Analysis

Finland is greying – will this weaken the effectiveness of monetary policy?

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Petri Mäki-Fränti, Helvi Kinnunen, Juha Kilponen

AUTHORS



Petri Mäki-Fränti
Senior Economist



Helvi Kinnunen



Juha Kilponen
Head of Monetary Policy and Research

This article studies the link between population ageing and monetary policy transmission in Finland from the perspective of consumption behaviour and the macro economy. We estimate the consumption functions of Finnish households in various age groups, using household-specific data. If consumption in the younger cohorts is more sensitive to changes in income and interest rates than consumption in the older, growth in the population share of the elderly will decrease the economic impact of changes in the key monetary policy interest rate. The effect of ageing on consumption is estimated by taking into consideration the age variation of household margins. The results are based on wealth and income distribution data from Statistics Finland. Finally, we describe the effect of demographics on monetary policy transmission, using a general equilibrium model of the Finnish economy.



Monetary policy transmission channels and demographics

Monetary policy affects in different ways the consumption, net wealth and asset expenditure and income of different age groups. In addition to the interest rate channel and wealth effect, ageing can change monetary policy transmission mechanisms via the credit, risk taking or expectation channels. The relative importance of the various channels defines whether ageing increases or decreases the effectiveness of monetary policy.

Ageing affects the interest rate channel of monetary policy mainly because the young tend to be more indebted than the elderly. As a result, consumption by the young is more sensitive to interest rate changes than consumption by the elderly. This is particularly the case if a household has a housing loan with a variable interest rate. Elderly people are net lenders, and do not therefore finance their consumption by borrowing to the same extent. The younger a population, the more sensitive it is to interest rate changes, other things being equal, and the more effective monetary policy changes are on average.

Monetary policy effects via the credit channel emerge via creation of the price of credit. In an aged economy, the need for external finance is smaller, as tends to be the share of credit and liquidity constrained households. Because the elderly tend to have a larger amount of net wealth, this has a

negative impact on the risk premia on loans.[1] As a result, the availability of finance is on average better in an aged economy and its price is lower, which is likely to reduce the response of the economy to monetary policy changes.

Asset prices respond strongly to actual and expected changes in interest rates, and correspondingly, consumption responds to changes in asset prices. Population ageing increases the monetary policy effect via the wealth effect channel, because young households typically have less assets and their financial portfolio more heavily comprises equity investments than in the case of older households. In an aged economy, the wealth channel is thus stronger than on average and monetary policy is more effective.

The relative importance of the different channels has been examined in various models. The impact of population ageing has been assessed by e.g. analysing how the transmission of monetary policy shocks to the economy has changed over time, or by estimating consumption functions for households in various age groups.[2,3] The impact of ageing on monetary policy transmission has been examined also using general equilibrium models that incorporate features of overlapping generations (OLG) models. [4]

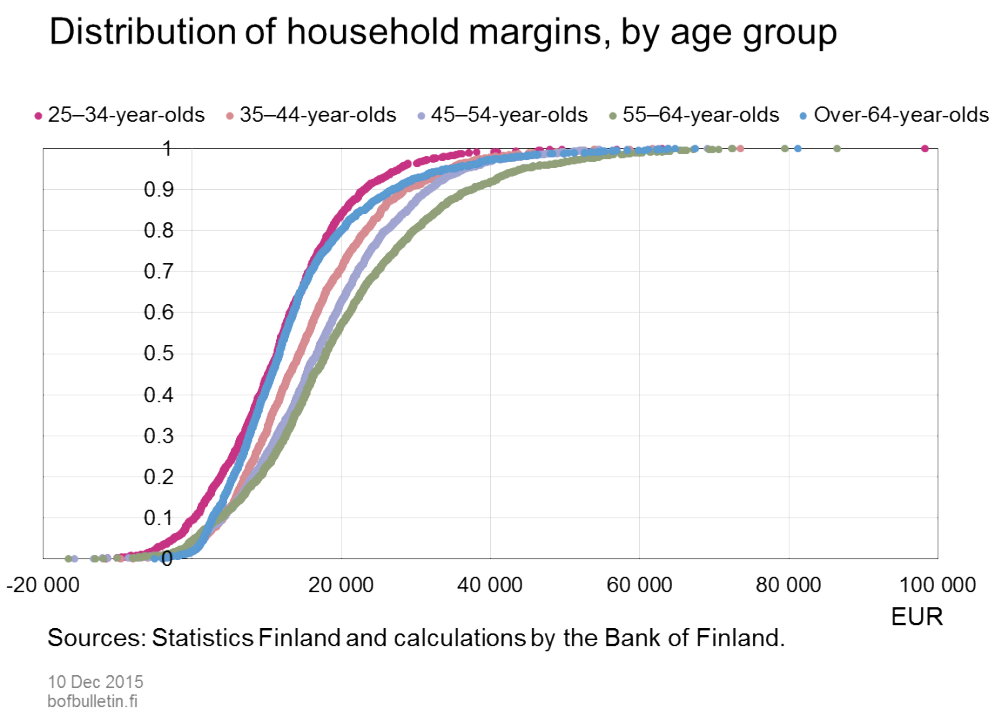
The research findings on the role of ageing in the transmission of monetary policy are somewhat contradictory. Most empirical studies show that population ageing has a negative impact on the effectiveness of monetary policy. For example, estimates by Imam show that an increase in the old-age dependency ratio of one percentage point lowers (in absolute terms) the cumulative impact of a monetary policy shock on inflation and unemployment by 0.10 of a percentage point and 0.35 of a percentage point, respectively. On the other hand, simulations conducted by Miles in 2002 using a general equilibrium model show that monetary policy becomes more effective with ageing. This is the result of a strong wealth effect caused by changes in interest rates.

