Macroeconomics and Housing: A Review of the Literature

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Macroeconomics and Housing: A Review of the Literature♠

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Introduction

In his encyclopedic collection of writings about *Origins of Macroeconomics*, Robert Dimand includes a set of important contributions to macroeconomics, by many of the most eminent contributors (in alphabetical order): W. H. Beveridge, Milton Friedman, Roy Harrod, J. R. Hicks, John M. Keynes, Frank Knight, Tjalling Koopmans, Simon Kuznets, Alfred Marshall, Karl Marx, Lloyd Metzler, Ludwig von Mises, Franco Modigliani, Bertil Ohlin, A. C. Pigou, Frank Ramsey, Paul Samuelson, Joseph Schempeter, Jan Tinbergen, James Tobin, and Allyn Young. Only one article therein is related to the housing market, which is the debt deflation-paper by Irving Fisher (1933). This compendium is not an exception but rather a reflection of the apparent disconnect between macroeconomics and housing research. Among the 40 papers selected for *Landmark Papers in Economic Fluctuations, Economic Policy and Related Subjects* (edited by Nobel Prize Winner Lawrence Klein), the only paper focusing on the housing market is "The Relation of Home Investment to Unemployment" by R. F. Kahn. Among the 11 papers contained in *Landmark Papers in Economic Growth*, (edited by Nobel Prize Winner Robert Solow), and the 32 papers in *Landmark Papers in Macroeconomics*, (edited by Nobel Prize Winner James Tobin), none is dealing directly with

the housing market.[1] Standard macroeconomics textbooks either treat housing as one of many consumption goods, or neglect it all together. "Mainstream macroeconomics," simply put, ignores the housing market.

Conventional housing economics and urban economics research for its part virtually ignores interactions with the macroeconomy. At best, some of the theoretical and empirical analyses for urban and housing economics include macroeconomic variables (such as the inflation, the economic growth, GDP, the unemployment rate, etc.) as exogenous "control variables." For instance, in the 4 volumes of *Handbook of Regional and Urban Economics*,[2] the papers by Charles Becker and Andrew Morrison on "Urbanization in Transforming Economies" and Stephen Malpezzi on "Economic Analysis of Housing Markets in Developing and Transition Economies" attempt to relate the interaction between the macroeconomy and the housing markets.[3]

The adjacent field, Finance, borders on both macroeconomy and real estate housing in a much more responsive fashion. In *Handbook of the Economics of Finance, Vols 1A-B*, edited by G. Constantinides, M. Harris and R. Stulz, there are at least two macro oriented papers, "Consumption-

[1] Tobin includes several papers related to portfolio choices under uncertainty, and housing is arguably one of many different assets to hold.
[2] Volume 1 is edited by Peter Nijkamp, Volume 2 is edited by Edwin Mills, Volume 3 is jointly edited by Paul Cheshire and Edwin Mills and Volume 4 is jointly edited by V. Henderson and J. F. Thisse.
[3] There is a literature on whether real estate and/or real estate securities can be a hedge of inflation. However, it is mainly related to the portfolio choice rather than housing market behavior itself.

based asset pricing" by John Campbell and "The Equity Premium in Retrospect" by Rajinish Mehra and Edward Prescott. In addition, there are several chapters which take "macroeconomic" seriously.[4] In light of this comparison with finance, it is indeed shocking that there has been so little overlap and interaction between the macroeconomics and the housing literatures.

