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CONSUMPTION AND INCOME INEQUALITY IN AUSTRALIA

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CONTENTS

Abstract

It has been argued that consumption is a more appropriate measure of household well-being than income or earnings. Using four Household Expenditures Surveys collected by the Australian Bureau of Statistics between 1975 and 1993, we examine trends in consumption inequality among Australian households and compare consumption inequality with income inequality. We find that consumption is much more equal than income. Further, while both income and consumption inequality rose by statistically and economically significant amounts over the period covered by our survey, consumption inequality rose by much less. For example, the Gini coefficient for equivalent gross income inequality rose by 0.043 (17%) while the Gini coefficient for equivalent nondurable consumption rose by 0.019 (9%). We discuss possible interpretations of these differences. Through a series of specification checks we are able to rule out several ways in which the result might be spurious, or an artifact of our methodological choices. One interpretation of the results is that some income inequality in Australia reflects transitory fluctuations which households can smooth, and that some of the growth in income inequality over the study period reflects an increase in these transitory fluctuations.

I. Introduction.

When analysing economic inequality, some authors have argued that consumption is a more appropriate quantity to examine than either earnings or income (for example, Slesnick, 1998). Consumption is a direct measure of individual, and household, well-being. Income streams exhibit transitory fluctuations, and if households are able to smooth such fluctuations by borrowing and saving, then income will be more variable than expenditure at a point in time and will overstate the level of inequality in household welfare. Furthermore, an increase in the dispersion of income over time due to greater temporary fluctuations may represent little or no change in the distribution of welfare if households smooth their consumption. Therefore, if social welfare depends on the distribution of individual or household well-being then it is more appropriate to examine inequality in the distribution of consumption.

Much public policy in Australia is, at least in part, driven by concerns for equality. Examples include incomes policies and the tight targeting of social policy. Nevertheless, research over the past decade (as surveyed, for example, in Borland, 1999) has identified significant increases in wage and earnings inequality in Australia. Other research in Australia has suggested that the changes in individual income may not be reflected in household income (Harding, 1997). In other developed countries, a common finding is that consumption is considerably more equal than income (Cutler and Katz, 1992, Pendakur, 1988). However, the connection between changes in income inequality and changes in consumption inequality appears to be country specific. All these findings suggest the need for an analysis of consumption inequality in Australia.

In this paper we primarily employ four household expenditure surveys (HES) collected by the Australian Bureau of Statistics (ABS) over a period of eighteen years to provide a picture of consumption inequality in Australia from the middle of 1970's to the middle of 1990's . We begin by examining the four cross sections, to provide a comparison with existing research on income and earnings (Borland, 1999; Harding, 1997) and with analyses of expenditure inequality in other countries (Cutler and Katz, 1992; Pendakur, 1998). We find that, as in other countries, consumption in much more equal than income. In fact, in Australia, the increase in inequality as one goes from net (after taxes and transfer) income to consumption is as large as the increase in equality between private (before taxes and transfers) and net income. Looking across the years, we find increases in both income and consumption

inequality over the period but the former is much larger. This suggests that a significant fraction of the changes in income inequality represent increases in the variance of transitory income fluctuations which households have some facility to smooth. Our results are reasonably robust to a number of specification and data issues, including the choice of equivalence scale and the effects of inflation.

The outline of the paper is as follows. The next section describes the ABS's Household Expenditure Survey data, on which we base our analysis. Section 3 discusses the methods of our analysis, reviewing issues relating to the choice of inequality measures and equivalence scales. Section 4 examines the cross sectional distributions of household expenditure and income over the study period, and thus contains our central findings. In Section 5 we report a series of specification tests which investigate the robustness of the findings of Section 4. Section 6 discusses alternative interpretations of the differences between consumption and income inequality, and how one might further investigate those alternative interpretations. Finally, Section 7 concludes.

II. Data.

The analysis presented in this paper is based on unit record data from the Australian Bureau of Statistics' Household Expenditure Survey (HES) for the years 1975-76, 1984, 1988-89 and 1993-94. The information on demographic characteristics, income and infrequent expenditure items (eg. vehicle and property purchases, household bills) were recorded by personal interview and details of all other payments made by each household member, aged 15 years or more, during a 2 week period were recorded in personal diaries.[1] The surveys covered all of Australia with the sample of households spread evenly over the respective 12 month periods.

The HES records information on expenditures while the main object of our analysis is consumption. Expenditure and consumption will differ at a point in time in the case of durable goods since by definition durables provide a flow of consumption services over a number of

[1]In the 1975-76 and 1984 HES the diary period for rural respondents was 4 weeks. For all households in all survey years, the expenditure items correspond to average weekly amounts.

periods. To minimise the problems of imputing consumption flows to durable expenditures (or alternately making the strong assumption that all durables are consumed during the 2-week reference period) we focus on the distribution of *non-durable* consumption. Furthermore, to ensure that we have a measure of non-durable consumption that is consistent across the four surveys, we define non-durables as expenditures on food, alcohol and tobacco, fuel, clothing, medical care, transport, recreation and current housing. Ideally, it would be preferable to include additional items such as expenditures on household operations and personal care; however, this item is combined with durables (household equipment and jewellery, respectively) in the 1975 survey and are therefore excluded from the analysis.

The definition of non-durables does include current housing costs. For families residing in rental accommodation, this simply corresponds to (average weekly) rent payments. For families who owned or were purchasing their accommodation, we needed to impute a consumption flow and adopted the method used by Pendakur (1998). For these families the consumption flow from housing was estimated as the family's predicted rent from OLS regressions, by survey year, of rent on a series of indicator variables for number of bedrooms and location of residence.

In selecting the sample of observations for analysis we impose several exclusions. Firstly, we confine our sample to single family households. Multiple family households represent a small and roughly constant portion of the population over our study period. Most multiple family household are comprised of unrelated young adults and the income and expenditure information obtained from interviewing one household member is notoriously inaccurate. Secondly, we focus on families headed by an individual aged between 25 and 59 years of age. By doing so we attempt to minimise the effects of labour force entry at earlier ages, and exit and retirement at later ages. Next, to minimise the potential influence of measurement error and to ensure our results are not sensitive to outliers in the data, we trim the top and bottom 3 percent of observations in both the income and expenditure distributions. Finally, a very small number of observation reported negative expenditures in the components of nondurable consumption we examine and are therefore dropped from the analysis.

We also adjust the nominal values of income and consumption for changes in prices over time. We take the national consumer price index for each survey year and inflate the values to 1998 dollars. Ideally we would use state-specific CPI series for the data period to take account of regional differences in the cost of living, but unfortunately the public release

version of the 1988 HES does not report state of residence.

III. Methods.

a. Measures of Inequality

In order to compare our results with the existing literature on earnings and income inequality in Australia, the 90^{th} -10^{th} percentile ratio and the variance of the natural logarithm of income are calculated. However, these summary measures have a number of important limitations. First, the variance of log earnings is scale dependent and therefore sensitive to the choice of reference year prices. Secondly, the 90^{th} -10^{th} percentile ratio only uses information from two points in the distribution. Moreover, neither measure satisfies the Lorenz dominance criteria. The Lorenz dominance criteria states that distribution **a** is more equal than distribution **b** if it is possible to more from **b** to **a** by a sequence of transfer from richer to poorer households[2] This property is known as the "principle of transfers" and is widely accepted as a minimal property for normative measures of inequality (Atkinson, 1970, Sen, 1973). One distribution is classified as more equal than another distribution by the Lorenz dominance criteria if its corresponding Lorenz curve lies everywhere above (or closer to the line of equality) than another. To check for Lorenz dominance relations, and unambiguous differences in inequality across measures of well-being and over time, we estimate Lorenz curves $L(x)$, which shows the cumulative share of total income going to the poorest x percent of the population, for income and consumption in each year. Lorenz curves are scale independent and provide a picture of the inequality which is purely a function of the shape, and is independent of the location, of the distribution.

We also construct the Generalised Lorenz curve $GL(x) = \mu_x L(x)$, which is obtained by scaling the Lorenz curve by the mean level of income in the distribution. The Generalised Lorenz curve incorporates information regarding both equity ($L(x)$) and efficiency (μ_x) and therefore provides a measure of the level of welfare in the distribution (Shorrocks, 1983).

A limitation of Lorenz (and Generalised Lorenz) curves for inequality analysis is that they only provide a partial ranking of distributions. If two Lorenz curves intersect it is not possible to rank one distribution as more equal than another distribution. To obtain a

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[2]Formally a summary measure of inequality satisfies the Lorenz dominance criteria if and only if it is S-concave (Dasgupta, Sen and Starrett (1973)).

complete ordering of distributions, and to quantify the "distance" between distributions in terms of their inequality content, it is necessary to use an inequality index. The indices we use are members of the Atkinson-Kolm-Sen (AKS) family of normative inequality indices which can be represented as

$$I(y) = 1 - \frac{\chi}{\mu}$$

where μ is mean income and ξ is the "equally distributed equivalent income".[3] Since the indices are relative indices, they are homothetic in income and hence scale free. The members of the AKS family which we estimate are the Gini coefficient and members of the Atkinson (or mean of order r) class of inequality indices.

Formally, the Gini coefficient is given by:

$$Gini = 1 - \frac{1}{\mu}\sum_{i=1}^{n}(2i-1)y_{(i)}$$

where $y_{(1)} \geq \ldots \geq y_{(i)} \geq \ldots \geq y_{(n)}$ is the income vector arranged into descending order and i corresponds to the rank of the individual in the ordered distribution and n is the size of the population. Geometrically, the Gini coefficient is equal to twice the area between the line of equality and the Lorenz Curve, and the difference between two Gini coefficients is simply the area between the two corresponding Lorenz curves.

The Atkinsion indices are defined as:

[3]The EDE income, by definition, is that level of income which if it were equally distributed to everyone in the population would generate the same level of social welfare as the actual income distribution. Consequently the AKS relative inequality indices can be interpreted as measuring the share of total income which could be wasted with social indifference if the remainder were redistributed equally. Further, note that the EDE income is ordinally equivalent to social welfare. See Blackorby and Donaldson, 1978, for an indepth analysis of the duality between measures of inequality and social welfare functions.

$$I^{a}(y)=\begin{cases}1-\dfrac{1}{m}\left[\dfrac{1}{n}\sum_{i=1}^{n}y_i^{1-a}\right]^{\frac{1}{1-a}}, a\geq 0, a\neq 1\\[2ex] 1-\dfrac{1}{m}\prod_{i=1}^{n}y_i^{\frac{1}{n}}, a=1\end{cases}$$

where α is the 'inequality aversion' parameter with larger values of α corresponding to greater inequality aversion.

The Gini coefficient and Atkinson Indices satisfy the Lorenz dominance criterion. Both summary measures of inequality also impose additional structure on the underlying SWF. The main difference between the Gini coefficient and the mean of order r indices is in their sensitivity to transfer between different points in the distribution. In particular, the Gini coefficient weights transfers according to the differences in the rank order of the individuals involved. In contrast, the Atkinson indices weight a given transfer according to ratio of the income shares of the individuals involved.[4] In addition, the indices corresponding to larger values of α place a progressively larger social weight on transfers involving individuals with the smallest income shares. In the limit as α approaches ∞, the index places all the social weight on the income share of the poorest individual.[5]

An additional advantage of the Atkinson indices is that they are readily decomposable by population subgroup. In this paper, we exploit that possibility to investigate the sensitivity of these inequality measures to the contemporaneous inflation rate. In a companion paper (Barrett, Crossley and Worswick, 1999) we present a much more extensive discussion of the decomposition, and apply the decomposition to an investigation of the role of demographic change in inequality changes in Australia.

By estimating the conventional summary measures of inequality plus the Lorenz curve

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[4] The mean of order r indices satisfy the "sensitivity to diminishing transfers" property, whereas the Gini coefficient does not.

[5] The corresponding SWF is the maximin income (which is sometimes referred to as the Rawlsian SWF).

and AKS relative indices, a broad range of normative positions will be encompassed by the analysis. This will also enable us to determine which segments of the income and consumption distribution have experienced most change over time. In addition, we present bootstrapped standard errors for all of the inequality indices estimated. This enables us to use the point estimates of the inequality indices for formal statistical inference rather than just for purely descriptive purposes.

b. Unit of Analysis

When analysing consumption patterns it is natural to think of the family as the basic spending unit although social welfare, and household welfare, is usually expressed as a function of the well-being of constituent individuals. An individual's well-being will be determined by their access to family resources which will be a function of family characteristics, especially the family size. This is because many goods, such as housing and transportation, have within-family public good features. Similarly, there may be economies of scale in consumption for larger families. Therefore we need to use an adult equivalent scale (AES) to adjust family income and consumption levels to individual-equivalent levels that are comparable across individuals living in families of differing sizes.

