

Salary Linked Home Finance: Reducing Interest Rate, Inflation and Idiosyncratic Salary Risks

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Abstract

It is possible to develop an alternative housing finance instrument that matches the cash flow, and reduces the risks faced, by homeowners and pension funds. The instrument would also reduce the liquidity constraints faced by new and existing homeowners, and eliminate the cash flow tilt imposed by high inflation. Moral hazard and anti-selection risks are likely to restrict the market to employees of large institutions, but such an instrument would encourage a greater flow of funds from superannuation into housing. Other obstacles to its introduction can be overcome.

Keywords: mortgages, human capital contracts, income contingent loans, macro contracts

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1 Introduction

Salary-linked home-finance (SLHF) describes a home financing instrument repaid by a predetermined proportion of the home-owner's income over a predetermined term. The cost, and the return to the investor, are therefore dependent on the homeowner's income growth over the term – and is independent of interest rates.

As a financial instrument, the concept is closely related to that of income contingent loans (ICLs), such as Australia's HECS system, which are increasingly used, internationally, to fund higher education. SLHF is however an equity rather than a debt instrument and is intended also to provide stable inflation-protected returns on the assets that back pensions in payment.

This paper first describes the motivation for SLHF. It then goes on to describe one practical embodiment in more detail and examines the advantages and disadvantages for homeowners and investors. It then considers the returns that could be earned based on historical salary growth in Australia, and how the expected rate of return might be adapted to satisfy investors and homeowners. A final section considers risks – particularly moral hazards – in more detail and the obstacles to SLHF's introduction in the marketplace, suggesting how they might be managed.

The instrument could offer advantages for investors and homeowners.

2 Motivation

SLHF provides a way that asset-rich pensioners can provide finance to asset poor young homeowners in a manner that reduces the risks faced by both.

The idea for SLHF came from attempts to address three different challenges. This section discusses these challenges and then briefly compares SLHF with ICLs, which, while similar, have a significantly different focus.

2.1 Liquidity constraints and the inflation tilt

The first challenge is the liquidity constraints faced by young homeowners: if they were to smooth their consumption over their lifetimes, they would borrow more than they can typically do because of lenders' (understandable) antipathy to the capitalisation of interest. This is aggravated by high interest rates in inflationary times, as the real value of repayments is tilted towards earlier years. Nominally level repayments on even small home loans are burdensome in the earlier years, but soon ease with salary inflation. The mathematics of inflation annuities could however be applied to the problem faced by younger borrowers to start repayments low and increase them with inflation.

This relatively obvious solution has been tried frequently. Mortgage repayments can be increased at a fixed rate or in line with a wage-related index, but the cost of borrowing is still related to market interest rates. Roldan and Spoor (1992) tell how these dual indexed mortgages were introduced to Mexico when they were in favour with the World Bank. They have been tried in other countries, including Australia. They have a significant drawback however in that the incomes of some borrowers did not keep pace with the required increases in the repayments. The loans of these borrowers became too large to be serviced and also exceeded the current market value of their homes.

SLHF addresses the tilt problem because nominal instalments automatically rise with income, and those with lower salary increases repay less.

2.2 Usury and idiosyncratic salary risks

The second challenge can be posed as an ethical one. Usury (the charging of interest) was prohibited in much of the ancient world and is still prohibited by some versions of Muslim law. Mills (1989) looked at the religious and historical arguments for and against charging interest, and concludes that various partnership arrangements – some analogous to share cropping – and the joint stock company are preferable to charging interest, because they place less of the burden on the 'borrower' if things go badly.

The problem can alternatively be expressed as a market failure in the provision of insurance against idiosyncratic salary risks. The actuarial challenge is therefore to develop appropriate insurance contracts to protect borrowers against salary increases falling short of expectations.

SLHF is based on the recipient's own income and is therefore an equity rather than debt instrument. As with insurance contracts, the SLHF contracts are fair *ex ante* in that the future value of expected repayments is equal to the initial value. They are also reasonable and fair *ex post* because those with salary increases higher than expected will 'subsidise' those with increases lower than expected.

2.3 Smoothed inflation-protected investment returns

The third challenge is to provide an inflation-protected low volatility asset to back pensions. For these, SLHF is expected to provide a low volatility cash flow directly related to the cash flow required by a pension, and growing with salary inflation.

2.4 Human capital contracts (HCCs) and ICLs

ICLs have a different origin and largely different purpose to SLHF.

It would seem that Friedman and Kuznets (1945) first suggested that students could pay for their higher education and share the risks of the accompanying increase to their future incomes using HCCs with a form similar to SLHF (ie. the return dependent on increases to incomes). Palacios (2002) describes them in more detail. They now appear to be available commercially in a number of countries.

Other versions (where the repayments but not the returns are linked to the borrower's income and are therefore more debt than equity) have been developed over time and are now common internationally. While they address the liquidity constraints and create some insurance against idiosyncratic salary risk, they are aimed at a different demographic and are not intended to yield a smoothed real investment return. In fact, most of the schemes are significantly subsidised by government. Chapman (2005) provides a thorough summary.

They do, however, provide insights into the potential – particularly operational risks of a SLHF product.

3 The Financial Instrument

The new product is simply explained by the formula linking the finance amount with the repayments.

