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Two types of Minsky cycles: investment-corporate debt cycles and speculative house price cycles

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Abstract

One of Tom Palley's many contributions has been on developing Minsky's theory of financial cycles and propose empirical tests for cycles with a central role for household debt (Palley 1994, 2011). Minsky developed a rich theoretical argument, but there is no canonical Minsky model. One feature that sets Minsky's approach apart from mainstream models of financial instability is that it features endogenous cycles. Such models need an overshooting and a dampening force. Most of Minsky's original writings were centered on business debt, with investment as the overshooting and business debt as the dampening force. In the Global Financial Crisis, however, household debt played the key role. This paper suggests that Minksy models can be grouped along two axes: whether the core cycle mechanisms is a real expenditures-debt interaction cycle or a speculative asset price cycle; and whether the indebted sector is businesses or households. Thus there are types of Minsky models. After reviewing empirical evidence the paper concludes that two are empirically particularly relevant: first, corporate debt seems to follow business investment-business debt interaction cycle; second for household debt speculative house price dynamics are the key driver and momentum trader-fundamentalist models help to understand these housing cycles.

Keywords: financial cycles, Minsky models, household debt, house price cycles

JEL codes: E11, E12, E5, E7, G01

Introduction

In 1994 Tom Palley published a paper entitled "Debt, aggregate demand, and the business cycle: an analysis in the spirit of Kaldor and Minsky". In that paper he proposes a Minskyan model where household debt plays a critical role, and it presents empirical evidence for the existence of oscillations. This paper was in many ways ahead of its times and testifies to Tom's sharp analytical mind. First, it incorporated household debt in a Minsky model. In the following two decades household debt would become a prominent topic in post-Keynesian macroeconomics. Second, it offered a rigorous empirical application of this Minskyan model. While there is now a rich theoretical literature on Minsky models there is still a very limited number of empirical studies. The paper became incorporated in Tom's 2013 book *Financialisation. The economics of finance capital domination*, where he presents distinct Minskyan models for business debt and household debt and also the distinct role of asset price dynamics.

This paper will pick up on these themes that Tom raised many years ago, though it may take these in somewhat different direction. The main contribution of the paper is to establish a grouping of four types of Minsky models and, after reviewing the empirical literature, concluding that there are two rather distinct sets of mechanisms working in business debt cycles and in household debt cycles and try to substantiate this claim through a review of the empirical literature. The business debt cycles,

are investment-business debt cycles, where real expenditures lead to rising debt levels and debt has a dampening effect on expenditures. The second, household debt cycles, differ in that speculative asset price dynamics, namely house price cycles are key and household debt only plays a secondary role in this cycle. These cycles are better understood as momentum trader-fundamentalist cycles. Expectations of capital gains play a key role and debt is important for the transmission of this financial cycle to the real sector, but not for the cycle itself.

The argument is the following. Minsky developed a rich argument, but there is no canonical Minsky model (unlike the other canonical model in heterodox business cycle theory, the Goodwin model). A model that generates endogenous cycles at the minimum needs an overshooting and a dampening force. There are different aspect of financial instability one could focus on in a Minskyan analysis: the mechanisms of the boom, the bust with its amplifying mechanisms and relation between financial and real factors, for example. I choose to focus on the endogeneity of the cycles. This is both for consistency of analysis of Minsky models as Minsky himself emphasized the endogeneity of the boom and bust, but also because endogenous cycles are an important distinguishing feature of Minskyan (or more generally heterodox macro) models that sets them apart from more mainstream analyses of financial instability, which discuss amplifying mechanisms of an exogenous shocks that may lead to a boom the subsequently a bust, but ultimately explain financial crises as due to exogenous shocks rather than as systemic features of monetary production economies.

Nikolaidi and Stockhammer (2017), in a survey of the theoretical literature on Minsky models identify no fewer than seven families of Minsky models. This paper suggests two axes to organize these models into four groups. The first dimension distinguishes between models where the underlying cycle mechanism is a real expenditure-debt interaction; the second dimension distinguishes between models where business debt is at the core and those where household debt is. Among the result four theoretical combinations, we argue, two are empirically particularly relevant.

