

Pro-Poorness Growth and the Elderly in Australia

by

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Abstract

ABSTRACT

In this paper, we employ various measures of growth pro-poorness and six rounds of micro-unit survey data to examine the impact of Australia's long run of consistent growth on the welfare of various segments of the population, particularly the elderly. We find from consumption data analysis that there was a steady overall improvement in the welfare of households in Australia between 1983 to 2010. Our results, however, also show that compared to the rest of the population, elderly households gained relatively little from the country's long spell of economic growth. In particular, we find that despite strong economic growth, the relative proportion of poor elderly households increased significantly over time, and most particularly between 2004 and 2010. Further, older cohorts were found to have experienced higher increases in the inequality levels amongst them compared to their younger counterparts.

JEL: I32, J11 and J14

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1. Introduction

Australia's 23 years of sustained economic growth in a highly unpredictable and volatile global economic environment is truly remarkable and unprecedented at the world stage. The country's outstanding run, however, stands out alongside increased public concern that poverty has remained high and increasing, particularly for certain population groups. The Poverty Report published in 2014 by the Australian Council of Social Service (ACOSS) reports that 2.55 million Australian residents lived below the poverty line in 2012. This is about 14 per cent of all Australian residents in 2012, where this rate is 0.9 percentage points higher than what it was 3 years prior (ACOSS 2014). This poverty rate estimate appears roughly consistent when compared to those found in recently published academic articles. For example, Saunders and Abe (2010) in their study on deprivation, estimate Australian poverty rate for 2006 at 14.8 per cent; while, Redmond, et al (2013) estimates it to be about 15 per cent for the same period. Further, there is evidence that show that poverty rates are higher among elderly households and households with single parents (Valenzuela et al (2014), Saunders and Abe (2010), Athanasopoulos and Vahid (2003)), and among regional households (Wright et al (2015)); and that inequality has increased over time (Valenzuela et al (2014), and Austen and Redmond (2013)). This seemingly odd coupling of economic growth and increased levels of poverty and inequality begs the question, 'How pro-poor has Australia's economic growth been?'

Whether Australia's economic growth is pro-poor or not is a question that encapsulates many others, including such evocative ones as: Have the benefits of growth accrued to only a select section of the population? Did the benefits of economic growth fail to "trickle down" to the poorer income groups? More positively, we ask in this paper, 'How has economic growth affected the poor in Australia?' Is economic growth in Australia associated with marked improvements in the living conditions of the poorer groups in society as much as it has been for groups higher in the income strata? What was the effect of growth on poverty and inequality levels? The answers to these questions bear important policy implications. If the benefits of growth are found to be more widely shared across the economic strata, this will affirm the country's strategy for growth-oriented policies and promote the adoption of more policies targeting growth and development as a first priority. But if the benefits of growth are found to favour only some population segments and leave others behind, pro-growth policies may need to be re-assessed and reconsidered in greater coordination with distributional goals. Findings

from this study will also provide valuable inputs to Australian policy for the future, given its welfare state system and the ageing of its population.

Pro-poorness growth is basically the economic growth that improves the living conditions or causes higher welfare levels of the most marginalised members of society. Ideally, this will involve tracking a wide arrange of attainments and capabilities to determine how welfare states they are altered during the growth process. However, given data availability and the time lags with which capabilities are affected by economic conditions, most studies have focused mainly on analysing the effects of economic growth on income growth alone. Azpitarte (2014) made a novel attempt to investigate this issue for Australia using a multidimensional approach and found that weak evidence towards pro-poorness, and mainly in the income sense only; there was no evidence that growth was pro-multidimensional poor. Due to data constraints, Azpitarte's conclusions only apply for the short 7 year period between 2001 to 2008. It remains to be seen how the poor fared overall during the microeconomic reform years of the 1980s, through to the growth years of the 1990s; as well, it is uncertain how the poor pulled through post 2008, when the economy recovered rather quickly from the ravages of the 2007/08 Great Recession that debilitated much of the advanced economies of the world.

Against that backdrop, we undertake this study to investigate the pro-poorness of Australia's economic growth over a 28-year period, between 1983 and 2010. Our specific aim is to track changes in welfare levels of households alongside the growth and development of the economy over this long time. The lengthy period of analysis is highly appropriate for investigating changes in the slow-moving indicators that we are interested in: poverty rates and inequality levels. In addition, our use of decomposable pro-poorness measures will provide useful insights into the components or sources of the positive or negative welfare changes experienced by the population, where information on household expenditures are used to proxy for welfare in our analysis. Our preference for expenditure over income stems from three primary considerations¹. First, compared to income, expenditure data is less vulnerable to under-reporting bias. Second, expenditure is a more direct measure of material well-being than income. Third, expenditure is also thought to better capture long-run welfare levels of individuals or households compared to current income.

¹ A good reference for this discussion can be found in Deaton (1997).

Our specific research questions are as follows: Was Australia's economic growth poverty alleviating? Was it inequality reducing? Is economic growth in Australia associated with marked improvements in the living conditions of the poorer groups in society as much as it has been for groups higher in the income strata? How much of the improvements in household welfare over time can be attributed to economic growth, and how much to the government's redistribution policy? Additionally, we attempt to find answers to these questions by analysing the case for the elderly population only. In other words, we ask: What is the poverty and inequality level among the elderly, relative to the rest of the population? How has this changed over time and through the growth period? Did the poor elderly benefit from Australia's economic growth as much as the mainstream poor? Or, is there a bias in economic growth against the elderly poor? Answers to all these questions bear important policy implications.

The rest of the paper is as follows: Section 2 presents concepts, terms and measures; Section 3 describes the data and details the various data adjustments applied so that variables are comparable over the long period of time considered; Section 4 presents results and provides a thorough discussion on inequality and poverty trends, pro-poor growth analysis results for all households in the economy in the first instance. Following this, we present results of our inequality, poverty and pro-poor growth analysis for the elderly population only. Section 5 concludes.

2. Historical Overview

The set the research question in context, an overview of significant economic events from the early 1980s can be instructive. Microeconomic reform was the hallmark of the Australian economy in the 1980s. As the world was fast moving towards greater integration, the Hawke government sought measures to increase the country's competitiveness by such moves as introducing significant labour reforms, gradually reducing tariffs, deregulating the financial system and floated the Australian dollar. By and large, the joint effects of these reforms boosted the economy and increased our economic ties and opportunities with the rest of the world - the economy boomed! The 1980s also saw the beginning of the end of government owned corporations as several government enterprises were privatised – this in general increased labour productivity and increased efficiency overall; not only were we selling wool and meat and minerals, the economy was favourably considered by new overseas investors as a good and secure place to do business. They came in droves.

The good times did not last though. The early 1990s recession came swiftly after the October 1987 stock market crash. This collapse, larger than the stock market crash of 1929, was handled effectively by the global economy, and the stock market began to quickly recover. However, North America struggled to recover financially due to severe structural defects in the lumbering savings and loans industry which eventually led to a savings and loan crisis. The recession thus impacted the many countries closely linked to the United States, including Australia. Paul Keating, who was Prime Minister at the time, famously referred to it as "the recession that Australia had to have."^[14] During the recession, GDP fell by 1.7 per cent, employment by 3.4 per cent and the unemployment rate rose to 10.8 per cent.^[15] Despite this, there was a beneficial reduction in inflation.

In 1993, Australia was just coming out of a deep recession, and the Hawke-Keating government led recovery by continuing on with the economic liberalisation reforms that lifted the economy up in the mid-1980s. When the Liberals were voted to power in 1996, the Howard government moved swiftly to reduce government expenditure, prioritise a return to budget surplus and instigate industrial relations reforms to further speed up economic recovery. The short term pains that accompanied these reforms were rationalised as unfortunate but necessary for achieving economic efficiencies critical for the long term growth performance of the economy. It was apparent that equity was less important as a reform goal, despite the political rhetoric.

In the 1990s, Australia's economic performance was characterised by low inflation targeting and high productivity. The first is a lesson learned from the last recession, and the latter is a result obtained from a long process of labour pro-market reforms dating back from the 1980s and which culminated in a formal shift towards enterprise bargaining early on in the Howard regime. Australia grew strongly under these policies. Towards the end of the decade, the country's economic growth was quite robust so much so that the economy got through the severe Asian financial crises of 1998 virtually unscathed.

