Submission to Productivity Commission Inquiry on Housing Affordability for First Home Buyers

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This submission presents results from a simulation analysis of three particular policy suggestions for improving housing affordability:

- the First Home Owner Grant;
- housing equity partnerships;
- deposit loans.

The main results are as follows.

(i) Policies to improve housing affordability may not increase demand for housing and therefore house prices, in the long term, as has been widely claimed. Rather, households may use improved housing affordability to buy a house earlier in their life cycle without necessarily increasing their outlay. While this may increase demand in the short term, this effect will wash out over time.

(ii) Measures to improve housing affordability may not raise the private saving rate or reduce household debt; in fact in the base case simulation reported here, the saving rate falls and household debt rises.

The analysis and results in this submission will be presented at the International Microsimulation Conference on Population Ageing and Health, organised by NATSEM, in Canberra in December, 2003. This submission is a cut-down version of the conference paper.

1. The simulation model.

The simulation model is an adapted form of the model of housing tenure choice in Hayashi, Ito and Slemrod (1988) which is in turn based on the model in Slemrod (1982).[1] A representative single-person household plans its optimal tenure choice – rent or own – over its lifetime. The life cycle consists of fourteen periods, each period representing five years of a person's adult lifetime which starts at age 20 and finishes at age 90. The household chooses the consumption of a composite commodity and housing services for each period over the lifetime. Housing services may be obtained either by purchasing a house or by renting housing. It is assumed that housing purchases and sales take place at the end of a period; which implies that the household must wait at least until the end of the first period (at age 25) to buy a house. It is also assumed that the household must sell the house at the end of the second last period (at age 85) and move into a rented unit. Therefore the household has a choice of owning a house for any duration between periods two and thirteen but can buy only once. That is, there are no opportunities for trading up or down to a new house, nor are their opportunities to improve the house through renovations; and, finally, the house does not depreciate. The household chooses the own/rent lifetime pattern that maximises the discounted sum of lifetime utility subject to the lifetime budget constraint, a wealth constraint and the downpayment constraint.

When a house is purchased with a down payment, *d*, of the house value, the down-payment expenditure is deducted from income of the period of house purchase. The mortgage debt (1-*d*) becomes (1+*R*)(1-*d*) at the beginning of the next period, where *R* is the (before tax) interest rate. An equal payment of *V* for *m* periods amortises the mortgage debt. When a house is sold, the value of the house, less remaining mortgage, is used for consumption after the period of the sale.

The household's problem is to maximise with respect to t(b), t(s), {c(t), t=1,..,12}, {h(t), t=1,..,12}, H,

$$\sum_{t=1}^{t(b-1)} U(c(t),h(t)) + \sum_{t=t(b+1)}^{t(s-1)} Z(c(t),H(t)) + \sum_{t=t(s+1)}^{12} U(c(t),h(t)) + F(B)$$

subject to

$$A(0) = 0$$

$$A(t) = \left(1+R(1-\tau)\right)A(t-1) + y(t) - c(t) - P_r h(t) + INH(t) \geq 0 \qquad t = 1,..,t(b-1)$$

$$A(t) = \left(1+R(1-\tau)\right)A(t-1) + y(t) - c(t) - P_r h(t) - dP_h H + INH(t) \geq 0 \qquad t = t(b)$$

$$A(t) = \left(1+R(1-\tau)\right)A(t-1) + y(t) - c(t) - V(1-d)P_h H + INH(t) \geq J(t) - P_h H \qquad t = t(b)+1,..,t(s)-1$$

$$A(t) = \left(1+R(1-\tau)\right)A(t-1) + y(t) - c(t) - V(1-d)P_h H + P_h H - J(t) + INH(t) \geq 0 \qquad t = t(s)$$

where

A(t) is the end-of-the-period financial asset value;

y(t) and *c(t)* are labour income (net of taxes and transfers) and consumption in period t, respectively;

h(t) is the size of a rental unit (which could vary every period);

H is the size of an owner-occupied unit (which remains constant once purchased) and the units of *H* are defined such that the price of *H* is normalised to one;[2]

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[1] The main differences between the model here and that in Hayashi et al. (1988) model are : (i) the lifetime here is represented by 14 periods of 5 years whereas Hayashi et al. used 6 periods of 10 years – Hayashi et al recommended a model with more periods but did not pursue this due to computational cost; (ii) parameters are chosen, where possible, to reflect realities of the Australian housing market and tax system (for example, unlike in the U.S., mortgage interest is not tax deductible in Australia).