The adult equivalence scale we adopt is the square root of the number of family members.[6] This is widely used and lies near the middle of the range of AES surveyed in Buhmann et.al. (1987). We adjust family income and consumption by dividing by the AES. Since the HES are weighted at the household level, we then multiply the household weight by family size as recommended by Danziger and Taussig (1979). By this method we generate distributions of individual-equivalent income and consumption that are representative of the population of individuals in Australia. Note that implicit in this procedure is the assumption that resources are equally shared within the household. This assumption is unavoidable since the HES does not provide details on the consumption of individual family members (for an analysis of intra-household inequality see Haddad and Kanbur, 1990). An important consequence of this assumption is that the measured level of (adult equivalent) income

[6] This implies that a family of two people requires $\sqrt{2}=1.41$ times the consumption of a single person for all to be considered equally well off.

inequality will by definition be lower than the level of inequality found in analyses of the distribution of individual earnings and income (which implicitly assume no sharing among family members).

We examine the sensitivity of our results to the choice of AES by recalculating the inequality measures for total family consumption (which implies all goods are pure public goods within the household) and per-captia family consumption (implying all goods are private goods). We also try the well known and simple OECD equivalence scale.[7] As reported in Section 5, our principle qualitative results are robust to the choice of equivalence scale.

IV. Consumption and Income Inequality, 1975-1993.

(a) Income inequality.

We begin our analysis by examining the distribution of individual-equivalent income and expenditure in each of the four survey years. Figure 1a presents the Lorenz curves for income. Equivalent-income inequality has increased over the period covered by our data. In situations such as this, where differences in Lorenz curves are difficult to distinguish visually, one can plot the *difference* between line of equality and the Lorenz curve (see Deaton, 1997). We do so in Figure 1b. This improves the separation between curves, and makes it clearer (in the current case) that income inequality increased from 1975 to 1984, decreased slightly from 1984 to 1988 and then increased again from 1988 to 1993. The decrease in inequality between 1984 and 1988 may be related to a general improvement in macroeconomic conditions. If the curves do not cross, the distributions are unambiguously ranked and inequality indices that obey the principle of transfers will assign the same rank to these distributions (though their magnitudes will reflect their sensitivity to various parts of the distribution). A detailed examination of the Lorenz reveals that the 1984 distribution dominates the 1975 distribution at exactly one percentile - the 5th - and is dominated by 1975 distribution everywhere else. Similarly, the the 1984 distribution dominates the 1988 at the same percentile (the 5th) and is dominated by 1988 distribution everywhere else. The 1975 distribution Lorenz dominates the

[7] The OECD scale assigns all additional adults a weight of 0.7 and children a weight of 0.5.

1988 equivalent income distribution which in turn Lorenz dominates the 1993 distribution.

Table 1 reports alternative measures of income inequality in each of the four years. Every measure indicates increasing inequality from 1975 to 1984, an improvement to 1988 which is more than reversed by 1993. The indices quantify the 'distance' between the distributions graphed in Figure 1 and they reveal that the increase in income inequality between 1975 and 1993 was substantial; for example, the Gini coefficient increase by 17 percent.

As we increase the inequality aversion measure in the Atkinson index the measure becomes increasingly sensitive to inequality at the bottom of the distribution. From Table 1 we see that the indices with greater inequality aversion report a higher level of inequality in each survey year; however, the general rise in inequality over time was much smaller. It is the least inequality averse Atkinson indices which show the greatest increase in income inequality. This suggests that most of the change in the distribution did not occur at the very bottom.

In addition, Table 1 reports bootstrapped standard errors for each inequality index.[8] Because the statistics are calculated on independent samples (survey years), the test for equality of any two statistics is given in Barrett and Pendakur (1995) as:

$$z^* = \frac{\hat{I}_a - \hat{I}_b}{\sqrt{\frac{V(I_a)}{n_a} + \frac{V(I_b)}{n_b}}} = \frac{\hat{I}_a - \hat{I}_b}{\sqrt{se(I_a)^2 + se(I_b)^2}}$$

The final column of Table 1 presents tests of the equality of each index in 1975 and 1993, which show that the the increase in inequality over time was statistically significant

In the Australian context, considerable attention has been paid to the prospect of a "disappearing middle" (Harding, 1997, Gregory, 1993). Table 2 focuses on this issue. In the top panel, we report the fraction of income received by the bottom 10%, 10- 25th percentile,

[8] The bootstrap standard errors are derived from simulating the distribution of each inequality index with 500 replications. We have also calculated asymptotic standard errors for the Atkinson indices following Thistle (1990). We find that the asymptotic and bootstrap standard errors are very similar, except in the case of the most inequality adverse (α=2) Atkinson indices. For those indices the asymptotic standard errors are somewhat larger. However, the only inference that is affected concerns the change in consumption inequality between 1975 and 1993 which becomes statistically insignificant for this one index (α=2).

the middle 50% (that is between the 25th and 75th percentile), the 75 to 90th percentile and the top 10% of the population in each of the four survey years. Note that this is simple a subset of the information contained in the Lorenz ordinates. We find that the fraction of income which is received by the middle 50% of the population was fairly stable over the almost 20 years spanned by our data. The income share of the bottom 10% was also generally maintained. However, there was a substantial deterioration in the income share of those between the 10th and 25th percentile of the distribution. The top of the distribution experienced important gains.

We conclude our preliminary analysis of income by examining the combined effects of changing inequality and income growth. That is, even with with increasing inequality, it could be that there was sufficient economic growth to ensure that all members of society experienced increasing welfare. In Figure 2 we present Generalized Lorenz curves for the 1975 and 1993 survey years. The Generalized Lorenz curve is the Lorenz curve scaled by mean income, and it has a direct welfare interpretation. The curve for 1993 dips below the 1975 curve and then catches up, with the turning point around the 50% percentile of the population. Accepting equivalent gross income as the measure of welfare, the Generalized Lorenz curves indicate real welfare losses by the bottom of the income distribution and real welfare gains by the top half of the distribution. The bottom panel of Table 2 again draws attention to the middle of the distribution, where we can see that the average real equivalent income of the middle of the income distribution fell by less than one 1998 dollar between 1975 and 1993. Real equivalent income growth was experienced by the top of the distribution, especially the top 10%. Real equivalent income losses were experienced by the bottom of the distribution, especially those between the 10th and 25th percentile.

(b) Consumption Inequality.

We now turn our analysis from equivalent income to equivalent consumption. As mentioned in the introduction, it has been argued that equivalent consumption represents a superior measure of household wellbeing. We begin with a comparison of income and consumption inequality. Figures 3a through 3d illustrate the income Lorenz curve and consumption concentration curve for 1975, 1984,1988 and 1993 respectively. The income Lorenz curve for 1975 showed that the bottom 25 percent of individuals received 12.0 percent of total income. The concentration curve for consumption then reports the cumulative proportion of total consumption received by the bottom fraction of the population *ordered by*

income. Therefore the consumption concentration curve for 1975 shows that individuals in the bottom quarter of the income distribution received 19 percent of total consumption. This clearly shows that household saving and borrowing activities effectively redistribute resources toward the bottom of the point-in-time income distribution, serving to reduce the level of inequality observed with a snapshot of the income distribution. This equalising effect of families' saving and borrowing activities is evident in the consumption concentation curves for each survey year.

Harding (1997) has emphasized the role that taxes and government transfers have played in equalizing income in Australia. In Figures 4a and 4b, for 1988 and 1993 respectively,[9] we present a slightly different comparison which illustrates this point. The lowest curve in each figure is the Lorenz curve for "private income", that is, gross income minus government transfers and benefits. The next curve is the concentration curve for "net income", which is private income plus government transfers and benefits, minus income taxes.[10] The third curve, which is closest to the line of equality, is the concentration curve for consumption.

What these pictures show is that the difference in inequality between net income and consumption (which is presumably the result of private smoothing and redistributive activities) is as large as the difference in inequality between gross and net income (which results from the tax and transfer activities of the state). In this descriptive sense, private redistributive, consumption smoothing and insurance activities are as important as the welfare state. The latter does seem to be more important towards the bottom of the distribution, again, in a purely descriptive sense.

It is extremely important to recognize that these pictures have no counterfactual content. They do not tell us, for example, what the consequences of a reduction in public

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[9]These are the only two years for which we can do these calculations. The information on transfer income and taxes are not available in the 1975 and 1984 Household Expenditure Survey files.

[10]An important caution is that taxes are not reported taxes paid but rather taxes payable as imputed by the ABS. Nonetheless, Harding (1997) reports that for 1994 the ABS's imputations match quite well with Taxation Statistics produced by the Australian Tax Office. Furthermore, we suspect that, if anything, imputed taxes payable are more progressive than actual taxes paid, and thus data on actual taxes paid would only strengthen the point we are making here.

redistribution would be. Taking extreme (and implausible) cases to illustrate, it could be the case that public smoothing and redistribution simply crowds out private mechanisms. In that case, changes to public provisions would have no impact on the consumption concentration curve. On the other hand, it could be that private activities are completely unresponsive to the activities of the state. In that case, one would expect a reduction (or increase) in public provisions to cause the consumption concentration curve to move by an amount comparable to the movement in the net income concentration curve. In context of Figures 4a and 4b, it may be that state provisions seem more important at the bottom of the distribution exactly because that is where they are targetted: low income individuals smooth via public mechanisms because they have access to them. The data tell us nothing about what they would do in the absence of those mechanisms. Making plausible inferences about such counterfactuals is difficult, and requires a source of exogenous variation in public provisions (a natural experiment). We are unaware of any Australian studies of this sort; examples from the international literature include Browning and Crossley (1998) and Gruber (1997).

We next examine changes in consumption inequality over our study period. Figure 5a plots the consumption Lorenz curve for each of the 4 survey years; they are indistinguishable. In order to improve the visual separation, we again plot the *difference* between the line of equality and the Lorenz curve against the cumulative population share, in Figure5b. Here we can see a slight increase in consumption inequality between 1975 and 1984, a slight decrease to 1988 which did not completely reverse the changes between 1975 and 1984, and another increase which brought consumption inequality to 1984 levels again in 1993. These changes appear to be related to the business cycle: the unemployment rate was below 5% in 1975, above 8% in 1984, fell by some 2% by 1988 and then rose above 10% by 1993 (Borland and Kennedy, 1998). Comparing Figure 5b with 1b, we note that the deterioration in consumption inequality between 1988 and 1993 was considerably less dramatic than the deterioration in income inequality. In particular consumption inequality only returned to its 1984 level while the gains in income equality between 1984 and 1988 were considerably more than reversed by 1993.

The Lorenz curves for consumption do not cross, so the distributions are unambiguously ranked. The distribution for 1975 Lorenz dominates that for 1988 which in turn dominates that for 1984 which dominates the 1993 distribution. Inequality indices are nonetheless presented in Table 3. Among the Atkinson indices, inequality growth is largely

independent of the inequality aversion parameter. By every measure consumption inequality was considerably smaller than income inequality at the beginning of the study period and grew by less than income inequality over the study period. Nevertheless, the changes were economically and, as the 2nd column from the right demonstrates, statistically significant.

The top panel of Table 4a allows us to focus again on different segments of the distribution. From 1975 to 1993 the fraction of total consumption received by each segment remained very stable. The bottom 10% and the 10th- 25th percentiles experienced relatively minor deterioration in their consumption shares. The consumption share of the middle 50% of the consumption distribution fell from 47.3% to 46.6% over the data period. As with income (Table 2) this does not suggest a disappearing middle.

With repeated cross sections it is of course the case that households at the bottom of a distribution in any year are different households from those that we observe in any other year. Further note that it is not necessarily the case that the same households are at the bottom of both the income and consumption distributions in any year. We can however ask what the shares, and levels, of equivalent consumption were for different segments of the *income* distribution in each year. This analysis is presented in Table 4b.[11] Table 4b is directly comparable to Table 2 since the corresponding cells represent the same households. Comparing the top panel of Table 4b with Table 2, we note that the bottom of the income distribution does considerably better in terms of consumption shares than income shares. The consumption share of the bottom 10% of the income distribution actually rose by 0.3% over the study period. The next segment of the income distribution (10-25%) experienced a minor fall in their consumption share (0.4%) which constrasts sharply with the substantial fall in their income share (1.4%).