More recently, however, there is a small yet growing research effort that strives to bridge the gap between the two literatures and shed light on issues that are jointly consequential to macro and housing economists. This paper will review selectively and highlight the new directions of this joint research. This paper is organized into six subsequent sub-sections. The next section will provide underlying motivations for the "macro-housing" literature. It will be followed by a discussion about the important ways in which macroeconomics and housing economics overlap, with a brief summary of the existing research. Section 3 will examine the interplay of

[4] They include the chapters on "Financial intermediation" by Gary Gorton and Andrew Winton, "Intertemporal asset pricing theory" by Darrell Duffie, "Tests of multi-factor models, volatility, and portfolio performance" by Wayne Ferson, "Are financial assets priced locally or globally?" by G. A. Karolyi and Rene Stulz, "Finance, optimization, and the irreducibly irrational component of human behavior," by Robert Shiller, "Fixed income pricing" by Qiang Dai and Ken Singleton, among others.
[5] According to Chetty and Szeidl (2004), the mean expenditure share for shelter (i.e. housing) is about 20%, household income, supplies and furniture is about 6%, transport (including gas and maintenance) is 16%, food and apparel each is 15%, utilities, fuels, and public services is 7%, health care is 6%, the rest are for education, entertainment, and miscellaneous items.

housing taxation with the macroeconomy. Sections 4 and 5 will discuss the vibrant sub-fields of housing markets dynamics and cycles. The focal point of section 6 will be the micro-structure of housing markets and urban form. The last section will conclude.

2. Why Macro-housing?

How are the housing market and the macroeconomy intertwined? Is it important to include the housing market in macroeconomic analysis, and vice versa? What is, and should be the scope of macro-housing research? These are fundamental issues that deserve a response.he plain response is housing is a large share of the overall macro- economy. To illustrate the significance of the housing market in the macroeconomy, here are stylized facts. Housing constitutes a significant share of household expenditure as well as total wealth.[5] Greenwood and Hercowitz (1991) find that the value of the residential capital stock is larger than than that for business capital, and usually, the annual market value of residential investment is larger than that for business capital investment.[6] Clearly, housing is not just "another" consumption good. Significant fluctuations in housing price would imply significant fluctuations in wealth, and thus potentially significant household

[6] See also Skinner (1994).

wealth effects.[7] Davis and Heathcote (2001) find that the market value of the U.S. residential property stock is approximately equal to the annual average GDP. As a comparison, the value of real balance for M1 and M2 in the U.S. are about 30% and 60% of the GDP, respectively.[8]

3. Housing and Taxation

It is easy to anticipate that property taxation of housing can be an important component of governmental budgets because of its immobility and magnitude. There is a large diverse literature related to the housing and taxation. Many of these papers have been previously surveyed.[9] We will restrict our attention to those research treaties which examine the aggregate effects of taxation and the housing market, including an explicit consideration of the government budget and the general equilibrium effects. Even this branch of the literature is voluminous, and the discussion is therefore selectively developed.

3.1 Differential tax treatment on housing

[7] For instance, see Skinner (1989, 1996b), Case, Quigley and Shiller (2001), Campbell and Cocco (2004).
[8] Notice that according to the quantity theory of money, the ratio of nominal monetary stock to the nominal GDP, M/(PY) is equal to the reciprocal of the velocity of money, 1/V. See Cheung (2003).
[9] See the Handbook of Public Economics series, edited by A. Auerbach and M. Feldstein.

There are at least two predominant reasons why housing is taxed. First, the market value of housing stock is significant. Second, it is difficult to avoid taxation of housing because of its durability and immobility.[10] Yet, in the United States, as in many countries, the tax system seems to favor house ownership Hendershott and Hu (1981, 1983) study how differential tax treatment on residential housing and business capital affects the equilibrium allocation of capital and investment returns.[11] DiMasi (1987) solves a computable, spatial general equilibrium model; and finds that eliminating the differential tax treatment on capital and land can lead to a significant social welfare gain.[12] Fullerton and Henderson (1989) also show that general equilibrium taxation induced distortions among industries are smaller than those across assets.[13] Other general equilibrium models find that tax policies which favor the housing sector will cause a significantly negative impact on both the aggregate income and the housing sector, as the policy distorts the accumulation of physical capital which is essential for goods production and economic growth.[14] More recent property tax research borrows sophisticated

