



Working Paper No. 801

The Political Economy of Shadow Banking: Debt, Finance, and Distributive Politics under a Kalecki-Goodwin-Minsky SFC Framework

by

Eloy Fisher¹

Javier López Bernardo²

May 2014

¹ Ph.D. candidate at The New School

² Ph.D. candidate at Kingston University

The Levy Economics Institute Working Paper Collection presents research in progress by Levy Institute scholars and conference participants. The purpose of the series is to disseminate ideas to and elicit comments from academics and professionals.

Levy Economics Institute of Bard College, founded in 1986, is a nonprofit, nonpartisan, independently funded research organization devoted to public service. Through scholarship and economic research it generates viable, effective public policy responses to important economic problems that profoundly affect the quality of life in the United States and abroad.

Levy Economics Institute
P.O. Box 5000
Annandale-on-Hudson, NY 12504-5000
<http://www.levyinstitute.org>

Copyright © Levy Economics Institute 2014 All rights reserved

ISSN 1547-366X

ABSTRACT

This paper describes the political economy of *shadow banking* and how it relates to the dramatic institutional changes experienced by global capitalism over past 100 years. We suggest that the dynamics of shadow banking rest on the distributive tension between workers and firms. Politics wedge the operation of the shadow financial system as government policy internalizes, guides, and participates in dealings mediated by financial intermediaries. We propose a broad theoretical overview to formalize a stock-flow consistent (SFC) political economy model of shadow banking (stylized around the operation of money market mutual funds, or MMMFs). Preliminary simulations suggest that distributive dynamics indeed drive and provide a nest for the dynamics of shadow banking.

Keywords: Political Cycles; Debt and Public Finance; Shadow Banking; Political Economy of Finance; Kaleckian Macrodynamics; Stock-Flow Consistent (SFC) Modeling; Political Macroeconomic Models

JEL Classifications: E12, E62, E63, H5, H6, P16

1 INTRODUCTION

Shadow banking (a term used interchangeably with *shadow financial system*) is “money market funding of capital market lending,” [19] which generally takes place outside the regular banking system [3, 28]. This definition highlights the activities of financial intermediaries that use short-term money market funding (sourced from global dollar markets) to fund long-term investment projects—namely capital loans. Non-traditional banks and other types of institutions (a broad array of financial agents allowed to take client’s deposits to invest in different types of projects) engage in these activities.

Estimates differ on the size of this unregulated shadow banking sector—some suggest a figure around 65 trillion dollars worldwide as of 2011, from 26 trillion in 2002 [5]. This exponential growth is commonly explained as a direct consequence of advances in securitization, which sought to minimize risk by packaging and pooling assets in structured products, a favorable regulatory climate, and a macroeconomic environment of low interest rates.

However, this paper describes the operation of the shadow financial system through an approach which not only underscores the interlinkages between agents, sources and the target of this funding, but also the political economy of capital and labor behind the dense web of financial intermediaries who participate as dealers, investment banks or special purpose vehicles (or SPVs) to price funding, economic, and political risk. Assets and liabilities held by these financial intermediaries link firms, workers, and their rolling clout with government action and policy. With this in mind, we will argue that the financial operation of the shadow financial system is not a mere mechanical outgrowth of advances in securitization and risk management, but the natural result of tensions in the political economy of democratic capitalism as argued by Kalecki [12].

Shadow banking reaches deep into the political development of capitalism, as argued by heterodox writers of both Marxist and Post-Keynesian persuasion. After this short introduction, we present a short sketch of these views: Marx himself took interesting notes on the appearance of quasi-banking, highly leveraged financial institutions (namely, the “Crédit Mobilier” of the mid-19th century) whose operation was analogous to many shadow banks. His analytical innovation stressed not only the intimate political linkages of the “Crédit Mobilier” with the government of Napoleon III, but its overall function within French capitalism. Much later, Hyman Minsky traced the development of what he coined *money manager capitalism*, a system “in which the proximate owners of a vast proportion of financial instruments are mutual and pension funds”

[21]. L. Randall Wray [29] updated Minsky's definition, as "capitalism characterized by highly leveraged funds seeking maximum total returns (income flows plus capital gains) in an environment that systematically under-prices risk." We conclude this section with a discussion of how politics drives a wedge in the shadow financial system, as government agency guides the nature of deals undertaken by financial intermediaries, supplies needed collateral, and provides the policy space for the tug-of-war between workers' wages and firms' profits around government stabilization policy.

The third section presents the stylized facts used to describe the political economy model of shadow banking, using insights from Mehrling, Pozsar, Sweeney, and Neilson's work on shadow banks [19] and data from the United States. Section four presents the mathematical model, the balance sheet and the flow of funds accounts used in this stock-consistent model. Section five presents baseline results and preliminary alternative scenarios. Finally, Section six concludes, and shortly thereafter, we include a mathematical appendix, which details the equations used in the model.

2 LITERATURE REVIEW

2.1 Marx and Minsky: From *Financial* to *Money Manager Capitalism*.

In journalistic works and personal exchanges with Friedrich Engels, Karl Marx discussed the appearance of the *Crédit Mobilier* in France. Sanctioned by the government of Napoleon III and with direct involvement of cabinet members and influential personalities of the Second Empire, the *Société Générale de Crédit Mobilier* was founded by the Péreire brothers, a resourceful duo who, in earlier years, had toyed with Saint-Simonian ideas—to Marx’s derision. Their company issued shares to select investors (later it was opened to the public) who wished to partake in long-term investments in “mobile” property—railways, industrial production or stock market listings of these companies.

Marx, like many other contemporary commentators, described the venture as a “swindle” [26] given the obvious lack of safeguards. Yet, regardless of the tone he used to describe the “*Crédit Mobilier*,” Marx took interest in the political intrigue behind its operations. For one, the Péreire brothers’ venture was opposed by none other than the Rothschild family, the premier financiers of the time, whose political leanings initially sided with the dethroned Bourbon king, Louis Phillipe. But more importantly for Marx, the “*Crédit Mobilier*” served an important role in French capitalism. Its increasingly leveraged positions, fueled the boom in industry and economic activity beyond potential capacity, especially as France lagged behind other industrial powers. As Marx recognized in notes that would later become the third tome of *Das Kapital*, this financial institution would only come to prominence in a country like France, “where neither the credit system nor large-scale industry was developed to the modern level. In England and America this kind of thing would have been impossible” [18].

Although characteristically sardonic, Marx pinned the “*Crédit Mobilier*” to a broader economic narrative. As he saw it, industrial capitalism demanded a structured banking sector with ties to a state-led apparatus to finance industrial development; this view was later developed by Rudolf Hilferding [11]. Following Marx’s reasoning, Hilferding explained how these financial institutions used their proximity to the political establishment and their financial wherewithal to support the prices of securities and lengthen boom cycles, especially when the productive kernel of capitalism faltered.

Almost a century after Marx, Hyman Minsky framed this issue similarly. Minsky recognized that economic stability in capitalism was the direct result of government involvement. However, Minsky also acknowledged that capitalism was “inescapably a financial system” [20] where *managed money* (hedge funds, mutual funds and the much-maligned investment banks) had risen to become top performers and dominate an ever-growing share of financial flows. With the elimination of interest caps in 1982, these institutions, now global in scope, sold liabilities to eager buyers hunting for returns worldwide. Indeed, the modern shadow banking system was born.

As US sovereign debt provided a safe, trusted asset to park accumulated cash resources, higher government deficits backstopped this financial system. With higher deficits, the financial sector did not need to increase its portfolio diversity or hunt for other types of safe assets to meet demand. As financial capitalism allowed for greater government intervention, industrial demand hiked capital goods prices. But in this *managerial capitalism* (as phrased by Minsky), it was still possible for traditional banks to syndicate loans for purposes of industrialization. Their efforts led to the concentration of capital under the control of large companies with strong government backing.

But as the political coalitions between capital-intensive industries and labor interests of the post-War era slowly weakened, changes in the domestic political landscape and competition from abroad sapped competitive advantages in heavy industries for the US [7]. Furthermore, the collapse of the Bretton Woods system in 1971 created a global dollar market. Floating exchange rates, coupled with the dollar’s exceptional privilege, strengthened the need and the supply of dollar liquidity to international markets. With the elimination of interest rate ceilings on deposits (or Regulation Q), the global dollar market created an environment in which new international institutions operated with ease. As the world shed the last vestiges of the New Deal, it quickly took up the mantle of *money-manager capitalism*.

Earlier phases in capitalism relied on a strong government to tame the domestic financial needs of a growing economy. However, while the appearance of a deregulated worldwide dollar market still required the support of a government willing and able to supply needed surety to anchor global finance, innovations in securitization supplied financial products to meet the demand for “safe” global capital investment. The flourishing demand outstripped the capacity of the traditional banking sector to advance loans to these purposes.

As the US entered a period of lower deficits (and interest rates) with President Bill Clinton, the demand for safe, high-yielding assets outstripped supply. With the advent of securitization, synthetic assets were created to guarantee investor deposits. Low interest rates provided by the now (in)famous Alan Greenspan contributed to reduced Treasury rates and fueled the need for “safe” substitutes. As argued by Gorton and Metrick [10], the booming global market in dollars outstripped the capacity of the Federal Deposit Insurance Corporation (or FDIC) to allow institutions with large cash holdings to seek safe harbor, especially as the 1990s saw government surpluses—“the regulatory changes were, in many cases, an endogenous response to the demand for efficient, bankruptcy-free collateral in large financial transactions [...]” At the international level, Mehrling, Pozsar, Sweeney and Neilson [19] provide an explanation:

“[...] In today’s world so many promised payments lie in the distant future, or in another currency. As a consequence, mere guarantee of eventual par payment at maturity doesn’t do much good. On any given day, only a very small fraction of outstanding primary debt is coming due, and in a crisis the need for current cash can easily exceed it. In such a circumstance, the only way to get cash is to sell an asset, or to use the asset as collateral for borrowing. In the private market, the amount of cash you can get for an asset depends on that asset’s current market value. By buying a guarantee of the market value of your assets, in effect you are guaranteeing your access to cash as needed; if no one else will give you cash for them, the guarantor will. [...] That, in effect, is what all the swaps are doing, or at any rate what they are trying to do. *Because the plain fact of the matter is that all the swaps in the world cannot turn a risky asset into a genuine Treasury bill*” (The emphasis is ours).

