How Financially Fragile can Households Become? Household Borrowing, the Welfare State, and Macroeconomic Resilience

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How Financially Fragile can Households Become? Household Borrowing, the Welfare State, and Macroeconomic Resilience*

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Abstract

We extend the principles of the Financial Instability Hypothesis (FIH) to the household sector by re-framing the three financial postures associated with the FIH (hedge, speculative, and Ponzi) in the context of households, using a simple model of household borrowing and debt-financing behavior. We also connect our analysis to various strands of research in Comparative Political Economy on credit regimes, the welfare state, and Varieties of Capitalism. Our paper thereby discusses the importance of welfare systems and financial regimes as determinants of household borrowing behavior and hence the financial fragility of the household sector. In so doing it relates to recent US policy debates by demonstrating the macroeconomic consequences of raising taxes on top incomes in order to fund an increase in the social wage. Our results suggest that taxing top incomes to provide social services without accumulating public debt improves macroeconomic resilience and may also improve macroeconomic performance. We therefore uncover some of the values of welfarism that the neoliberal 'experiment' inadvertently revealed by 'rolling back the frontiers of the welfare state' and in so doing, leading capitalism headlong into the 2007-09 financial crisis.

Key words: Financial fragility, financial instability hypothesis, household borrowing, household debt, welfare state, macroeconomic resilience

JEL classifications: E12, E44, O41

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1 Introduction

Hyman Minsky's financial instability hypothesis (FIH) is predicated on the accumulation of corporate debt.[1] Over the last three decades, much attention has been paid to the accumulation of household debt, in the run up to and aftermath of the Great Recession. The question posed in the title of this paper thus becomes pertinent. It is addressed in what follows by re-framing the three financial postures (hedge, speculative, and Ponzi) originally associated with the FIH using a simple model of household borrowing and debt-financing behavior. This model derives from recent contributions to Kaleckian macrodynamics that take into account both borrowing and debt accumulation by less-affluent households and the three-class structure of modern capitalism (workers, managers, and capitalists). This three-class structure has established capitalists and managers as a modern rentier class of positive net worth households, with production workers suffering stagnant wage incomes and a declining wage share that has increased their recourse to financial markets in order to achieve socially-constructed consumption targets (Dutt, 2005, 2006, 2008; Kapeller and Schütz, 2015; Setterfield and Kim, 2016, 2020; Setterfield et al., 2016). The analysis in this paper can also be thought of as part of the broader Kalecki-Minsky project to provide macroeconomic foundations for Comparative Political Economy (CPE) rooted in Heterodox macroeconomics discussed by Stockhammer (2019).

At the same time, part of the motivation for household borrowing can be associated with the retreat of the welfare state and the consequent 'privatization' of expenditures on socially necessary services such as health care and education. In this way, declining social provision, the financialization of the household, and the prospect of financial fragility are intimately related. These are themes that have been emphasized by recent research in Comparative Political Economy (see, for example, Wiedemann, 2021), to which the analysis in this paper is therefore also related.[2]

[1] See, for example, Minsky (1982b, 1986).

[2] According to North (1990, p.4), "Institutions include any form of constraint that human beings devise to shape human interaction. Are institutions formal or informal? They can be either, and I am interested

The remainder of the paper is organized as follows. In section 2, we discuss the possibility of extending Minsky's financial instability hypothesis to the household sector. In section 3, we outline the model on which our analysis is based, focusing on the consumption, borrowing, and debt-servicing decisions of households. In the fourth section, building on elements of the model outlined in section 3, we define a series of thresholds that enable us to construct a taxonomy of household financial positions resembling Minsky's original (corporate sector) taxonomy in the FIH. Section 5 connects our analysis to recent research in Comparative Political Economy that addresses credit regimes and the welfare state in different 'varieties' of capitalism (Wiedemann, 2021). In particular, we explore the relationship between the welfare state, household borrowing behavior, household financial fragility and macroeconomic resilience and performance. Section 6 concludes

2 The financial instability hypothesis and the household sector

As remarked by Leclaire (2021), there is a clear need to consider the possible contribution of households to financial fragility given the size of the household sector's share of total income, assets and liabilities and, in particular, the increasing prominence of household debt. But can the FIH, which was developed originally with reference to the corporate sector, be applied to the household sector? Various commentators – including Minsky himself – have argued that with suitable modifications, the principles of the FIH *can* be applied to households (Minsky, 1982a; Variato, 2015).[3] Nevertheless, 'migrating' the FIH from the corporate to

both in formal constraints – such as rules that human beings decide – and informal constraints – such as conventions and codes of behavior." Our work is also consistent with this line of thought, emphasizing both informal (consumption norms) and formal (welfare state) institutions within the macroeconomic context.

[3]As noted by Vercelli (2011, p.51) and Lavoie (2020, p.91), there are various references to household indebtedness and its potential contribution to financial fragility in Minsky's writings. According to Minsky (1982a, pp.30-32): households may debt-finance consumption and/or the acquisition of assets (housing being both a consumption good and an asset); and household debt-financing of consumption and housing is typically hedge financing, and can become Ponzi only 'after the event' (for example, as a result of unemployment).

the household sector requires some thought and attention because of the structural differences between these sectors. For example, compared to corporate debt, household debt originates much less frequently with the acquisition of assets designed to generate income streams, as a result of which there is, instead, reliance on labour market income in order to meet debt-servicing obligations (Minsky, 1982b, p.30; Lavoie, 2020, p.91). Variato (2015, p.31-32), with reference to the 2007-09 financial crisis, summarizes the matter at hand succinctly: "if the question one wants to investigate is whether or not the sub-prime crisis was as Minsky described in his own work, through specific examples, the answer is no. But if the alternative question is: can the FIH be used to understand and/or predict processes of endogenous financial instability, and is the sub prime crisis, even not explicitly referenced, an event coherent with this framework, the answer is yes."

The modifications required to apply the FIH to households are far from trivial. In particular, the (corporate) financial postures that are central to the original FIH do not carry over to the household sector. As argued by Pressman and Scott (2018), debtor households cannot obviously become speculative (much less Ponzi) units in the sense of the original FIH, because they need recourse to non-borrowed resources for purposes of social reproduction. In other words, it is not possible for households to devote all of their current income flows to debt servicing in the manner of a conventional Minskyan speculative unit. The possibility of household Ponzi finance seems even more remote, meanwhile, owing to the well-established unwillingness of lenders to accept expected future labour market earnings (much less expected future labour market earnings associated only with a dimly-perceived and yet-to-materialize 'bonanza' in household income) as collateral for loans. Households can nevertheless generate substantial financial fragility (in the same manner as the corporate sector) by testing the limits of the debt burdens that they can feasibly manage.

In what follows, this last claim is demonstrated by appeal to three financial postures that can be used to characterize household finance in a modified FIH: hedge, quasi-speculative, and (following Pressman and Scott (2018)) Lehman. The Lehman posture is shown to be

sustainable under special case conditions in asset (especially real estate) markets that give it 'quasi-Ponzi finance' properties that are especially inimical to financial stability. These financial postures are derived from elements of a model of the household sector that incorporates household debt accumulation, and includes motivations for borrowing that subsequently allow us to make the connection between household financial fragility (and hence macroeconomic resilience) and the size of the welfare state. It is to the development of this model that we now turn.

3 A model of household borrowing and debt-servicing behavior

Our model of the household sector follows Setterfield and Kim (2016); Setterfield et al. (2016) and Setterfield and Kim (2020) by positing three classes of income recipients (workers, managers, and capitalists) divided into two types of household: positive-net-worth rentier households (made up of capitalists and managers), and negative-net-worth worker households. Rentier households consume a conventional fraction of their income (consisting of profit, managerial salaries, and interest income from loans to working households). Similarly, worker households consume a conventional fraction of their (wage) income, but also borrow in order to finance autonomous consumption. In equilibrium, the borrowing of workers is funded by part of the saving of rentiers,[4] although much as in any simple model of effective demand where injections equal leakages in equilibrium, endogenously-created 'bridging finance' is required in order to effect the traverse from one equilibrium position to another.[5] Workers' borrowing behavior is, in turn, motivated by two things. The first is their propen-

[4]The remainder of rentiers saving funds investment by firms.