The analysis of consumption so far has focused on inequality alone, with relative (scale free) measures. In Figure 6 we present the Generalized Lorenz curves for real equivalaent consumption for the 1975 and 1993 survey years. The Generalized Lorenz curve for 1993 lies everywhere on or above the Generalized Lorenze curve for 1975. Thus if welfare is measured by real equivalent consumption, it was nondeclining over the period for all segments of the population. Some portions of the population experienced real gains.The bottom panel of Table

[11]The numbers in Table 4a are calculated from Lorenz ordinates, while the numbers in Table 4b are calculated from ordinates of concentration curves.

4a once again draws attention to segments of the consumption distribution. We see that each of these segments experienced a gain in average real equivalent expenditure over the data period. The greatest absolute and percentage gains were at the top of the distribution.

The bottom panel of Table 4b tracks the average real equivalent consumption of segments of the income distribution. Comparing this panel to the bottom panel of Table 2, we see that households at the bottom of the income distribution were dissaving in all years. Because average incomes were falling while average consumption was rising, the amount of implied dissaving has risen both absolutely and as a fraction of income. It is important to bear in mind that the income distribution here is that of current income measured over a short interval a not a measure of permanent or long run average resources. This is an important issue for the interpretation of our findings which we develop further in Section 6.

C) International Comparisons of Gini Coefficients

To put our results in international perspective we present our Gini Coefficients, and changes in the Gini coefficients over time, in Table 5 along side a selection of published results. For both income and consumption, inequality in Australia in 1975 is lower than that reported for Canada in 1978 by Pendakur (1998) and considerably lower than that reported by Culter and Katz (1992) for the United States in 1972. We find that the growth in the Australian income Gini coefficient over the period 1975 to1993 (0.043) is less than one third of the difference between Australia and the United States in the mid 1970s (0.112). Comparing Tables 5 and 1, we see that by 1988, the difference in the Gini coefficients between the countries had actually risen slightly (to 0.122). However, the largest increase (between adjacent surveys) in the income Gini coefficient for Australia occured between 1988 and 1993 (see Table 1).

In all three countries consumption is more equal than income. However, comparisons of the growth of income and consumption inequality are country specific. In Canada, as in Australia, consumption inequality appears to have grown more slowly than income inequality. However, the difference is much less dramatic than in Australia. For the United States, Cutler and Katz report that consumption inequality has actually grown more quickly than income inequality. Investigating the underlying source of these cross - country differences would be an interesting avenue of future research.

V. Specification Checks.

The results of the previous section have important implications, and may be considered controversial by some readers. Accordingly, before we turn (in Section 6) to a discussion of their interpretation, we present, in this section, a series of specification checks which test the robustness of our results and discuss some potential sources of bias.

a) Measurement Error.

Quantities such as income and expenditure are inevitably measured with error in household surveys, and random measurement error will increase the magnitude of any inequality measure. Income is sometimes thought to be less well measured than consumption in the ABS's Household Expenditure Surveys, which raises the possibility that we find consumption to be more equal simply because it is more precisely measured. We address this concern in Table 6 where we compare Gini coefficients for weekly equivalent consumption and weekly equivalent income from the HES with Gini coefficients for two measures of weekly income calculated from the ABS's Income Distribution Survey (IDS) for the years 1982, 1986, 1990, and 1994. Income is thought to be well measured in the latter survey. The first measure of income is average weekly income during the previous financial year (so for example, this measure in the 1982 survey refers to the financial year from July 1981 to June 1982). The second measure is derived from on the survey question regarding current weekly income in the survey week. For the 1982, 1986 and 1990 surveys, interviews were conducted in the final quarter of the calender year. In 1994, the interviews were conducted over the 1994-1995 financial year. Allowing for the fact that the HES and IDS were conducted in different years, Table 6 illustrates that meaures of income inequality in the two surveys are highly comparable.

b) Reporting Period.

It is possible that differences in consumption and income inequality arise because of differences in the survey reporting period for these items. In the HES, most expenditures are reported for a biweekly period. Some durables expenditures are reported for a longer period, but many of these are excluded from our nondurable consumption bundle. Each expenditure category is then divided by the appropriate number to give a weekly amount. Wage and salary

income is reported for the respondents pay period, and then scaled to a weekly amount. Other sources of income reflect a weekly average of the entire previous financial year.

Suppose (as is certainly the case) that incomes and expenditures vary through time. Then the dispersion of a set of weekly income (or expenditure) measures will depend on the length of the reporting period over which the weekly average is calculated. The more weeks that are used, the less within individual variance will be passed on to the cross sectional dispersion.[12] Since in the HES expenditures are averaged over shorter periods than income, this consideration strengthens our result that consumption is more equal than income; if expenditures were averaged over the longer periods for which income is recorded, the observed dispersion of consumption would likely be even smaller. Interestingly, in columns 3 and 4 of Table 6, Gini cofficients for the two weekly income measures available in the Income Distribution Survey, one reflecting a yearly reporting period and the other a much shorter period, do not show any particular pattern.

c) Total Expenditure Elasticity of the Commodity Bundle.

As discussed in Section 2, our consumption measure is a bundle of nondurable expenditures. Infrequency of purchase, especially of durables, causes total expenditure to contain considerable measurement error (as a measure of total consumption). Measurement error of this type will bias upward measures of inequality. One way around this is to impute service flows from durables (which we do for housing), but it is impractical to do so for all the durable goods for which expenditures are recorded. Instead we follow much of the literature and exclude (non-housing) durable expenditures from our measure. The median budget share of our measure is 0.85.

One might be concerned that the lower inequality of consumption (relative to income) is a result of our choice of consumption measure. We emphasize that the budget share of our

[12]The variance of individuals reported (average) weekly expenditures will decline with the length of the averaging period unless expenditures are completely nonstationary or there are structural breaks. Of course, some optimizing models of consumer behaviour imply that consumption will be nonstationary, regardless of the properties of the income process. We believe that the consumption process may have a stationary component, because of liquidity constraints or precautionary savings. In addition to this, infrequency of expenditures adds a large stationary component to the expenditure (as opposed to consumption) process.

measure is not the source of our result. The relative (homogeneous of degree zero) inequality measures we employ are not affected by linear scaling. Thus any bundle which is proportional to total consumption suffices. What is important is that the bundle is proportional to total consumption - that is, it has a constant budget share across total expenditure levels, or equivalently, that it has unit total expenditure elasticity. If the total expenditure elasticity of the chosen consumption bundle is less than unity, then estimates of the dispersion of expenditure will be biased down.[13] Because many durable goods are luxuries (have greater than unit total expenditure elasticities), the researcher faces a tradeoff between two biases. Eliminating durable goods reduces the upwards bias in inequality measures which results from infrequency of expenditures. However, as durables are eliminated from the expenditure bundle, the total expenditure elasticity tends to drop below unity, inducing an opposite downward bias in inequality measures. A second important consideration, when analysing trends in consumption inequality, is that the total expenditure elasticity of the chosen bundle is stable through time. Were this not the case, comparisons of income and consumption inequality growth would be undermined by shifting expenditure patterns.

In fact, a careful investigation suggests that the total expenditure elasticity of the consumption bundle on which we base our analysis (described in section 2) is stable through time. However, it is less than unity, approximately 0.8.[14] On the otherhand, the bundle certainly exhibits some infrequency. It contains clothing, for example, and with a two week reporting period even some elements of food expenditure exhibit infrequency of purchase. Thus we believe it represesnts an acceptable trade off between the biases outlined above.

Nevertheless, we have repeated our analysis with second consumption bundle, similar to the first but with (imputed) rent and fuel expenditures eliminated. The resulting bundle has a

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[13]This is easiest to see in the case of the log variance. Let x bet the expenditure bundle, and total expenditure be x*. If the elasticity is ϵ, then $\ln(x) = \epsilon \ln(x^*)$ and $\text{var}[\ln(x)] = \epsilon^2 \ln(x^*)$. The bias grows quadratically as ϵ diverges from 1. The bias does not result from the scale dependence of the variance of logarithms. While the magnitude is more difficult to calculate the direction of bias in other indices is in the same direction.

[14] Reported elasticities come from estimated Engel curves. That is, we model the responsiveness of the consumption bundle to total expenditure as recorded by the ABS in a regression framework. Measurement error in total expenditure, and the endogeneity of total expenditures, are handled by instrumental variables estimation. The estimated elasticities are robust to alternative specifications and alternative instrument sets. Complete results are available from the authors.

median budget share of 0.65 but a unit total expenditure elastacity (rent and fuel have quite low total expenditure elasticities). It suffers from infrequency in same way as the original bundle. Since we have eliminated the downward bias (but not the upward bias), we contend that calculations of consumption inequality measures with this second commodity bundle represent upper bounds.

A sample of such calculations is presented in Table7, column 3. For the purposes of comparison, previously reported results for income and the original consumption bundle are reproduced alongside in columns 1 and 2. As expected, the new upper bound estimates of consumption inequality are larger than those reported in Section 4. Nevertheless, by these estimates consumption is still less disperse than income (though not always significantly so). It also the case that the difference in the growth in income and consumption inequality is diminshed. For example, the Gini coefficient for income increased 17%, our first estimate of the increase in the Gini coefficient for consumption was 9% and with this alternative consumption bundle we find a change in the Gini coefficient for consumption of 12%. Most importantly, though, the qualitative pattern of the results is preserved. Thus we conclude that our central findings are not an artifact of our choice of consumption bundles.

We have also investigated the robustness of other calculations to the choice of consumption bundle, including Tables 2, 4a and 4b. Again we find that the results are very similar with our alternative bundle.

d) Equivalence Scale.

We have investigated the robustness of our results to alternative equivalence scales. In particular we consider total household expenditure (or income), which corresponds to the assumption that all goods are public within the household, and the opposite, per capita expenditure (or income) which corresponds to the assumption that all goods are privately consumed (or that there are no returns to scale in consumption). We also implemented the commonly used OECD equivalence scale.

The general qualitative pattern of our results is unchanged by these variations. Table 8 illustrates for the case of Gini coefficients. By all measures, consumption is more equal than income, both have exhibited rising inequality, with income inequality rising at least as much as consumption inequality. Income inequality rises by more than consumption inequality except in the case of per capita income and expentures, which is an extreme of the range of possible

equivalence scales.

e) Inflation Bias.

We have also considered the possibility that our year on year comparisons of consumption inequality are biased by changes in the inflation rate through time. The expenditure information in the HES is mostly collected over a two week period for each household, the reference period for which households are observed throughout the year. We deflate each years expenditures with a single yearly price index. However, since we deflate only annually, rapid inflation within a year may raise the apparent expenditures of households interviewed later in the year relative to those interviewed early in the year. This will add spurious dispersion to the consumption distribution and bias our inequality indices up. This is of particular concern for our year on year comparisons because the degree of bias will depend on the rate of inflation. Between the year on year change in the CPI, measured to the second quarter of 1975 (the fourth and final quarter in which data was collected for the 1975 HES) was 12%. The corresponding numbers for 1984, 1988 and 1993 are 2.5%, 7.6% and 1.3%, respectively (See Appendix Figure A1). Thus the small change in consumption inequality that we find between 1975 and 1993 could be biased towards zero by the greater inflation rate in 1975 than 1993. The quarter in which an interview occured is unavailable for the 1975 and 1984 Household Expenditure Surveys, but is available in 1988 and 1993. We have used this information in the 1988 survey (because 1988 had the second highest inflation rate after 1975) to examine what the bias in our inequality indices from inflation (and seasonal factors) may be.

We exploit the fact that Atkinson inequality indices are decomposable to examine the role of *between* quarter inequality plays in the total consumption inequality observed in 1988. The results of this analysis are presented in Table 9. By all the measures we consider , between quarter inequality is less than one percent of *within* quarter inequality, and so contributes neglibly to total inequality for the year. From this evidence we conclude that bias stemming from inflation is probably not a problem in our results.

f) Ageing and Cohort Composition.