An important link in identifying how this global shadow banking system appeared is provided by the operation of *money market mutual funds* (or MMMFs), which became popular after the demise of Regulation Q (or the elimination of interest rate caps). According to the Investment Company Institute (ICI), these funds comprise 17% of total assets held in mutual funds worldwide, behind equity and bond mutual funds. Deemed very safe and liquid investments, MMMFs sell shares to investors, and lend those funds (via repurchase agreements, or *repos*) to banks or dealers who demand liquidity for overnight operations.

MMMFs deposit their cash in investment banks or broker accounts, which in turn provide MMMFs with collateral—usually, high-quality commercial or sovereign debt. The collateral provided is worth more than the deposit—the difference between the par value of the collateral provided and the cash deposit is commonly known as the *haircut*. Under the terms of the repo, the bank repurchases the collateral at a higher price - or the difference between the initial selling price and the repurchase price is the *repo rate*, or interest rate on the loan. If the borrower fails to pay the repurchase price, the lender gets to keep the collateral at par value.

Given these terms, the shares of these MMMFs are backed by high-quality debt—high-quality commercial paper, Treasury bills, and/or other sovereign bonds. Hence, their profitability depends wholly on the overall health (i.e., the net worth) of the economy’s systemic institutions—*blue chip* companies and the government. Their operation in the US is closely regulated by the Investment Company Act of 1940 (and subsequent amendments) which describes what constitutes a safe investment asset. These regulations make them unlike other types of mutual funds—MMMFs must keep a net asset value (or the value of its assets minus its liabilities) greater than one, as their assets are highly liquid and risk-free—at least in theory. Herein lies the caveat: these MMMFs are viable entities as long as markets provide liquidity for well-regarded liabilities, governments fulfill and backstop market operations, and all participants are able to price risk adequately—an ability that market participants regrettably overestimated in the run-up to the last crisis. For this reason, how markets are organized institutionally, the interests they represent and where the “buck” ultimately stops, are critical factors in the operation of the shadow financial sector, and particularly for MMMFs (who, at the receiving end of government deficits, trade large amounts of sovereign United States debt).

Given these reasons, therefore, we need to further discuss the ability and operation of the private sector to package and distribute these “safe” assets backstopped by sovereign debt—and hence, government deficits. The first requires grounding on how this shadow financial sector works, and how it conducted business until very recently, especially in the US. The second issue prompts an explanation of how these deficits came to be and the interests behind them. To these issues we turn next.

2.2 Financial Fragility, Class Politics and Government Policy in the Operation (And Crises) of the Shadow Financial System.

The origin of the shadow financial sector is a natural outgrowth of a worldwide, liquid dollar market that appeared after the demise of Bretton Woods. It took root after a new regulatory climate changed the nature of the banking business. However, global financial flows rely today on dollar-denominated assets that carry the full faith and credit of the world's only superpower (although that may change in the coming decade or so). For this reason, it is also a consequence of government policy—especially of deficits, sovereign debt and the institutional balancing role government plays in supplying dollar securities to eager investors.

Much has been written about the intellectual and policy ideas that became conventional wisdom after the late seventies (for some examples, Wray[29], Wray and Nersisyan[31], Tymoigne and Wray [28], Skidelsky[25]). As argued above, New Deal coalitions withered, and private markets in assets and debt flourished. Ideas that promised the rational and efficient behavior of financial markets and their linkages to the needs of households and firms bubbled to the top of policy discussions and implementation. As Wray [29] notes, at their intersection was the repeal in the US of the Glass-Steagal Act in 1999 (and specifically the provision that separated retail and investment activities in banks), the Commodities Future Modernization Act of 2000 (which excluded a number of financial instruments from regulatory oversight) and the Employee Retirement Income Security Act of 2000 (which expanded the scope of instruments that pension funds could invest in):

“Some of these changes responded to innovations that had already undermined New Deal restraints, while others were apparently pushed-through by administration officials with strong ties to financial institutions that would benefit. Whatever the case, these changes allowed for greater leverage ratios, riskier practices, greater opacity, less oversight and regulation, consolidation of power in 'too big to fail' financial institutions that operated across the financial services spectrum (combining commercial banking, investment banking and insurance) and greater risk [29].”

Meanwhile, the shadow financial sector experienced spectacular growth in the same period, as recognized by Claessens, Pozsar, Ratnovski and Singh [5]. The need for safe dollar assets and low interest rates allowed for experimentation in securitization via off-balance-sheet intermediation. As dealers and banks received cash from institutional investors (and especially MMMFs), they loaned these funds to SPVs, which in turn packaged different types of securities into tranches, set apart by their combination of safe and riskier assets. In turn, SPVs (off-balance sheet vehicles given favorable regulatory treatment on bankruptcy and taxes) held by these investment banks and dealers off their balance sheets became a source of profits and revenue, as their packaged securities served as collateral in their dealings with MMMFs and other institutional investors.

This demand for collateral to back ever-growing acquisitions of assets that were expected to rise in value gave rise to what Minsky labeled as *Ponzi finance*, a core concept of his *financial instability hypothesis*. In the timely analysis Tymoigne and Wray [28] wrote to update and extend Minsky's views on the matter, the authors explain at great length the different Ponzi processes enabled by the regulatory climate in *money manager capitalism*. For one, they argue, "Ponzi finance is different from bubble, fraudulent activity, poor credit or speculation." Ponzi processes inhabit a gradient where the most dangerous practice is a process which demands continuous liquidation of assets or the permanent growth of refinancing (the ubiquitous *pyramid scheme*), while the least dangerous is the financial practice of temporarily refinancing loans before net cash flows from business operations mature to their expected level.

Unlike other theories of bubbles and crises, Minsky claimed financial fragility was the byproduct of stability as periods of prolonged expansion lulled investors into complacency. As Tymoigne and Wray[28] write:

"The idea behind the boom period is, therefore, that the sum of the net cash inflows from routine operations cannot grow as fast as the cash outflows from financial commitments without generating inflation in output and/or asset markets. This inflationary pressure will be built-up in financial contracts, and the economy will become more sensitive to the realization of asset-price and output price-expectations. Coupled with euphoria, this high sensitivity leads to a major crisis when expectations are not realized and refinancing needs cannot be met."

During the financial crisis, especially after the *Lehman shock* in September 2008, there was a run on these assets. As argued by Morgan Ricks, “Lehman’s default triggered a run on the MMMF sector... Practically overnight, investors withdrew nearly half a trillion dollars from prime money market funds... The free fall was halted only after a massive policy response by government authorities [23].”

The first indication of a problem occurred in the repo market tying banks to MMMFs and other institutional investors. As asset value quickly drained away from banks’ balance sheets, haircuts on repos increased. As Gorton and Metrick [10] recognized, “depositors [namely MMMFs] in repo transactions with banks feared that the banks might fail and they would have to sell the collateral in the market to recover their money, possibly at a loss given that so much collateral was being sold at once.” As haircuts increased, banks had to finance larger amounts of their normal cash operations by other means, which hiked borrowing rates. MMMF investors cashed their shares given the turmoil around the valuation of what was once regarded as quality debt. The forced liquidation of their assets put downward pressure on the value of these holdings—for one, there was a run out of prime MMMF funds (which invest in commercial paper, certificates of deposit and repos) into sovereign non-prime MMMFs, until the temporary guarantee program on MMMFs sponsored by the government stopped the ebb of funds. However, at this point in the crisis, it was the government’s implicit net worth which propped the value of both private and sovereign funds in the economy.

Contrast the above scenario to what happened during the debt ceiling crisis of April-July 2011 when the US Congress refused to approve the Treasury’s request to issue additional debt to meet projected fiscal obligations. As argued by Krishnan et al., [17], the crisis affected private debt prime MMMF funds earlier and to a greater extent than sovereign, non-prime MMMFs, which only saw sharp outflows after mid-July when the situation turned critical for the leading banks and financial institutions, prompting them to send a strongly worded warning to the political leadership on Capitol Hill. However, the authors argue that the outflow effect was not as stark given the simultaneity of this crisis with an ever-worsening European situation.

For the reasons outlined above, we can distinguish the operation of two mechanisms at work, one financial and another political, within the shadow financial sector—and particularly with respect to MMMFs. As intermediaries, shadow banks react to systemic economic conditions that affect their financial counterparts; it happened during the 2008 crisis in their dealings with brokers and banks. However, as asset managers, they must also react to political calculations

which affect the price of the debt assets. If the US had defaulted on its debt, it would have opened a downward price spiral on other assets, increasing the costs of borrowing, forcing the government to abruptly stop its operations and undoubtedly generate political unrest.

However, these debt ceiling debates did not happen in a vacuum: the hardline push of House Republicans to deny the request of the Treasury happened amidst debates about how much government spending was adequate in the aftermath of the 2008 crash to help stimulate the economy. For one, Republicans (and some moderate Democrats) argued that government spending failed to jumpstart economic activity, and only raised costs for businesses. Democrats, in turn, argued that President Obama's stimulus project (or the American Recovery and Reinvestment Act of 2009) was not enough, and more spending was needed in critical sectors. Almost immediately after the 2011 debt ceiling crisis, the Obama Administration proposed the American Jobs Act, but garnered little support in its aftermath—especially with the political fallout of the Standard and Poor's downgrade soon after the debt ceiling crisis was resolved. For this reason, any view which links sovereign debt and financial markets must also include perspectives on what interests and political tensions lie behind debt and deficits.

At a theoretical level, the political economy of government debt and deficits is featured in treatments by both mainstream and heterodox scholars. With regards to the mainstream, Buchanan and Wagner's classic work [4] proposed *deficit illusion* of voters, who seek the benefits of government spending but do not wish to pay for these goods via higher taxes or inflation. Persson and Svensson [22], Alesina and Tabellini [2] and Tabellini and Alesina [27] argue that high debt burdens tie the hands of successor governments who inherit a constrained fiscal space for spending, and may lead to overindulge debt beyond "optimal" levels.

A more sophisticated version of this argument appears in a paper by Aghion and Bolton [1]. The authors contend that left-leaning governments increase debt levels to finance public expenditures geared to their own constituencies especially if they harbor certainty that their opponents will win the next election. On the other hand, conservative-leaning politicians favor debt reduction regardless to minimize the probability of decreasing the value of savings apportioned by their better-off constituents (assumed to be held in bonds). If default is deemed to be a strategic decision by either party, leftists will be perceived as more likely to default than conservatives. With this in mind, conservatives issue more debt to create the perception of debt unsustainability and influence election outcomes to their advantage.