[5]See Setterfield and Kim (2016); Setterfield et al. (2016) and Setterfield and Kim (2020) for details germane to the specific model developed in this paper, and Chick (1973, 1983) for more general discussion and development of the principles just enunciated. In short, the reader should not confuse the equilibrium condition stating that injections equal leakages (so that rentiers' saving funds workers' borrowing) with the notion that the model developed has a 'loanable funds' structure. It does not.

sity to emulate the consumption of rentiers and in so doing, 'keep up with the Joneses' – even if the growth of their wage income does not, in the first instance, facilitate realization of this relative consumption target. The second is a desire to maintain consumption in the face of any diminution of social provision, such as cuts to health care and/or education, that shifts the burden of providing for certain basic services from the public sector onto individual households. The ambition here is simply to *maintain* welfare at some pre-existing absolute standard, as a result of which this second motivation for borrowing can be referred to as 'running to stand still' (Setterfield and Kim, 2020).

The model of the household sector so-described is captured by the following system of equations:

$$C = C_W + C_R + \dot{D} \tag{1}$$

$$C_W = c_W W_p N \tag{2}$$

$$C_R = c_\pi(\phi\alpha W_P N + [1-t]\Pi + iD_R) \tag{3}$$

$$\dot{D} = \beta(C^T - C_W), \beta > 0 \tag{4}$$

$$C^T = \eta C_R - \omega_S \tag{5}$$

$$\omega_S = t\Pi \tag{6}$$

where C denotes aggregate consumption by households, C_W and C_R are consumption out of current income by working and rentier households, respectively, $\dot{D}$ is borrowing by working households to finance consumption independently of their wage income, W_p is the wage earned by production workers and N is the level of their employment, Π is total profit income, i is the interest rate, D_R is that part of workers' total debt (D) that is owned by rentiers, C^T is workers' consumption target, ω_s denotes the 'social wage' (public provision of services such as health and education), and t is the tax rate on profit income. All variables are measured in real terms.

Equation (1) describes the total flow of consumption spending in any period as consisting of three components. The first is consumption out of wage income by workers which, per equation (2), is a constant fraction (the marginal propensity to consume c_W) of workers' total wage income. The second is consumption out of current income by rentiers. According to equation (3), this is derived as a constant fraction (the marginal propensity to consume c_π) of rentiers' total income. The latter is, in turn, made up of three components: managerial wage income $\phi\alpha W_P N$, which is reckoned as a multiple of production workers' total wage income based on the size of managerial salaries relative to the wage rate of production workers ($\phi > 1$) and the ratio of managers to production workers necessitated by the demands of the production process ($\alpha > 0$); net profit income, $(1-t)\Pi$; and the flow of interest income received from worker households, iD_R. Note that, as intimated in the definition of variables above, $D_R = D - D_W$ is only *some part* of the total debt of worker households at any point in time, net of that part of total debt that workers as a class 'owe to themselves' (D_W). This is because worker households are assumed to save even as they borrow ($c_W < 1$), as a result of which they must accumulate financial assets.[6] Following Setterfield and Kim (2016); Setterfield et al. (2016) and Setterfield and Kim (2020), we assume that workers accumulate no equity, as a result of which the savings of worker households can only take the form of the accumulated debts of other worker households. In this way, workers as a class – who are net debtors by assumption ($D_R > 0$) – owe only a portion of their total debts to rentier households.[7]

The third component of total consumption spending per period in equation (1) is borrowing by workers, $\dot{D}$. This is described in equation (4) as depending on the difference between

[6]Our description of behavior here is designed to be consistent with stylized facts: the observation that negative net-worth households do engage in some saving out of current income even as they borrow and accumulate debt. This can be explained by a combination of fundamental uncertainty and imperfect credit markets, which combination makes it reasonable for any household that ultimately consumes in excess of its current income to simultaneously save and borrow. "This is because uncertainty implies a precautionary demand for liquidity to meet unforeseen contingencies, while imperfect credit markets mean that dis-saving and borrowing are not perfect substitutes: a household is always legally entitled to draw down its previously accumulated wealth, but has no similar entitlement to borrow"(Setterfield and Kim, 2016, p.24).

[7]See Setterfield and Kim (2016); Setterfield et al. (2016) and Setterfield and Kim (2020) for a stock-flow consistent accounting of the structure of households so-described.

workers' consumption target and the level of consumption they achieve based on their wage income, where β denotes a speed of adjustment parameter that depends on various factors including both household borrowing and financial market lending norms. In equation (5), meanwhile, workers' consumption target is described as the difference between the level of rentiers' consumption that workers seek to emulate (where the parameter η represents the propensity to emulate) and the value of the social wage, ω_S. The emulation effects that inform the size of η can result from direct imitation of the most affluent households, or more indirectly through 'expenditure cascades' (Cynamon and Fazzari, 2008; Frank et al., 2014).[8] Meanwhile, C^T varies inversely with the social wage: as public provision of services such health and education diminishes, households increase their target level of private consumption in an effort to maintain an established standard of living.[9] Ultimately, then, it is the combination of two processes – 'keeping up with the Joneses' and 'running to stand still' – that drive consumption targeting and hence borrowing by working households.

Finally, equation (6) states that the latter is entirely funded by revenues raised by taxing profit income.[10] Equation (6) acts as a parsimonious representation of two important and coincident features of recent (neoliberal) capitalism: tax cuts for the most affluent households coupled with a process of 'rolling back the frontiers of the welfare state'. Note, then, that in equation (6), the social wage varies directly with the rate of taxation on profits, so that the equation is capable of capturing these coincident developments through a decline in a single

[8]The empirical significance of emulation effects as a driver of household debt accumulation has been contested recently by Stockhammer and Wildauer (2017), but see Banuri and Nguyen (2022); Thompson (2018); Petach and Tavani (2017) and Berlemann and Salland (2016) for contrary evidence.

[9]The rise of student debt in the US is an example of this process. See, for example, Webber and Burns (2017).

Note that for $\omega_s > 0$ sufficiently large it is possible to obtain $C^T < 0$ in equation (5). In other words, with a sufficiently generous social wage, workers aspire to a target level of saving out of current net wage income. The stylized facts of the neoliberal era suggest that this condition is not satisfied, however, and that for worker households as a whole $C^T - C_W > 0 \Rightarrow \dot{D} > 0$. We correspondingly maintain this assumption throughout what follows to capture the recently-observed phenomenon of less affluent households accumulating debt by virtue of their reliance on credit to supplement stagnant real incomes in order to finance growing consumption expenditures. Note further that our households use credit only to finance current consumption: we abstract from that part of debt used by working households to accumulate assets such as housing.

[10]The state sector thus runs a balanced budget.

parameter (t).[11]

3.1 Consumption, saving, and debt servicing

As a result of their borrowing, working households accumulate debt that they must then service. Following Setterfield and Kim (2016), we think of workers' debt-servicing obligations as fitting into a hierarchy of spending commitments, according to which households first consume from current income (in order to socially reproduce the household itself), then service their debts, and finally (and if possible) save. The flow of savings per period thus becomes a 'residual of a residual' – the part of total income that remains after consumption expenditures and debt servicing obligations have first been disbursed. The motivation for this approach derives from Cynamon and Fazzari (2012) and Lusardi et al. (2011). According to Cynamon and Fazzari (2012), debt servicing expenditures by households are best conceived as monetary outlays undertaken volitionally by households, rather than autonomous deductions from gross household income akin to income taxes. At the same time, Lusardi et al. (2011) observe that "just as corporations tend to fund themselves first by drawing upon internal funds, households address financial shocks first by drawing down savings" (Lusardi et al., 2011, p.27). In other words, debtor households are inclined to sacrifice savings specifically, rather than household income more generally, in response to an increase in creditors' claims upon them.

