsidy payments still favor the urban residents (Wang and Piesse 2010). The urban biases also interact with biases towards SOEs because few rural residents can gain employment in SOEs. The latter biases, particularly in terms of energy and credit subsidies, reinforce inter-sector gaps which have risen significantly over time (Chen et al 2010).

7.3.3 Location or Geographic Factors

Geography matters. In addition to preferential policies, coastal provinces benefit from location advantages for exports, better infrastructure and more human capital although the inland areas have more natural resources and higher population growth rates (Lu 2008). Demurger, Sachs, Woo, Bao, and Chang (2002) quantified the effect of both policy (preferential policy index) and geography (ability to participate in international trade) variables, finding that geography and policy had about equal influence on coastal growth. Geography also plays a major role in determining the urban-rural income gap (Gustafsson and Li, 1998). According to Sicular et al (2007), about 46% of the urban-rural gap in 1995 can be attributed to the location dummy variables and the constant term. The contribution increased to 81% in 2002.

Nevertheless, the contribution of location to regional inequality may be declining over time. According to Wan, Lu and Chen (2007), the contribution of East-Central-West gaps in composing regional inequality has dropped from less than 18% in 1987 to just over 15% in 2001. These results are broadly in line with the decomposition results shown in Figure 7.5b. The between-component (largely indicating location impacts) is small and may decline further as infrastructure develops, labour mobility improves and urbanization proceeds. This finding corroborates well with Chen and Zheng (2008) who used data from 100 villages of 9 provinces to study rural inequality. They found that less than half of inequality is due to factors between villages.

7.3.4 External Factors: Trade and FDI

The benefits of trade and capital flows to economic development are well-known and they can be amplified indirectly via the multiplier effect. Of course, coastal China gained much more than the inland area (and urban more than rural) from the open-door policies (Fujita and Hu, 2001). In 1999, the degree

of openness, (imports + exports + FDI)/GDP, was 64.47% for the eleven coastal provinces, but under 10% for the 8 central and 12 western provinces (Yin, 2004). It is thus not surprising for Wei, Yao, and Liu (2009) to find that FDI generated a consistent and positive effect on growth differences between regions. In addition, firms with FDI usually offer higher salaries, thus FDI contributes to the wage gap between firms and individuals (Wu, 2005; Tian, Lo, Lin and Song 2011). Further, Kanbur and Zhang (2005) regressed the coastal-inland inequality component on various determinants and showed that openness and decentralization contributed to the rapid increase in inland-coastal disparity in the reform period of the 1980s and 1990s.

According to Wan et al (2007), trade accounts for 12% of regional inequality in the late 1980s and grew to more than 14% in early 2000s. The contribution of FDI also rose, from 5% to almost 7% during 1987–2001. Adding these two together, globalization contributes more than 20% to the total regional inequality in China since 1999, overtaking capital as the sole most important driver of inequality. These findings are consistent with those of Zhang and Zhang (2003) who used CV as a measure of inequality.

7.3.5 Other Factors

Education and skills are the major means for earnings thus their inequalities must help drive inequality. Ito (2008) noted that human capital-related factors are largely responsible for the increased rural-urban disparity, more than 25% of which can be explained by the schooling variable (Sicular et al, 2007). Based on the 2002 CHIP data, educational inequality accounts for as high as 36 percent of self-employment income inequality. But it only accounts for 2 percent of the rural inequality (Liu and Sicular 2009). Thus, as urbanization proceeds, education is expected to play a much more significant role in affecting inequality.

Unfortunately, regional gaps in human capital are large. As Yin (2004) highlighted, in 2000 the eastern region had 5.98% population with college or higher degrees, relative to only 2.97% in the western region. As another example, 7.4% of employees were illiterate in the eastern region in 1999, much lower than 16.25% in the western region. Using enrolment data, Lee (2008) finds deteriorating educational inequality across provinces and the deterioration becomes worse at higher levels of the education ladder. Meanwhile, returns to education are found to be on the rise in China, further aggravating the inequality impacts of the educational endowments.

Worse still, educational attainment is highly correlated with provincial innovation activities (Chi and Qian, 2010). Controlling for a set of variables, Wang and Zhang (2003) found a significant correlation between knowledge disparity (particularly on public spending on knowledge advancement and educational attainment) and economic inequalities.

Finally, a number of studies show that households headed by a member of the Communist party are on average better off than others. But decomposition results show that gaps in average household income between households headed by party members and those by non-party members contributed little to total inter-household inequality. The same can be concluded regarding ethnicity (Gustafsson and Li, 1998).

7.4 SUGGESTED INTERVENTIONS

As far as policy options are concerned, the urban-rural gap and regional inequality deserve priority considerations. Eliminating the former is possible and will cut inter-household inequality by one third. While it is not possible to eliminate regional inequality, encouraging migration and developing transport and telecommunication infrastructure can help lower the total inequality considerably. When combined with other interventions, China can contain and eventually reverse the rising trend of inequality.

7.4.1 Tackling the urban-rural gaps: Urbanization

Since the urban-rural gap has been the largest component of income inequality in China, tackling this should be a policy priority. It is important to point out that fiscal policy intervention or redistribution alone would not be sufficient because only a little more than one third of China's population can be classified as being urban with absolute majority of China's population being poor rural residents. Thus, the government must abolish the *hukou* so as to alleviate various kinds of discriminations and allow migrants to enjoy some social protection.

However, abolishing *hukou* is only a necessary but not sufficient condition for bridging the urban-rural gap. In other words, the urban-rural gap will not automatically disappear after abolishing *hukou*. This is demonstrated by the persistence of urban-rural disparity in India, Mexico, and many other countries where labour and population movement is free. Other policy measures (fiscal policy, taxation policy, social protection programmes) are needed to support urban settlement of rural residents. In this context, the inability to sell or mortgage rural land represents an obstacle to urbanization. Allowing farmers to trade their land plots not only helps facilitate permanent migration but also helps defray cost of urban settlement and promote agricultural development. In addition, migrants must be provided with education and training opportunities to enable them to acquire or upgrade skills so they can compete with original urban residents.

To minimize the social and environmental problems potentially associated with massive migration, a step-by-step procedure is necessary where migrants

with long-term jobs or secure housing should be given priority. Those with better education should also enjoy concessions. In fact, some cities such as Shenzhen have recently adopted a scoring system, with demographic and other characteristics of potential migrants being taken into consideration. To ease fiscal pressure, new migrants may be provided with limited access to financial assistance in housing, education, health care, and other welfare provisions. Community colleges could be set up in the cities to provide training and education to temporary and long-term migrants and their family members.

7.4.2 Tackling regional inequality

Underlying regional inequality are cross-region differences in human and physical capital endowments and other economic conditions (such as proximity to the global market). According to Wan et al (2007), equalization of domestic capital stock on a per capita basis across regions will cut regional inequality by 20%. To narrow these gaps, greater public investment in infrastructure, and productive capabilities in the lagging regions should be prioritized. In particular, continued financial reform is necessary in order to improve access to finance in inland provinces and rural areas. While various government entities and financial institutions are experimenting with micro-credit schemes, such schemes must cater for capital formation.

Meanwhile, it is important to promote trade and FDI in inland China. Policy biases that helped expand trade and FDI but are gradually being phased out in coastal China should be implemented in inland provinces to create a better environment for attracting and absorbing FDI (Wei et al, 2009). Since firms are attracted to locations with better infrastructure (Sridhar and Wan, 2010), infrastructure investment in China shall continue in the backward regions (Ding et al, 2008; Demurger, et al, 2002). Such public infrastructure investments are effective in reducing regional disparities (Vijverberg, Fu and Vijverberg 2011). Zou, Zhang, Zhuang and Song (2008) found that reducing road inequality would lead to a reduction of income inequality. The infrastructure investment, particularly in the rural areas, could facilitate rural-urban migration and make technological progress in the rural sector faster (Liu and Zou, 2011).

Fundamental changes are needed in the collection and allocation of fiscal resources across regions (Gao 2008). An equalization in fiscal support would lead to an almost 15% drop in regional inequality and a progressive fiscal scheme would result in a much larger impact (Wan et al 2007). Fiscal transfers should be conditional, geared toward capital formation and education of the young. Public research and development (R&D) investment in agriculture should be increased to improve farming productivity as agriculture has been the major part of the economy of the inland areas. Special attention shall be paid to the quality of schooling in poor areas where school fees in compulsory education have been abolished since 2005.

Reform in fiscal system shall include centralization of public spending on basic services to eliminate their disparities. In the US, the poorest state has about 65 percent of the revenues of the average state, and in Germany, any state falling below 95 percent of the average level gets subsidized through the “*Finanzausgleich*”, and any receiving more than 110 percent gets taxed (Dollar and Hofman 2008).

7.4.3 Hukou reform and social protection

There is consensus that the *hukou* system must be reformed, as highlighted in the *Decision on Major Issues Concerning Comprehensively Deepening Reforms* that was adopted at the Third Plenum of the 18th Central Committee of the Chinese Communist Party. While experiments have been undertaken in a couple of provinces, they are largely designed to reform *hukou* for residents within provincial borders. How to reform *hukou* at the national level remains a daunting task.

Besides ensuring a minimum living standard for all which is already in place, a well-functioning social protection system helps the poor and the vulnerable to invest in human and possibly physical capital, which is essential for improving income distribution in the long run. This will become increasingly important as aging and migration gains momentum. While social protection in terms of pension, health care and unemployment benefits are more advanced in urban areas, the rural sector is significantly lagging behind, not only in terms of breadth and depth of coverage, but also in terms of level of benefits. Similar differences also exist between provinces which may adversely affect labour mobility across provincial borders. These differences must be addressed.

One of the most serious problems lies in the non-portability of various benefits. Overcoming this problem appeals for a centralized social welfare system where individuals can have access irrespective of their location of residence and *hukou* status. While still a long way to go as far as social protection is concerned, it is important not to develop into a welfare state. The lessons of overshooting experienced by Australia and Canada ought to be borne in mind.

7.4.4 Other proposed remedies

It is widely accepted that job creation will help moderate income inequality as the poor and vulnerable mainly possess labour as the only resource, while the rich often have capital and other resources. To enhance job creation, growth must be maintained, particularly in the labour intensive tertiary sector. At present, the services sector contributes about 40% of GDP and around 35% of total employment, both low. If international experience is any guide, the

services sector should account for 50-60% of national GDP and total employment at the current stage of development. A simple calculation projects 400-456 million jobs in the services sector, implying a gap of 150-200 million. It must be pointed out that these calculations have not taken into account new jobs to be generated by economic growth, which is expected to remain high and sustainable for the next 20-30 years.

The roles of the central and local governments should be clear and properly defined to help in the reallocation of fiscal resources (Shen et al, 2012). Local governments should focus on public services and social development while the national government should focus on regional equalization.

Further ownership reform is needed to break down state monopoly by removing various subsidies to SOEs and introducing private investment in the currently protected sectors (Feng 2004). As the state sector still accounts for a major share of the economy in inland China, such ownership reforms are expected to boost growth more in inland areas and help bridge regional inequality (Yin 2004). Also, concerted effort should be made to promote the private sector as the rapid economic growth of the eastern region is closely associated with the development of the private sector (Hao and Wei, 2010).

Meanwhile, anti-protection regulations shall be enacted to remove inter-regional trade protections (Zhang and Zou, 2012). An integrated domestic market with less government interventions not only helps promote economic development but also facilitate factor mobility and improvement of income distribution (Hao and Wei, 2010).

7.5 SUMMARY AND AREAS FOR FUTURE RESEARCH

In pre-reform China, egalitarian distribution was only implemented in the urban sector and within production teams of the rural sector. Thus, sizable income inequality existed, largely attributable to urban-rural gaps and disparities within the rural sector. Economic reforms broke the “iron rice bowl” in the urban areas and the egalitarian distribution within production teams. Consequently, within-rural and within-urban inequalities have been increasing until recently. However, the overall inequality declined in the first several years of reform due to the narrowing down of the urban-rural gap which represents a dominant component of the overall inequality. From mid-1980s till early 2000s, inequalities along all dimensions in China exhibited increasing trends, leading to a voluminous literature and policy interventions. To what extent these interventions are effective in containing the rising inequalities is subject to further research.