Comparisons of inequality in a population through time which do not take account of changes in the age structure of the population may be misleading. For example, as Deaton and Paxson (1994) point out, an implication of intertemporal optimization by households is that

the variance of expenditure within a birth cohort will increase as the cohort ages and shocks to "permanent income" accumulate. Thus the cross sectional inequality in expenditure in an economy could increase solely as a consequence of an ageing population, with no change in the underlying economic processes. Obviously, a more relevant question is, are more recent cohorts experiencing more inequality than older cohorts did *at the same age*. Many of the inequality measures which we employ are decomposable. In a companion paper (Barrett, Crossley and Worswick, 1999), we exploit this property to investigate the contribution of demographic change to the rise in Australian income and consumption inequality over the period covered by our data. In that work we find, among other things, that the results of the current paper hold within age groups and family types. Although demographic change over the study period was substantial, the same patterns of changes in income and consumption inequality were observed within the various demographic groups and hence demographic trends appears to be an insignificant factor in accounting for the growth in aggregate inequality. For example, we observe that younger cohorts are experiencing more inequality than older cohorts did at the same age, for all age categories.[15]

VI. Alternative Interpretations.

In section 4 we demonstrated that in Australia consumption is considerably more equal than income, and that consumption inequality among Australian households rose by considerably less than income inequality over the period of 1975-1993. In Section 5 we demonstrated the robustness of these results. What mechanism generates these differences between income and consumption inequality?

One interpretation of our results is that, in Australia, cross sectional income inequality in part reflected transitory income fluctuations, which households can largely smooth.

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[15]While comparisons of individuals from different cohorts made at the same age are more attractive than unconditional comparisons, it should be noted that the welfare interpretations of such can still be compromised if the cohorts experienced very different real interest rate histories to the age of comparison (see Blundell and Preston, 1998). Because we see a very similar pattern of rising inequality across a range of age groups - with each series of within age group observations representing a different sequence of cohorts - it seems extremely unlikely that changes in the real interest rate could explain our results.

"Permanent Income" is less variable than measured income, and some of the households who appear to be "poor" in any cross section are only temporarily so. The differential growth of income and consumption inequality would then suggest that the well known increase in income inequality in part reflects an increase in transitory income fluctuations. Since households appear to have some capacity to smooth these fluctuations, the welfare costs of this increase in income inequality are abated.

On the other hand, some readers may be skeptical about the role of income mobility in generating income inequality in cross section. If the low income households we observe in each cross section are permanently so, then our results potentially have the disasterous implication that (permanently) low income households have not reduced their expenditures to match their declining incomes, and are financing (through debt or dissaving) consumption incompatible with permanent income. Lifetime budget constraints bind, and such behaviour must lead to very low levels of consumption in the future. With any reasonable intertemporal substitution elasticity this would have an large welfare cost.

For theoretical reasons, we are inclined to the former interpretation, and find it difficult to reconcile the notion that low income households systematically maintained (through debt or dissaving) consumption incompatible with permanent income over a period of almost 20 years. Given the magnitude of dissaving at the bottom of the income distribution implied by Tables 2 and 4b, it is difficult to believe that this dissaving does not represent in part the smoothing of transitory fluctuations. That people would behave so myopically seems implausible exactly because it would be so costly.

Nevertheless, since one interpretation of the results suggests that the rise in inequality has not been matched by a rise in the inequality of household welfare, and the other interpretation implies that the welfare cost of the rise in income inequality will ultimately be exacerbated by the myopic behaviour of households, it would be desirable to bring additional empirical evidence to bear on these alternatives. The remainder of this section examines whether such evidence can be found in the available Australian data.[16]

Unfortunately, it is very difficult to discriminate between these stories with our

[16] These two interpretations do not exhaust the possibilities. We focus on these two possibilities in order to illustrate how difficult is to discriminate between them - which is essentially a question of dynamics - without panel data.

repeated cross section data. Both interpretations of our basic results imply that the correlation between income and consumption should be declining over time - in the one case because the correlation between measured income and permanent income is declining and in the other because the correlation between permanent income and consumption is falling. As reported in Table 10, we do observe a declining correlation between income and consumption across the four survey years, although the decline is not statistically significant. Nevertheless this does not discriminate between the two interpretations of our basic results.

Similarly, both hypotheses suggest that we should see increasing borrowing or dissaving by individuals at the bottom of the (observed) income distribution. In the one case low income households are temporarily so, and they borrow or dissave in order to consume consistently with their marginal utility of wealth (permanent income). As transitory fluctations increase, the amount of dissaving by negatively shocked households increases. In the other scenario, permanently low income households are dissaving to maintain a level of consumption that is no longer consistent with their permanent income. As their economic position deteriorates, the amount of borrowing or dissaving increases.

Ultimately, distinguishing between these interpretations is a question of income dynamics. Are households with low income at a point in time permanently low income households? Its is extremely difficult to address such questions of dynamics with cross section data. In fact, recent studies of trends in income inequality in the United States have focused exactly on the issue at hand: decomposing the income processes faced by individual households into their transitory and permanent components (Gottshalk and Moffit, 1994; Buchinsky and Hunt, 1996). For example, Gottshalk and Moffit, using the Panel Survey of Income Dynamics example, find that one third of the increase in cross sectional earnings inequality observed in the United States during their study period can be attributed to increasing transitory fluctuations (increasing income instability). Unfortunately, such analyses require a long panel data set, which is currently unavailable for Australia.[17]

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[17] Blundell and Preston (1998) show that, if one assumes that households behave according to a standard life cycle consumption model, then it is possible to infer such a decomposition from repeated cross sections (by comparing within cohort changes in expenditure inequality with the coincident movements in income inequality). That is they begin from our preferred interpretation of our results. This illustrates how some well specified theory can reduce data requirements.

One of the data sets which we have analyzed, the Income Distribution Survey, has a short panel aspect. As was introduced in Section 5, the Income Distribution Surveys records income in the previous financial year and in the current week. This short panel aspect can be exploited to get some sense of short run income mobility in Australia. Table 11, as an example, shows the transition matrix between quintiles of the previous financial year income distribution and the current weekly income distribution, for the 1982 and 1994 surveys. In 1982 the percentage of individuals remaining in the same quintile of equivalent income is 63%. In the three other surveys (1986, 1990, 1994), the correpsonding number is 64%. Table 12 reports the Pearson correlation between the two income measures for each survey. Unlike the quintile transitions, Table 12 does seem suggest a (statistically significant) increase in income mobility.

Evidently, there is considerable short run income mobility in Australia. However, the evidence from the IDS on whether income mobility has been increasing over time is at best mixed. More importantly, though, with such a short panel - only two observations for each household - we can not determine whether the income movements summarized in Table 11 are permanent or transitory.[18] While there appears to be significant short-run income mobility, determining whether or not transitory income fluctuations have increased must be deferred until more appropriate data are available.[19]

VII. Conclusions.

In this paper we have investigated economic inequality in Australia, particularly

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[18] As well as confounding transitory and permanent income movements, the changes in the transition probabilities through time are also confounded by changes to the survey design. Most important was a change, starting with the 1994 IDS, in the distribution of interview dates.

[19] Like Australia, a population panel data set covering a long time period is not available in Canada. However, Baker and Solon (1998) have worked with a panel constructed from Canadian income tax records covering a period of 19 years to decompose the growth in Canadian male earnings inequality into transitory and permanent components. The use of administrative tax records also appears to be the only feasible option for investigating these issues for Australia.

consumption inequality, over the period 1975 to 1993. Any examination of inequality necessarily involves a series of methodological decisions. The approach followed in this paper has been guided by the goal of consistency with an ethically defensible social welfare function defined over individual utilities.

Our focus on consumption reflects the fact that utility is typically defined over consumption rather than income and that resources consumed in a period are not necessarily the same as those received in the period. We examine household income and expenditure because individuals live in households and resources are surely shared within households. Of course, such an approach understates individual inequality to some extent because it imputes identical resources to all members of a household and therefore misses intra-household inequality. Intra-household inequality may be important, but it is impossible to measure with standard data sets. Note that alternative approach of imputing to individuals resources equal to their own income surely overstates inequality because of sharing within households,[20] and we believe that such an approach suffers from the greater flaw. To move from household resources back towards an individually based measure of social welfare we calculate the equivalent resources of a member of the household (from household resources and household size) and then weight each household by the number of individuals in the household. Finally, we use measures of inequality which are consistent with social welfare functions that have properties generally accepted as desirable from a normative position.

While it is arguable that our measure of nondurable expenditure more closely corresponds to household welfare than does income, it is important to recognize that household expenditure is still not a complete measure of the inputs to household wellbeing. For example, we do not measure households' consumption of public goods (such as recreational and cultural facilities) or non-cash benefits (such as education and healthcare). We also do not measure the consumption of goods produced in the household. Such inputs are extremely difficult to measure. For an attempt to measure non-cash benefits, see Harding (1995) and for household production, Jenkins and O'Leary (1996). The findings reported by those authors suggest that the inclusion of these additional inputs to wellbeing has an equalizing effect.

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[20]For example, such an approach would lead one to conclude that almost all children are poor.

We find that consumption is much more equal than gross income, and income net of taxes and transfers; that income and consumption inequality grew over the study period; and that the level of inequality displays macroeconomic sensitivity. Each of these finding is consistent with the international literature (Pendakur, 1998, Cutler and Katz, 1992). The greater equality of consumption, even compared to income net of taxes and transfers, highlights the important role of private arrangements for smoothing and redistributing income. However, the data have no counterfactual content. We cannot infer how households would fair if public programs were to change.

Our finding of increasing income inequality contrasts with Harding's (1997) finding of no increase between 1982 and 1994. It is true that half of the increase we observe occured between 1975 and 1984.

We find that income inequality has grown much more than consumption inequality. In Canada as well, income inequality has grown more than consumption, though the difference is not so dramatic (Pendakur, 1998). In the US, the pattern is reversed: consumption inequality grew more quickly than income inequality (Cutler and Katz, 1992).

We find that real incomes rose at the top of the income distribution, were remarkable stable in the middle and fell at the bottom. Real income losses were especially concentrated between and 10^{th} and 25^{th} percentile of the income distribution. This may suggest a growing problem of working poor. Determining the characteristics and circumstances of households in this segment of the population is an important area of future research.

In contrast, we find that the bottom of the income distribution exhibits rising real consumption levels over the data period, and by implication, growing dissaving. This suggests that the declining aggregate savings rate may be related to greater dissaving at the bottom of the income distribution. Disaggregated analysis of Australian savings behaviour is an area for future research which we are pursuing.

One interpretation of our finding that income inequality rose more than consumption inequality in Australia is that the increase in income inequality in part reflected an increase in transitory income fluctuations, which households have largely been able to smooth. Although alternative explanations, such as low income households maintaining consumption levels incompatible with permanent income (through debt or dissaving) over a 20 year period, are less appealing from a theoretical standpoint they cannot be ruled out with the data at hand. Specifically, with repeated cross-sections we are unable to determine the size of the transitory

component of income or any changes in the income process over time. To do so would require a long panel data set.

Determining the source of rising income inequality would be of considerable policy interest. If rising income inequality largely reflects increasing permanent income inequality, then the appropriate policy focus is towards redistributive measures (for example progressive taxation and transfers). On the otherhand, if the source of rising income inequality at a point in time is increasing transitory fluctuations (as seems more plausible given our findings for consumption), then an appropriate policy response is smoothing assistance to overcome imperfections in insurance and credit markets. Such measures should be tightly targetted on those households which are likely to have difficulty shifting resources across periods.[21]

[21] While our finding that consumption inequality rose less than income inequality suggests that some households can smooth transitory fluctuations, it does not imply that all households can do so. As an example, Browning and Crossley (1998) find that most Canadian households can smooth consumption through an unemployment episode, but that an important fraction of the population cannot. This latter group's consumption is sensitive to unemployment insurance benefit levels. Membership in this group can be predicted on the basis of potentially observable characteristics such as the number of earners in the household and liquid asset holdings.

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TABLES.