It should be explained that the word ‘loan’ is not used in order to make it clear that the pure form of the instrument is not a loan, and there is no interest in the sense of a predetermined cost of borrowing. Instead of the traditional interest rate, the investor has an equity interest in a share of the homeowner’s future earnings. Salary is used for income or wage as the product is likely to be more attractive to those earning a relatively fixed salary rather than a wage with overtime allowances.

$$SLHF_t = \sum_{i=t}^{n-1} K_i S_i$$

Where

$SLHF_t$ is the amount of finance outstanding at the end of month t ,

K_i is the predetermined proportion of salary to be repaid in month i ,

S_i is the home-owner’s salary in month t , and

n is the term of the loan in months.

In a simplified example, if $n = 240$, K_i is fixed at 20%, then:

$SLHF_0 = 48 S_0$ is the amount advanced initially

$SLHF_1 = 47.8 S_1$, which together with a repayment of 20% S_1 gives a return of $S_1/S_0 - 1$

$SLHF_2 = 47.6 S_2$ etc.

(eg. If \$480,000 were to be advanced, it would be repaid over 20 years by 20% of a salary that began at \$10,000 per month. Future increases are not anticipated, and if salary remained constant, there would be no investment return.)

One might see this as a linear repayment of capital. The homeowner is able to repay some or all of the amount outstanding at any time, although some charge might be necessary to manage anti-selection.

The basic formula described above may well require embellishment for operational, legal and marketing reasons, but the adaptations may prove commercially valuable and add nothing to the description of the basic product. They are therefore not described in this paper.

3.1 The return and cost of finance

The return (or cost of the SLHF), in the simple example above, is therefore equal to the homeowner's growth in salary.

This return may not, however, match investors and users of the SLHF. If there is insufficient investment, then the repayments will have to be loaded to attract more investors and discourage users of SLHF – and vice versa. Most obviously, the instalments could be increased by a fixed percentage loading. Such a loading is easily calculated as the term of the SLHF divided by the annuity factor determined at an interest rate equal to the required increase to the yield. This loading therefore can be regarded as an interest charge (increasing the return over and above salary growth).

The instrument therefore creates a novel link between investors and users of funds, which can be regarded financially as analogous to a new currency (unique to each homeowner). Investors and borrowers in this currency will be matched at a particular loading or interest rate that will depend on supply and demand and expectations of the rate of increase of each homeowner's salary.

The loadings could be fixed over the lifetime of the loan – and therefore lead to a potential charge on early repayment as with conventional fixed interest loans, or vary as supply and demand for funds changes.

3.2 Advantages to homeowners

Ignoring, for the moment, the question of expected returns and charges, this instrument provides a number of advantages to the homeowner relative to the standard variable rate mortgages.

3.2.1 No exposure to interest rate movements

The instalments on variable rate mortgages can be volatile. Australian mortgage rates have varied from 5% to 17% over the past 50 years.¹ This translates into monthly instalments on a 20-year \$100,000 loan that have varied from \$660 to \$1,467. On three occasions, instalments on these mortgages would have increased by more than 20% over the course of one year.

Direct interest rate risk is eliminated completely with this instrument – unless a variable loading is applied, in which case changes to the loading would represent a new interest-type risk.

3.2.2 Greater advances and lower initial instalments

The instalments under standard mortgages are not adapted to allow for the likelihood that the borrower's income will grow. The expected returns on the SLHF instrument can however anticipate some salary growth, and therefore can allow for a greater initial advance relative to initial instalments.

The actual amounts will depend on the credit rules applied by the investors in these instruments. Comparisons with standard mortgages also depend on the rules of particular lenders, but it is suggested that the numbers in Table 1 would be realistic for some borrowers and SLHF recipients at time of writing. The calculations assume that the instalments would have to be loaded in order to provide a return that would attract sufficient investors.

¹ <http://www.rba.gov.au/Statistics/Bulletin/F05hist.xls>

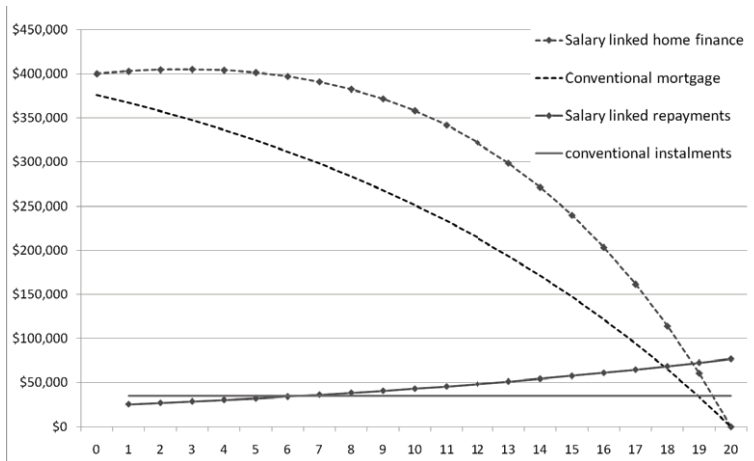
Table 1: Cash flow comparisons

Earning \$100,000 pa	Maximum amount advanced	Initial instalments
20 year variable rate mortgage	\$376,199	\$35,000
20 year salary linked home finance	\$400,000	\$25,200
Difference	6.3%	-28.0%

Note: These calculations are based on interest of 7% (payable in arrears and compounded monthly) and include loadings (on the repayments) of a flat percentage of 20% in order to achieve this yield on the SLHF, assuming salary inflation of 5% including promotional increases. (See section 4 for discussion.)