[10] See Ljungqvist and Sargent (2000) for an explanation why durable and immobile capital is more vulnerable to taxation.
[11] See Hamilton and Whalley (1985), Cooley and Salyer (1987) for related analysis.
[12] For instance, in one of the parameterization, this change can lead to 6.6% increase in tax revenue.
[13] Yet they find that even the latter is below one percent of income, a view clearly not shared by others.
[14] For instance, see Goulder (1989), Goulder and Summers (1989), Hendershott and Won (1992), Skinner (1996a).

analytical devices from the macroeconomics tool kit.[15] Gervais (2002) develops preferential tax treatment in a dynamic general equilibrium, multi-period overlapping-generation model, calibrated for both the aggregate statistics and the income distribution of the U.S; He concludes that the preferential tax treatment for residential property leads to a net welfare loss.

If the preferential tax treatment on housing is undesirable, then, why has it been implemented? There are some obvious candidate explanations. First, short term elected democratic governments may not be able to commit to long term policy.[16] Hansson and Stuart (1989) demonstrate such a time-inconsistency by showing that under certain conditions, government would subsidize investment flows, while taxing the capital stock. In a similar fashion, housing may be a politically expedient tax target.

There may be some positive externality of house ownership; that is, house ownership has significant social benefit.[17] Differential tax treatment on housing may be a tool to "internalize" the externality.

Most, if not all, of the current housing taxation research is focused on the U.S. tax system.Casual observation suggests that the preferential tax treatment for housing exists in other countries. Future research should

[15] Among others, see Nielsen and Sorensen (1994), Turnovsky and Okuyama (1994), Lin and Zhang (1998), Leung (1999).
[16] The literature on time-consistent policy is too large to be reviewed here. Interested readers may consult Ljungqvist and Sargent (2000) for a textbook treatment.
[17] For instance, see Glaeser and Sacerdote (2000).

address differences in the preferential tax treatment across countries? If so, are the difference related to some economic indicators, such as the demographic structure, the degree of economic development, financial development, or the political system? Can different treatments be Pareto ranked? Currently, the literature lacks both empirical and theoretical research about the effects of international differences of property taxation upon the macroeconomy.

4. Housing and business cycles

The housing market endures significant cyclical movements and volatility. For example, Davis and Heathcote (2001) show that, in the U.S., the standard deviation of residential investment is more than twice that of non-residential counterpart. Ortalo-Magne and Rady (1998) find that, for the U.S. and U.K., the number of housing market transactions is more volatile than the aggregate housing price, which is in turn more volatile than GDP, although all three variables are correlated. It would be interesting to explain these movements in the housing market, and to what extent they are related to macroeconomic movement in business cycles. We will examine both

qualitative and quantitative aspects of the housing-business cycle relationship.[18]

4.1 Quantity Comovement

An important portion of housing market movements is related to the business cycles. Davis and Heathcote (2001) find that, in the U.S., the residential investment leads the cycle (or GDP), whereas the non-residential investment lags the cycle. The comovement of the housing market and the macroeconomy has been documented for several countries.[19] For city level data, Jud and Winkler (2002) conclude that real housing price appreciation is strongly influenced by the growth of population and real changes in income, construction costs and interest rates. The macroeconomy and the housing market are indeed interrelated and co-determined.[20]

However, it is not a trivial task to create a unifying theory of the business and the housing cycles. As shown by Matsuyama (1990), the dynamics of residential investment are fundamentally different from the non-residential counterpart. For instance, a change in government purchases has little, if any, effect on the capital stock adjustment in a small open economy model, without a residential housing stock. In a model with

[18] See Cooley (1995), especially chapter 1, for a detailed discussion of why the quantitative implications of a theory are as important as the qualitative counterpart.
[19] For instance, see Baffoe-Bonnie (1998), Green (1997), Wen (2001) for the case of U.S., Bowen (1994) for the case of U.K., Ito (1993), Seko (2003) for the case of Japan. See also Hwang and Quigley (2004).
[20] See also Case (2000).

residential property, since housing is a normal good, the stock accumulation will be affected by a change in government purchases.