Given the structure of the model developed earlier and, in particular, the description of consumption out of wage income in equation (2), these considerations can be captured if we specify saving by worker households (S_W) as:

$$S_W = W_p N - (c_W W_p N + [i + \psi] D_R)$$

[11] In so doing, equation (6) also draws attention to the opportunity cost of tax cuts: more generous funding for social programs that would, in turn, relieve the pressure on less affluent households to rely on credit markets in order to provide basic services such as health care and education.

$$\Rightarrow S_W = (1 - c_W)W_p N - (i + \psi)D_R \tag{7}$$

where $\psi \geq 0$ is the rate of amortization at which debtors are expected to pay down existing debt balances.

3.2 Consumption targeting or debt targeting?

In the model developed above, household borrowing is motivated by a consumption target that is, in turn, related to the 'keeping up with the Joneses' and 'running to stand still' processes described earlier. Elsewhere in the Kaleckian literature, however, household borrowing is motivated by a debt target that is, in turn, related to net (of debt-servicing commitments) household income (Dutt, 2005, 2006). These two objectives – consumption targeting and debt targeting – need not be thought of as unrelated, however.

To see this, first note that consistent with equation (7), and by setting $S_W = 0$, we can identify an *upper bound* to workers' feasible debt servicing commitments, $(i + \psi)D_{Rmax}$, defined as follows:

Definition 1 *(Upper Bound of the Feasible Debt Servicing Payment) The upper bound of workers' feasible debt servicing payment,* $(i + \psi)D_{Rmax}$*, satisfies:*

$$0 = (1 - c_W)W_p N - (i + \psi)D_{Rmax} \tag{8}$$

In equation (8), and following Lusardi et al. (2011), workers will (in the limit) sacrifice all current saving flows in order to service previously-accumulated debt. Note that given our hierarchical description of household consumption, debt servicing, and saving activities, the relationship in equation (8) – from which we will eventually derive our characterizations of household financial postures – is essentially a '(minimum) disposable income to payment difference'. In this respect it bears resemblance to the payment to income *ratio* used by

Minskyans such as Tymoigne (2008) to characterize the concept of 'margin safety' used in formalizing the FIH.

Standardizing the expression in (8) by the capital stock, K, and solving for the resulting maximum net debt to capital ratio (d_{Rmax}), we find that:

$$d_{Rmax} = \frac{(1 - c_W)W_pN}{(i + \psi)K}$$

$$\Rightarrow d_{Rmax} = \frac{(1 - c_W)}{(i + \psi)} \frac{W_pNY}{YK}$$

$$\Rightarrow d_{Rmax} = \frac{(1 - c_W)\omega_p u}{i + \psi} \tag{9}$$

where Y is total real income, $\omega_p = \frac{W_pN}{Y}$ is production workers' share of total income, and $u = \frac{Y}{K}$ is the rate of capacity utilization.[12] Finally, note that d_{Rmax} is closely related to the more intuitive (maximum) debt to income ratio, d_{Ymax}, since it follows that:

$$d_{Ymax} = \frac{D_{Rmax}}{W_pN} = \frac{\frac{D_R}{K}}{\frac{W_pN}{Y}\frac{Y}{K}} = \frac{d_{Rmax}}{\omega_p u}$$

$$\Rightarrow d_{Ymax} = \frac{1 - c_W}{i + \psi} \tag{10}$$

In other words, implicit in workers' behavior is a debt target, or at least a debt ceiling that they are unwilling to exceed. Note that interpretation of d_{Ymax} as a debt ceiling that workers

[12]Note that in accordance with the structure of the model developed in this paper, total income (the sum of total wage and profit income) can be written as:

$$Y = W_pN + \phi\alpha W_pN + \Pi$$

$$\Rightarrow Y = (1 + \phi\alpha)W_pN + \Pi$$

$$\Rightarrow \omega_p = \frac{1 - \pi}{1 + \phi\alpha}$$

where π denotes the profit share of income.

are *unwilling* (as opposed to *unable*) to exceed follows from the fact that the determinants of d_{Ymax} are to some extent volitional. Hence even if $c_W = c_{Wmin}$, where c_{Wmin} is the minimum value of c_W necessary for the basic social reproduction of the household at some socially-defined subsistence level,[13] it is still the case that the manner in which households consume, service debts, and save results from a household choice regarding the prioritization of monetary outlays. In this way, the debt to income ceiling in equation (10) has target-like properties, even if the actual target that guides borrowing behavior (C^T) will imply that any feasible steady-state worker household debt to income ratio, d_Y^*, will ultimately satisfy $d_Y^* \leq d_{Ymax}$ rather than the strict equality $d_Y^* = d_{Ymax}$.

4 Household financial postures and financial instability

As noted, the accumulation of debt by households means that debtor households must then service their debts. This draws attention to the relationship between income flows and debt-servicing commitments on which the three financial postures (hedge, speculative, and Ponzi) associated with the original FIH were predicated. In this section, we explore three financial postures, associated with increasing degrees of financial fragility, that are germane to household (as opposed to corporate) finance.

Recall that because saving is a 'residual of a residual' – what remains after debtor households have first consumed and then serviced their debts from their available wage income – it follows that workers' maximum feasible debt servicing payment, $(i + \psi)D_{Rmax}$, satisfies:

$$0 = (1 - c_W)W_pN - (i + \psi)D_{Rmax} \tag{8}$$

from which it follows that:

[13]'Basic social reproduction should be understood as socially defined, rather than as being related to a physical standard (such as a minimum caloric intake required for survival). It may include expenses for items such as telephony and/or internet connectivity and therefore – as the examples just given suggest – vary over time.

$$d_{Rmax} = \frac{(1 - c_W)\omega_p u}{i + \psi} \tag{9}$$

and:

$$d_{Ymax} = \frac{1 - c_W}{i + \psi} \tag{10}$$

Now note that as long as $\psi > 0$ and $d_Y \leq d_{Ymax}$, workers can service and, in the process, pay down their debts over time, dependent only on the 'ordinary' workings of the labour market (i.e., continued employment that continues the flow of wage income $W_p N$ from period to period without interruption due to unemployment). In other words, 'cash [in]flows ... exceed the cash flow commitments on liabilities for every period' (Minsky, 1982b, p.105) and as such, households can function successfully as Minskyan hedge units.[14]

Definition 2 *(Minskyan Hedge Units) Workers are Minskyan hedge units if, with* $\psi > 0$*, their indebtedness satisfies the condition:*

$$d_Y \leq d_{Yh} \equiv d_{Ymax} = \frac{1 - c_W}{i + \psi} \tag{10}$$

But now suppose now that:

$$d_{Yh} = \frac{1 - c_W}{i + \psi} < d_Y \leq \frac{1 - c_W}{i} = d_{Yqs} \tag{11}$$

In (11), d_{Yqs} denotes a new, higher value of the maximum debt-to-income ratio associated with $\psi = 0$, as a result of which debtor households are assumed only to meet interest payments due on outstanding debt. This corresponds to the speculative financial state of

[14]Here and subsequently we associate financial postures exclusively with cash inflows in relation to cash flow commitments on accumulated debt liabilities, or what Vercelli (2011, p.53) calls the debtor unit's 'index of current liquidity'. As noted by Vercelli (2011, p.53-54), Minskyan financial postures are also associated with an 'index of solvency' – the discounted value of expected future values of the index of liquidity – but this index of solvency is not essential to distinguishing between financial postures at a point in time, and can therefore be set aside.

firms in Minsky's FIH. As long as the condition in (11) holds, workers can meet the interest payments on their outstanding debts, the value of which will carry forward from period to period. In this scenario, and subject now to the 'ordinary' workings of both labour markets *and* financial markets (that allow accumulated debt to be rolled over from period to period), households can successfully function as 'quasi-speculative' units. This financial posture is 'quasi-speculative' because it is defined with reference to only part of the debtors total income – specifically, that part of current wage income ($[1 - c_W]W_pN$) that exceeds the income required for the social reproduction of the household. Unlike corporations, that can finance working capital by borrowing or even issuing equity, households must fund their social reproduction from some part of their current income.[15] As such, they cannot become full-fledged speculative units in the manner of corporations that can, in principle, use all current income to service interest payments on debts.