This additional advance increases the homeowner’s gearing to the price of housing – and the amount outstanding may well increase initially before reducing. This potentially increases the size of the loss if the home is sold. Figure 1 below illustrates using a simplified version to show how the amount outstanding can increase initially in nominal terms before declining to zero. Salaries have been increased at a higher 6% pa in order to illustrate the increase.

Figure 1: Comparisons of instalments and amounts outstanding



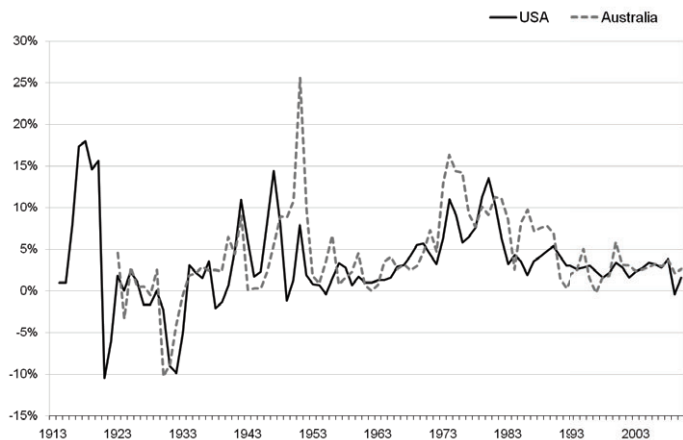
3.2.3 Protection against higher inflation and nominal interest rates

While high inflation has not been an issue for more than a decade, it places significant pressures on homeowners in increasing nominal interest rates and therefore their cash-flow problems. Policy makers can also respond to inflation by increasing real interest rates, so exacerbating the problem.

History suggests that inflation always remains a risk. Massive government stimulus being offered to the world economy this year, combined with increasing demand from developing populations in China and India particularly may create demand-pull inflation. The likelihood of periods of higher inflation is further increased by the cost-push inflation that may be created by the peaking of world oil production in the next decade or two.

Inflation also harms retirees. Figure 2 below gives a history of inflation in Australia and the USA. Even the USA, the world's largest economy, has suffered three bouts of significant inflation over this period. Someone retiring in 1940 on a fixed pension would have lost half the value by the mid-1950s and another half by the mid-1970s.

Figure 2: Inflation rates of the last century



Source: Created from US Census and Bureau for Economic Analysis Data obtained from <ftp://ftp.bls.gov/pub/special.requests/cpi/cpia1.txt> and http://www.rba.gov.au/statistics/tables/index.html#prices_inflation

3.24 Salary growth hedge

This instrument also provides insurance (or a hedge) for homeowners against their own salary growth being below expectations – either because of macroeconomic factors beyond their control, or considerations more closely related to their personal circumstances, such as difficulties experienced by their employers or poor health.

The SLHF would therefore provide one natural way of implementing ‘macro-markets’ as described in Shiller (1999). He suggested the development of a very wide range of income indices (based on different professions and economies) that would allow people to swap a portion of their own future income for someone else’s. SLHF has an advantage over Shiller’s swaps in that there is no basis risk between the index and the individual’s salary growth, but – on the other hand – SLHF faces the risks of anti-selection and moral hazards.

Moral hazards arise because people might put less effort into increasing their incomes if they have to share a significant proportion with investors (in addition to their tax obligations). This risk is clearly uninsurable; its impacts and management are considered in section 4.3.2 below.

If we ignore the impact of moral hazards, the expected return on SLHF at issue will depend on expected income growth. Expectations may however differ between investors and recipients. This creates the anti-selection risk, which is discussed further in section 4.3.1 below.

If we further assume that potential investors and recipients have the same expectations of future income, random deviations from the expectation are ‘insurable’ in the sense that the risks can be pooled and those with below average increases are supported by those with above average increases. As discussed in section 2.2 above, SLHF contracts can be seen as incorporating an insurance element.

I am not aware of any attempt to measure the deviation of these random deviations only, although personal observation would suggest that it is considerable. Deaton and Paxson (1998) do measure the considerable dispersion of incomes over the life cycle and show that it

is increasing and that there is a positive correlation between health and income. This suggests that at least part of the differences is involuntary and insurable.

3.3 Advantages to funds paying income streams

Ignoring again the question of expected returns, a portfolio of SLHF investments provides some significant advantages to superannuation funds attempting to match retirement income streams. It matches the liabilities of the employer in the case of defined benefit (DB) funds and of the objectives of the members in the case of defined contribution (DC) funds.

3.3.1 Returns linked to salary inflation

A portfolio of SLHF would yield a return equal to a weighted average of the growth in the salaries of the homeowners who had been financed.

It is suggested that salary linkages provide the ideal match for superannuation fund liabilities – DB and DC. In the absence of any investment that will yield a return precisely equal to the particular needs of individual retirees, it is generally argued the best linkage is either to a pensioner price index or to salary inflation.

Salary inflation is generally expected to be higher than price inflation, but this just creates a tilt in the payment, if the present values of cash flows are expected to be the same. A price index would be more appropriate to match a particular standard of living, while a salary link would allow the pensioner to participate in the prosperity – or otherwise – of the current generation of workers. For those on a comfortable retirement income, the salary linkage would seem more appropriate, arguably an ideal match.

3.3.2 Regular cash flows to match income stream payments

While not exact, the regular cash flows from a portfolio of SLHF investments would be strongly related to the outflows from a portfolio of pensions.

