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The Baby Boom, the Housing Market and the Stock Market

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During most of the past two decades, the housing market in the U.S. boomed while the stock market faltered. The nominal return on single family housing rose fairly steadily from 6.5 percent a year in 1965 to over 15 percent in 1979. In the same interval, stock market returns rose from 3 percent to only 5.5 percent. Since inflation accelerated from 3 percent to almost 12 percent in the meantime, real (inflation-adjusted) returns in the stock market were negative through most of the 1970s. The real value of corporate equities declined by 48 percent but the real value of a single family house increased by 26 percent.[1] As a consequence, the composition of private wealth changed markedly. The total value of corporate equities compared to the total value of owner-occupied housing declined by an astounding 150 percent between 1965 and 1980.[2]

A number of researchers, e.g., Martin Feldstein, Randall Pozdena, and Lawrence Summers, attribute most of the change in the value of housing relative to corporate stock to the interaction of inflation and a non-indexed tax system. Taxable nominal corporate profits rise more in percentage terms than inflation because of historical cost depreciation and prevailing (first-in-first-out) inventory accounting practices. As a result, inflation-adjusted after-tax corporate profits actually decline with inflation. Furthermore, stockholders must pay tax on purely nominal stock market capital gains as inflation pushes them into higher marginal brackets. Homeowners, however, avoid or benefit from many tax "non-neutralities." Owner-occupants consume the flow of services their houses provide. This service flow is an imputed rent payment that adds to income in the National Income Accounts but the "in kind" payment is not counted as explicit taxable income by the Internal Revenue Service. In addition, capital gains taxes on housing can be deferred or avoided altogether by using rollover provisions and exemptions for those over age 55.

The researchers therefore concluded that the non-neutralities in the tax system were capitalized in the asset prices during the inflationary period of the 1970s. Moreover, they believe that the changing relative asset values induced changes in the physical stock of assets and the composition of wealth.

Thus far in the Eighties, inflation has fallen rapidly from 12 percent in 1980 to under 5 percent in 1982. The Economic Recovery Act of 1981 reduced individual and business taxes, and tax indexing slated to begin in 1985 should further reduce taxes. As inflation recedes and the tax system is made more equitable, the macroeconomic causes of the housing boom will presumably be eliminated. In the 1980s, the U.S. may also face the task of working off an *excess supply* of housing created by the macroeconomic climate of the last decade. As a result, economists that attribute the housing boom of the 1970s to macroeconomic causes see a relatively dismal future for the housing industry.

Their line of reasoning follows a traditional macroeconomic approach in analyzing the changes in relative values. The emphasis is on macroeconomic variables—inflation and taxes—while the composition of consumer demand is assumed constant or relatively unimportant at the nation-wide level. The theoretical and empirical work by Feldstein, Pozdena, and Summers shows that macroeconomic variables should and did affect the value of corporate stock relative to owner-occupied housing in the 1970s.

The 1970s, however, also witnessed major demographic shifts that affected the composition of consumer demand. The traditional macroeconomic aggregation assumption that the composition of underlying demand is fairly stable was not valid in that decade. Household formation, for example, grew much more rapidly than housing starts. The number of households in the 24-35 age cohort

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(survey data indicate that half the new home buyers in the 1970s fell in this age cohort[3]) almost doubled between 1960 (10 million) and 1980 (18 million). Over the same period, housing starts only increased about 20 percent.

An increase in housing demand relative to supply is a standard microeconomic explanation for the rise in housing prices and home construction. However, since the baby boom enters the housing market through a long and supposedly easily observed gestation period, many believe the aggregate impact of the demographic shift can be anticipated and therefore should have no significant effects.

Section I presents a brief discussion of the effect of an increase in the demand for housing services on the relative price of housing services, the relative asset price of houses, and investment in houses relative to corporate capital. It concentrates on the demographic effects and shows that even if the baby boom had been anticipated by the market *and* there were no inflation or tax distortions, demographic changes would still have led to an increase in the relative value of housing. Section II examines empirical evidence from 1965 to 1980. The results indicate that *either* inflation *or* household formation can explain the value of houses relative to corporate stock in the 1970s. In fact, *both* probably influenced the housing and stock markets in the Seventies. The results also indicate that demographic factors will continue to exert some demand pressure on the housing market in the Eighties and make the outlook for housing more sanguine.

I. Uncertain Demographics and Rates of Return

Other things being equal an increase in demand for a product increases the relative price of that product. The price mechanism sends a signal to individual decisionmakers to transfer resources to the high price (high profit) industry from lower price (lower profit) industries. The short-run reallocation in flow markets is straightforward and quite simple. When demand shifts, some industries move up their short-run supply curves by adding variable inputs (labor) and other industries move down their short-run supply curves by reducing variable inputs. If the shift is permanent (or long-lasting) the capital stock must also be reallocated. Asset prices, which reflect expected discounted future earnings, will change and lead to a change in investment. Both current and unknown future prices affect the present value of assets and capital allocation. Moreover, reallocating the capital stock is complex and costly so the unknown future makes any major capital decision risky.

