

**Income Inequality and Transformation of the Welfare State:
A Comparative Study of the Reforms in New Zealand and Sweden**

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**Income Inequality and Transformation of the Welfare State:
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ABSTRACT. The purpose of this paper is to analyse income inequality trends in New Zealand and Sweden from 1983 to 1997, a period when both New Zealand and Sweden implemented economic reforms that transformed their respective welfare systems. The results do not suggest that the more extensive reform programme in New Zealand was associated with a relatively larger increase in income inequality. Moreover, the level of social welfare of New Zealanders increased slightly after the implementation of the reform programme, while no similar evidence is apparent in the Swedish income data.

JEL Classifications: D13; D78; I31; O15

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1. Introduction

Sweden and New Zealand are two often-cited countries that developed particularly strong ‘cradle-to-grave’ welfare systems following the Second World War. In both cases greater government income redistribution through progressive taxation and social security income transfers took place within a wider macroeconomic framework that might be labelled as “Keynesian expansionism”. Monetary policies were generally accommodating even during periods of significant inflation, fiscal policies accepted high marginal tax rates and rising levels of public debt, while industrial relation laws were firmly based on centralised negotiation with little scope for individual or enterprise-based bargaining. Subsequent reforms introduced by the two countries to transform their respective welfare states have been of wide interest, as attested by two authoritative surveys in the *Journal of Economic Literature* (Evans et al., 1996, and Lindbeck, 1997). There were many similarities. Both countries redirected monetary policy to achieving and maintaining low inflation. Both countries reformed their fiscal policy to lower tax rates and reduce social security income entitlements. Both countries introduced some labour legislation reform to allow greater enterprise-level bargaining (although this was quickly reversed in Sweden). New Zealand’s reforms came earlier, however, and were far more extensive in both scope and degree.

Perhaps as a result of their extensive nature, New Zealand’s programme of welfare reforms has received considerable attention in the literature; see, for example, Massey (1995), Evans et al. (1996), Henderson (1996), Silverstone et al. (1996), Macmillan (1998), Kelsey (1997, 1999), Boston et al. (1999), Dalziel and Lattimore (2001) and Dalziel (2002). These reviews have been mixed. The first five of these studies were

generally very positive, arguing that the reforms greatly increased economic efficiency and provide useful policy lessons for other countries. The other five studies were far more negative, drawing particular attention to a substantial sacrifice of output during the reform period and greater social exclusion afterwards. There has been one previous comparative study of the regime shifts in New Zealand and Sweden. Daunfeldt and de Luna (2001) concluded that New Zealand made a more successful transition to lower inflation, taking into account the transitory and permanent impacts on unemployment, but did not investigate any income inequality changes following the regime shifts. These needs to be addressed, since in New Zealand many commentators have argued that the reforms, because they were so extensive and intensive, created widespread poverty and hardship that could have been avoided by a more moderate programme. Several studies focusing on New Zealand's household income distribution have shown that income inequality increased sharply after 1984 (Stephens et al., 1995 and 2000; Easton, 1996; Martin, 1998; Stephens, 1999; ; Podder and Chatterjee, 2002; Chatterjee et al., 2003; Chatterjee and Podder, 2007). This might suggest that more extensive reforms increased income inequality more in New Zealand compared to Sweden. However, Johansson (1999) and Klevmarken (2001) among others have presented results indicating an increase in income inequality in Sweden as well, which means that the relative difference in income inequality following the regime shifts is an unresolved empirical matter. This is the question that this paper seeks to answer using data from the New Zealand Household Economic Survey (HES) and the Longitudinal Individual Data for Sweden (LINDA).

The paper is organised as follows: The next section presents brief historical overviews of the policy reforms that transformed the welfare states in New Zealand and Sweden

respectively. Section 3 presents the data used in this study. In Section 4, the empirical method is described and the results are presented with a commentary on their interpretation. Finally, Section 5 concludes with a discussion of the policy lessons that might be drawn from the paper's analysis.

2. Historical Overview

Although all western countries expanded their welfare states in the early or mid twentieth century, New Zealand and Sweden could be described as two of the most ambitious welfare states in terms of protecting citizens against economic risk. Their economies were characterised by large centralised employer and worker organisations, strongly interventionist stabilisation policy, extensive financial and capital market regulations, large public sectors providing a broad range of commercial and social services, universal rather than targeted forms of social assistance, and progressive taxation used to achieve significant redistribution of household incomes.

Towards the end of the century, however, policymakers in New Zealand and Sweden implemented reform programmes that transformed the role of the welfare state. Figure 1 presents the sequences of the major economic reforms in each country between 1984 and 1997. Nine areas of economic reform are distinguished: financial, foreign exchange and goods market liberalisation, monetary and fiscal policy regime changes, taxation and social security income support reforms, privatisation of state assets, and alterations in the institutional framework of industrial relations.¹

– Figure 1 Placed About Here –

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As can be seen in Figure 1, the New Zealand reforms proceeded over a decade between 1984 and 1994. In contrast the economic reforms in Sweden were concentrated in a short period of five years between 1991 and 1995 (apart from financial market liberalisation, achieved in 1985).² When comparing the sequence of the decisions to redesign the welfare state in New Zealand and Sweden, Figure 1 reveals both similarities and differences as will be described below. Most notably, the Swedish reforms were in a number of ways less comprehensive than the reforms in New Zealand.

The initial reforms in both countries were targeted at deregulating the economy. When the electorate in 1984 returned the Labour political party to power in New Zealand after nine years of government by the National party, the incoming government immediately removed interest rate ceilings and deregulated a number of other controls on financial institutions before the end of the year. On 4 March 1985, the New Zealand dollar was floated and the Reserve Bank has not intervened directly in foreign exchange markets during the period of the study. The deregulation of the New Zealand continued with phasing out of import quotas, reductions of tariffs, and elimination of a number of subsidies to producers. In addition, the 1986 State Owned Enterprises Act required that the principle objective of every State enterprise would be to operate as a successful business. This ended decades of non-competitive behaviour by government trading departments, and prepared the way for the programme of asset privatisation that commenced in 1988.

During the mid 1980s, the Swedish Social Democratic government of that time also realised that the tightly regulated financial, capital and foreign exchange markets were in need of reforms. In 1985 the government removed domestic capital market controls.

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The internationalisation of firms also made the control of international capital movements less effective, and these regulations were finally abolished in 1989. The fixed exchange rate regime was maintained until 1992 when the European Exchange Rate Mechanism (ERM) collapsed. The Swedish goods market was opened up to greater competition when a newly elected four party non-socialistic government implemented its political program ‘a new start for Sweden’ in the beginning of the 1990s, i.e., about six years after the deregulation of the New Zealand goods market. Key national markets were deregulated – the national airline (1992), postal services (1993), telecom (1993) and electricity (1996), for example – and a number of companies previously owned by the state were privatised. On the other hand, Sweden has a long history as a pronounced free-trade regime and its economy was generally far more open and competitive than was the New Zealand economy at the beginning of the 1980s.

Another similarity between the regime shift in New Zealand and Sweden is that major tax reforms occurred in both countries during the study period. New Zealand’s taxation system was reformed in 1986, while the Swedish ‘tax reform of the century’ was implemented in 1991. In both countries substantial cuts of marginal income tax rates were implemented. In New Zealand, the top personal marginal income tax rate was reduced from 66 cents to 45 cents in the dollar, and was later reduced again to 33 cents in 1988. The Swedish tax reform of 1991 replaced a complicated and highly progressive income tax schedule with a much simpler system based on two tax brackets. In this reformed system, the majority of taxpayers pay only local government taxes (26-33 percent), while taxpayers at the upper end of the income distribution also pay an additional 20 per cent income tax to the central government.

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In addition, almost all tax exemptions were removed in New Zealand and the government introduced a new indirect tax on domestic expenditure (the goods and services tax, or GST). The GST rate was initially 10 per cent, increasing to 12.5 per cent in 1989.³ The Swedish tax reform in 1991 replaced several different indirect taxes by a single indirect tax rate of 23 per cent, the corporate income tax rate was reduced from 57 to 30 per cent, and a flat capital income tax rate of 30 per cent was introduced.