TABLE 1: Income Inequality in the Four Household Expenditure Surveys

Measure of Inequality	1975	1984	1988	1993	Δ 1993-1975 [z-stat.]	%Δ 1993-1975
variance of ln(income)	0.247 (0.009)	0.283 (0.008)	0.280 (0.007)	0.330 (0.009)	0.083 [6.52]	34%
90/10 ratio	3.551 (0.136)	4.245 (0.103)	4.143 (0.152)	4.433 (0.074)	0.882 [5.70]	25%
Gini Coefficient	0.259 (0.004)	0.280 (0.004)	0.275 (0.004)	0.302 (0.003)	0.043 [8.60]	17%
Atkinson α=0.5	0.054 (0.002)	0.062 (0.002)	0.060 (0.002)	0.072 (0.001)	0.018 [8.05]	33%
Atkinson α=1.0	0.109 (0.003)	0.124 (0.003)	0.122 (0.003)	0.143 (0.002)	0.034 [9.43]	31%
Atkinson α=2.0	0.220 (0.007)	0.244 (0.006)	0.243 (0.007)	0.279 (0.005)	0.059 [6.86]	27%

Notes:
1. Standard errors in round parentheses, z-statistics in square parenthesis.
2. For a two tailed test of 1993=1975 the 5% critical value for the z-statistic is 1.96. For a 1 tailed test of 1993>1975, the 5% critical value for the z-statistic is 1.65.
3. Calculations are based on Australian Bureau of Statistics' Household Expenditure Survey and are weighted by (survey weights x household size).

TABLE 2: Performance of Top, Middle and Bottom (Income).						
Year	Bottom 10%	10-25%	Middle 25-75%	75-90%	Top 10%	Overall Mean Weekly Equivalent Gross Income, 1998$
	Fraction of Equivalent Gross Income Received (Differences in Lorenz Ordinates)					
1975	3.5%	8.5%	46.0%	21.5%	19.7%	489
1984	3.3%	7.7%	46.6%	21.9%	20.5%	483
1988	3.3%	7.8%	46.8%	22.0%	20.1%	495
1993	3.2%	7.1%	45.4%	22.9%	21.4%	495
	Group Mean Weekly Gross Equivalent Income, 1998 $ (Differences in Generalized Lorenz Ordinates Scaled by Population Fraction)					
1975	171.2	277.1	449.9	700.9	963.3	
1984	159.4	247.9	450.2	705.2	990.2	
1988	163.4	247.5	463.3	726.0	995.0	
1993	158.4	234.3	449.5	755.7	1059.3	

Notes:
1. Calculations are based on Australian Bureau of Statistics' Household Expenditure Survey and are weighted by (survey weights x household size).

TABLE 3: Consumption Inequality in the Four Household Expenditure Surveys.

Measure of Inequality	1975	1984	1988	1993	Δ 1993-1975 [z-stat.]	%Δ 1993-1975
variance of ln(income)	0.131 (0.004)	0.159 (0.005)	0.152 (0.005)	0.157 (0.003)	0.025 [4.94]	19%
90/10 ratio	2.547 (0.043)	2.833 (0.038)	2.768 (0.069)	2.869 (0.049)	0.322 [5.27]	12%
Gini Coefficient	0.202 (0.003)	0.221 (0.003)	0.214 (0.003)	0.221 (0.002)	0.019 [4.24]	9%
Atkinson α=0.5	0.032 (0.001)	0.038 (0.001)	0.036 (0.001)	0.038 (0.001)	0.006 [4.24]	19%
Atkinson α=1.0	0.063 (0.002)	0.075 (0.002)	0.071 (0.002)	0.075 (0.002)	0.012 [4.95]	19%
Atkinson α=2.0	0.123 (0.003)	0.147 (0.003)	0.140 (0.004)	0.144 (0.003)	0.021 [4.95]	17%

Notes:
1. Standard errors in round parentheses, z-statistics in square parenthesis.
2. For a two tailed test of 1993=1975 the 5% critical value for the z-statistic is 1.96. For a 1 tailed test of 1993>1975, the 5% critical value for the z-statistic is
3. Calculations based on Australian Bureau of Statistics' Household Expenditure Survey and are weighted by (survey weights x household size).

TABLE 4a: Consumption of the Performance of Top, Middle and Bottom of the Consumption Distribution.

Year	Bottom 10%	10-25%	Middle 25-75%	75-90%	Top 10%	Overall Mean Weekly Equivalent Nondurable Consumption, 1998$
	Fraction of Equivalent Nondurable Consumption Received (Differences in Lorenz Ordinates)					
1975	5.0%	10.0%	47.3%	20.0%	17.7%	313
1984	4.6%	9.5%	46.9%	20.5%	18.5%	324
1988	4.6%	9.6%	47.4%	20.5%	17.9%	326
1993	4.7%	9.5%	46.6%	20.7.%	18.5%	345
	Group Mean Weekly Equivalent Nondurable Consumption, 1998 $ (Differences in Generalized Lorenz Ordinates Scaled by Population Fraction)					
1975	156.5	208.7	296.1	417.3	554.0	
1984	149.0	205.2	303.9	442.8	599.4	
1988	150.0	208.6	309.0	445.5	583.5	
1993	162.2	218.5	321.5	476.1	638.3	

Notes:
1. Calculations are based on Australian Bureau of Statistics' Household Expenditure Survey and are weighted by (survey weights x household size).

TABLE 4b: Consumption of the Top, Middle and Bottom of the Income Distribution.						
Year	Bottom 10%	15-25%	Middle 25-75%	75-90%	Top 10%	Overall Mean Weekly Equivalent Nondurable Consumption, 1998$
	Fraction of Equivalent Nondurable Consumption Received (Differences in Lorenz Ordinates)					
1975	7.0%	12.0%	49.2%	18.0%	13.8%	313
1984	6.6%	11.6%	49.8%	18.3%	13.8%	324
1988	6.9%	11.9%	49.1%	18.6%	13.5%	326
1993	7.3%	11.6%	48.3%	18.9%	13.8%	345
	Group Mean Weekly Equivalent Nondurable Consumption, 1998 $ (Differences in Generalized Concentration Ordinates Scaled by Population Fraction)					
1975	219.1	250.4	308.0	375.6	431.9	
1984	213.8	250.6	322.7	395.3	447.1	
1988	224.9	258.6	320.1	404.2	440.1	
1993	251.9	266.8	333.3	434.7	476.1	

Notes:
1. Calculations are based on Australian Bureau of Statistics' Household Expenditure Survey and are weighted by (survey weights x household size).

TABLE 5: Changes in Gini Coefficients: Various Comparisons.

Country	Item	Period	Initial Gini	Δ Gini (%Δ)	Source
Australia	Equivalent Gross Income	1975-1993	0.259	0.043 (17%)	This Study
Australia	Equivalent Nondurable Consumption	1975-1993	0.202	0.019 (9%)	This Study
Australia	Equivalent Disposable Income	1982-1993	0.276	-0.001 (-0%)	Harding, 1997
Canada	Equivalent Gross Income	1978-1992	0.272	0.044 (16%)	Pendakur, 1998
Canada	Equivalent Nondurable Consumption	1978-1992	0.228	0.029 (13%)	Pendakur, 1998
United States	Equivalent Gross Income	1972-1988	0.371	0.026 (7%)	Cutler and Katz, 1992
United States	Equivalent Total Consumption	1972-1988	0.253	0.043 (17%)	Cutler and Katz, 1992

Notes:
1. Cutler and Katz do not report results for nondurable consumption but state that they are similar to those they report for total consumption.

TABLE 6: Gini Coefficients, Consumption and Income, HES and IDS.

	Weekly Nondurable Consumption, HES	Weekly Gross Income, HES	Annual Gross Income/52, IDS	Weekly Gross Income, IDS
75Q3-76Q2 (“1975")	0.202	0.259		
81Q3-82Q2			0.266	
82Q4				0.279
84Q1-84Q4 (“1984")	0.221	0.28		
85Q3-86Q2			0.285	
86Q4				0.295
88Q3-89Q2 (“1988")	0.214	0.275		
89Q3-90Q2			0.292	
90Q4				0.284
93Q3-94Q2 (“1993")	0.221	0.302	0.293	
94Q3-95Q2				0.289

Notes:
1. Calculations are based on Australian Bureau of Statistics’ Household Expenditure and Income Distribution Surveys and are weighted by (survey weights x household size).

TABLE 7: Gini Coefficients, Alternative Consumption Bundles.			
Inequality Measure	Gross Income	Nondurable Consumption including Shelter, Fuel	Nondurable Consumption excluding Shelter, Fuel.
Levels, 1975			
ln variance	0.247	0.131	0.208
90/10 ratio	3.55	2.55	3.25
Gini Coefficient	0.259	0.202	0.246
Atkinson, $\alpha = 0.5$	0.054	0.032	0.046
Atkinson, $\alpha = 1.0$	0.109	0.063	0.095
Atkinson, $\alpha = 2.0$	0.22	0.123	0.187
%Δ, 1975 - 1993			
ln variance	34%	19%	25%
90/10 ratio	25%	12%	16%
Gini Coefficient	17%	9%	12%
Atkinson, $\alpha = 0.5$	33%	19%	26%
Atkinson, $\alpha = 1.0$	31%	19%	24%
Atkinson, $\alpha = 2.0$	27%	17%	22%

Notes:
1. Calculations are based on Australian Bureau of Statistics' Household Expenditure Surveys and are weighted by (survey weights x household size).

TABLE 8: Gini Coefficients, Alternative Equivalence Scales		
	1975	% Change, 1975 - 1993
Income		
Total Household	0.242	18%
Equivalent	0.259	17%
OECD	0.279	14%
Per Capita	0.321	12%
Consumption		
Total Household	0.206	4%
Equivalent	0.202	9%
OECD	0.218	9%
Per Capita	0.259	12%

Notes:
1. Calculations are based on Australian Bureau of Statistics' Household Expenditure Survey and are weighted by (survey weights x household size).

TABLE 9: Inflation and Seasonal impacts on Inequality, 1988 HES
(Year on Year CPI Growth, 1989,Q2 = 7.6%)

	Weekly Gross Equivalent Income			Weekly Equivalent Nondurable Expenditure		
Atkinson indices	α=0.5	α = 1	α = 2	α = 0.5	α = 1	α = 2
Overall	0.06	0.122	0.243	0.036	0.071	0.14
Within Quarter (% of total)	0.060 (100%)	0.121 (99%)	0.241 (99%)	0.036 (100%)	0.071 (99%)	0.140 (99%)
Between Quarter (% of total)	0.000 (0%)	0.001 (1%)	0.002 (1%)	0.000 (0%)	0.000 (0%)	0.001 (1%)

Notes:
1. Calculations are based on Australian Bureau of Statistics' 1988 Household Expenditure Survey and are weighted by (survey weights x household size).

TABLE 10: Correlations Between Equivalaent Expenditure and Equivalent Income, Household Expenditure Survey, 1975-93.

	Pearson Correlation (standard error)
1975 (75Q3-76Q2)	0.541 (0.017)
1984 (84Q1-84Q4)	0.524 (0.019)
1988 (88Q3-89Q2)	0.526 (0.014)
1993 (93Q3-94Q2)	0.520 (0.010)

Notes:
1. Calculations are based on Australian Bureau of Statistics' Household Expenditure Survey and are weighted by (survey weights x household size).
2. Bootstrapped standard errors are in round parentheses.

TABLE 11: Income Mobility in 1982 IDS (Transition Matrix).

1982						
		Income, Current Weekly				
	Quintile	1st	2nd	3rd	4th	5th
Income, previous financial year	1st	0.72	0.17	0.04	0.02	0.04
	2nd	0.11	0.59	0.23	0.04	0.03
	3rd	0.04	0.16	0.54	0.2	0.05
	4th	0.02	0.05	0.15	0.58	0.20
	5th	0.09	0.04	0.04	0.13	0.70
1994						
		Income, Current Weekly				
	Quintile	1st	2nd	3rd	4th	5th
Income, previous financial year	1st	0.73	0.16	0.04	0.01	0.06
	2nd	0.14	0.58	0.18	0.05	0.05
	3rd	0.05	0.17	0.54	0.19	0.05
	4th	0.02	0.05	0.15	0.57	0.2
	5th	0.04	0.03	0.06	0.13	0.74

Notes:
1. All rows sum to 1.0 (except for rounding error). Thus the numbers report the probability of destination states (income quintile in the current week), given the initial state (income quintile in the previous financial year).
2. Calculations are based on Australian Bureau of Statistics' Income Distribution Survey and are weighted by (survey weights x household size).

TABLE 12: Correlations Between Current weekly income and Income in the Previous Financial Year, Income Distribution Survey, 1975-93.