To overcome this difficulty, Greenwood and Hercowitz (1991) and Baxter (1996) build a set of dynamic general equilibrium models to reproduce jointly the business and the residential investment cycles observed in the U.S.[21] They assume reversibility between residential and business capital, which implies that the relative price of housing will always be unity; They intentionally suppress the "price dynamics" in order to focus on the "quantity dynamics". The productivity shocks to home production (such as home cooking, which is not traded in the market) and market production (such as food served in the restaurant) are assumed to be the same (or highly correlated).[22] These assumptions enable Greenwood and Hercowitz to reproduce the co-movement of business and residential investment in the macro model. The crucial assumption that the productivity shock in both the market and home sectors is highly correlated cannot be easily tested.[23]

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[21] For related analysis, see also Benhabib, Rogerson and Wright (1991), who focus on the allocation of market versus non-market *time*, while Greenwood and Hercowitz (1991) focus on the allocation of market versus non-market *capital*.

[22] A typical story is that both home production and market production sectors can take advantage of the modern microwave oven in the cooking process, and washing machines with "micro-computers" installed in the laundry process, and so forth.

[23] "Output" of home production is not traded in the market, and neither priced nor recorded. Thus, the productivity shock to home production cannot be measured even in principle. It follows that the theory cannot be easily "tested."

As an alternative, Fisher (1997) explains residential and non-residential investment comovement by assuming complementarity between the household and business capital in goods production. In an endogenous growth framework, Einarsson and Marquis (1997) show that a positive productivity shock in production leads to time re-allocation, from human capital accumulation to market goods and home production. Consequently, business and residential investment both increase, thereby creating an observed comovement. Chang (2000) shows that if there is an adjustment cost in capital accumulation, and if consumer durables and time are substitutes in home production,[24] then the business and residential investment will co-move in the equilibrium. The existence of convex adjustment cost encourages agents to "spread" the accumulation between business and residential investment.[25] With substitutability between time and consumer durable in home production, an increase in residential investment during the current period will release more labor hours for goods production in subsequent time periods resulting in a higher level of business investment in the current period. Thus, both effects reinforce each other and lead to the investment comovement. Fisher (2001) observes that the effectiveness of

[24] In other words, home production is not just the purchase of durable goods (home), or simply buying a big home, but the process of generating utility from consumer durables (including housing).
[25] It is well known that the supply of housing adjusts slowly to price changes. For instance, see Hanushek and Quigley (1979, 1980).

market labor hours is positively related to the quantity and quality of household capital.[26] Predicated on this assumption, agents would naturally invest in both business and residential capital, generating higher levels of business capital and effective market labor hours, respectively. In equilibrium, investment comovement will be observed. Gomme, Kydland and Rupert (2001) allow for time-to-built stock accumulation (i.e., the time horizon for goods production and stock accumulation differ) and calibrate the model to emulate the U.S. data. Their model obtains significant improvement in terms of fitting the data.

In sum, there are several theoretical explanations for the residential and non-residential investment comovement; and the quantitative modeling is relatively satisfactory.

4.2 Property prices, collateral and related issues

Existing research has not been successful for explaining the price dynamics of the housing market.[27] Davis and Heathcote (2001) employing the U.S. national data, find that the correlation between the residential property price and the real output is 0.53 and statistically significant.[28] In

[26] For instance, a more comfortable home can make the sleeping time more "efficient" and lead to higher "productivity."
[27] This seems to be true for a very large class of dynamic, general equilibrium models. For instance, see Stockman and Tesar (1995), Lane (2001) for more discussion.
[28] See Ortalo-Magne and Rady (1998, 2003b) for the analysis of the English experience.