[2] Both h and H are expenditures, hence expenditure is assumed to be an index of physical size in this model.

B is the bequest;
INH(t) is the inheritance which is assumed to be received in a lump sum at age 60 on the assumption that heirs are 30 years younger than their parents; [3]
V represents the equal payments of interest and principal such that the mortgage is paid off at maturity of the mortgage;
P_r is the price per period of a rental unit;
P_h is the price of a house and is normalised to one by defining the unit of H accordingly;
J(t) is the amount of outstanding mortgage debt;
τ and d represent the constant tax rate on return from saving and the required down-payment ratio, respectively.

The inequality restrictions on A(t) imply that the sum of financial and real wealth cannot be negative. In other words households cannot hold net financial liabilities in excess of the equity in their homes which is equal to $J(t)-P_hH$.[4]
The lifetime plan at age 20 is made on the basis of perfect foresight regarding future income, parameter values and death at age 90. The plan consists of values for non-housing consumption, *c*, housing services, *h*, in each five year period, and the size, *H*, of owner-occupied housing and the timing of its purchase and sale, *t(b)* and *t(s)* respectively. Aggregate variables at time *t* are a cross section of the per-household variables summed over *i* generations. For example, aggregate income at time t is the sum of $y_{i,t}$,$i=1,..,12$. The first year of interest for calculating aggregate variables is 2002. The plan for the cohort aged 85-90 years in 2002 was made in 1932 when that cohort were 20 years of age. Hence five year plans must be calculated from 1932. Following Hayashi et al. (1988), $P_r=R$ due to the implicit arbitrage condition between financial asset investment and rental property investment.

2. Data, parameters and limitations of the model

The base case parameter values are summarised as follows:
the five year growth rate of labour income (per capita), g= 0.077, representing an annual growth rate of 0.015;
the five year interest rate, R=0.217, implying an annual interest rate of 0.04;
the annual rate of time preference is equal to 0.03 which implies that β=0.91;[5]
the downpayment ratio, d=0.25;
the proportion of the house left as a bequest, q=1;
the elasticities of marginal utility of c and h (α_c and α_h respectively) are set such that the ratio of rental expenditure to other consumption Rh/c= 0.25;
the sum of α_c and α_h is equal to 0.5 (discussed above);
the tax rate on income from financial assets, τ=0.3;
the pride-of-ownership coefficient, γ=1.5 (Hayashi et al. used 1.4);
the maturity of mortgages, m=5, representing 25 year mortgages.[6]

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[3] Given that population growth, the inheritance, INH, per person is less than the bequest, B, per person. Hence, $INH_t = \frac{B}{\prod_{k=1}^{t}(1+n_k)}$ where k is the growth rate of population in period k.

[4] It has become more common for households to borrow against housing equity through financial products such as home equity loans and mortgages with redraw facilities. A reverse mortgage is a similar product in that a bank advances a loan against security on a property; the difference is that both accrued interest and principal are repaid in one lump sum on either the sale of the property or death of the borrower.

[5] Hayashi et al. (1988) implicitly assume an annual rate of time preference of 0.029.

[6] Hayashi et al. (1988) assume that mortgages are for 30 years.

The exogenous variables in the model are labour income per worker, $(Y/L)(i,t)$, the labour force participation rate, $(L/N)(i,t)$ for age i in year t, and population shares, $N(i,t)$, t=1932, 1937,…2072. The population estimates up to the year 2002 are calculated from ABS Catalogue 320109.1 and the projections beyond 2002 are calculated from ABS Catalogue 3222.0; the population shares are normalised to a mean of 1. Household labour income in period t, $y(t) = (Y/L)_i.(L/N)_i.N_i(t)$. The age-specific labour income levels, $(Y/L)_i$, are the mean weekly earnings of full-time employees from ABS Catalogue 6310.0; and the age-specific labour force participation rates, $(L/N)_i$, are in person units, from ABS Catalogue 6291.0. Both of these variables are held constant from 2002 onwards.

