Capital Income Taxation and the Mirrlees Review

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ABSTRACT

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The Mirrlees Review of the UK tax system, together with its companion volume of research papers, can be expected to influence future discussions of tax reform. Indeed, this can already be recognised in the Henry Review. As far as income taxation is concerned, the most substantive recommendation of the Mirrlees Review is a move toward a system of consumption or expenditure taxation, by exempting the "normal return" to saving and taxing only "excess returns" on the same tax schedule as labour earnings. This paper argues against this direction of reform on the grounds that it is based on a model of household behaviour over the life cycle that ignores important aspects of reality. We present an alternative model, together with supporting empirical evidence. We go on to argue that, against the background of rising inequality and an aging population, the appropriate direction for reform is towards more progressive taxation of both labour earnings and capital income, although not necessarily under the same rate scale.

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1   Introduction

The Mirrlees Review of the UK tax system[1] together with its companion volume
of research papers[2] make an important contribution to the literature on the
theory and policy of taxation, which can be expected to have an impact on
future discussions of reform in a number of countries. Aspects of the review's
approach foreshadowed in the research papers can for example be recognised as
an influence on the recent Henry Review of the Australian tax system.[3] This
paper makes no attempt to survey the whole of the Mirrlees Review, but instead
aims to contribute to the discussion of the review by focusing on the issue of
the taxation of the return to capital received directly as household income.[4]
However, in doing so it is also necessary to discuss its basic approach towards
the taxation of income in general, both from labour earnings and saving. Thus
we are concerned with the arguments presented in Chapters 2-5, 13 and 14 of
Tax by Design.

In the next section of this paper we discuss critically the arguments for a
move away from the taxation of earnings from both labour and capital to a
system of consumption or expenditure taxation that are set out in these chap-
ters. The basis for this criticism is that the implicit model of the household
underlying the review's proposals is inadequate to deal with the central issues
of tax design. In Section 3 we give a brief overview of the empirical work which
supports this contention. In the section following we go on to examine the
particular proposal to exempt the "normal return to capital" from taxation,
subjecting "excess returns" to the same tax schedule as labour earnings. This
appears to be the main substantive innovation the review proposes in this area.
Section 5 concludes.

2   Principles and proposals

In Chapters 2 and 3 the review makes clear its adherence to the professed
starting point of the modern theory of optimal taxation: Ideally we would like to
tax the innate productivity or earning capacity of individual income earners, but
since this is unobservable we are forced instead to generate distortions by taxing,
inter alia, incomes and consumption, thus creating deadweight welfare losses as
the cost of funding the supply of public outputs and income redistribution.
Then the goal of a tax system is to achieve an in some sense optimal balance
between the efficiency costs and equity benefits of taxation, for any given level of
real public output. Less clear however is the way in which the review's specific
proposals in the area with which we are concerned could be expected to help
achieve this goal.

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[1] Mirrlees et. al. (2011).
[2] Mirrlees et. al. (2010).
[3] See Australia's Future Tax System Review Panel (2009).
[4] That is, we also leave to one side the issues surrounding corporate taxation.

2.1 Changing the tax base from income to consumption

The review is clearly strongly in favour of changing the tax base from income - labour earnings plus returns to saving - to consumption. It presents three main ways in which this can be achieved:

1. A cash flow expenditure tax, or **EET**: Withdrawals from income for saving are tax exempt (**E**), income from saving is tax exempt (**E**), and then the proceeds are taxed when spent on consumption (**T**). This is in fact how pension saving is treated in the UK, where private pension wealth accounts on average for about 75% of financial (i.e. non-housing) wealth.

2. A labour earnings tax with exemption for income from saving, or **TEE**: Saving is made out of taxed income with no exemption (**T**), but returns (**E**) and final consumption of proceeds (**E**) are tax-exempt. This is essentially how housing wealth is treated in the UK.

3. An income tax with an "allowed rate of return", or **TtE**: Saving is made out of taxed income (**T**), returns to saving at a rate below a certain level, the "normal rate of return", are tax exempt, while returns above this are taxed at the same rate as labour earnings (**t**), and withdrawal of savings for consumption are tax-exempt (**E**). The "normal rate of return" could, it is suggested, be based on the real rate of return of 10-year UK government bonds (in numerical illustrations the review uses 5%), which of course, if only because of the risk of inflation, is not entirely risk-free.

In rationalising these proposals, the review adopts as a "guiding principle" the neutrality of taxation as the basis for determining tax policy. At the first appearance of this principle, in Chapter 2, it could be interpreted as saying nothing more than that tax design should seek to minimise distortions or deadweight losses for any given required tax revenue and degree of redistribution, which of course is just a restatement of the approach of optimal tax theory. However, when it is proposed in Chapter 13 as the basis for the discussion of capital income taxation, it becomes the proposition that there should be no distortion of the time pattern of consumption chosen by households and no distortion of their allocation of saving among assets.

To anyone familiar with the idea that modern optimal tax theory sees the problem of tax design as an application of the theory of the second best, this is on the face of it a surprising statement. The basic principle emerging from second best theory is that in general, given an unavoidable distortion in one sector of the economy, for example that created in the labour market by the taxation of labour earnings, it will in general be (second best) optimal to create distortions in related sectors, for example in the capital market by taxing the income from saving. Then, we are necessarily concerned with the optimal levels of two instruments, taxes on labour and on capital income, and the relationship between them.

However, although it does not mention the second best by name, the review does consider four essentially second best arguments for violating their principle of "neutrality". These are:

■ Individuals who save more may do so because they are more patient and

have higher cognitive capacities, and if these characteristics are positively related to (untaxable) innate earning ability then taxing saving is warranted

■ Taxing labour income implies taxing the return to investment in human capital, thus creating a distortion which would justify distorting the return to physical capital

■ In the absence of a complete market for insurance against future income uncertainty, saving might be high to self-insure against bad future income realisations, but ex post a high income state may occur and induce a corresponding reduction in labour supply, which would be corrected by taxing the return to saving

■ If current (untaxable) leisure and future consumption are complements, then on standard Corlett-Hague grounds[5] future consumption, i.e. the income from saving, should be taxed

Although it discusses these four arguments at some length, the review concludes, somewhat lamely in our view, that "it would be better to make neutrality the central goal of savings tax policy".[6] The grounds for this seem to be that not enough is known empirically about the size or even, in some cases, the direction, of these effects, to justify a deviation from the "guiding principle of neutrality".