An exact match would not be possible given that the SLHF investments:

- are likely to have a maximum term shorter than the maximum likely term of a life pension; and
- must include an option to repay, which will create a varying reinvestment risk.

It will be difficult therefore to manage a portfolio to match the term of a pension portfolio. Nevertheless, a portfolio of SLHF would produce an increasing cash flow that would leave relatively little liquidity risk and, because the pension payments could be linked to the value of the SLHF, no market risk.

3.3.3 Minimal credit risk

The actual credit experience of these instruments will depend on the credit restrictions adopted and the enforceability of the contracts, but properly managed portfolios should enjoy the minimal losses that are normally associated with home loans. The primary security will be the income of the homeowners, with the home itself providing additional protection through a secured mortgage should this fail through unemployment.

Credit risk, and the possible need for government intervention, is discussed in more detail below.

4 Likely returns

The return on a portfolio of SLHF would be equal to the weighted average salary increase of recipients. This section suggests that the average increase in the salaries of recipients is likely to be at least 3% above inflation, and so justifies the 5% increase used in Table 1, as a conservative estimate.

Increases would differ from a national wage index, because:

- the salaries would represent only a sample of the total; and

- the salary increases would include a ‘promotional’ element arising from the increases experienced by the homeowners. This increase arises partly from promotions to more senior positions and partly from increases arising from the benefits of experience. In considering the factors that affect these increases, it is important to distinguish between annual changes in cross-sectional data and the increases of a particular cohort. A notional index of a stationary population would not include any promotions. The average SLHF recipient will however be younger than average and promotions should make an important contribution to the return.

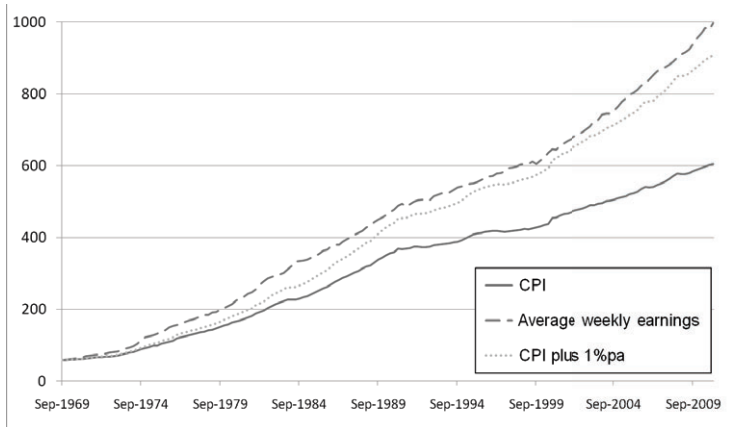
The returns can therefore be seen as depending firstly on the average increase to salaries arising from inflation plus an additional element of promotion. They will also depend on the individual salary expectations of SLHF recipients and how the behaviour of SLHF recipients is modified as a consequence of their receipt of the loan. This section addresses these questions in turn. There is no attempt to be particularly scientific in measuring the past, as any precision would be spurious. The past is at best a guide to the future, but it is likely that potential returns will best be estimated by measuring a potential SLHF recipient’s salary history and that of his or her employer.

4.1 Salary growth

Average salary growth in Australia has exceeded inflation by a little over 1% pa over the past 40 years, as shown in Figure 3. This is more or less consistent with other developed and urbanised countries, and is unlikely to change significantly in future.

The fact that the working population is not entirely stationary means that the average can be distorted by the inclusion or exclusion of a greater or lesser promotional element. Some rough calculations based on a fairly steep promotional curves and the current age structure suggests that such distortions are likely to be small.

Figure 3: Wages vs inflation



4.2 Increases over the working life

The precise effect of promotional increases on SLHF return will depend on the characteristics of the recipients that influence their salary growth. Polachek and Siebert (1993) summarise the factors affecting salaries, which depend significantly on education levels and age.

- For educated men, income normally rises with age until the late forties (later in organisations with promotions based on seniority), and then appears to be relatively flat until retirement.
- Non-skilled men's incomes peak at around age 30.
- Single women's incomes largely follow the pattern for single men.
- Married women's incomes drop at the birth of the first child, and they seldom catch up.

Not surprisingly however actual salary increases vary significantly over time and the type and location of the employer.

There are three main sources of information available on the progress of income over the working life.

4.2.1 Actuaries of defined benefit funds

Actuaries have produced salary scales including promotions for DB schemes for many years. They can be found in most valuation reports, and generally show fairly steep increases in the twenties, dropping to zero before retirement. These may not be applicable to SLHF portfolios:

- Older ages are normally more important financially to defined benefit schemes and so increases at the younger end of the scale may be given less attention and may be less reliable, unless the age and benefit structure of the fund dictate otherwise.
- There may be an anti-selection impact in that people taking out SLHF may not be typical, and those leaving the employer may subsequently have an experience of increases in income that differ from those that stay.

With these caveats, it is interesting to speculate what annual promotional type increases are likely to add to the return on SLHF portfolios. The scales of a couple of large Australian government funds suggest that, for ages where the finance is received under 30, the return would be enhanced by between 1% and 3% pa.

4.2.2 National statistics

Most of these appear to be based on cross-sectional studies. An OECD (1998) report provides a number of graphs of the progression of salaries over the working lifetime scale. It shows steep increases in the early twenties reducing in later decades.