Owning a house is more attractive than renting for two reasons: the tax advantages arising from the absence of a tax on either the implicit rent from owner occupation or the capital gain on the sale of the house; and what Hayashi et al. (1988) call the "pride of ownership" effect. The latter includes psychological and real advantages of home ownership, including security of occupation and freedom to make alterations. The tax advantage applying to the implicit rent from owner occupation is captured in to the model because the repayments of principal on mortgages that renters would otherwise have made must instead be accumulated in financial assets, the interest from which is taxed at the rate τ.[7] Whereas for owners, the repayments of principal allow the accumulation of housing equity, the implicit income from which is untaxed. The pride of ownership effect is captured by weighting the housing services from owner occupation more highly than the services from renting (see equations (1) and (2) below). Given these advantages of owning, households will prefer to own rather than rent a house of equivalent size in any period. However, households may be constrained by the need to have saved the deposit before the house can be purchased. This constraint is stronger, the greater is the preference for consumption smoothing over the lifecycle. The desire to smooth consumption can make it optimal to have little or no saving early in the lifecycle when income is relatively low and to accumulate saving as income rises. The desire for little or no saving early when households are young can delay the accumulation of sufficient saving for the deposit on the house.

Some qualifications are in order before going any further. The asset demand for land is not modelled; only the consumption demand for housing services is modelled. This is likely to bias downwards the level of housing purchases compared with actual housing purchases which include the demand for land as an asset separate from buildings.[8] Equally important is the absence of housing supply from the model. Implicitly housing supply is infinitely elastic and hence increases in housing demand do not increase the relative price of housing. This means that the model is not capable of capturing housing bubbles. Another limitation is the absence of uncertainty which implies that the saving and housing plans that households make at age 20 for the next 70 years of their lives are exactly realised – there are no errors of judgement or revisions of plans. Also the assumption of single person households means that the number of households in each age group is simply the number of persons in that age group. Other assumptions described above such as the absence of opportunities to trade up or down and no home improvements or depreciation are further abstractions in order to make the model tractable.

These simplifications mean that, as predictions of actual responses to shocks, the quantitative outcomes can only be interpreted as orders of magnitude. On the other hand,

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[7] It would be possible to simulate the effect of the tax break on implicit rental income from home ownership by running a counterfactual simulation in which the implicit income from housing equity, R.Heq, where Heq is housing equity and R is the rate of income earned on rental property, is taxed at the rate τ.

[8] The expected real appreciation of land reduces the imputed rental price of housing services which equals the real cost of capital minus the expected real appreciation of the house and land combined (minus any depreciation of buildings which is also assumed to be zero in this model).

parsimony and simplicity has its advantages. In this context, it illustrates the effect of lifecycle effects on housing demand and saving, in the context of changing demographics and policies to improve housing affordability.

3. Results

We first consider how well the simulation results for the base case fit the observed characteristics of the Australian households with respect to their housing and saving decisions.

In the base case the optimal age at which to purchase a house is at age 30 which is at the end of the second five year period of the household's lifetime planning period. This fits the observation that the most common age group in which households buy a house is the 25-34 age group (ABS, Australian Social Trends, 2003).

The optimal private saving rate in 2002 is 19 percent but this is a peak as the baby boomers are at their maximum earning potential in the period 1995 to 2005. The actual gross private saving to private income ratio in Australia in 2002 was only 11 percent although the national saving rate was 19 percent (ABS, Cat. 5206.027). Hence the model somewhat over-predicts the actual private saving rate unless households are true Barro-like savers and reduce their private saving in response to positive public sector saving.[9]