Definition 3 *(Minskyan Quasi-Speculative Units) Workers are Minskyan Quasi-Speculative units if their indebtedness condition satisfies,*

$$d_{Yh} = \frac{1 - c_W}{i + \psi} < d_Y \leq \frac{1 - c_W}{i} = d_{Yqs} \tag{11}$$

The distinction made here between quasi-speculative households and speculative corporations has potential implications for economy-wide financial fragility. Hence note that for a household unit and a corporate unit that have incomes of identical size, the maximum debt-to-income ratio consistent with a quasi-speculative posture on the part of the household must be strictly less than the maximum debt-to-income ratio consistent with a speculative posture on the part of the corporation (all other things equal). Given that in the FIH financial fragility is associated with movement through the hierarchy of financial postures, this immediately suggests that indebted households are likely prone to creating a more financially

[15]This dependency of households on current income to fund social reproduction my be relaxed somewhat in practice by the existence of, for example, pay-day loans. We overlook such considerations here for the sake of simplicity.

fragile economy than are corporations.

Now suppose that $d_Y > d_{Yqs}$. At this point, working households become 'Lehman units' – households that 'cannot sustain themselves and also pay interest on past debts' (Pressman and Scott, 2018, p.10). Such households are susceptible to default.

Definition 4 *(Minskyan Lehman Units) Workers are Minskyan Lehman units if their indebtedness satisfies the condition:*

$$d_Y > \frac{1 - c_W}{i} = d_{Yqs} \tag{12}$$

If $c_W = c_{Wmin}$, so that current consumption out of income is required for the basic social reproduction of working households from one period to the next and the propensity to consume *cannot* be reduced, households can only default if (12) is satisfied. If, however, $c_W > c_{Wmin}$, then d_{Yqs} can be thought of as a local (rather than global) constraint that can be relaxed by reducing c_W in order for the household to escape Lehman status and avoid default. Reducing c_W is not without consequences for demand-formation and hence the level of employment, N, however. A fall in the level of employment will, in turn, raise the value of c_W required to generate the minimum flow of expenditures that is literally required for the social reproduction of households. From a macroeconomic perspective, then, escape from Lehman status through increased 'thriftiness' (lowering c_W) is far from assured. The question thus remains open as to how 'soft' a 'soft landing' the strategy of reducing c_W would engineer.

Lehman finance so-defined falls short of Minsky's concept of Ponzi finance, a situation where debt-servicing obligations exceed current income so that the debtor unit must borrow merely in order to service previously accumulated debt. Households cannot realistically approach such a position, however, because it involves devoting all current income to debt servicing, and "households, unlike firms, need food, clothing, and shelter in order to survive"

(Pressman and Scott, 2018, p.10).[16] The concept of Lehman finance, and the prospect that a Lehman unit is likely to default, once again draws attention to the fact that a capitalist growth regime that depends on household (as opposed to corporate) debt accumulation is more susceptible to problems of financial fragility, which problem is more likely to become pressing *before* debtor units approach the threshold of Ponzi finance.

Suppose, however, that the condition in (11) is satisfied and that $c_W = c_{Wmin}$:

Definition 5 *(Minskyan Quasi-Ponzi Units) Workers are Minskyan quasi-Ponzi units if their indebtedness satisfies the conditions:*

$$d_{Yqs} = \frac{1 - c_W}{i} < d_Y \leq \frac{1 - c_W}{i\delta_{temp}} = d_{Yqp} \tag{13}$$

and:

$$d_Y \leq E(d_{Yqs}) = \frac{1 - c_W}{i'} \tag{14}$$

where $i' < i$.

Rather than being doomed to default, the expressions in (13) and (14) describe a situation in which households become 'sustainable Lehman' or 'quasi-Ponzi' units. Here, the seemingly unsustainable Lehman posture is sustained by a temporary interest-rate discount, $\delta_{temp} < 1$, that is predicated on the subsequent possibility of refinancing at a permanently lower interest rate i', at which $d_Y \leq d_{Yqs}$. The willingness of lenders to permit such postures is presumably based on speculation – for example, that an asset used by the household to secure its debt will appreciate in value. This can be likened to the notion of an 'expected future bonanza' underlying Ponzi finance in Minsky's original FIH. Given that the debtor in this analysis is a household, the creation of quasi-Ponzi households would appear most likely in the case of real estate transactions based on 'teaser rate' or 2/28 mortgages during a real estate boom.[17]

[16] As previously noted, firms need to pay wages and acquire material inputs (as well as meet their debt servicing obligations) in order to remain in operation, but such needs for working capital are – unlike the basic needs of households – ordinarily financed by borrowing.

[17] See also McCulley (2009), who identifies conventional mortgages with hedge finance, interest-only mort-

As such, the possibility of quasi-Ponzi finance is perhaps best considered a special case.

5 The Welfare State, Credit Regimes, and Financial Fragility

5.1 Insights from the CPE literature

Our formulation of the financial taxonomy above focuses on households' borrowing behavior. This behavior is, however, strongly influenced by institutional structures characterized by the extent of the welfare state, characteristics of financial markets, and the organization of society in general. It follows that a fundamentally important but largely unexplored area of research concerns the interrelationships between the welfare state, financial markets, social structures, household borrowing behavior, and macroeconomic stability. Here, we attempt to explore these linkages by connecting our financial taxonomy to certain strands of research in Comparative Political Economy (CPE), which explore differences in market and financial systems, industrial structures, welfare systems, and, more broadly, political and economic institutions, and how they affect economic performance across countries.[18]

According to Wiedemann (2021), household indebtedness is significantly influenced by the extent of the welfare state and characteristics of financial markets. He finds evidence that household borrowing emerges as a substitute for social welfare when a country's credit regime is more permissive. According to Wiedemann (2021), the credit regime is a concept

gages with speculative finance, and 2/28 mortgages with Ponzi finance. According to Minsky (1982a, pp.30-32), households only set up Ponzi financing arrangements on an *a priori* basis when acquiring certain types of financial assets (such as gold or common stock) that exist in a *sub-account* of a household's financial accounts, in which cash income (from the asset) may approach zero and debt-servicing obligations are met by acquiring more debt – the expectation of lenders being that the capital value of the assets will rise over time. Such arrangements would obviously apply to a different and likely much smaller echelon of the household sector than the quasi-Ponzi arrangements associated with mortgage financing described above.

[18] Our work is also related to two theses in the CPE literature: the 'compensation thesis,' which posits that in Scandinavian countries, for example, there still exist robust welfare structures that compensate 'losers' in the globalization and financialization processes; and the 'efficiency thesis,' which argues that in Anglo-Saxon countries, for example, welfare expenditure has been reduced to enhance the efficiency of market processes in an environment of globalization and financialization (Hein et al., 2021).

that describes the institutional and political structure that determines the breadth and depth of financial markets, and the allocation of credit between businesses and households. Permissive credit regimes combine open and deep financial markets in which households can more easily access credit. Restrictive credit regimes, meanwhile, feature smaller capitals market in which capital flow is more geared towards the business sector. Wiedemann (2021) compares Denmark and the US, two countries with relatively permissive credit regimes but different welfare states. He finds that in Denmark, where there is a stronger social safety net, low-income groups borrow little whereas high-income groups borrow considerably more in response to an unemployment shock. By contrast, in the US, the credit market seems to substitute for the welfare state, as low and middle-income groups borrow significantly more following an unemployment shock, accumulating debt to address financial shortfalls.