Further research is also needed on the impacts of inequality on growth, consumption, crimes, health, human capital formation and so on. There is a lack of analytical work on the consequences of inequality in general, particularly in China. Unless these consequences are properly documented and brought

to the attention of policy makers, the urgency and significance of tackling income inequality may be undermined.

Of course, before appropriate policy interventions can be initiated, it is vital to pin down the causes or sources of worsening income distribution. Towards this purpose, many studies have employed conventional decomposition techniques to quantify the components of inequality or its changes in China, as reviewed in this paper. Unfortunately, such decompositions cannot identify fundamental determinants of inequality and the decomposition results are most likely to be contaminated. The more recently advanced regression-based inequality decomposition offers a promising alternative (see Wan 2004), but its empirical applications to China are limited and shall be expanded.

One important research area which so far has attracted little attention relates to the evaluation of various policy interventions. These include the introduction in 2000 of the great western development strategy to tackle regional divide and in 2005 of the “socialist new countryside development” movement aiming at reducing the urban-rural gaps. In 2006, the government adopted the goal of “building a harmonious society” in its 11th Five-Year Plan. In November 2013, the Third Plenum of the 18th Central Committee of the Chinese Communist Party has outlined a systematic approach to tackling the issue of income distribution, through reforms in a wide range of areas including the *hukou* system, social protection, access to public services (particularly education and health care), taxation, and governance.

Samenvatting (summary)

Dit proefschrift bestaat uit zes studies over inkomensongelijkheid en inkomensherverdeling, die onafhankelijk van elkaar zijn te lezen als hoofdstuk 2 tot en met 7. Samen bieden zij een vergelijkend perspectief op trends en determinanten van ongelijkheid in OESO-landen en China, waaraan het tot op heden in de literatuur heeft ontbroken.

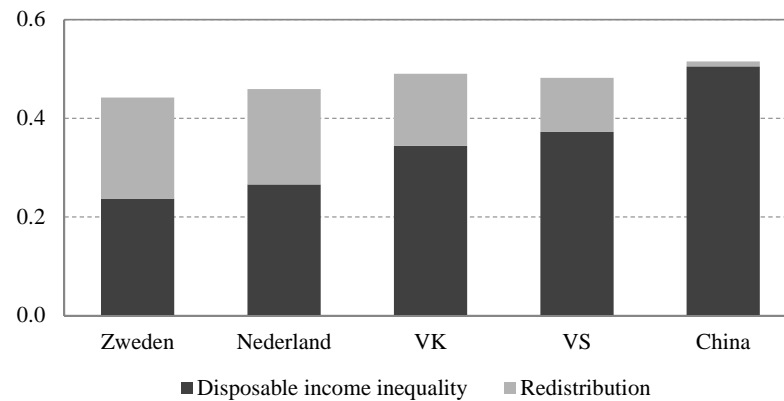
Het doel van dit hoofdstuk is het schetsen van een algemene achtergrond en motivatie voor het bestuderen van inkomensongelijkheid (paragraaf 1). Hieruit vloeien de specifieke onderzoeksvragen voort die in dit proefschrift aan de orde komen (paragraaf 2). Dit hoofdstuk wordt afgesloten met een samenvatting van de belangrijkste onderzoeksresultaten (paragraaf 3).

1 ACHTERGROND EN MOTIVATIE

Dit proefschrift is ingegeven door de trend van een stijgende inkomensongelijkheid in de afgelopen decennia, zowel wereldwijd als meer specifiek in vele ontwikkelde landen en ontwikkelingslanden (Qureshi en Wan, 2008; OECD, 2008; 2011a; Milanovic, 2005). Deze trend is robuust, ongeacht welke gegevens (inkomen, vermogen of uitgaven) of ongelijkheidsmaatstaven (de Gini-coëfficiënt, de Theil-index of andere mondiale indicatoren) worden gebruikt.

Figuur 1 toont de Gini-coëfficiënten voor diverse OESO-landen en China. Er is te zien dat de inkomensongelijkheid vóór belasting- en premieheffing (de som van de ongelijkheid in besteedbaar inkomen en herverdeling) aanzienlijk is, variërend van 0,442 in Zweden tot 0,515 in China.

Figuur 1 Inkomensongelijkheid in geselecteerde landen



Bron: eigen berekening op basis van microgegevens uit de Luxembourg Income Study (LIS)-database, die vergelijkbare gegevenssets uit diverse landen bevat.

Een dergelijk hoog niveau aan inkomensongelijkheid vraagt om onderzoek en beleidsaandacht, omdat zij nadelige sociale, economische en politieke gevolgen kan hebben. In de eerste en plaats kan een hoge mate van ongelijkheid de maatschappelijke stabiliteit ondermijnen en is deze dus schadelijk voor economische en sociale activiteiten. Een gebrek aan een dergelijke stabiliteit ontmoedigt investeringen en kan verschillende nadelige gevolgen hebben voor de economie. Zo is gevonden dat inkomensongelijkheid de misdaad stimuleert (Kelly, 2000). Ook worden politieke processen negatief beïnvloed wanneer de publieke opinie tussen inkomensgroepen verschilt (Gilens, 2005; Bartels, 2009). Bovendien wordt inkomensongelijkheid in verband gebracht met een verminderd vertrouwen en een geringere maatschappelijke betrokkenheid en participatie.

Ten tweede hindert een sterke ongelijkheid de economische ontwikkeling, aangezien zij de armen kansen op onderwijsmogelijkheden en de vorming van menselijk kapitaal ontnemt. Ongelijkheid leidt bijvoorbeeld tot een slechte gezondheid en bedreigt de publieke voorzieningen zoals gezondheidszorg en politiediensten (zie Osberg, Smeeding en Schwäbisch (2004) voor een literatuuroverzicht). Een grotere ongelijkheid resulteert ook in een sterkere herverdeling door belastingheffing en sociale uitkeringen, waardoor werken kan worden ontmoedigd. Grote ongelijkheid hindert dus de groei en de productiviteit (Barro, 2000). Bovendien biedt zij producenten die aan de middenklasse verkopen minder mogelijkheden om schaalvoordelen te behalen (Keefer en Knack, 2002).

In de derde plaats betekent grote ongelijkheid minder sociale mobiliteit. In een ongelijke maatschappij kunnen huishoudens of personen met een vergelijkbare achtergrond, capaciteiten en kenmerken, maar laag inkomen, moeilijk opklimmen tot hogere inkomenscategorieën (Motiram en Sarma, 2014).

Vanwege deze brede en verstrekkende implicaties is inkomensongelijkheid niet alleen uitgegroeid tot een populair onderwerp voor economisch onderzoek, maar trekt zij ook in toenemende mate aanzienlijke publieke en politieke aandacht. Zo steunt in de Verenigde Staten ongeveer 57 tot 66 procent van de bevolking een meer rechtvaardige verdeling van de welvaart, tegen 28 tot 35 procent die tevreden is met de bestaande situatie (Shaw en Gaffey, 2012). De enorme publieke belangstelling voor het boek 'Capital in the Twenty-First Century' (2014) van Thomas Piketty laat duidelijk zien hoe belangrijk het onderwerp van inkomensongelijkheid is voor veel mensen in de hele wereld.

2 ONDERZOEKSVRAGEN

Nu we de noodzaak van het bestuderen van inkomensongelijkheid hebben gerechtvaardigd, moeten we de focus van dit proefschrift nader specificeren. Inkomensongelijkheid is immers een breed onderwerp dat vele aspecten omvat. In grote lijnen richt dit proefschrift zich op de determinanten van inkomensongelijkheid en de veranderingen hierin. Meer specifiek worden de volgende zes sets onderzoeksvragen behandeld.

Ten eerste: wat is de rol van sociaal beleid? Sociaal beleid (denk aan belastingen en sociale uitkeringen) is een belangrijke determinant van de inkomensongelijkheid. Zoals Figuur 1 laat zien, hebben verschillende landen een vergelijkbaar niveau aan primaire inkomensongelijkheid (vóór belastingen en premieheffing) maar verschilt de ongelijkheid in besteedbaar inkomen. Het is duidelijk dat herverdeling door de overheid een belangrijke rol speelt. Onder de in Figuur 1 genoemde landen vindt de grootste herverdeling plaats in Zweden, terwijl deze het geringst is in China.

Hoewel de meeste studies zich richten op het totale herverdelende effect, is in sommige gevallen gekeken naar de impact van bepaalde sociale programma's zoals pensioenen, werkloosheidsuitkeringen, etc. Er zijn echter slechts weinig studies die dergelijke effecten in verschillende landen hebben vergeleken. In hoofdstuk 2 wordt derhalve gekeken naar de inkomensongelijkheid in 28 OESO-landen rond 2005 en wordt onderzocht welke rol herverdeling sociale uitkeringen en belasting- en premieheffing daarin spelen. In het bijzonder zal worden geprobeerd om de effecten van verschillende sociale programma's op de ongelijkheid te kwantificeren.

Ten tweede: welke rol speelt herverdeling bij de ontwikkeling inkomensongelijkheid in OESO-landen *in de loop der tijd*? In de meeste OESO-landen is de inkomensongelijkheid in de afgelopen twee of drie decennia toegenomen, voornamelijk ten gevolge van een grotere ongelijkheid in het marktinkomen (OECD, 2008; 2011). Zoals eerder gemeld, kan herverdeling door de overheid een belangrijke rol spelen bij het verminderen van de inkomensongelijkheid. In literatuur die de afgelopen decennia is verschenen over de 'terugtrekkende overheid' wordt gesteld dat de herverdeling in verzorgingsstaten is afgenomen.

Daarentegen laten andere studies zien dat verzorgingsstaten in de jaren '80 en '90 juist een groter herverdelend vermogen tentoonspreidden (Kenworthy en Pontusson, 2005). Deze controverse motiveert ons om te onderzoeken of de herverdeling door de overheid nu sterker of zwakker is geworden in de loop der tijd. Hoofdstuk 3 gaat in op deze kwestie door middel van een vergelijkend onderzoek naar de bijdragen van belastingen en sociale programma's aan veranderingen in inkomensongelijkheid.

Ten derde: leidt de transitie van een traditionele verzorgingsstaat naar een nieuwe sociale investeringsstaat tot meer ongelijkheid en armoede? Deze vraag stond centraal in recent publiek debat in Europa. De in maart 2000 aangenomen Lissabonstrategie beoogt de sociale cohesie te versterken en de armoede te verminderen in de Europese Unie. Om dit doel te bereiken, pleit de Lissabonstrategie voor een overgang van de traditionele verzorgingsstaat naar een nieuwe sociale investeringsstaat. Dit suggereert de geleidelijke vervanging van herverdelend sociaal beleid door actief sociaal beleid dat een hogere arbeidsparticipatie bevordert. De impact van deze transitie op de armoedecijfers blijkt minimaal te zijn. Er zijn zelfs mensen die geloven dat de transitie deels verantwoordelijk is voor de teleurstellende resultaten van de armoedebestrijding. Dit heeft geresulteerd in een fel wetenschappelijk debat dat twijfels oproept over de effectiviteit van de sociale investeringsstrategie. Hoofdstuk 4 van dit proefschrift probeert derhalve de impact van deze transitie op de armoede en inkomensongelijkheid te onderzoeken.