Finally, a less realistic view of debt and deficits is described in Kenneth Rogoff's seminal paper on political budget cycles [24]. For Rogoff, deficits are a byproduct of a government's competence in efficiently delivering public goods with existing tax resources. Very much like the authors above, Rogoff assumes that voters are myopic in their assessment of public consumption goods with respect to investment goods. Yet, Rogoff assumes that competent policymakers deliver these goods without the added burden of deficits (and hence, tax increases over the same period). Over the long-run, voters favor highly competent incumbents who deliver a higher level of public good provision and investment, rather than uncontested challengers or incompetent politicians.

With respect to Rogoff's work and related extensions, deficits can hardly be construed as a competency problem. Politicians enact spending policies to attract votes; doing so is their core competency in a democratic political system. With respect to the rest of the models, while they rightly recognize the strategic use of debt and deficits (and voters myopia in their assessment), they are generally critical of expansionary government policy. More importantly, their use of normal distributions to describe a median income and a median voter does not capture how the functional distribution of income and the endogenous political forces behind their determination can change the direction, priorities and overall effectiveness of government spending.

These critiques are developed by heterodox writers. Espoused forcefully by Michal Kalecki in his famous 1943 paper and in writings about public finance, an alternative view proposes a different take on the drivers and sustainability of deficits and debt. In his political cycle model, Kalecki [12] argued that government expenditures (at least initially) benefited both workers and businesses *knowingly*. Spending pushes effective demand, accumulation and growth, and increases wages and profits. The conflict between businesses and workers that takes place later in the cycle is of a political nature. For one, higher deficits lead to tighter wage markets, increased labor bargaining power and decreased worker discipline. Also, it shifts the locus of expectations from the private to the public sector. In doing so, it relinquishes a powerful tool at the reach of private markets to guide economic activity. For this reason, as their political tolerance wanes, businesses object to full employment policies and promote austerity to shift politics once again to their favor.

This Kaleckian-inspired view is loosely analogous to work undertaken by Keen [15, 16]. Nonetheless, whereas Keen’s work stresses the drivers behind private sector euphoria in his Minsky models, we argue that government makes an effort to balance the political interests of labor and capital, with a bias to guarantee capital accumulation by firms over the longer-term. In his oft-cited 1995 paper, Keen simulated counter-cyclical government policy, but recognized (and left open) whether this institutional setup was appropriate. At the time of his piece, he noted that “Western governments have adopted policies anti-thetical to the countercyclical role they largely followed in the 1950s and 1960s” [15]. However, it was in that very period that Kalecki proposed his stylized facts of a government-driven political business cycle to explain a behavior he deemed hardwired into the political economy of capitalism. And while Kalecki briefly and cogently discussed the stark distinction between democratic capitalism and authoritarian fascism, he wondered whether *full employment capitalism* would (and could) develop the new social institutions needed to eliminate this stop-and-go cycle. It is obvious that this did not happen, but it remains an open question to assess whether the change we experienced in the last two decades was just a slow quantitative shift, instead of the oft-discussed qualitative change in the role of government in capitalism.

On another note, Kalecki believed an increase in government deficit had no adverse effect on output. Objections to deficits were political, not economic in nature. Kalecki recognized that state borrowing did compete with private interests for loanable funds at full employment, but argued that as the state pays to individuals, money returned to banks as deposits. Therefore, interest rate stability does not depend on budget policy, but “on proper banking” action. More recently, Wray [30] suggested that bond sales are also an instrument of monetary policy, and not a mere recourse to deficit finance.

Our view is that the above is a source of political friction within social groups. While there is an interesting debate around the fiscal space enjoyed by sovereigns who issue debt in their own currency (as noted by scholars who subscribe to what is commonly known as *Modern Monetary Theory*, or MMT for short), we must underscore that these sovereign privileges assume institutional and political trappings. While close financial substitutes, crediting bank reserves and bond issues may serve different political constituencies with conflicting attitudes towards government action undertaken by either the Treasury, the central bank—or both. All the above may ultimately lead to differential results in interest rate management and/or stabilization policy. Furthermore, the characteristics of the security offered itself frames the market in which it is

traded. For example, participants in the primary market for debt in the US have intimate dealings with the Treasury (and must subscribe to a set of prerequisites to that purpose. See Dupont and Sack [6] for an overview). Meanwhile, participants in secondary markets engage in over-the-counter transactions across the global dollar market under the welter of intervention by the Federal Reserve. With respect to the dollar, primary and secondary markets are deep, broad and liquid—despite the difference in size (the primary market gathers a mere 2,000 registered participants, of which a select few are the most active dealers). Finally, other countries might not enjoy the same luck: In the US, political considerations around debt are rendered moot by the exceptional privilege of the dollar as gatekeeper of the world market for dollar assets. In other countries, primary market auctions may serve other urgent and very concrete political aims: if a government spends to appease fractious politics, recruiting primary auction participants may prove a slow, protracted and politically costly affair, especially if international market participants understand the underlying reason and directly ask for higher yields (as political appeasement involves a degree of unpredictability well beyond some of the most speculative profit-making opportunities). As the cost of debt increases, higher debt yields asked by financial markets will have a negative effect on government real expenditures and stop the more ambitious plans for such appeasement.

Under these constraints imposed by financial markets, a government under political pressure can buy some time (instead of waiting and then restraining spending) when it nudges a central bank to finance these deficits at the best available price but at an inflationary cost. If markets are able to test a government's willingness (and the people's tolerance) to resort to inflation, itself a politically costly endeavor, it may exact a heavy price on government borrowing. To these stylized facts we turn next.

3 THE MODEL

3.1 Stylized Facts

This model operates on two levels: at its barest, the model synthesizes the fundamental conflict between wages and profit over production as argued by Kalecki's political business cycle [12] and Goodwin's profit rate / investment dynamics [8, 9]. The broad set-up of our model is similar to models proposed by Keen [16, 15], although our stylization will stress a Kaleckian political backdrop for the linkages between labor, capital, government and finance.

In Kalecki, deficit expenditures add to demand and employment, and increase overall output levels. Meanwhile, government policy will be sensitive to the clout of worker households, as government stabilization scales back with increased labor bargaining power. As deficit expenditures increase employment and demand, heightened worker bargaining power causes political restlessness in businesses. Business and financial expectations shift with waning political tolerance, prompt calls for *sound government finance* and hike yields on debt, which increases the costs of deficit-financed expenditures. Rapid retrenchment in expenditures depresses output, income and growth, and aligns new business interests with popular demands for compensatory fiscal expenditures.

However, at a broader level, the financial sector drives the cyclical dynamics of this political economy as argued by Marx and Minsky. As a departure point, we borrow Mehrling, Pozsar, Sweeney and Neilson's [19] analytical approach: Their model abstracts from traditional banking to devise a bare construct "in which shadow banking is the only system." Given their centrality, we propose a version where MMMFs take the role of the shadow banking sector as a whole. This vantage point incorporates the political economy of financial intermediaries (where MMMFs mediate holdings of businesses, traditional banks and government), productive units (firms and households) and government itself.

Hence, amidst the above changes in the state of business and financial expectations due to the tug-of-war between profits and wages, government deficits source the auction of treasuries at prevailing yields, which in turn backstop the supply of readily available debt assets demanded by MMMFs. In turn, MMMFs sell shares to the private sector. Furthermore, MMMFs advance cash (received from firms' purchase of shares) via repos (which use treasuries as collateral) to cover the financing needs of the traditional banking sector to meet normal business operations.

The financial implications of this model can be readily seen in the balance sheets of Table 1 below. The first balance sheet to the left is the government’s account at the Treasury. Government will issue treasuries against its (negative) net worth Ω_G regardless of the amount of outstanding debt—this net worth is an institutional balancing factor, determined by political governance and decision structures.³ Next to government, we have MMMFs which keep government debt as collateral assets and issue “shares” to investors—the residual is the MMMFs’ net worth Ω_{MMMF} . Finally, firms accumulate profits and save MMMF shares as assets to finance their capital investment, which constitutes their net worth.

Finally, we include a balance sheet for a “traditional” bank sector just below the “shadow” bank sector. Traditional banks accept deposits and issue loans. However, banks swap (via repos) cash funding from the “shadow” financial sector (itself raised via shares sold to the private sector) in exchange for treasuries as collateral. The juxtaposition of these balance sheets clarifies the reason behind Mehrling, Pozsar, Sweeney and Neilson’s abstraction from traditional banking: in their *shadow banking only world* “money market dealers were and still are typically divisions of traditional banks that enjoy traditional governmental backstops” [19].

³ Many countries keep a legal and political backstop to their financial obligations: Perhaps the most famous is the 14th Amendment (Section 4) of the United States Constitution, which reads that the “validity of the public debt of the United States, authorized by law, including debts incurred for payment of pensions and bounties for services in suppressing insurrection or rebellion, shall not be questioned”. This clause floated as final recourse during the debt ceiling debates if an agreement was not reached, although no explicit strategy was articulated with regards to how did this “unquestioning acceptance” could be enforced. On that count, the Supreme Court did rule on a case (Perry v. United States, 1935) that “[i]n authorizing the Congress to borrow money, the Constitution empowers the Congress to fix the amount to be borrowed and the terms of payment. By virtue of the power to borrow money ‘on the credit of the United States,’TM the Congress is authorized to pledge that credit as an assurance of payment as stipulated, as the highest assurance the government can give, its plighted faith. To say that the Congress may withdraw or ignore that pledge is to assume that the Constitution contemplates a vain promise; a pledge having no other sanction than the pleasure and convenience of the pledgor. This Court has given no sanction to such a conception of the obligations of our government (the emphasis is ours).

Table 1 Balance Sheets for the Government (Treasury), Money Market Mutual Funds (MMMFs), Firms and Traditional Banks.