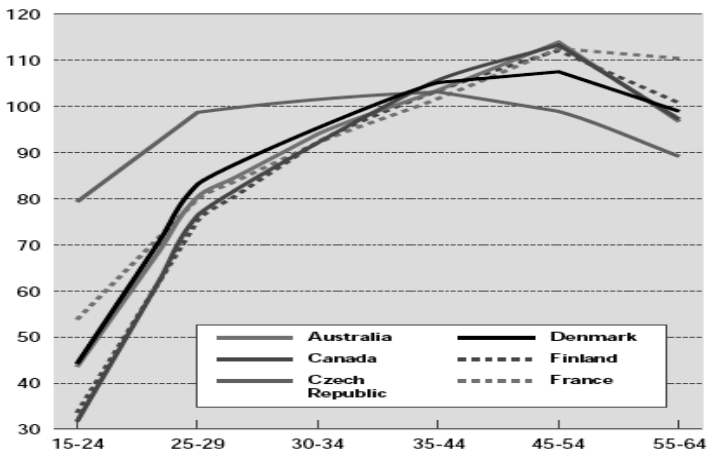
The curves appear to be similar for fairly different countries. In Figure 4, France and the Scandinavian countries have rather different educational and tax arrangements to Australia and Canada, yet still have similarly shaped curves. The curve for the Czech Republic is very much flatter, but its recent emergence from a centrally controlled market may explain the difference.

While tracing a similar shape, the precise curvature differs significantly by country and over time. The OECD report uses the ratio of the income of those aged 45 to 54 to the income of those aged 25 to 29

to measure steepness. In 1995, the ratio for graduates varied from 1.42 in the Czech Republic to 2.61 in Spain. Also reported was the change over the last 20 years in the USA, where the ratio had increased from 1.23 in 1975 to 1.67 in 1995. These ratios would suggest promotional increases between 1% and 4.5% pa, which would be consistent with the increases reported in the section above and, with salary increases of at least 5%, when inflation is of the order of 2%.

These cross-sectional studies invariably report a decline in average incomes at later ages – a pattern not repeated in the longitudinal studies of the next section. It is generally agreed that the difference is caused by higher income people retiring earlier.

Figure 4 Cross-sectional wage levels in 1995



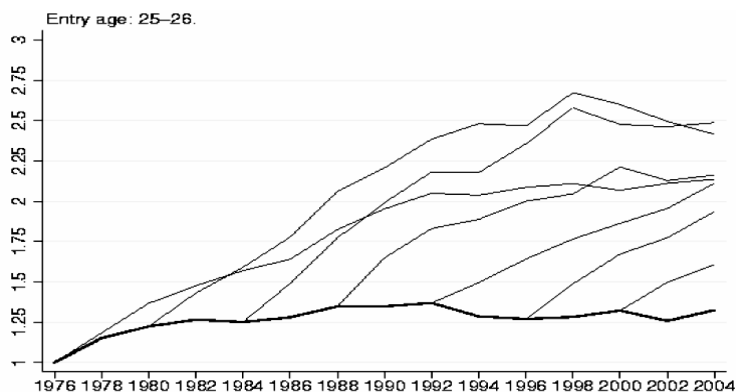
Source: OECD (1998)

4.2.3 Panel studies

Studies that have examined salary progression over a significant period of the lives of the same individuals show significantly steeper curves that do not seem to differ much in different economic and cultural circumstances.

Figure 5 shows the earnings of a sample of 70,000 Italian workers, who entered the labour market at the age of 25 or 26, and are therefore assumed to have had some higher education. The thick line represents the initial real wages of those entering the labour market in the years shown, while the thin lines show the subsequent real increases of each cohort. It confirms that actual increases are likely to be steeper at younger ages, but to vary over time.

Figure 5: Entry wages and career development of young workers



Source: Rosolia and Torrini (2007)

Similar results are found by an analysis by Beach and Finnie (2004) of a 10% sample of Canadian taxpayers.

Of particular interest in both samples is the interaction between the change in the real starting average wage and the impact on subsequent increases. It would appear – particularly for the women in the Canadian sample – that the rate of increase is similar for different cohorts although the starting points may vary.

Perhaps the best data on which to base estimates of Australian increases is that provided by HILDA (the Household, Income and Labour Dynamics in Australia Survey), which has been surveying over 12,000 people since 2001. Wilkins et al. (2011, ch.12) reports that average wage increases in the seven years to 2008 were 5.5% p.a. above inflation. The results confirm that there is considerable variation year by year

and between individuals, with increases much higher for younger, lower income and better educated individuals particularly. They also show that increases were much higher for those who changed jobs, which would explain the lower salary increases reported by DB schemes, and which would reduce the return on SLHF – as people would often repay when changing jobs.

While each of the data sources above shows significant variability over time and between individuals, there are also overall patterns that appear universal and justify the expectation that average salary increases for those remaining with the same employer will outpace inflation by perhaps 2% to 4% pa under normal circumstances.

4.3 The impact of anti-selection and moral hazard

The link between income and SLHF instalment does introduce additional risks arising from anti-selection and moral hazard.

4.3.1 Managing anti-selection

‘Prior endowments’ (the capabilities inherent in a person’s genes, education and experience) are not insurable to the extent that their impact on salary growth is already known at inception. Asymmetric knowledge of the impact of these prior endowments and other factors that may impact salary increases creates an anti-selection risk.