The mortgage interest to household income ratio in the model is 6.5 percent in 2002 which is almost exactly equal to the actual rate of 6.5 percent; and total debt service (principal plus interest) of 13 percent of income in the model is reasonably close, but somewhat higher, than the actual ratio of 10 percent (Reserve Bank of Australia, 2003). The somewhat higher total debt service ratio is consistent with the fact that the model over-predicts the level of housing demand somewhat. The optimal housing demand to private income ratio is 11.8 percent compared with actual new dwelling expenditure to private income of approximately 7.5 percent in 2002 (ABS Cats. 5206.03, 5206.027). Perhaps this is because the "pride of ownership" coefficient is too high; but as the sensitivity analysis in Table 1 shows, even a zero value of this parameter makes almost no difference to housing purchases. It is not hard to explain, however, why the optimal household debt to income ratio, at 21 percent, is well below the actual level which has risen from about 60 percent to 120 percent (Reserve Bank of Australia, 2003). The difference reflects the fact, mentioned above, that the households in the model do not incur debt for the purchase of land in expectation of a real appreciation in its price. This also implies that there cannot be any housing bubble phenomenon explaining demand for housing credit. Nor does the model allow for borrowing for the purchase of existing houses.

The model yields housing equity of 50 percent of household wealth which, given the above comments regarding land, is compatible with the actual figure of between 60 and 70 percent (Caplin and Joye, 2002). A figure of 57 percent was estimated by the Australian Treasury as the ratio of dwelling assets to total private sector net worth (Littrel, 1999).

3. Housing affordability policies

In this section we consider three suggestions for improving the affordability of housing . We investigate the impact of each on private saving, housing demand and private debt.

3.1 The First Home Owners Grant (FHOG)

[9] By equating private saving with household saving in the model we are already assuming some Barro-type behaviour on the part of households by assuming that households save partly through private firms.

The FHOG was introduced in mid-2000 to cover the estimated impact of the GST on the construction costs of a new home which would be passed on to first home buyers. The amount was set at $7000, although it was temporarily increased to $14000. The FHOG is simulated here by reducing the expenditure required to purchase a house by *x* percent of the income of the household at age 30-35. We set *x*=15.5 percent in the base case. This implies that if household income is $45000 at age 30-35 then the FHOG is $7000 and the housing deposit and mortgage are reduced accordingly. The results are illustrated in Figures 1 and 2 (see also Table 1).

The effect is to slightly reduce the size of the house purchased and to bring the purchase forward by 5 years from 30 to 25 years of age; but the house is sold at the same time as in the base case which is at age 80-85. Buying a house earlier in the life cycle implies, other things equal, a smaller house because of the constraint imposed by the need to save for the deposit from the lower income that applies at a younger age. Households are then locked into the smaller level of housing services - recall that there are no opportunities for trading up in this model.[10] This timing effect, which tends to decrease housing demand, is offset by the positive wealth effect of the FHOG, which tends to increase housing demand. The two effects can be seen in Figure 3. The series "No FHOG-buy at age 30" represents optimal housing demand in the base case. The series "FHOG-buy at age 25" represents the optimal housing demand in the case of the FHOG where the timing of the housing purchase is brought forward by 5 years. The third series, "FHOG-buy at age 30" represents a suboptimal tenure choice in which the household does not alter the timing of their house purchase in response to the FHOG. The difference between the first and the third of the series just described is the negative timing effect. In 2002, the negative timing effect is 1 percent of income and the positive wealth effect is 0.5 percent of income, leaving a net effect of the FHOG on housing demand of minus 0.5 percent. As Figure 3 illustrates, the sizes of these effects do not change much over the projection period.

Alternative parameter values could make some difference to the strength of the above two effects. This is not so important for our purposes given that the numbers can only be interpreted as, at best, rough orders of magnitude due to the simplicity of the model as explained above. Rather, the important point is that measures to improve housing affordability, in this case a housing grant, can alter the timing of housing purchases over the life cycle in such a way as to offset the positive wealth effect on housing demand.

The FHOG reduces the saving rate in the order of 1 percent throughout the projection period (see Figure 2). This is the net effect of higher non-housing consumption and lower housing costs (rent plus interest). Housing costs are lower for three reasons. One is because home owners have slightly lower mortgages, for reasons just explained, and therefore interest payments are a little lower; secondly, because the house is owned for longer and therefore the period after the house is paid off, during which housing payments are zero, is longer. The third reason is that rent is lower during the periods in which the household rents, because it is not optimal to plan to jump from a high value of housing services while renting to a low value while owner-occupying, or vice versa. Non-housing consumption is higher, however, due to both higher lifetime consumption possibilities from the FHOG and the boost to discretionary income from the reduction in housing costs. The net effect is a lower saving rate for the base case. The key point with respect to the effect on saving is that, like the effect on housing

[10] This is not as restrictive as it might seem at first. Habit, transaction costs and general inertia limit the frequency and extent to which households trade up and down in their consumption of housing services. This is consistent with the optimal smoothing of housing and non-housing consumption over the life cycle which mitigates big jumps in consumption of housing services.

demand, there are offsetting effects – in this case between housing and non-housing expenditure.