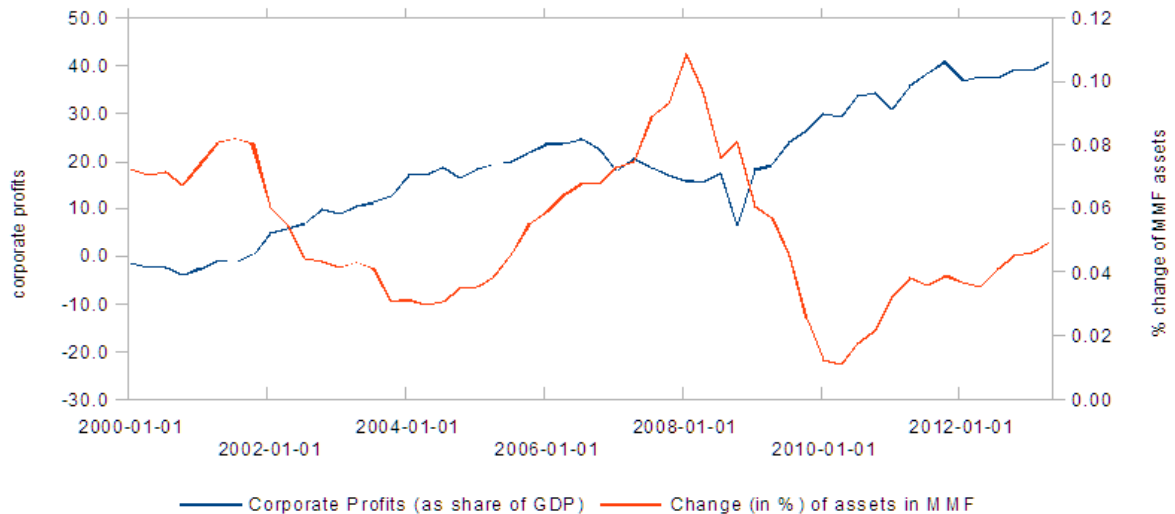
Government		Money Market Funds (MMMFs)		Firms	
<i>nil</i>	treasuries Ω_G	(treasuries)	shares Ω_{MMF}	shares	capital
Traditional Banks					
		loans (cash)	deposits Ω_B		

Notes: Ω_G is the net worth of the government (which is negative, as the net *value* of government is larger than the replacement value of its capital), Ω_{MMF} is the net worth of the MMMFs, Ω_B is the net worth of banks. () denote swapped assets between MMMFs and Traditional Banks.

Finally, in Mehrling et al. [19], financial prices are set by dealers who quote in a two-sided market. There are two types of dealers, those who keep matched books (or whose long positions are completely offset by their short positions) and those who do not. Unlike the first (who do not supply market liquidity at all), those who do not keep matched books engage in constant price revaluations that require a quickly acquired sense of how much liquidity is needed by the market, which involves a degree of risk.

In our model, the latter are the main players undertaking the revaluation of returns on deposits loaned to the shadow banking sector based on overall profits—this is seen in Figure 1 below. A quick glance at the graph hints at a cointegrating relationship between the level of corporate after-tax profits and the change of MMMF assets under management in the US. The overall increase in profits pulls up the demand of MMMF assets and lures investors into shadow financial assets for a quick return, but it also acts as a floor on financial assets. As Minsky explained, in money manager capitalism, the “total return on the portfolio is the only criteria used for judging the performance of [...] managers of these funds, which translates into an emphasis upon the bottom line in the management of business organizations” [20].

Figure 1 Quarterly Time Series Of The After-tax Corporate Profits as Share of Real Gross Domestic Product (GDP) and the Change in Assets under Management by Money Market Mutual Funds (Mmmfs) for the United States (2000:1–2013:2).



Source: Federal Reserve of St. Louis Database <http://research.stlouisfed.org/fred2/>.

Notes: A Johansen cointegration test (for an unrestricted constant) allows us to reject the null hypothesis that there are no cointegrating relationships between the series (rank 0, eigenvalue 0.30, trace test 18.973 with p-value [0.0129]) but we cannot reject the null for a single cointegrating relationship (rank 1, eigenvalue 0.021, trace test 1.11 with p-value [0.2922]).

Profits add further complexity to the model’s distributive dynamics: as Kalecki explained [14, 13], higher profits do not translate into more output if demand stagnates. Moreover, the reaction of financial intermediaries, trapped in the tug-of-war dynamics of distribution, is not clear-cut given their indirect linkages to both parties. Shadow banks keep stakes both in government debt as collateral (and in doing so, allow for increasing government expenditures) but also benefit from higher profits (and overall asset demand). As MMMFs do not keep matched book positions, they supply market liquidity under risks underscored not only by the nature and drivers of market transactions, but also by the political dynamics between labor and capital.

Government securities pay a yield on shadow banking sector holdings (as higher yields on debt securities held by the central bank will not turn into a direct, payable expense). This yield is set according to a privately held debt-to-output ratio. This debt premium is not rationalized as a function of debt levels (and a possible default), but of the bargaining power of private markets over the government’s prospects of using debt resources to fulfill political ends in stabilization. As governments spend more, private markets will demand ever-higher premia if the government hesitates to pursue the monetization of its debt (and inflation) beyond currency needs, given the

political costs involved—and especially if workers’ income is constrained by their employment prospects.

This leads us to the role of government policy. Government is trapped in a political cycle that oscillates between the narratives of sound and functional finance, as politicians play a delicate balancing act between the economic clout of businesses and financiers, and the majoritarian political clout of workers. This careful balancing act sums up recent political debates about austerity and spending.

Democratic capitalist polities with responsive governance structures with respect to worker and business interests are caught in a debate on who to bailout around a political zero-sum game. Government stabilization is paid mainly by borrowing (and not through higher taxes) to avoid disgruntling political constituencies that differ in reach and scope (although what can be taxed without fear of effective political repercussion can differ considerably from place to place). As government borrows, it finds willing lenders amongst financial intermediaries, who then complain that this borrowing will nudge politicians to continue spending and increase the clout of workers over firms—without a doubt, it is Kalecki’s political business cycle, but with a Minskyian twist.

The conflicting interests of stabilization to directly prop the wages of workers, and indirectly, via the needs of financial intermediaries, to require government securities as collateral, raises the question of *who* manages government policy and for *what* purpose. Under these constraints, government policy cannot be everything to everyone—it is either geared to those who want to expand spending to support wage income, those who wish to restrain it to prop the clout of profits or those who need it to keep the financial system operating under increasingly strained political circumstances. Indeed, this complex matter is at the heart of the political economy of modern shadow banking.

3.2 The Theoretical Model

We present a closed economy model over the short- to medium-run, where workers, businesses and government interact in the real sector, and businesses and government transact through a “shadow financial sector” (modeled specifically after a money market fund) which settles financial claims between the latter two groups. All the relationships explained in this section are presented in the balance sheet and the flow of funds tables below. To simplify matters, all prices (except for financial asset prices) remain fixed.

Workers consume their after-tax wages. Firms save their after-tax profits to buy equity stakes in money market mutual funds lured by their returns, and invest the rest. Investment relates firm income and interest earnings, and their investing in MMMF shares. Government is financed via taxes on consumption and issues short-term treasury bills to make up the difference in spending, its expenditures are set via a policy rule that checks worker clout in the economy. A central bank provides cash for workers and firms, and buys government debt as an asset. Finally, the central bank follows an interest rate stability rule, where bonds are bought to credit cash reserves to facilitate consumption and investment. The shadow financial sector churns business equity investment into asset purchases of government debt. They pay an equity return to business investors, itself a function of the overall profit share in the economy—if aggregate profit shares are high, these push up money market returns and increase demand of MMMF equity.

Aggregate demand: National output Y equals worker consumption C_w , investment expenditures I and government spending G :

$$Y = C_w + I + G \quad (1)$$

We deal with each of these demand components in turn:

Workers: Workers consume their after-tax wages:

$$C_w = (1 - \tau)\psi Y \quad (2)$$

Where τ is the tax rate and ψY is the wage share of output.

Firms: Investment expenditures are after-tax profits earned by firms (after factoring for the accelerator δ), autonomous investment expenditures I_0 and invested financial dividends (where i_r are the share θ of shadow banking returns ipS invested in the real economy) minus purchases of financial equity $d(p \cdot S)$.

$$I = I_0 + \delta(1 - \tau)(1 - \psi)Y + i_r \theta ipS - \frac{d(p \cdot S)}{dt} \quad (3)$$

The change in the holdings of financial equity $d(p \cdot S)$ at current prices p is a function f of the return on assets of the economy i and of incentives to invest in the real sector (as represented by ε , the signs show partial derivatives):

$$\frac{d(p \cdot S)}{dt} = f(i^+, \varepsilon^-) \quad (4)$$

The overall change in demand for financial assets can be decomposed in transactions and changes in prices, hence $d(p \cdot S) = (dp \cdot S) + (p \cdot dS)$. Given that the model spans from the short- to medium-run, we assume that prices and not quantities lead the adjustment (hence, $p \cdot dS = 0$).

The return of assets i is itself a positive function h of overall (after-tax) profit levels $(1 - \tau)(1 - \psi)Y$ - we posit that higher profits accrue to the valorization of investment assets across the economy (as wages are consumed by workers):

$$i = h[(1 - \tau)(1 - \psi)Y^+] \quad (5)$$

The Treasury: Government spending G is a function g of G_0 , a jump variable which is higher if a more fiscally active government is in power (or lower, or zero if otherwise), the wage share ψ and the yield on government debt r :

$$G = g(G_0, \psi^-, r^-) \quad (6)$$

The model argues that increased government expenditures will move inversely to worker clout in the economy—more worker clout prompts government to cave to business pressure and scale back spending; meanwhile, reduced wage shares nudge government leaders to increase government expenditures and cater to labor.

The yield on government debt r is a positive function j of the government's holding of private debt:

$$r = j\left(\frac{D_{MMMF}}{Y}\right) \quad (7)$$

where D_{MMMF} is government debt held in money market mutual funds. As argued above, if the government issues short-term debt to finance its deficit, and firms recognize the political perils of debt monetization, their stronger bargaining power will push up yields of government debt. This is reflected in the debt-to-output ratio, as higher debt levels or lower output would weaken the government's hand in their dealings with financial markets. For this reason, this makes the government's net deficit position with respect to private investors the main driver of the government's overall deficit:

$$\frac{dD_{MMMF}}{dt} = G - \tau W - \tau I + rD_{MMMF} \quad (8)$$

where τ is effective tax rate (profits and wages are taxed equally). The last term is the debt payable to private investors, as the public sector as a whole does not pay interest on its overall debt, but only on privately-held debt in money market funds.