In the 2000s, the Australian economy continued to grow strongly on the back of a successful tax reform program introduced in the early years, and the Australian mining boom. Experts estimate the boom to have officially started in 2004, when Australian minerals had a surge in commodity prices and a tremendous increase in the trade of terms, particularly with China. A second stage is identified to have begun in late 2005, when sustained international demand for our minerals

led mining companies to reinvest their superprofits by opening up new mines, building new infrastructure and acquiring/developing new technologies – all to accommodate growth in demand. It is this capital investment stage that is known to have peaked in 2013, and signalled the end of the mining boom. Through that 2004 to 2013 period, Australia had a change of government. As well, the global recession of 2008 seriously threatened the stability of the economy. The Australian economy however continued to grow through all these hurdles, albeit at reduced rates. Fact is, the economy did so well that Australia topped the list of countries that were least affected by the global financial crisis, where this included China, Canada, Japan,

3 Conceptual Framework

How economic growth impacts on the poor has long been the object of study by many researchers and analysts alike, but the quantification of that concept is a relatively new development. In terms of empirical measurement, there are two basic approaches in the economic literature towards this – one on each side of the anonymity axiom. Social evaluations based on the anonymity (sometimes called symmetry) axioms achieve conclusions based on the use of indicator variables that excludes people's attributes from the social choice problem. This can be income or expenditure or generally, any chosen welfare indicator whose distribution is being measured; we will use income to simplify exposition. In the context of pro-poorness growth measurement, the anonymity axiom requires that the pro-poor measure be independent of any characteristic of individuals other than their income. Conclusions of pro-poorness of growth or otherwise are thus achieved by focusing only on the income changes at different positions of the income distribution. Grimm (2007) and Bourguignon (2010) point out that such approach effectively ignores income mobility in the analysis because it is not able to take account of the transition experiences of those who were *initially* poor and, as such, results may provide only a partial or incomplete picture of the how pro- or anti- poor growth has been. This is an appealing proposition that will certainly provide greater insight into the welfare of the poor over time; however, it requires characterisation of units by other social and economic variables than can be tracked through time, and this is achievable only with a sufficiently long panel of unit record data. In view of this, we will focus discussion and implementation of pro-poorness growth measures that satisfy the anonymity axiom. These are broadly consistent with all poverty and inequality under the axiomatic approach, all of which satisfy the basic axioms required of welfare

measures, namely, the Pigou-Dalton transfer principle, the income and population scale independence, anonymity and decomposability².

To set the notation, we let $F_{t-1}(y)$ and $F_t(y)$ be the cumulative distribution functions (cdfs) of income, giving the proportion of the population with income less than y at time $t-1$ and t , respectively. For a given percentile μ , inverting these cdfs yield $y_{t-1}^{(\mu)} = F_{t-1}^{-1}(\mu)$ and $y_t^{(\mu)} = F_t^{-1}(\mu)$, where these are the total incomes at the μ^{th} percentile at time $t-1$ and t , respectively. In the context of our anonymised approach, these two functions contain all the information that is required for analysis. The most popular instrument for measuring pro-poorness is the ‘growth incidence curve’ (*GIC*) proposed by Ravallion and Chen (2003). If we let $g_t(\mu)$ denote the growth rate of income of the μ^{th} quantile

$g_t(\mu) = \frac{y_t^{(\mu)} - y_{t-1}^{(\mu)}}{y_{t-1}^{(\mu)}}$, the *GIC* can be obtained by simply tracing out the value of $g_t(\mu)$ across the range

of μ , that is, from zero to 1. The *GIC* shows the growth rates at different positions of the distribution ranging from the lowest quantile to the highest quantile. If $g_t(\mu) > g_{t-1}(\mu)$ for all μ , then there is first order dominance of y_t over y_{t-1} , that is, welfare in the distribution improved over time. If, however, $g_t(\mu)$ switches sign across the range of μ , dominance is not evident from *GIC* alone.

In our analysis, pro-poor growth analysis will be made using the FGT class of poverty indices (Foster, Greer and Thorbecke 1984)³ defined by

$$P_\lambda = \frac{1}{N} \sum_{x_i < Z} \left[\frac{z - x_i}{z} \right]^\lambda \quad (1)$$

where z is the poverty line, in real terms over time and λ is inequality aversion. P_0 is the head count ratio or the proportion of households below the poverty line; P_1 is the poverty gap index which indicates the aggregate distance of poor household incomes from the poverty line; and P_2 is the squared poverty gap index. If $g_t(\mu) > 0$ for all $\mu < P_\lambda$, this implies that growth has been

² (see Cowell, 1995 or Chotikapanich XXX)

³, although it is general applicable to a general class of additively decomposable poverty measures that we denote here by H.

absolutely pro-poor. If however $g_t(\mu) > (\bar{y}_t - \bar{y}_{t-1})/\bar{y}_{t-1}$ for all $\mu < P_\lambda$ implies that growth has been *relatively pro-poor*.

In general, dominance analysis can apply to a general class of additively decomposable poverty measures of the form $P = \int_0^z \theta(y, z) f(y) dx$ where $\theta(y, z)$ is a unit poverty function homogenous of degree zero in both arguments and $f(y)$ is the density function of income. For a singular index of pro-poor growth, Ravallion & Chen (2003) suggest to use the average growth rate of the income of the poor, that is, $RC = \frac{1}{N} \int_0^{N_1} g_t(\mu) du$, where N is the total population and $N_1 = P_0 N$.

When the growth is negative, the Ravallion and Chen (2003) measure described above are the strongest definitions of pro-poorness growth because poverty reduction is the only necessary condition for the definition to apply. When the growth is positive, on the other hand, this definition gives the weakest definition of pro-poorness growth as there is no specific benchmark that is required on the magnitude of the poverty reduction for growth to qualify as pro-poor. As such, this concept is simple and easily understood. By the same token, this measure can be very limiting for analysis in that by looking at the change in poverty alone, conclusions on pro-poor growth patterns are achieved without accounting for how the benefits of growth are distributed among the population. In other words, this basic pro-poorness growth measure gives no regard for any distributional distortions that economic growth could have.

In response to this, Kakwani & Pernia (2000) distinguished between the absolute and relative concepts of pro-poorness growth. Accordingly, growth is considered pro-poor in the absolute sense if the welfare gain of the poor group exceeds that of the non-poor group so that the absolute gap in the welfare levels of these two population groups are reduced as a result of growth. On the other hand, growth is considered pro-poor in the relative sense if the poor group's share of total income increases proportionally more compared to the corresponding share of the non-poor group. Viewed this way, when the growth is positive, the poor are seen to benefit proportionately more than the rich; and when the growth is negative, the poor is perceived to lose proportionately less than the non-poor. A relatively pro-poor growth will lead to a reduction in inequality as the share of the poor's income increases.

In this context, the second measure KP from Kakwani and Pernia (2000), compares the change in a poverty level with the change that would have occurred with the same growth rate, but with distribution neutrality. Let P_A denote poverty level in earlier period $t-1$ and P_B denote poverty level in later period t . Let $P_{\tilde{B}}$ denote poverty level in later period t under distribution neutrality (d.n.); further, let g denote the growth in average income. The KP is defined as

$$KP = \frac{P_A - P_B}{P_A - P_{\tilde{B}}} \quad (2)$$

where $P_A - P_B$ is the change in poverty from distribution A to distribution B , and $P_A - P_{\tilde{B}}$ is the change in poverty that would have occurred if the benefits from growth were distributed in a manner that is distributionally neutral; ie inequality levels are unchanged. Here, \tilde{B} denotes a welfare distribution that would be obtained if all incomes changed in the same proportion as the change in the corresponding mean income when moving from distribution A to distribution B . The matrix below summarise possible outcomes using the KP measure:

Absolute Pro-Poorness			
i	$g > 0 \ \& \ KP > 0$	\rightarrow decrease in absolute poverty	Growth is absolutely pro-poor
ii	$g < 0 \ \& \ KP < 0$	\rightarrow decrease in absolute poverty	
iii	$g > 0 \ \& \ KP < 0$	\rightarrow increase in absolute poverty	Growth is absolutely anti-poor
iv	$g < 0 \ \& \ KP > 0$	\rightarrow increase in absolute poverty	
Relative Pro-Poorness Growth			
	$g > 0 \ \& \ KP > 1$	decrease in absolute poverty > than decrease in absolute poverty under d.n.	
	$g < 0 \ \& \ KP < 1$	increase in absolute poverty < than increase in absolute poverty under d.n.	