There is a notable imbalance in research on Minsky models: while there is a rich (and rapidly growing) theoretical literature, there is a dearth of empirical studies. To be clear, there are numerous applied works that take inspiration from Minsky and document some Minskyan mechanism, namely the negative effect of business debt on investment (e.g. Fazzari et al 1998), but there is only a handful of rigorous works that provide evidence of Minsky *cycles*. For that to mechanisms need to be at work: like the blades of scissor, two arms are necessary to generate endogenous cycles.

Business debt cycles often seem to emerge from investment-business debt interactions. Minsky's own analyses were centered on business debt, with investment as the overshooting and business debt as the dampening force. Investment grows dynamically during the boom, based on optimistic expectation of future income streams, but it also leads to growing debt burdens and thus to financial fragility. There is an extensive theoretical literature on these models now and also a number of partial empirical models (Fazzari et al 1998, Nishi 2018), which analyse one arm of the cycle mechanism, in particular the negative effect of business debt on investment. Stockhammer et al (2019) provide evidence for these cycles for (some advanced economies).[1]

[1] This paper focuses on closed (advanced) economies. Kohler and Stockhammer (2023) present evidence on GDP-exchange rate cycles for (some) developing countries. Their underlying model is closely related to what this paper discusses as real expenditures-debt models, but the debt in foreign exchange denominated, which give the exchange rate a key role in the cycle.

In the Global Financial Crisis (GFC), however, household debt played the key role. Thus there has been a growing interest in Minskyan models with household debt. The Minskyan argument does not fully carry over to households: households can have 'overshooting' expenditures, but these cannot be linked to expected future income streams as households typically do not hold many of these assets. The most important asset they hold is real estate, which (unless houses are rented) do not generate income streams, but they may come with expected capital gains. We thus suggest that household debt cycles are best described as arising from speculative asset price dynamics. Such models are most elaborated in behavioural economics with heterogenous agents (Beja and Goldman 1980, Brock and Hommes 1998, Bofinger et al 2013). They include fundamentalists and chartists (or noise traders) at the core. In these models the overshooting force is the momentum traders and the stabilizing force is the fundamentalists. It is an interesting question how 'Minskyan' such models are. We argue they should also be regarded as Minskyan once they are inserted in macro model where debt and net worth feed back onto expenditure decisions and the leverage ratio is considered part of the fundamentals. Ryoo (2016) offers a such a theoretical model. The house price cycle are a key component of financial cycles (Claessens et al 2011, Drehmann et al 2012) and have a powerful impact on household debt (Stockhammer and Wildauer (2018), will thus plays key role.

The paper is structured as follows. Section 2 will discuss families of Minsky models theoretically. Section 3 will discuss evidence for business debt-investment cycles. Section 4 will discuss how house price cycles arise and how they household debt and GDP cycles, and will also critically evaluate emulative consumption as a potential driver of household debt. Section 4 will conclude.

Varieties of Minsky models

Hyman Minsky's (1975, 1985) analyses offer a rich discussion of the process of financial instability and of the emergence of endogenous financial cycles, but Minsky did not provide a canonical model. It is also fair to say that there is a number of loose ends. Unlike the neo-Marxist Goodwin model or the multiplier-accelerator model there is thus no baseline model from which to develop further ideas. Moreover, researchers building on Minsky have used diverse modelling strategies ranging from small scale macro model, fully fledged SFC models to heterogenous agents modelling. So let us begin with stating some core features of Minsky's analysis. A first feature is the endogenous change from periods of tranquillity (economic growth and stable financial markets) to speculative booms. It is the very experience of the early phase of the boom that gives rise to changes in risk perceptions that will lead to more risky behaviour. This has 'real' as well as 'financial' aspects. During the boom firms will investment more. Investing requires finance, thus the boom implies that firms have to take out loans. Thus debt-to-income ratios will increase during the boom and balance sheet will become more fragile.[2] This requires risk perceptions of firms as well as of the banks that lend to them to change. At the core of Minsky's original argument is business debt as the source in instability. But there is also a financial channel: during the boom, as risk perceptions change, the liquidity premium and the spread between safe and risky assets will decline. Financial investors will shift their portfolio towards riskier assets. The economic boom will be accompanied by a boom in asset prices as risk perceptions change and the economic outlook (expectations) improve.