Interestingly, it does not explicitly refer to the older literature in which a number of models produce the result that the income from saving should not be taxed,[7] perhaps in deference to the comment made by Banks and Diamond (2008), with which we fully agree, that these models are based on "considerations of economic behaviour and the nature of economic environments that are too restrictive when viewed in the context of both theoretical findings in richer models and the available econometric evidence".[8]

There are however further problems with the conceptual framework the review adopts in these chapters that have not been previously considered in the large literature on this subject, and we now turn to a discussion of these.

2.2 Household income as a measure of household wellbeing

The core of the review's approach is captured by the following quotation:[9]

"...in an ideal world, we would like to tax people according to their life time earning capacity - broadly equivalent to their potential consumption[....]. It might appear that taxing savings is an effective way to redistribute [....]. But

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[5] See Corlett and Hague (1953).

[6] At a later point the review argues: "given that we start with a tax system that is a long way from a tax system that is savings neutral, it seems to us to make sense to move towards neutrality". But in a second best economy which is a long way from a global optimum, there is no guarantee that a movement in the direction of that optimum will in fact increase welfare.

[7] See Atkinson and Stiglitz (1975), Judd (1985) and Chamley (1986).

[8] See also Banks and Diamond (2011) and Auerbach (2009) for fuller discussion of the more recent literature that underpins this conclusion.

[9] Op cit., p 293.

*someone with savings is not necessarily better off over their life time than some-
one without savings. The two might earn and spend similar amounts over their
lifetimes, but at different times: one earns his money when young and saves it to
spend when he is old, while for the other the timings of earning and spending are
close together. We can tax people on their total resources by taxing their money
income at its source (taxing earnings) or when it is finally used for consumption
(taxing expenditure). We can tax better-off people more heavily by making the
rate scale applied to earnings or expenditure more progressive. If [...] people's
saving decisions tell us nothing about their underlying earning capacity, just
about their taste for consuming tomorrow rather than today, then taxing saving
cannot help us to target high ability people more accurately than taxing earnings
or expenditure."*

To paraphase: we should not tax savings that simply result from differences
in time preferences for consumption, or in the timing of endowed incomes relative
to the desired time stream of consumption. The problem with this apparently
uncontroversal statement is that it ignores reality. The unit of taxation typically
is not, as implicitly assumed, a single individual dividing his time between work
and leisure and, on a perfect capital market, allocating consumption over his
life time in accordance with his preferences for consumption of goods vs. leisure
at various points in time. It is a household with two actual or potential earners
in which household production, particularly child care, is an important form
of time use, and which in its intertemporal decisions faces an imperfect capital
market. This simple observation has we believe far-reaching consequences for
the type of proposal, as well as the underlying arguments, presented in the
review.

The difference between the standard model and reality might not matter if
second earners in these households had very similar patterns of time use, but in
fact the data show that for OECD countries there is a very large degree of het-
erogeneity in second earner labour supply, ranging from complete specialisation
in home production, through various levels of part time work, to full time en-
gagement in market work. According to UK data for couples, 86% of males and
75% of females of prime working age[10] are employed.[11] However, while almost
80% of males are employed full time, only 37% of females are in full time market
work. Based on a matching data set for Australian couples,[12] the employment
rates are over 90% for males and 75% of females, with 85% of males and 37%
of females in full time employment. If the comparison is based on primary vs.
secondary earner status, we find an even greater degree of heterogeneity.

Relatively little of this heterogeneity is explained by differences in wage rates
or demographic factors, such as the number and ages of children, with one im-
portant qualification. The pattern of female/second earner labour supply, and
therefore of total household income, consumption, and saving over the house-
hold's life cycle, is in fact driven largely by the size and age structure of the

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[10] Defined as aged 25 to 59.
[11] Data source: UK Office of National Statistics 2010 Living Costs and Food Survey.
[12] Data source: Austratian Bureau of Statistics 2010 Household Expenditure Survey.

family. This becomes evident when we organise the data according to life cycle phases defined on the presence and ages of children. We see a dramatic fall in average female labour supply following the arrival of the first child. A basic limitation of the conventional life cycle literature is that this critical change is largely hidden because the life cycle is defined on the age of "head of the household", which results in averaging over the phase in which couples have not yet had children and those in which they are present.

Figure 13.1 of the Review provides an example, showing, as we would expect, the usual "hump" shaped profile of net income per household. However, the profile by family phase exhibits a fall in net income after the arrival of children. Net income begins to rise only after the children reach school age and therefore have access to publicly provided child care and education. Moreover, time use data show a fall in leisure hours, computed as non-market time net of domestic work and child care hours, with the arrival of children. This raises questions concerning the assumption of a perfect capital market.[13] In a perfect capital market an anticipated "income shock" such as that following the arrival of children and the resulting loss of secondary earner's income and /or increase in child care costs, can be diffused or smoothed over the entire lifecycle, so that its effects in the period in which it takes place will be relatively small. In an imperfect capital market however, where non-collateralised borrowing is costly and in inelastic supply, the effects of the shock bear heavily on that period, as the data show. The level and pattern of household saving is strongly influenced by variations in secondary earner labour supply associated with the number and ages of children.

While changes in average female labour supply over a "family life cycle" strongly tracks demographic change, we still observe a high degree of within-phase heterogeneity. Time use data show that when a preschool child is present and, to a much lesser extent, when there is a school age child present, much of the time of a non-employed parent is spent on child care and related services that cannot be included in the tax base. In contrast, families in which both parents work full time must spend part of their earnings on buying in child care and additional work related expenses, which are reported as part of consumption expenditure, but which are in fact inputs into a household production process.

This more realistic view of the household-as-family has two important implications for the analysis of tax rates and choice of tax unit:

- Income, whether measured in a single period or over a lifetime, is not a reliable measure of the capacity of the household to generate wellbeing for its members, which is the type of capacity that we really want to tax. The same applies to consumption expenditure on market goods.[14]

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[13] See Apps and Rees (2009), ch.5, and (2010) for fuller discussion.

[14] Virtually all economists would quickly agree that the values of neither imports nor exports would be a good measure of the standard of living of a country or economy, but many seem to find it difficult to see that the same is true for market labour income ("exports") and expenditure on market goods ("imports") of a family household. In both cases goods produced for domestic consumption are a significant component of total household income and consumption.

- When there are two earners, choice of the tax base, whether individual or joint income, becomes of central importance to the analysis of both the efficiency and equity effects of taxation.