Ten vierde: hoe beïnvloeden internationale handel, technologische vooruitgang en arbeidsmarktinstellingen de inkomensongelijkheid? Deze factoren zijn aangedragen als oorzaken van de toenemende ongelijkheid, en dan met name de stijgende arbeidsinkomensongelijkheid, in tal van landen. De toename van de import zou de lonen of arbeidsmogelijkheden van binnenlandse werknemers kunnen belemmeren door voor rechtstreekse concurrentie met buitenlandse werknemers te zorgen. Aan de andere kant kan export ruimte creëren voor hogere arbeidsinkomsten of het scheppen van werkgelegenheid. Wat betreft technologische veranderingen geldt dat recente innovaties meestal ten goede komen aan de hooggeschoolden en routinematige arbeid vervangen worden door kapitaal, wat leidt tot polarisatie op de arbeidsmarkt. Hoofdstuk 5 biedt een aanvulling op de huidige literatuur door inkomensongelijkheid op sectorniveau te bestuderen. Dit is nuttig omdat de effecten van handel, technologie en instituties per sector kunnen verschillen. Zo is er in sectoren die sterker worden blootgesteld aan de wereldmarkt wellicht sprake van hogere niveaus van inkomensongelijkheid. Hoofdstuk 5 schat de arbeidsinkomensongelijkheid op sectorniveau in acht ontwikkelde landen en onderzoekt welke rol de internationale handel, technologische veranderingen en arbeidsmarkt-instituties hierin spelen.

Ten vijfde: wat bepaalt de veranderingen in de inkomensongelijkheid onder ouderen? Hoewel er een grote en groeiende hoeveelheid literatuur bestaat over de ongelijkheid binnen de totale bevolking of de beroepsbevolking, is nog

weinig aandacht besteed aan de inkomensongelijkheid onder ouderen. Dat is een gemis, want de inkomensverdeling van ouderen is een integraal onderdeel van de totale inkomensongelijkheid; een onderdeel dat bovendien wint aan betekenis omdat de OESO-landen en opkomende economieën vergrijzen. Nog belangrijker is het feit dat ouderen over het algemeen minder verdienen dan de beroepsbevolking; velen van hen zijn voor hun onderhoud volledig afhankelijk van pensioeninkomen. In deze situatie kan een stijgende inkomensongelijkheid onder ouderen sommigen van hen onder de armoedegrens duwen. Dit is met name relevant in Europa aangezien in vele de (publieke en particuliere) pensioenen zijn beperkt (Scruggs, Jan en Kuitto, 2014). Hoofdstuk 6 richt zich daarom op de trend van inkomensongelijkheid onder ouderen in acht OESO-landen en onderzoekt factoren die bijdragen aan de verandering van deze ongelijkheid.

Ten zesde: wat is het profiel van de inkomensongelijkheid in China? Hoofdstuk 7 besteedt aandacht aan China als een casestudie voor ontwikkelende economieën. Het China van voor de hervormingen wordt gezien als een egalitaire samenleving, maar de inkomensongelijkheid begon te stijgen in het midden van de jaren '80 toen de regering in haar hervormingen de aandacht verschoof van het platteland naar de stad. Deze verschuiving versterkte het negatieve effect van de opendeurstrategie op regionale ongelijkheid, aangezien de strategie een voorkeursbeleid voor de kustgebieden met zich meebracht. China vormt een goede casestudie omdat het verschilt van de OESO-landen wat betreft groeisnelheid en ontwikkelingsstatus, terwijl er toch ook overeenkomsten zijn: een toenemende inkomensongelijkheid en vergrijzing. Als we kijken naar de oorzaken of drijvende krachten van de inkomensongelijkheid, heeft China in tegenstelling tot de OESO-landen een gesegregeerde arbeidsmarkt vanwege het huishoudregistratiesysteem (*Hukou*-systeem) dat discrimineert tegen de arbeid in plattelandsgebieden. Het zal duidelijk zijn dat een complete vergelijkende studie tussen de OESO-landen en China buiten het bestek van dit proefschrift valt, maar hoofdstuk 7 biedt een literatuurstudie naar de trends en determinanten van de ongelijkheid in China.

3 BELANGRIJKSTE BEVINDINGEN

In deze paragraaf wordt antwoord gegeven op de onderzoeksvragen die in de vorige paragraaf werden besproken.

Hoofdstuk 2 onderzoekt de inkomensverdeling en herverdelingseffecten die kunnen worden toegeschreven aan sociale uitkeringen en belastingen in 28 OESO-landen rond 2004, gebaseerd op de inkomensgegevens op huishoudniveau van de Luxembourg Income Study (LIS). Met betrekking tot de herverdelingseffecten geeft onze 'budget incidence'-analyse aan dat de belastingen en sociale uitkeringen zorgen voor een gemiddelde afname van de Gini-coëfficiënt van 0,462 tot 0,299, wat neerkomt op een daling van 35 procent. Sociale

uitkeringen zijn verantwoordelijk voor 85 procent van de totale herverdeling, terwijl belastingen goed zijn voor 15 procent. De grootste herverdeling werd gevonden voor België, Hongarije en Finland, terwijl voor Mexico, Korea en de Verenigde Staten beperkte totale herverdelingseffecten worden berekend. Waar het gaat om sociale programma's zijn er in de meeste landen twee dominante inkomensbestanddelen die verantwoordelijk zijn voor 50 tot 60 procent van de totale vermindering van de inkomensongelijkheid: 1) de publieke ouderdoms- en nabestaandenpensioenen, en 2) de inkomstenbelasting. Alle andere sociale programma's blijken beperkte herverdelingseffecten te hebben in alle landen, hoewel werkloosheids-uitkeringen wel enig effect hebben.

Hoofdstuk 3 onderzoekt de veranderingen in inkomensongelijkheid vanaf circa 1985 tot ongeveer 2005 in 20 LIS landen, met speciale aandacht voor de herverdeling die kan worden toegeschreven aan sociale uitkeringen en directe belastingen. De resultaten laten zien dat, ondanks de stijgende inkomensongelijkheid, de uitkeringsstelsels rond 2005 effectiever waren in het verminderen van de inkomensongelijkheid dan de systemen in het midden van de jaren negentig. De publieke ouderdoms- en nabestaandenpensioenen droegen voor 60 procent bij aan de toename van de herverdeling in de periode 1985-2005. De bijstand was goed voor 20 procent, en uitkeringen wegens ziekte, beroepsongevallen en -ziekten, en arbeidsongeschiktheid zorgden voor ongeveer 12 procent van de totale toename van de herverdeling. Andere uitkeringen (kinder-/gezinstoeslagen, toeslagen voor zwangerschapsverlof en ander familieverlof, uitkeringen voor militairen/veteranen/oorlogsslachtoffers, en overige sociale-zekerheidsuitkeringen) waren goed voor 22 procent van de totale toename van de herverdeling. Daarentegen zorgden directe belastingen voor een vermindering van de herverdeling met 16 procent gedurende de periode 1985-2005.

Hoofdstuk 4 analyseert de verdelingseffecten van verschuivingen in het uitgavenpatroon van traditionele verzorgingsstaatprogramma's naar sociaal investeringsbeleid in 19 Europese landen in de periode 1997-2007, aan de hand van gecombineerde tijdreeks- en cross-sectionele gegevens uit de OESO-database en Eurostat. De resultaten suggereren dat deze verschuivingen niet gepaard gaan met hogere of lagere armoedecijfers. Deze bevinding ondersteunt echter niet noodzakelijkerwijs het standpunt dat de teleurstellende Europese armoedecijfers gedeeltelijk zijn toe te schrijven aan een grotere focus op nieuwe welvaartstaatsprogramma's. Zoals opgemerkt door Cantillon (2011) en Marx, Vandenbroucke en Verbist (2012) hebben werkloze huishoudens minder sterk geprofiteerd van de toegenomen werkgelegenheid dan huishoudens waarin al minstens één persoon een baan had. Eén mogelijke verklaring is dat de verschuivingen in het uitgavenpatroon tussen het traditionele en sociale investeringsbeleid tot dusver relatief beperkt zijn gebleven.

Hoofdstuk 5 analyseert sectorale trends in inkomensongelijkheid en werkgelegenheid, als aanvulling op de literatuur over stijgende arbeidsinkomensongelijkheid op landenniveau. Op basis van de meest recente sectorale ge-

gevens van LIS voor acht landen tussen 1985 en 2005, geeft onze gecombineerde tijdreeks- en cross-sectionele analyse aan dat de ongelijkheid sterk verschilt tussen sectoren en dat de arbeidsinkomensongelijkheid in de meeste sectoren is toegenomen. Met betrekking tot de factoren achter de ongelijkheid, is er weinig bewijs gevonden voor een verband tussen arbeidsinkomensongelijkheid en handel of technologische vooruitgang. Wat betreft de arbeidsmarktinstituties wordt een negatief verband gevonden tussen het landelijk percentage werknemers dat lid is van een vakbond en sectorale arbeidsinkomensongelijkheid. Dit ondersteunt de hypothese dat tanende handelsmacht tot grotere ongelijkheid leidt.

Op basis van microgegevens van LIS wordt in hoofdstuk 6 de inkomensongelijkheid onder ouderen onderzocht en wordt geanalyseerd hoe deze is veranderd in acht OESO-landen tussen circa 1995 en 2005. In deze periode van ongeveer tien jaar wordt een gematigde stijging van de gemiddelde inkomensongelijkheid onder ouderen gevonden: de Gini neemt toe van 0,280 tot 0,291, waarbij de grootste stijging wordt waargenomen in Australië. De grootste bijdrage aan de toegenomen ongelijkheid wordt geleverd door veranderingen in het arbeidsinkomen. Dit wordt gevolgd door veranderingen in de inkomsten uit particuliere pensioenen. Veranderingen in het aandeel van publieke pensioenen zorgen daarentegen in de loop der tijd voor een sterkere ongelijkheidsreductie. Over het geheel genomen speelt de verandering van de demografische structuur van ouderen een verwaarloosbare rol als verklaring voor de toenemende ongelijkheid. Tussen de landen bestaan aanzienlijke verschillen. In Canada, Denemarken en Duitsland hebben de veranderingen in (particuliere en publieke) pensioenen een toenemend positief effect op de vermindering van de ongelijkheid. In de Verenigde Staten doen ze de ongelijkheid echter juist steeds sterker stijgen. De verandering van het aandeel aan huishoudens waarin het gezinshoofd of zijn/haar echtgeno(o)t(e) een baan heeft, draagt bij aan een hogere inkomensongelijkheid in Australië, Denemarken en Duitsland. De veranderingen in de arbeidsinkomens versnellen de groeiende ongelijkheid in alle landen met uitzondering van Israël. De verandering van het percentage mensen boven de 75 jaar heeft bijgedragen aan een grotere ongelijkheid in Noorwegen, en de veranderingen in het aandeel aan eenpersoonshuishoudens heeft geleid tot een stijging van de ongelijkheid in Israël, maar een daling van de ongelijkheid in Noorwegen en de Verenigde Staten.

Hoofdstuk 7 biedt een literatuuroverzicht met betrekking tot de inkomensongelijkheid in China. In het China van voor de hervormingen werd een egalitaire verdeling alleen nagestreefd in de steden en binnen productieteams in de rurale sector. Er bestond derhalve aanzienlijke inkomensongelijkheid, die grotendeels was toe te schrijven aan verschillen tussen de stad en het platteland en verschillen binnen de rurale sector. Economische hervormingen braken de 'ijzeren rijstkom' in de stedelijke gebieden en de egalitaire verdeling binnen productieteams. Als gevolg hiervan was er tot voor kort een toenemende ongelijkheid waar te nemen binnen zowel de landelijke gemeenschap als

de stedelijke gemeenschap. In de eerste jaren van hervormingen nam de totale ongelijkheid echter af door de verkleining van het *gap* tussen stad en platteland. Vanaf het midden van de jaren '80 tot aan de eerste jaren van het nieuwe millennium vertoonde de ongelijkheid in China in alle dimensies een stijgende trend.