[2] We set aside the matter that the paradox of saving may result in macroeconomically self-financing investment as pointed out be Lavoie and Seccareccia (2001). This is clearly a theoretical possibility, but it critically depends on the assumption of a fixed marginal propensity to consume by households. For firms to become more indebted during the boom household need to increase their saving. Thus a decreasing marginal propensity to consume is a necessary condition for Minskyan pro-cyclical debt ratio of business to arise.

It is not fully clear in Minsky what constitutes the turning point, at various points he highlights rising interest rates, which could be due the central bank reacting to inflationary pressures or commercial banks raising interest rates on loans as the get worried about the leverage of their costumers (Minsky 1975, 1985). While in some ways this may not be too important, it does beg some questions as to the nature of the cycle: if it is central banks, then policy decisions (as opposed to private sectors decisions) are key; if it is commercial banks then this is private-sector endogenous cycle mechanism. Either way, once the boom has given way to a bust, things unravel quickly, again with real as well as financial channels. Firms will reduce spending, which creates knock on effects through the multiplier: other firms will see their sales decline and may struggle to service their debts. On the financial side, the correction of risk perceptions will affect the interest rate structure and, as financial investors shift from high-yield to safe assets, asset prices (for risky assets) will fall. This will lead to fire sales (synchronized sales of assets below their medium-term value as investor scramble for liquidity). Asset prices will collapse. In response to their balance sheet problems banks will curtail lending, which will lead further tightening of spending. Minsky emphasises that in this situation only the public sector can take counter position when private sectors seek to deleverage and prevent a full collapse (e.g. Koo 2011). Big government should run large deficits to stabilise demand, which will also prevent the cascades of bankruptcies. In practice a bastardized version[3] of this is what has happened in many advanced economies (Tooze 2018). But even if it occurs, it will not be the end of the story. Firms (and households) will now have large debt burdens and a more pessimistic outlook of the future. They will try to deleverage, which leads to slow recovery. Thus the 'secular stagnation' that followed the Global Financial Crisis would be no surprise to Minsky.

Since the mid 1980s there has been a growing number of contributions that seek to formalise Minsky's analysis of endogenous financial cycles. Nikolaidi and Stockhammer (2017) provide a survey of these and distinguish no fewer than seven families of Minsky models depending on the centrality of asset prices, whether goods markets are stable, how interest rates are determined. We will focus on two axes to group the models: first, on whether the core cycle mechanism rests on the interaction of real expenditures and debt or on asset prices; second on whether the indebted sector is (non-financial) business of households.

To appreciate this let us review the mathematical requirements of endogenous cycles. By these we mean models that generate oscillations (at this point it is a secondary matter whether these are damped oscillations or limit cycles).[4] In a two-dimensional system oscillations arise when the root of the dynamical system has complex eigenvalues.

We can depict a dynamic system consisting of two variables, x and y,

$$\dot{x} = f(x, y),$$

$$\dot{y} = g(x, y),$$

$$J = \begin{bmatrix} J_{11} & J_{12} \\ J_{21} & J_{22} \end{bmatrix} = \begin{bmatrix} f_x & f_y \\ g_x & g_y \end{bmatrix},$$

where the partial derivatives are evaluated at the equilibrium values of x and y.

[3] This is form of bastard Keynesianism as its overall aim seems to have been saving the financial sector rather than full employment.

[4] Limit cycles can arise in models with non-linearities. Such non-linearities can arise quite naturally in Minsky models, but they are not the focus of this paper as they are of secondary importance for its focus, which is on the different types of cycles for business debt on the one hand and household debt and speculative house price cycles on the other.