	Pearson Correlation (standard error)
1982	0.855 (0.006)
1986	0.767 (0.008)
1990	0.814 (0.005)
1994	0.807 (0.012)

Notes:
1. Calculations are based on Australian Bureau of Statistics' Household Expenditure Survey and are weighted by (survey weights x household size).
2. Bootstrapped standard errors are in round parentheses.

FIGURES

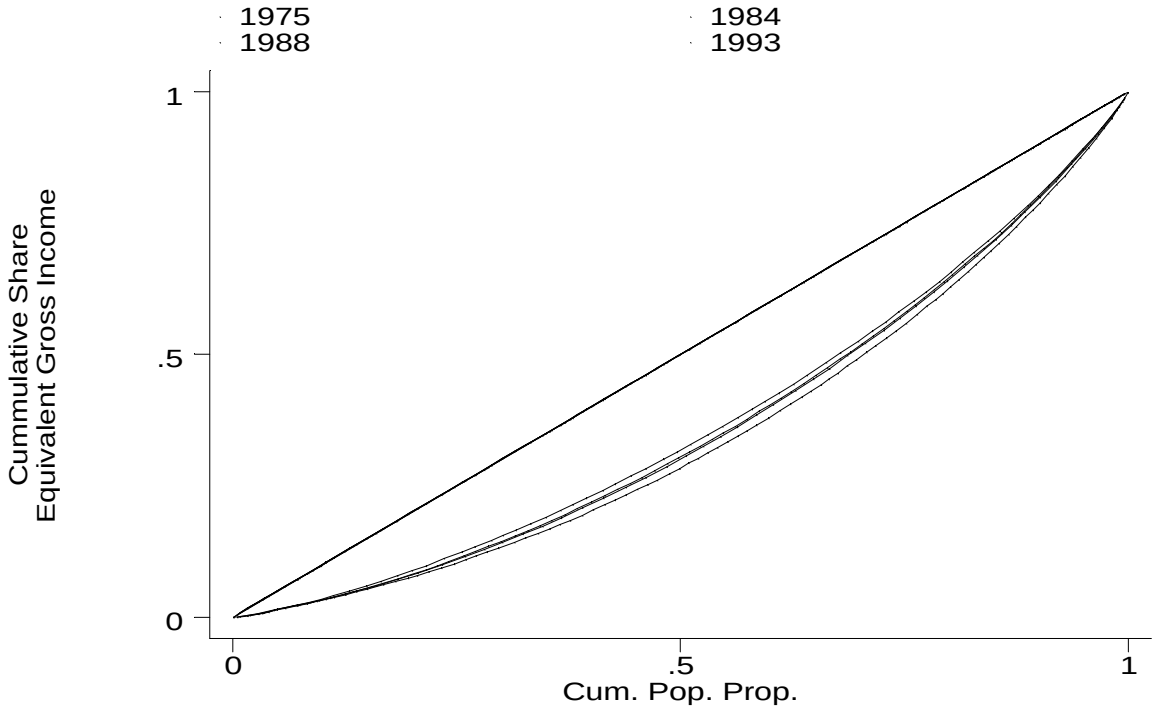

FIG 1a: Lorenz Curves:Income

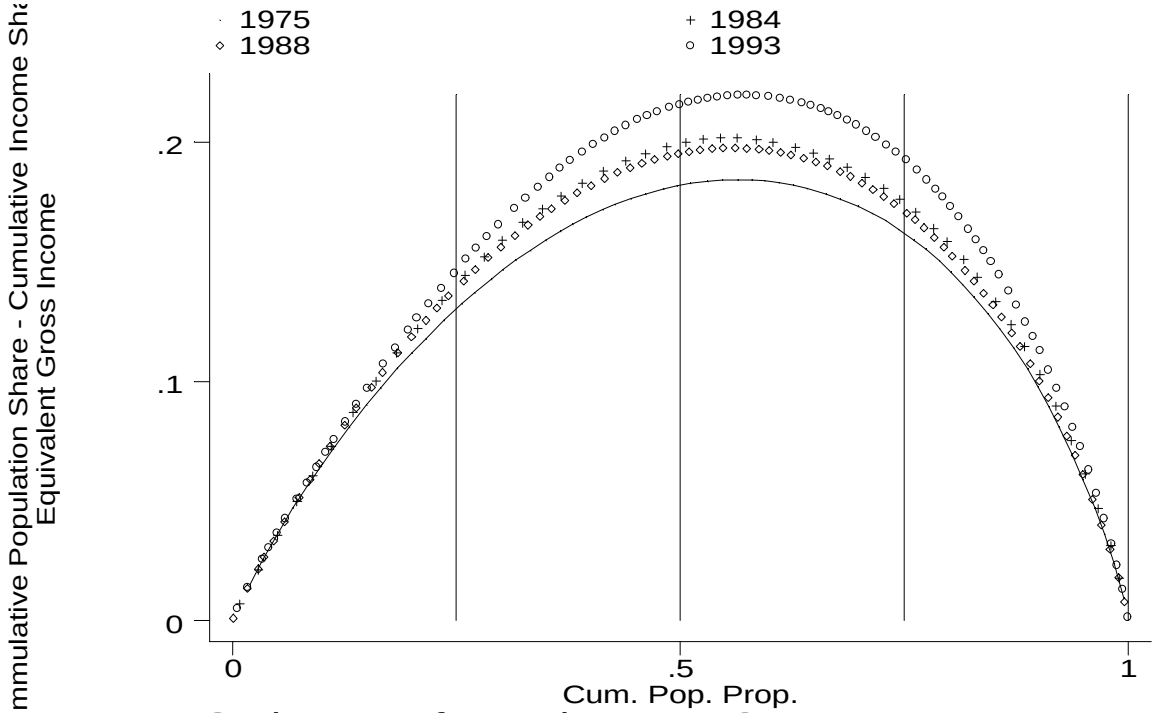

FIG 1b: Transformed Lorenz Curve: Income

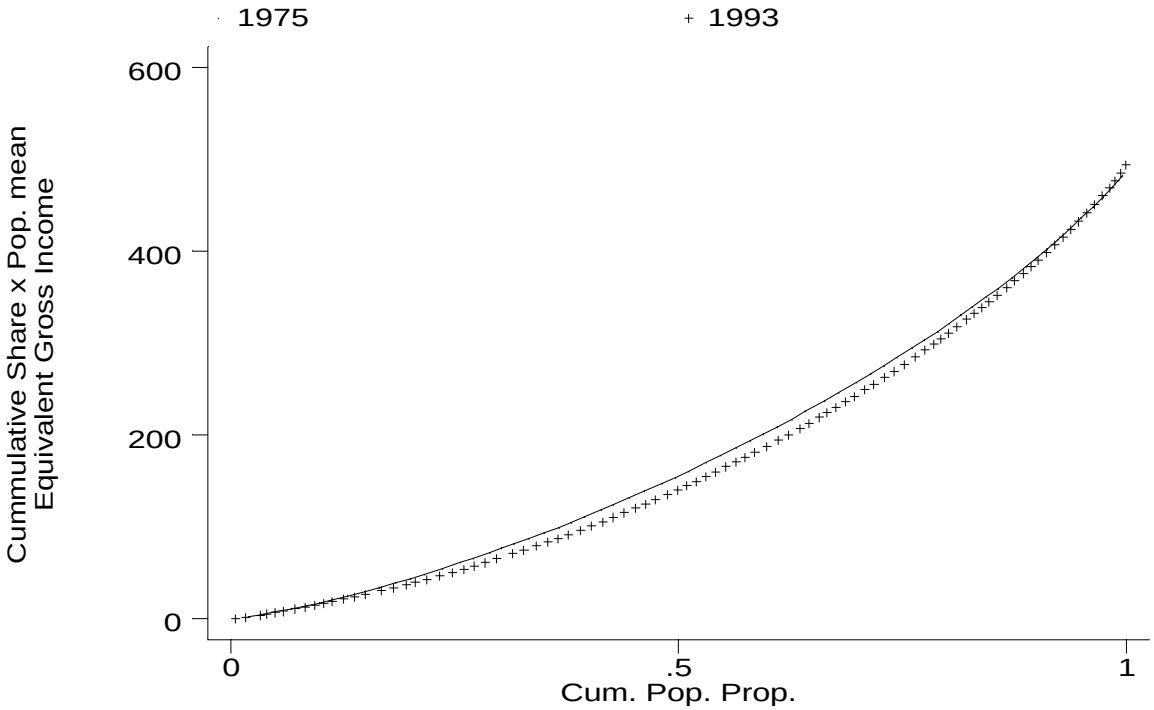

FIG 2: Generalized Lorenz Curves: Income

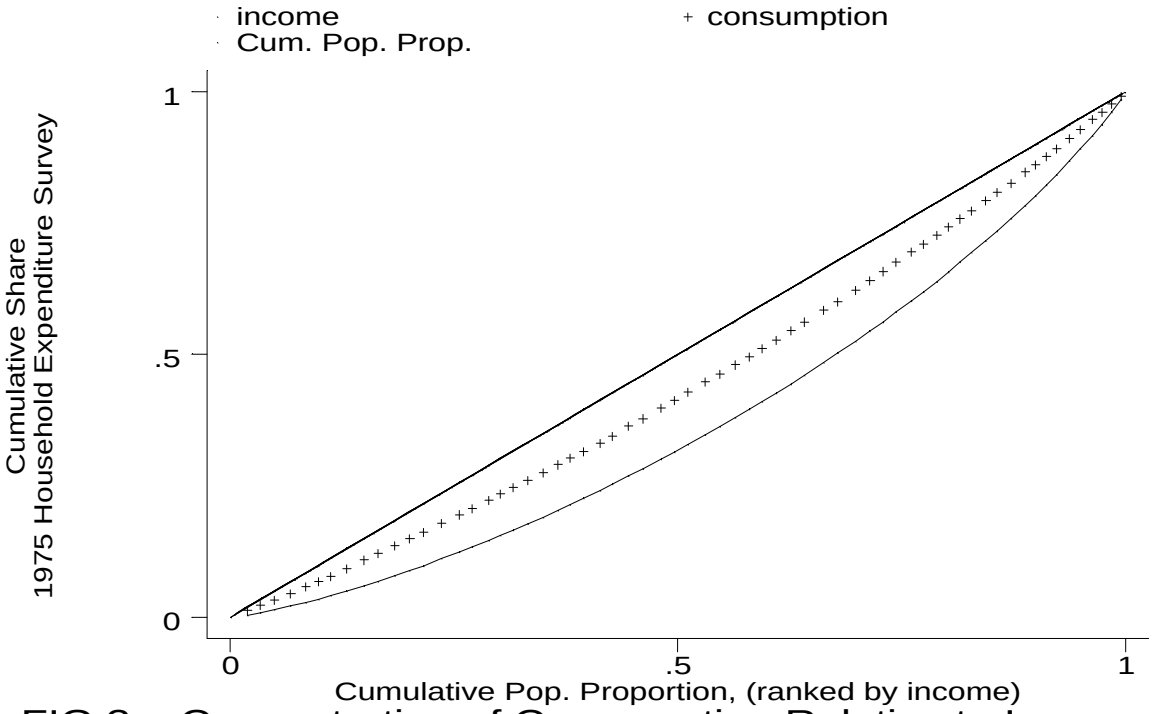

FIG 3a: Concentration of Consumption Relative to Income

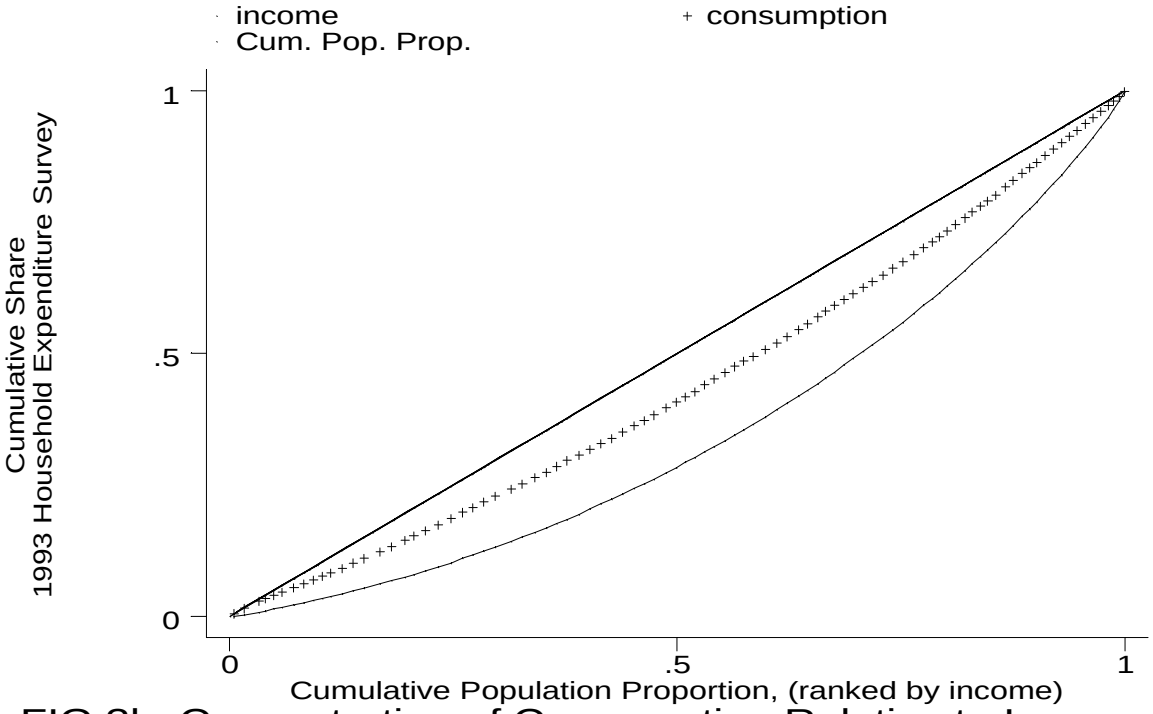

FIG 3b: Concentration of Consumption Relative to Income

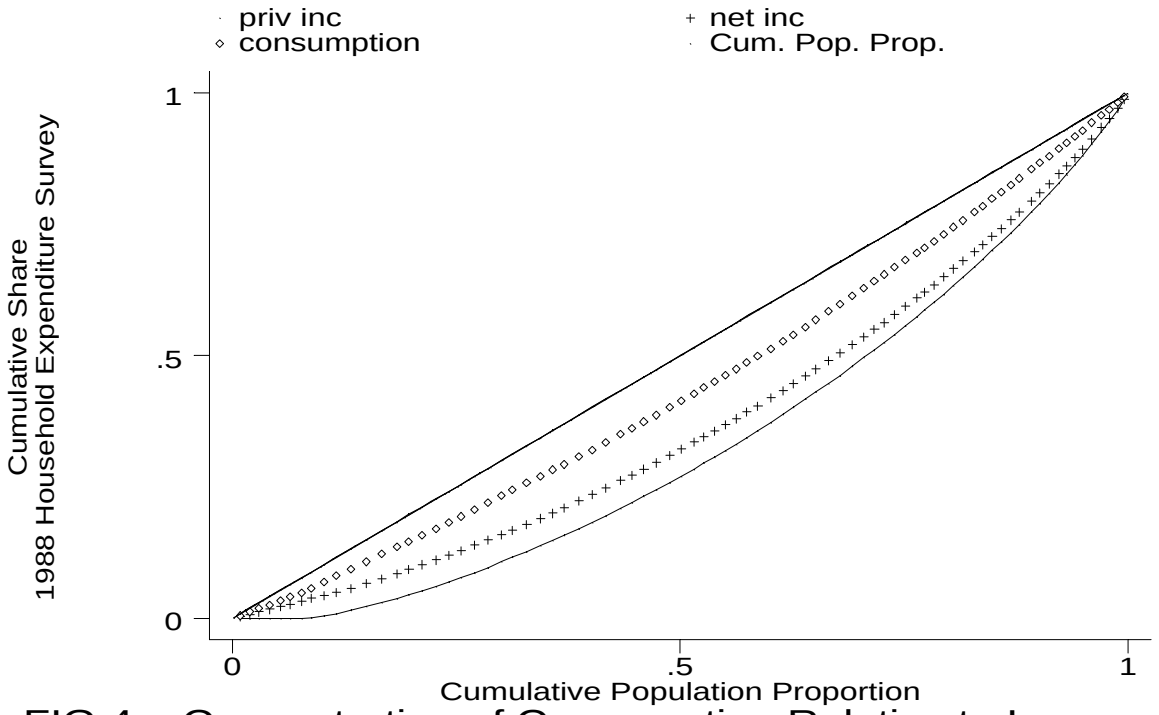