A third measure of pro-poor growth used here is the Poverty Equivalent Growth Rate ($PEGR$) suggested by Kakwani and Son (2008). It is the growth rate that would bring the actual reduction in poverty, given all incomes increase by the same proportion. The $PEGR$ is given by

$$PEGR = \left(\frac{\delta}{\eta} \right) g \quad (3)$$

where $\delta = \frac{dLn(P)}{g}$ is the growth elasticity of poverty, and where $\eta = \frac{1}{p} \int_0^H y_i(p) dp$ is the neutral relative growth elasticity achieved under distribution neutrality. Growth is absolutely pro-poor if $PEGR > 0$ and growth is relatively pro-poor if $PEGR > g$. $PEGR$ thus measures the growth rate necessary to achieve the observed change in poverty when distribution neutrality is maintained.

Duclos and Verdier-Chouchane (2010) show that the change in the values of the poverty index, $P_A - P_B$ has two mutually exclusive components: $P_A - P_B = (P_A - P_{\tilde{B}}) + (P_{\tilde{B}} - P_B)$. Alternatively, a decomposition of the change can also be obtained if we carried out the same analysis with the counterfactual distribution \tilde{A} with the same income shares and inequality as distribution B, but the same average income as distribution A. Such decomposition would result in $P_A - P_B = (P_A - P_{\tilde{A}}) + (P_{\tilde{A}} - P_B)$ where first term now represents the redistribution effect and the latter term the growth effect. To accommodate this difference in results, Duclos and Verdier-Chouchane (2010) suggest averaging the values from the two alternatives.

4 Data

In this study, we use household unit records from six rounds of the Household Expenditure Survey (HES) from the Australian Bureau of Statistics (ABS) to study the welfare impact of economic growth in Australia from 1983 to 2010, a total period of 28 years. The HES are a series of surveys designed to obtain details of expenditure, income and a wide range of demographic characteristics of Australian private households on a nationwide basis. The information on demographic characteristics, income and infrequent expenditure items (e.g. vehicle and property purchases, household bills) were recorded by personal interview and details of all other expenditures made by each household member, 15 years old or older, during a two-week period, were recorded in personal diaries⁴. The public-use files were representative of the Australian population and the sample of households enumerated evenly over the respective 12-month period.

The household is the basic unit of our analysis and is defined as a person or a group of people living together having common provision for food and other essentials of living. A household includes both adults and children where children are those typically aged up 15, but it can also include as those up to age 24 years so long as they are fully financially dependent on the parent(s) as defined in the survey. Each HES sample is chosen using a stratified procedure, and so it was necessary to use the sampling weights provided to ensure that conclusions drawn from the sample analysis apply to the general population as well. Households classified as multiple family types were excluded in the analysis. Such households consist mainly of unrelated young adults (as in

⁴ Regular but infrequent bills are pro-rated and the expenditure items correspond to average weekly amounts.

students sharing a house), and so the income and expenditure information obtained from interviewing one member cannot be simply taken as true for all the others in the house. We also follow the standard practice of excluding households with negative incomes and negative expenditures as these are known to cause large distortions in the results (see, for example, Valenzuela, et.al. (2014)). All up, we use about around 90 percent of the full HES sample (depending on the year)⁵, and the subsamples for each year are still large and sufficiently rich in information to allow some hypotheses testing for smaller population groups.

We analyse expenditure data to make inferences about the welfare of households in the population. In HES, expenditure information is available for 11 broad categories including such items as Food, Fuel & Power, Clothing, Health, Transport, Recreation, Current Housing, etc. We use total non-durable expenditure of the households to minimize imputation problems associated with the consumption of durables⁶. Non-durable consumption is here defined as total expenditure minus indirect savings and all expenditures on durables. To obtain this, we deduct all household expenditures on furniture and equipment (including cars), all investment expenditures such as Mortgage Repayments and Other Capital Housing Costs, as well as all items reflecting deferred consumption (e.g. expenditures on life insurance and superannuation payments). Note that we use non-durable consumption which includes Current Housing Expenditures. Items under Current Housing include rent payments and the insurance components of mortgage repayments, and all housing maintenance costs (rates, insurances as well as expenditures on repairs, etc.). For homeowners, we used imputed rents to more accurately reflect their welfare levels in the analysis⁷.

To ensure meaningful analysis over time and space, the incomes and expenditure series obtained from each survey year were adjusted in the following ways. First, each series was adjusted using adult equivalence scales: Equivalence scales are indices that show the relative income (or expenditure) levels required by people in different circumstances to attain the same level of economic well-being. Use of an appropriate adult equivalent scale ensures that incomes and expenditures are comparable across the various types and sizes of households. The adult equivalence scale used here was the square-root of family size due to Buhmann, et. al. (1987).

⁵ The total household exclusions from the HES data we used each year ranged from 8.6 per cent (1983/94) to 11.7 per cent (2003/04) of the total HES sample.

⁶ For use of non-durable expenditures rather than all expenditures (*see Valenzuela, et al 2014 for reason; other works that can be cited are those of Barrett and Pendakur*)

⁷ Note about imputed rent here!

The second adjustment needed for the data was the conversion of all nominal values in the raw data sets to 2009 dollars using the national consumer price index. Ideally, we would use state specific CPI values to account for regional variation in the cost of living but this is not possible because the 1988/89 HES does not report state of residence. All results presented in this paper are from the weighted samples.

5. Results and Discussion

In this section, we present density plots and calculated statistics to provide a picture of changes in welfare of the Australian households between 1983 and 2010. The section will have two parts: Section 4.1 will discuss results for all households in the population. Section 4.2 will present results for the older households in the population.