The slightly lower saving rate explains the small rise in the household debt in 2002 of about 0.2 percent of income.

3.2 Equity Partnerships

Caplin and Joye (2002) argue in a paper commissioned for the Menzies Research Centre that the present institutional arrangements for housing finance impose an all-or-nothing constraint on owner-occupiers. That is, households must "make the stark choice between the disadvantages of rental accommodation and the harsh financial realities of complete home ownership" (p. 9). This means that households' housing consumption is tied to the size of the house that they can afford to purchase as the sole owner. Caplin and Joye propose a model in which households can take on a passive equity partner in the house which they occupy. The equity partner shares the financial costs of owner occupation in exchange for a share of the ultimate sale proceeds.

Caplin and Joye see a number of advantages of their proposal. It would allow households to enjoy the benefits of owner-occupation along with higher housing and non-housing consumption than they would if they were restricted to all-or-nothing ownership. Higher non-housing consumption implies a greater capacity for households to provide for their own health and aged care. This would, they argue, relieve some of the pressure for public provision of health, aged care and pensions that will accompany further ageing of the population. Equity partnerships would also "accelerate the average household's transition from the rental to the home ownership market" (p.5). Presumably, "accelerate" means enable households to purchase a house earlier in their lifecycle. It is also claimed that households would be able to diversify their wealth into alternative assets.

The life cycle simulation model is applied here to investigate these propositions. Equity partnerships are simulated by reducing the proportion of the house that is owned by the household by z percent which reduces the mortgage and the required deposit by z percent. The equity partner (a bank for example) owns z and the household owns $(1-z)$ of the house. This implies that the bequest is $(1-z)H$ in the case where the house is fully paid off at the time of death (which it is in all of the simulations). We choose z=0.25, meaning that all households have an equity share of 75% in their house and therefore their deposit and repayments are only 75% of the amounts that would apply under 100 percent equity.[11]

The simulation result is an increase in housing demand of about 2.5 percent in 2002 and roughly the same magnitude in years thereafter. Like the FHOG case, this is the net result of two effects: a timing effect and a wealth effect. The respective contributions of these effects are illustrated in Figure 4 which can be interpreted analagously to Figure 3. Although housing demand is higher than it is in the base case, it is lower than it would be if households did not bring forward the timing of their housing purchases in response to the improvement in housing affordability.

Similarly to the FHOG simulation, the saving rate is lower than in the base case. The reason is essentially the same – non-housing consumption is higher than in the base case. Household debt is also higher than in the base case and higher than in the FHOG case.

[11] As for the FHOG and deposit loans, the equity partnerships are assumed to apply to all households. It would be relatively straightforward to simulate the case where any arbitrary proportion of households took up a particular policy measure. To the extent that not all households would, in practice, take up an affordability improvement option because either they are ineligible or because they choose not to, the outcomes reported here for housing demand and the saving rate would overstate the actual outcomes.

These results support some of the claims by Caplin and Joye (2002) about the effects of equity partnerships. By bringing forward the optimal purchase of a house, the partnership scheme does "accelerate the average household's transition from the rental to the home ownership market". Non-housing consumption is also increased as claimed and this could, conceivably, relieve some pressure for public provision of certain forms of non-housing consumption like health and aged care. However, rather than diversify into the alternative asset – a financial asset in this model – households actually increase their concentration of wealth into housing. This is because it is optimal to buy a house earlier in the lifecycle, and therefore own it for longer, and spend the saving in mortgage interest on non-housing consumption. The increased household indebtedness is not forshadowed by Caplin and Joye (2002).

The simulation results cannot however address the question of the effect of the increase in housing demand on housing prices. In the model here, housing supply is implicitly perfectly elastic. Caplin and Joye (2002) argue that in fact this can be expected to be approximately true in the very long run when housing supply has sufficient time to adjust to the short term increase in house prices brought about by the increase in demand. Clearly the dynamic response of housing prices is an empirical question that requires a model of housing supply.