In sum, the welfare system and the credit regime appear to be important determinant of household borrowing behavior, and hence the financial fragility of the household sector and, by extension, macroeconomic stability. This argument is conceptualized in the diagram 1.

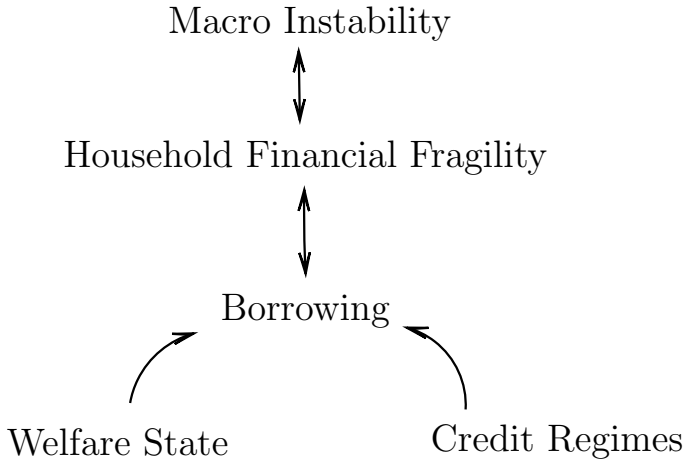

Figure 1: The Welfare State, Credit Regimes, and Household Indebtedness

5.2 Household financial postures, debt dynamics, and the welfare state

A more permissive credit regime may provide a lower repayment rate (ψ) and interest rate (i), and thus help to sustain households' financial positions by expanding the ranges of hedge, speculative, and Lehman financial postures. The size of the welfare state can also significantly impact households' consumption behavior and hence their financial positions. To illustrate this last idea, assume that c_{Wmin}, the minimum value of c_W required for the social reproduction of the household, is a negative function of the social wage share of total output. In other words:

$$c_{Wmin} = c_{Wmin}(\omega_s), c_{Wmin}^{'} < 0 \tag{15}$$

It follows that greater welfare spending allows both hedge and speculative conditions to be more relaxed. To see this, note that from the conditions stated in Definitions 2 and 3, and assuming that $c_W = c_{Wmin}$ therein:

$$\frac{dd_{Yh}}{d\omega_s} = \frac{dd_{Yh}}{dc_{Wmin}} \frac{dc_{Wmin}}{d\omega_s} = \frac{-1}{i+\psi} c_{Wmin}^{'} > 0 \tag{16}$$

$$\frac{dd_{Yqs}}{d\omega_s} = \frac{dd_{Yqs}}{dc_{Wmin}} \frac{dc_{Wmin}}{d\omega_s} = \frac{-1}{i} c_{Wmin}^{'} > 0 \tag{17}$$

In what follows, we further explore these basic insights by embedding the financial postures developed earlier into the macrodynamic framework of Setterfield and Kim (2016). This allows us to study household debt dynamics in the context of different household financial postures and their relationship to welfare spending. To begin, assume that the household sector described in section 3 is embedded in a closed economy so that, by hypothesis, goods market equilibrium can be stated as:

$$Y = C_W + C_R + \dot{D} + G + I \tag{18}$$

In equation (18), $G = \omega_s$ denotes public expenditures and $I = g_K K$ is investment spending by firms, where K denotes the capital stock and:

$$g_K = \kappa_0 + \kappa_r r \tag{19}$$

with $r = \frac{\Pi}{K}$ representing the rate of profit. Together, equations (1) – (6), (18) and (19), when normalized by the value of the capital stock, can be solved to yield equilibrium values of the rates of capacity utilization, profit and accumulation (growth) for any given value of the net debt to capital ratio $d_R = \frac{D_R}{K}$. Our interest, however, is in the debt dynamics (and their implications for household financial fragility and macroeconomic resilience) that arise as this net debt to capital ratio changes over time in response to household borrowing and economic growth.

5.2.1 Debt dynamics with households as Minskyan quasi-speculative units

In order to examine the issues just identified (and their relationship to the size of the welfare state), we begin by setting $\psi = 0$ and $c_W = c_{Wmin}$ and focusing our attention on the threshold $d_{Yqs} = \frac{1-c_{Wmin}}{i}$.

It follows from the net debt to capital ratio as defined above that:

$$d_R = \frac{D_R}{K}$$

$$\Rightarrow \hat{d_R} = \hat{D_R} - \hat{K}$$

$$\Rightarrow \dot{d_R} = \hat{D_R} d_R - g_K d_R = \frac{\dot{D_R}}{D_R}\frac{D_R}{K} - g_K d_R$$

$$\Rightarrow \dot{d_R} = \frac{\dot{D_R}}{K} - g_K d_R \tag{20}$$

Now recall from equation (4) that total borrowing by working households is described as:

$$\dot{D} = \beta(C^T - C_W)$$

Substituting equations (2), (3), (5), and (6) into this expression, we arrive at:

$$\dot{D} = \beta(\eta c_\pi[\phi\alpha W_p N + (1-t)\Pi + iD_R] - t\Pi - c_W W_p N) \tag{21}$$

Meanwhile, on the basis of equation (7), and recalling our assumption that $\psi = 0$, that part of borrowing by workers that is funded by the savings of working households themselves can be written as:

$$\dot{D}_W = S_W = (1 - c_W)W_p N - iD_R \tag{22}$$

Now recall that $D_R = D - D_W \Rightarrow \dot{D}_R = \dot{D} - \dot{D}_W$. If we substitute equations (21) and (22) into this last expression, we arrive at:

$$\dot{D}_R = (\beta\eta c_\pi - t[\beta + \beta\eta c_\pi])\Pi - (1 - \beta\eta\phi\alpha c_\pi - (1-\beta)c_W]W_p N + (1 + \beta\eta c_\pi)iD_R \tag{23}$$

which, when substituted into equation (20), yields:

$$\dot{d}_R = [(\beta\eta c_\pi - t[\beta + \beta\eta c_\pi])\pi - (1 - \beta\eta\phi\alpha c_\pi - (1-\beta)c_W)\omega_p]u + [(1 + \beta\eta c_\pi)i - g_K]d_R \tag{24}$$

Setting $\dot{d}_R = 0$, equation (24) can be solved for the stable, steady-state value of d_R, d_R^*,[19] from which, given that:

[19] As demonstrated by Setterfield and Kim (2020), g_K is increasing in d_R. This means not only that the expression for $\dot{d}_R$ in (24) is quadratic, but also that we will observe $(1 + \beta\eta c_\pi)i - g_K < 0$ at higher values of d_R, so that $\dot{d}_R$ will vary indirectly with d_R at *higher* values of d_R. The significance of this last observation is that the debt dynamics described in (24) will be of an 'unconventional' (inverted U-shape) type, meaning that the larger of the two values of d_R associated with $\dot{d}_R = 0$ will be the stable steady-state equilibrium value of d_R. As noted by Setterfield et al. (2016, pp.59-60), this arises from the 'pecking order' approach to household spending commitments outlined in section 3.