In both New Zealand and Sweden, significant cuts in social insurance programs did not occur until the beginning of the 1990s. When the New Zealand National party was returned to power in October 1990, it introduced one of the most far-reaching reforms of the welfare state in any western industrialised country in recent decades. From the 1st of April 1991, social security income support was reduced by approximately 9 per cent in total, accompanied by much stricter work-test rules for the unemployment benefit. Single unemployed adults aged 20 to 24 were reclassified as youth beneficiaries, reducing their income support by 24.7 per cent. Other cuts in social security support included a 10.7 per cent reduction of the sickness and unemployment benefits for sole parents with one child, and the family benefit was abandoned as a universal payment (Richardson, 1990).

In Sweden, the recession of the early 1990s meant increased pressure on the Swedish welfare system as expenditures increased while revenues declined. The fiscal deficit was 12.3 percent of GDP in 1993, and the public debt reached 80.9 percent of GDP in 1995. The non-socialistic government implemented social security benefit cuts amounting to 9.4 billion SEK in 1992-93. These benefit cuts included a one-day stand down period in the sickness benefit, a requirement that the employers had to pay for the first 14 days of

an employee's sickness leave, a reduction of the compensation rate from 90 to 80 percent in the sickness, unemployment and parental benefit, and a reduction of basic pensions by 2 percent. These cuts were insufficient, however, and the newly elected Social Democratic party government announced a major fiscal consolidation programme in 1995/96. This programme included balancing measures worth 126 billion SEK; where reduced expenditures amounted to 66.1 billion SEK. Replacement rates in the social security income support payments were further reduced to 75 percent, pensions were reduced, and the universal child allowance payment was reduced by 14.7 percent (the first reduction since child allowances were introduced). Housing allowances were reduced, targeted more towards families and abolished for individuals over 28 years without children. There were also revenue measures in the consolidation programme, including tax increases. The individual social insurance contribution and the property tax were increased, while the national income tax was increased from 20 to 25 percent for incomes above a certain threshold level.

At the same time as the National government in New Zealand implemented cuts in the country's social security programmes, it also replaced the previous industrial relations legislation with the Employment Contracts Act 1991 (ECA). The ECA produced a rapid transformation of the institutional structure of the labour market in New Zealand (see, for example, Maloney and Savage, 1996). Compulsory centralised wage bargaining was replaced by a system where individual employers or employees could insist on decentralised wage bargaining, and both compulsory union membership and strikes or lock-outs during a contract period were made illegal. Since the social security reform included a 26 weeks stand down period for the unemployment benefit for those who were voluntarily unemployed or fired for misconduct (reduced to 13 weeks in 1996),

and the minimum age for receiving the unemployment benefit was raised from 18 to 20, the combined impact of these policy changes greatly weakened organised labour in wage negotiations with employers. In contrast, no major labour market reform has been implemented in Sweden yet. There was a short attempt to reform industrial relations in Sweden in 1993. Strikes against small businesses were prohibited, the union's veto against entrepreneurs was abolished and the possibility of employing people for shorter spells of time was strengthened. During periods when the employers had to reduce its work force, the opportunity to choose between two employees outside the general 'last in, first out' rule was also introduced. None of these changes, however, survived the change of government in the following year.

Both New Zealand and Sweden changed their monetary policy frameworks during the study period. The Reserve Bank of New Zealand Act 1989 (RBA) set price stability as the single objective of monetary policy, and provided the Reserve Bank with policy autonomy to achieve and maintain stability in the general price level. The Act does not state what exactly is meant by price stability, but requires the government and the Bank to publish a Policy Targets Agreement (PTA).⁴ In Sweden, an explicit quantitative target (2 per cent plus or minus one per cent to be achieved by 1995) was not introduced until 1993. Even then, it is worth noting that an official Swedish investigation (SOU 1993:20) found that the independence of the central bank was insufficient for achieving the price stability target. It was not until 1997 that the Swedish government announced the necessary changes to increase the autonomy of the Swedish central bank for implementation in January 1999 (almost ten years after the passing of the Reserve Bank of New Zealand Act 1989). To decrease the probability of discretionary fiscal policy, the fiscal budget process was reformed in both countries in the mid 1990s.

3. Data

The income inequality trends in New Zealand are analysed using data for the years 1983/84, 1991/92, 1995/96 and 1997/98 from the Household Economic Survey (HES) provided by Statistics New Zealand.⁵ We restrict the analysis to these years because inclusion of more years would have involved substantial financial costs. The sample sizes for these years were 3,573, 3,018, 2,889, and 2,876 observations, respectively.

In order to calculate the income inequality trends in Sweden, the Longitudinal Individual Data for Sweden (LINDA) are used.⁶ LINDA is a register-based longitudinal data set covering a large panel of individuals, and their household members, from 1960 to 1998. The data set covers approximately 3.35 percent of the Swedish population annually. To compare the income inequality trends in New Zealand and Sweden, we include the years 1983, 1991, 1995 and 1997 in the analysis. The sample sizes for these years were 282,892, 293,550, 300,978, and 306,931 individuals, respectively.⁷

HES consists of private households living in permanent dwellings and resident in New Zealand. Each household member aged 15 years or over is required to complete an interviewer-administrated questionnaire. Regular income data are collected using the current approach, i.e., each respondent is required to give the details of the latest amount received, the time period covered for that amount (e.g., week), and the number of week or months in the twelve months to the interview date. The recall approach is used to collect non-regular income data. This means that each respondent is required to give details of the total amount received from each source of irregular income in the twelve months to the interview date.

LINDA is a register-based longitudinal data set where the income data are based on filed tax reports. This means that the Swedish data set is large and comprehensive, whereas the New Zealand data reflect information on a limited number of observations. A number of studies (see e.g., Feenberg and Poterba, 2000) have compared large register based data sets (e.g., LINDA) with survey data (e.g., HES) and found that the relative income shares of the top earners have been significantly larger when register based data are used.⁸ Note also that the data in LINDA are contingent on the tax legislation in a particular year. As the study period coincides with the Swedish tax reform in 1991, this means that the income data after 1990 are not directly comparable with income data for previous years. These observations mean that the comparisons between the income inequality trends in New Zealand and Sweden cannot be pushed too far because of the different data set used in the empirical study.

When income distribution data are analysed, important decisions are the unit of analysis, the weighting schemes, the ranking criteria, and the measure of income. Unfortunately, there are no standardised concepts regarding these issues in the empirical literature.⁹ In this paper, we take individuals in the households as the unit of analysis. Although we do not have any knowledge of the intra-household allocation of resources, it is reasonable to assume that the household members pool at least some of their incomes and spend it for the collective welfare of the household.¹⁰ Once this choice is made, the next step is to determine how to allocate household income among household members.

It is quite common to use an adult equivalent scale to adjust household income in order to consider the needs for different members within the household (see, for example, Blundell and Lewbel, 1991; Coulter et al., 1992; and Buhman et al., 1996). Some

analysts prefer to use an arbitrary rule of thumb where the first adult member, for example, getting a weight of 1, the remaining adult household member getting a weight of 0.8, and each child getting a weight of 0.4. In this paper, we assign the same weights to each household member, so that total household income is divided equally among all household members.

The income measure adopted in the study is gross income; that is, income from all sources before taxes are paid, excluding income-in-kind and employer's contributions to superannuation. The reader should note, however, that the income definition might differ between the countries because two different types of data sets are used. The reason for not using income net of all direct taxes is that the New Zealand income tax figures are imputations that do not appear to be consistent over the four surveys. For instance, the imputed taxes reported yield negative after-tax incomes in a number of cases. We also exclude households that report zero income because these observations include households where tax information and/or the adult household members incomes are missing.

4. Empirical Method and Results

4.1 Ordinary Lorenz-curves for New Zealand and Sweden

The empirical analysis begins by arranging the households in ascending order of total household income per unit member. To provide an overview of income inequality in New Zealand and Sweden, the ordinary Lorenz-curves over the study years are presented in Figure A1 (New Zealand) and Figure A2 (Sweden) in the appendix. Note that an ordinary Lorenz-curve typically represents the cumulative proportion of total

income against the cumulative proportion of population from the poorest to the richest household, while we use the cumulative proportion of total income per unit person in the various deciles of the population. The deciles being used, therefore, represent ten percent of the population covered by the sample, and not ten percent of the households.

As can be seen from Figures A1 and A2, New Zealand's and Sweden's ordinary Lorenz curves are very close to one another. In order to more easily identify the intersections of the curves, Table 1 provides an overview of the cumulative income shares per unit person in the different deciles for New Zealand and Sweden respectively.