Hoofdstuk 7 specificeert ook de belangrijkste oorzaken van de verslechterende inkomensverdeling in China. Ten eerste is er het *Hukou*-systeem dat discrimineert tegen plattelandsarbeid en verhindert dat veel meer potentiële migranten kunnen delen in de groeivoordelen van stedelijke of kustgebieden (Zhao, 1999, Zhang en Zhou, 2012). Het is een van de oorzaken van het vergrote inkomensgat tussen stad en platteland en regionale inkomensverschillen. Ten tweede spelen beleidskwesties zoals China's regionale ontwikkelingsbeleid en de ontsluiting van de kuststeden een rol. Bovendien werkt het fiscale stelsel in China denivellerend en draagt het bij aan regionale ongelijkheid. Ten derde is de geografie een factor van belang. De kustprovincies profiteren van voordelen met betrekking tot export, een betere infrastructuur en meer menselijk kapitaal, waar de binnenlandse gebieden over meer natuurlijke hulpbronnen beschikken en een sterkere bevolkingsgroei kennen (Lu 2008). Een vierde oorzaak zijn externe factoren (handel en buitenlandse investeringen) die hebben bijgedragen aan de snelle groei van de ongelijkheid tussen de binnenlanden en kustgebieden.

Bibliography

- Acemoglu, D. (2003) Cross-Country Inequality Trends. *The Economic Journal* 113: F121-F149.
- Alderson, A. and Doran, K. (2013) How has income inequality grown: The reshaping of the income distribution in LIS countries, in: J. Gornick and M. Jäntti (eds.) *Income inequality: Economic disparities and the middle class in affluent countries*. Stanford, CA: Stanford University Press, pp. 51-74.
- Alderson, A. and Nielsen, F. (2002) Globalization and the Great U-turn: Income Inequality Trends in 16 OECD Countries. *American Journal of Sociology* 107: 1244-1299.
- Alderson, A., Beckfield, J. and Nielsen, F. (2005) Exactly how has income inequality changed? Patterns of distributional change in core societies. *International Journal of Comparative Sociology* 46: 405-423.
- Alesina, A. and Rodrik, D. (1994) Distributive Politics and Economic Growth. *Quarterly Journal of Economics* 109: 465-490.
- Andersen, C. and Skjodt, P. (2007) Pension Institutions and Annuities in Denmark. World Bank Policy Research Working Paper No. 4437.
- Artuc, E. and McLaren, J. (2010) A Structural Empirical Approach to Trade Shocks and Labor Adjustment: An Application to Turkey, in B. Hoekman and G. Porto (eds.) *Trade Adjustment Costs in Developing Countries: Impacts, Determinants and Policy Responses*. Washington D.C.: The World Bank, pp. 37-58.
- Artuc, E., Chaudhuri, S. and McLaren, J. (2008) Delay and Dynamics in Labor Market Adjustment: Simulation Results. *Journal of International Economics* 75: 1-13.
- Atkinson, A.B. (1970) On the Measurement of Inequality. *Journal of Economic Theory* 2: 244-263.
- Atkinson, A.B. (1979) Horizontal Equity and the Distribution of the Tax Burden, in: H.J. Aaron and M.J. Boskins (eds.) *The Economics of Taxation*. Washington D.C.: The Brookings Institution, pp. 3-18.
- Atkinson, A.B. (1996) Seeking to Explain the Distribution of Income, in: J. Hills (ed.) *New Inequalities*. Cambridge: Cambridge University Press, pp. 19-48.
- Atkinson, A.B. (2000) The Changing Distribution of Income: Evidence and Explanation. *German Economic Review* 1(1): 3-18.
- Atkinson, A.B. (2003) Income Inequality in OECD Countries: Data and Explanations. *CESifo Economic Studies* 49(4): 479-513.
- Atkinson, A.B. (2010) *Poverty and the EU: the new decade, Macerata Lectures on European Economic Policy*. Macerata: Università degli Studi di Macerata.
- Atkinson, A.B. and Brandolini, A. (2001) Promise and Pitfalls in the Use of Secondary Data-Sets: Income Inequality in OECD Countries as a Case Study. *Journal of Economic Literature* 39(3): 771-800.

- Atkinson, A.B. and Morelli, S. (2011) Economic Crises and Inequality. Human Development Research Paper 2011/06. Research Background paper for the Human Development Report 2011, UNDP, UN.
- Atkinson, A.B., Rainwater, L. and Smeeding, T.M. (1995) Income Distribution in OECD Countries: Evidence from the Luxembourg Income Study. *OECD Social Policy Studies* 18.
- Autor, D., Dorn, D. and Hanson, G. (2013) Untangling Trade and Technology: Evidence from Local Labor Markets. Institute for the Study of Labor: IZA Working Paper No. 7329.
- Autor, D., Levy, F. and Murnane, R. (2003) The Skill Content of Recent Technological Change: An Empirical Exploration. *The Quarterly Journal of Economics* 118: 1279-1333.
- Bao, S., Bodvarsson, O., Hou, J. and Zhao, Y. (2011) The regulation of migration in a transition economy: China's Hukou system. *Contemporary Economic Policy* 29(4): 564-579.
- Barro, R.J. (2000) Inequality and Growth in a Panel of Countries. *Journal of economic growth* 5: 5-32.
- Bartels, L.M. (2009) *Unequal democracy: The political economy of the new gilded age*. Princeton: Princeton University Press.
- Bassanini, A., Nunziata, L. and Venn, D. (2009) Job Protection Legislation and Productivity Growth in OECD Countries. *Economic Policy* 24: 349-402.
- Beck, N. and Katz, J.N. (1995) What to do (and not to do) with time-series-cross-section data. *American Political Science Review* 89(3): 634-647.
- Behrendt, C. (2000) Private Pensions – a Viable Alternative? Their Distributive Effects in a Comparative Perspective. *International Social Security Review* 53(3): 3-26.
- Bergh, A. (2005) On the Counterfactual Problem of Welfare State Research: How Can We Measure Redistribution? *European Sociological Review* 21: 345-357.
- Bhalla, A., Yao, S. and Zhang, Z. (2003) Causes of inequalities in China, 1952 to 1999. *Journal of International Development* 15: 939-955.
- Blundell, R., Dearden, L. and Sianesi, B. (2005) Evaluating the Impact of Education on Earnings in the UK: Models, Methods and Results from the NCDS. *Journal of the Royal Statistical Society Series A* 168(3): 473-512.
- Bonoli, G. (2006) New Social Risks and the Politics of Post-Industrial Social Policies, in: K. Armingeon and G. Bonoli (eds.) *The Politics of Post-Industrial Welfare States: Adapting Post-War Social Policies to New social Risks*. London and New York: Routledge, pp. 3-26.
- Bonoli, G. (2012) Active labour market policy and social investment: a changing relationship, in: N. Morel, B. Palier and J. Palme (eds.) *Towards a Social Investment Welfare State? Ideas, Policies and Challenges*. Bristol: Policy Press, pp. 181-204.
- Bradley, D., Huber, E., Moller, S., Nielsen, F. and Stephens, J. (2003) Distribution and Redistribution in Postindustrial Democracies. *World Politics* 55(2): 193-228.
- Brady, D. (2005) The Welfare state and relative poverty in rich western democracies, 1967-1997. *Social Forces* 84: 1329-1364.
- Brandolini, A. and Smeeding, T.M. (2007) Inequality: International Evidence, in: S.N. Durlauf and L.E. Blume (eds.) *The New Palgrave Dictionary of Economics*. Basingstoke: Palgrave Macmillan, pp. 1013-1021.

- Brandolini, A. and Smeeding, T.M. (2009) Income Inequality in Richer and OECD Countries, in: W. Salverda, B. Nolan and T.M. Smeeding (eds.) *The Oxford Handbook of Economic Inequality*. Oxford: Oxford University Press, pp. 71-100.
- Brandolini, A. and D'Alessio, G. (2001) Household Structure and Income Inequality. LIS Working Paper Series 254.
- Brandolini, A. and Smeeding, T.M. (2007) Inequality Patterns in Western-Type Democracies: Cross-Country Differences and Time Changes. LIS Working Paper Series 458.
- Breen, R., García-Peñalosa, C. and Orgiazzi, E. (2008) Factor Components of Inequality: Cross-Country Differences and Time Changes. LIS Working Paper Series 503.
- Brown, R. and Prus, S. (2003) Social Transfers and Income Inequality in Old-Age: A Multi-National Perspective? LIS Working Paper Series 355.
- Burniaux, J.-M., Dang, T.-T., Fore, D., Förster, M., Mira d'Ercole, M. and Oxley, H. (1998) Income distribution and poverty in selected OECD countries. OECD Working Papers 189.
- Cai, F., Wang, D. and Du, Y. (2002) Regional disparity and economic growth in China: the impact of labor market distortions. *China Economic Review* 13(2): 197-212.
- Caminada, K. and Goudswaard, K.P. (2001) International Trends in Income Inequality and Social Policy. *International Tax and Public Finance* 8(4): 395-415.
- Caminada, K. and Goudswaard, K.P. (2002) Income Distribution and Social Security in an OECD Perspective, in: R. Sigg and C. Behrendt (eds.) *Social Security in the Global Village*. International Social Security Series, Volume 8, Transaction Publishers: New Brunswick/ London: 163-188.
- Caminada, K. and Goudswaard, K.P. (2010) How well is social expenditure targeted to the poor?, in: P. Saunders and R. Sainsbury (eds.) *Social Security, Poverty and Social Exclusion in Rich and Poorer Countries*. International Studies on Social Security, volume 16, Morsel, Belgium: Intersentia: 97-112.
- Caminada, K., Goudswaard, K.P. and Koster, F. (2012a) Social income transfers and poverty: a cross country analysis for OECD countries. *International Journal of Social Welfare* 21(2): 115-126.
- Caminada, K., Goudswaard, K.P. and Wang, C. (2012b) Disentangling income inequality and the redistributive effect of taxes and transfers in 20 LIS countries over time. LIS Working Paper Series 581.
- Cantillon, B. (2011) The paradox of the social investment state: growth, employment and poverty in the Lisbon era. *Journal of European Social Policy* 21: 432-449.
- Cantillon, B. and Van Lancker, W. (2012) Solidarity and Reciprocity in the Social Investment State: What can be learned from the case of Flemish School Allowances and Truancy? *Journal of Social Policy* 41(4): 657-675.
- Çelik, S. and Basdas, U. (2010) How Does Globalisation Affect Income Inequality? A Panel Data Analysis. *International Advances in Economic Research* 16(4): 358-370.
- Checchi, D. and García-Peñalosa, C. (2008) Labour market institutions and income inequality. *Economic Policy* 56: 1-49.
- Chen, J. and Fleisher, B. (1996) Regional income inequality and economic growth in China. *Journal of Comparative Economics* 22: 141-164.
- Chen, M. and Zheng, Y. (2008) China's regional disparity and its policy responses. *China and World Economy* 16(4): 16-32.