$$d_Y = \frac{D_R}{W_p N} = \frac{\frac{D_R}{K}}{\frac{W_p N}{Y}\frac{Y}{K}} = \frac{d_R}{\omega_p u}$$

we can derive:

$$d_Y^* = \frac{d_R^*}{\omega_p u^*} = \frac{(1+\phi\alpha)d_R^*}{(1-\pi)u^*} \tag{25}$$

where u^* is the steady-state value of u consistent with solution of equations (1) – (6), (18) and (19) (with all variables first normalized by the capital stock), and $\dot{d}_R = 0$ in equation (24). The steady-state value d_Y^* in equation (25) can then be compared with the value of d_{Yqs} to yield the value of what Setterfield and Kim (2020) call the *sustainability gap*, calculated as $d_{Yqs} - d_Y^*$ when households are quasi-speculative units. This is the difference between the maximum feasible debt to income ratio for any given household financial posture and the steady state debt to income ratio consistent with macroeconomic outcomes that result from this posture.[20] If $d_{Yqs} \geq d_Y^*$ (so that d_Y^* is a sustainable steady-state outcome, given the assumptions made about debt-servicing behavior and the limits to this behavior imposed by the value of d_{Yqs}), the sustainability gap $d_{Yqs} - d_Y^*$ provides a measure of macroeconomic resilience: the larger is the sustainability gap, the lower is the vulnerability of the economy to shocks that may (temporarily) cause $d_Y > d_Y^*$, and hence the greater is the resilience of the economy given the financial structure of the household sector. The size of the sustainability gap can be thought of as a measure of the economy's financial fragility, therefore, a larger gap corresponding to a lower level of financial fragility and *vice versa*.

But what does any of this have to do with the welfare state? A preliminary answer arises from inspection of equation (24), which reveals that the 'running to stand still' effect on household borrowing, coupled with the assumptions made about the way in which the social wage is financed in equation (6), mean that the value of $\dot{d}_R$ varies indirectly with the rate of taxation on profits, t. This indirect effect arises for two distinct reasons. First, by increasing

[20] As will become clear, the sustainability gap can be calculated for any household financial posture.

t and thus raising the social wage in (6), the pressure on working households to borrow (in equation (5)) is reduced: greater public provision of goods such as education and health care reduces the need for working households to debt-finance private expenditures on these goods in order to achieve any given standard of living. Second, an increase in t reduces capitalist consumption (in equation (3)), which reduces worker borrowing and spending through the emulation effect in equation (5): higher taxes on top incomes, and hence less conspicuous consumption by affluent households, makes it easier for working households to 'keep up with the Joneses', thus diminishing resort to credit markets on the part of these households.

5.2.2 Debt dynamics with households as Minskyan hedge units

In order for households to operate as hedge units, it must be that $\psi > 0$. The threshold beyond which this behavior is unsustainable is $d_{Yh} = \frac{1-c_{Wmin}}{i+\psi}$. With households now repaying principal (as well as paying interest on outstanding debt), the debt dynamics previously outlined are modified by a reduction in the flow of savings by workers, which becomes:

$$\dot{D}_W = S_W = (1 - c_W)W_pN - (i + \psi)D_R \tag{26}$$

However, the hedge posture does not alter consumption by rentiers, which remains as stated in equation (3). This is because while iD_R constitutes income for rentiers (which is partly saved), ψD_R constitutes repayment of principal, and since rentiers do not consume out of wealth by hypothesis, the transfer payment ψD_R is entirely saved. Aggregate debt dynamics are thus once again derived by starting with:

$$\dot{D} = \beta(C^T - C_W)$$

and substituting equations (2), (3), (5), and (6) into this expression, to arrive at:

$$\dot{D} = \beta(\eta c_\pi[\phi\alpha W_pN + (1 - t)\Pi + iD_R] - t\Pi - c_W W_pN)$$

Substituting this last expression together with equation (26) into $\dot{D}_R = \dot{D} - \dot{D}_W$, we now arrive at:

$$\dot{D}_R = (\beta\eta c_\pi - t[\beta + \beta\eta c_\pi])\Pi - (1 - \beta\eta\phi\alpha c_\pi - (1-\beta)c_W]W_p N + ([1 + \beta\eta c_\pi]i + \psi)D_R \tag{27}$$

which, when substituted into equation (20), yields:

$$\dot{d}_R = [(\beta\eta c_\pi - t[\beta + \beta\eta c_\pi])\pi - (1 - \beta\eta\phi\alpha c_\pi - (1-\beta)c_W)\omega_p]u + [(1 + \beta\eta c_\pi)i + \psi - g_K]d_R \tag{28}$$

5.2.3 Debt dynamics with households as Minskyan quasi-Ponzi units

Finally, we consider the case where households operate as quasi-Ponzi units, with $\psi = 0$ and $0 < \delta_{temp} < 1$. The threshold beyond which this behavior is unsustainable is $d_{Yh} = \frac{1-c_{Wmin}}{i\delta_{temp}}$. These considerations once again modify the economy's debt dynamics. First, the flow of savings by workers, now becomes:

$$\dot{D}_W = S_W = (1 - c_W)W_p N - i\delta_{temp} D_R \tag{29}$$

Second, the discounted interest rate modifies the flow of interest payments from worker to rentier households, and hence rentier consumption, which now becomes:

$$C_R = c_\pi(\phi\alpha W_P N + [1-t]\Pi + i\delta_{temp} D_R) \tag{30}$$

When equation (30) together with equations (2), (5), and (6) is substituted into $\dot{D} = \beta(C^T - C_W)$, aggregate debt dynamics become:

$$\dot{D} = \beta(\eta c_\pi[\phi\alpha W_p N + (1-t)\Pi + i\delta_{temp} D_R] - t\Pi - c_W W_p N)$$

and if we now substitute this last expression together with equation (29) into $\dot{D}_R = \dot{D} - \dot{D}_W$, we arrive at:

$$\dot{D}_R = (\beta\eta c_\pi - t[\beta + \beta\eta c_\pi])\Pi - (1 - \beta\eta\phi\alpha c_\pi - (1-\beta)c_W]W_p N + (1 + \beta\eta c_\pi)i\delta_{temp} D_R \tag{31}$$

Finally, when (31) is substituted into equation (20), we get:

$$\dot{d}_R = [(\beta\eta c_\pi - t[\beta + \beta\eta c_\pi])\pi - (1 - \beta\eta\phi\alpha c_\pi - (1-\beta)c_W)\omega_p]u + [(1 + \beta\eta c_\pi)i\delta_{temp} - g_K]d_R \tag{32}$$

5.3 The welfare state, financial fragility, and macroeconomic performance: a numerical analysis

The observations made in the previous section provide *prima facie* evidence that expanding the welfare state will diminish the accumulation of debt by less affluent households and so make the economy less financially fragile – especially if the expansion of the welfare state is funded by taxation on top incomes. Caution must be exercised before reaching this conclusion, however, because of the demand-led structure of the economy and the contribution of household borrowing to demand formation. Indeed, as shown by Setterfield et al. (2016), it is possible in principle that even debt-servicing transfer payments will contribute positively to demand formation and hence the level and rate of growth of total income – despite 'ordinary' Keynesian logic that would suggest such payments will diminish demand by transferring income away from households who have a higher marginal propensity to spend. In order to demonstrate the effects of the welfare state on financial fragility, we need to show how expansion of the welfare state affects the sustainability gap associated with any given household financial posture (hedge, quasi-speculative, or quasi-Ponzi) taking into account the endogeneity of macroeconomic performance to household debt accumulation. In what follows, we address this task by means of a numerical analysis.

Table 1 reports the parameter values used in this study and their sources, with the exceptions of t and c_{Wmin}.[21] The values of t are reported in table 2 and reflect different

[21] Following Setterfield and Kim (2016), we calculate η – the propensity of working households to emulate

plausible assumptions about the size of a top-income-tax financed social wage based on average annual rates of taxation on top incomes in the US for selected periods since 1948. Also reported in table 2 are imputed values of c_{Wmin} which, based on equations (6) and (15), we associate (for the purposes of our simulations) with the different actual average values of t reported in the same table. These imputed values bear no clearly demonstrable relationship to actual values of the unobservable variable c_{Wmin} during the period 1948-2007. This does not pose a problem, however, because the exercise at hand is one of comparative statics. Ours is a simple rather than fully calibrated model, so we attach no literal meaning to any of its numerical outcomes regardless of the source of parameter values. Our interest, instead, is in results that indicate the *direction of change* of key outcomes in response to the parametric changes that precipitate them.