Wealth by age group in Finland

In terms of the wealth effect, it is of key importance how the wealth and debt positions of households differ between age groups. The more the elderly have wealth and the stronger the response of the value of property to changes in interest rates, the stronger is the response to rises in interest rates as households become older. In Finland, the differences in wealth between age groups are significant, and they have increased as a result of the protracted economic recession.[5] Measured by cohort averages, the real and financial wealth of 45–54-year-olds is double the size of those 10 years younger. Wealth also appears to remain substantial among the oldest cohorts (Chart 1).

Even though the life cycle model suggests older households should draw down their savings, the savings rate of these households is, both in Finland and in many other countries, even higher than in the younger cohorts.[6] The differences in the level of financial wealth are smaller than in the level of real wealth, but financial wealth grows, too, with ageing. Measured by net wealth, household wealth more or less triples when the age of the principal breadwinner approaches 50 (Chart 1). The decrease in debt levels accompanied with an increase in housing wealth boosts net household wealth.

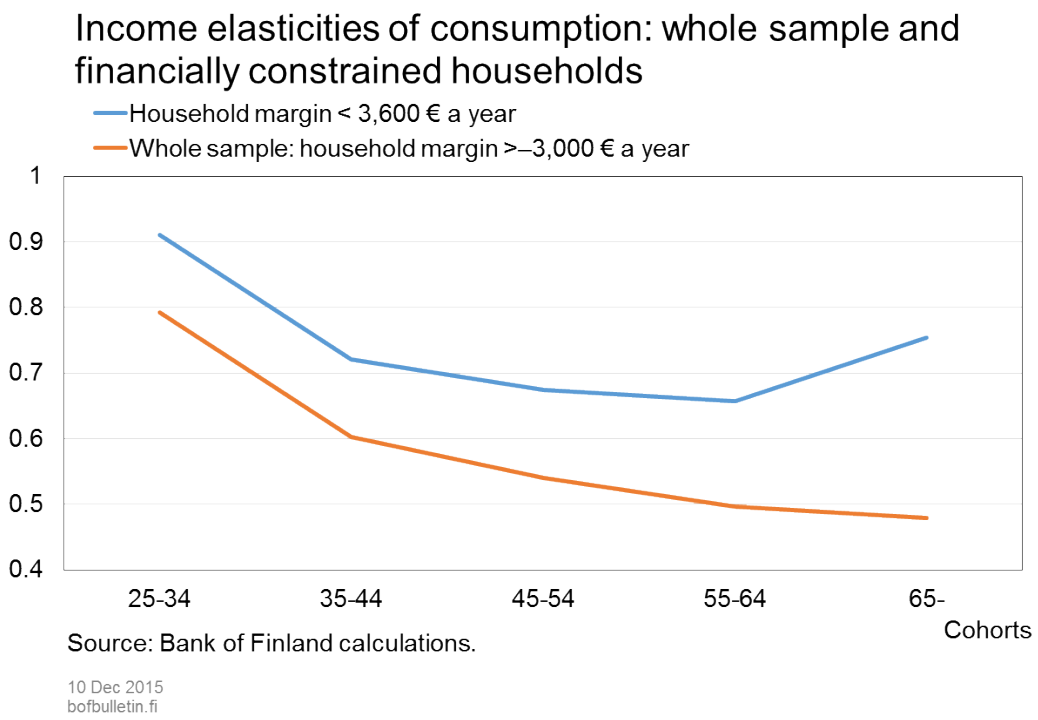
Chart 1.



The distribution of Finnish household average net wealth by age group does not differ significantly from that found in the other European countries. For example in Sweden and the United Kingdom, net financial wealth increases by age group more or less in parallel with Finland.[7]

In terms of wealth effect, the composition of financial assets also plays a key role. The larger the share of fixed-interest investments in the financial portfolio of the elderly, the larger the impact of monetary policy tightening on the value of their assets. In Finland, deposits account for approximately half of all financial assets, and the share seems to rise slightly with age. Particularly among those over 75, the majority of these assets would seem to be in bank deposits (Chart 2). Developments in the market value of shares are, however, of key importance to the wealth of those who are close to or have recently reached retirement age.

Chart 2.



In terms of monetary policy transmission, the pension system also plays a key role. The generosity of the defined benefit pension scheme determines how much longer life expectancy increases the need for personal precautionary savings. If statutory pension benefits are small or if the replacement ratio of pensions decreases with population ageing, this increases the need for personal savings. As a result, consumption by the elderly is increasingly dependent on personal wealth and property income, and the wealth effects in monetary policy transmission become increasingly important. In the case of a generous pension system, in turn, a growing share of household income is social benefits that are not dependent on the economic cycle. This decreases the need for precautionary savings.