FIG 4a: Concentration of Consumption Relative to Income

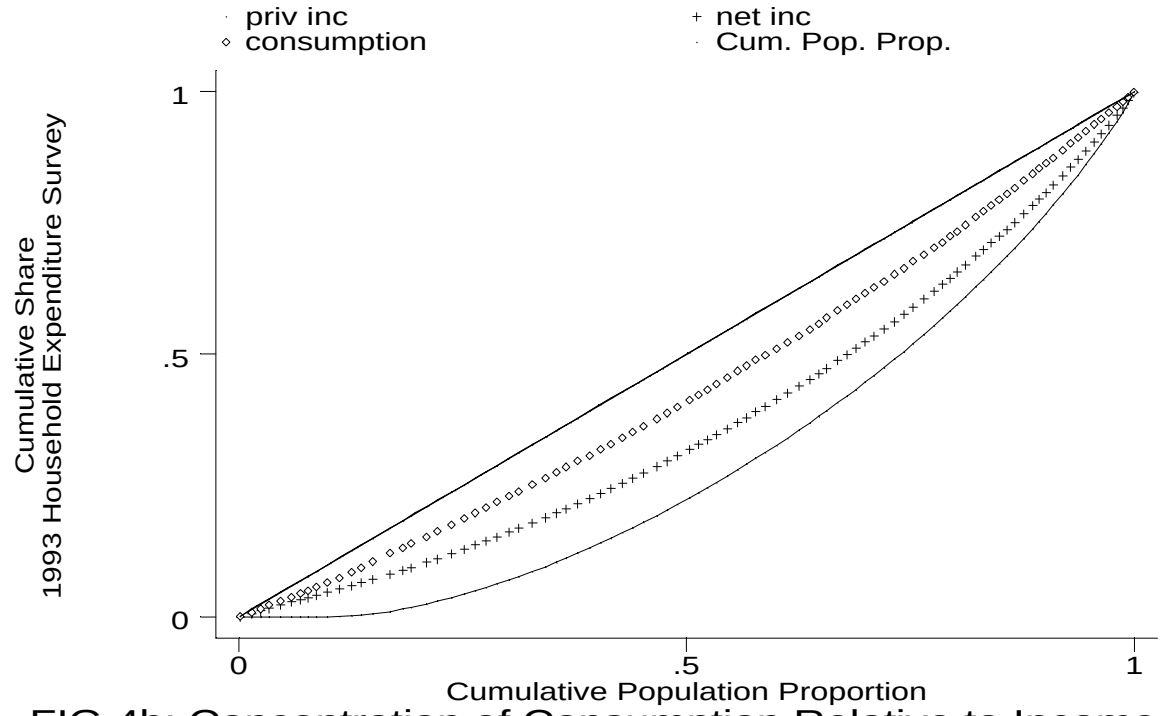

FIG 4b: Concentration of Consumption Relative to Income

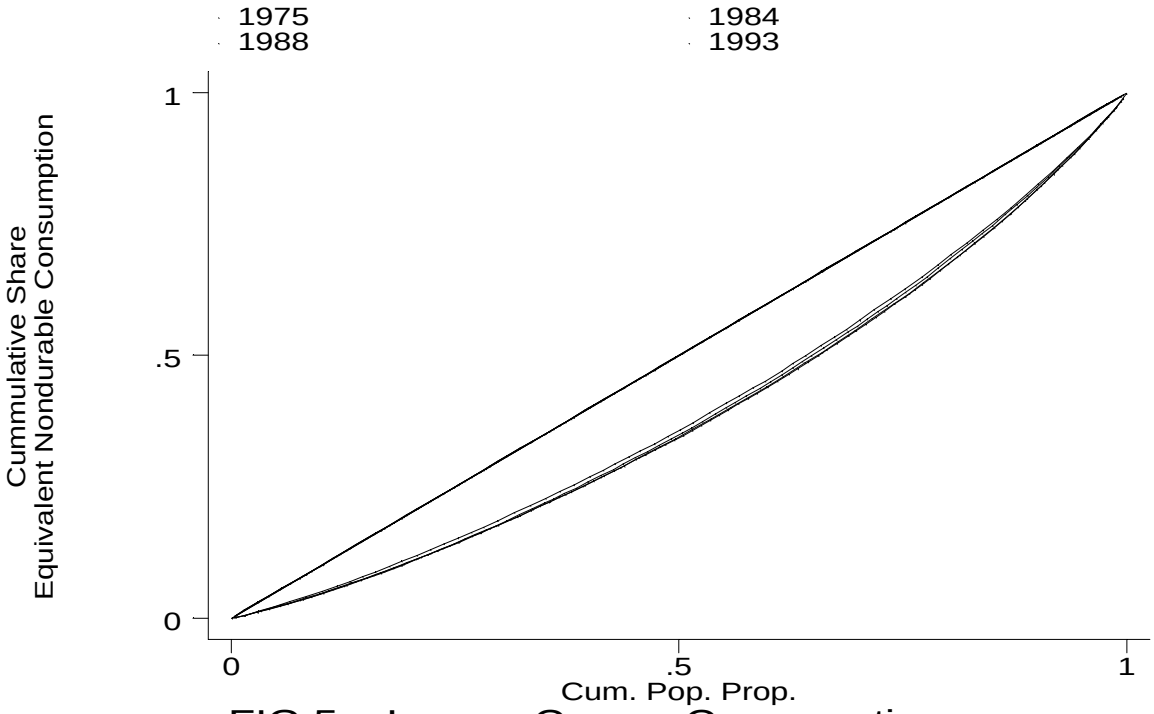

FIG 5a: Lorenz Curves:Consumption

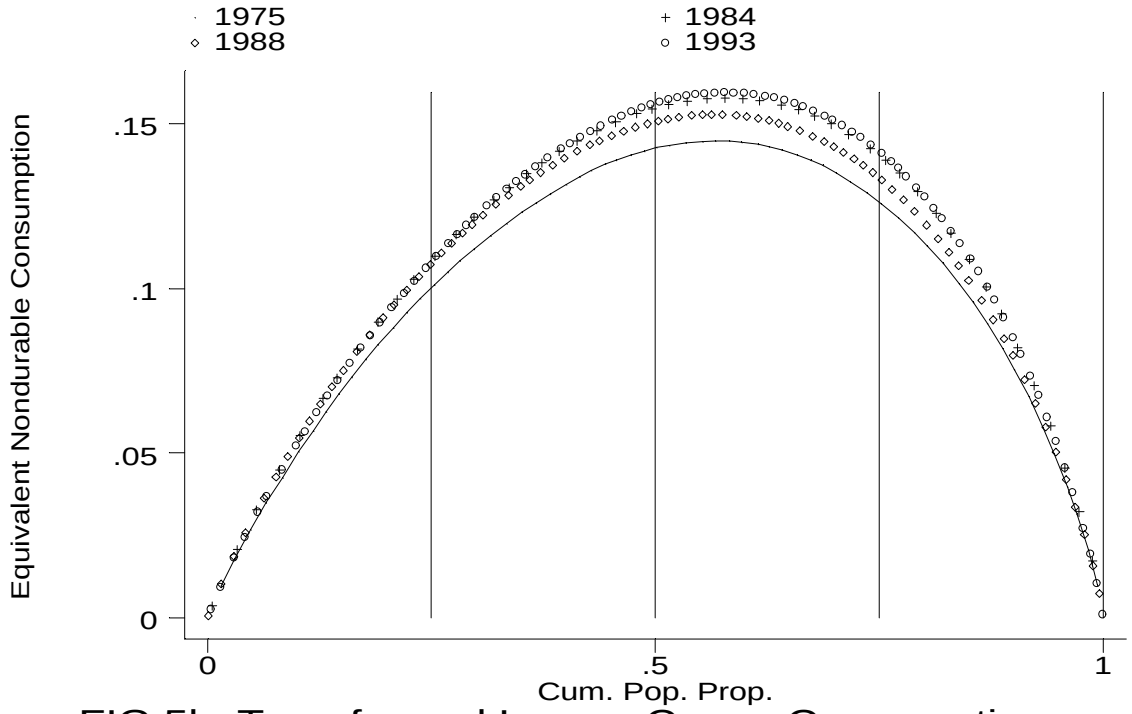

FIG 5b: Transformed Lorenz Curve: Consumption

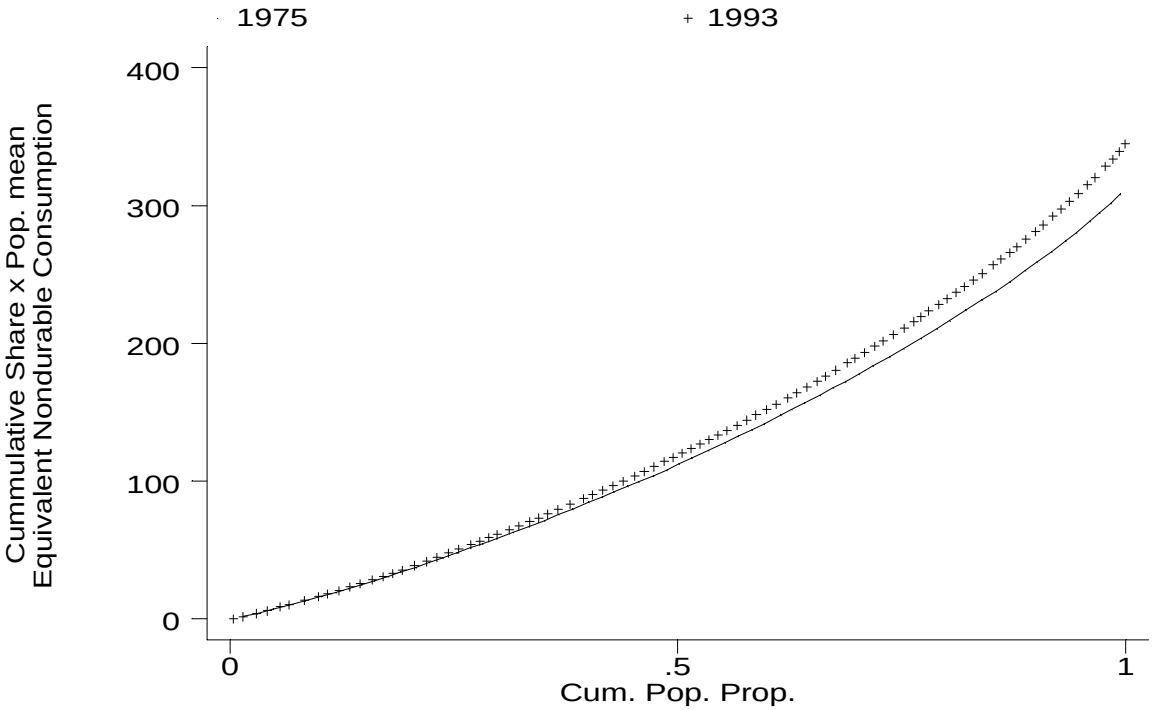

FIG 6: Generalized Lorenz Curves: Consumption

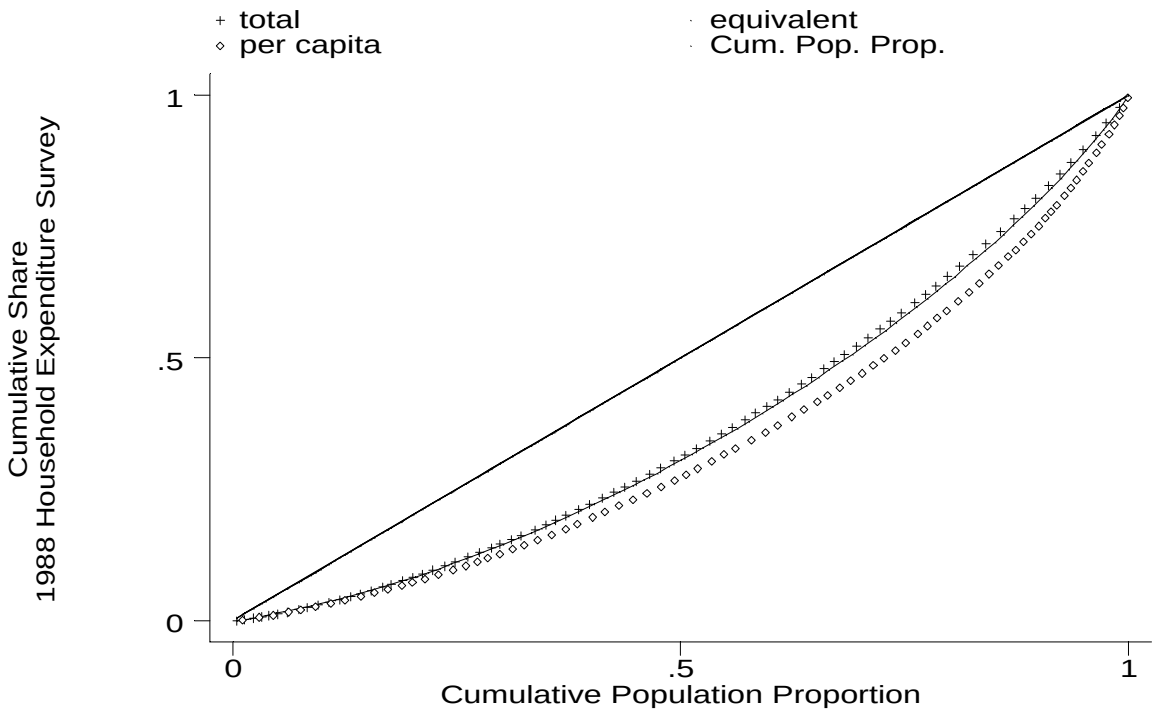

FIG 7a: Lorenz. of Income, Alt. Equiv. Scales

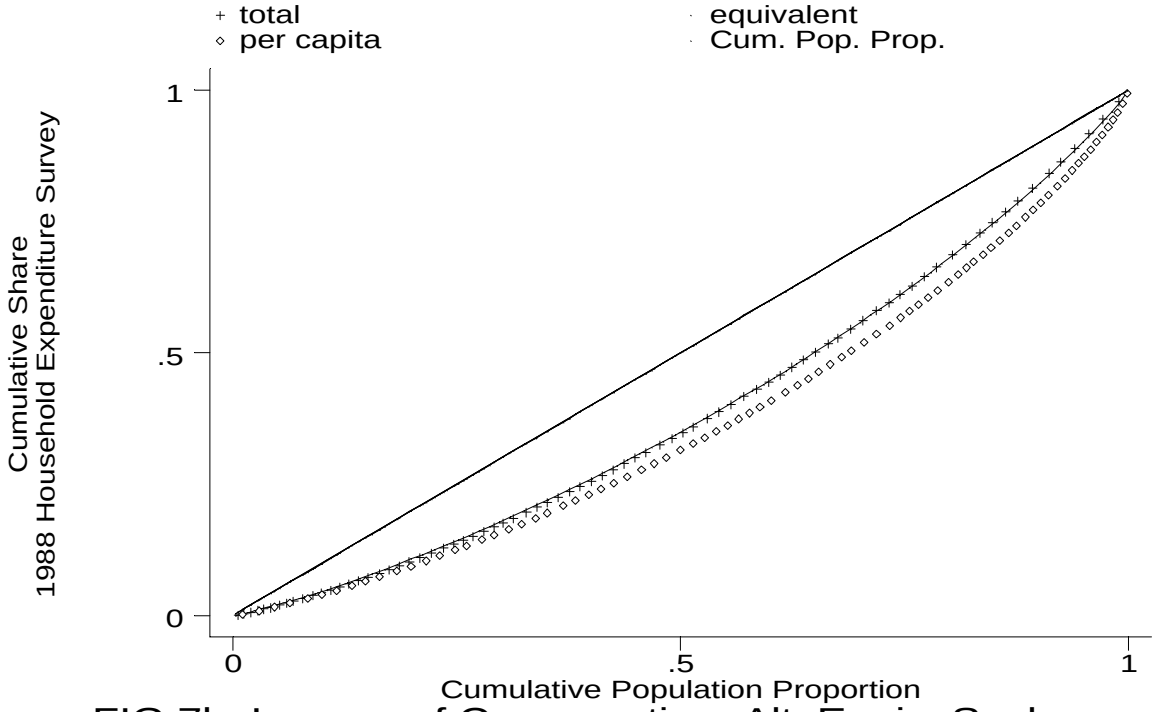

FIG 7b: Lorenz. of Consumption, Alt. Equiv. Scales

APPENDIX

TABLE A1: Selected Statistics by Year.						
Variable		1975	1984	1988	1993	Notes.
Survey		HES	HES	HES	HES	
Survey Period		75Q3 - 76Q2	84Q1 - 84Q4	88Q3 - 89Q2	93Q3 -94Q2	