One important consideration in the comparison of consumption or expenditure taxation with the taxation of capital as well as labour income, not noticed by the review, is that it is not possible, without making arbitrary assumptions, to tax consumption *per se* individually, since the individual consumptions of household members are not observable,[15] and so consumption taxation is necessarily joint. Earnings can of course be individually observed, assigned and taxed. An important advantage of labour income taxation is then that the tax rates can be varied on individual labour earnings across households with the same total joint income but differing relative contributions of the two earners. This allows the choice of tax parameters that have the effect of taxing indirectly part of the untaxed additional production in households with the traditional division of labour. Given the high degree of heterogeneity in second earner labour supply across households, this will in general achieve greater efficiency and equity than a tax on household consumption, as we argue in more detail in the next section.[16] When individual incomes provide a better tax base on both equity and efficiency grounds[17] moving from taxation of earnings to taxation of consumption risks a worsening of the tax system in both these respects.

A further critical point that has achieved prominence recently could perhaps be called the "Mitt Romney factor". Exempting from taxation entirely the capital income corresponding to a "normal" rate of return creates an exemption that is unbounded above. If a billionaire's income consists entirely of capital income from bonds earning less than 5% (deemed to be the normal rate of return), then he pays no tax. On equity grounds, the kinds of arguments the review presents to justify its "neutrality" stance, which emphasise differences in individual preferences concerning the timing of consumption over the life cycle as the source of differences in saving, look extremely weak when confronted with this kind of example, particularly at a time when there has been a large increase in the inequality of wages and incomes in the leading developed economies. The controversy over "bankers' bonuses" and the incomes of top managers is the popular manifestation of what is a serious problem of growing inequality in some major countries, including the UK.

To economists and econometricians trained in the tradition of standard consumer theory, it is hard to accept that household well being does not increase monotonically with household income. Yet the problem presented by the existence of household production has long been recognised in the public finance

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[15] If an individual earnings tax system is retained and converted to consumption taxation by allowing saving to be set off against taxable income, there is the problem of whose tax liability will be reduced and by how much, since it is not possible to observe whose consumption has been reduced to fund the saving. This is brought out very simply when we try to write the budget constraint for the household in such a case. See Section 4 below.

[16] This is discussed at much greater length in Apps and Rees (2009), Chs 6-9. See also Apps and Rees (2012).

[17] See Apps and Rees (2009), (2012), where the case for this is argued at some length.

literature,[18] and the economic analysis of time use that goes beyond the simple work/leisure dichotomy has been well-developed since the early contributions of Becker, Mincer and Gronau in the 1960's and '70's.[19] In the following section we present data to support our basic argument, that the conventional view of the household and its life cycle that underlies the analysis of saving in the review does not capture the essential aspects of the real family life cycle that is relevant for the analysis of saving and capital income taxation. The alternative is to look for second best optimal policies that tax both labour earnings and the returns to saving in the context of realistic models of the household, rather than to prescribe *a priori* "neutrality" for the tax treatment of the income from capital. In doing so, there need be no presumption that the tax schedules for the two forms of income have to be identical,[20] as seems to be assumed in the review's critique of income taxation.

3 The family life cycle

To support the arguments in the preceding section we present UK and Australian data on time use, incomes and saving organised according to a family life cycle defined on phases determined by the presence and ages of children in addition to the age of adults. The analysis draws on data samples for couples partitioned into 5 phases defined as:

Phase1: Children have not yet arrived

Phase 2: At least one child of pre-school age is present

Phase 3; Children are of school age or older but still dependent

Phase 4: Parents are of working age but with no dependent children

Phase 5: Retirement

3.1 Life cycle time use

The pivotal relationship between female labour supply decisions and the demand for child care becomes evident when time use data are organised according to the above phases. Table 1 reports UK and Australian data means for the allocation of time to market work, domestic work and child care in each phase.[21] Figure 1 presents the life cycle profiles graphically.[22]

Table 1 and Figure 1 here

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[18] See for example Munnell (1980).

[19] See Apps and Rees (2009) Ch. 2 for an extensive survey if this literature.

[20] For a discussion of alternatives see for example Auerbach (2009) and Sørenson (2005).

[21] The data sources are the UK Office of National Statistics (ONS) 2000 Time use Survey (TUS) and the Australian Bureau of Statistics (ABS) 2005-06 Time Use Survey (TUS). These are the most recent time use surveys available for both countries. For a detailed discussion of the diary time use categories and our classification of the cateories into market work, domestic work, child care and leisure, see Apps and Rees (2009, 2011).

[22] For a detailed list of the criteria used to partition the sample of couples from the ABS TUS into the five life cycle phases, see Apps and Rees (2011). The same criteria are used to partition the ONS TUS sample. In particular, phase 1 includes all couples with no dependent children present and a female partner under 42 years.

When the family enters phase 2, female labour supply falls by over 50% in the UK and over 60% in Australia. The fall is more than matched by a rise in the allocation of time to household production, around 60% of which is child care. Because there are no children under 5 in the household in phase 3, child care hours fall to a small fraction of their phase 2 level and, of course, to zero in phase 4, with only a relatively small rise in domestic hours over these two phases. Nevertheless, average female labour supply remains well below its phase 1 level for the remainder of the life cycle. There is very little change in average male hours during the working age phases. The decline in phase 4 in no way matches the drop in female hours in phase 2. The result is a large gender gap in hours across the life cycle.

The lower female market hours profile for Australia is consistent with its more strongly joint income tested family payment system. When combined with the individual personal income tax, families face a form of "quasi-joint income tax" with the highest marginal rates applying to second incomes across the middle of the distribution of primary income. Interestingly, the review does not acknowledge that its recommendation to retain the individual as the tax unit for UK income tax and the household as the unit for withdrawal of benefit payments (including child benefits) is a recommendation also for a form of quasi-joint income tax system for most families. This system has two out of the three main characteristics of a joint tax system. First, it makes the marginal tax rate of one earner depend on the income of the other. Secondly, if we take the primary earner's labour supply as given and calculate the full increase in the household's tax bill when the second earner goes out to work as a proportion of her earnings,[23] we find that this significantly exceeds her average tax rate as conventionally measured. It does not however possess the third property of a fully-fledged joint tax system, the full equalisation of individual marginal tax rates.

3.2   Female earnings, income and saving

The fall in female labour supply in phase 2 has a dramatic effect on female earnings and, in turn, on household income, as indicated in Table 2. The table draws on data for samples of couples from the ONS 2010 Living Costs and Food Survey (LCF) and from the ABS 2010 Household Expenditure Survey (HES) to construct family life cycle profiles of median household income, female earnings and net (disposable) income.[24] The usual single "hump" shaped profile of household income and net income is missing because household income so

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[23] What the review defines as the "participation tax rate".