The following condition has to hold for oscillations to arise:

$$(J_{11} - J_{22})^2 + 4J_{21}J_{12} < 0.$$

For oscillations, a necessary condition is that the J_{21} and J_{12}, i.e. the off diagonal elements of the Jacobian, have opposite signs. The intuitive interpretation is that there needs to be an overshooting (positive) and a stabilising (negative) force.

This simple structure will help us understand the main families. Table 1 below groups models according to the cycle mechanism and the indebted sector. The first cell are models that the overshooting force is investment and the dampening force is the debt-to-income ratio. Asada (2001) is an example of this, Dafermos (2019) another one. There is variation in these models, for example as to whether the interest rate is determined by the central bank (as in Fazzari et al) or as in Asada (2001) by the debt-to-income ratio. In some of these models, such as in Dafermos changes in the desired debt-to-income ratios play a critical role, in Nikolaidi (2014) there is credit rationing, which most other models in this group don't have. But what all these share, is that businesses are the key sector that gets indebted during the boom.

Table 1. Four families of Minsky models

		Cycle mechanism	
		Expenditure-debt cycles	**Speculative asset price cycles**
Indebted sector	**Businesses**	[1] Business investment-business debt cycles (e.g. Asada 2001)	[2] Share price-cycles
	Households	[3] Consumption-household debt cycles (e.g. Kapeller and Schutz 2014)	[4] House price cycles (e.g. Ryoo 2016)

In the second main family of Minsky cycle models speculative asset price cycles take the centre role. These types of models overlap with behavioural economics models that are variably referred to as momentum trader models or noise trader models. Here the overshooting and stabilising forces lie in the different investment strategies (or different ways of forming expectations). In the simplest versions there are fundamentalist and momentum traders (also called chartists or noise traders). The fundamentalists use an external anchor for the calculation of the proper asset price. As a consequence, they will sell assets if, other things (including fundamentals) equal, asset prices rise. In contrast the momentum traders form extrapolative expectations and expect further price rises and thus will want to buy if there is an increase in asset prices. Under some conditions the interaction of fundamentalists and momentum traders will give rise to oscillations (e.g. Beja and Goldman 1980, de Grauwe and Macchiarelli 2015). Many of the behavioural versions of these models involve strategy switching, which creates non-linearities that can give rise to limit cycles (Brock and Hommes 1998). These models can be partial models of a financial market (as many behavioural finance models are),

but they can also be inserted into a macroeconomic model with business or household debt, in which case they take on a Minskyan character.

There is a handful of models where households get indebted rather than businesses with consumption expenditures constituting the overshooting force (cell 3). Applying the Minsky model to households is not straightforward however: unlike businesses households don't usually invest in income generating assets, thus motivating the overshooting mechanism for household expenditures is not straightforward. In Kapeller and Schuetz (2014) emulative consumption plays the overshooting mechanism. Households get indebted during the boom when they emulate expenditures of richer households. Thus the indebtedness of households is ultimately due consumer debt.

Cell 2 has asset price cycles with businesses getting indebted. This is a momentum trader cycle on the stock exchange and businesses whose investment responds to share prices (via a form of Tobin's Q). Here the financial cycles get translated into real cycles as business invest and get indebted. Ryoo (2013) is an example of this.

Cell 4 depicts speculative asset price cycles with households getting indebted. The relevant asset price could be share prices, but certainly since the dot com bubble (a major stock market crash with only weak effects on consumption) and the GFC, real estate prices are the main candidate for driving household debt. Ryoo (2016) is most explicit in developing such a model with house price cycles and household debt. Here a speculative housing cycle impacts households' consumption and residential investment, which leads to cycles in real variables.

Thus theoretically four groups are possible.[5] In the remaining sections we will argue that among these two have been empirically particularly relevant: investment-business debt cycles and speculative house price cycles that lead to household debt cycles.

Empirical findings on financial cycles and investment-business debt cycles

While there is an extensive theoretical literature on Minsky models, the number of empirical studies that document Minsky cycles is rather limited. We will thus first discuss the empirical literature coming from the mainstream.