3.3 Deposit Loans

Various suggestions have been put for HECS-style loans provided by the government to improve housing affordability. Gans and King, for example (AFR, 6.8.03), propose a housing lifeline loan to home owners who are under short term financial stress in meeting their mortgage payments. The loan would be repayable through the tax system on an income contingent basis. An extension of this idea, suggested by Quiggin (AFR, 196.03), is to provide this type of loan to finance housing deposits. It is the latter idea that is simulated here.

The deposit loan is equal to a proportion of the required housing deposit. In the simulation the proportion is set at 75 percent in order to simulate the case where the bulk of the deposit is obtained as a loan. The loan is a HECS-style loan in the sense that it is repaid as an additional tax on labour income at the flat rate of 5 percent. The real interest rate on the loan is assumed to be zero (as there is no inflation in the model the nominal interest rate is a real interest rate). The minimum income threshold at which the tax applies is assumed to be less than the average labour income which all households receive in the model. Hence all households pay the tax.

The effect on the saving rate and housing demand turns out to be very similar to that for the FHOG. There is very little net effect on housing demand and a small reduction in the saving rate. However, the household debt to income ratio is about 7 percent higher than in the base case and therefore also the FHOG case since debt in the latter two cases is similar; and it is about 3 percent higher than in the case of equity partnerships. Household debt is higher simply because the deposit loan is repayable whereas neither the FHOG nor equity partnerships imply repayable financing.

Sensitivity analysis

Some sensitivity results are given in Table 1. More detail is available from the author. In summary, the qualitative results reported here about the effect of housing affordability policies on housing demand and private saving are the same under a wide range of alternative parameter values.

4. Policy implications and conclusion

An important insight from the lifecycle approach is that policies to improve housing affordability may not permanently increase demand for housing, and therefore house prices, as has been widely claimed. Rather, households may use improved housing affordability to buy a house earlier in their lifecycle but the size of the house may have to be smaller because of liquidity constraints. There may be a temporary boost to housing demand if younger cohorts decide to buy a house earlier in their lifecycle than have older cohorts. For example, 25 and 35 year olds could be simultaneously purchasing houses following an improvement in affordability. This effect was not modelled here but will wash out over time.

Policy makers might be concerned that each of the three measures affordability measures results in a lower private saving rate, although the reduction is not large – in the order of 1 to 2 percent. There is also the potential for a reduction in public saving of any measure that requires a public subsidy, such as the FHOG. (This applies to a similar policy, not simulated here, for publicly-subsidied matched saving accounts for low income earners for specific purposes such as acquiring a house. See for example the Report by the Allen Consulting Group for the Chifley Research Centre, 2003). In addition there may be concern that none of the policies to improve housing affordability result in a reduction in household debt.

It is worth repeating that a model as simple as this is always subject to important qualifications because by its very nature it abstracts from a number of real world phenomenon affecting the housing market and private saving. In particular, neither the supply of housing nor the asset demand for land is modelled. By ignoring the supply side of the housing market it is not possible to quantify the effect of policies on house prices. There is no uncertainty in the model and no myopia on the part of households. Households cannot trade up to a bigger house as their incomes increase in their 40s and 50s, nor can they trade down to a smaller house as they move into their 60s and 70s. Despite these simplifications there are some important insights from treating housing demand and saving simultaneously in a life cycle framework.

Table 1. Optimal values for 2002.

		Purchase house in period	Sell house in period	private saving	housing demand	private debt
				ratios to private income		
base		2	13	0.190	0.118	0.209
Housing affordability simulations						
Equity partnerships		1	13	0.171	0.142	0.245
First Home Owners Grant		1	13	0.173	0.113	0.212
Deposit loans		1	13	0.171	0.122	0.278
Sensitivity simulations	**base value**					
mortgage maturity = 20 years	25 years	2	13	0.192	0.119	0.178
deposit = 10%	20%	1	13	0.162	0.130	0.354
deposit = 35%		2	13	0.186	0.098	0.188
bequest=200% of house	100%	2	13	0.178	0.106	0.172
bequest = zero		2	13	0.195	0.132	0.291
"pride of ownership" = zero	1.5	3	13	0.173	0.119	0.240
rent=15% of other cons.	25%	2	13	0.184	0.121	0.215
rent=40% of other cons.		2	13	0.192	0.114	0.222
elasticity of MU wrt cons.=0.2	0.5	2	13	0.205	0.102	0.228
tax rate = 20%	30%	2	13	0.177	0.113	0.219