- Table 1 Placed About Here -

The New Zealand Lorenz-curve for 1983 dominates the Lorenz-curves for all other years. This means that income inequality in 1983 was lower than for the other years under study. The Lorenz-curve of 1995 crosses that of 1991 at the lowest decile, indicating that the top 90 per cent of the income recipients in 1991 had a greater share in total income than the corresponding group in 1995. It also follows that the Lorenz-curve of 1997 is above that of 1995 up to decile seven, but below it for the top three deciles, indicating that inequality had fallen slightly in 1997 by any inequality measure that satisfies the Pigou-Dalton transfer condition.

Turning to the Swedish results, it is clear from Table 1 that no crossings of the Swedish Lorenz curves occur. As for New Zealand, the Swedish Lorenz curve for 1983 dominates the Lorenz curves for all other years. In contrast to New Zealand, however, the Lorenz curve of 1991 dominates the Lorenz curves of 1995 and 1997, while the

Lorenz curve of 1995 is above that of 1997. This means that income inequality increased steadily in Sweden throughout the study period.

- Table 2 Placed About Here -

The relative positions of the different population deciles over the study years for New Zealand are presented in Table 2, while the corresponding results for Sweden can be found in Table 3. Table 2 shows that the relative income shares of the bottom eight deciles of the households in New Zealand declined sharply between 1983 and 1991, and remained lower than their 1983 values in 1997. The relative income share of the richest 10 per cent of the population in New Zealand increased sharply over the study years, from 25.6 per cent in 1983 to 29.2 per cent in 1997.

The Gini-coefficients presented in Table 2 indicate that income inequality increased sharply in New Zealand between 1983 and 1991, and again between 1991 and 1995, before falling slightly in 1997. While the Gini-coefficient may experience significant changes over a longer period of time, an increase of more than 14 percent within a twelve-year period is spectacular. (see e.g., Atkinson et al., 1995) Although the share of the poorest 10 per cent of the population recovered steadily after its initial sharp fall between 1983 and 1991, the middle classes experienced sizeable falls in their relative position over the next six years while the top ten per cent continued to improve. Thus, New Zealand's economic reform program was associated with a widening of the country's income distribution as the very rich became richer and the majority of the population, in relative terms, became poorer.¹¹

Similarly, Table 3 shows that the relative income shares of the bottom seven deciles in Sweden declined steadily after 1983, while the relative income share of the richest 10 per cent of the population increased. Note that the relative income share of the poorest 10 per cent of the population in Sweden declined by more than fifty per cent during the study period, while the increase in the relative share of the top ten per cent increased by more than one-fifth. These changes contributed to an extraordinary increase in the Gini coefficient of 24 per cent over the 14-year study period.

Although the percentage change in the Gini coefficient was greater in Sweden, the value of the coefficient in Sweden remained below the value of the Gini coefficient in New Zealand. Comparing the alterations of the relative income shares between the two countries, the results indicate that the low-income households in New Zealand were relatively well-protected (particularly in 1995 and 1997) compared to their counterparts in Sweden, whereas the middle classes in Sweden maintained a larger share of total income than was the case in New Zealand.

- Table 3 Placed About Here -

There are, of course, several difficulties associated with international comparisons of income distributions. The Atkinson theorem means that social welfare is higher when one income distribution Lorenz-dominates another distribution with the same mean (see Atkinson, 1970). The Atkinson theorem does not, however, provide any normative implication when two ordinary Lorenz-curves cross or when the Lorenz-dominating

distribution has a lower mean. No welfare judgments, therefore, can be made on the basis of the results presented in Tables 1-3 above. This is addressed in the next section.

4.2 Generalised Lorenz-curves for New Zealand and Sweden

The generalised Lorenz-curve developed by Shorrocks (1983) resolves some of the crossings of ordinary Lorenz curves, although not all.¹² In accordance with the Shorrocks theorem, the mean income for the income distributions under study is multiplied by the ordinary Lorenz curve values to obtain ordinates for the so-called generalised Lorenz-curves to see whether we have a configuration for which a welfare distinction is available.

To construct generalised Lorenz-curves per capita income for each of the study years are computed from each data set. The New Zealand data reveal that average per capita income for the study years 1983, 1991, 1995 and 1997, in current New Zealand dollars, were \$7,846, \$14,543, \$16,861, and \$18,314, respectively. The corresponding figures for Sweden, in current Swedish kronor (SEK), are 54,604 SEK, 94,024 SEK, 107,384 SEK, and 120,471 SEK. In order to obtain the real per capita incomes, we deflate these current dollars figures by the official OECD GDP-deflators (see various issues of the *OECD Economic Outlook*) using 1995 as the base year. The resulting New Zealand figures for the study years 1983, 1991, 1995 and 1997 are \$16,012, \$15,842, \$16,997, and \$17,955, respectively, while the corresponding figures for Sweden are 103,027 SEK, 103,324 SEK, 107,384 SEK and 116,735 SEK. As the mean income in New Zealand is lower in 1991 compared to the corresponding figure in 1983, while the

ordinary Lorenz curve for 1983 dominates the Lorenz curve for 1991, the Atkinson corollary result (see Atkinson, 1970 p. 247) immediately tells us that the income distribution in 1983 was welfare superior to the 1991 income distribution.

Using the deflated average real per capita income figures and the corresponding ordinates of the ordinary Lorenz curves from Table 1, we obtain ten data points of the ordinate of the generalised Lorenz-curves for New Zealand and Sweden, respectively. These ordinates are presented in Table 4 for New Zealand and in Table 5 for Sweden, while the corresponding generalised Lorenz curves are shown in Figure A3 (New Zealand) and Figure A4 (Sweden) in the appendix. One has to examine the figures very closely to identify any crossing of the generalised Lorenz curves. This is done more easily with Table 4 and Table 5.

It is clear from Table 4 that the generalised Lorenz curve for the year 1997 in New Zealand dominates that for other years. This suggests that, for all strictly concave utility functions, total social welfare was higher in 1997 compared to the other study years. Note, however, that the generalised Lorenz curve of 1997 in many cases is very close to the generalised Lorenz curve of 1983. In the case of a crossing of two curves we must reserve our judgment about welfare superiority of either of the years. We should, therefore, be careful drawing a too strong conclusion when these two years are compared. For example, using a different GDP-deflator compared to this study, Chatterjee et al. (2003) reports two crossings between the generalised Lorenz curve for 1983 and 1997.¹³

- Table 4 Placed About Here -

In addition, the results presented in Table 4 show that the generalised Lorenz curve for 1991 is dominated by that of any other year. According to Shorrocks theorem, this implies that the level of social welfare in 1991 is lower compared to the other study years. The generalised Lorenz curve for 1983 is, moreover, above the generalised Lorenz curve for 1995 except for the two highest income deciles. This means that the bottom 80 per cent of the population was still worse off in 1995 compared to 1984.

Turning to the ordinates of the generalised Lorenz curve for Sweden presented in Table 5, the results indicate that no curve Lorenz dominates any of the others. This means we cannot unambiguously rank the study years in social welfare terms according to every strictly increasing utility function. However, the generalised Lorenz curve for 1983 is above the generalised Lorenz curve for 1991 except for the top decile. This suggests that 90 per cent of the population was better off in 1983 compared to 1991. In 1995 this figure had decreased to 80 per cent, while 60 per cent of the population was still better off in 1983 compared to 1997.

- Table 5 Placed About Here -

To compare the level of overall social welfare in the two countries under study, we proceed by adjusting the average income figures using the purchasing power parities (PPP) published by the OECD (1999). We do not use the official exchange rates because these rates do not necessarily reflect the purchasing power of different countries

and, therefore, can be misleading. The PPP are the rates of currency conversation that equalise the purchasing power of different countries by eliminating price levels differential between countries. The new PPP-adjusted average incomes are given in US dollars and are presented in Table 6. These data suggest that the PPP-adjusted per capita incomes of the two countries are very close together, with New Zealand moving from just behind to just ahead of Sweden. The difference in levels, of course, may be a consequence of the particular databases used for this study (as discussed earlier in this paper). This observation deserves further research.

- Table 6 Placed About Here -

In the next step, we transform the ordinates of the generalised Lorenz curves (see Table 4 and 5) to US dollars using the PPP-adjusted income figures given in Table 6. The new PPP-adjusted ordinates are presented in Tables A1 (New Zealand) and A2 (Sweden) in the appendix, while the resulting generalised Lorenz curves are presented below.