[24] The samples are selected on the criteria that the male partner is aged 25 years or older and neither partner reports negative incomes. Phase 1 includes all couples with no dependent children present and a female partner aged under 42 years. Phase 2 includes all couples with a child under 5 years and phase 3, all couples with dependant children of school age or older and in tertiary education. Phase 4 is limited to couples in which the male partner is aged under 60 years. Phase 5 includes couples in which the male partner is aged from 60 to under 80 years. The LCF sample contains 2905 records and the HES sample, 4830 records.

strongly tracks female earnings which in turn tracks female labour supply.[25]

Table 2 here

Not surprisingly, household saving also tends to track female labour supply. Table 2 reports median saving, calculated as the difference between disposable income and consumption expenditure. Median saving is at its highest level in phase 1 and falls to its lowest level in phase 2 in both countries. While median saving begins to rise in phase 3, it does not return to its phase 1 level in the later phases in either country.[26]

3.3   Employment status

The preceding life cycle time use profiles conceal the high degree of heterogeneity in female labour supply, which is evident from gender differences in employment status, as noted previously. Table 3 reports the distribution of employment status for prime aged males and females in phases 1 to 4, with "prime age" defined as 25 to 59 years. "FT" refers to full time employment defined as 35 hours and over. "PT" is part-time employment defined as 1 to 34 hours and "NE" is "not in employment". The histograms in Figure 2 show graphically the significant heterogeneity that emerges in phase 2 and continues through to phase 4.

Table 3 and Figure 2 here

Full time female employment in the UK is 78.2% in phase 1 and falls to 21.8% in phase 2. The corresponding figures for Australia are 72.5% in phase 1 and 18.4% in phase 2. In subsequent working age phases female full time employment rises to a maximum of 42.3% (phase 4) in the UK and to maximum of 36.2% (phase 3) in Australia. Around 24% and 27% of partnered women in the UK are not in employment in phases 3 and 4, respectively, and around 19% and 29% in Australia are not in employment in the same phases. These figures indicate a high degree of persistence of decisions made in the child rearing phases. In contrast, UK male employment is around 80% until the pre-retirement phase, at which point it drops to 75%. Australian full time male employment is even higher, at 90% and 86%, and is relatively high, at 78%, in the preretirement phase. Because much of this observed heterogeneity in female labour supply is left unexplained by wage rates and demographics, it is often attributed to differences in preferences. However, this ignores the impact of heterogeneity in child care prices, availability and quality when home and bought-in care are close substitutes, which is likely to be the case when bought-in care is not part of the education system.[27]

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[25]The household income variable from the ONS LCF is gross personal income with social security benefits excluded. In the ABS HES the household income variable is private income from wages, investments, etc. Government benefits are excluded. These variables tend to be less well matched in phase 5 due to differences in retirement income policies.

[26]Detailed analysis of Australian data indicate that many households are borrowing short term to meet various forms of long term saving, such as mortgage payments on housing loans and mandatory contributions to superannuation. For a detailed analysis see Apps and Rees (2010).

[27]As we show in Apps and Rees (2012), small variation in the price of child care can

3.4 Saving and second income

The data indicate that household saving tends to track within-phase female labour supply because it tracks the second income. This becomes evident when we rank households in phases 2 to 4, partitioned as described for Table 2, by quintiles of primary income and then partition the records in each quintile into two household types:

Type H1: Second earner working at or below median second worker hours;

Type H2: Second earner working above median second worker hours.

Table 4 reports predicted levels of saving by household type, H1 and H2, based on regression estimates that control for the number and age of children. The table also gives the data means for second earnings. It can be seen that the level of saving depends heavily on the contribution made by the second earner across the middle quintiles of the distribution.

Table 4 here

These results suggest that the labour supply effects of high effective tax rates on the second earner may have a very significant negative effect on saving, far more so than a tax on saving directly or a tax on capital income. Female labour is arguably the most mobile factor of production in the economy, because of its high degree of substitutability with household production, especially in the form of parental child care in the early phases of the life cycle. OECD countries with family tax and child support systems that do not discriminate as heavily against the second earner have far higher female labour supplies, for example in the order of 50% higher in the case of Sweden. The preceding analysis suggests that the same countries also will tend to have higher levels of saving (as opposed to saving rates) and greater taxing capacity for the purpose of public investment in child care and education as a result of their larger tax base.

3.5 Welfare ranking errors

Defining household welfare on joint income can lead to serious ranking errors due not only to heterogeneity in child care choices but also to the shape of the primary wage distribution. An important feature of primary income rankings in countries such as the UK, US and Australia is a relatively flat profile across much of the distribution followed by a steep rise in the upper percentiles. In a distribution of primary income of this shape, the position of a family in a household income ranking will be very sensitive to the labour supply of the second earner, because it will take only a small increase in her earnings to shift the family to a significantly higher point in the distribution. In a primary income ranking, households with the second earner working full time tend to be relatively evenly distributed across the distribution. In contrast, in a household income ranking they are much more strongly represented in the upper quintiles. This allows low wage families to be misrepresented as "high income" in the

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have a large impact on female labour supply when home and market child care tend to be substitutes. This is missed in studies that treat parental child care as leisure and bought-in care as a consumption good.

discussion of joint income tested family payments. To illustrate the problem, Table 5 compares rankings of the two household types, H1 and H2, by quintiles of household income for couples in phases 2 to 4 with a primary income of at least £6,000 in the ONS LCF sample and of $10,000 in ABS HES sample.

Table 5 here

In the UK distribution the upper income limit of quintile 1 is £30,628 and the lower income limit of quintile 4 is £52,988. A single-earner family on an annual income of £28,000 will be located in quintile 1. If the family switches "type", with the second earner taking up full time employment for the same income, the family will be re-ranked from quintile 1 to quintile 4.

The potential for reranking of low wage families when a second partner goes out to work is just as high in the Australian distribution. The corresponding income limits are $67,288 and $125,372. A single-earner family on an income of $63,000 will move to quintile 4 if the second partner earns the same income. If the family has a preschool child, much of the second net income may be spent on child care and associated cost of entering the workforce. Clearly, such a household cannot be said to have the same standard of living as another in which only one parent needs to work full time to earn $126,000 while the other works full time at home.[28] These are the underlying assumptions in arguments that identify household utility possibilities with household income.