4.1 The Welfare of All Households Over Time

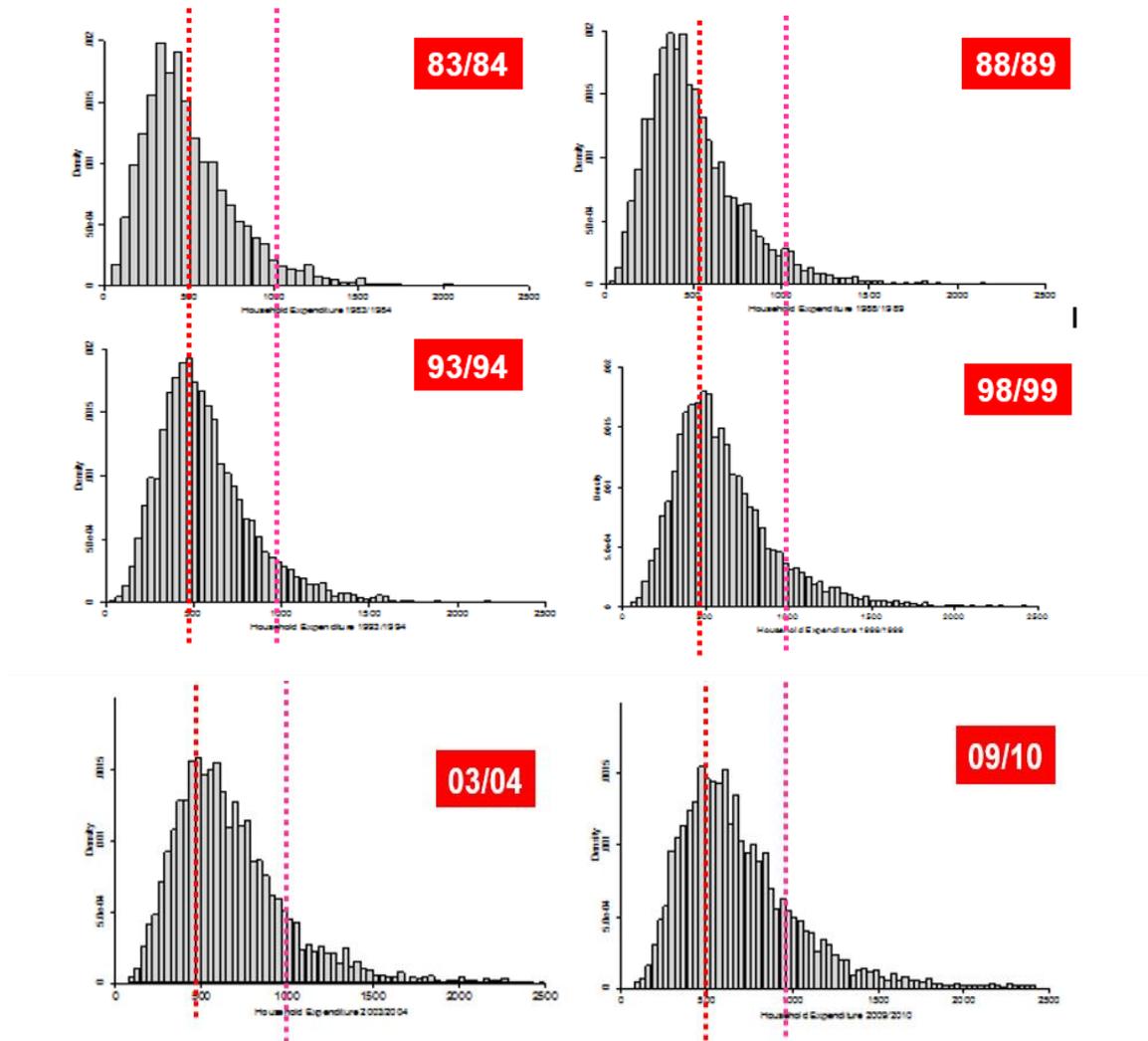
For a broad overview of welfare over time, we present in Figure 1 the kernel densities of the expenditure distributions for all households over the years⁸. We utilize the Epanechnikov kernel function available in STATA software. The densities are cut at a certain level of expenditure to provide a much clearer pattern of the changes. Between 1983/84 and 2009/10, we can see that the kernel densities move out to the right over time with lower modal peaks and fatter right tails. These suggest that over that 28 year period, there are more people with a higher level of expenditure; at the same time, the broader and flatter density curves point to a rise in inequality during those periods as well. There is not much change in the density between two consecutive periods of 1983/84-1988/89, 1993/94-1998/99, and 2003/04-2009/10. However, there is a significant shift in the density to the right between those three periods.

Table 1 presents some summary statistics. As expected when comparing incomes and expenditures, mean expenditure levels are found lower and also appear more stable over time compared to mean incomes across the years. With income, the weighted mean show a steady increase over time from 1983/84 until 2003/04; while a sharper increase in mean incomes is seen between 2003/04 to 2009/10. Between 1983/84 and 2003/04, mean incomes increased by 28.2 per cent or by 1.4 per cent per annum, while between 2003/04 to 2009/10, mean incomes increased by 45 per cent increase between, or a rise of 7.5 per cent per annum. Meanwhile, mean

⁸ To distinguish the kernel densities between each other, we plot only 4 of the 6 densities.

expenditures for all households show a steady upward trend for the entire period, increasing from \$515 to \$716 from 1983/84 to 2009/10 or a growth rate of 1.4 per cent per annum.

Figure 1. Histogram of Household Expenditure



To put these changes in the context of changes over time in the demographic composition of the Australian population, we present in the lower panel of Table 1 the distribution of weighted samples across different age groups. The significant rise in the population share of the two older age groups over time is very evident; so is the sharp decline in the population share of the 20-34 age group over that same 28 year timespan. Where in 1983-84, the 50+ age group comprised 40 per cent of the population, that group’s share has increase to 47 per cent in 2010. In contrast, the 20-34 age group population share dropped significantly over the study period – it was almost 30 per cent of the population in 1983; it was just over 20 per cent in 2010.

Table 1. Summary Statistics

	1983/84	1988/89	1993/94	1998/99	2003/04	2009/10
Income and Expenditure (Means), All Households						
Income	618.59	620.98	655.80	721.10	793.60	1153.75
	(7.77)	(6.50)	(6.16)	(7.10)	(8.21)	(14.40)
Expenditure	515.06	515.72	583.28	618.39	676.45	716.98
	(5.49)	(3.87)	(4.05)	(4.17)	(4.84)	(6.25)
Age Group Population Share						
15-19	0.7	0.68	0.74	0.58	0.48	0.13
20-34	28.84	26.56	25.86	24.49	22.01	20.61
35-49	28.52	31.84	32.83	33.51	32.39	30.68
50-64	22.95	22.3	21.14	22.3	25.2	27.63
65+	18.98	18.63	19.42	19.12	19.92	20.95

The trend in inequality and poverty measures are presented in Table 2. Over the period observed, the Gini coefficient show a total decline of about 4 per cent from its initial level, with a flat U trend in between. It was 0.2978 in 1983/84 and this reduced to 0.2854 in 2009/10. On a period-to-period basis, we can see that for all measures, the inequality levels was on the decline from 1983/84 to 1993/94, with largest drop in the value of the Gini index occurring in the latter 4 years of that time. After 1994, inequality is observed to have gradually increased, with the largest increases occurring between 2003/04 and 2009/10. A similar pattern of flat U inequality is also observed for the calculated Theil indices, where the decomposition shows that inequality within groups contribute to over 95 per cent of total inequality in the population, and just less than 5 per cent of total inequality can be attributed to the between age groups inequality.

Table 2 Inequality Statistics

Inequality Measures	1983/84	1988/89	1993/94	1998/99	2003/04	2009/10
Gini index	0.2978	0.2895	0.2629	0.2682	0.2696	0.2854
	se	se	se	se	se	se
Theil Index (T)	0.1513	0.143	0.1174	0.121	0.1226	0.1357
	(0.0213)	(0.0140)	(0.0093)	(0.0095)	(0.0140)	(0.0114)
Theil Within (Tw)	96.91%	97.15%	96.66%	96.83%	97.39%	95.65%
	(0.0025)	(0.0025)	(0.0027)	(0.0023)	(0.0025)	(0.0037)
Theil Between (TB)	3.09%	2.85%	3.34%	3.17%	2.61%	4.35%
	(0.0052)	(0.0061)	(0.0061)	(0.0053)	(0.0057)	(0.0083)
Period to Period change in Inequality						
Gini		-2.79%	-9.17%	2.00%	0.54%	5.83%
Theil		-5.46%	-17.91%	3.06%	1.33%	10.62%

Standard errors are in brackets.

In terms of poverty, alternative FGT poverty indices are summarised in Table 3, using 50 percent of the median expenditure as the poverty line z . Between 1983 and 2010, a steady reduction in poverty is evident. The head count ratio P_0 shows that the proportion of people in poverty steadily decreased from 11.3 per cent in 1983/94 to just 8.5 per cent in 2009/10. P_1 and P_2 show the same declining trends, albeit at significantly lower poverty rates which is not surprising. These indices are consistent in indicating a decline in the proportion of poor people over time, and inequality among them narrowed.

Table 3 Poverty Statistics

Poverty Measures	1983/84	1988/89	1993/94	1998/99	2003/04	2009/10
FGT(z=50% median)						
P0	0.1131 (0.0043)	0.1075 (0.0041)	0.0856 (0.0035)	0.0798 (0.0036)	0.0826 (0.0037)	0.0849 (0.0039)
P1	0.0288 (0.0017)	0.0265 (0.0012)	0.0188 (0.0009)	0.0183 (0.0010)	0.0187 (0.0012)	0.0174 (0.0011)
P2	0.0111 (0.0009)	0.0102 (0.0006)	0.0066 (0.0005)	0.0066 (0.0005)	0.0066 (0.0006)	0.0059 (0.0005)

To determine whether Australian economic growth was pro-poor or not, present the growth incidence curves for each survey year. From Figure 2 we can see that in the 1980s and the early 1990s, the *GICs* for Australia sit mostly above the zero line, except for some higher percentiles. Clearly, the latter period curve (1988/89-1993/94) has a steeper downward slope compared with the earlier period (1983/84-1988/89), but pro-poorness of economic growth is strongly evident during both periods. More specifically, we can see that up to the 60th percentile of income, the *GICs* sit above the growth rate of all expenditures indicating that the welfare of the poorest households improved much more than the overall average. In contrast, we can see from Figures 2c, 2d and 2e that a good section of the *GICs* sit below the income growth rate curves, and more markedly so in the last period 2003/04 to 2009/10. This is a strong indication that Australia's economic growth was biased against poorer households for the years between 1993/94 and 2003/04; and that this bias had grown more strongly against the poor between 2003/04 to 2009/10.