– Figure 2 Placed About Here –

As can be seen from Figure 2, the generalised Lorenz curve for Sweden in 1983 dominates the corresponding curve for New Zealand. This indicates that the overall level of social welfare was higher in Sweden compared to New Zealand. This is consistent with the earlier observations that New Zealand had a wider income distribution (measured by the Gini coefficient) and a lower mean income (Table 6). By 1991, New Zealand had implemented most of its reforms (see Figure 1), while most

reforms in Sweden took place after 1991. To compare the change in the overall level of welfare between 1984 and 1991, the PPP-adjusted generalised Lorenz curves for 1991 are presented next (Figure 3).

– Figure 3 Placed About Here –

The difference between the curves has clearly increased since 1983. This means that the generalised Lorenz curve for Sweden still dominates the generalised Lorenz curve for New Zealand. Thus, the level of overall social welfare was higher in Sweden compared to New Zealand immediately after the latter country had implemented its economic reform program between 1983 and 1991.

– Figure 4 Placed About Here –

The generalised Lorenz curves for New Zealand and Sweden in 1995 are presented in Figure 4. By 1995 the transition phase of the reform programme in New Zealand had come to an end, while a major fiscal consolidation programme was being implemented in Sweden. The results show that the generalized Lorenz curves for New Zealand and Sweden now cross. We must reserve judgment of welfare superiority when two generalized Lorenz curves cross and can, therefore, no longer state that the overall level of welfare was higher in Sweden. The generalised Lorenz curve for Sweden is above the corresponding curve for New Zealand except for the lowest and highest income decile. This indicates that the Swedish middle class was still better off than the middle class of

New Zealand in 1995, while the level of overall social welfare for the poorest and the richest part of the population was higher in New Zealand.

– Figure 5 Placed About Here –

Finally, in Figure 5, we compare the PPP-adjusted generalised Lorenz curves for 1997. This year belongs to the post-reform period in both New Zealand and Sweden. generalised Lorenz curves are very close to each other in 1997 and one has to examine Figure 5 very closely to identify any crossing. However, by comparing the figures for 1997 in Table A1 and Table A2 in the appendix, it is clear that the generalised Lorenz curve for New Zealand is below the generalised Lorenz curve for Sweden except for the three lowest income deciles and the top decile. This indicates that the level of overall social welfare in New Zealand was higher for the poorest and the richest part of the population, while the middle class was still better off in Sweden.

5. Conclusions

In this paper we have analysed income inequality trends in New Zealand and Sweden from 1983 to 1997, a period when both countries implemented a number of economic reforms that transformed their previously strong ‘cradle-to-grave’ welfare systems. However, the reforms in New Zealand came earlier and were far more extensive in both scope and degree.

The main conclusions drawn from the empirical study can be summarized as follows: In both New Zealand and Sweden, income inequality increased sharply during the study period. Whereas most OECD-countries have experienced increased income inequalities during the 1980s (see e.g., Atkinson et al., 1995; Gottschalk and Smeeding, 1997), New Zealand and Sweden seem to have experienced a particularly strong increase. According to the results presented in this study, New Zealand’s and Sweden’s economic reform programme saw the very rich becoming even richer, while the vast majority of the population become relatively poorer; with the poorest faring the worst.

This paper does not try to identify the factors that have caused these inequality changes during the study period. There are several possible explanations. For instance, the de-industrialisation of the economies may have shifted labour from manufacturing to the service sector, with more low-paying jobs as a consequence (see e.g., Levy and Murnane, 1992). Increased trade may have led to increased competition, which has pushed down the wages of less qualified workers (for surveys see Burtless, 1995; Freeman, 1995). Recessions have also an inequality generating effect because they cause unemployment that hit the bottom of the income distribution hardest. These factors are

all interrelated with the structural reforms that were implemented in New Zealand and Sweden and it is, therefore, a very difficult task to identify what actually have caused inequality to increase.

The results presented in this study, however, do *not* suggest that the more extensive reform programme in New Zealand was associated with a relatively larger increase in income inequality. On the contrary, despite a more moderate policy regime shift, the results indicated that income inequality increased relatively more in Sweden, although the Gini coefficient for income inequality in Sweden was still below that in New Zealand by the end of the study period. The results showed, moreover, that New Zealand's generalised Lorenz curve for 1997 dominated that country's three curves for the other study years. Thus, the level of social welfare of New Zealanders has increased, albeit modestly, after the implementation of the reform programme, while no similar evidence is apparent in the Swedish income data.

When the generalised Lorenz curves for the two countries were compared using purchasing power parity exchange rates, the results indicated that the level of overall welfare was higher in Sweden for the year 1983 and 1991. In 1995 and 1997, we observed several crossings of the generalised Lorenz curves. This means that the level of overall social welfare in New Zealand and Sweden cannot be ranked unambiguously for these years. The results suggested, however, that both the poorest and the richest part of the population were better off in New Zealand, while the level of social welfare was higher for the Swedish middle class. The analysis also showed how the gap between

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Sweden and New Zealand widened during the transition phase of New Zealand's reforms (1983-1991), but closed again during Sweden's transition phase (1991-1995).

Endnotes

- * The authors gratefully acknowledge generous financial support from the Swedish Institute for International Cooperation in Research and Higher Education (STINT).
- ¹ The reader is referred to Daunfeldt and de Luna (2001) for another comparison of the major economic reforms in New Zealand and Sweden.
- ² Figure 1 concentrate on what are thought to be the implementation dates of major regime shifts in economic policy in New Zealand and Sweden. Note, however, that this choice is subjective. The monetary policy regime shift in Sweden, for example, is considered as the year (1993) when an explicit inflation target was introduced. Other researches might argue that the starting point of the monetary policy regime shift should be the time point when the policymakers stated that price stability was the primary goal for the monetary policy (1991), or when the central bank was given sufficient independence from the political policymakers (1999).
- ³ There was a further tax reform in New Zealand a decade later, in which the income tax rate for low income earners was reduced in two stages (1996 and 1998) and the threshold separating the lower and the top tax rates was increased.
- ⁴ The first PTA set a target of 0-2 per cent, which has been slightly relaxed in recent years to 1-3 per cent.
- ⁵ The study years used in HES refer to the twelve month from 1 April to 31 March the following calendar year. For ease of exposition, the remainder of this paper uses 1983 (for example) to refer to the HES year beginning 1 April 1983. This survey is previously known as the Household Survey (1973-82), and the Household Expenditure and Income Survey (1983-1993). For a more detailed description of HES, the reader is referred to numerous publications from Statistics New Zealand which can be accessed at their website: <http://www.stats.govt.nz>.
- ⁶ For a detailed description of LINDA, see Edin and Fredriksson (2000).

- ⁷ The numbers of observations refer to the sampled individuals. For each year, information on all family members are added to the data set.
- ⁸ Using income tax data collected by the New Zealand Inland Revenue Department (IRD), for example, Podder and Chatterje (2002) showed that the relative share of the top five per cent of the income earners had increased with more than double the increase when measured with survey data.
- ⁹ The reader is referred to O'Higgins et al. (1990) for an excellent survey regarding the problems involved in income distribution studies.
- ¹⁰ Note, however, that complete pooling of non-labour incomes within the household have been rejected in numerous studies (see e.g., Schultz, 1990; Thomas, 1990; Kawaguchi, 1994; and Fortin and Lacroix, 1997). This means that income inequality within the household, although not the scope of this paper, is an interesting question for further research.
- ¹¹ A Statistics New Zealand (1999) report on income inequality, which used equivalised incomes, showed that the Gini coefficients rose from 0.384 in 1982 to 0.395, 0.469, 0.478 in 1986, 1991 and 1996 respectively. Even though inequality is more present when equivalised incomes are used, the similarity in the magnitude and the upward trend of these two sets of inequality coefficients indicate that the use of unweighted data is unlikely to have introduced a major bias.
- ¹² The Shorrocks theorem, as well as the Atkinson theorem and Atkinson corollary result, was developed initially by Kolm (1969, p. 193) but his work did not capture the attention of the profession. An independent proof of the Shorrocks theorem can be found in Kakwani (1984).
- ¹³ According to their results, the generalised Lorenz curve for 1997 is above the generalised Lorenz curve for 1983 except for deciles three and four.