The risk can be mitigated by developing a classification model for potential borrowers. Individuals’ lifetime wage patterns will depend on age, income, education and other variables. The models could then be applied to determine loadings so that the expected return on every advance would be the same at inception. The models do not have to be perfect. The anti-selection risks will be acceptable to the extent that the relationship between the recipients’ characteristics and their salary increases remains more or less stable and therefore a reliable basis for projecting returns.

Developing the models initially presents one of the significant challenges to SLHF, but experience with HCCs and ICLs is promising. O’Neill and Antcliff (2009), in their abstract, reports that Australian

HECS data has enabled them to build ‘feasible ... microsimulation models of incomes to project future repayments’ for those entering the workforce. The anti-selection and moral hazards attached to SLHF may be greater than those of the HECS scheme as the amounts being repaid will be significantly larger. Investors will however have access to some years of salary growth history, which gives significantly more data for individuals than that available before they begin repaying their HECS. It can be noted that Nerlove (1975, p.160) felt that developing a model to evaluate the prospects of students applying for human capital contracts would not be practical: ‘Risk rating and independent appraisals of income prospects for individuals, or even for broadly defined groups of common socioeconomic background or race, would have far-reaching, indeed politically and socially intolerable, consequences, quite apart from the high informational costs involved.’ Investors in HCCs have obviously overcome the problem, part of which arose from the politics of the time. Information costs have also reduced dramatically with computer technology.

Anti-selection risks also include the risk that SLHF recipients will repay the finance just before they get significant promotions – that would make also it easier for them to afford conventional finance. This risk can be managed by a combination of break fees and ceilings on the maximum rate of increase.

It is not entirely clear who will have the best knowledge of future salary increases. The individual has a better insight into their relative skills and future plans but limited knowledge of average salary progressions. The investor will however have detailed knowledge of how salary increases are developing in the market. The actual ‘deal’ struck between the two is likely to be fair in the sense that both will believe that the risk adjusted costs/yields are reasonable relative to alternatives.

4.3.2 Managing moral hazard

The moral hazard risks are directly analogous to those that arise from proportional income tax. Income may be underreported, shifted to other non-counting sources, and reduced by working less. Managing this risk will probably be easier if SLHF recipients are selected from the employees or large employers who have minimal ability to manipulate

their income. Information on income can also be obtained from the employers, who are also likely to be associated with the superannuation fund advancing the finance.

The possible work disincentives cannot be gauged with any accuracy, but there are some studies of the problem. Tuomala (1990, p. 43) reports that 'most labour supply studies of men seem to indicate backward-sloping supply curves.' Higher income leads to men taking more leisure (described as an income effect), but the leisure is more expensive relative to other goods (which creates a substitution effect and reduces the leisure taken.) He lists 11 studies undertaken in the 1970s, of which seven showed the backward slope. Studies of women have, however, normally shown a normal slope. Brown (1983) gives more detail of some of these studies. More recent studies similarly find different and barely significant results, except perhaps for very low incomes. Kalb (2002), for instance, finds negative slopes for both men and women in Australia.

This suggests that moral hazard will not be a significant issue. Even if it is, as with anti-selection, it is not so much the existence but its unpredictability that might make SLHF unattractive. At this point, there appears to be no strong reasons to believe it will be an insurmountable problem. It will probably be necessary, anyway, to introduce floors and ceilings to the rate of increase to reduce the impact of anti-selection and be fair to those who obtain very high increases.

The experience of defined benefit schemes can give considerable comfort to potential investors in SLHF portfolios. They are, in a sense, mirror images, with SLHF providing a lump sum benefit in advance in return for a predetermined proportion of income, while a DB scheme provides the benefit in arrears. The benefits are determined in very much the same way, with relatively significant cross subsidies (in the case of DB schemes to those whose salaries have risen faster, but vice versa in the case of SLHF arrangements). While DB schemes are fast disappearing, their demise would appear to relate mainly to the investment-risks involved rather than the instability or unpredictability of incomes, or of cross subsidies. Given that SLHF will reduce investment related risks significantly, there may be good reason to believe that SLHF schemes could ultimately be more durable than fast-disappearing DB schemes.

4.3.3 The need for government involvement

An argument can be made for government involvement in ICLs and HCCs. The fact that there is no insurance against income risks – in spite of the need – suggests market failure. Market failure in insurance markets arises, in theory, because of asymmetric information and the presence of moral hazards.

This is the justification made for government intervention that is made by:

- Chapman (2005) when discussing ICLs for higher education;
- Chapman and Higgins (2009) in the context of a suggestion to issue ICLs to fund parental leave; and
- Gans and King (2004) to assist low income households with very unreliable incomes.

In each of these cases, however, the ICL is seen as a way in which existing government subsidies can be reduced or made more efficient. In each case, government is seen as the bearer of the extreme risks.

There are strong arguments against government intervention into areas where markets are already functioning. Government intervention, and particularly the possibility of subsidies, has a destructive impact on markets: why pay a full price when you can obtain a better deal? One of the major reasons why Friedman's ideas for the financing of higher education took so long to be introduced was the significant level of subsidised finance available. The Yale scheme described by Nerlove (1975) began only as subsidised finance was phased out because it became too expensive.

Government intervention can address anti-selection by making insurance compulsory. It cannot avoid moral hazards in lending: the large losses of the US housing agencies in the 1980s and again in the past three years, demonstrate this. As discussed in section 4.3.1 above, however, it seems quite feasible given current data processing abilities, to develop models to address anti-selection. It is moreover not possible to make SLHF compulsory.