4   A tax reform analysis

Much, though by no means all, of the discussion of income and expenditure taxation in the chapters under review proceeds as if households consisted of individual worker/consumers. In those relatively brief sections in which the reality of family taxation is allowed to intrude, the discussion of earnings taxation seems obsessed by an old[29] but not very significant conundrum. This is presented as follows:[30]

"To be neutral with respect to whether two individuals form a couple or not, the tax and benefit system would have to treat them as separate units. But to treat all couples with the same combined income equally, the tax and benefit system would have to treat couples as a single unit. If an individualized system is progressive, so that the average tax rate rises with income, then two couples with identical joint incomes but different individual incomes would pay different amounts of tax.[...] A tax system cannot simultaneously be progressive, neutral towards marriage/cohabitation, and tax all families with the same joint income equally."

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[28] In Apps and Rees (2012) we show that when home and market child care tend to be substitutes - a plausible assumption for the UK and Australia given the state of their child care sectors - small variations in price that have little effect on household utility on can generate wide variation in second earner labour supplies. Under these conditions we show that progressive individual taxation with universal family payments is optimal.

[29] See Rosen (1977).

[30] Op.cit. p 66.

The review appears to use the existence of this dilemma as a reason for not accepting the superiority of individual over joint taxation, despite the weight of theoretical and empirical work supporting this, and to retain, in its proposals for the UK tax system, the elements of joint taxation in what is supposedly an individual tax system in the UK.

However, this supposed dilemma is an entirely false one. Horizontal equity, defined as the imposition of equal tax burdens on households with equal capacities to generate utility for their members, is not served by equalising tax burdens on households with equal incomes, since, as just pointed out, in reality household income is not a good or reliable measure of the household's utility possibilities. Having tax burdens that vary across households with equal joint incomes in a way determined by optimal individual taxation does less damage to horizontal equity than joint taxation, and removes the basis of the case for retaining the elements of joint taxation in the UK tax system.[31] A strongly progressive individual-based income tax with universal family payments can be expected to contribute to a greater degree of vertical and horizontal equity, especially given the current distribution of primary incomes and the potential for errors in a welfare ranking defined on household income of the order of magnitude we have just demonstrated.

Interestingly, in the light of our comments above on the underlying view of the life cycle the review appears to take, it does advocate reducing the tax burden on families with school age children, though apparently funding this at least in part by raising that on families with preschool children.[32] Citing evidence that the elasticity for employment of single mothers is 0.85 when their youngest child is aged at least five, as compared to around 0.5 for those with younger children, they base this proposal on the greater reponsiveness to incentives of the former group. Though we welcome the more realistic view of the life cycle underlying this recommendation, we would argue that it gets things precisely the wrong way around. The reason for the relatively lower (but still high by comparison with elasticities of male labour supply) responsiveness for mothers of pre-school aged children is of course the constraints they face in obtaining good quality child care at affordable prices. The cost of reduced labour supply at this stage in the life cycle is likely to be a loss of human capital and worsened future employment possibilities. Thus reductions in marginal tax rates of secondary earners with pre-school children, together with expenditure on improving child care facilities, is likely to have a more productive effect on labour supply, in the short and longer term, than the policy proposed by the review.

4.1 Integrating capital and labour income taxation

A notable omission in the review is the integration of the proposal for the tax treatment of capital income, which, as we pointed out above, necessarily involves joint taxation, with the system of labour earnings taxation, which is taken to be

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[31] See Apps and Rees (2012), which analyses this issue in some depth.
[32] See pages 111-115 of the review.

based on individual incomes. To explore this issue we take a household with two earners facing an individual-based, piecewise linear progressive labour earnings tax system, and first consider what happens to their budget constraint under each of the three forms of expenditure taxation considered by the review and set out above. We then go on to carry out a tax reform analysis of the proposal in the review to introduce a "rate of return allowance" in an economy in which, as just discussed, household income and utility possibilities are not co-monotonic. Throughout, we use a to denote a lump sum transfer under the tax system,[33] t_i the marginal tax rate paid by individual[34] $i = 1, 2$ on individual income y_i, s is household saving, τ the tax rate on the income from saving yielding a rate of return r in the second period, and x_1, x_2 are total household consumptions in periods 1 and 2 respectively. The household works, consumes and saves in the first period and consumes the income from its saving in the second.

4.1.1 EET

Under individual taxation it is necessary to specify exactly how the exemption from taxation of income that is saved is given. We assume that some proportion $k_i \in [0, 1]$ of total saving is set against the labour income of individual $i = 1, 2$, with $\sum_i k_i = 1$. In the simplest case of a two-period model in which individuals work, consume and save in the first period and consume the net proceeds of saving in the second, we have the single period budget constraints as

$$x_1 + s \leq a + \sum_i [y_i - t_i(y_i - k_i s)] \tag{1}$$

$$x_2 \leq (1 - \tau)(1 + r)s \tag{2}$$

yielding the wealth constraint

$$x_1 + \frac{1 - \sum_i k_i t_i}{(1 - \tau)(1 + r)} x_2 \leq a + \sum_i (1 - t_i) y_i \tag{3}$$

Then clearly the saving decision is undistorted relative to the situation without a savings tax if and only if $\sum_i k_i t_i = \tau$. If the household is allowed to set all its saving against the income of the primary (by assumption more highly taxed) earner, $k_1 = 1$, then this could represent an implicit subsidy to saving.[35]

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[33] Strictly we should write the budget constraint as $x_1 \leq a + \sum_i (1 - t_i) y_i + (t_1 - t_2) \hat{y}$, where $\hat{y}$ is the upper limit of the lower tax bracket, but we can regard the term $(t_1 - t_2) \hat{y}$ as being subsumed in a.

[34] For simplicity we assume that all primary earners pay the higher marginal tax rate t_1 and all second earners the lower marginal tax rate t_2. In reality of course households may consist of two high wage/high tax rate or two low wage/low tax rate individuals. This assumption however suffices to allow us to make the main points.

[35] The review of course stresses that the neutrality result may fail to hold when the household faces different marginal tax rates in the first and second periods. In this particular case the need to raise tax revenue might require ceilings on the value of s.

4.1.2 TEE

The wealth constraint in this case is

$$x_1 + \frac{1}{(1+r)}x_2 \le a + \sum_i (1-t_i)y_i \tag{4}$$

and saving is clearly undistorted. However, a revenue neutral change from a situation in which capital income was taxed would of course require an increase in labour earnings taxation and increased distortion of labour supplies.