CPI		0.259	0.552	0.774	0.92	Value of CPI in 3rd Quarter of Survey (not calender) year, with base 98Q1 = 100.
Year on Year CPI Growth		12.0%	2.5%	7.6%	1.3%	Last Quarter of Survey
unweighted observations		3238	2509	4037	4573	
Means						
Household Size		3.68	3.32	3.2	3.03	
Real Gross Income, 1998$	Household	964	914	926	900	
	Equivalent	489	483	495	495	/sqrt(hh size)
	Per Capita	260	267	278	287	/(hh size)
Real Nondurable Expenditure, 1998$	Household	626	618	615	634	
	Equivalent	313	324	326	345	/sqrt(hh size)
	Per Capita	164	177	181	198	/(hh size)

Note:
1. Calculations are based on Australian Bureau of Statistics' Household Expenditure Survey and are weighted by (survey weights x household size). The sample restricted to households with a head between 25 and 60 years of age.

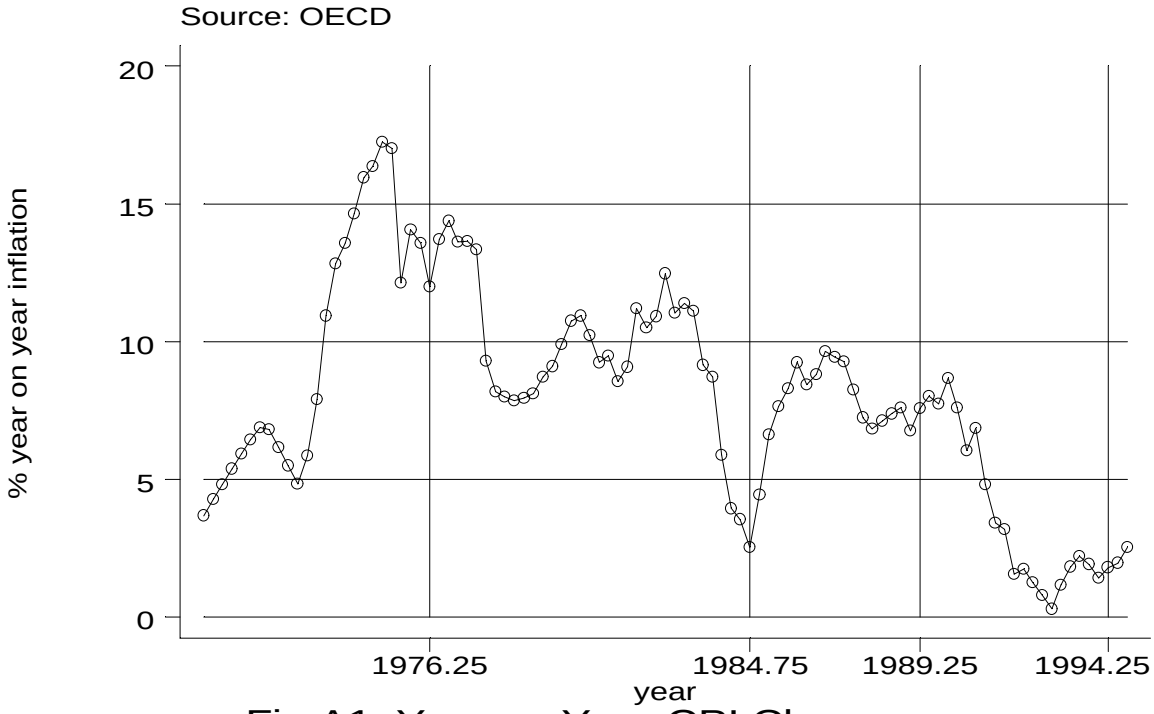

Fig A1: Year on Year CPI Changes