In Finland, the extensiveness of the defined benefit and earnings-related pension scheme improves the consumption possibilities of the elderly and decreases the need for personal savings. Even though pension benefits have been weakened by the pension reforms, and despite the fact that the pension index compensates pensioners only partly for the growth in real earnings, the wealth accrued through pension savings is significant relative to other wealth. A cohort-specific examination shows that imputed pension wealth grows steadily with the rise in the expected age of retirement.[8]

Household margin and consumption

The importance of the interest rate channel and the wealth effect channel in terms of consumption behaviour is examined empirically by comparing consumption behaviour in the various age groups. Differences in the consumption behaviour of the various age groups reflect the changes in households' preferences in the various phases of the life cycle. On the other hand, the possibilities of a household to consume and save depend on the life cycle.[9]

According to the life cycle hypothesis, the larger the share of middle-aged people in the population, the higher the savings rate in the economy. Differences in the consumption behaviour of households in various cohorts may thus change the transmission of monetary policy as the share of the elderly in the economy grows. Interest rate changes are reflected not only in the interest rates on housing loans and household credit, but also in asset prices. An increase in interest expenses or property income have an impact on disposable income and consumption.

Results for Finland suggest that the response of consumption is strongly affected by the household margin. Through the liquidity constraint, the monetary policy credit channel may have an impact on the responsiveness of consumption to changes in income and wealth as the population ages.

Household margin

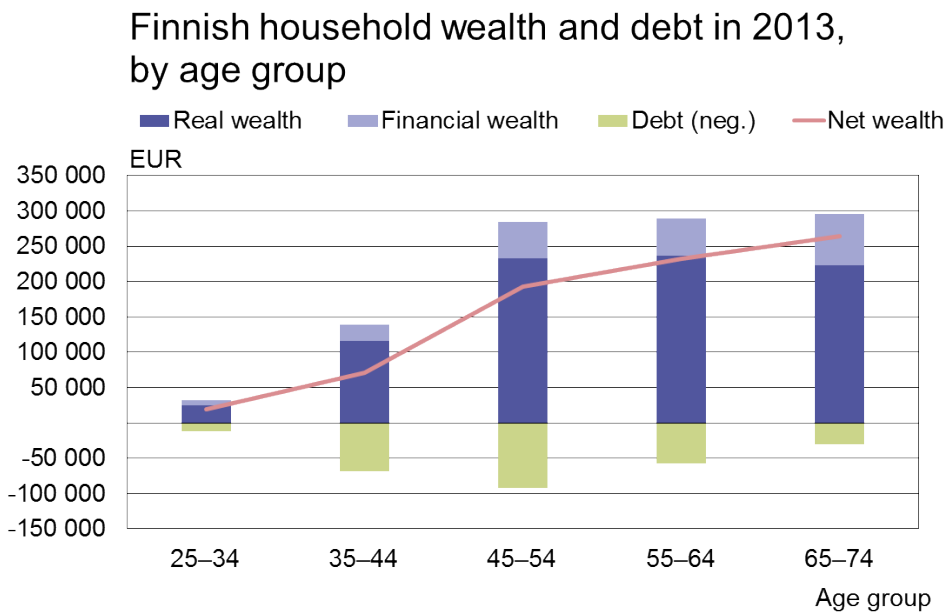
The household margin refers to the amount of money households have left (monthly/annually) after standard expenses.[10],[11] A small margin restricts a household's possibilities to smooth consumption over time. If for a large portion of the households the margin remains small, this is reflected as an increase in the sensitivity of private consumption to fluctuations in disposable income. On the other hand, this also increases the monetary and fiscal policy impact on consumption.

In Finland, the household margin has decreased slightly in recent years, due to an increase in household indebtedness. On the other hand, the low level of interest rates has clearly compensated for the impact of higher debt levels. As the population ages, the household margin improves, due to a decrease in the proportion of the heavily indebted.

The financial position of retirement-age households is, however, significantly tighter than that of households in prime working age. An examination by 10-year cohorts shows that household

margin increases steadily from the 25–34-year-olds until close to retirement, i.e. the age of 55–64 (distribution of household margin by age group, see Chart 3), but the margin of the over-65-year-olds shrinks close to the level of that of the younger age groups. The margin of a median household is highest in the group of 55–64-year-olds (EUR 14,500 per unit of consumption per annum), but among over-64-year-olds the margin is just some EUR 8,500 per annum. Of pensioners, 40% were below the annual margin of EUR 10,000, whereas in the group of 55–64-year-olds, the proportion was 23%. Correspondingly, only 12% of pensioners exceeded the margin of EUR 25,000, whereas among 55–64-year-olds the portion was 29%. On the other hand, the amount of households with little means of subsistence is lower in the group of retirement-age households than among younger households. Among 45–54-year-olds and 55–64-year-olds, the margin of approximately 7% of households remained negative, i.e., their income was not sufficient to cover even basic living costs. In contrast, among pensioners, the proportion of such households was only 3%.

Chart 3.