In our simulations we assume that $c_W = c_{Wmin}$ and that in accordance with equations (6) and (15), $c'_{Wmin} < 0$ such that c_{Wmin} decreases in t to the extent reported in table 2. We then vary t and c_{Wmin} simultaneously, in accordance with the corresponding values of each parameter reported in table 2, and for each pair of values of t and c_{Wmin}, calculate five key macroeconomic outcomes: $\omega_{sY} = \frac{\omega_s}{Y} = \frac{t\Pi}{Y} = t\pi$ (which represents the *welfare regime*), d^*_Y, d_{Yi}, and $d_{Yi} - d^*_Y$ for $i = h, qs, qp$ (which three variables together represent the *financial regime*), and u (which represents the performance of the real economy). Note that even as the *level* of the social wage $\omega_s = t\Pi$ varies with the (endogenously-determined) mass of profits Π, the welfare regime $\omega_{sY} = t\pi$ is the *share* of the social wage in total income. As such, ω_{sY} is the product of two parameters (t and π) and is unambiguously increasing in t

the consumption of the rentier class – as:

$$\eta = \lambda\delta \tag{33}$$

where λ is the emulation parameter reported in (Ravina, 2007)), and δ is a scaling parameter defined as the ratio of consumption by the upper-middle class (capitalists and the working rich) to consumption by the median rentier family, and proxied by the ratio of CEO pay to median rentier household income. By including δ in the calculation of η we are able to account for the way in which consumption standards established by very affluent members of society affect the aspirations of working households. This influence may be direct, resulting from exposure to much-publicized 'celebrity lifestyles' or the propensity of less-affluent households to believe in upward social mobility, and hence a perceived need to consume in accordance with their expected future social status (Wisman, 2009, 2013). Alternatively, it may be indirect, resulting from the 'expenditure cascades' (Frank et al., 2014).

Table 1: Parameter values

Parameter	Value (US)	Source
c_W	0.90 – 0.94	Author's calculations based on Bunting (1998)
c_π	0.20	Setterfield and Budd (2011)
β	0.10	Author's calculations[a]
λ	0.29	Ravina (2007)
δ	74.89	Author's calculations based on Mishel and Sabadish (2012), Anselmann and Krämer (2015), Melcher (2016)
ϕ	2.27	Author's calculations based on Mishel et al. (2007), Anselmann and Krämer (2015)
α	0.25	Author's calculations based on (Mishel et al., 2007, p.118)
ω_p	0.42	Author's calculations based on Mohun (2006)
π	0.34	Setterfield and Budd (2011)
κ_0	0.0165 – 0.0415	Author's calculations[b]
κ_r	0.5	Lavoie and Godley (2001), Skott and Ryoo (2008)
i	0.0481	Author's calculations based on World Bank Data[c]
ψ	0.015	Author's calculations[d]
δ_{temp}	0.25	Author's calculations[d]
η	21.72	Calculated as $\eta = \lambda\delta$

a. Set in accordance with other parameters to satisfy the Keynesian stability condition.
b. Set in accordance with other parameters to yield utilization rates of 80% in each initial (benchmark) case.
c. See data.worldbank.org.
d. Based on "Teaser rates on mortgages approach 0%", *The Wall Street Journal*, February 15, 2005.

ceteris paribus. Meanwhile, the financial regime can clearly be summarized with reference to the sustainability gap $d_{Yi} - d_Y^*$ for $i = h, qs, qp$.

Finally, our treatment of c_W as varying with c_{Wmin} merits further comment. This is motivated by the same logic that informs equation (6): cutting welfare provision while simultaneously cutting top tax rates has been a signal feature of the turn towards neoliberalism. Hence as welfare provision has fallen and income inequality has risen as a result of real wage stagnation, not only has c_{Wmin} risen but so, too, has c_W, as more and more working families have been 'squeezed' to the point of living paycheck-to-paycheck. We therefore associate the 'unwinding' of the low tax rates and diminished welfare provision resulting from neoliberalism with simultaneous reductions in c_{Wmin} and c_W, as the neoliberal 'squeeze' on working households is alleviated. Effectively, this means that as the welfare state expands, workers accept this dividend in the form of a precautionary 'income cushion': by reducing

Table 2: Taxation rates on top incomes (1948-2007) and associated values of c_{Wmin}

	Taxation rate (t)	c_{Wmin}
1948-73	0.829	0.90
1974-89	0.565	0.92
1990-2007	0.366	0.94

Source: Federal Reserve Economic Data (FRED); author's imputations.

the rate at which they spend out of current income in accordance with the decline in c_{Wmin}, they increase resources (residual income) available for debt servicing and, ultimately, saving. There are two consequences of all this for the financial regime. First, it means that the threshold values d_{Yh}, d_{Yqs} and d_{Yqp} associated with our typology of household financial postures will function as 'hard' constraints. Since they are based on $c_W = c_{Wmin}$, there is no possibility for households to alter these thresholds by reducing the value of c_W in the manner previously discussed with reference to the threshold d_{Yqs}. Second, by virtue of equation (15), $c_W = c_{Wmin}$ means that the size of the welfare state will affect the size of $d_{Yi}\ \forall\, i = h, qs, qp$. In this way, in addition to its effects on macroeconomic equilibrium and hence d_Y^*, the size of the welfare state will exert a second effect on the financial regime and hence the size of the sustainability gap $d_{Yi} - d_Y^*$. The effects of expanding the welfare state on d_{Yi} are unambiguous if $c'_{Wmin} < 0$. The effects on d_Y^*, however – and hence the net effects of the size of the welfare state on the sustainability gap – will depend on demand formation and its consequences for macroeconomic equilibrium.

The results of our simulations are reported in tables 3, 4 and 5. In each table, the first row represents our 'benchmark' case, which is set up to resemble the tax treatment of top incomes in current (neoliberal) US capitalism. The second and third rows of each table then reflect the effects on the welfare regime, the financial regime, and macroeconomic performance of two successive innovations: an increase in the top tax rate to its average value during the period 1974-89; and a further increase in the top tax rate to its average value during the

1948-73 Golden Age (the era of welfare capitalism). These innovations are accompanied by successive reductions in the value of c_{Wmin} in response to the successive improvements in the welfare regime (captured by the rising values of ω_{sY} reported in column 2 of each table) that necessarily result from the rise in t.[22] As is clear from the penultimate columns of tables 3, 4 and 5, the successive improvements in the welfare regime are accompanied by successive improvements in the financial regime, regardless of household financial posture. In all three cases, the sustainability gap rises and eventually turns positive. The size of these positive sustainability gaps varies, indicating differing degrees of macroeconomic resilience (as defined earlier). But in all three cases the positive sustainability gap indicates that the corresponding household financial posture is rendered sustainable by a sufficiently-enhanced welfare regime. It is also noteworthy that in all three cases, the sustainability gap increases by virtue of simultaneous improvements in both $d_{Yi}\ \forall\, i = h, qs, qp$ (which increases are inevitable given that $c_W = c_{Wmin}$ and $c'_{Wmin} < 0$ in (15)) *and* reductions in the steady-state debt to income ratio d^*_Y (the value of which depends in part on real-sector performance).

Table 3: Simulation Results: Hedge Posture

Values of t, c_{Wmin}	ω_{sY}	d^*_Y	d_{Yh}	$d_{Yh} - d^*_Y$	u
$t = 0.366$, $c_{Wmin} = 0.94$	0.12	4.13	0.95	-3.18	0.80
$t = 0.565$, $c_{Wmin} = 0.92$	0.19	3.17	1.27	-1.90	0.73
$t = 0.829$, $c_{Wmin} = 0.90$	0.28	1.48	1.59	0.10	0.60

Source: author's calculations.