The Central Bank: The central bank buys government debt to issue currency. With this in mind:

$$\frac{dH}{dt} = \frac{dD_{CB}}{dt} \quad (9)$$

where $\frac{dH}{dt}$ is the supply of cash liabilities issued by the central bank and $\frac{dD_{CB}}{dt}$ is

Central Bank lending to the government. The total supply of cash to workers and firms is:

$$\frac{dH}{dt} = \frac{dH_w}{dt} + \frac{dH_\pi}{dt} \quad (10)$$

At each point in time, the central bank facilitates cash balances demanded by workers and firms respectively, hence:

$$\frac{dH_w}{dt} = (1 - \theta)iS \quad (11)$$

$$\frac{dH_\pi}{dt} = \theta(1 - i_r)iS \quad (12)$$

where $\theta(1 - i_r)$ is the share of shadow financial sector returns that accrue to firms and are retained in deposits, and $(1 - \theta)$ are returns distributed to workers (we assume firms credit a share of their claims in the shadow financial sector to labor, which constitutes the latter's savings—for example, in private retirement pensions). Furthermore, the above policy undertaken by the central bank (with cooperation of the Treasury) seeks to keep interest rates stable at r_0 via function w by adjusting currency needs and bond issues to that purpose:

$$r_0 = w\left(\frac{dD}{dt} - \frac{dD_{CB}}{dt} + \frac{dH}{dt}\right) = w\left(\frac{dD_{MMMF}}{dt} + \frac{dH}{dt}\right) \quad (13)$$

Money Market Funds: Our shadow banks, the MMMFs, issue equity shares and buy government debt as collateral for their interest-generating operations. MMMFs accrue interest income to business asset holdings—for simplicity, we assume that MMMFs transfer all their operating profits to investors. As dealers of the system, they price both firms’ savings and the value of government treasuries used as collateral - this will be further explained when we close the dynamical section in the last paragraphs of this section.

The multiplier: Using equations (2)–(7) above and replacing to solve for the multiplier in (1), we get:

$$Y^* = \left(\frac{G + I_0 - \frac{d(p \cdot S)}{dt}}{1 - (1 - \tau)[\psi + (1 - \psi)] - i_r \left(\frac{h[(1 - \tau)(1 - \psi)Y]S}{Y} \right)} \right) \quad (14)$$

Employment and labor markets: With regard to the labor market and wage dynamics, the labor force N is assumed to be constant over the short-run:

$$N = \bar{N} \quad (15)$$

The change in employment $\frac{dE}{dt}$ is a function x of the gap between actual output Y and potential output \bar{Y} ⁴ and a negative function of exogenous labor productivity.

$$\frac{dE}{dt} = x\left(\frac{Y}{\bar{Y}}, \xi_L^-\right) \quad (16)$$

Based on the above, the change in the employment rate L is:

$$\frac{dL}{dt} = \frac{\frac{dE}{dt}}{\bar{N}} = \frac{p\left(\frac{Y}{\bar{Y}}, \xi_L^-\right)}{\bar{N}} \quad (17)$$

⁴ While we could make potential output \bar{Y} a function of investment, we keep it constant—at this time, we are only interested only in short to medium-run dynamics.

The change in the wage share of the economy is a positive function z of the employment rate and a negative function of η , a parameter that gauges the clout and push-back of capitalists in their bargaining against wage increases:

$$\frac{d\psi}{dt} = z(L^+, \eta^-) \quad (18)$$

The dynamical system: Our dynamical model is described by equations (4), (8), (17) and (18). However, for equation (8) we consolidate the public sector accounting of the Treasury and the central bank. For this we use the inverse equation (14) and assume no central bank profits, therefore:

$$\frac{dD_{MMMf}}{dt} = G - \tau W - \tau \Pi + rD_{MMMf} - \frac{dH}{dt} - w^{-1}(r_0) \quad (19)$$

Where $w^{-1}(r_0)$ is the inverse function of equation (13). However, as cash serves the purposes of consumption of workers and investment by firms, we replace $\frac{dH}{dt}$ with equations (11) and (12):

$$\frac{dD_{MMMf}}{dt} = G - \tau W - \tau \Pi + rD_{MMMf} - (1 - i_r)iS - w^{-1}(r_0) \quad (20)$$

Where $w^{-1}(r_0)$ is the inverse function of (13). To sum up, the four state equations for the system are:

$$\frac{dD_{MMMf}}{dt} = G - \tau Y^* + rD_{MMMf} - (1 - i_r)iS - w^{-1}(r_0) \quad (21)$$

$$\frac{d(p \cdot S)}{dt} = f(i, \varepsilon) \quad (22)$$

$$\frac{dL}{dt} = \frac{x\left(\frac{Y^*}{\bar{Y}}, \xi_L\right)}{\bar{N}} \quad (23)$$

$$\frac{d\psi}{dt} = z(L, \eta) \quad (24)$$

Where

$$Y^* = \left(\frac{G + I_0 - \frac{d(p \cdot S)}{dt}}{1 - (1 - \tau)[\psi + (1 - \psi)] - i_r \left(\frac{h[(1 - \tau)(1 - \psi)Y]S}{Y} \right)} \right), I = I_0 + \delta(1 - \tau)(1 - \psi)Y + i_r \theta p S - \frac{d(p \cdot S)}{dt}, G = g(G_0, \psi, r), r = j \left(\frac{D_{MMMF}}{Y^*} \right)$$

and $i = h[(1 - \tau)(1 - \psi)Y]$. In the next section we proceed to simulate and analyze a linear (where possible) specification of this dynamical system.

Table 2 Balance Sheet for our Model Economy

Balance Sheet	Households	Firms	MMMFs	Government	Central Bank	Total
High-powered money	$+ H_w$	$+ H_\pi$			$- H$	0
Treasuries			$+ D_{MMMF}$	$- D$	$+ D_{CB}$	0
Financial shares		$+ pS$	$- pS$			0
Real capital		$+ K$				$+ K$
Net worth	$- \Omega_w$	$- \Omega_\pi$	$- \Omega_{MMMF}$	$+ \Omega_G$		$\Omega_G - \Omega_w - \Omega_{pi} - \Omega_{MMMF}$
Total	0	0	0	0	0	0

Notes: H_π are cash balances held by firms, H_w are cash balances held by workers. H is the supply of high powered money by the central bank. D_{MMMF} are treasuries privately held by money market mutual funds (MMMFs), D is the stock of outstanding debt owed by the government and D_{CB} is debt held by the central bank. S are financial shares issued by the MMMFs and p is their price, K is the stock of capital. Ω_w is worker's net worth (which is assumed zero), Ω_π is the firm's net worth (which also assumed zero by construction), Ω_G is the government's net worth and Ω_{MMMF} is the money market fund's net worth.

Table 3 Flow Of Funds For Our Model Economy

Flow of Funds	Households		Firms		MMMFs		Government	Central Bank		Total
			Current	Account	Current	Account		Current	Account	
Consumption	$-C_w$	$+C_w$								0
Investment		$+I$		$-I$						0
Gov. Expenditure		$+G_0$					$-G_0$			0
Wages	$+W$	$-W$								0
Firms (profits)		$-\Pi$		$+\Pi$						0
Financial (profits)	$+(1-\theta)iS$	$+\theta(1-i_r)iS$	$+i_r iS$		$-iS$					0
Taxes	$-\tau W$	$-\tau \Pi$					$+\tau W + \tau \Pi$			0
Interest on treasuries					$+rD_{MMMF}$		$-rD$	$+rD_{CB}$		0
Central Bank profits							$+rD_{CB}$	$-rD_{CB}$		0
Change in HPM	$-\Delta H_w$	$-\Delta H_\pi$							$+\Delta H$	0
Change in treasuries						$-\Delta D_{MMMF}$	$+\Delta D$		$-\Delta D_{CB}$	0
Change in financial shares				$-\Delta pS$		$+\Delta pS$				0
Total	0	0	0	0	0	0	0	0	0	0

Notes: C_w stands for worker consumption expenditures, I_0 for business investment, G_0 for government expenditures. W is the total wage bill, and Π total profits. τW is the tax bill out of wages (where τ is the effective tax rate on consumption), $\tau \Pi$ is the tax bill out of profits. rD_{MMMF} is the the yield on government debt. iS is the interest-bearing money market fund (MMMF) assets held by firms. θ is the share of financial profits which accrue to firms, and $1-\theta$ are those profits that accrue to worker households, i_r are the share of shadow financial banking returns invested in the real economy, i is money market rate of return, r are interest payments on government debt. ΔD is the government deficit, which is financed by central bank lending ΔD_{CB} and money market funding ΔD_{MMMF} . ΔpS is the change in financial equity at current prices (we assume that the change takes in prices, not in volumes). ΔH is the change of high-powered money supplied by the central bank for worker (ΔH_w) and firm (ΔH_π) consumption.

4 SIMULATION AND ANALYSES

4.1 Methodology, Specification and Calibration

Our simulation methodology is similar to that used by Keen [15, 16]. Keen simulates dynamical systems that shed light on particular features around Minsky's views on instability. However, Keen stresses the private dimension of these crises as firms borrow to invest, and in doing so, engage in hedge, speculative and Ponzi finance.

Our specification differs in the role and nature of the assets involved. Instead of using public debt as an outright redistributive variable in debt and labor markets, we consider deficits as a redistributive balancing factor in both, and as a backstop to shadow banking sector liabilities owed to firms. Furthermore, we make explicit the sources of funding, and posit that public debt stems from deficits driven by the conflict between labor and capital over the spoils of stabilization.

Keen's models range from stable to unstable, depending on the selected cases and parameters. Although he departs from a bare-bones, baseline-stable specification, the non-linear, unstable character of the system stands out, and is perhaps the most interesting feature of these models. This is natural, given the logic behind Minsky's theory of crises, where seemingly regular behavior eventually culminates in systemic breakdown.

The introduction of finance, like in Keen's more complex models, begets a source of long-run instability which precludes steady-state analyses for simulations. However, we produce a baseline specification that cycles over several hundred time steps and within a plausible range of variables. This allows us to sketch the dynamics and some comparative tests around the volatility of the series (to gauge the level of tension in the social conflict between labor and capital). Moreover, we also assess scenario dynamics as deviations from our chosen benchmark.