4.1.3 TtE

This proceeds by defining a "normal rate of return" r_N and an "excess return" $\rho = \max[0, r - r_N]$, where r is again the realised rate of return. The single period budget constraints are then

$$x_1 + s \le a + \sum_i (1-t_i)y_i \tag{5}$$

$$x_2 \le (1 + r - \tau\rho)s \tag{6}$$

The wealth constraint is then

$$x_1 + \frac{1}{1+r-\tau\rho}x_2 \le a + \sum_i (1-t_i)y_i \tag{7}$$

If the review intends r_N to be the rate of return at which saving in the economy is in some sense optimal, then as long as the tax rate $\tau < 1$ and the "excess rate of return" $\rho > 0$, there will still be "too much" saving. Obviously TEE and TtE are equivalent if $\rho = 0$, the actual rate does not exceed the normal rate. If on the other hand $\rho = r$ so that the normal rate is effectively zero, we have the full taxation of capital income. Thus a marginal reduction in capital income taxation following from increasing the allowed rate of return r_N implies $d\rho < 0$.

Since the TtE system is the main innovation proposed in the review, we carry out our tax reform analysis on the assumption that this is the alternative to the full taxation of the income from saving, i.e. the non-exemption of the "normal rate of return".

4.2 The tax reform model

The intuition of the results we derive in the following formal analysis is quite straightforward, though they may seem counter-intuitive if one's intuition is based only on the model of the household as a single individual.

To ensure revenue neutrality of the reduction in taxation on the income from saving, we have to increase earnings taxation.[36] Since a reduction in the lump

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[36] Alternatively of course the government could increase indirect taxation, reduce expenditure or increase borrowing. We do not consider these possibilities here.

sum a is obviously regressive, while the review generally rules out an increase in the higher rate of income tax, here t_1, we have to increase the lower tax rate t_2 to maintain tax revenue. This, in the framework we have here, means increasing taxation of second earners.[37] This makes the corresponding households worse off as long as the relationship between second earner income and their saving satisfies a reasonable condition given below, which implies that they benefit from the saving tax reduction by an amount less than the cost to them of the income tax increase. Their saving may also fall, even if we assume, as does the review, that the substitution effect of a change in the tax on saving outweighs the income effect *of that change*. The reason for this is of course that the fall in their labour earnings after the increase in t_2 gives an additional income effect which will reduce consumption in all periods. This therefore reduces the increase in saving following the fall in the savings tax rate and may even make it negative in the aggregate. Households with saving that is high relative to second earner's income will be better off. Overall however social welfare may fall if household welfare is not monotonically increasing with joint income and if second earner labour supply elasticities with respect to earnings tax rates are high relative to the elasticity of saving with respect to the saving tax rate.

We assume two types of households, indexed $h = 1, 2$, with utility functions

$$U_h = u_{1h}(x_{1h} - \psi_{1h}(y_{1h}) - \psi_{2h}(y_{2h})) + u_{2h}(x_{2h}) \tag{8}$$

The form of the utility function rules out income effects on earnings but allows them on both current and future consumption. The household subscripts should not be thought of as denoting a simple difference in preferences, but rather as denoting reduced form functions that reflect such factors as differences in productivity in household production and in prices of bought-in child care leading to differences in choices of second earner labour supply. In particular we assume $y_{21} > y_{22} = 0$. Given the budget constraints for this case in (5) and (6) above, we simplify the model by writing the period 2 utility as $u_{2h}(\pi(\rho)s_h)$, where $\pi(\rho) \equiv (1 + r - \tau\rho) > 1$ is the marginal net of tax return to saving.

It is straightforward to show that the household optimisation implies supply functions for earnings given by $y_{ih}(t_i)$, which involve no income effects, and demand functions for first period consumption and saving given by $x_{1h}(\pi(\rho), Y_h)$, $s_h(\pi(\rho), Y_h)$, where $Y_h = a + \sum_i (1 - t_i)y_{ih}(t_i)$ is first period disposable income. Note that the tax rates on earnings affect consumption and saving only through their effects on disposable income as a result of the assumed form of the utility function.

We are going to take as the two variable policy instruments t_2 and ρ (equivalently r_N), while holding r, τ and t_1 fixed. In the usual way we can define indirect utility functions $v_h(t_2, \pi(\rho))$, with derivatives

$$\frac{\partial v_1}{\partial t_2} = -\lambda_1 y_{21}(t_2); \quad \frac{\partial v_h}{\partial \rho} = -\lambda_h \tau s_h / \pi(\rho) \quad h = 1, 2 \tag{9}$$

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[37] In reality, low wage primary earners will also be among these, but given assortative matching, this will strengthen the distributional aspects of the following discussion.

where λ_h is the marginal utility of household income and recalling that $\partial v_2/\partial t_2 \equiv 0$ by assumption.

The government budget constraint is

$$\sum_h \phi_h[t_1 y_{1h} + t_2 y_{2h} + \tau \rho s_h] - a \geq G \tag{10}$$

where ϕ_h is the proportion of type h households in the population, $\sum_h \phi_h = 1$, and $G \geq 0$ is a per capita revenue requirement. It follows that revenue neutrality requires

$$dt_2 = -\mu d\rho \tag{11}$$

where

$$\mu \equiv \frac{\sum_h \phi_h \tau s_h (1 + \varepsilon_h^{s\rho})}{\phi_1 [y_{21}(1 + \varepsilon_1^{y_{21}t_2}) + \tau \rho \frac{\partial s_1}{\partial Y_1} \frac{\partial Y_1}{\partial t_2}]} > 0 \tag{12}$$

Here $\varepsilon_h^{s_h\rho}$, $\varepsilon_1^{y_{21}t_2}$ are elasticities and the sign restriction reflects the assumption that taxation is efficient, in the sense that reducing one tax must result in an increase in the other. Note that the second term in brackets in the denominator is negative, since saving is increasing in household income which is decreasing in the tax rate t_2.