Since the global financial crisis there is a growing mainstream literature on financial cycles, several of them also reference Minsky, but typically without discussing the post-Keynesian literature on Minsky models. There is a notable tension between the theoretical and empirical work on cycles in this traditio. Theoretically they are at best ambiguous as to whether observed cycles are endogenous or

[5] In large SFC models these (and other) mechanisms can get combined (Zezza 2008; Caverzasi and Godin 2015). Zezza (2008) offers a stock-flow consistent model with a housing market. Poor households can buy or rent houses from rich households. Poor households can also take out debt to finance consumption based on the emulation approach discussed above. Rich households invest in houses based on expected capital gains, forming extrapolative expectations. During house price booms, the consumption of rich households increases through wealth effects. The model exhibits cycles in GDP as well as in house prices. These are presumably driven the expectational dynamics that determine a range of variables As with many SFC models it is not fully clear which mechanism drives business cycles and housing cycles. Caverzasi and Godin (2015) offer a related SFC model that features a housing sector prominently but is aimed at illustrating mechanisms of the subprime boom and bust. It features consumption expenditures that include emulative consumption as well as wealth effects and consumption our of new borrowing. Household borrowing is determined by banks' credit supply, which is based on household leverage ratio. House prices are determined by the portfolio decisions of rentiers. The model exhibits boom-bust responses in response to an increase in securitization, but does not feature persistent cyclical dynamics.

merely, in a New Keynesian fashion, financial booms that are due to exogenous shocks and amplified by the financial accelerator (for example Bernanke et al 2001, Eggertson and Krugman 2012). On the other hand, the empirical studies often use filtering technique and turning point analyses that document regular financial cycles (Claessens et al 2011, Drehmann et al., 2012; Borio, 2014; Aikman et al., 2015; Strohsal et al., 2015). They tend to identify credit growth and real estate prices as key variables in the financial cycle. Mainstream studies have also documented the crises with large levels of household debt lead to more severe recession and that increases in household debt have an expansionary effect in the short run but negative growth effects over longer time periods (Mian et al 2017, Jorda et al 2016).

The empirical estimations of Minsky models are still thinly spread. As explained above, endogenous cycles require the interaction of an overshooting and a stabilizing mechanism. Thus a full Minsky model needs two legs. There is a number of studies that documents one of these mechanisms for the business investment-business debt cycle. For example, Fazzari et al., (1988) and Ndikumana, (1999) document a negative effect of leverage ratios on business investment with firm level data for the USA and Nishi (2018) present evidence for Japan. However, both of these only provide support for only one of the two arms of the Minsky cycles. Greenwood-Nimmo and Tarassow (2016) estimate a policy-oriented Minsky model, using a sign-restricted vector autoregressive (VAR) model with up to eight variables, which include business debt and GDP, for the USA. They examine the implications of monetary and macro-prudential shocks for aggregate demand and financial fragility. They do not explicitly test for endogenous cycles, but the reported impulse responses are suggestive of cycles.

Stockhammer et al (2019) investigate different version of Minskyian 2D systems empirically for six advanced economies. Each of the reduced form systems of simultaneous equations consist of a real variable and a financial variable interact with each other. These business debt and GDP, and household debt and GDP. They find evidence for financial-real interactions at high frequencies between GDP and interest rate and a low frequency between GDP and business debt, but no evidence for GDP-household debt cycles. The signs (a positive effect of investment on debt) and a negative sign of debt on investment hold in six out of seven countries, though levels of statistical significance vary. The implied length of these cycles is around 11 years, i.e. longer than a regular business cycle.[6] Stockhammer and Gouzoulis (2023) use the same theoretical frame with a marginally different estimation strategy and perform a similar exercise with historical macroeconomic data for the USA (1889-2014). They estimate a Vector Autoregressive Moving Average model to investigate whether business cycles are driven by corporate debt or by mortgage debt. They find that the USA economy has experienced corporate debt-driven Minsky cycles, but not for mortgage debt-driven Minsky cycles.