The baby boom led to an obvious increase in the demand for housing services. As children matured they took jobs, left their parents' homes, and demanded housing. Most married and started families which increased the demand for housing. The bulge in the age structure of the population created an extraordinary demand for housing that required resources to be reallocated toward housing and away from other activities. The adult population grew at a rate of 3 million a year in the 1970s; in the 1960s, it grew at 2 million a year. The growth of households increased even more dramatically, from about 1 million a year in the 1960s to 1.75 million a year in the 1970s.

The changing demographic structure of the population had many economic consequences that can be analyzed as the microeconomic substitution effect of a change in the mix of consumer goods demanded, holding everything else constant. In this section I assume total consumption, investment, and wealth are fixed. This analysis illustrates that a change in the mix of consumer goods demanded can change relative flow and asset prices.

The service flow from housing (the services housing provides, such as a place to sleep, eat, and relax) is a perishable consumption good that can be purchased by paying rent. Owner-occupants implicitly pay themselves rent that equals the value of the services they consume. At a fixed level of income and saving, an increased demand for housing services must be matched by a decreased demand for other goods. The shift in the mix of consumption demand is reflected in the relative flow prices of the goods and services. In the simplest case, rents would increase relative to the prices of other consumption goods.

Asset prices depend on the current and future income stream associated with the asset. Title to the asset conveys the right to the future income stream to the owner of the title. For example, the owner of a

house will receive its current and future rent. The present value of a house (PV_H) is the stream of future rents (R_{T+j}) discounted to reflect their current value,

$$PV_H = R_{T+1}/(1+r) + R_{T+2}/(1+r)^2 + R_{T+3}/(1+r)^3 \ldots,$$

where r is the discount rate. The prices of titles reflect the market's evaluation of the future income stream. If the market expects the rental rate to increase relative to the price of consumer goods, the present value of housing and house prices increase relative to corporate capital. Since the aging of the baby boom is easily predicted, the increased demand for housing was (at least partially) expected.

Figure 1 shows the relationship between rent (R), other prices (P), house prices (H) and stock prices (S) assuming a one-time demand shift that is *perfectly* anticipated. (The stock of housing and corporate capital is assumed fixed.)

The top panel shows the flow prices—rent and the price of other consumer goods. The demographic shift, which is assumed to occur in year T, increases the demand for housing services and reduces the demand for other goods. As a result the rent for houses rises, and other prices fall in year T. Since the change is permanent, rents exceed the prices of other goods thereafter ($R_{T+i}>P_{T+i}$). When the flow prices change, asset values also change. After rents increase, the asset value of a house (H_{T+i}) must exceed the asset value of corporate stock (S_{T+i}) as shown in the bottom panel. However, asset prices depend on the entire stream of future earnings and, therefore, change prior to year T.

The rate of return to an asset is the sum of flow income and capital gains expressed as a percent of asset price. After year T, when asset prices are constant, the rates of return are,

$$r_H = \frac{R_{T+i}}{H_{T+i}} \text{ and } r_S = \frac{P_{T+i}}{S_{T+i}}$$

In a world of certainty, rates of return on all assets are equal, that is, $r_H = r_S$; otherwise, riskless arbitrage opportunities exist. For example, if the rate of return on housing exceeds the rate of return on corporate stock, speculators (in theory) can sell stock short and use the proceeds to buy houses. In the process, they make a riskless profit. However, as agents buy one asset and sell another, the asset prices change to equalize the rates of return.

Prior to year T, the flow income from the two assets (R_{T-i}, P_{T-i}) is equal but the asset prices change in anticipation of the demand shift. When the future is *perfectly anticipated,* asset prices change over time so that the *rates of return are always equal*, i.e.