- Chen, W. and Corak, M. (2005) Child Poverty and Changes in Child Poverty in Rich Countries since 1990. LIS Working Paper Series 405.
- Chen, W. and Corak, M. (2008) Child Poverty and Changes in Child Poverty. *Demography* 45(3): 537-553.
- Chen, Z., Lu, M. and Wan, G. (2010) Inter-industry wage differentials: An increasingly important contributor to urban China income inequality. Institute of Economic Research, Hitotsubashi University: Global COE Hi-Stat Discussion Paper Series gd09-139.
- Chevan, A. and Stokes, R. (2000) Growth in Family Income Inequality, 1970–1990: Industrial Restructuring and Demographic Change. *Demography* 37: 365-380.
- Chi, W. and Qian, X. (2010) The role of education in regional innovation activities: Spatial evidence from China. *Journal of the Asia Pacific Economy* 15(4): 396-419.
- Chiquiar, D. and Hanson, G.H. (2005) International Migration, Self-Selection, and the Distribution of Wages: Evidence From Mexico and the United States. *Journal of Political Economy* 113: 239-281.
- Coder, J., Rainwater, L. and Smeeding, T.M. (1989) Inequality among Children and the Elderly in Ten Modern Nations: The United States in an International Context. *American Economic Review* 79(2): 320-324.
- Corluy, V. and Vandenbroucke, F. (2012) Individual employment, household employment and risk of poverty in the EU. A decomposition analysis. CSB Working Paper No. 12/06.
- Cowell, F. and Fiorio, C. (2011) Inequality Decompositions: A Reconciliation. *Journal of Economic Inequality* 9: 509-528.
- Creeedy, J. and Ven, J. (2001) Decomposing Redistributive Effects of Taxes and Transfers in Australia: Annual and Lifetime Measures. *Australian Economic Papers* 40(2): 185-198.
- Crystal, S. and Shea, D. (1990) Cumulative Advantage, Cumulative Disadvantage, and Inequality Among Elderly People. *The Gerontologist* 10: 437-443.
- Dafermos, Y. and Papatheodorou, C. (2013) What drives inequality and poverty in the EU? Exploring the impact of macroeconomic and institutional factors. *International Review of Applied Economics* 27(1): 1-22.
- Daly, M.C. and Valletta, R.G. (2006) Inequality and Poverty in the United States: The Effects of Rising Dispersion of Men's Earnings and Changing Family Behavior. *Economica* 73: 75-98.
- Danziger, S., Haveman, R. and Plotnick, R. (1981) How Income Transfer Programs Affect Work, Savings and Income Distribution: A Critical Assessment. *Journal of Economic Literature* 19: 975-1028.
- De Deken, J. (2013) Identifying the skeleton of the social investment state: defining and measuring patterns of social policy change on the basis of expenditure data, in: B. Cantillon and F. Vandenbroucke (eds.) *For better, for worse. For richer, for poorer. Labour Market Participation, Social Redistribution and Poverty in the EU*. Oxford: Oxford University Press.
- Deltas, G. (2003) The Small-sample Bias of the Gini Coefficient: Results and Implications for Empirical Research. *The Review of Economics and Statistics* 85: 226-234.
- Demurger, S., Fournier, M. and Li, S. (2006) Urban income inequality in China revisited (1988-2002). *Economics Letters* 93(3): 354-359.

- Demurger, S., Sachs, J., Woo, W., Bao, S. and Chang, G. (2002) The relative contributions of location and preferential policies in China's regional development: Being in the right place and having the right incentives. *China Economic Review* 13: 444-465.
- Dickens, W. and Katz, L. (1987) Interindustry Wage Differences and Industry Characteristics. The National Bureau of Economic Research: NBER Working Paper 2014.
- DiNardo, J., Fortin, N.M. and Lemieux, T. (1996) Labor Market Institutions and the Distribution of Wages, 1973-1992: A Semiparametric Approach. *Econometrica* 64: 1001-1044.
- Ding, L., Haynes, K. and Liu, Y. (2008) Telecommunications infrastructure and regional income convergence in China: Panel data approaches. *Annals of Regional Science* 42: 843-861.
- Disney, R.F. and Johnson, P.G. (2001) *Pension Systems and Retirement Incomes across OECD Countries*. Aldershot: Edward Elgar.
- Disney, R.F. and Whitehouse, E.R. (2002) The Economic Well-being of Older People in International Perspective: A Critical Review, in: S. Crystal and D.G. Shea (eds.) *Annual Review of Gerontology and Geriatrics*, vol. 22. New York: Springer, pp. 59-94.
- Dollar, D. and Hofman, B. (2008) Intergovernmental Fiscal Reforms, Expenditure Assignment, and Governance, in: J. Lou and S. Wang (eds.) *Public Finance in China: Reform and Growth for a Harmonious Society*. Washington D.C.: The World Bank, pp. 223-250.
- Dreher, A. and Gaston, N. (2008) Has Globalization Increased Inequality? *Review of International Economics* 16: 516-536.
- Eichen, M. and Zhang, M. (1993) Annex: The 1988 household sample survey – data description and availability, in: K. Griffin and R. Zhao (eds.) *The distribution of income in China*. New York: St. Martin's Press.
- Elsby, M., Hobijn, B. and Sahin, A. (2010) The Labor Market in the Great Recession. *Brookings Papers on Economic Activity* 41: 1-69.
- Engelhardt, G.V. and Gruber, J. (2004) Social Security and the Evolution of Elderly Poverty. NBER Working Paper 10466.
- Ervik, R. (1998) The Redistributive Aim of Social Policy. A Comparative Analysis of Taxes, Tax Expenditure Transfers and Direct Transfers in Eight Countries. LIS Working Paper Series 184.
- Esping-Andersen, G. and Myles, J. (2009) Economic Inequality and the Welfare State, in: W. Salverda, B. Nolan and T.M. Smeeding (eds.) *The Oxford Handbook of Economic Inequality*. New York: Oxford University Press, pp. 639-664.
- Estevez-Abe, M., Iversen, T. and Soskice, D. (2001) Social Protection and the Formation of Skills: A Reinterpretation of the Welfare State, in: P. Hall and D. Soskice (eds.) *Varieties of Capitalism: The Institutional Foundations of Comparative Advantage*. Oxford: Oxford University Press, pp. 145-183.
- EU-KLEMS (2011) *Growth and Productivity Accounts* (March update), Retrieved from <http://www.euklems.net/>.
- European Commission (2013) Towards Social Investment for Growth and Cohesion – including implementing the European Social Fund 2014-2020. COM (2013) 83, Brussels.

- Eurostat (2005) The continuity of indicators during the transition between ECHP and EU-SILC. Working Paper and Studies. Brussels: Eurostat.
- Eurostat (2011) SILC-database. Brussels: Eurostat.
- Feld, L.P. (1999) Tax competition and income redistribution: An empirical analysis for Switzerland. *Public Choice* 105: 125-164.
- Feng, J. (2004) Income disparities in China: A review of Chinese studies, in: OECD (ed.) *Income disparities in China: An OECD perspective*. Paris: OECD.
- Ferrarini, T. and K. Nelson (2003) Taxation of Social Insurance and Redistribution: a Comparative Analysis of Ten Welfare States. *Journal of European Social Policy* 13(1): 21-33.
- Figini, P. (1998) Inequality Measures, Equivalence Scales and Adjustment for Household Size and Composition. LIS Working Paper Series 185.
- Figini, P. and Görg, H. (2006) Does foreign direct investment affect wage inequality? An empirical investigation. IIS Discussion Paper 186.
- Forbes, K.J. (2000) A Reassessment of the Relationship Between Inequality and Growth. *American Economic Review* 90: 869-887.
- Förster, M. (2000) Trend and Driving Factors in Income Distribution and Poverty in the OECD Area. OECD: Labour Market and Social Policy Occasional Papers No. 42.
- Fortin, N., Lemieux, T. and Firpo, S. (2010) Decomposition Method in Economics. NBER Working Paper Series 16045.
- Frick, J.R., Büchel, F. and Krause, P. (2000) Public Transfers, Income Distribution, and Poverty in Germany and The United States, in: R. Hauser and I. Becker (eds.) *The Personal Distribution of Income in an International Perspective*. Berlin: Springer-Verlag, pp. 176-204.
- Fu, X. (2004) Limited linkages from growth engines and regional disparities in China. *Journal of Comparative Economics* 32(1): 148-164.
- Fuchs-Schündeln, N., Krueger, D. and Sommer, M. (2010) Inequality Trends for Germany in the Last Two Decades. *Review of Economic Dynamics* 13: 103-132.
- Fuest, C., Niehues, J. and Peichl, A. (2010) The Redistributive Effects of Tax Benefit Systems in the Enlarged EU. *Public Finance Review* 38(4): 473-500.
- Fujita, M. and Hu, D. (2001) Regional disparity in China 1985-1994: The effects of globalization and economic liberalization. *The Annals of Regional Science* 35: 3-37.
- Galor, O. and Zeira, J. (1993) Income distribution and macroeconomics. *Review of Economic Studies* 60: 35-52.
- Gao, Q. (2008) Social benefits in urban China: determinants and impacts on income inequality in 1988 and 2002, in: G. Wan (ed.) *Understanding Inequality and Poverty in China: Methods and Applications*. New York: Palgrave Macmillan.
- Ghysels, J. and Van Lancker, W. (2011) The Unequal Benefits of Activation: An Analysis of the Social Distribution of Family Policy among Families with Young Children. *Journal of European Social Policy* 21(5): 472-485.
- Gilens, M. (2005) Inequality and democratic responsiveness. *Public Opinion Quarterly* 69(5): 778-796.

- Gillespie, W.I. (1965) Effects of Public Expenditures on the Distribution of Income, in: R. Musgrave (ed.) *Essays in Fiscal Federalism*. Washington D.C.: The Brookings Institution, pp. 122-186.
- Goldin, C. and Katz, L. (2008) *The race between education and technology*. Cambridge, MA: Harvard University Press.
- Goñi, E., López, H. and Servén, L. (2008) Fiscal Redistribution and Income Inequality in Latin America. World Bank Policy Research Paper No. 4487.
- Goos, M., Manning, A. and Salomons, A. (2009) Job Polarization in Europe. *American Economic Review* 99: 58-63.
- Gottschalk, P. and Smeeding, T.M. (1997) Cross-National Comparisons of Earnings and Income Inequality. *Journal of Economic Literature* 35(2): 633-687.
- Gottschalk, P. and Smeeding, T.M. (2000) Empirical Evidence on Income Inequality in Industrialized Countries, in: A.B. Atkinson and F. Bourguignon (eds.) *Handbook of Income Distribution*. Amsterdam: North-Holland, pp. 261-308.
- Goudswaard, K.P. and Caminada, K. (2010) The Redistributive Effect of Public and Private Social Programmes: A Cross-country Empirical Analysis. *International Social Security Review* 63(1): 1-19.
- Griffin, K. and Zhao, R. (1993) *The distribution of income in China*. New York: St. Martin's Press.
- Gunatilaka, R. and Chotikapanich, D. (2009) Accounting for Sri Lanka's expenditure inequality 1980-2002: Regression-based decomposition approaches. *Review of Income and Wealth* 55(4): 882-906.
- Gustafsson, B. and Johansson, M. (1999) In Search of Smoking Guns: What Makes Income Inequality Vary Over Time in Different Countries? *American Sociological Review* 64: 585-605.
- Gustafsson, B. and Li, S. (1998) Inequality in China at the end of the 1980s: Locational aspects and household characteristics. *Asian Economic Journal* 12(1): 35-63.
- Gustafsson, B. and Li, S. (2001) A more unequal China? Aspects of inequality in the distribution of equivalent income, in: C. Riskin, R. Zhao and S. Li (eds.) *China's retreat from equality: Income distribution and economic transition*. New York: M.E. Sharpe, Inc.
- Gustafsson, B., Li, S. and Sicular, T. (2010) *Inequality and public policy in China*. Cambridge: Cambridge University Press.
- Haider, S.J. and Loughran, D. (2001) Elderly Labor Supply: Work or Play. Boston College: CRR Working Paper 2001-04.
- Hao, R. and Wei, Z. (2010) Fundamental causes of inland-coastal income inequality in post-reform China. *Annals of Regional Science* 45: 181-206.
- Harrison, A., McLaren, J. and McMillan, M. (2011) Recent Perspectives on Trade and Inequality. *Annual Review of Economics* 3: 261-289.
- Hauser, R. and Becker, I. (1999) Changes in the Distribution of Pre-Government and Post-Government Income in Germany 1973-1993, in: R. Hauser and I. Becker (eds.) *The Personal Distribution of Income in an International Perspective*. Berlin: Springer-Verlag, pp. 72-98.
- Hellier, J. and Chusseau, N. (2013) *Growing Income Inequalities: Economic Analyses*. New York: Palgrave Macmillan.