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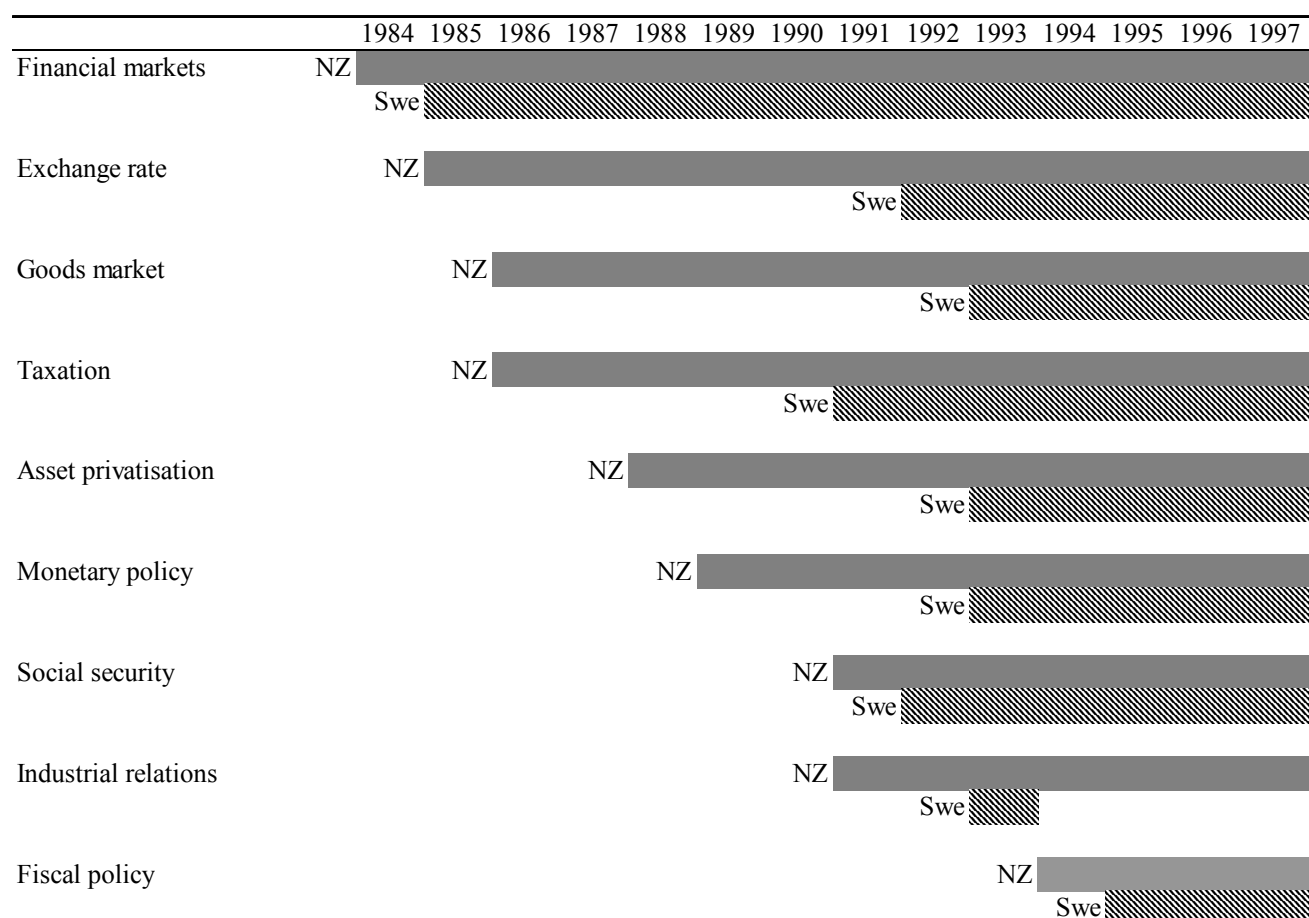
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Figure 1
Sequence of Major Economic Reforms in New Zealand and Sweden 1984-1995



Note: NZ=New Zealand, and Swe=Sweden.

Table 1: Ordinates of ordinary Lorenz curves for New Zealand and Sweden.

Decile	New Zealand				Sweden			
	1983	1991	1995	1997	1983	1991	1995	1997
Lowest	2.05	1.63	1.71	1.91	2.81	2.33	1.65	1.35
Second	6.35	5.50	5.44	5.77	7.70	7.03	5.74	5.12
Third	11.80	10.65	10.26	10.63	13.71	12.99	11.29	10.41
Fourth	18.36	16.92	16.07	16.51	20.74	20.04	18.01	16.91
Fifth	25.93	24.29	22.93	23.57	28.84	28.13	25.83	24.53
Sixth	34.78	32.84	31.19	31.88	38.18	37.39	34.87	33.39
Seventh	45.33	43.13	41.28	41.99	49.00	48.13	45.48	43.82
Eighth	58.27	55.98	53.89	54.47	61.77	60.86	58.26	56.47
Ninth	74.43	72.60	70.36	70.78	77.13	76.45	74.18	72.35
Top	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Table 2: Relative income shares in New Zealand 1983, 1991, 1995 and 1997.

Decile	1983	1991	Δ 1983	1995	Δ 1983	1997	Δ 1983
Lowest	2.05	1.63	-20.49%	1.71	-16.59%	1.91	-6.83%
Second	4.20	3.87	-7.86%	3.73	-11.19%	3.86	-8.10%
Third	5.45	5.15	-5.50%	4.82	-11.56%	4.86	-10.83%
Fourth	6.56	6.27	-4.42%	5.81	-11.43%	5.88	-10.37%
Fifth	7.57	7.37	-2.64%	6.86	-9.38%	7.06	-6.74%
Sixth	8.85	8.55	-3.39%	8.26	-6.67%	8.31	-6.10%
Seventh	10.55	10.28	-2.56%	10.09	-4.36%	10.11	-4.17%
Eighth	12.94	12.85	-0.70%	12.61	-2.55%	12.58	-2.78%
Ninth	16.16	16.62	2.85%	16.47	1.92%	16.31	0.93%
Top	25.57	27.40	7.16%	29.64	15.92%	29.22	14.27%
Gini	0.353	0.382	8.22%	0.404	14.45%	0.394	11.61%

Table 3: Relative income shares in Sweden 1983, 1991, 1995 and 1997.

Decile	1983	1991	Δ 1983	1995	Δ 1983	1997	Δ 1983
Lowest	2.81	2.33	-17.08%	1.65	-41.28%	1.35	-51.96%
Second	4.89	4.70	-3.89%	4.09	-16.36%	3.77	-22.90%
Third	6.01	5.96	-0.83%	5.55	-7.65%	5.29	-11.98%
Fourth	7.03	7.05	0.28%	6.72	-4.41%	6.50	-7.54%
Fifth	8.10	8.09	-0.12%	7.82	-3.46%	7.62	-5.93%
Sixth	9.34	9.26	-0.86%	9.04	-3.21%	8.86	-5.14%
Seventh	10.82	10.74	-0.74%	10.61	-1.94%	10.43	-3.60%
Eighth	12.77	12.73	-0.31%	12.78	0.08%	12.65	-0.94%
Ninth	15.36	15.59	1.50%	15.92	3.65%	15.88	3.39%
Top	22.87	23.55	2.97%	25.82	12.90%	27.65	20.90%
Gini	0.306	0.319	4.25%	0.357	16.67%	0.380	24.18%

Table 4: Ordinates of Generalised Lorenz Curves for New Zealand.

Decile	1983	1991	1995	1997
Lowest	328.24	258.22	290.65	342.95
Second	1016.74	871.3	924.63	1036.02
Third	1889.37	1687.15	1743.88	1908.64
Fourth	2939.74	2680.43	2731.39	2964.41
Fifth	4151.82	3840.04	3897.38	4232.05
Sixth	5568.85	5202.43	5301.31	5724.14
Seventh	7258.08	6832.55	7016.3	7539.41
Eighth	9329.99	8868.22	9159.6	9780.23
Ninth	11917.47	11501.12	11958.98	12708.73
Top	16011.65	15841.76	16996.84	17955.26

Table 5: Ordinates of Generalised Lorenz Curves for Sweden

Decile	1983	1991	1995	1997
Lowest	2895.06	2407.44	1771.84	1575.93
Second	7933.07	7263.64	6163.84	5976.85
Third	14124.98	13421.72	12123.66	12152.15
Fourth	21367.77	20706.03	19339.87	19739.95
Fifth	29712.95	29064.90	27737.30	28635.18
Sixth	39335.66	38632.66	37444.81	38977.94
Seventh	50483.17	49729.61	48838.26	51153.43
Eighth	63639.70	62882.69	62561.94	65920.46
Ninth	79464.62	78990.82	79657.48	84458.03
Top	103026.87	103323.51	107384.04	116735.36

Table 6: PPP-adjusted average income figures in Sweden and New Zealand.