contrast, Kan, Kwong and Leung (2003) using city data, find that the average correlation between residential property price and the real output for about 50 major U.S. cities is 0.1475. (The average correlation between commercial property and real output is similar, 0.1346.) Though they are still statistically significant, the magnitudes for aggregate U.S. and local city data are remarkably different. An obvious explanation for this discrepancy is that there is important reallocation of consumption as well as production activities across cities over the business cycles. A satisfactory joint explanation awaits future research with a unifying theory.[29]

Quantitative analysis of the property prices frequently are found to be less than satisfactory. An often-cited reason for failure of theory and reality is the existence of "housing price bubble". Yet the recent researche finds that the "bubble" is not an attractive explanation. Santos and Woodford (1997), Montrucchio and Privileggi (2001), among others, show that for discrete time models with rational agents, the conditions for the existence of bubbles are very fragile.[30] Empirically, it is also difficult to establish the existence of bubbles. For instance, Driffill and Sola (1998) demonstrate that bubbles and switching processes are not easily distinguished. Chen (2001a) finds that a rational bubble model is unable to explain the movements in stock prices

[29] See Wang (2003) for a review of the related literature.
[30] See Loewenstein and Willard (2000) for the case of continuous trading.

and property prices in Taiwan. Thus, researchers either may need to either reject the rational expectation hypothesis, or proffer an alternative explanation.[31]

Another alleged explanation for housing price cyclicality and volatility is the structure of the residential lending market. Ortalo-Magne and Rady (1998) are perhaps the first to differentiate residential housing from other kinds of capital in a dynamic general equilibrium, overlapping-generations model.[32] Their work is built around the variable severity of

[31] See Hamilton and Whiteman (1985) for discussion on rational expectation and econometrics.
[32] For earlier related contributions, see Skinner (1989), Venti and Wise (1984, 1989), Sheiner and Weil (1992). For more elaborate models, see Li and Yao (2005) (dynamic partial equilibrium model) and Chambers, Garriga and Schlagenhauf (2005) (dynamic general equilibrium). See also Ben-Shahar (1998, 2004) for alternative approaches.

collateral constraints over the life cycle.[33] For instance, young agents do not own houses and an increase in the housing price would make it more difficult for them to buy. In contrast, homeowners, (old agents) benefit from housing prices increases through capital gain without altering their housing demand (or supply).[34] The case of "middle-aged" households is subtle. Some of the middle group may be waiting for the opportunity to "trade-up".[35] Other "middle aged" households may have already "moved up", and would possibly exchange for small units (i.e., trade down) to increase their available financial wealth for retirement consumption. Thus, even a temporary income shock can generate very rich dynamics in such an endowment economy. Ortalo-Magne and Rady (1998, 1999, 2003a, b) extend this framework to explain the interactive dynamics among housing prices,[36] housing transactions, demographic change, income distribution changes and aggregate economic activity.

These theoretical analyses are buttressed by empirical research. The significant interactions between the collateral value and the aggregate economic activities are also confirmed by a number of case studies for

[33] See Bardhan et. al. (2003) for the case of Singapore, which is consistent with the prediction of Ortalo-Magne and Rady's model. See also Ortalo-Magne and Rady (2002a, b).
[34] See Davidoff (2004) for evidence that the elders indeed de-accumulate the housing stock by reducing maintenance.
[35] Lusardi, Cossa and Krupka (2001) provide evidence that many young parents have little net worth.
[36] As a matter of fact, Ortalo-Magne and Rady (1998) find that the price of "houses" (large units) relative to "flats" (small units) vary systematically over the business cycle.

residential price cycles.[37] Black, de Meza and Jeffreys (1996) find that for the United Kingdom, a 10% rise in net housing equity would increase the number of new businesses by 5%. Using micro data for Japan, Gan (2003) confirms the intuition that losses in collateral value significantly reduce investments, and forces firms to rely more upon internal funds to finance investment.