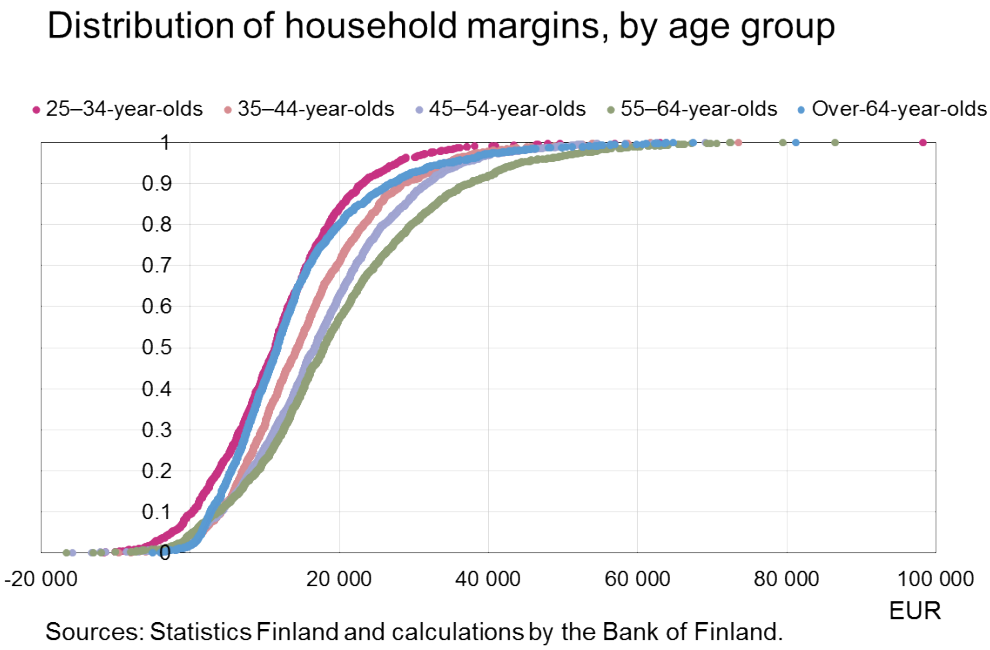


Sources: Statistics Finland and Bank of Finland.

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Household margins are strongly dependent on wealth. Financial wealth accounts for a relatively small share of household gross wealth in Finland, but particularly for elderly households – which usually do not have debt – owner-occupied housing increases the margin for consumption. The median household margin for all households is EUR 4,000 per annum, whereas the median for owner-occupiers is close to EUR 14,000 (Chart 4). The comparison also shows that even in the lowest income decile of owner-occupiers, the margin is close to that of a median rental household.

Chart 4.



Consumption function estimations

Consumers' willingness to use their income and assets for consumption and saving varies according to the phase of their life cycle. The size and composition of wealth may also affect consumer demand.

However, the basic model of consumption behaviour is not materialising in practice, due to both uncertainty about future developments and problems in the availability of liquidity. Consequently, the following estimations explicitly allow for variations in household margins. Consumption behaviour at different ages is explored by estimating cohort-specific consumption functions using cross-sectional data so as to also enable a separate examination of the behaviour of liquidity-constrained households.

Consumption responses are investigated using a model in which logarithmic household consumption expenditure is the dependent variable.[12] Consumption is accounted for by disposable income, wealth and various background variables. The estimations make use of household-level data based on Statistics Finland's annual income distribution survey and the European Central Bank's household finance and consumption survey of 2013.

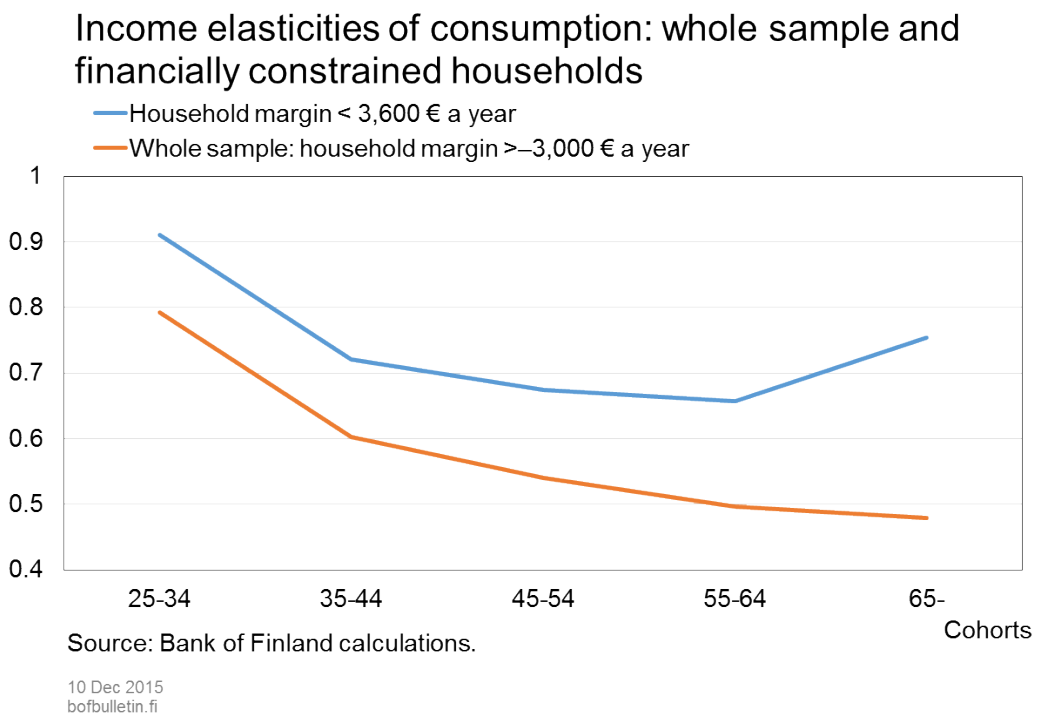
For our purposes, disposable income comprises all a household's earned and capital income and