Year	<u>New Zealand</u>			<u>Sweden</u>		
	Average income	PPP	PPP-adj. income	Average income	PPP	PPP-adj. income
1983	7,846	1.09	7,198	54,604	7.53	7,252
1991	14,543	1.56	9,322	94,024	9.94	9,459
1995	16,861	1.47	11,470	107,384	9.77	10,991
1997	18,314	1.46	12,544	120,471	9.62	12,523

Figure 2: Generalised Lorenz curves for New Zealand and Sweden in 1983.

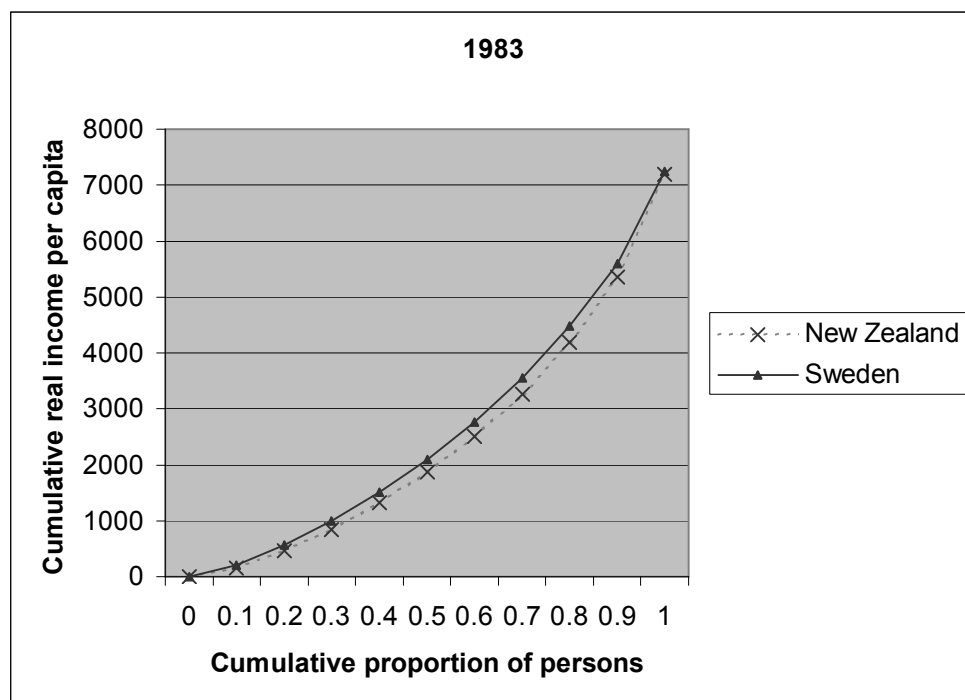


Figure 3: Generalised Lorenz curves for New Zealand and Sweden in 1991.

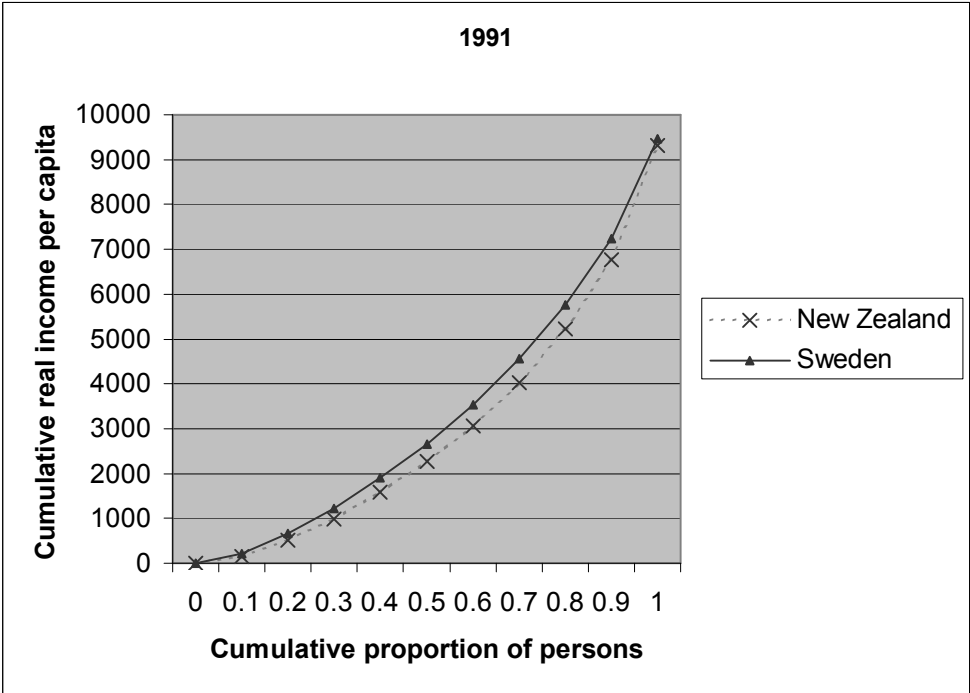


Figure 4: Generalised Lorenz curves for Sweden and New Zealand in 1995.

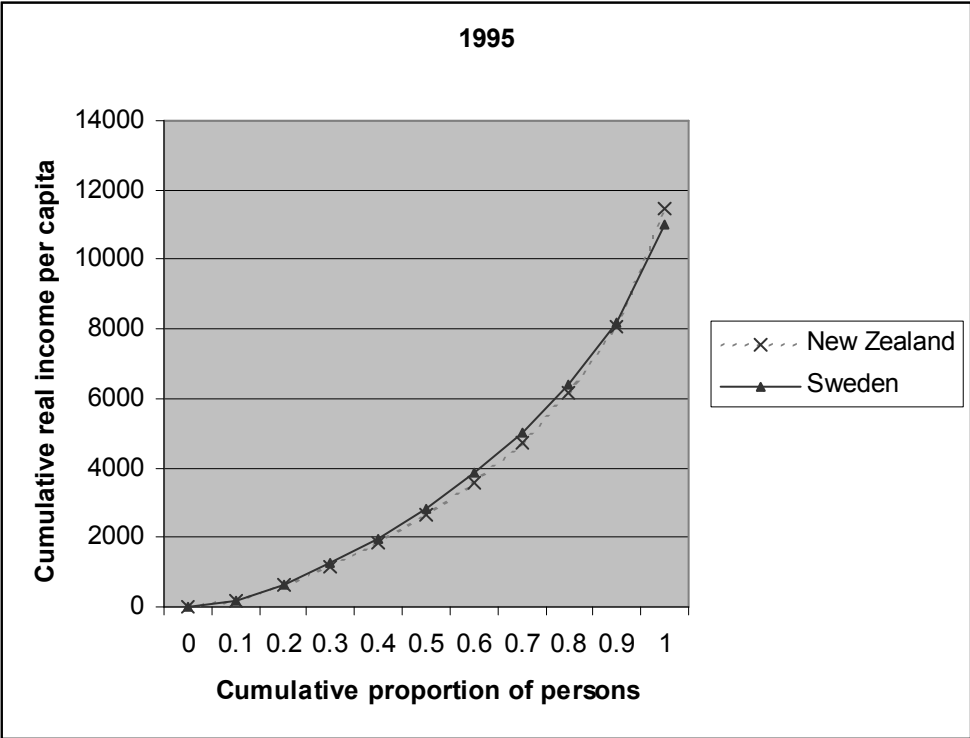
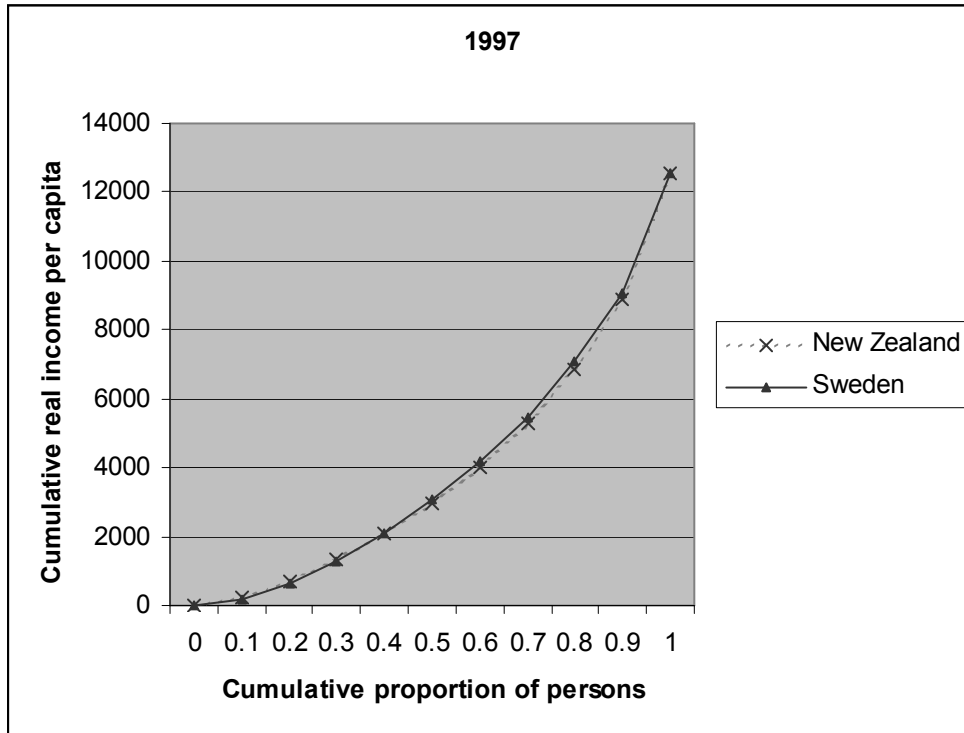