Collateral is recognized as playing an important role as a determinant for "financial crises." Mera and Renaud (2000), show a clear interrelationship between and among real estate collateral values and aggregate economic activity.[38]

The collateral role of housing may have important implications for asset pricing.[39] Those households with significant mortgage debt may need to adjust non-durable consumption when confronted by a negative, unanticipated economic shock the ("lock-in" effect).[40] Chetty and Szeidl (2004), Cocco, Gomes and Maenhout (2002), Flavin and Nakagawa (2004),

[37] For instance, see Chen and Wang (2003) for the case of Taiwan, Edelstein and Lum (2003) for Singapore, Leung, Lau and Leong (2002), Ho and Wong (2003), Leung and Feng (2003) for Hong Kong, Liu and Shen (2003) for China, Ortalo-Magne and Rady (2003a) for England, Seko (2003) for Japan, and Kim (2003) for the case of Korea.
[38] There are alternative theories for financial crises. Among others, see Burnside, Eichenbaum and Rebelo (2001) and the references therein.
[39] Berkovec and Fullerton (1989, 1992) build general equilibrium models for the housing and portfolio choice.
[40] See Davidoff (2003) for empirical evidence.

Gomes and Michaelides (2004), Kwok (2003), Piazzesi, Schneider and Tuzel (2003), Piazzesi and Schneider (2004), among others, develop models that demonstrate that collateral and portfolio effects are closely interrelated and affect asset price volatility.

5. "Long Cycles" in Housing

Empirical research repeatedly documents "long cycles" in the real property market. For instance, Wheaton (1987) finds that the cycles of office vacancy and office development in the U.S. are approximately 10 years. Ball, Lizieri and MacGregor (1998) show that new commercial property cycles have a duration of 10 years, and are independent of the business cycle in the United Kingdom. Employing the Kalman Filter technique and cross-country data, Ball, Morrison and Wood (1996, 1999), discover significant long cycles of new construction, with periodicity of 20-30 years (so-called "Kuznets cycles") in both residential and non-residential real estate markets.[41]

[41] There is a large literature on "long swings" or "long cycles" or "Kuznets cycles". See Kelley (1969) for a literature review. Adelman (1965) claims that "long cycles" do not exist. However, Klotz and Neal (1973) verify the existence of "long cycles" with spectral and cross-spectral analysis.

The NBER monograph by Gottlieb (1976), is perhaps the most systematic analysis of the cycles in the real property market. . Adopting the Burns and Mitchell methodology, Gottlieb, investigating more than 100 real estate related time series from different cities in different countries,finds that local building cycles exhibit the mean periodicity of 19.7 years, and a mean standard deviation of 5.0 years; National building cycles are similar,[42] and local, regional and national cycles typically move together. The periodicity of housing cycles may be significantly longer than typical business cycles, and amplitudes are larger than those of the business cycle. Vacancy rates also display dramatic cyclical movements. Interestingly, in the Gottlieb micro data, vacancy rates in different communities at different time periods are similar. They tend to "lead" the new building cycle. All these empirical regularities demand an explanation and the next section will provide a quick review on that.

[42] The mean periodicity is 19.0 years and a mean deviation is 4.4 years.
[43] This general finding can be traced back to Conklin (1935), Derksen (1940). See also Dokko et. al. (1999) for more discussion.

5.1. Why building cycles exist?

Why does new building displays dramatic cyclical behavior? Many explanations have been proposed. For instance, it has been suggested that the change of construction costs over time leads to the fluctuations of new building. However, this explanation is not consistent with the evidence. The changes of new buildings seem to be much more in line with the change in supply and vacancy than changes in cost.[43] Therefore, the question is: what changes the supply and vacancy? For England, Lewis (1965) examines housing cycles between 1700- 1950, and finds that the changes in population, credit, and shocks (such as wars and natural disasters) are the driving forces behind cycles. For the United States, Campbell (1963) shows that it is the "swings" or "cycles" in population that lead to "swings" in housing starts from 1890- 1960.[44]

An alternative explanation for real estate cycles hinges upon the. strategic activities among real estate developers. The decision for constructing new buildings is an option, since the landowner can always leave the land idle for the current period and develop it later. Once the real estate development project starts, it is costly to terminate or to reverse. Also, the value of a development is not independent of other developments nearby.