Figure 2. Growth Incidence Curves, All households, various years.

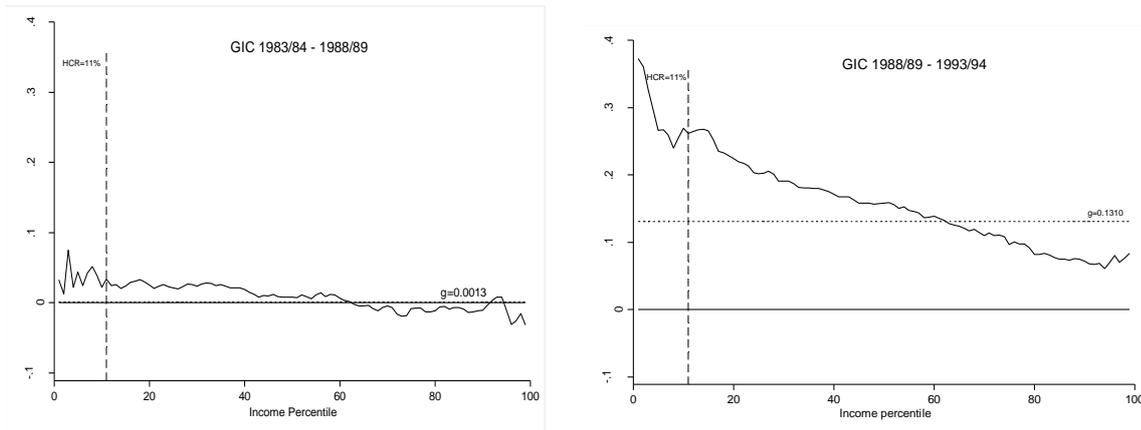


Figure 2. Growth Incidence Curves, All households, various years, continued.

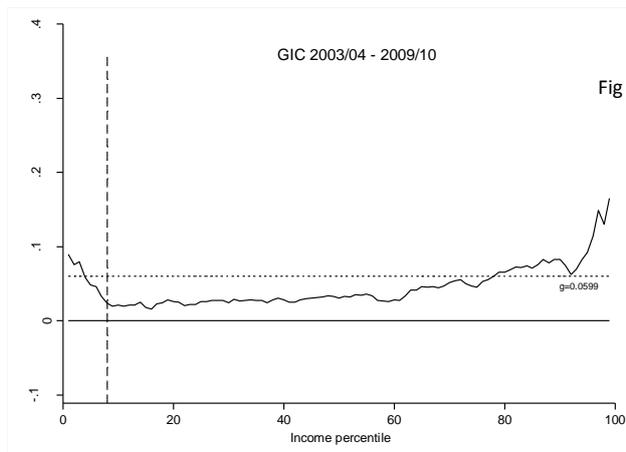
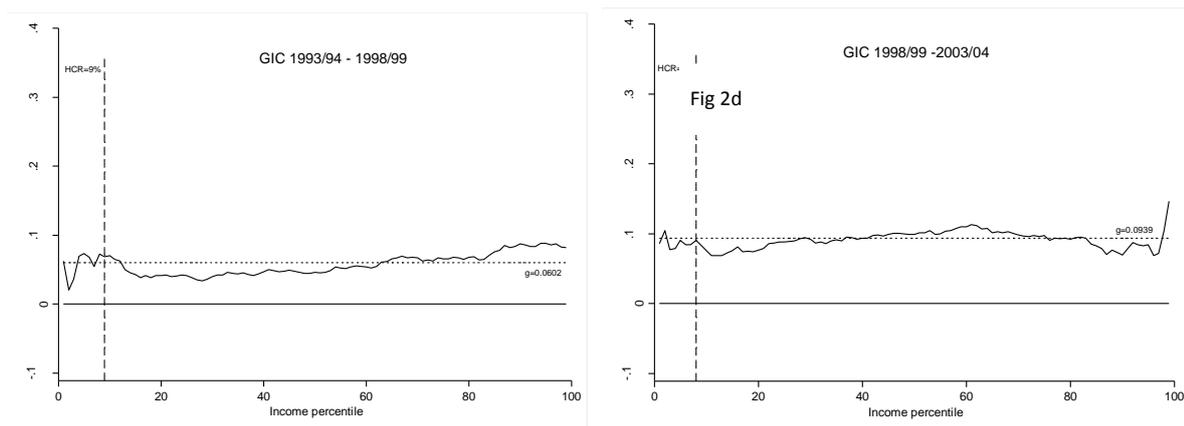


Fig 2e

poverty line z is 0.5 mean expenditure
 $g_t(\mu) > 0$ for all μ
 $g_t(\mu) > 0$ for all $\mu < P_0(z)$ for all $\mu < P_0(z)$

The calculated values of the pro-poor growth measures used in the study are presented in Table 4. Based on the RC measure, economic growth was absolutely pro-poor in all periods except for

the period of 1983/84-1988/89. In contrast, using the alternative the KP and PEGR measures, it appears that economic growth has been absolutely pro-poor in the first half of the study period, that is between 1983 and 1998, and anti-poor in the latter half, which is between 1999 and 2010. The KP and PEGR measures suggest trends in pro-poorness that are more consistent with the kernel densities, compared to the RC measure.

Table 4. Pro-Poor Growth Measures & Decomposition, ALL Households

	83/84-88/89	88/89-93/94	93/94-98/99	98/99-03/04	03/04-09/10
Pro-Poorness Measure					
RC	-0.0107	0.2919	0.1806	0.1368	0.0621
KP	21.529	0.6303	0.3258	-0.1342	-0.1524
PEGR	0.0279	0.0826	0.0196	-0.0126	-0.0091
Growth rate in mean expenditure γ	0.0013	0.131	0.0602	0.0939	0.0599
Decomposition Of Pro-Poorness					
$P_A - P_B$	0.0056	0.0219	0.0058	-0.0028	-0.0022
Growth effect	0.0002	0.0335	0.0156	0.0244	0.0166
Redistribution effect	0.0054	-0.0116	-0.0098	-0.0272	-0.0189

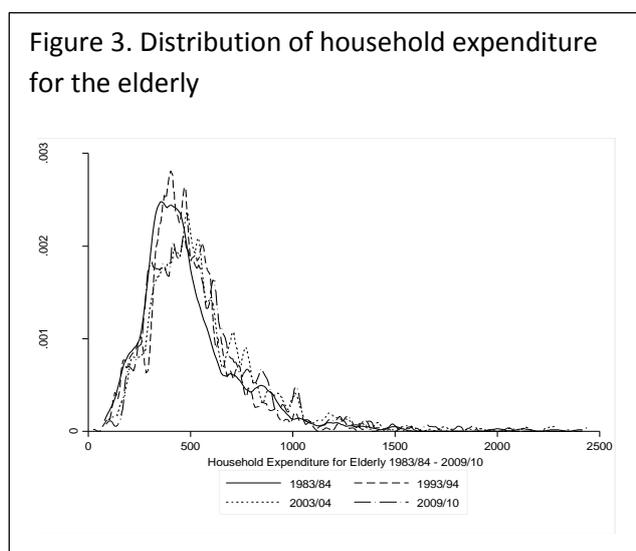
Also presented in the lower panel of Table 4 is the change in the poverty rate, for which we use the change in the head count ratio, $P_A - P_B$. The change is presented for each 5 year period and are decomposed into a Growth Effect and a Redistribution Effect. We can see that these components have dominated changes in household welfare levels at different times. In the earliest period, between 1983/84 and 1988/89, the redistribution effect was the dominant source of the overall decline in poverty rate – accounting for as much as 96 per cent of the change- while the growth effect accounted for only 4 per cent of the improvement in total welfare. In contrast, from 1988 onwards, the decline in poverty rates in Australia is all attributable to the positive effects of country’s economic growth, which we also see as offsetting the net negative effect of redistribution. In particular, during 1988/89-1993/94 and 1993/94-1998/99, the bulk of poverty reduction was caused by the growth component where its large effect more than enough to outweigh the adverse effect of distributional change, resulting in decrease in headcount ratio by 2.19 and 0.58 per cent, respectively. This implies that greater reduction in poverty rates could have been achieved if the expenditure distribution had not worsened. This result is consistent with earlier findings - that the inequality index for 1988/89-1993/94 decreased but the negative

shift in the expenditure distribution had adversely affected the headcount ratio in the period. In 1993/94-1998/99, on the other hand, the inequality index increased.