Turning now to an analysis of the welfare effects, we assume a utilitarian social welfare function

$$W = \sum_h \phi_h v_h((t_2, \pi(\rho)) \tag{13}$$

giving

$$dW = \sum_h \phi_h [\frac{\partial v_h}{\partial t_2} dt_2 + \frac{\partial v_h}{\partial \pi} \pi'(\rho) d\rho] \tag{14}$$

$$= [\phi_1 \lambda_1 (\mu y_{2h} - \frac{\tau}{\pi} s_1) - \phi_2 \lambda_2 \frac{\tau}{\pi} s_2] d\rho \tag{15}$$

Since $d\rho < 0$, we require the term in square brackets to be negative for an increase in welfare to follow from a reduction in the taxation of the return from saving, but the first term in these brackets will be positive if y_{2h} satisfies the condition

$$y_{2h} > \frac{\tau}{\pi \mu} s_1 \tag{16}$$

and so the welfare effect of the policy change could be negative overall if

$$(\mu y_{2h} - \frac{\tau}{\pi} s_1) > \frac{\phi_2 \lambda_2}{\phi_1 \lambda_1} \frac{\tau}{\pi} s_2 \tag{17}$$

in line with the intuition given above. This simply says that the welfare loss to the households that lose from the tax policy outweighs the benefit to those that gain.

Aggregate saving falls if

$$-\frac{\mu \phi_1}{\tau} \frac{\partial s_1}{\partial Y_1} \frac{\partial Y_1}{\partial t_2} > \sum_h \phi_h \frac{\partial s_h}{\partial \pi} \tag{18}$$

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which simply says that the negative effect on saving of the increase in earnings taxation outweighs the positive effect of the reduction in capital income taxation in absolute value. *A priori* there is nothing to rule out satisfaction of this condition and as far as we know there is no empirical evidence to suggest that it could not be satisfied.

5 Conclusions

This paper has provided a critique of the review's main proposals on the taxation of the income from household saving that is based on taking a fundamentally different view of the household than that which underlies the arguments presented to support those proposals. We believe that this view supports a different approach, that of finding the second best optimal taxation for both types of income, where neither can be expected to have a zero optimal tax rate. In following this approach, it is essential in our view to use models that take account of the real characteristics of the household, as we have sought to describe them in this paper. Also, the problem should be formulated as that of finding the optimal parameters of a tax system that is based on individual labour incomes and a piecewise linear system of marginal tax rates applied to these. Whether the tax on capital income should be also piecewise linear or a flat rate tax[38] is an open question *a priori,* that can and should be analysed within this framework.

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Table 1　Life cycle time use, hours pa

Phase	Male hours			Female hours		
	Market	**Domestic**	**Child care**	**Market**	**Domestic**	**Child care**
UK						
1	1762	745	-	1457	1027	-
2	1855	718	769	674	1291	1693
3	1768	836	267	1019	1427	561
4	1556	866	-	906	1465	-
5	323	1219	-	156	1627	-
AU						
1	1857	753	-	1508	1047	-
2	1985	747	1221	532	1471	2250
3	1845	897	434	934	1671	716
4	1558	909	-	807	1624	-
5	381	1228	-	129	1241	-

Figure 1　Life cycle time use, hours pa

(a)　UK time use　　　　　**(b)　AU time use**

Table 2   Median incomes, earnings and saving, 2010
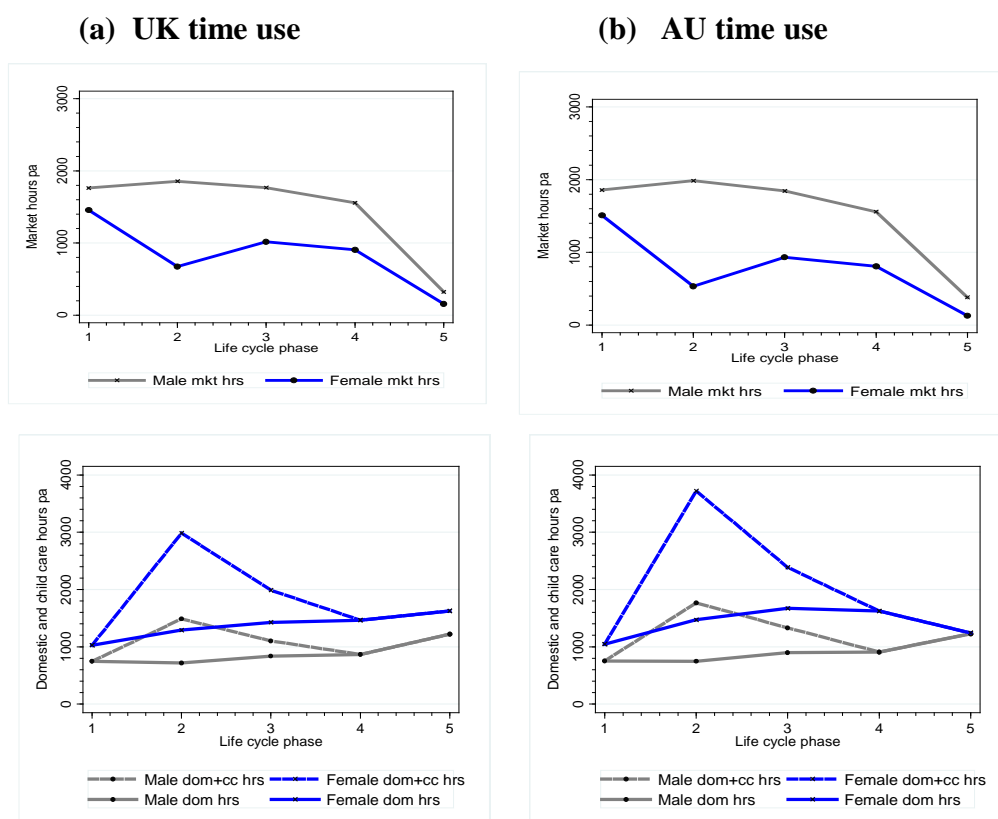
Phase	Household income	Female earnings	Disposable Income	Saving
UK£				
1	47996	19994	37960	13676
2	35152	6604	32110	8892
3	42588	8970	39468	9620
4	39468	10972	31720	8320
5	12756	0	22932	3224
AU$				
1	116141	47502	96122	19760
2	83824	6240	80236	5824
3	110244	30212	93964	9776
4	94744	26208	83252	14040
5	6980	0	33956	1404

Table 3   Employment status by gender, 2010

Phase	Males			Females		
	FT	PT	NE	FT	PT	NE
UK						
1	86.9	4.4	8.7	78.2	11.1	10.6.
2	79.2	8.4	12.4	21.8	44.5	33.6
3	80.9	8.1	10.9	32.2	44.0	23.8
4	74.6	8.8	16.6	42.3	30.9	26.9
5	15.5	10.1	74.4	4.9	14.2	80.8
AU						
1	88.9	8.5	2.6	72.5	18.2	9.3
2	90.3	5.5	4.2	18.4	37.5	44.1
3	86.2	7.3	6.5	36.2	44.8	19.0
4	78.3	9.9	11.8	35.3	35.9	28.8
5	16.5	10.3	73.2	6.9	12.9	80.2