Figure 5: The generalised Lorenz curves for New Zealand and Sweden in 1997.



Appendix

Figure A1: Ordinary Lorenz curves New Zealand 1983, 1991, 1995 and 1997.

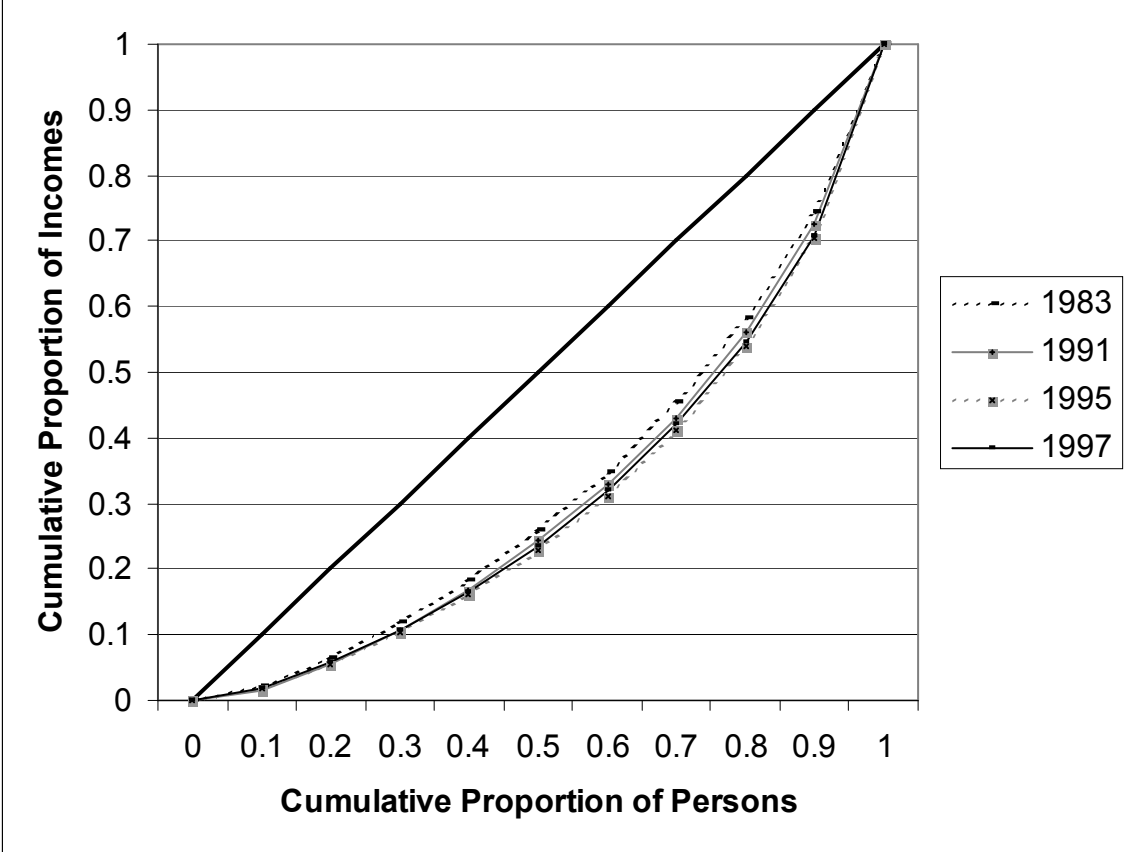


Figure A2: Ordinary Lorenz curves Sweden 1983, 1991, 1995 and 1997.

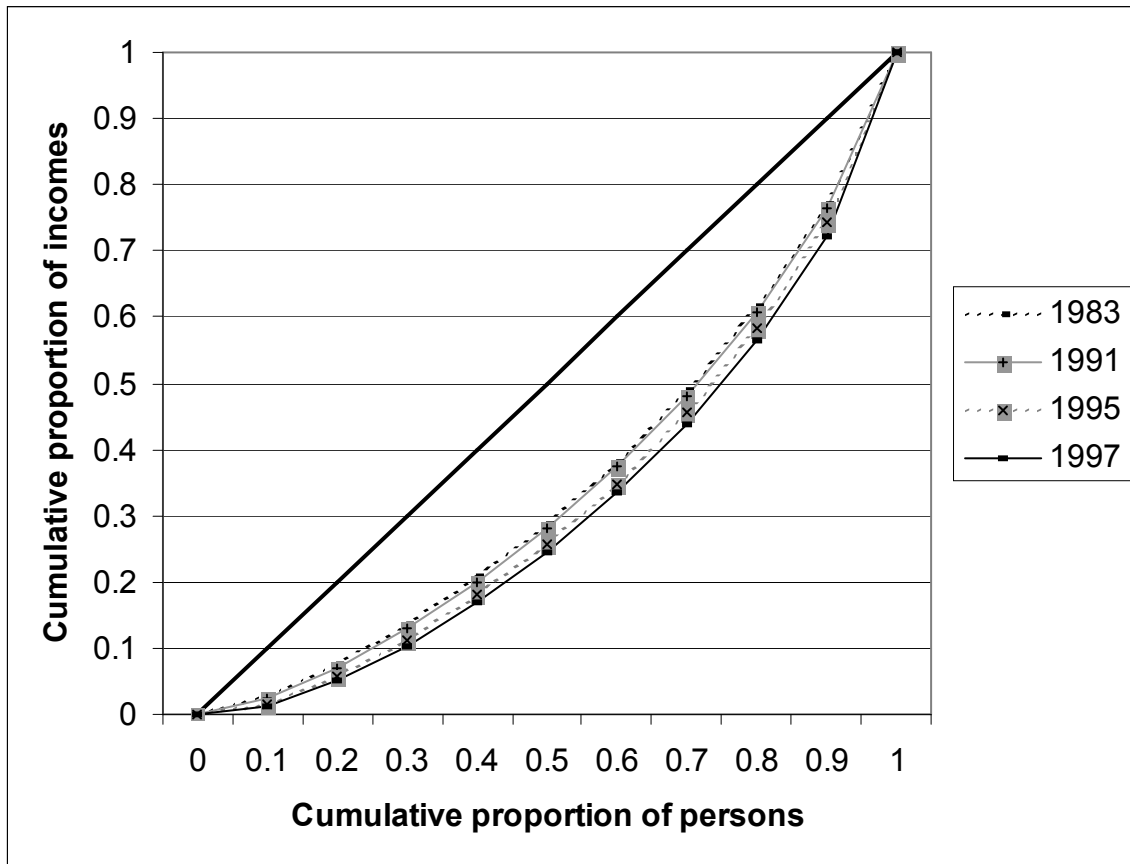


Figure A3: Generalized Lorenz curves New Zealand 1983, 1991, 1995 and 1997.