Examination of later periods are also revealing. In the last two columns, which are periods of growth and increasing poverty as the same time, we see that the increase in poverty rates was mainly attributable to the net negative effects of redistribution, which dominated the positive effect that economic growth would have had on everyone's welfare levels. In particular, the change in the expenditure distribution in periods 1998/99-2003/04 and 2003/04-2009/10 is seen to overshadow the positive effect of the increase in the mean expenditures by about 0.28 and 0.22 per cent, respectively. These finding augur well with earlier conclusions of increased in inequality within these periods indicated in Table 2.

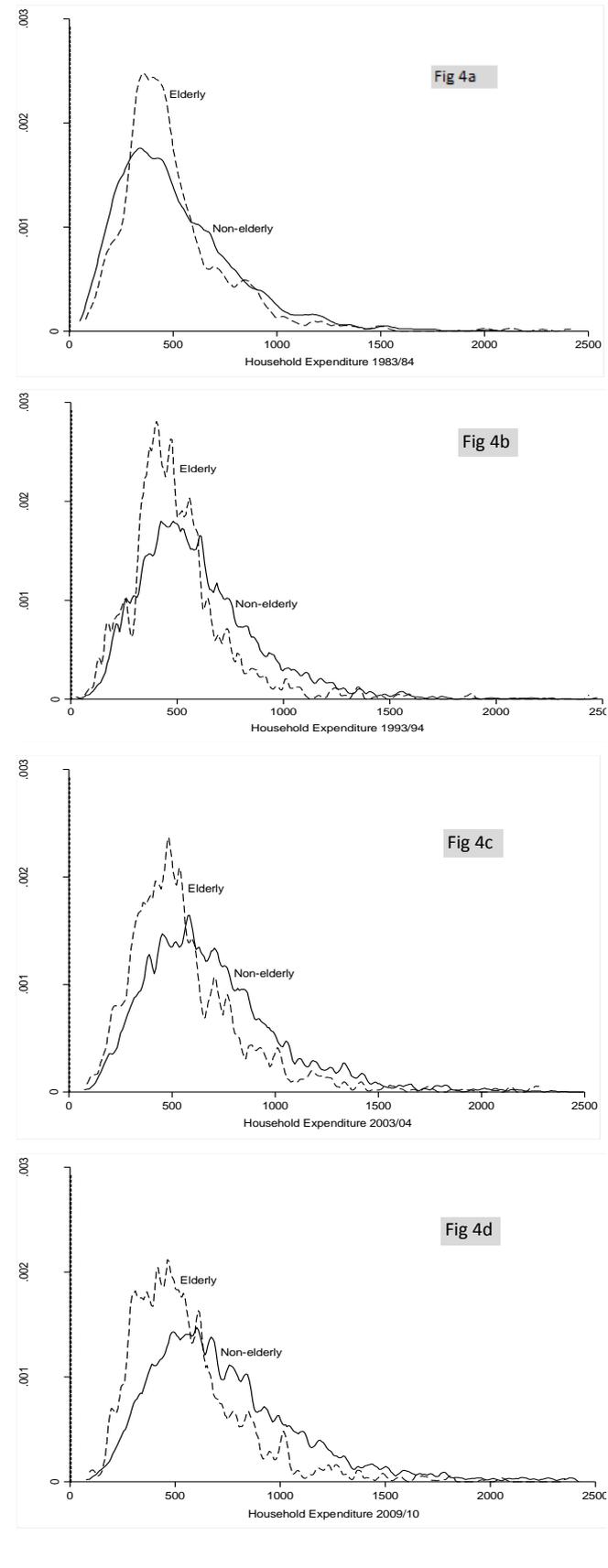
5.2 Pro-Poorness Growth and the Elderly

Recall from Table 1 that the population share of Australia has shifted in composition over the 28 year study period that we cover. In particular, the trends show a steady increase in the share of older households in the population (50+), at the same that that younger households, those whose heads are under 35 in particular, have gradually decreased over time. The ageing of the Australian population is not unique to Australia; rather, it is a characteristic feature of populations of many advanced nations. It is however important to look into specific welfare implications of ageing so assist policy in managing the transition as the economy moves through time. We therefore focus here on the welfare analysis of 'older' households, which we here define as having heads aged 65 or above.



The expenditure distribution for the elderly group over the years is shown in Figure 3. We can see that over the study period, the expenditure distribution of the elderly households gradually shifted to the right, where the later year distributions having fatter tails at the upper end. This suggest that 65+ households experienced increased expenditure levels over time, indicating improved overall welfare amongst them over time.

Figure 4. Expenditure distribution for the elderly v non-elderly



To set this trend in context, the year by year comparisons between elderly and non-elderly expenditure distributions are presented in Figure 4. In 1983/84, we can see from Figure 4a that the density for the elderly is much narrower compared to the non-elderly density; it peaks around the \$450 level and has a thinner right hand side tail. The relative shapes of these two densities suggest a higher inequality of incomes existing amongst the elderly group. Ten years later, we can see from Figure 4b that both densities have moved rightwards, although the shift in the non-elderly curve is much more pronounced than that of the shift in the curve for the non-elderly. Also, the relative shapes (means and kurtosis) of the two densities have stayed more or less the same after 10 years. After 1993/94, we see a noticeable fall in the modal peak within the period of 1993/94-1998/99 and 1998/99-2003/04, which suggests that the inequality markedly increases during those periods. For elderly distributions, we see that expenditure curves shifts to the right as well, but the density appears to retain relatively higher modal peaks and thinner tails compared to the non-elderly expenditure distribution. Starting from the period of 1993/1994, the elderly expenditure distribution is

also gradually shifted more to the left of the non-elderly distribution. Kernel densities for

particular age groups amongst the elderly is provided in the Appendix. We find that for each year, the densities for the youngest cohorts (65-69) always sit to the right of the 70-74 and 75+ age groups, has lower modal peaks and thicker right tails. These imply that the older cohorts who fall within the lower percentile of the expenditure distribution tend to be the poorest of the elderly.

Table 5 presents presents the FGT poverty measures for the 65+ age group, alongside the non-65 group as well as for all households. It is clear from here that relative rates of poverty declined overall, but within than we can see that pover have changed

Table 5. Poverty Measures by Age Groups, elderly v non-elderly

Poverty Measure	Ages	1983/84	1988/989	1993/94	1998/99	2003/04	2009/10
Head count Ratio	ALL	0.1131	0.1075	0.0856	0.0798	0.0826	0.0849
	< 65						
	65+	0.0818	0.0814	0.1099	0.0932	0.1162	0.1500
Poverty Gap Index	ALL	0.0288	0.0265	0.0188	0.0183	0.0187	0.0174
	< 65						
	65+	0.0185	0.0185	0.0280	0.0251	0.0280	0.0290
Squared Poverty Gap Index	ALL	0.0111	0.0102	0.0066	0.0066	0.0066	0.0059
	< 65						
	65+	0.0063	0.0065	0.0106	0.0100	0.0101	0.0094

Ari, pls fill in, thanks.

For the head count ratio, the dominant result is a reduction in the population share of poor households overall, while consistent increases in population share of poor over time was evident in the older cohorts⁹. In particular, we find that for the 65+, the proportion of poor households increased from 8 to 11 per cent between 1983/84 and 1993/94. The ratio then decreased slightly to 9.3 per cent in 1998/99 before increasing again in the next two periods to 11.6 and 15 per cent, respectively. The same pattern is observed for the poverty gap index for the elderly group. This index tells us how far below the poverty line the poor are and it is expressed as a percentage of the poverty line. The gap for the elderly rises from about 1.85 per cent in 1983/84 and 1988/89

⁹ A more age-disaggregated table is found in the Appendix.

to around 2.8 per cent in 1993/94. The poverty gap decreased slightly to 2.5 per cent in 1998/99 before increasing again in the next two period to about 2.8 and 2.9 per cent, respectively.