social benefits. Wealth includes housing wealth, risk-free bank accounts and risky financial assets. The consumption equations were estimated separately for five age groups: 25–34-year-olds, 35–44-year-olds, 45–54-year-olds, 55–64-year-olds and those over 65. The age, gender and marital status of the household reference person, information on whether there are children in the household, and the income and wealth quintile represented by the household were used as background variables. Of these variables, marital status, children and the income and wealth quintiles turned out to be statistically significant.

Household margins may play an important role in explaining differences in consumption elasticity. Households living at subsistence level naturally respond more strongly to changes in disposal income. The consumer credit on offer is typically expensive, which acts as a constraint on the liquidity of these households. To control for this factor, consumption functions were estimated separately for households whose household margin was assumed to be below EUR 250 a month per consumption unit.[13]

The amount of disposable income provides a statistically significant explanation for consumption in all age groups. The income elasticity of consumption for liquidity-constrained households with little means of subsistence is in all age groups higher than for other households and broadly in line with the life-cycle model (Chart 5), i.e. saving is highest in the age group approaching retirement. The fluctuation range of elasticity estimates for liquidity-constrained households is fairly large, at 0.9–0.65. Consumption elasticity for these households is smallest among 55–64-year-olds, i.e. the age group transferring to retirement.

Chart 5.



In contrast, consumption elasticity for the whole sample diminishes steadily with age until retirement (Chart 5). An examination of all households irrespective of household margin shows the income elasticity of consumption varies from 0.8 among those aged 25–34 to 0.5 among those over 65. Income elasticities of consumption in the present analysis are larger than e.g. the elasticities estimated by Helander on the basis of 1998 household data. Irrespective of the estimation model, average elasticities estimated for the population as a whole remained below 0.4 in Helander's (2014) study.[14]

In no age group does consumption respond significantly to changes in wealth.[15] Consumption elasticities in respect of financial or housing wealth variables had in cohort-specific models only in some cases a statistically significant effect.[16] Even then the estimated elasticities were typically low or negative. Wealth has the strongest effect on consumption among 35–44-year-olds. In this age group, an increase of one euro in risky investments boosts consumption by 0.7 of a cent.

The wealth effects estimated here are weaker than the wealth effects estimated by Helander (2014) for Finland on the basis of 1998 data or the effects estimated by Sousa (2009) for euro area households.[17] According to Helander, net housing wealth, in particular, has a statistically significant positive impact on consumption. However, this wealth effect was in size minor or even negative for households with a small amount of housing wealth.[18]Sousa suggests that, instead, at

the level of the euro area as a whole, consumption displays a high degree of elasticity with regard to financial, but not housing, wealth.

On the basis of these consumption function analyses, it appears that the savings behaviour of Finnish households does not correspond very well to the life cycle model. Saving increases steadily with age, which weakens the role of the interest rate channel of monetary policy in Finland. Nor will population ageing reinforce the wealth effect of monetary policy. Admittedly, wealth in the economy will increase along with changes in the age structure, but consumption barely appears to respond to changes in wealth. Overall, responses of consumer demand to interest rate changes will fade to some extent as ageing continues to advance.

Simulations using the general equilibrium model

Simple empirical models may not be sufficient to capture the relative importance of, and changes in, different monetary policy transmission channels in the context of population ageing. In contrast, better insights into different channels of influence can be obtained by using a macroeconomic general equilibrium model.

The general equilibrium model analyses presented here made use of the Bank of Finland's general equilibrium model calibrated for the Finnish economy and age structure.[19] In this model, consumers' life cycle behaviour is conveyed via two types of households. The consumer is either a worker, i.e. a working-age person, or a retirement-age person whose income mainly comprises pension benefits but who can also participate in working life. The household types differ in terms of productivity and planning horizon.

Household wealth in the model comprises discounted earned income, financial assets and pensions. Financial assets comprise bonds, for which the nominal yield corresponds to risk-free interest, and shareholdings, reflecting the present value of future corporate profits.

In their decisions on consumption and labour supply, both types of households take into account their expected discounted lifetime wealth. Interest rate increases boost bond yields, thereby adding to disposable household income. On the other hand, interest rate increases reduce the present value of expected earned income, public transfers and pensions, as well as the value of shareholdings. An essential aspect for the model results, and a difference compared with typical overlapping generation models, is that this model also allows pensioners to increase their labour supply, thereby seeking to maintain their level of consumption in the event of negative wealth shocks. Although the model describes the pension system as a defined benefit-based regime, it also includes features from an earnings-related, defined contributions scheme. Accordingly, for example, longer working careers also have an impact on future pension wealth. In the model, life

expectancy is reflected in the length of households' planning horizon. Working-age persons discount their future earnings over much longer horizons than do those of retirement age. On the other hand, longer life-spans lengthen the discount period for both working-age and retirement-age persons.