Figure 2   Employment status by gender

UK employment status by gender: phases 1 to 4
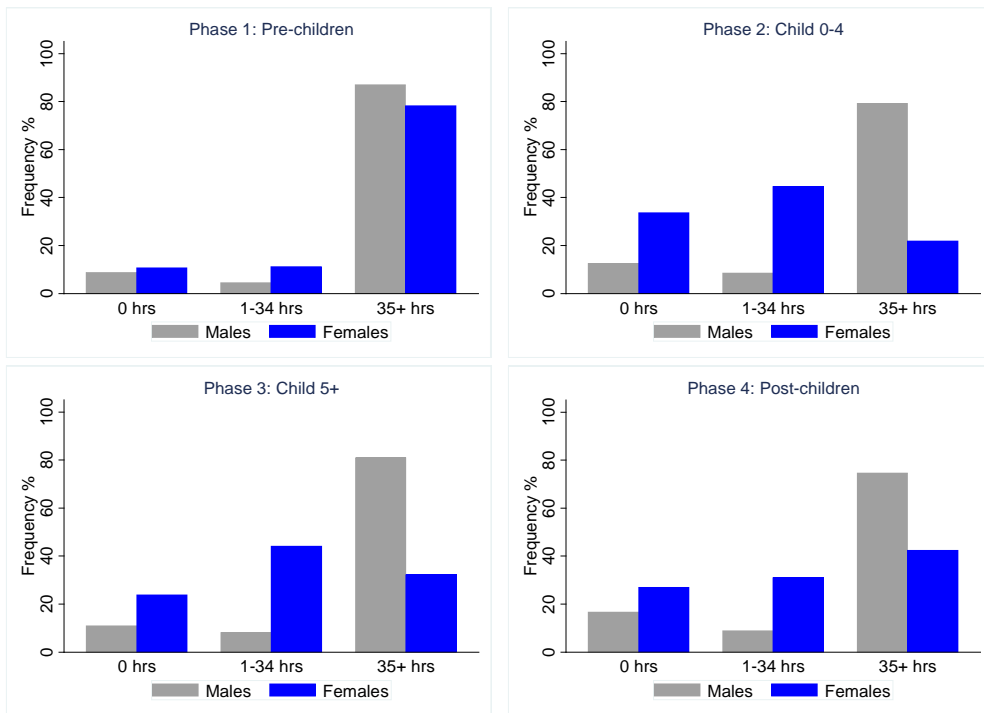
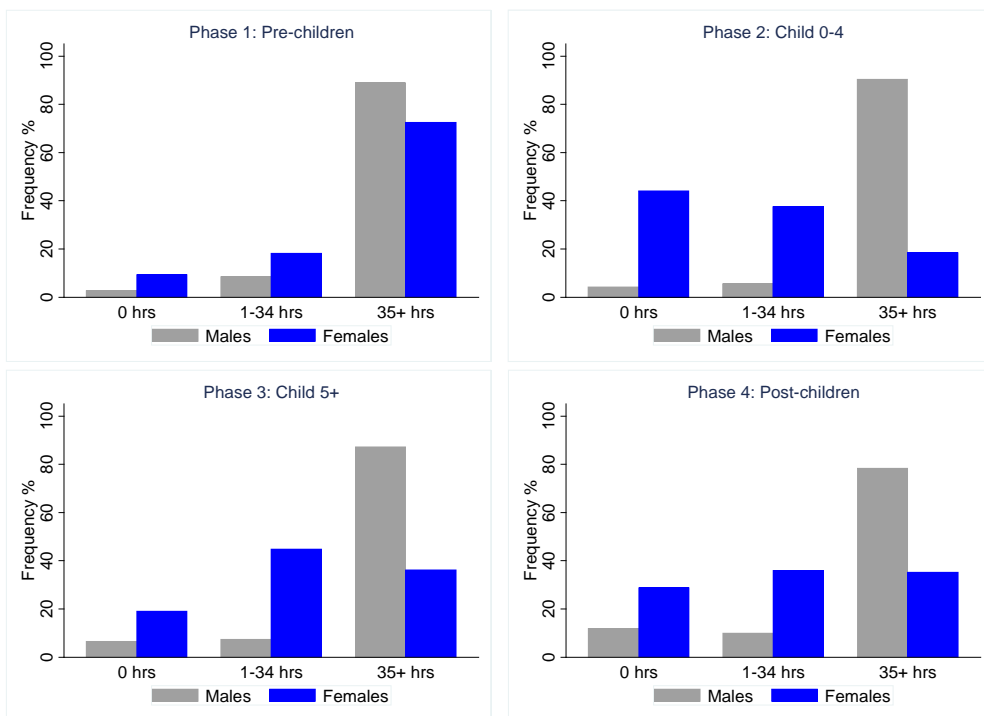**AU employment status by gender: phases 1 to 4**

Table 4   Saving and 2nd earnings by primary income (phases 2 to 4)

UK£: Primary income quintiles	13294	22093	29597	40707	60971
H1: Saving $pa	-1820	4009	7545	11673	18854
2nd earnings $pa	807	2801	4270	4654	2805
H2: Saving $pa	3764	9433	14009	19129	24657
2nd earnings $pa	9682	14863	18771	21827	26891
AU$: Primary income quintiles	**34265**	**54701**	**71982**	**96648**	**201855**
H1: Saving $pa	-8227	331	4095	14268	54642
2nd earnings $pa	330	9745	9494	16794	12835
H2: Saving $pa	297	9075	16167	30634	76973
2nd earnings $pa	24425	37410	43001	60451	67281

Table 5 Household type and primary income by household income (phases 2 to 4)

UK£: Household income quintiles	23782	35765	46562	61349	90744
H1%	69	55	46	42	41
H1 Primary income £pa	21105	31088	39053	51299	77462
H2%	31	45	54	58	59
H2 Primary income £pa	16976	23714	30931	41324	59789
AU$: Household income quintiles	**45967**	**78968**	**107194**	**143962**	**265543**
H1%	73	55	46	38	36
H1 Primary income $pa	40546	67014	87493	111820	239152
H2%	27	45	54	62	64
H2 Primary income $pa	34626	50145	65297	84535	16393