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摘要

我們使用動態的一般均衡來描述不動產價格的動態以及其對人們福利的影響。我們證明，即使沒有任何市場摩擦的形式（訊息不對稱、借貸限制、調節成本與建屋期間的延遲）、不確定性、政府管制（稅制的改變）、以及泡沫的情況下，均衡不動產價格仍可能產生各式各樣的“循環”。均衡價格可能上下擺動直到收斂，也可能不存在 steady state。也就是說，不動產價格的波動本身具有內在的傳遞機制。不動產價格的動態取決於人們效用函數裡某些參數的組合，尤其是折現率和跨期替代率。而且，即使不動產價格的波動不影響總生產，不同世代消費者的福利水準可能會有差異，而此差異源自各世代出生之時不動產價格的水準。

關鍵詞

不動產價格，擺動收斂，跨期替代，習慣形成

Abstract

The cyclical and volatility of property prices have been extensively documented. Many explanations have been proposed. This paper builds a simple dynamic general equilibrium model in which these often cited

channels are assumed away. Instead, the role of intertemporal elasticity of substitution is highlighted. In this model, the land price exhibits either unstable dynamics or cycles. Moreover, the land price always fluctuates more than the aggregate output. The welfare of different cohorts depends crucially on the land price at the period they were born. The implications of these results are then discussed.

Key words

land price cycle, oscillatory convergence, intertemporal substitution, habit formation, catching up with the Joneses

計畫緣由與目的

Cyclical and volatility of property and land prices have been extensively documented. For instance, Borio et al. (1994) and Renaud (1997) shows that there was a global real estate cycle among the OECD countries in between 1985 to 1994. Employing the Kalmer Filter and data of more than a century, Ball et al. (1996) find very significant and long period cycles in non-residential property market. Ball and Wood (1999) find similar results for the residential

property market. Moreover, Ortalo-Magne and Rady (1998) show that the real housing prices in the US and UK fluctuate more than the real GDP.

Attempts have been made to explain the boom-bust cycles of property and land prices. There is a large literature on speculation and bubbles in the housing market as well as other asset prices such as stock prices (see for example, Case and Shiller (1989), Abraham and Hendershott (1995), Sato (1995), Ito and Iwaisako (1996), Levin and Wright (1997), and Muellbauer and Murphy (1997)). Many of these studies found evidence of speculative behavior to be a significant factor causing wide swings in property or land prices.

On the other hand, much research has focused on how house prices relate to market fundamentals. Stein (1995) rationalizes the appear-to-be excess house price volatility by changes in fundamentals. Given a down payment requirement and the initial distribution of household debt levels, the model demonstrates that there is a potential for multiple equilibria, and that a small change in fundamentals can generate within-equilibrium multiplier effects, leading to large, discontinuous jumps in prices. Kiyotaki and Moore (1997), Ortalo-Magne and Rady (1998), Chen (2001), among others, also generate the cyclical behavior of asset (land) prices. The crucial element of their results is that when borrowers are credit constrained, the demand for productive asset (and

collateral) is an increasing function of its price. For empirical evidence, Chinloy (1996) finds that the real estate cycles depend on the lag in construction, planning, and entitlement, and also the lumpy cost of vacancy and releasing. Leung et. al. (2002) find that the short-term fluctuations of housing prices tend to be induced by the "down payment effect," while the business cycle component of the fluctuations is caused by informational incompleteness. Based on survey data and official data, Dokko et. al. (1999), Edelstein and Paul (2000), Edelstein et. al. (2001) also find that the fluctuations of land price can be largely explained by the change in expectations, as well as changes of income generated by the corresponding land.

In this paper we study the dynamics of real estate prices and its welfare implications in an overlapping generations model. There are several reasons to employ an overlapping generations model. When the model is interpreted literally, it helps to explain the "long cycles" identified by the empirical literature. Alternatively, it can be interpreted as "waves of myopic investors". Moreover, overlapping generations models also generate transactions of land and real estate across cohorts naturally, which will prove to be an important mechanism of our results here.