While the theoretical literature is more heavily skewed towards the business investment-business debt interaction cycles there are more empirical studies on Minsky cycles with household debt. Palley (1994) and Kim (2013; 2016) estimate VAR and vector error correction (VEC) models with GDP and household debt and report positive short-run feedback effects and negative long-run feedback effects of household debt on output, for the USA. They do not explicitly test for endogenous cycles.

[6] They also present results for interest rate-GDP cycles, but these are less clearly Minskyan as they can also be derived from a standard ISLM model with adjustment lags. However, these cycles are distinct: the implied frequency of the interest-GDP cycles is five years, i.e. closer to regular business cycles and different from the debt cycles.

Similar to the Minskyan business investment-business debt cycles, there is an asymmetry between theoretical and empirical research on momentum trader models. Most of these are pure financial market models and most of the research if focused on explaining stock market prices. Chiarella et al (2014) present results for momentum trader model with strategy switching for the US stock market with monthly data. Hommes and van't Veld (2017) estimate a heterogenous agent model for the US stock market and find that allowing for heterogeonous agents (fundamentalists and momentum traders) and switching improves the fit. These models typically only cover financial markets and do not consider debt.

Overall, there is thus evidence for some countries for corporate debt – GDP cycles and for the USA for long periods, which lends empirical support for cycle models with interaction between real economy and business debt (Asada 2001; Fazzari et al. 2008). While there is evidence that household debt impacts GDP (and consumption in particular), household debt cycles do not seem to follow the debt-GDP interaction pattern. While there is evidence for speculative cycles on share prices, since the dot com bust, which was a major stock market crash with a rather mild recession, few researchers have explored a speculative asset price cycle as driving business debt.

House price cycles and household debt

How do we reconcile the importance of household debt in the GFC on the one hand and the negative findings for household debt-GDP cycles? In the framework suggested above (Table 1) this suggests that the household debt cycles are not household debt-real expenditures cycles, but that changes in household debt should be understood as a side effect of house price cycles. The core cycle mechanism is one of speculative dynamics based on momentum trading strategies that interact with fundamentalist strategies. To elaborate this, we review evidence for house price cycles, for a link between house prices and household debt and we report evidence for momentum trader models in housing markets.

As discussed above Stockhammer et al (2019) fail to find evidence for household debt-GDP cycles for any of the seven countries investigated (for the 1970-2015 period). In particular the effect of household debt on GDP growth is positive, thus the interaction cycle lacks one key mechanism. This is further corroborated by Stockhammer and Gouzoulis (2023), who investigate a similar model for the USA with historical data (1889-2015) and use mortgage credit rather than household debt as the debt variable. They fail to find evidence for the mortgage debt-GDP cycles for the full period. Again, the effect of mortgage debt on GDP is positive and thus violates the necessary conditions for the debt-GDP cycles. The only sub-period where there is a negative effect of mortgage debt on GDP is in the 1889-1939 period, however, the discriminant is positive and thus does not support cycles either. Short, the observed cycles in household debt don't seem to be of the financial-real interaction type (cell 3 in Table 1).

This means that the emulative or conspicuous consumption model of household debt cycles are not supported. Given that these have been popular in heterodox macroeconomics recently (Kapeller and Schutz 2014, Behringer and van Treeck 2019, Setterfield and Kim 2020), it is worth exploring the matter further. The emulative consumption hypothesis argues that a household's consumption expenditures depend not only on their own income and wealth, but will be influenced by social comparisons. In particular they will observe and try to emulate the consumption pattern of peer groups. In a 'keeping up with the Joneses' version of this argument proposed by Frank et al (2014),

households will emulate the consumption of richer peers in their attempt to attain higher status. This argument has a certain intuitive appeal and has been incorporated in a variety of heterodox macroeconomic models (Kapeller and Schütz, 2014; Belabed et al., 2018). On important implication of these models is that increasing inequality will positively impact consumption expenditures.