The concrete specification of the system is:

$$\begin{aligned}
\frac{dD_{MMMFF}}{dt} &= G_0 - \delta_1\psi - \delta_2\left(\delta_3\frac{D_{MMMFF}}{Y^*}\right) - \tau Y^* + \left(\delta_3\frac{D_{MMMFF}}{Y^*}\right)D_{MMMFF} \\
&+ \delta_4(1-i_r)(1-\tau)(1-\psi)SY^* + \delta_5\left(\frac{1}{r_0}\right) \\
\frac{d(p \cdot S)}{dt} &= \delta_4(1-\tau)(1-\psi)Y^* - \varepsilon \\
\frac{dL}{dt} &= \frac{(\delta_6\frac{Y^*}{\bar{Y}} - \xi_L)}{\bar{N}} \\
\frac{d\psi}{dt} &= \delta_7L - \eta \\
Y^* &= \left(\frac{G_0 - \delta_1\psi - \delta_2\left(\delta_3\frac{D_{MMMFF}}{Y^*}\right) + I_0 - \frac{d(p \cdot S)}{dt}}{1 - (1-\tau)[\psi + (1-\psi)] - \delta_4i_r(1-\tau)(1-\psi)S} \right)
\end{aligned}$$

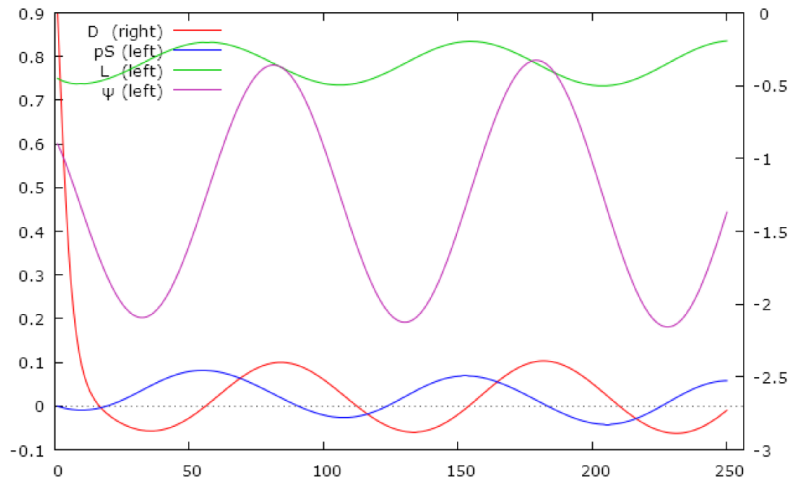
For simplicity and better visualization of the dynamics, we assume in our specification a pass-through accelerator where δ in equation (3) equals 1, and maximum retained financial earnings (hence, $i_r = 0$).

We simulate the model in continuous time, and calibrate the above specification with the following values $G_0 = 0.8, I_0 = 0.725, \tau = 0.35, \varepsilon = 0.00465, \xi_L = 0.0175, \eta = 0.3, r_0 = 0.08$ and parameters $\delta_1 = 0.85, \delta_2 = 1, \delta_3 = 0.25, \delta_4 = 0.0035, \delta_5 = 0.02, \frac{\delta_6}{\bar{Y}} = 0.475, \bar{N} = 100, \delta_7 = 0.3825$.

For our initial conditions we use $D_{MMMFF}(0) = 0, S(0) = 1, L(0) = 0.80$ and $\psi = 0.60$.

4.2 Baseline Simulation

Figure 2 Time Series for Financial Assets



Notes: pS , debt D , wage share ψ and employment L for a 250 time steps.

Figure 3 (Top) Tridimensional Scatterplot for pS, D and L ; (Bottom) Scatterplots Between the Wage Share ψ , Debt D (with a Simple Linear Fit) and employment L for 1500 Time Steps

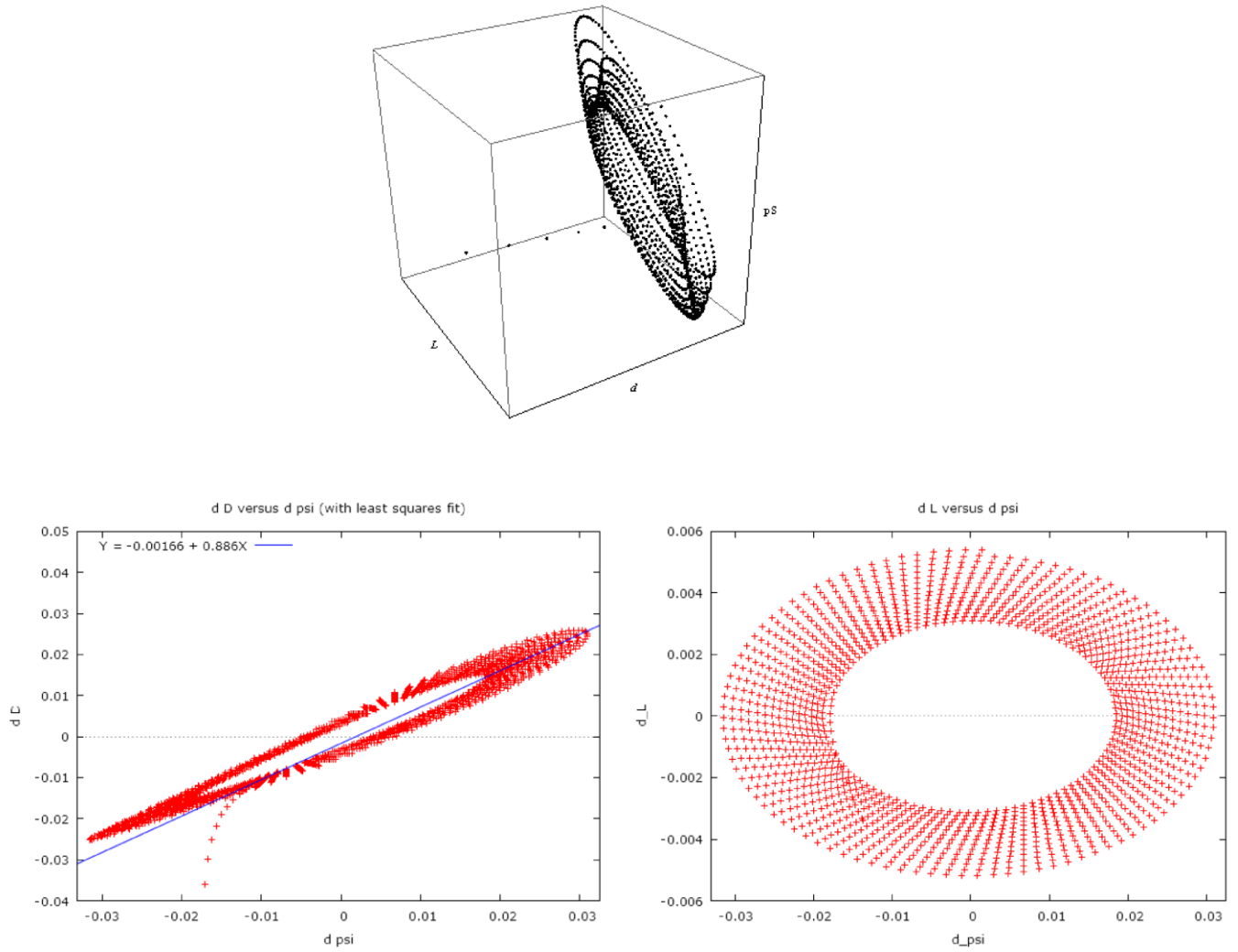
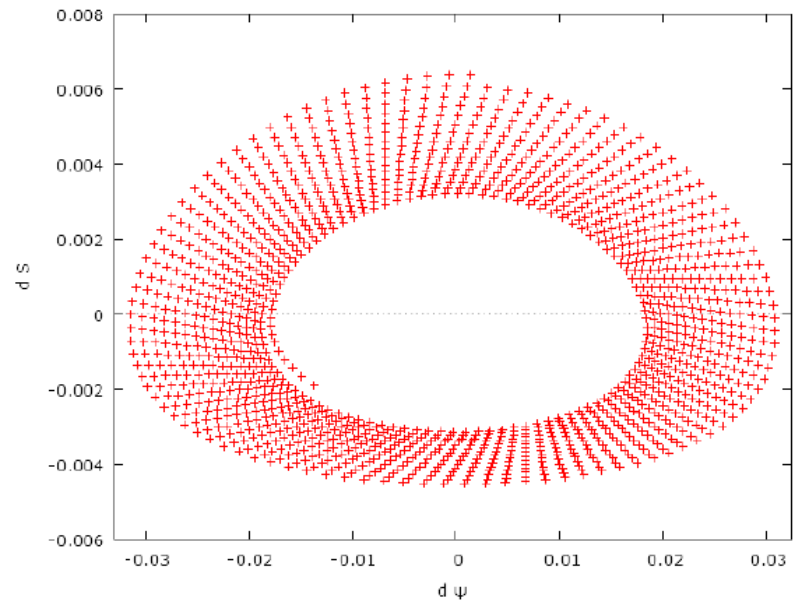


Figure 4 Scatterplots Between The Wage Share ψ and Financial Equity pS for 1500 Time Steps



4.3 ALTERNATIVE SCENARIOS

4.3.1 Scenario 1: An Increase in the Tax Rate

Figure 5 Time Series for Financial Assets pS , Debt D and the Wage Share ψ for 750 Time Steps

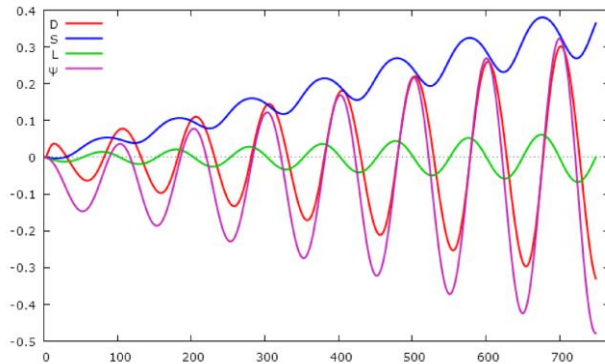
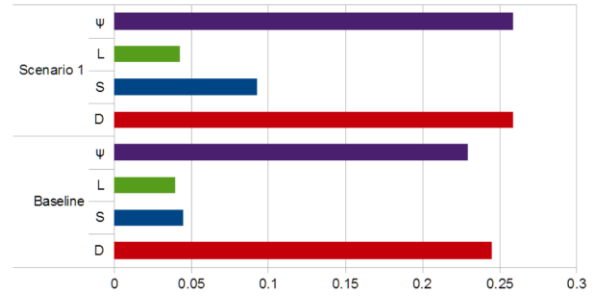