On the other hand, recent research seems to suggest that allowing for time-non-separable utility functions can

significantly improve the ability for the model to match the data (Constantinides (1990), Boldrin, Christiano and Fisher (1997). Following this line of thought, we extend the analysis to different types of time-non-separable utility functions. There are at least two types of time-non-separable utility function widely used in the literature. In the terminology of Carroll et al. (1997), one is "inward-looking" and the other is "outward-looking." In the former, the second period consumption is discounted by the amount of her own consumption in the first period ("habit formation"), whereas under the latter case, it is discounted by the average consumption in the first period ("catching up with the Joneses"). Under the outward-looking case, the agent fails to take into consideration that her consumption decision would have an impact to the aggregate/average consumption. Although at the equilibrium, the individual consumption coincides the average consumption level, the dynamics displayed and the welfare implication can be different, as demonstrated by Carroll et al. (1997). Since it is empirically difficult to differentiate the "inward-looking" from the "outward-looking" preference, this paper considers both types for completeness.

結果與討論

Applying an overlapping generations model to the study of the land (real estate) market is not new,

however, this paper differs from the previous literature in the following aspects. First, land serves as an input for production (from the aggregate perspective) and also an investment vehicle (from an individual perspective). Second, the model is intentionally abstracted from many features which are considered in the previous studies that have been proposed to explain the cyclicity of land prices. They include the market frictions (informational asymmetry, collateral constraints, adjustment costs, and construction lag), uncertainty (persistent stochastic shocks), government intervention (taxation and policy changes), and bubbles. This paper complements the literature by showing that even without these important features, the equilibrium land price could still display "cycles". It means that the land price oscillates above and below the steady state value, and even may not restore to the steady state values in some cases. In particular, land prices exhibit cycles even when the aggregate output, wage and rental are constant over time. That says, the land price in this model fluctuates more than the aggregate output, as found in Ortalo-Magne and Rady (1998). Specifically, the equilibrium land price is either constant over time, or it exhibits oscillatory dynamics. In fact, the path of transitional dynamics can be

indetermine, even when the steady state is unique. The land price cycles are, in a sense, intrinsic.

Finally, we find that the nature of the dynamics of land prices depend crucially on certain combinations of preference parameters, such as the rate of time preference and the elasticity of intertemporal substitution. In particular, we find that, holding other parameter constant, there is a wider range of parameters which generates cyclical land price dynamics with multiplicative habit formation. Virtually any value of the rate of time preference (θ) can generate oscillatory convergence, provided that a suitable value of intertemporal elasticity of substitution ($1/\sigma$) is chosen. The restriction on σ , on the other hand, has not be relaxed. On the other hand, subtractive habit formation is even worse than the baseline case.

Furthermore, quantitative results of catching-up-with-Joneses preference are similar to the case of habit formation. The multiplicative case produces a wider region of parameter combinations that deliver oscillatory land prices, while the subtractive is worse than the baseline case in terms of generating cyclical dynamics.

In addition, the model is constructed in a way that, even when the aggregate output in the model is unaffected by the

fluctuations of the land price, the welfare of different cohorts varies and depends on the price of the land at the period they were born.

計畫成果自評

This paper illustrates that there is an intrinsic tendency to generate land price cycle in an overlapping generations model, even when factors such as capital market imperfection, informational incompleteness, non-convexity, etc. are abstracted away. It holds with typical time-separable utility function with a wide range of parameter values, and even wider range with multiplicative time-non-separable preference. It seems to suggest that land price cycle is inevitable in a simple general equilibrium OLG model, given a large class of utility functions and a wide spectrum of parameter combinations.

This research can be extended in several directions, such as the introduction of physical capital (for instance, see Mountford, 2002), the consideration of adding a sector which is less land-intensive (for instance, see Laitner, 2000), or including residential housing (for instance, see Leung, forthcoming). They will enable us to have a deeper understanding of the interactions of cyclical behavior in different sectors of the economy.

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