Stockhammer and Wildauer (2018) investigate the determinants of household debt in a panel analysis for 13 OECD economies for the 1980-2011 period. They explore the house prices, income inequality, interest rates and credit market deregulation as explanatory factors. They report statistically significant results for house prices, interest rates and financial deregulation. Among these the economic impact from house prices is by far the largest. They use the Gini coefficient as well as top income shares as measures for income inequality and report mostly statistically insignificant results and several negative coefficients. Thus. inequality does not seem to be main driver of household debt.[7]

Thus, the prominence that emulative consumption has gained in some recent heterodox economics research is misguided if the aim is to explain the rise of household debt. Theoretically, this should not be too surprising. Emulative consumption is mostly a theory of consumption expenditures. Thus, it would mostly apply to consumer credit. However, most household debt is not consumer credit, but mortgage debt, i.e. related to housing transaction rather than to consumption. Moreover, as regards the explanation of household debt emulative consumption would explain the demand for credit, i.e. why households want to borrow, but not why banks would want to lend to households. To put it differently, while it is plausible that a household might want to consume more and take out a loan based on the consumption expenditures of their neighbours, it makes little sense for a bank to lend to finance a consumption behaviour that exceeds the income of the household – unless there are assets that serve as collateral. This brings us back to house prices as real estate is an excellent collateral.

There is an extensive literature documenting housing wealth effects in consumption e.g. Case et al (2003). While these are often framed as rational life-time utility maximisation, such an explanation is not necessary. Simple behavioural rules could anchor current consumption in current income as well as in wealth. An alternative explanation of cycles in household debt is thus that they are driven by house prices, which follow their own cycles. And there is ample evidence of house price cycles (Bracke 2013, Glaeser 2013,). Bracke (2013) in a study on 19 OECD economies for the period 1970s-2010 find average housing cycle length of about 11 years. Borio (2013) provides evidence for reoccurring financial cycles by means of a filtering techniques and establishes as one of its key features that it is most parsimoniously described in terms of credit and property prices and that it is longer than regular business cycles. Drehmann et al (2012) identify house price dynamics as one of the core elements of the medium-term financial cycle. Claessens et al (2011) find that credit and house prices cycles are highly synchronized in a study based on 21 advances economies for the period 1960-2007. Glaeser (2013), in a historical analysis based on different regions in the USA, argues that the recent housing boom has many historical precedents in US history.

As mentioned, most empirical momentum trader models analyse stock markets or foreign exchange markets. Gusella and Stockhammer (2021) test a momentum trader-fundamentalist model for house prices for the USA, UK, France and Germany for the period 1970-2017. The model is based on model of the Beja and Goldman (1980)-type with fixed shares of momentum traders and fundamentalists. They use a Kalman filter to identify the unobservable parameters for the share of momentum

[7] Stockhammer and Wildauer 2016) report similar panel results for consumption expenditures and fail to find positive effects of inequality on consumption expenditures.

traders and fundamentalists and for the respective adjustment parameters. They find that for the USA, UK and France suggest endogenous cycle (i.e. complex roots of the dynamic system). Their theoretical framing refers to Minskyan models, but the estimated model only covers the housing market, but does not analyse a full Minskyan macro model.

To wrap up, there is substantial evidence for house price cycles and for movements in household debt being driven by house prices. On the other hand, there is little macroeconomic evidence that emulative consumption and rising inequality have driven household debt. Data-driven analyses of financial cycles typically find a strong role of house prices in the financial cycle. Momentum trader models have rarely been applied to housing markets, but there is some suggestive evidence that momentum trader models are able to explain house price cycles. Thus, in terms of the classification proposed in Table 1, evidence is supportive of Minsky models with speculative asset price dynamics on housing markets (as in Ryoo 2016), however a full Minskyan model with momentum trading in housing in macroeconomic setting with mortgage debt and aggregate waits to be estimated.