Figure 6 Standard Deviation for Financial Assets pS , Debt D , Wage Share ψ and Employment L for 750 Time Steps



4.3.2 Scenario 2: Decrease in the Central Bank Interest Rate

Figure 7 Time Series for Financial Assets pS for Scenario 1 and Scenario 2 for 750 Time Steps

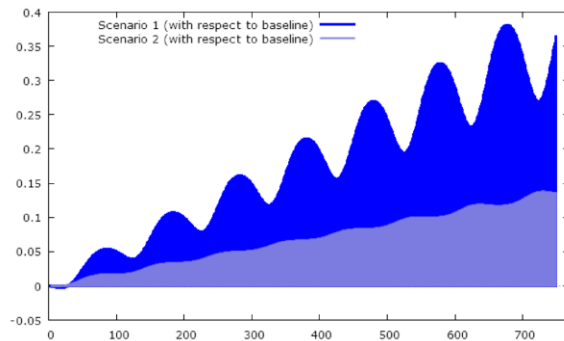
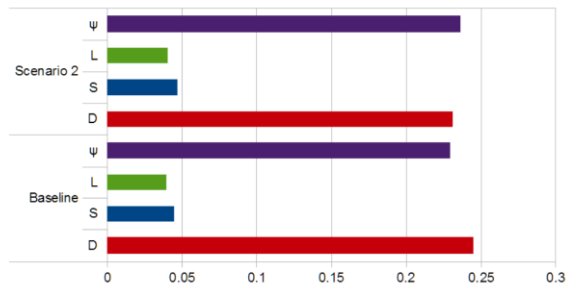


Figure 8 Standard Deviation for Financial Assets pS , debt D , Wage Share ψ and Employment L for 750 Time Steps



4.3.3 Scenario 3: Lower Government (Political) Sensitivity to Increases in Wage Share

Figure 9 Time Series for Financial Assets pS , Debt D , Wage Share ψ and Employment L for 750 Time Steps

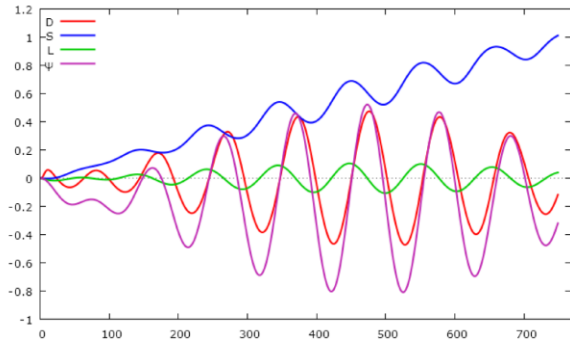
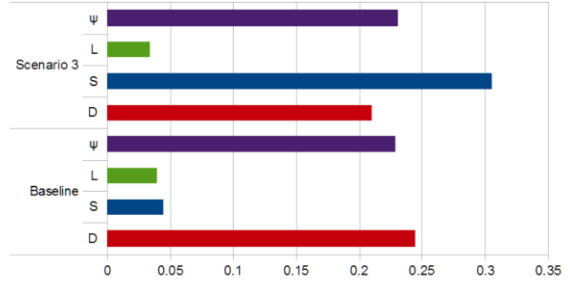


Figure 10 Standard Deviation for Financial Assets pS , Debt D , Wage Share ψ and Employment L for 750 Time Steps



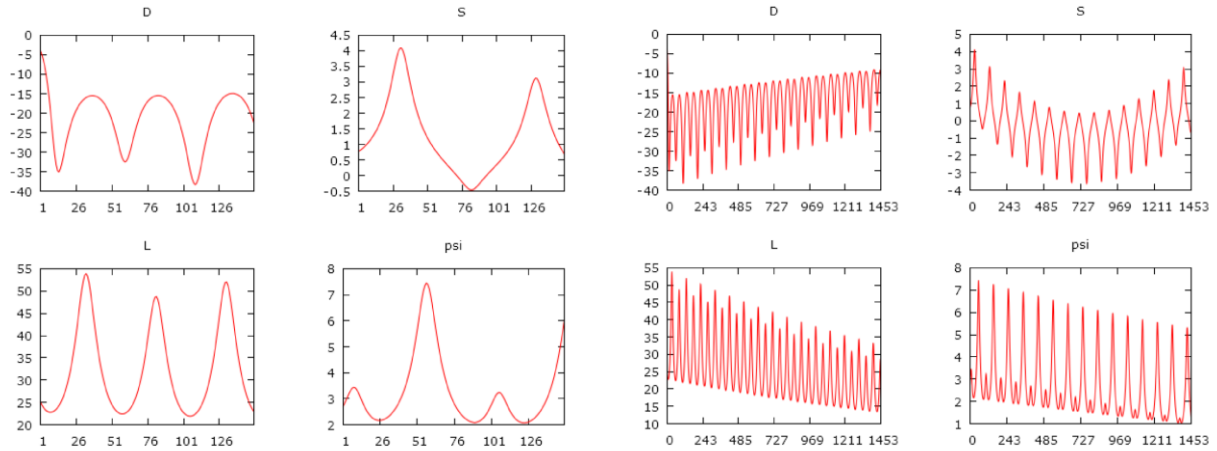
5 DISCUSSION AND ANALYSIS

Section 4.2 presents the basic features for the benchmark case, while the remaining subsections present three scenarios as deviations from the benchmark. For our baseline, the scatterplots resemble similar simulation results around unstable *Minsky-type* cases where financial influences are present [15]. Furthermore, the time series in Figure 2 suggest a complex interaction between the different state variables—while wages and employment exhibit a classic Goodwin dynamic, deficits and wage cycle tightly, and financial equity and wages rotate unevenly around a spiral source.

However, the most interesting data from the benchmark is presented in Figure 11. It calculates the signal-to-noise ratio (i.e., the mean divided by the standard deviation of the simulated results) over a rolling mean and standard deviation of the model output to assess how conditions in the four state variables evolve from tranquility to breakdown. For one, this ratio shows the degree of noise experienced by the series as they progress in time and the amount of information they carry about expected values. We find that as the system evolves, there is a short-run cycle between the “signal” and the “noise” (in the left), with a clear downward trend in the “signal” (for wages and labor) as the “noise” grows stronger. Financial assets exhibit a clear non-linear trend over the short- and the long-run, as seen in the right-top, right panel. This suggests that confidence breeds overconfidence, and then leads to less reliability over the medium-run, despite short ups and downs—indeed, we believe these nested cyclical dynamics to be congruent with Minsky’s views on capitalism’s financial fragility.

The alternative scenarios feature an increase in the tax rate (of 1.5 percentage points), a decrease of the central bank rate (from 8 to 6%) and a 25%-decrease in the (political) sensitivity of government spending to the wage share (which makes government less responsive to the pushback of firms in their demands for fiscal retrenchment). Although counterintuitive at first, a tax rate increase feeds unstable dynamics to the system, especially via the increase in financial assets in the economy, which also drives the issue of collateral by the sovereign. The increased elasticity of the profit share is the likely culprit: Indeed, the model taxes both wages and profits equally (an easy change for subsequent extensions), so tax increases differentially hurt wages more than profits, especially if profits are stowed into (untaxed) shadow financial assets as their returns increase. Nonetheless, as profits increase, volatility increases both over wages and in financial assets.

Figure 11 (Left) Rolling Signal-to-Noise Ratio (Over 50 Time Steps) for Financial Assets pS , Debt D , Wage Share ψ and Employment L for 150 time steps; (Right) Rolling Signal-to-Noise Ratio (Over 50 Time Steps) for Financial Assets pS , Debt D , Wage Share ψ and Employment L for 1450 Time Steps



A decrease in the central bank interest rate highlights another channel where distributive conflict takes place—the control of central bank interest policy (although that could be extended to other types of monetary interventions). Whereas profits have greater flexibility, given the model set-up, to shoulder higher tax burdens (when compared to wages, as explained above), lower interest rates contribute to the more parsimonious accumulation of financial assets. Furthermore, lower interest rates, acting as a floor on asset prices, deepen the tension between profits and wages only marginally, as worker households are also invested in the fortunes of the shadow financial sector. Even when the effects of conflict are smaller than overt tax increases, they are not insignificant—as interest rates decrease, bond prices increase and their yields decrease. Higher bond prices, lower yields and volatility increase the government policy space, lower the costs of political stabilization biased to workers and facilitates debt as financial collateral—this is seen by the reduced volatility in sovereign debt. However, as both the interest payments on this debt and worker clout increase, firms lobby the government for fiscal retrenchment. One could argue that the US is undergoing a political and monetary policy process which dithers between the two scenarios above.

A dampened fall-back reaction of government policy to increased worker clout pushes the conflict between wages and profits to the forefront and affects how debt accumulation oscillates in time, as seen in Figure 9. Higher profit shares decrease demand for financial assets, and this increases financial volatility as their demand wanes (the same applies to reduced sensitivity of government spending to increased sovereign yields, as government deliberately affords itself more fiscal space).