The squared poverty gap index further encompasses the inequalities amongst the poor. The elderly group appears to have experienced a slight increase in the poverty from 0.63 per cent in 1983/84 to about 1.1 per cent in 1993/94 before it showed a steady decline thenon, reaching a low of 0.94 per cent in 2009/10. The emerging cohort analysis strongly indicate that, for any cohort, there is increased risk of falling into poverty once people reach age 50 and that this risk increases with age. When greater weight for inequality among the poor is assumed, we see from P_1 and P_2 that the adverse poverty outcome for the older cohorts continue to be evident, except perhaps for the years between 1993/94 and 1998/99, when the poverty gap measures decreased in the younger cohort, that is, there was poverty reduction for these groups. Meanwhile, the same measures computed for the older cohorts registered increases, meaning there were more older people in poverty at the end of the period.

Was Australian growth pro-poor for the elderly poor? To analyse pro-poor growth among the older households, we present the growth incidence curves for the elderly v non-elderly group in Figure 5. The bars indicated in the graphs represent the head count ration based on the chosen poverty lines for each group¹⁰. For the period 1983/84 to 1988/89, growth rate of mean expenditure tracks closely to zero. For these early years, For the 65+ group, we can see that in the mid-1980s, their *GICs* of the 65+ group appears first order dominated by the *GIC* of the non-elderly group, indicating growth benefited the younger cohort more than the latter. Additionally, the *GIC* for the elderly is seen to mostly lie just below the average growth in mean expenditures, whereas those for the non-elderly sat mainly above the growth line except for some percentiles in the upper tail. Further, we also observe that in the lower end of the population percentile, welfare of the elderly fluctuated significantly around the mean expenditure growth rate of $g=0.0013$. Welfare/expenditure appeared stable around g for the 15-35th percentile of older households, afterwhich the gap between the *GIC* for the 65+ and the growth rate line grew larger. All these suggest that growth in welfare of the elderly tracked the economic growth poorly particularly those in the extreme ends of the distribution.

Australian growth grew more robust between 1998/89 and 1993/94 with $g = .1310$. It however appears, based on the *GICs* for the period, that the benefits of growth all accrued to the non-

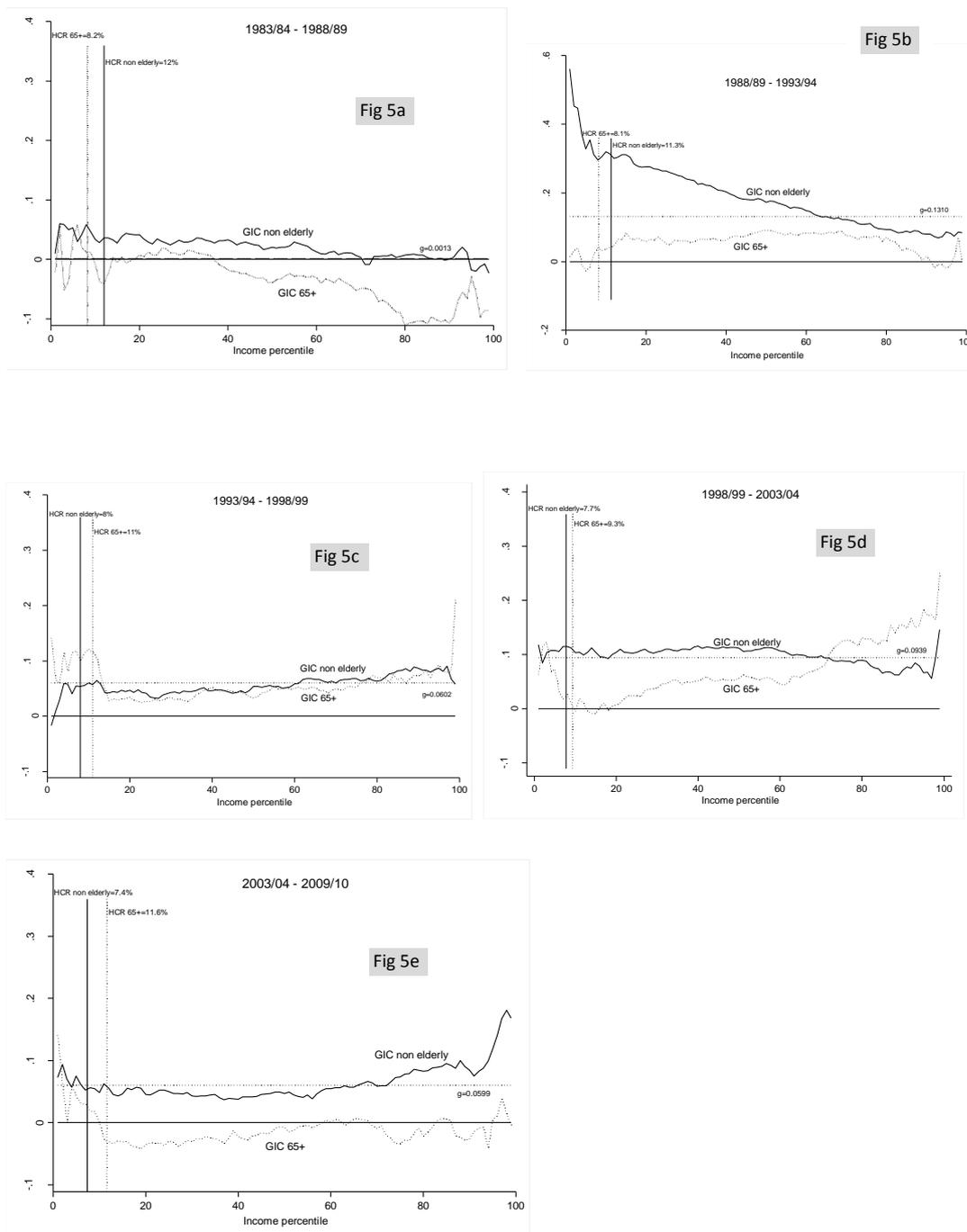
¹⁰ $z=0.5$ median expenditure for each group

elderly, with largest benefits accruing to the poorest percentiles of non-elderly. In contrast, we see that the GIC for the elderly group lied completely below that of the non-elderly (first order dominance); and it is also everywhere below that of the growth rate line g . Here, the poorest among the elderly percentiles were the worst off in all the groups.

Relative welfare of the elderly appear to have improved in the next period. In 1993/94 and 1998/99, the GIC of the elderly group sits closely to the GIC of the non-elderly group, and both are everywhere close the growth rate line g . In the lower percentile, it appears that the elderly poor's welfare made significant relative improvements as the economy grew; they did better than the non-elderly poor. This period turns out to be the best one for the poor elderly in terms of benefits gained from growth; analysis for the following years indicate that their welfare overall grew worse with growth.

GICs for the 1998/99 - 2003/04 period show economic growth did not benefit that the lower percentiles of the elderly group (0-70th percentile). They did worse compared to those in the upper 30 percent in that age group, and also compared to the all in the non-elderly group. For the period 2003/04-2009/10, the welfare of the relatively poorer elderly households was still no good in comparison to everyone else; but in fact, the evidence for this period indicated that they were worse of compared to the period before, because their GIC now mostly sat below zero, ie they mostly experience negative welfare growth, except perhaps for the extremely poor who received transfers from the government. All these imply that Australia's economic between 1993/94-2009/10 overall did not benefit poor elderly households as much as they had the mainstream poor, where this effect is a continuation of the trend observed for the 10 years period analysed before this.

Figure 5 – GIC curves for the elderly Households



In Table 6, we present calculated values of pro-poorness measures for the 65+. Using the KP measure, we can see that Australia's economic growth has been absolutely pro-poor for the 65+ group for the period 1993/94-1998/99 only; all other periods were not beneficial for this group. Meanwhile, based on the PEGR measure, the growth is considered to be absolutely pro-poor for the same period as indicated by KP, and the period of 2003/04-2009/10 as well. Lastly, we noted that for this age group, we observe zeroes for the years 1983/84-1988/89 indicating that there is

also no observed change found in the poverty rate when distribution neutrality is maintained. Overall, our results show that for the elderly, the country's growth is only pro-poor in absolute term in 1993/94-1998/99 but that this growth is not accompanied by a decline in inequality. In the relative sense, we find that Australia's economic growth can be considered pro-poor in the initial period of 1983/84-1988/89, and if only the 65+ group is considered, growth is found relatively pro-poor only in the period 1993/94-1998/99. As seen, conclusions from the GIC analysis are sustained here.