Higher education loans may also require government assistance in the collection of debt. Students are particularly mobile and without fixed assets, and the loans are made in the absence of collateral. SLHF however will be made to people who have had employment for some years, are settled, and provide significant collateral in the form of their houses. There should be no difficulty in collecting instalments in the majority of cases.

Share cropping, where a tenant pays a proportion of the produce to the landlords, is an ancient practice. The percentage is often 50%, and the practice is often called 'farming in the halves'. Share cropping faces risks of anti-selection and moral hazard very similar to SLHF, but it is in extensive use in many countries with landless farmers and small land holdings. It requires fairly close monitoring by the landlord.

It is therefore suggested that it would be possible for markets to provide SLHF-type instruments without government action. The problems of anti-selection and moral hazard are well understood by insurers and the existence of a number of analogous products shows that they can be managed.

4.4 Comparisons to other investment returns

If SLHF is to be sufficiently attractive to potential homeowners and investors, it will have to offer a risk-adjusted investment return comparable to other financial instruments. From an actuarial perspective, compared with the liabilities of investors and the cash flows of recipients, the market risks are lower than all alternatives. The operational risks and lack of liquidity are however such that investors are likely to require an expected return perhaps of the same order as obtainable on ordinary mortgages – or about 3% above average wage growth. Finance at that expected rate would probably be attractive to homeowners. Supply and demand would no doubt lead to deviations from this level at times.

Figure 6 below shows how the returns on an SLHF portfolio earning 3% more than salary inflation would have fared relative to Australian shares and mortgages since 1961. Table 2 shows the average returns (geometric for equities) and the annual standard deviations.

It is believed 2% more than wage growth (3% more than inflation or 5% nominal) should be readily attainable from younger homeowners, and that (supplemented with minimal loadings to increase the return to about 7% nominal) this will not be so high as to reduce the attraction to homeowners, and yet be sufficient to attract investors.

Figure 6: Comparable historical returns in Australia

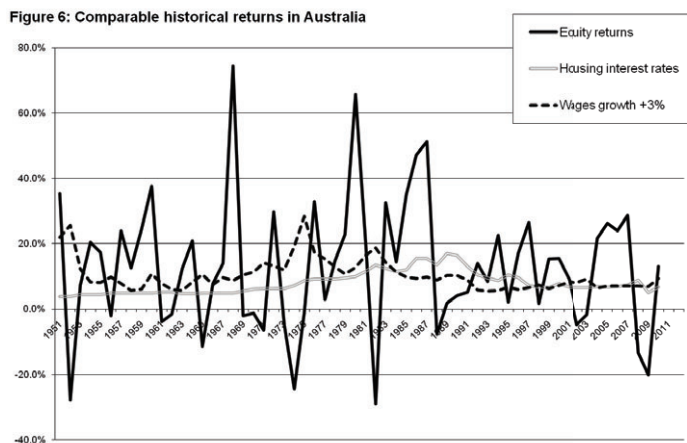


Table 2: Average returns and volatility

	15 years		30 years	
	Average return	Standard deviation	Average return	Standard deviation
Equities	14.7%	15.1%	11.2%	18.1
Housing loans	7.1%	1.1%	9.9%	3.4%
Wages +3%	7.3%	1.0%	8.7%	3.2%

5 Obstacles to its introduction

While the author remains convinced of the advantages of the instrument, it must be asked why no-one has seen fit to attempt its introduction in the two decades since the idea was first suggested publicly.

5.1 Additional risks

It is clear that there are real credit and operational risks attached, although not obvious that any of these are unmanageable.

5.1.1 Credit and reputational risks

The US subprime experience proves it is not impossible to suffer considerable credit and reputational losses on home loans. The novelty of SLHF makes it particularly vulnerable to unexpected sources of risk.

One possible source of brand and reputational risk that will require careful management is that some of the recipients will end up paying more than they would under a conventional mortgage (much like subprime borrowers), and have the potential of embarrassing any institution that may have invested. Investors will need to be convinced that the homeowners have understood and acknowledged this possibility.

Some thought also needs to be given to possible legal challenges to the novel contract required for SLHF. Two that have been raised previously were:

- the ‘ultra duplum’ principle that prevented capitalised interest from exceeding the initial principal. Legal opinion was that it was possible to specifically contract out of this; and
- the possibility that the contract would be interpreted as one of forced labour or slavery. The investor however does not exercise any domination over the recipient of the funds, and has almost no power over the nature of work performed; the interest is purely pecuniary.

Appropriate disclosures, training and education will however be needed to manage this risk.

It was credit losses of another type that prevented the product launch in South Africa in the early 1990s. Asher (1991) calculated that SLHF would have enabled over a million Black South African families to afford to enter the formal housing market. It should be explained that Black South Africans had been unable to buy property until 1988,

and the high nominal interest rates effectively prevented all but 750,000 households from buying even the least expensive house. At the time the product should have been launched however, over 300,000 loans were subject to 'bond boycotts' for a combination of political and economic reasons.

Setting aside the anti-selection and moral hazard concerns noted above, a sensibly managed home finance instrument should be subject to minimal credit risks. Recent experience, does however suggest that loan originators and administrators should participate in credit losses in order to reduce moral hazards arising from their ability to compromise credit standards.