[44] See also Wickens (1941).

Clearly, combining the option feature of real estate development with the strategic interactions of different developers is a difficult task. Early attempts to model this complex behavior have been conducted by, among others, Wang and Zhou (2000), Wang et. al. (2000).[45] These models are technically involved and partial equilibrium in nature. Much remains to be devised to reconcile the "strategic theory of cycles" with the empirical realities of long housing cycles.

5.2 City and housing

This section will discuss briefly the relationship between the urban city and the housing market, and the need for pioneering research. According to Bogart (1998), the city is "a spatial concentration of a large number of people. The fundamental characteristic of a city is its density."[46] Fundamental research on the relationship between city for and structure and housing is needed for several reasons. First, there is an increasing tendency for both population and economic activities to concentrate in cities; the world is becoming more urban. Much of housing market fluctuations may

[45] See also Downing and Wallace (2002a, b), Lai (2003), Lai, Wang and Zhou (2004).
[46] There is a large literature on agglomeration, which is reviewed by Wang (2003), among others. There is a related literature on the spatial structure of cities, surveyed by Anas, Arnott and Small (1998). For some recent development on the structure of cities, see Lucas (2001), Lucas and Rossi-Hansberg (2002), Rossi-Hansberg (2004), among others.

actually emanate from fluctuations in urban areas.[47] Thus, understanding urban city fluctuations may enhance our understanding of the relationship between the macroeconomy and the housing market.

Second, the correlation between housing prices and city output is much lower than that for the national economy, suggesting that there may be significant reallocations of economic activities and resource (including both capital and labor) across cities over time; and the relative housing prices across cities may have changed significantly as well. Alternatively, some cities "substitute" for other cities. Torto Wheaton Research (2002) presents evidence that the real price of housing in Amsterdam over the 300 years displays no trend, although it has experienced dramatic volatility. Perhaps when the Amsterdam real housing price rises above a certain threshold, businesses and households move to other cities. If this were the case, we would observe a relationship between the growth and decline of cities, and housing prices. This conjecture, though often mentioned in the media, has yet to be irrefutably and scientifically established.

Third, the micro-structure and non-market interactions, such as the neighborhood effects, may have important impacts upon household

[47] For instance, see Chatterjee (2003), Rossi-Hansberg and Wright (2004).

ownership behavior.[48] How "non-market interactions" interact with the aggregate economic activities is an under-explored economic phenomena.

Perhaps macro-housing market fluctuations (prices, new building, vacancy, etc.) may be explained better by aggregating micro-behavior within cities.

5.3 New research frontiers for the macro-housing nexus

This paper selectively reviews the existing literature about the nexus of the the macroeconomy and the housing market. It examines the relationship between and among housing and taxation, housing cycles and business cycles; the impacts of collateral upon housing and its "long cycles" for the housing market, and housing markets and urban structure. There are many other interesting research topics about the nexus of the macroeconomics and housing. Among these, two questions deserve special highlighting. How will the housing market change in the era of globalization and financial integration?[49] Second, how will housing market performance and the housing-macro finance system and capital markets change in the

[48] Among others, see Glaeser (2000), Glaeser and Gyourko (2001), Glaeser and Kahn (2003), Glaeser and Scheinkman (2003), Ioannides and Zabel (2000), and Ioannides (2003).
[49] For instance, see Leung (2001), Bardhan, Edelstein and Leung (2003), Bardhan, Edelstein and Tsang (2004) for some preliminary attempts.
[50] See Jeske and Krueger (2004).

future, especially in developing economies? How has the integration of the housing finance system changed the risk-sharing across the economy?[50] Both of these issues deserve special research attention in the future.

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