Table 6. Pro-Poorness Growth Measures and Decomposition, 65+ Households

	83/84-88/89	88/89-93/94	93/94-98/99	98/99-03/04	03/04-09/10
Pro-Poorness Measure					
RC	0.0257	-0.0776	0.2042	0.1340	0.0325
KP	0.0000	-1.0044	1.0466	-1.2702	-1.9968
PEGR	0.0000	-0.0535	0.0736	-0.1179	0.0092
Growth rate in mean expenditure g	-0.0532	0.0533	0.0703	0.0928	-0.0046
Δ Gini	-0.0230	-0.0059	0.0142	0.0260	0.0061
Decomposition Of Pro-Poorness					
$P_A - P_B$	0.0004	-0.0285	0.0167	-0.0230	-0.0338
Growth effect	0.0000	0.0268	0.0141	0.0308	0.0259
Redistribution effect	0.0004	-0.0553	0.0026	-0.0538	-0.0597

Decomposition results are shown on the lower panel of Table 6. For the 65+ group, the growth and redistribution effects reinforced each other to decrease poverty in 1983/84-1988/89 and 1993/94-1998/99. The redistribution component appears to be the only contributor to poverty reduction in the first period while the growth component was the biggest contributor in the later period. There is also a decrease in the Gini and Theil index in 1983/84-1988/89 (by 2.79 and 14.9 per cents, respectively) while there is an increase in the same index in 1993/94-1998/99 (by 2 and 12.05 per cents, respectively). The rise in inequality in the later period seems to worsen the distributional shift which then lessens the positive impact of redistribution component on poverty reduction.

In the other periods, the growth and redistribution components counteracted each other to produce the calculated net effect. We see that redistribution effect in these periods dominated the growth effects, leading to a net increase in poverty. Except for the period of 1988/89-1993/94, the inequality indices are also observed to increase from 0.2535 to 0.2856 for the Gini coefficient

and from 0.1138 to 0.1378 for the Theil index. For the 65+ households, the increased inequality in this group during these periods appears to have diminished the positive effect of any increase in their mean expenditure on the headcount ratio. Put differently, the poverty would have reduced instead of grown had the distribution not deteriorated. We note that the Gini and Theil index for the elderly group in 1988/89-1993/94 was decreasing slightly by 2.43 and 1.69 per cent, respectively, during this period and that the redistribution effect was found negative. This implies that the shift in the distribution had an adverse effect on poverty overall.

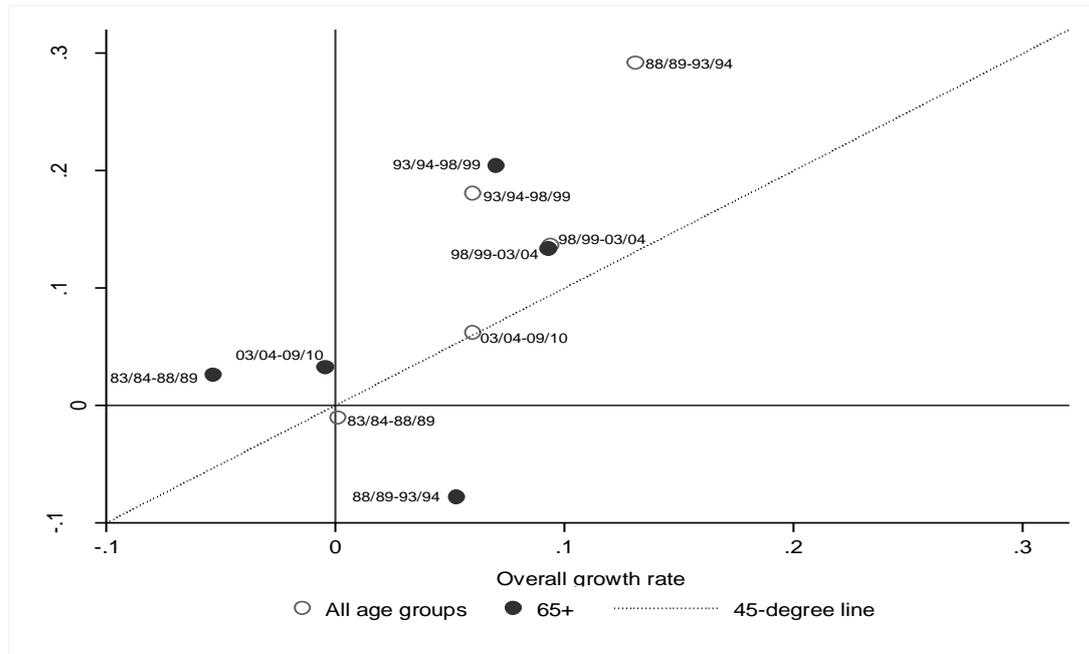
Figure 7 provides another perspective with which to view the above results. Here, we use the RC measure to evaluate the growth rate of the mean consumption of households on or below the poverty line relative to the growth rate of the whole population. The white dots represent the coordinates for all households in the population, while the black dots represents the coordinates for all 65+ households. The desired absolute outcomes is that both growth rates are positive, that is, the dots will be to the right or above the zero demarcation lines. Given that and under the assumption that inequality does not change over the relevant period, there are three outcomes to consider. First, if the poor group's mean expenditure increases at the same pace as the mean income growth rate for all in the population, this is reflected in the graph in a dot that sits on the 45-degree line. Second, if the poor group's mean expenditures growth rate is higher than the population's growth rate for the period, the dot coordinate will sit above the 45-degree line. Finally, if the poor group's mean expenditures growth rate is lower than the population's income growth rate for the period, then the dot-coordinate will sit below the 45-degree line. Consequently, it is highly desired that the poor's mean expenditure growth rates are positive value, and the corresponding dot coordinates sit above the 45-degree line.

From Fig 7, we can see that Australia's economic growth for all age groups was absolutely pro-poor in all periods except for the period of 1983/84-1988/89. For the elderly group, it was only in the period of 1988/89-1993/94 that the growth was not absolutely pro-poor. For all households in the Australian population, the calculated relationship between the two growth rates is quite strong, with a correlation coefficient value of $r = 0.89$. This is a strong indication that the faster the increase in mean expenditure for the population, the poor's mean expenditure will tend to rapidly increase as well¹¹. However, for the elderly group, the correlation is found to be not as

¹¹ Causality is not presumed here, just correlation.

strong (at $r = 0.43$), particularly during the years 1983/84-1988/89 and 2003/04-2009/10, where this group experienced negative growth rates.

Figure 7. Plot of overall growth rate against the poor's growth rate



6. CONCLUSION

In this paper, we employ various measures of growth pro-pooriness and six rounds of micro-unit survey data to examine the impact of Australia's long run years of consistent growth on the welfare of various of the population. We find that, over the years and using household expenditure information to indicate welfare, there was a steady improvement of household welfare for the population of Australia for the period over the last 28 years. The welfare levels of older householders were found to be lower than those of the mainstream population, with the eldest of the elderly observed to have higher chances to falling within the poorer percentile of expenditure.

Over the study period, we find that overall poverty measures was on a downward trail at the same time the inequality was slowly but steadily inching upwards. The increase in the overall inequality from period to period is found to be minor, we find that older households experienced higher increases in the inequality compared to the mainstream population. The proportion of poor elderly households among the 65+ group was also found to increase, especially towards the

end of the observed period. On economic growth, we find evidence that the poor among the elderly gained relatively little from growth compared to their younger counterparts.

A decomposition analysis reveals that in the first half of the study period, the redistribution effect accounted for much of the poverty reduction in those years, rather than achieved from the growth effect itself. In the latter half of the study period though, the sustained increases in inequality from period to period are found to be mainly responsible for the observed increase in poverty levels; as well, increasing inequality in this period and have also masked the potentially positively effect that economic growth may have had on poverty levels in those years.

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