- Helpman, E., Itskhoki, O. and Redding, S. (2010) Inequality and unemployment in a global economy. *Econometrica* 78: 1239-1283.
- Hemerijck, A. (2013) *Changing Welfare States*. Oxford: Oxford University Press.
- Hudson, J. and Kühner, S. (2009) Towards Productive Welfare? A Comparative Analysis of 23 OECD Countries. *Journal of European Social Policy* 19(1): 34-46.
- Hungerford, T., Rasette, M., Iams, H. and Koenig, M. (2001) Trends in the Economic Status of the Elderly, 1976–2000. *Social Security Bulletin* 64(3): 12-22.
- Hussain, A., Lanjouw, P. and Stern, N. (1994) Income inequalities in China, evidence from household survey data. *World Development* 22: 1947-1957.
- Immervoll, H. and Richardson, L. (2011) Redistribution policy and inequality reduction in OECD countries: What has changed in two decades? OECD Social, Employment and Migration Working Papers No. 122.
- Immervoll, H., Levy, H., Lietz, Ch., Mantovani, D., Donoghue, C.O., Sutherland, H. and Verbist, G. (2005) Household incomes and redistribution in the European Union: Quantifying the equalising properties of taxes and benefits. EUROMOD Working Papers EM9/05.
- Ito, J. (2008) The removal of institutional impediments to migration and its impact on employment, production and income distribution in China. *Economic Change and Restructuring* 41: 239-265.
- Iversen, T. and Soskice, D. (2013) A political-institutional model of competitiveness and the international division of labor, in: A. Wren (ed.) *The Political Economy of the Service Transition*. Oxford: Oxford University Press, pp. 73-107.
- Jäntti, M. (1997) Inequality in five countries in the 1980s: The role of demographic shifts, markets and government policies. *Economica* 64: 415-440.
- Jenkins, S.P. (1995) Accounting for Inequality Trends: Decomposition Analyses for the UK 1971-86. *Economica* 62: 29-63.
- Jenkins, S.P. (1999/2010) INEQDECO: Stata module to calculate inequality indices with decomposition by subgroup. Statistical Software Components S366002, Boston College Department of Economics, revised 19 Apr 2001. (Software available at: <http://ideas.repec.org/c/boc/bocode/s366007.html>).
- Jenson, J. (2012) Redesigning citizenship regimes after neoliberalism: moving towards social investment, in: N. Morel, B. Palier and J. Palme (eds.) *Towards a Social Investment Welfare State? Ideas, Policies and Challenges*. Bristol: Policy Press, pp. 61-87.
- Jesuit, D.K. and Mahler, V.A. (2004) State Redistribution in Comparative Perspective: A Cross-National Analysis of the Developed Countries. LIS Working Paper Series 392.
- Jesuit, D.K. and Mahler, V.A. (2010) Comparing Government Redistribution across Countries: The Problem of Second-Order Effects. *Social Sciences Quarterly* 91(5): 1390-1404.
- Kakwani, N.C. (1977a). Measurement of Tax Progressivity: An International Comparison. *Economic Journal* 87: 71-80.
- Kakwani, N.C. (1977b) Applications of Lorenz Curves in Economic Analysis. *Econometrica* 45(3): 719-727.

- Kakwani, N.C. (1986) *Analyzing Redistribution Policies: A Study Using Australian Data*. Cambridge: Cambridge University Press.
- Kammer, A. and Niehues, J. (2011) Fiscal Redistribution in Modern Welfare States. Dynamic Evidence from Germany and the United Kingdom. Paper presented at the 18th International Research Seminar of the Foundation for International Studies on Social Security, Sigtuna, Sweden.
- Kammer, A., Niehues, J. and Peichl, A. (2012) Welfare regimes and welfare state outcomes in Europe. *Journal of European Social Policy* 22(5): 455-471.
- Kampelmann, S. (2009) Inequality Measures as Conventions: New Interpretations of A Classic Operationalization problem. *Socio-Economic Review* 7: 679-694.
- Kanbur, R. (2006) The policy significance of inequality decompositions. *Journal of Economic Inequality* 4: 367-374.
- Kanbur, R. and Zhang, X. (1999) Which regional inequality? The evolution of rural-urban and inland-coastal inequality in China from 1983 to 1995. *Journal of Comparative Economics* 27(4): 686-701.
- Kanbur, R. and Zhang, X. (2005) Fifty years of regional inequality in China: A journey through central planning, reform, and openness. *Review of Development Economics* 9(1): 87-106.
- Keefer, P. and Knack, S. (2002) Polarization, politics and property rights: Links between inequality and growth. *Public choice* 111(1-2): 127-154.
- Kenworthy, L. (1999) Do Social-welfare Policies Reduce Poverty? A Cross-national Assessment. *Social Forces* 77(3): 119-139.
- Kenworthy, L. (2008) *Jobs with Equality*. Oxford: Oxford University Press.
- Kenworthy, L. (2009) Tax Myths. *Contexts* 8: 28-32.
- Kenworthy, L. (2011) *Progress for the Poor*. Oxford: Oxford University Press.
- Kenworthy, L. and Pontusson, J. (2005) Rising Inequality and the Politics of Redistribution in Affluent Countries. *Perspectives on Politics* 3(3): 449-471.
- Kelly, M. (2000) Inequality and crime. *Review of Economics and Statistics* 82(4): 530-539.
- Khan, A. and Riskin, C. (1998) Income and inequality in China: Composition, distribution and growth of household income, 1988 to 1995. *China Quarterly* 154: 221-253.
- Khan, A. and Riskin, C. (2005) China's household income and its distribution, 1995 and 2002. *The China Quarterly* 182: 356-384.
- Khan, A., Griffin, K. and Riskin, C. (2001) Income distribution in urban China during the period of economic reform and globalization, in: C. Riskin, R. Zhao and S. Li (eds.) *China's retreat from equality: Income distribution and economic transition*. New York: M.E. Sharpe, Inc.
- Khan, A., Griffin, K., Riskin, C. and Renwei, Z. (1992) Household income and its distribution in China. *The China Quarterly* 132: 1029-1061.
- Kim, H. (2000a) Anti-Poverty Effectiveness of Taxes and Income Transfers in Welfare States. *International Social Security Review* 53(4): 105-129.
- Kim, H. (2000b) Do welfare states reduce poverty? A critical shortcoming in the standard analysis of the anti-poverty effect of welfare states. LIS Working Paper Series 233.
- Koeniger, W., Leonardi, M. and Nunziata, L. (2007) Labor Market Institutions and Wage Inequality. *Industrial and Labor Relations Review* 60: 340-356.
- Kohl, J. (1992) The Public/Private Mix in the Income Packages of the Elderly: a Comparative Study. LIS Working Paper Series 78.

- Korpi, W. and Palme, J. (1998) The Paradox of Redistribution and Strategies of Equality: Welfare State Institutions, Inequality, and Poverty in the Western Countries. *American Sociological Review* 63: 661-687.
- Kristal, T. (2013) The capitalist machine: Computerization, workers' power, and the decline in labor's share within U.S. industries. *American Sociological Review* 78: 361-389.
- Kristjánsson, A.S. (2011) Income Redistribution in Iceland. Development and European Comparison. *European Journal of Social Security* 13(4): 424-452.
- Kristjánsson, A.S. (2011) Governmental Income Redistribution in Iceland. Development and European Comparison. Paper presented at the 18th International Research Seminar of the Foundation for International Studies on Social Security, Sigtuna, Sweden.
- Krueger, A. and Summers, L. (1988) Efficiency Wages and the Interindustry Wage Structure. *Econometrica* 56: 259-263.
- Kuznets, S. (1955) Economic Growth and Income Inequality. *American Economic Review* 45: 1-28.
- Kwong, T. (1994) Markets and urban-rural inequality in China. *Social Science Quarterly* 75(4): 820-837.
- Lam, D. (1997) Demographic Variables and Income Inequality, in: M.R. Rosenzweig and O. Stark (eds.) *Handbook of Population and Family Economics*. Amsterdam: Elsevier Science B.V., pp. 1015-1059.
- Lambert, P.J. (1993) *The Distribution and Redistribution of Income: A Mathematical Analysis*. Manchester: Manchester University Press.
- Lambert, P.J., Nesbakken, R. and Thoresen, T.O. (2010) On the Meaning and Measurement of Redistribution in Cross-Country Comparisons. LIS Working Paper Series 532.
- Lardy, N. (1978) *Economic growth and income distribution in the People's Republic of China*. New York: Cambridge University Press.
- Larsen, M. and Pedersen, P.J. (2012) Paid Work after Retirement: Recent Trends in Denmark. Forschungsinstitut zur Zukunft der Arbeit: Discussion Paper series No. 6537 (<http://nbn-resolving.de/urn:nbn:de:101:1-201208174818>).
- Lee, J. (2000) Changes in the source of China's regional inequality. *China Economic Review* 11: 232-245.
- Lee, M.D.P. (2008) Widening Gap of Educational Opportunity? A Study of the Changing Patterns of Educational Attainment in China, in: G.H. Wan (ed.) *Inequality and Growth in Modern China*. Oxford University Press, pp. 163-184.
- Lefèbvre, M. (2007) The Redistributive Effects of Pension Systems in Europe: A Survey of Evidence. LIS Working Paper Series 457.
- Lemieux, T. (2008) The Changing Nature of Wage Inequality. *Journal of Population Economics* 21(1): 21-48.
- Lerman, R.I. and Yitzhaki, S. (1985) Income Inequality Effects by Income Source: A New Approach and Applications to the United States. *The Review of Economics and Statistics* 67(1): 151-156.
- Li H. and Zhu, Y. (2006) Income, Income Inequality, and Health: Evidence from China. *Journal of Comparative Economics* 34(4): 668-693.

- Li, H. and Zou, H. (1998) Income Inequality is not Harmful for Growth: Theory and Evidence. *Review of Development Economics* 2(3): 318-334.
- Li, S., Luo, C. and Sicular, T. (2011) Overview: Income inequality and poverty in China, 2002-2007. The University of Western Ontario, Department of Economics: CIBC Working Paper Series 2011-10.
- Lin, J. and Liu, Z. (2000) Fiscal decentralization and economic growth in China. *Economic Development and Cultural Change*: 1-21.
- Lin, T., Zhuang, J., Yarcia, D. and Lin, F. (2010) Decomposing income inequality: People's Republic of China, 1990-2005, in: J. Zhuang (ed.) *Poverty, Inequality, and Inclusive Growth in Asia: Measurement, Policy Issues, and Country Studies*. Manila: Asian Development Bank, London: Anthem Press.
- LIS (2011) Luxembourg Income, LIS Key Figures and LIS micro datasets. Luxembourg (www.lisproject.org).
- LIS (2013) Luxembourg Income Study Database (Micro data runs completed June 1, 2013). Retrieved from www.lisdatacenter.org.
- LIS (n.d.). Luxembourg income study database. Retrieved June 1, 2013 from www.lisdatacenter.org.
- Liu, X. (2010) Decomposition of China's income inequality, 1995-2006. *The Chinese Economy* 43(4): 49-72.
- Liu, X. and Sicular, T. (2009) Nonagricultural employment determinants and income inequality decomposition. *The Chinese Economy* 42(4): 29-43.
- Liu, Y. and Zou, W. (2011) Rural-urban migration and dynamics of income distribution in China: A non-parametric approach. *China and World Economy* 19(6): 37-55.
- Lopez-Feldman, A. (2006) Decomposing inequality and obtaining marginal effects. *The Stata Journal* 6(1): 106-111.
- Lu, D. (2008) China's regional income disparity: An alternative way to think of the sources and causes. *Economics of Transition* 16(1): 31-58.
- Lundvall, B. and Lorenz, E. (2012) Social investment in the globalising learning economy: A European perspective, in: N. Morel, B. Palier and J. Palme (eds.) *Towards a Social Investment Welfare State? Ideas, Policies and Challenges*. Bristol: Policy Press, pp. 235-257.
- Luxembourg Income Study (LIS) Database, <http://www.lisdatacenter.org> (multiple countries; microdata runs completed on 21st August 2013), LIS, Luxembourg, 2013.
- Luxembourg Income Study (LIS) Database, <http://www.lisdatacenter.org> (multiple countries; microdata runs completed on 27 August 2012). Luxembourg: LIS.
- Lyons, T. (1991) Interprovincial disparities in China: Output and consumption, 1952-1987. *Economic Development and Cultural Change* 39(3): 471-506.
- Mahler, V.A. (2004) Economic Globalization, Domestic Politics, and Income Inequality in the Developed Countries: A cross-national study. *Comparative Political Studies* 37: 1025-1053.
- Mahler, V.A. and Jesuit, D.K. (2006) Fiscal Redistribution in the Developed Countries: New Insights from the Luxembourg Income Study. *Socio-Economic Review* 4: 483-511.
- Mahler, V.A., Jesuit, D.K. and Roscoe, D. (1999) Exploring the Impact of Trade and Investment on Income Inequality: A Cross-National Sectoral Analysis of the Developed Countries. *Comparative Political Studies* 32: 363-395.