Figure 1. Policies to improve housing affordability: the effect on housing demand

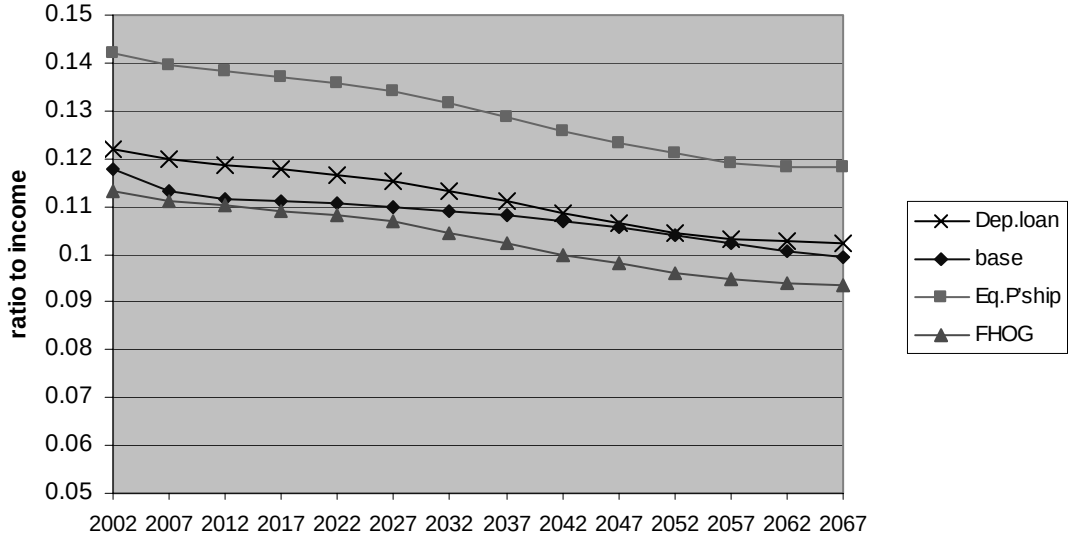


Figure 2. Policies to improve housing affordability: the effect on the saving rate

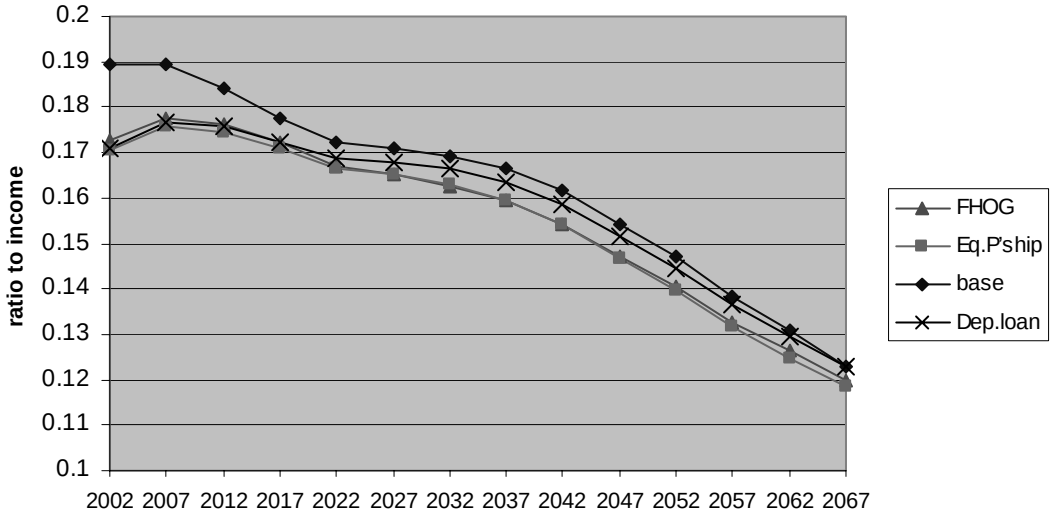


Figure 3. Effect on aggregate housing demand of bringing forward the housing purchase in response to the FHOG