However, as is revealed by inspection of the final columns of tables 3, 4 and 5, the relationship between successive improvements in the welfare and financial regimes and *macroeconomic performance* is more complicated. In tables 3 and 4, u declines as the welfare and financial regimes improve. This coincidence of improvements in the financial regime

[22] The reader is reminded that $\omega_{sY} = t\pi$ is the product of two parameters and is thus necessarily increasing in t, *ceteris paribus*.

Table 4: Simulation Results: Quasi-Speculative Posture

Values of t, c_{Wmin}	ω_{sY}	d^*_Y	d_{Yqs}	$d_{Yqs} - d^*_Y$	u
$t = 0.366$, $c_{Wmin} = 0.94$	0.12	2.97	1.25	-1.72	0.80
$t = 0.565$, $c_{Wmin} = 0.92$	0.19	2.02	1.66	-0.36	0.77
$t = 0.829$, $c_{Wmin} = 0.90$	0.28	0.60	2.08	1.48	0.73

Source: author's calculations.

Table 5: Simulation Results: Quasi-Ponzi Posture ($\delta_{temp} = 0.25$)

Values of t, c_{Wmin}	ω_{sY}	d^*_Y	d_{Yqp}	$d_{Yqp} - d^*_Y$	u
$t = 0.366$, $c_{Wmin} = 0.94$	0.12	2.19	4.99	2.80	0.62
$t = 0.565$, $c_{Wmin} = 0.92$	0.19	1.26	6.65	5.39	0.70
$t = 0.829$, $c_{Wmin} = 0.90$	0.28	0.28	8.32	8.04	0.91

Source: author's calculations.

and deterioration in real performance is not altogether surprising. Borrowing by working households falls because improved welfare provision reduces the 'running to stand still' imperative, while the financing of the social wage through taxes on top incomes simultaneously reduces the net income and hence consumption of rentiers that fuels the 'keeping up with the Joneses' effect. Meanwhile, real performance deteriorates because central to the structure of the economy is a debt-financed, consumption driven demand regime (Kapeller and Schütz, 2015; Setterfield and Kim, 2017). Hence redistributing income towards lower-income working households by improving the welfare regime simultaneously alleviates the need for these same households to borrow in order to finance consumption spending. In and of itself this adversely affects demand formation and hence real performance. These mechanisms draw attention to the perils of 'financialized' neoliberal capitalism, which depends on debt accumulation even as the latter threatens the sustainability of the economy. As noted by

Setterfield and Kim (2020), because of its debt-financed, consumption driven nature, neoliberalism appears to need more than just 'more welfarism' in order to reconcile financial sustainability and hence macroeconomic resilience with robust macroeconomic performance: explicit demand management accompanying these redistributive changes is also required.

Closer inspection of the final columns of tables 3, 4 and 5 introduces an important qualification to this conclusion, however. First, note that the precipitous decline in u in table 3 gives way to a far more modest decline in real performance in table 4, as successive improvements in the welfare regime of identical magnitude (and resulting improvements in the financial regime) are introduced. Finally, in table 5, u actually *rises* as the same improvements in the welfare regime (and associated improvements in the financial regime) are introduced. The results in table 5 are, of course, based on aggressive interest rate discounting by lenders ($\delta_{temp} = 0.25$). But as table 6 makes clear, qualitatively similar results (with respect to simultaneous improvement in both the financial regime and real performance) are observed even when household's quasi-Ponzi posture is based on less aggressive interest rate discounting ($\delta_{temp} = 0.8$). Hence taken together, what our results suggest is that there exists a non-linear relationship between the financial regime and real performance, whereby the effects of improvement in the former on the latter depend on the initial degree of financial fragility in the economy. Put differently (and more broadly), *the benefits of improving the welfare regime increase with the initial degree of household financial fragility.* Hence improvements in the welfare regime always yield accompanying improvements in the financial regime regardless of debtor households' financial posture. But as this financial posture becomes more precarious – as we progress from hedge, to quasi-speculative, to quasi-Ponzi postures – so the benefits of expanding the welfare state increase. Specifically (and other things equal), the detrimental effect on the economy's debt-dependent demand regime and hence its real performance when debtor households are hedge units is first moderated (if households are quasi-speculative units) and then actually *reversed* – so that macroeconomic performance improves – if the welfare state is expanded when households are quasi-Ponzi

units. In this latter regime, the 'traditional' Keynesian effect of redistributing income towards less affluent, high-propensity-to-consume households overcomes the detrimental effect on demand formation of reducing the borrowing requirements of these households. This is ultimately because the positive effect on demand formation of debt servicing which, per Setterfield et al. (2016), reduces aggregate saving (by reducing the saving of workers) and increases aggregate consumption (by increasing the consumption of rentiers and workers through its emulation effects) is modest in the quasi-Ponzi case, owing to the discounted interest rate that is intrinsic to the quasi-Ponzi financial posture. In sum, the macroeconomic benefits of expanding the welfare state increase with the degree of financial precarity that debtor households (and by extension, the economy as whole) initially confront.

Table 6: Simulation Results: Quasi-Ponzi Posture ($\delta_{temp} = 0.8$)

Values of t, c_{Wmin}	ω_{sY}	d^*_Y	d_{Yqp}	$d_{Yqp} - d^*_Y$	u
$t = 0.366$, $c_{Wmin} = 0.94$	0.12	2.25	1.56	-0.69	0.82
$t = 0.565$, $c_{Wmin} = 0.92$	0.19	1.40	2.08	0.68	0.85
$t = 0.829$, $c_{Wmin} = 0.90$	0.28	0.33	2.60	2.27	0.96

Source: author's calculations.

6 Conclusions

In this paper, we extend the principles of the FIH to the household sector. We re-frame the three financial postures associated with the FIH (hedge, speculative, and Ponzi) in the context of households, using a simple model of household borrowing and debt-financing behavior. We also connect our framework to research strands of Comparative Political Economy (CPE) and, in particular, the CPE discussions of credit regimes and the welfare state. In this sense, our work contributes to recent attempts to provide macroeconomic foundations for CPE based on Heterodox macro theory and its emphases on social conflict,

power, distribution and growth, demand formation, financialization, and financial cycles.[23]

Our results show that in the context of a permissive credit regime economy such as the US, an expansion of the welfare state funded by a tax on top incomes improves the resilience of the economy by increasing the sustainability gap – the difference between the maximum feasible and actual (steady-state) household debt-to-income ratios. They also show that the benefits of such top-tax-rate-funded welfarism increase as the initial financial precarity of the household sector increases, to the point where they can even result in improved macro performance (*ceteris paribus*). These results invite reflection on current US policy debate, given the Biden administration's proposals for expanding and funding 'social infrastructure' in the American Families Plan. Our results suggest that by lowering top tax rates and the social wage, the US did itself a disservice during the neoliberal era by reducing the 'sustainability gap' and so reducing macroeconomic resilience. They also reveal that raising top tax rates to provide social services without accumulating public debt – a core tenet of the American Families Plan – would unequivocally improve the macroeconomic resilience of the economy and depending on the degree of financial distress of US households, may improve macroeconomic performance, even in the presence of a consumption-led, debt-financed demand regime.

Our analysis is, of course limited by the act that it abstracts from corporate debt and the foreign sector. Despite its focus on household borrowing, it also abstracts from the accumulation of housing wealth – a vital facilitating factor in the accumulation of household debt. We regard these omissions as fruitful avenues for further research into the welfare state – credit regime – macroeconomic performance nexus explored in this paper.

[23]See Stockhammer (2020) for a recent discussion of this project, with specific reference to Post-Keynesian Economics.

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