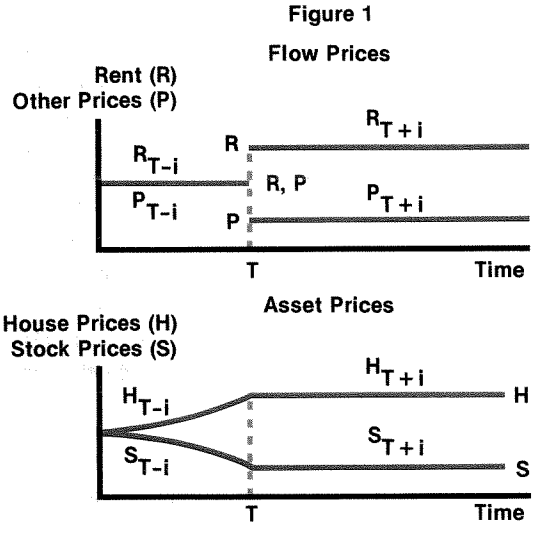
$$r_H = \frac{R_{T-i}+\Delta H_{T-i}}{H_{T-i}} = r_S = \frac{P_{T-i}+\Delta S_{T-i}}{S_{T-i}}$$

House prices gradually rise (ΔH_{T-i}) to give homeowners capital gains that offset the lower current rents, while stock prices (ΔS_{T-i}) gradually fall to give equity holders capital losses that offset current higher profits.

After period T, asset and flow prices are constant but not equal. Prior to period T, flow prices were constant and equal, but asset prices were changing. Throughout the period, however, rates of return are equal.

Figure 1 illustrates the relationship between the flow and asset prices in a stylized form. In this example, the rates of return had to be equal because the investors saw the future with perfect clarity. The actual relationship between flow and asset prices is much more complicated. Even though one can accurately predict the aging of the baby boom generation, its demand for housing and its rate of household formation is much more uncertain.

Figure 1



Household formation depends on complex social and economic factors. The quality and quantity of housing services can be varied and home purchases delayed. Furthermore, home builders add to an existing supply which feeds back on house prices and the rental rate. Construction has always been a boom and bust industry precisely because structures are long-lived durables and the future is uncertain.

In an uncertain environment, major shifts, such as the aging of the baby boom, provide increased opportunities for profit but only at the cost of bearing additional risk. Building too far in advance results in high vacancies, low rents, and sometimes bankruptcy. The current glut of commercial office space in many cities exemplifies the risky nature of real estate speculation.

In this risky environment, the rate of return on assets is likely to diverge as investors try to gain access to the uncertain future.

II. Empirical Evidence

The real price of homes increased by 26 percent between 1965 and 1980. Over the same period, the rate of return to housing was over twice the rate of return on corporate stock. These numbers are consistent with an increased demand for housing due to an uncertain but expected rapid growth in household formation. They are also consistent with an increased speculative demand for housing due to accelerating inflation and distortions in the tax system. The consequences of these two sources of demand, however, have very different implications for the 1980s. If demographics caused the change, demand will continue to grow but less rapidly than in the 1970s and the prices of housing relative to other assets will stabilize. On the other hand, if the shift in asset values was due only to inflation and tax distortion, and we have disinflation and tax changes in the 1980s, then relative home prices and home construction will decline.

To test the proposition that anticipated household formation and/or anticipated inflation increased the rate of return to housing and decreased the rate of return on stocks in the short-run, I regressed the excess return in each market on these variables. This test extends the work of Summers who only tested for the effect of inflation.

The excess return in the stock market (ESTOCK) is defined as the sum of capital gains plus dividends as a percent of the beginning-of-period value less the beginning-of-period Treasury bill rate. This is the difference between the one-period holding yield on stock and the return on an alternative "safe" asset—Treasury bills. The excess return to housing (EHOUSE) is the rent plus capital gains as a percent of the beginning-of-period value minus the Treasury bill rate (see the Appendix for details). Expected inflation (DPE) and household formation (HFE) are three-year averages for forecasts of future rates of change of the consumer price index and household formation from ARIMA models.[4]

Summers tested the hypothesis that the short-run expected inflation can "explain" the divergence in the excess returns by regressing the excess returns on expected inflation. Table 1 shows the results from estimated equations of the form,

$$E_t = b_o + b_1 DPE_t + u_t$$

where E is the excess return and u is an error, or omitted effects, and DPE is expected inflation.

Table 1*
Excess Returns and Expected Household Formation: Stock and Housing Markets

Dependent variable	b_o	b_1	R^2
ESTOCK	− .14	−66.02	.44
	(.96)	(19.56)	
EHOUSE	2.08	55.56	.10
	(2.23)	(51.27)	

*Standard errors in parentheses.

The regressions, based on annual data from 1965 to 1979, indicate that expected inflation has a statistically significant depressing effect on the stock market and a positive, although not statistically significant, effect on housing. These results are similar to Summers' who used a different data set and measure of the change in expected inflation to test the hypothesis. The results weakly support the hypothesis that expected inflation increased the demand for housing relative to other goods.

To test the hypothesis that household formation

"explains" the divergence in returns, I also estimated equations of the form,

$$E_t = c_o + c_1 HFE_t + v_t.$$

where HFE is expected household formation. Table 2 gives the results.