Conclusion

The main argument of this paper has been that two distinct mechanisms lead to cycles in business debt on the one hand and in household debt on the other. Any theory of endogenous financial cycles requires an overshooting and a stabilizing force that interact such as to create persistent oscillations. We can distinguish two families of Minsky models, one centred on an expenditures-debt interaction. The classical example for this is an investment-business debt interaction. During the boom businesses become more optimistic, invest more (the overshooting force) and thereby increase their debt. This higher debt burden (the stabilizing force) eventually dampens investment growth. A second family of Minsky models is based on speculative asset price dynamics. Momentum traders (the overshooting force) develop a more optimistic outlook regarding capital gains during the boom leads. They extrapolate past asset price growth. On the other hand fundamentalists expect mean reversion in prices (based on their assessment in fundamentals) and thus constitute the stabilizing force. Their weak or negative demand during the boom may in part also be driven by their high degree of indebtedness that limits their ability or desire to take on further loans. This in at its core a pure financial cycle that gets transmitted to the real economy via the net worth of sectors, wealth effects or credit constraints.

The paper has argued that business debt follows such expenditures-debt cycle, i.e. the more standard versions of the Minsky cycle. This requires a negative effect of debt on investment and a positive effect of growth on debt. There is a substantial amount of evidence (Fazzari et al 1998 to Nishi 2018) for the first channel and Stockhammer et al (2019) and Stockhammer and Gouzoulis (2023) provide evidence for the interaction cycles for several economies (and for the USA for longer periods). In contrast, they fail to find evidence for expenditure-household debt cycles.

Household debt cycles are thus better explained as speculative asset price cycles. Households do not normally hold most of their wealth in assets that yield income, but their most important asset is housing.[8] Speculation in housing is based on expected capital gains. No full empirical Minsky with a speculative housing market exist yet, but available evidence on financial cycles gives a prominent

[8] This statement requires a distributional qualification. It holds for the bottom 95% of the income distribution, for whom housing is the most important asset. For the top of the distribution income yielding financial asset do play an important role.

role to house price dynamics (Claessens et al 2011, Drehmann et al 2012) and momentum trader models of the housing market seem to work well for many countries (Gusella and Stockhammer 2021).

The essay picks up on some Tom Palley's early work on Minsky cycles, but takes it in a somewhat different direction. However, the underlying research agenda is deeply indebted to Tom Palley's work. First of the similarities. These include the desire to see Minsky models empirically tested. The extant literature on Minsky model is heavily skewed towards theoretical work. Palley (1994) proposed one of the first econometric Minskyan macro models and it focused on household debt. In this latter issue it was substantially ahead of its time and a decade and a half later Minskyan models focused on household debt would proliferate. There are two main differences, which are probably differences in emphasis rather than fundament differences. First, the approach outlined here puts endogenous cycles at the very center of Minsky models. This is to clarify mechanisms and to highlight differences to mainstream approaches that are based on exogenous shocks. Second, I interpret household debt cycles as based on speculative asset price cycles.

Why does the distinction between expenditure-debt cycle and speculative asset price cycles matter? If different mechanisms are at work, it is important to understand and identify these in order to enable effective policies of stabilization. Simply put, the mechanisms that were key to the GFC only represent one type of financial cycle. Admittedly, the highly stylized models discussed here are not detailed enough to seriously establish policy conclusions, but a few general comments may give a sense in which direct this should go. To begin with, the basic Minskyan insight the degree of indebtedness is a useful indicator to gauge the fragility of the system holds in both cases, but are there important differences. The key driving variable for business debt is business investment. In principle, investment is socially useful, thus the boom, even if it may come with sectoral overinvestment may still yield socially production facilities. The housing market is different. Here the leading variable is house prices. Housing booms may come with housing investment, but may also be due mostly to price movements. Housing is also a social necessity, thus policy will want to provide housing on a needs-oriented basis. Short, there is a stronger case to fuller de-financialise housing.

The paper also suggests some avenues for future work. First, we note an imbalance on empirical relative to theoretical Minsky models. Second, on the theoretical front, there are few full developed Minskyan macro models that include a housing market with speculative asset price cycle. Third, we have put house price cycles at the center of household debt models, but real estate prices of course also affect businesses. Thus, the integration and interaction of investment-business debt and speculative house price cycle is a logical next step.

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