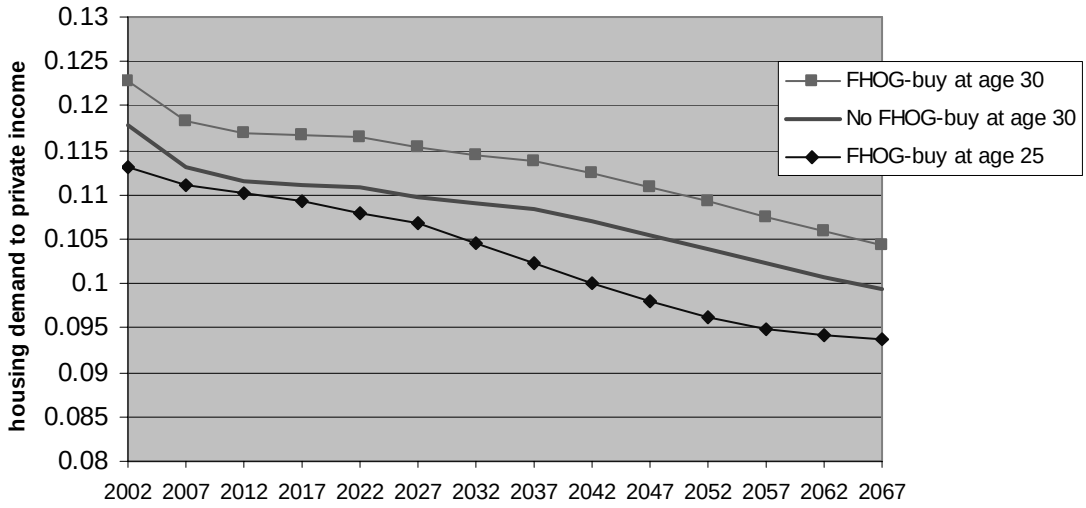
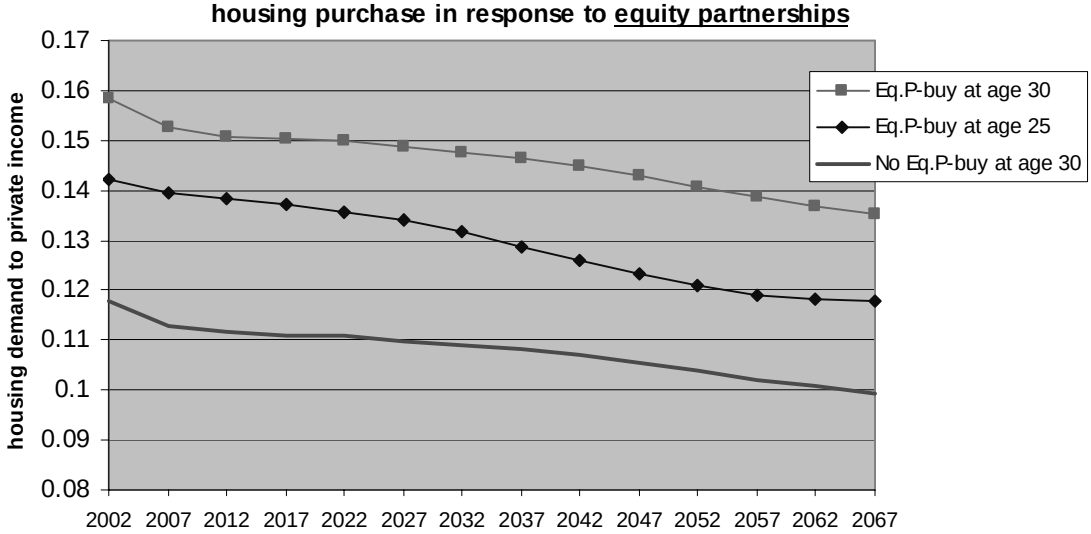


Figure 4. Effect on aggregate housing demand of bringing forward the housing purchase in response to equity partnerships



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