- Mares, I. (2005) Social protection around the world: External insecurity, state capacity, and domestic political cleavages. *Comparative Political Studies* 38: 623-651.
- Marx, I., Vandenbroucke, P. and Verbist, G. (2012) Can higher employment levels bring down poverty in the EU? Regression-based simulations of the Europe 2020 target. *Journal of European Social Policy* 22(5): 472-486.
- McCall, L. (2001) *Complex Inequality: Gender, Class, and Race in the New Economy*. New York: Routledge.
- McCall, L. and Percheski, C. (2010) Income Inequality: New Trends and Research Directions. *Annual Review of Sociology* 36: 329-347.
- Michaels, G., Natraj, A. and Van Reenen, J. (2013) Has ICT Polarized Skill Demand? Evidence from Eleven Countries Over 25 Years. *Review of Economics and Statistics*, forthcoming.
- Milanovic, B. (2005) Can we discern the effect of globalization on income distribution? Evidence from household surveys. *World Bank Economic Review* 19(1): 21-44.
- Mitchell, D. (1991) *Income Transfers in Ten Welfare States*. Aldershot: Avebury.
- Moller, S., Bradley, D., Huber, E., Nielsen, F. and Stephens, J.D. (2003) Determinants of relative poverty in advanced capitalist democracies. *American Sociological Review* 68(1): 22-51.
- Moore, E.G. and Pacey, M. (2001) Changing Income Inequality and the Elderly in Canada 1991-1996: Provincial Metropolitan and Local Dimensions. SEDAPR Research Paper 63. Hamilton: McMaster University.
- Morel, N., Palier, B. and Palme, J. (2012) Beyond the welfare state as we knew it?, in: N. Morel, B. Palier and J. Palme (eds.) *Towards a Social Investment Welfare State? Ideas, Policies and Challenges*. Bristol: Policy Press, pp. 1-30.
- Mortensen, D. and Pissarides, C. (1999) New Developments in Models of Search in the Labor Market, in: O. Ashenfelter and D. Card (eds.) *Handbook of Labor Economics*. North-Holland: Elsevier, pp. 2567-2627.
- Motiram, S. and Sarma, N. (2014) Polarization, Inequality, and Growth: The Indian Experience. *Oxford Development Studies* 42(3): 297-318.
- Munnell, A.H. and Sass, S.A. (2008) *Working Longer. The Solution to the Retirement Income Challenge*. Washington D.C.: Brookings Institution Press.
- Musgrave, R.A. and Thin, T. (1948) Income Tax Progression, 1929-48. *Journal of Political Economy* 56: 498-514.
- Musgrave, R.A., Case, K.E. and Leonard H.B. (1974) The Distribution of Fiscal Burdens and Benefits. *Public Finance Quarterly* 2: 259-311.
- Natali, D. and Rhodes, M. (2008) The Impact of Property Condition Disclosure Laws on Housing Prices: Evidence from An Event Study Using Propensity Scores. Department of Economics Working Paper Series University of Connecticut 2008-39R.
- Nelson, M. and Stephens, J.D. (2012) Do social investment policies produce more and better jobs?, in: N. Morel, B. Palier and J. Palme (eds.) *Towards a Social Investment Welfare State? Ideas, Policies and Challenges*. Bristol: Policy Press, pp. 205-234.
- Nolan, P. (1979) Inequality of income between town and countryside in the People's Republic of China in the mid-1950s. *World Development* VII: 447-465.

- Nolan, B. and Marx, I. (2009) Economic Inequality, Poverty, and Social Exclusion, in: W. Salverda, B. Nolan and T.M. Smeeding (eds.) *The Oxford Handbook of Economic Inequality*. New York: Oxford University Press, pp. 315-341.
- O'Higgins, M., Schmaus, G. and Stephenson, G. (1990) Income Distribution and Redistribution: A Microdata Analysis for Seven Countries, in: T. Smeeding, M. O'Higgins and L. Rainwater (eds.) *Poverty, Inequality, and Income Distribution in Comparative Perspective*. Hemel Hempstead: Harvester Wheatsheaf.
- OECD (1999) Agriculture in China and OECD Countries: Past Policies and Future Challenges (OECD Proceedings), *China in the Global Economy*, OECD Publishing.
- OECD (2001) Ageing and Income: Financial Resources and Retirement in Nine OECD Countries. Paris: OECD.
- OECD (2004) Employment Outlook. Paris: OECD.
- OECD (2008) Growing unequal? Income Distribution and Poverty in OECD Countries. Paris: OECD.
- OECD (2009) Employment Database. Paris: OECD.
- OECD (2009) Pensions at a Glance: Retirement-Income Systems in OECD countries. Paris: OECD.
- OECD (2011a) Divided We Stand: Why Inequality Keeps Rising. Paris: OECD.
- OECD (2011b) STAN Structural Analysis Database. Paris: OECD.
- OECD (2012a) Social Expenditure Database 1980-2007. Paris: OECD.
- OECD (2012b) National Accounts. Paris: OECD.
- OECD (2012c) Labour Force Statistics Database. Paris: OECD.
- OECD (2012d) Main Economic Indicators. Paris: OECD.
- OECD (2012e) Education Statistics Database. Paris: OECD.
- OECD (2012f) Trade Indicators Database. Paris: OECD.
- OECD (2014) Income Distribution Database. Paris: OECD.
- Oesch, D. (2013) *Occupational change in Europe: How technology & education transform the job structure*. Oxford: Oxford University Press.
- Oesch, D. and Menés, J. (2011) Upgrading or Polarization? Occupational Change in Britain, Germany, Spain and Switzerland, 1990-2008. *Socio-Economic Review* 9: 503-531.
- Oliver, R. (2008) Diverging Developments in Wage Inequality: Which Institutions Matter? *Comparative Political Studies* 41: 1551-1582.
- Orenstein, M.A. (2011) Pension Privatization in Crisis: Death or Rebirth of A Global Policy Trend? *International Social Security Review* 64(3): 65-80.
- Osberg, L., Smeeding, T.M. and Schwabish, J. (2004) Income distribution and public social expenditure: Theories, effects, and evidence. *Social Inequality*, 821-859.
- Paine, S. (1981) Spatial aspects of Chinese development: Issues outcomes and policies, 1949-1979. *Journal of Development Studies* 17(2): 133-195.
- Palme, M. (1996) Income Distribution Effects of the Swedish 1991 Tax Reform: An Analysis of a Microsimulation Using Generalized Kakwani Decomposition. *Journal of Policy Modeling* 18(4): 419-443.
- Pestieau, P. (1992) The Distribution of Private Pension Benefits: How Fair Is It?, in: OECD (ed.) *Private Pensions and Public Policy*. Paris: OECD.
- Piketty, T. (2014) *Capital in the Twenty-first Century*. Cambridge, MA: Harvard University Press.

- Pintelon, O., Cantillon, B., Van den Bosch, K. and Whelan, C.T. (2013) The Social Stratification of Social Risks: The Relevance of Class for Social Investment Strategies. *Journal of European Social Policy* 23(1): 52-67.
- Pinto, S. and Beckfield, J. (2011) Organized labor in Europe, 1960-2006: Persistent diversity and shared decline. *Research in the Sociology of Work* 22: 153-179.
- Plotnick, R. (1984) The Redistributive Impact of Cash Transfers. *Public Finance Quarterly* 12: 27-50.
- Poncet, S. (2003) Measuring Chinese domestic and international integration. *China Economic Review* 14(1): 1-21.
- Qureshi, M.S. and Wan, G. (2008) Distributional Consequences of Globalisation: Empirical Evidence from Panel Data. *The Journal of Development Studies* 44(10): 1424-1449.
- Ravallion, M. and Chen, S. (2007) China's (uneven) progress against poverty. *Journal of Development Economics* 82: 1-42.
- Rehm, P. (2009) Risks and redistribution: An individual-level analysis. *Comparative Political Studies* 42: 855-881.
- Reynolds, M. and Smolensky, E. (1977a) *Public Expenditures, Taxes and the Distribution of Income: The United States 1950, 1961, 1970*. New York: Academic Press.
- Reynolds, M. and Smolensky, E. (1977b) Post Fisc Distributions of Income 1950, 1961, and 1970. *Public Finance Quarterly* 5: 419-438.
- Ringen, S. (1991) Households, standard of living and inequality. *Review of Income and Wealth* 37: 1-13.
- Robinson, P.B. and Sexton, E.A. (1994) The Effect of Education and Experience on Self-employment Success. *Journal of Business Venturing* 9(2): 141-156.
- Scheve, K. and Slaughter, M. (2004) Economic insecurity and the globalization of production. *American Journal of Political Science* 48: 662-674.
- Scruggs, L., Jahn, D. and Kuitto, K. (2014). Comparative Welfare Entitlements Dataset 2. Version 2014-03. University of Connecticut & University of Greifswal.
- Shaw, G.M. and Gaffey, L. (2012) The Polls – Trends american public opinion on economic inequality, taxes, and mobility: 1990–2011. *Public opinion quarterly*, nfs039.
- Shen, C., Jin, J. and Zou, H. (2012) Fiscal decentralization in China: History, impact, challenges and next steps. *Annals of Economics and Finance* 13(1): 1-51.
- Shorrocks, A.F. (1982) Inequality Decomposition by Factor Components. *Econometrica* 50(1): 193-211.
- Shorrocks, A.F. (1983) Ranking Income Distributions. *Economica* 50(197): 3-17.
- Shorrocks, A.F. and Wan, G.H. (2005) Spatial Decomposition of Inequality. *Journal of Economic Geography* 5(1): 59-82.
- Shorrocks, A.F. and Wan, G.H. (2009) Ungrouping Income Distributions: Synthesising Samples for Inequality and Poverty Analysis, in: Kaushik Basu and Kanbur Ravi (eds.) *Arguments for a Better World: Essays in Honor of Amartya Sen*, Vol II. Oxford: Oxford University Press, pp. 414-434.
- Sicular, T. (2013) The challenge of high inequality in China. *The World Bank, Inequality in Focus* 2(2).

- Sicular, T., Yue, X., Gustafsson, B. and Li, S. (2007) The urban-rural income gap and inequality in China. *Review of Income and Wealth* 53(1): 93-126.
- Smeeding, T.M. (2000) Changing Income Inequality in OECD Countries: Updated Results from the Luxembourg Income Study (LIS), in: R. Hauser and I. Becker (eds.) *The Personal Distribution of Income in an International Perspective*. Berlin: Springer-Verlag, pp. 205-224.
- Smeeding, T.M. (2004) Twenty Years of Research in Income Inequality, Poverty and Redistribution in the Developed World: Introduction and Overview. *Socio-Economic Review* 2: 149-163.
- Smeeding, T.M. (2008) The LIS/LES Project: Overview and Recent Developments. LIS Working Paper Series 294.
- Smeeding, T.M., Gao, Q., Saunders, P. and Wing, C. (2008) Elder Poverty in an Ageing World: Conditions of Social Vulnerability and Low Income for Women in Rich and Middle-Income Nations. LIS Working Paper Series 497.
- Smolensky, E., Hoyt, W. and Danziger, S. (1987) A Critical Survey of Efforts to Measure Budget Incidence, in: H.M. van de Kar and B.L. Wolfe (eds.) *The Relevance of Public Finance for Policy-Making*. Proceedings IIFP Congress 1985 Detroit, pp. 165-179.
- Song, S., Chu, G. and Cao, R. (2000) Intercity regional disparity in China. *China Economic Review* 11: 246-261.
- Sridhar, K. and Wan, G. (2010) Firm location choice in cities: Evidence from China, India, and Brazil. *China Economic Review* 21(1): 113-122.
- Stark, O., Taylor, J.E. and Yitzhaki, S. (1986) Remittances and inequality. *Economic Journal* 96: 722-740.
- Taylor-Gooby, P. (2004) New Risks and Social Change, in: P. Taylor-Gooby (ed.) *New Risks, New Welfare: The Transformation of the European Welfare State*. Oxford: Oxford University Press, pp. 1-28.
- Thewissen, S.H. (2013) Is It the Income Distribution or Redistribution That Affects Growth? *Socio-Economic Review* mw019.
- Thewissen, S.H., Wang, C. and Van Vliet, O. (2013) Sectoral trends in earnings inequality and employment: International trade, skill-biased technological change, or labour market institutions? LIS Working Paper 595.
- Tian, H., Wan, G. and Huo, X. (2009) Analysis of Regional Economic Difference and Crime Rate. *Journal of Northwestern Polytechnical University (Social Sciences Edition)* 29(2): 220-236.
- Tian, X., Lo, V., Lin, S. and Song, S. (2011) Cross-region FDI productivity spillovers in transition economies: Evidence from China. *Post-Communist Economies* 23(1): 105-118.
- Tsui, K. (1991) China's regional inequality, 1952-1985. *Journal of Comparative Economics* 15(1): 1-21.
- Tsui, K. (1993) Decomposition of China's regional inequality. *Journal of Comparative Economics* 17: 600-627.
- Vaalavuo, M. (2013) The Redistributive Impact of 'Old' and 'New' Social Spending. *Journal of Social Policy* 42(3): 513-539.