5.1.2 Operational risks

The operational risks are more significant:

- Legal documentation for the instrument may require novel contracts with the recipients and investors, the tax consequences (what is income and what capital?) being entirely unclear.
- The collection and auditing of data are more demanding than most equivalent instruments. The definition of salary is an issue on its own as items subject to manipulation, such as overtime, need to be excluded in some way.
- There will be a need to rapidly build up the ability to analyse expectations of salary increases to prevent anti-selection and be fairer to different classes of borrowers.
- The supply and demand for funds is likely to take some time to find a balance that does not lead to large changes in price (loadings on the instalments) or the rationing of funds.
- Initial investors will have to commit to an untried instrument that may not be entirely repaid for 20 years, so are likely to be particularly wary of operational risks.

The operational risks are however potentially manageable; the fact that relatively predictable income tax is collected everywhere in the world demonstrates that salary contingent instalments can be collected.

5.2 Challenges faced by similar instruments

Thought must be given as to whether one of these risks, or other unthought of obstacles, are insurmountable. There are reasons for believing that instruments analogous to SLHF do face particular risks of being misunderstood. Such challenges to their introduction need to be addressed by more careful explanation of the risks that they address, and the manner in which these risks can be managed.

5.2.1 Inflation linked bonds

Stiglitz (1998, pp. 6-7) wonders why inflation indexed-bonds took so long to be introduced in the USA, given that they appear to be ‘Pareto improvements ... which make everyone better off ... provide a way for households and government to reduce their risks. At the same time they create a market that did not previously exist, and the government reaps some of the benefits of the new market in the form of lower interest charges on its debt.’ His reasons are worth quoting extensively as they come from first-hand experience from a man who had recently been chief economist of the World Bank and won the Nobel Prize three years later. My humbler experience is that the reasons continue to apply to indexed bonds, SLHF and other instruments that reduce inflation risk.

Despite these obvious attractions – and the fact that very few people would be hurt by the innovation – getting the Clinton administration to accept indexed bonds was a long and difficult process. There were three reasons for this. First, it was enormously difficult explaining the nature of the real risk faced by the government. Critics worried that if inflation increased, interest payments would increase. Try as we might, I think some never understood that the government’s tax receipts also went up with inflation and thus indexed bonds actually reduced the government’s real risk.

Second, some misguided inflation hawks thought that indexing would reduce the resolve of government to fight inflation. As is so often the case with such inflation hawks, they did not bother to look at the relevant empirical literature ... or at the counterargument that with indexed bonds, inflation has an immediate and direct budgetary impact, thus encouraging

governments to act against it.

The third reason was that Treasury turned to bond traders—their natural clientele – for advice. The experience in England from the perspective of bond traders was that these bonds were a failure; that is, people bought them for their retirement and did not trade them. Without trades, where were their commissions? Of course, from the perspective of someone trying to create an instrument to enhance retirement security, this was ideal: we did not want a gambling instrument. The bond traders raised anxiety levels: Would Treasury throw a party to which no one would come? (Stiglitz, 1998, p. 7)

5.2.2 Equity mortgages

Another housing innovation, which addresses both the cash flow problems of prospective homeowners and reduces the risks of house price volatility, is to tie the cost of the loan to changes in the value of the home.

As Joye et al. (2003) note, ‘shared equity’ products mitigate the indivisibility of the housing asset which otherwise binds together the homeowner’s consumption and investment decisions with the undesirable result of increasing their economic exposure to housing. Joye also notes that, in Australia, the volatility of a single family home is some 15–20% per annum which contrasts with a national property index’s volatility of around 3–4% per annum.

These ‘shared equity’ innovations offer not only benefits to homeowners, but also the opportunity for non-homeowning investors to hedge their future housing costs without the administrative complications of direct investment.

The idea dates back to Follain and Struyk (1977) if not earlier, but is now commercially available through Bendigo & Adelaide Bank (see www.efm.info).

The product can be used as a complimentary product with SLHF, subject to careful credit checking particularly for those equity shared mortgages that are geared to inflation.

The difficulties companies have had in making this innovation also appear to be greater than would be expected by the product itself. Stiglitz's list (underestimation of the real risks; misunderstanding of the instrument; and the antipathy of institutional investors to illiquid assets) also appears to apply.

SLHF instruments will be more liquid than equity mortgages because instalments are paid; both however are likely to suffer from anti-selection and moral hazard risks.

6 Conclusion

Salary linked housing finance as described in this paper can largely eliminate the interest rate and idiosyncratic salary or inflation risks faced by homeowners, as recipients of funds, and pensioners as investors. The return at which investors and homeowners will exchange contracts is likely to be some 3% pa above the rate of average salary inflation.

It is suggested that the risks of such a product appear to be manageable as the operational risks are comparable with those of DB superannuation schemes, and the moral hazards are analogous to those arising from the collection of taxes. But anti-selection and moral hazard risks will nonetheless be nontrivial obstacles that any participants seeking to bring such innovations to market will have to comprehensively address.

There are at least two other obstacles to the introduction of salary linked housing finance as alternatives to conventional housing finance. One relates to misunderstandings as to the nature of the product and its advantages and disadvantages, which this paper hopes to highlight. Another relates to a lack of appreciation of market and inflation risks that apply to investors and borrowers alike. The current financial volatility is persuasive evidence that historical causes of economic instability do not go away. In this context, neither homeowners nor pensioners should ignore the significant inflationary threats posed over

the decades to come, and in the near-to-medium term as a function of fiscal and monetary stimulus combined with the finite supply of key commodities

As it also provides a way of assisting younger people to buy their own homes, the instrument appears to be worth further consideration.

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