The impact of ageing on monetary policy transmission becomes visible in comparisons of responses to interest rate changes between young and aged economies. In the latter, the average life expectancy is longer and the number of those reaching labour market age is smaller than in the former. For assessing the effects of monetary policy, the simulations assumed a unexpected interest rate increase of 25 basis points, with half of the shock effect disappearing in a year's time. A three years longer life-span was assumed for the aged economy than for the young economy. Additionally, it was assumed there was no growth in the working-age population of the aged economy, whereas the young economy was assumed to boost working-age population at an annual rate of 0.18%. Otherwise, the model's key parameters affecting corporate and household behaviour were kept unchanged. A matter of interest is the extent to which the macroeconomic impact of a nominal interest rate shock differs in these economies.

Chart 6.

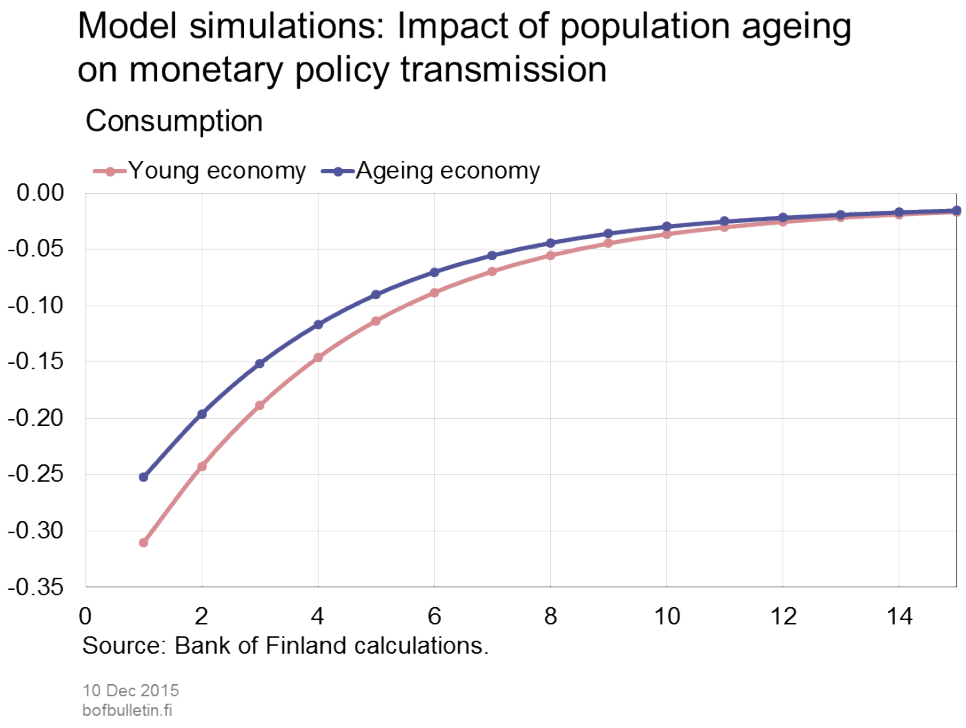


Chart 7.

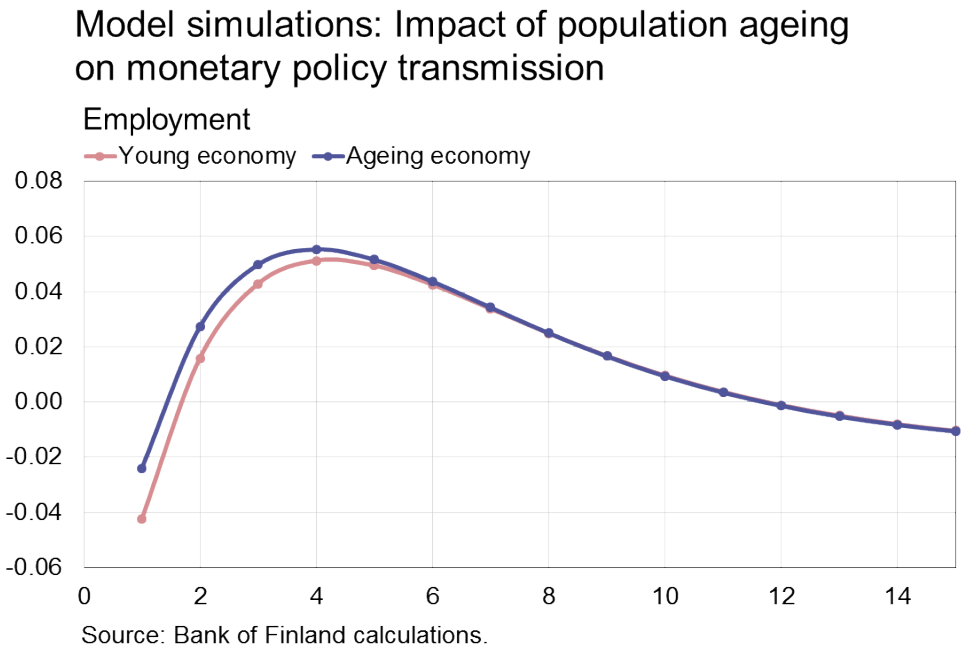


Chart 8.