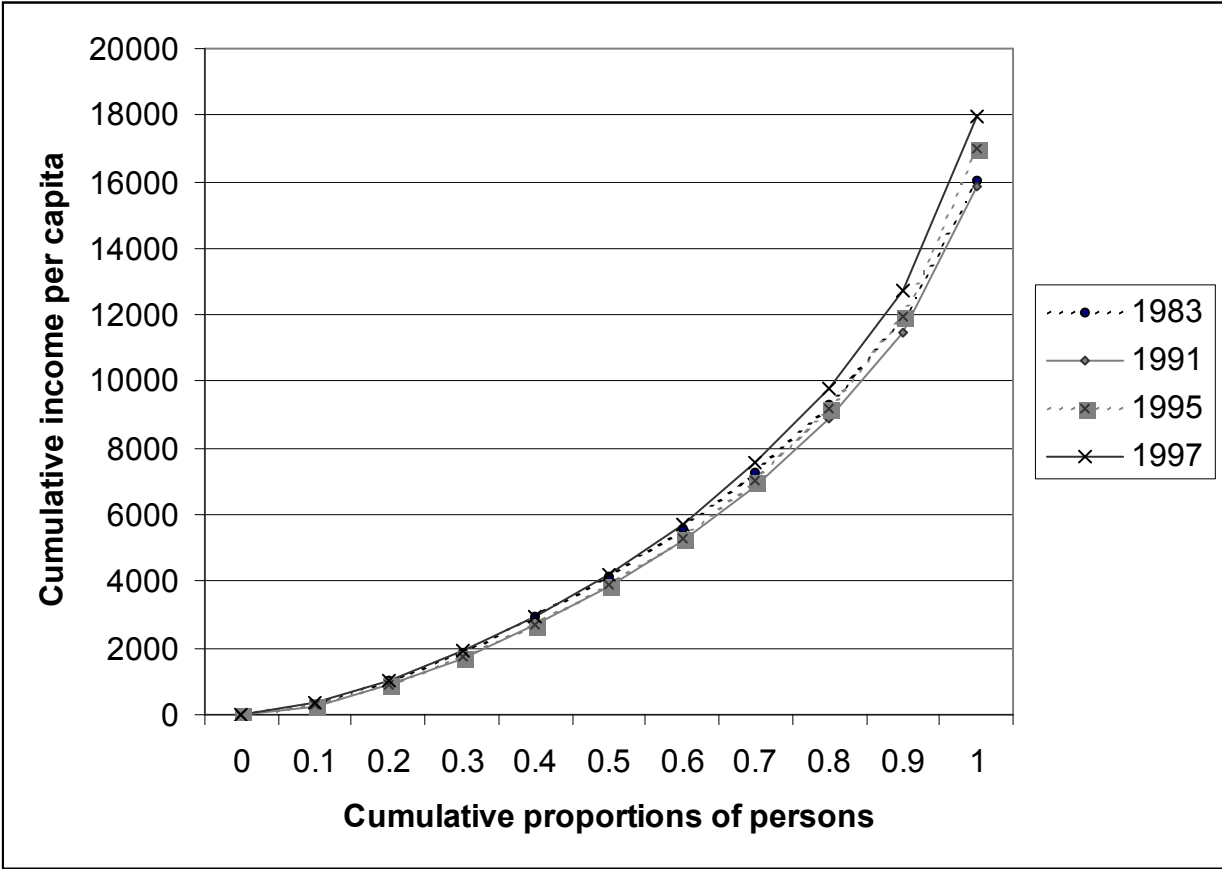


Figure A4: Generalised Lorenz curves Sweden 1983, 1991, 1995 and 1997.

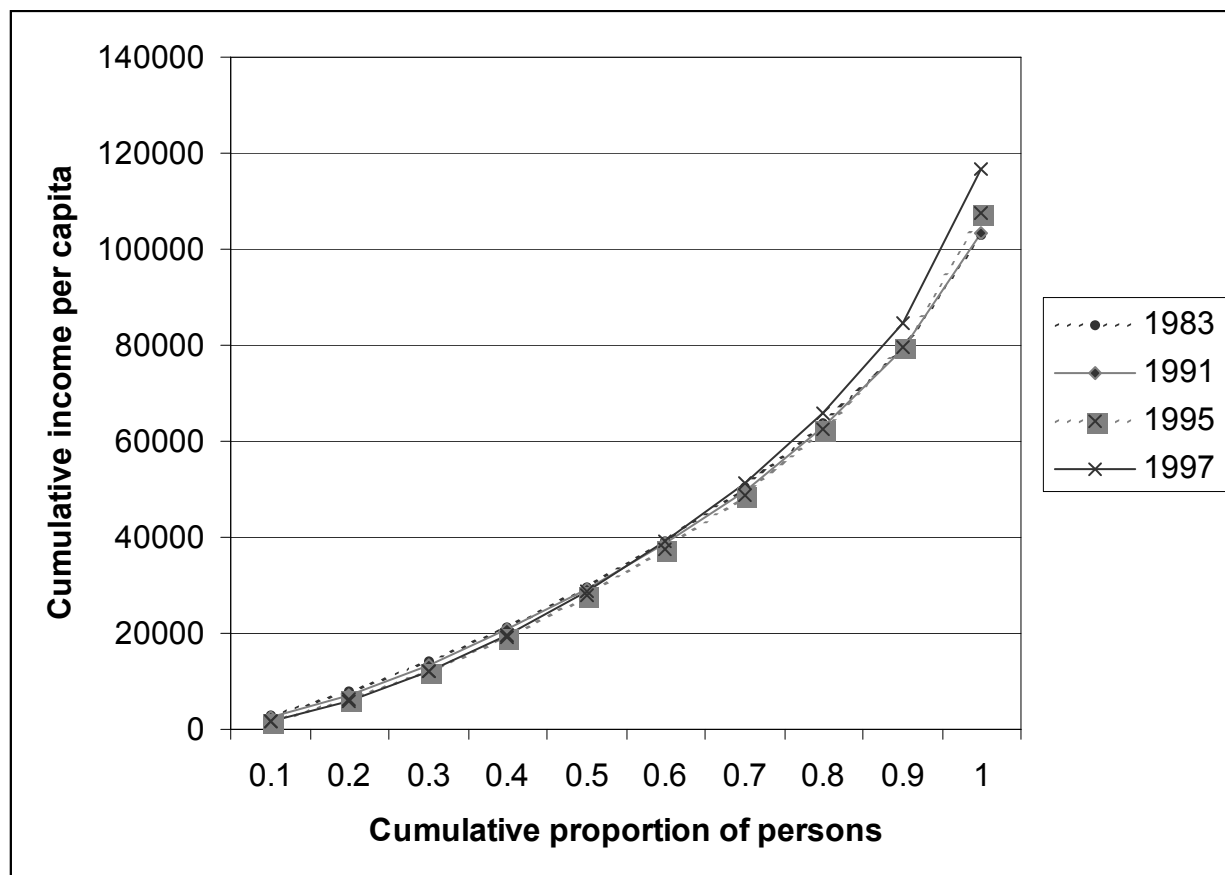


Table A1: Ordinates of the PPP-adjusted generalised Lorenz Curves for New Zealand.

Decile	1983	1991	1995	1997
Lowest	147.55695	151.953164	196.131528	239.592119
Second	457.06665	512.7254	623.950592	723.793993
Third	849.3522	992.82282	1176.789168	1333.436767
Fourth	1321.53444	1577.329776	1843.177576	2071.029259
Fifth	1866.41547	2264.381812	2629.997624	2956.642013
Sixth	2503.42962	3061.436752	3577.393192	3999.055892
Seventh	3262.80807	4020.699364	4734.683904	5267.263391
Eighth	4194.21633	5218.612344	6181.010552	6832.765823
Ninth	5357.39697	6767.97528	8070.066848	8878.706902
Top	7197.9	9322.28	11469.68	12544.09

Table A2: Ordinates of the PPP-adjusted generalised Lorenz Curves for Sweden.

Decile	1983	1991	1995	1997
Lowest	203.77	220.40	181.35	169.06
Second	558.37	664.98	630.89	641.18
Third	994.19	1228.75	1240.91	1303.64
Fourth	1503.97	1895.62	1979.52	2117.63
Fifth	2091.35	2660.87	2839.03	3071.88
Sixth	2768.65	3536.79	3832.63	4181.42
Seventh	3553.26	4552.71	4998.80	5487.56
Eighth	4479.29	5756.86	6403.47	7071.72
Ninth	5593.13	7231.55	8153.27	9060.36
Top	7251.56	9459.19	10991.20	12522.96