Table 2*
Excess Returns and Expected Inflation: Stock and Housing Markets

Dependent variable	c_o	c_1	R^2
ESTOCK	−3.09	−.002	.37
	(.45)	(.0006)	
EHOUSE	4.75	.0003	.49
	(.60)	(.0001)	

*Standard errors in parentheses.

The regression results indicate that expected household formation had a statistically significant depressing effect on the stock market and a statistically significant positive effect on the housing market. These results provide somewhat stronger statistical support for the hypothesis that the demographic changes increased the demand for housing services relative to other goods.

Obviously, there is no need to have an either/or hypothesis. Economic data are not generated by a controlled experiment and many factors change simultaneously in the actual economy. To test the hypothesis that expected inflation and household formation "caused" the divergence in the rates of return, I estimated equations of the form:

$$E_t = d_o + d_1 DPE + d_2 HFE + w_t.$$

Table 3 gives the results.

The results are consistent with the hypothesis that both variables help explain the short-run divergence in the rates of return. However, they are not strong in statistical terms. The only statistically significant coefficient of interest (at the 5 percent or even 20 percent level) is the coefficient on expected household formation in the excess return to housing equation. Expected inflation in this equation has a negative sign, contradicting the expected inflation hypothesis at least for housing; the coefficient, however, is statistically insignificant.

It is not terribly surprising that the data cannot cleanly separate the effects. The data are annual (household formation is only reported on an annual basis) and both household formation and inflation accelerated in the 1970s.[5] But an F test of the null hypothesis that neither expected inflation nor expected household formation affected the rates of return can be rejected at the 95 percent confidence level.

In summary, the data support the hypothesis that one or the other or both expected inflation and household formation influenced tha rate of return on stock and housing over the period from 1965 to 1980, although the statistical evidence is not precise. However, economic theory and common sense bolster the conclusion that inflation was bad for the stock market and probably good for the housing market, while the rapid increase in household formation was good for the housing market and probably bad for the stock market.

Table 3*
Excess Returns, Expected Inflation, and Expected Household Formation: Stock and Housing Markets

Dependent variable	d_o	d_1	d_3	R^2
ESTOCK	− .74	−52.78	.0005	.45
	(1.73)	(37.78)	(.0011)	
EHOUSE	7.02	−53.03	.0004	.55
	(2.28)	(51.41)	(.0001)	

*Standard errors in parentheses.

III. Conclusion

During the past fifteen years, the total value of corporate equities relative to the total value of owner-occupied housing fell by an incredible 150 percent. The 1960s and 1970s witnessed a massive change in the value and composition of privately held wealth. The macroeconomic explanation for the change in the value of housing relative to corporate stock is that accelerating inflation in the 1970s coupled with a non-neutral tax system increased the effective corporate tax rate. This explanation implies that the housing boom was not based on fundamental demand factors but peculiar features in the tax system and inflation. These factors can be reversed, so as we look forward to lower inflation and taxes in the 1980s, we might also look with trepidation to falling house prices and a stagnant homebuilding industry.

This paper couples the macroeconomic explanation with a more fundamental microeconomic explanation that the demand for housing increased because of demographic change. The large increase in households during the last decade also can explain house and stock prices over the period. The aging baby boom and the rapid rate of household formation swelled the real demand for housing. While household formation in the 1980s should grow less rapidly than in the 1970s, the demographic factors will continue to exert demand pressure on the housing market through most of this decade.

The evidence in this paper indicates that both inflation and household formation affected the returns to stock and housing. For the future, this means that while disinflation should help the stock market and reduce the speculative tax-induced demand for housing, the fundamental demographic-based demand for housing will remain strong.

APPENDIX

The rate of return to stocks was calculated as follows:

$$(\text{Stock Return})_t = SD_{t+1} + (SP_{t+1} - SP_t)/SP_t$$

where:

SD = the dividend yield on the Standard and Poor's 500 composite common stock index.

SP = the price of the Standard and Poor's 500 composite common stock index.

The rate of return to housing was calculated as follows:

$$(\text{Housing Return})_t = [RENT_t + (HP_{t+1} - HP_t)]/HP_t$$

where:

RENT = the rental return to housing calculated by using the rent component of the CPI normalized by the rent for residences in 1972.

HP = the price of housing calculated by using the Department of Commerce's price index for new one-family houses sold, normalized by the median home price in 1972.

FOOTNOTES

1. These calculations use the Standard and Poor's stock index, the CPI, and data on home prices from Census Reports C-25 and C-27.

2. See Lawrence H. Summers, p. 429.

3. Michael Sumichrast, et al, **Profile of a New Home Buyer: 1979 Survey of New Home Buyers** (Washington, D.C.: National Association of Home Builders.)

4. ARIMA models are a statistical forecasting procedure in which future values are forecast from past values. Actual values, or perfect foresight, give similar results.

5. The correlation between the series is .86.

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