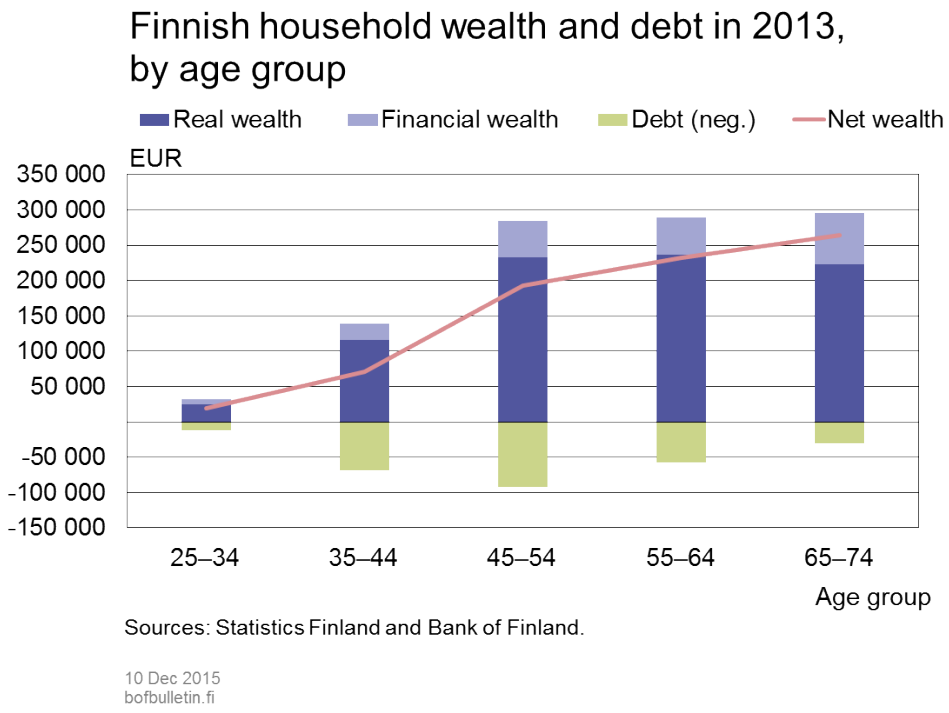
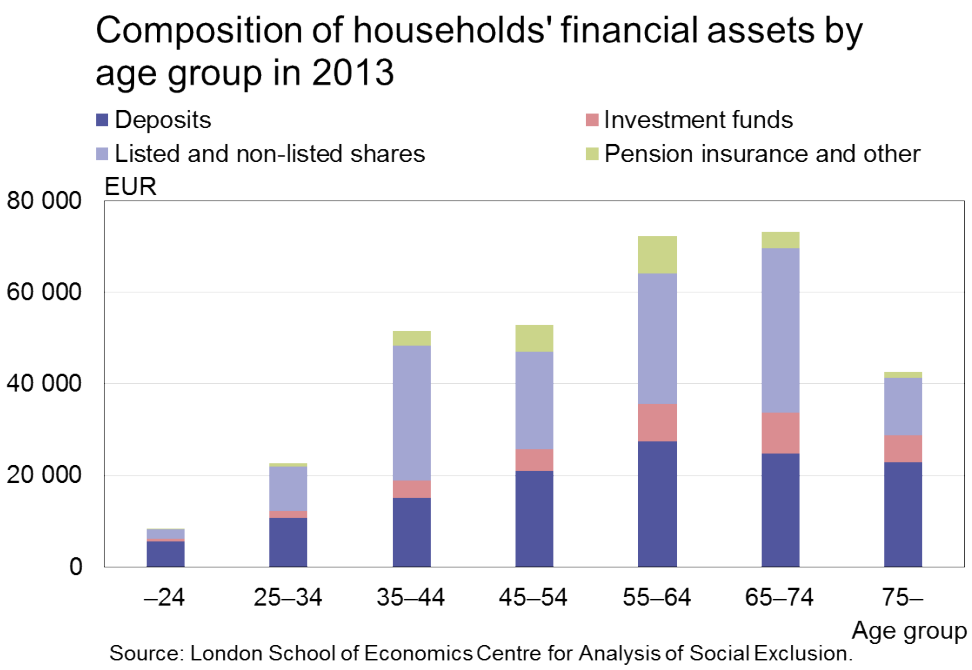


Chart 9.



The simulations suggest that a tightening of monetary policy has a smaller impact on consumption in the aged economy than in the young economy. The response of both private consumption and GDP to monetary tightening is weaker in the aged economy than in the young economy (Chart 6). An interest rate increase in the model triggers a negative wealth effect, with a stronger-than-average impact on ageing people. On the other hand, longer life expectancy lengthens the planning horizon for both working-age and retirement-age persons. Both households are able to smooth out their consumption paths over a longer period of time. Persons of retirement age, in particular, increase labour supply in response to interest rate rises in order to smooth out the negative wealth effect on consumption. Ageing barely affects inflation responsiveness, but the impact of the interest rate on inflation is slightly smaller in the aged economy than in the young economy.