- Van Kersbergen, K. and Hemerijck, A. (2012) Two Decades of Change in Europe: The Emergence of the Social Investment State. *Journal of Social Policy* 41(3): 475-492.
- Van Lancker, W. and Ghysels, J. (2012) Who Benefits? The Social Distribution of Subsidized Childcare in Sweden and Flanders. *Acta Sociologica* 55(2): 125-142.
- Van Reenen, R. (2011) Wage Inequality, Technology and Trade: 21st Century Evidence. *Labour Economics* 18: 730-741.
- Van Rie, T. and Marx, I. (2012) The European Union at Work? The European Employment Strategy from Crisis to Crisis. *Journal of Common Market Studies* 50(2): 335-356.
- Van Vliet, O. (2010) Divergence within Convergence: Europeanisation of Social and Labour Market Policies. *Journal of European Integration* 32(3): 269-290.
- Van Vliet, O. and Koster, F. (2011) Europeanization and the Political Economy of Active Labour Market Policies. *European Union Politics* 12(2): 217-239.
- Van Vliet, O., Caminada, K. and Goudswaard, K. (2012b) The Political Economy of Labour Market Policies in Western and Eastern European Countries. NEUJOBS Working Paper No. D6.3.
- Van Vliet, O., Been, J., Caminada, K. and Goudswaard, K. (2012a) Pension reform and income inequality among the elderly in 15 European countries. *International Journal of Social Welfare* 21(4s1): S8-S21.
- Vandenbroucke, F. and Vleminckx, K. (2011) Disappointing poverty trends: is the social investment state to blame? *Journal of European Social Policy* 21: 450-471.
- Vijverberg, W., Fu, F. and Vijverberg, C. (2011) Public infrastructure as a determinant of productive performance in China. *Journal of Productivity Analysis* 36: 91-111.
- Visser, J. (2011) ICTWSS: Database on Institutional Characteristics of Trade Unions, Wage Setting, State Intervention and Social Pacts in 34 Countries Between 1960 and 2007. Retrieved from <http://www.uva-aiaa.net/208>.
- Wan, G. (2001) Changes in regional inequality in rural China: Decomposing the Gini index by income sources. *Australian Journal of Agricultural and Resource Economics* 45(3).
- Wan, G. (2004) Accounting for income inequality in rural China: A regression-based approach. *Journal of Comparative Economics* 32(2): 348-363.
- Wan, G. (2007) Understanding regional poverty and inequality trends in China: Methodological issues and empirical findings. *Review of Income and Wealth* 53(1): 25-34.
- Wan, G. (2008a) *Inequality and growth in modern China*. Oxford: Oxford University Press.
- Wan, G. (2008b) Introduction to the special section: Poverty and Inequality in China. *Review of Development Economics* 12(2): 416-418.
- Wan, G. (2008c). Poverty reduction in China: Is high growth enough? World Institute for Development Economic Research (UNU-WIDER): Working Paper Series 4/2008.
- Wan, G. (2013) Inequality and Urbanization in China. *The Economic Research Journal* May issue (in Chinese).
- Wan, G. and Sebastian, I. (2011) Poverty in Asia and the Pacific: An update. Asian Development Bank: ADB Economics Working Paper Series 267.
- Wan, G. and Zhou, Z. (2005) Income inequality in rural China: Regression-based decomposition using household data. *Review of Development Economics* 9(1): 107-120.

- Wan, G., Lu, M. and Chen, Z. (2006) The inequality-growth nexus in the short and long run: Empirical evidence from China. *Journal of Comparative Economics* 34(4): 654-667.
- Wan, G., Lu, M. and Chen, Z. (2007) Globalization and regional income inequality: Empirical evidence from within China. *Review of Income and Wealth* 53(1): 35-59.
- Wan, G., Ye, J. and Zhuang, J. (2012) On regional and inter-household inequality in China, in: W.T. Woo, M. Lu, J.D. Sachs and Z. Chen (eds.) *A New Economic Growth Engine for China: Escaping the Middle-income Trap by Not Doing More of the Same*. London: World Scientific.
- Wang, C. and Caminada, K. (2011a). Disentangling Income Inequality and the Redistributive Effect of Social Transfers and Taxes in 36 LIS Countries. LIS Working Paper Series 567.
- Wang, C. and Caminada, K. (2011b) Leiden LIS Budget Incidence Fiscal Redistribution Dataset. Posted at the website of LIS cross-national data center Luxembourg.
- Wang, C., Caminada, K. and Goudswaard, K. (2012) The redistributive effect of social transfer programs and taxes: a decomposition across countries. *International Social Security Review* 65(3): 27-48.
- Wang, C., Caminada, K. and Goudswaard, K. (2013) Income redistribution in 20 countries over time. *International Journal of Social Welfare* 23(3): 262-275.
- Wang, C., Thewissen, S., and Van Vliet, O. (2014) Leiden LIS Sectoral Income Inequality Dataset version 1.1, Leiden University.
- Wang, D. and Zhang, L. (2003) Knowledge disparity and regional inequality in post-reform China. *Post-Communist Economies* 15(3): 383-399.
- Wang, S. (1997) China's 1994 fiscal reform. *Asian Survey* 37(9): 801-817.
- Wang, X. and Piesse, J. (2010) Inequality and the urban-rural divide in China: Effects of regressive taxation. *China and World Economy* 18(6): 36-55.
- Wei, K., Yao, S. and Liu, A. (2009) Foreign direct investment and regional inequality in China. *Review of Development Economics* 13(4): 778-791.
- Whalley, J. and Zhang, S. (2007) A numerical simulation analysis of (*hukou*) labour mobility restrictions in China. *Journal of Development Economics* 83(2): 392-410.
- Whiteford, P. (2008) How much redistribution do governments achieve? The role of cash transfers and household taxes, growing unequal: income distribution and poverty in OECD countries, in: OECD (ed.) *Growing unequal? Income distribution and poverty in OECD countries*. Paris: OECD, pp. 97-121.
- Whiteford, P. (2010) The Australian Tax-Transfer System: Architecture and Outcomes. *The Economic Record* 86(275): 528-544.
- Whitehouse, E.R. (2002a) The Value of Pension Entitlements: A Model of Nine OECD Countries. OECD: Labour Market and Social Policy Occasional Papers 9.
- Whitehouse, E.R. (2002b) Pension Systems in 15 Countries Compared: The Value of Entitlements. Centre for Pensions and Superannuation University of New South Wales, Sydney: Discussion Paper 02/04.
- World Bank (2012) *World Development Indicators*. Washington D.C.: World Bank.
- World Bank. (n.d.) World development indicators. Retrieved March 1, 2013 from <http://data.worldbank.org/data-catalog/world-development-indicators/wdi-2012>.
- Wren, A. (2013) *The political economy of the service transition*. Oxford: Oxford University Press.

- Wu, X. (2005) Will foreign capital inflow alleviate income inequality? *Journal of the Asia Pacific Economy* 10(4): 528-550.
- Yang, D. (1999) Urban-biased policies and rising income inequality in China. *American Economic Review Papers and Proceedings* 89(2): 306-310.
- Yang, D. and Zhou, H. (1999) Rural-urban disparity and sectoral labour allocation in China. *Journal of Development Studies* 35: 105-133.
- Yin, Y. (2004) Disparities between urban and rural areas and among different regions in China, in: OECD (ed.) *Income disparities in China: An OECD perspective*. Paris: OECD.
- Zhang, Q. and Zou, H. (2012) Regional inequality in contemporary China. *Annals of Economics and Finance* 13(1): 113-137.
- Zhang, X. and Zhang, K. (2003) How does globalization affect regional inequality within a developing country? Evidence from China. *The Journal of Development Studies* 39(4): 47-67.
- Zhang, Y. and Wan, G. (2006) The impact of growth and inequality on rural poverty in China. *Journal of Comparative Economics* 34(4): 694-712.
- Zhao, R. (1993) Three features of the distribution of income during the transition to reform, in: K. Griffin and R. Zhao (eds.) *The distribution of income in China*. New York: St. Martin's Press.
- Zhao, R. (2001) Increasing income inequality and its causes in China, in: C. Riskin, R. Zhao and S. Li (eds.) *China's retreat from equality: Income distribution and economic transition*. New York: M.E. Sharpe, Inc.
- Zhao, Y. (1999) Labor migration and earnings differences: The case of rural China. *Economic Development and Cultural Change*: 767-782.
- Zhao, Z. (2009) Fiscal decentralization and provincial-level fiscal disparities in China: A Sino-US comparative perspective. *Public Administration Review* Special Issue: 567-574.
- Zhou, L., Biswas, B., Bowles, T. and Saunders, P.J. (2011) Impact of globalisation on income distribution inequality in 60 countries. *Global Economy Journal* 11(1): 1-16.
- Zhou, Z., Dillon, J. and Wan, G. (1992) Development of township enterprise and alleviation of the employment problem in rural China. *Agricultural Economics* 6(3): 201-215.
- Zhu, N. and Luo, X. (2010) The impact of migration on rural poverty and inequality: A case study in China. *Agricultural Economics* 41: 191-204.
- Zou, W., Zhang, F., Zhuang, Z. and Song, H. (2008) Transport infrastructure, growth, and poverty alleviation: Empirical analysis of China. *Annals of Economics and Finance* 9(2): 345-371.

Curriculum vitae

Chen Wang was born on December 24, 1985 in Jiujiang, Jiangxi province, China. After graduating from secondary school at the second middle school in Jiujiang in 2003, she obtained a bachelor's degree and a degree for the research master in Economics at the Shanghai University of Finance & Economics in Shanghai. In 2006, she received the Honorable Mention of America Mathematical Contest in Modeling. Upon graduation (2010) she started working as a PhD-student Leiden University's Department of Economics funded by Chinese Scholarship Counsel. This PhD project is part of the research program 'Reforming Social Security'. During these years she was invited both to a winter school at the Institute for Social and Economic Research, University of Essex, and to address a guest lecture at the Luxembourg Income Study (LIS) Cross-National Data Center. In addition, she had an internship at the Economics and Research Department, Asian Development Bank. Two of her working papers were awarded the best yearly LIS working paper (one is co-authored with Koen Caminada and the other is co-authored with Stefan Thewissen and Olaf van Vliet), for which she has received the Aldi Harenaars Memorial Award in 2012. Chen assembled two large comparative datasets on Sectoral Income Inequality, and on Budget Incidence Fiscal Redistribution for 36 countries, posted at the website of LIS (<http://www.lisdatacenter.org/resources/other-databases/>). Her research is published in both Dutch and international journals.

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