The marginally smaller impact of the interest rate on inflation in the aged economy also means that, following an interest rate increase, the real interest rate rises somewhat less. This serves to weaken the responsiveness of consumption by both working-age persons and pensioners in the aged economy. The bulk of the differences in the responses of consumption and, as a consequence, of GDP to interest rate shocks is accounted for by more moderate reactions from consumption by working-age persons. This is specifically attributable to the fact that the impact of an interest rate shock on the discounted financial wealth of working-age persons is smaller in the aged economy than in the young economy.

Population ageing weakens the impact of interest rate changes

The way ageing changes monetary policy transmission has already been an important issue in the relevant literature for some time. The main finding is that interest rate changes would appear to have less of an impact on economic activity than before. In Finland, the question of the effects of population ageing on monetary policy transmission is topical precisely now that post-war baby boomers are approaching retirement and preparing for a longer pension period.

A key outcome of these analyses was that ageing weakens the effectiveness of monetary policy via the interest rate channel. Retirement-age consumption is less responsive to income developments than in the case of younger people. Consequently, ageing weakens the effects of interest rate changes on demand. Although the income elasticity of retirement-age persons with small incomes is slightly higher than for other households, average income elasticity will barely increase as the population ages. This is due to the fact that those of retirement age include relatively fewer households who live at subsistence level and would therefore respond strongly to changes in income. In addition, this age group includes more debt-free households living in owner-occupied housing than do younger age groups.

Ageing would not appear to change the transmission of monetary policy to the economy via the wealth effect channel. Admittedly, households' net wealth grows with age, but the consumption of Finnish households does not generally seem to respond in a statistically significant manner to changes in wealth in any age group. In the absence of significant changes in households' wealth portfolio, the role of the wealth effect channel in monetary policy transmission appears likely to remain limited in the future, too. The internationally weak wealth effect could be explained by the concentration of Finnish household wealth in owner-occupied housing.

The simulation results of the general equilibrium model were similar. An unexpected tightening of monetary policy has a smaller impact on consumption and economic growth in the aged economy than in the younger economy.

Monetary policy channels of influence appear to weaken to some extent as the population ages. Nevertheless, the significance of monetary policy will not diminish in the future. Owing to the weakening of the interest rate channel, a more active interest rate policy will be needed and, in addition, the relative importance of non-standard monetary policy channels of influence may become more pronounced.

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Notes

1. This effect may, however, be offset by the fact that the remaining life cycle of the elderly is shorter than that of the young. This may also boost the risk premia of loans with longer maturities, in particular. ↑
2. E.g. Imam (2013) has analysed, using a sample of five countries, deviations of the impulse response functions implicated by the Taylor rule and found that the decrease in the response of employment and inflation to changes in interest rates over time is partly explained by population ageing. ↑
3. Wong (2014) estimates, using age-specific consumption functions, the effects of interest rate shocks on consumption demand in various age groups. The tightening of monetary policy reduces consumption by young households significantly more than that by older households. Household-level data have been aggregated by demographics to the level of the economy as a whole. ↑
4. Kara and von Thadden (2010) as well as Fujiwara and Teranishi (2007) have studied, using general equilibrium models that incorporate life cycle features, population ageing effects and monetary policy transmission, as well as the effects of ageing on the general equilibrium interest rate. Using an overlapping generations model, the effects have been examined by e.g. Miles (2002). Also e.g. Saarenheimo (2005) has examined, with the help of an overlapping generations model, the effects of ageing on equilibrium real interest rates in a global economy. ↑
5. On the impact of the economic recession on various age groups, see also Kinnunen – Mäki- ↑

Fränti (2015).

6. This could be due partly to a strong motive to leave an inheritance or e.g. uncertainty about the adequacy of pensions as the need for care grows with ageing. ↑
7. See e.g. Cowell, F.A. – Karagiannaki, E. – McKnight, A. (2013). ↑
8. On developments in pension wealth by year of birth, see e.g. Risku (2015). ↑
9. In addition to labour market position and wealth, a household's necessary expenses, particularly housing costs, vary in the different phases in the life cycle. The differences in consumption expenditure are large both between and within the cohorts. According to Ahonen and Vaittinen (2015), the difference in the consumption expenditure of retirement- and working-age households has continued to shrink, and consumption expenditure of the retirement-aged is now higher than ever before. The group of retirement-age households however continues to include a significant amount of low-income households that have difficulties in covering even their necessary expenses. ↑
10. The household margin was defined as a function of the disposable income for a household, housing expenses and living costs such that margin = household income minus housing and debt servicing costs and basic living costs. ↑
11. For a more detailed discussion of household margin, see e.g. Persson (2009) and Jönsson et al (2011). See also Mäki-Fränti (2014). ↑
12. Helander (2014) has estimated the income and wealth effects of consumption using Finnish data. ↑
13. This limit excludes clear outliers from the sample. The estimation results were, in some respects, sensitive to these outliers so that income elasticities of consumption increased when the financially most distressed were dropped from the sample. ↑
14. Helander (2014), p. 27–31. ↑
15. Wealth variables received statistically significant values particularly in the income model, but consumption elasticity with regard to wealth also remained very small in these cases. ↑
16. Based on Finnish data, Kilponen (2012) has presented similar results for housing prices. ↑
17. Sousa (2009). ↑
18. For a more detailed description of the model, see Kilponen – Ripatti (2006) and Kilponen – Kinnunen – Ripatti (2006). ↑

Keywords

ageing, monetary policy