Table 4 Comparative Volatility Table for the Baseline Case and the Different Scenarios, with Percentage Point Deviations from the Baseline and Volatility Correlations

	D	S	L	ψ
Baseline	0.245	0.045	0.039	0.229
Scenario 1	0.259	0.093	0.042	0.259
Scenario 2	0.231	0.047	0.041	0.236
Scenario 3	0.210	0.306	0.034	0.231
Scenario 1	5.77%	107.14%	8.09%	12.81%
Scenario 2	-5.60%	4.25%	3.55%	3.10%
Scenario 3	-14.12%	581.90%	-13.25%	0.58%
	D	S	L	ψ
D	1.00	-0.74	0.89	0.70
S	-0.74	1.00	-0.86	-0.23
L	0.89	-0.86	1.00	0.69
ψ	0.70	-0.23	0.69	1.00

We present a table that sums up the differences in volatility in the variables (with respect to the benchmark), and a (simple) correlation table to suggest how these volatility levels are interlinked. Except for three cases (debt in scenario 2 and 3, and employment in scenario 3), all other movements are more volatile than the benchmark. Given their inherent instability, higher volatility accelerates the breakdown of the system under specific conditions—for this reason, we must agree with Minsky, Keen and others that more fiscal democratic governance (in this case understood as weakened resistance against the majoritarian interests of labor in their push for fiscal expenditure) does contribute to delaying the instability of an otherwise unraveling system. However, we must note that this stabilization has strong political undertones—how government intervenes and the endogenous drivers behind this intervention matter greatly. More remains to be explored around this question.

Furthermore, we also attest an inverse (simple) correlation between the volatility of financial assets with government debt, labor markets and to a lesser extent, wages. This means that financial asset volatility will not cluster next to sovereign debt, or even labor or wages, despite critical junctures. Although it is not possible to attribute causality at this stage, the dependence of financial assets on profits is hardwired in the system. For one, it is appropriate to suggest that higher labor and wage market volatility contributes to lower financial market volatility. If volatility in wages and employment takes place mainly in times of economic distress, there is a nexus between how relative financial market stability comes at the expense of ever-greater tension in the real side of the economy, and how financial instability originates out of relatively aligned interests between labor and capital. However, this also means that as financial markets grow unstable, government acts decidedly as a backstop to their operation, but conversely, as financial market asset demand strengthens and volatility decreases, it weakens sovereign sources of public finance and its relative bargaining position with respect to private market participants.

6 CONCLUSION

This paper presented a theoretical overview of the political economy behind *shadow banking*. Despite the ominous name, many features of modern shadow banking are neither new nor original and have been discussed by theorists interested in their wider implications. On that note, the most enduring of these assessments, like those offered by Marx and Minsky, noted not only how these financial institutions worked, but how the broader, institutional characteristics of markets and governments that nest their operation experienced dramatic changes over the last two centuries.

Shadow banking is intimately tied to the political economy of capitalism. The discontinuous distributive tension between wages and profits, itself an important source of political conflict in capitalism's social fabric, weaves a rich theoretical quilt about how these institutions survive amidst endogenous pressures within and outside government policy. Politics drives a wedge in how this shadow financial system operates alongside firms and workers, as government policy provides needed guidance and collateral in dealings undertaken by financial intermediaries. Government spending and borrowing is itself the result of endogenous, differential pressures between workers' desires to push for re-distributive stabilization and firms' uneasiness to go the extra mile, as demand beyond a certain point undermines their clout.

This tug-of-war is of central importance to fully understand the role of shadow banking in modern capitalism. As hinted by the theoretical model and the simulations, government action is crucial to check the power of wages despite the pressures to sway voters through increased spending. This deficit spending serves multiple functions: for one, it appeases voters but also provides collateral. In the end, governments will tread a careful balancing act to minimize this tug-of-war, although biased towards capital accumulation.

Moreover, given the flexibility of profits to quickly establish in the financial corners of the economy, higher taxes tend to hurt workers if these are not nested in comprehensive policy objectives. Furthermore, the use and control of central bank rates becomes an important tool for these shadow financial institutions, which, through regulatory capture, promote asset price floors through accommodative interest policy. However, these accommodative policies accelerate the political conflict between workers and firms, as lower interest rates and increased profit shares prompt worker political recoil.

Shadow financial institutions are involved in this conflict inasmuch as they demand government-issued collateral for their operations, and given their demand, ease or constrain government agency. Indeed, as most of these revenues accrue to profits, shadow (and normal) financial institutions keep allegiances to firms, and stall government action if thresholds of political tolerance are tested, as Kalecki suggested—however, it is also in their interest that government issue debt to spur economic activity and accumulation.

These complexities do not add up to simple solutions: for one, policies that seek to restrain the operation of shadow financial institutions to temper their operation and firewall its real economy linkages could insulate economic fundamentals. However, these policies cannot be undertaken unilaterally, or heavy-handedly, given the crucial role of finance in global capitalism. Additionally, institutional reforms which rely on automatic stabilizers (like counter-cyclical job guarantee programs and social insurance mechanisms) over discretionary policy might minimize overt political conflict between firms and workers, without denting prospects of economic growth.

Entrenched political impasses are not immutable or permanent: these can be shrewdly overcome by a reform agenda that seeks to address not only the economics but also the *political economy* behind these differences—it remains to be seen if this agenda will only come after, and not before, a regrettable tipping point.

REFERENCES

- [1] Aghion, P. and Bolton, P. Government Domestic Debt and the Risk of Default: A Political-Economic Model of the Strategic Role of Devt. Cambridge, 1990.
- [2] Allesina, A. and Tabellini, G. A Positive Theory of Budget Deficits and Government Devt. *Review of Economic Studies*, 57:403-414. 1990.
- [3] Financial Stability Board. Shadow Banking: Scoping the Issues. FSB Working Paper, 2011.
- [4] James Bichanan and Richard Wagner. *Democracy in Deficit: The Political Legacy of Lord Keynes*. Academic Press, 1977.
- [5] Claessens, S., Pozsar, Z., Ratnovski, L. and Singh, M. Shadow Banking: Economics and Policy. IMF Staff Discussion Note, SDN/12/12, 2012.
- [6] Dupond, D. and Sack, B. The Treasury Securities Market. *Federal Reserve Bulletin*, 1999.
- [7] Ferguson, T. The Coming of the New Deal. In Steve Fraser and Gary Gerstle, editors, *The Rise and Fall of the New Deal Order 1930-1980*. Princeton University Press, 1989.
- [8] Goodwin, R. *Socialism, Capitalism and Economic Growth*, chapter A Growth Cycle. Cambridge University Press, 1967.
- [9] _____. *Chaotic Economic Dynamics*. Oxford University Press, 1992.
- [10] Gorton, G. and Metrick, A. *Regulating the Shadow Banking System*. Brookings Papers on Economic Activity, 2010.
- [11] Hilferding, R. *Finance Capital: A Study of the Latest Phase of Capitalist Development*. Routledge, 1981.
- [12] Kalecki, M. Political Aspects of Full Employment. *The Political Quarterly*, 14:322-330, 1943.
- [13] _____. *Essays on Business Cycle Theory*. Clarendon, 1990.
- [14] _____. *Three Ways to Full Employment*. Clarendon, 1990.
- [15] Keen, S. Finance and Economic Breakdown: Modeling Minsky's Financial Instability Hypothesis. *Journal of Post-Keynesian Economics*, Vol. 17 (4):607-635, 1995
- [16] _____. A Monetary Minsky Model of the Great Moderation and Great Recession. *Journal of Economic Behavior and Organization*, 86:221-235, 2013.
- [17] Krishnan, N., Martin, A. and Sarkar, A. Pick Your Poison: How Money Market Funds Reacted to Financial Stress in 2011. *Liberty Street Economics Blog*, 2013.
- [18] Mark, K. *Capital: Volume III*. Penguin Books, 1991.

- [19] Mehrling, P., Poznar, Z., Sweeney, J. and Neilson, D. Bagehot was a Shadow Banker: Shadow Banking, Central Banking, and the Future of Global Finance. SRN Working Paper, 2013.
- [20] Minsky, H.P. Money Manager Capitalism. In Hyman P. Minsky Archive. Pper 13. Bard Digital Commons, 1989.
- [21] _____. Uncertainty and the Institutional Structure of Capitalist Economies. Working Paper No. 155, Levy Economics Institute, 1996.
- [22] Persson, T. and Svensson, L. Why a Stubborn Conservative would Run a Deficit: Policy with Time-Inconsistent Preferences. Quarterly Journal of Economics, 104:325-345, 1989.
- [23] Ricks, M. A Regulatory Design for Monetary Stability. Vanderbilt Law Review, 1289:1289-1359, 2012.
- [24] Rogoff, K. Equilibrium Political Budget Cycles. American Economic Review, 80:21-36, 1990
- [25] Skidelsky, R. Keynes: Return of the Master. Public Affairs, 2010.
- [26] Sperber, J. Karl Marx: A Nineteenth Century Life. W.W. Norton and Company, 2013.
- [27] Tabellini, G. and Alesina, A. Voting on the Budget Deficit. American Economic Review, 80:37-49, 1990.
- [28] Tymoigne, Eric and Wray, L.R. The Rise and Fall of Money Manager Capitalism: Minsky's Half-Century from World War II to the Great Recession. Routledge, 2013.
- [29] Wray, L.R. The Rise and Fall of Money Manager Capitalism: A Minskian Approach. Cambridge Journal of Economics, 33:807-828, 2009.
- [30] _____. Modern Money Theory. Routledge, 2012.
- [31] Wray, L.R. and Nersisyan, Y. The Global Financial Crisis and the Shift to Shadow Banking. Working Paper No. 587, Levy Economics Institute

A LIST OF EQUATIONS, VARIABLES AND PARAMETERS

$$Y = C_w + I + G$$

$$C_w = (1 - \tau)W$$

$$H_w = (1 - \theta)ipS$$

$$I = I_0 + \delta\Pi + i_r ipS - \frac{d(p \cdot S)}{dt}$$

$$H_\pi = \theta(1 - i_r)ipS$$

$$G = G_0 - \delta_1\psi - \delta_2r$$

$$i = \delta_4(1 - \tau)(1 - \psi)Y$$

$$\frac{d(p \cdot S)}{dt} = i - \varepsilon$$

$$r = \delta_3\left(\frac{D_{MMM}}{Y}\right)$$

$$\frac{dD}{dt} = \frac{dD_{MMM}}{dt} + \frac{dD_{CB}}{dt}$$

$$\frac{dD_{MMM}}{dt} = G - \tau W - \delta\Pi + rD_{MMM} - \delta_4(1 - i_r)(1 - \tau)(1 - \psi)SY^* + \delta_5\left(\frac{1}{r_0}\right)$$

$$\frac{dD_{CB}}{dt} = \frac{dH}{dt}$$

$$\frac{dE}{dt} = \delta_6\left(\frac{Y}{Y^p}\right) - \xi_L$$

$$N = \bar{N}$$

$$L = \frac{E}{N}$$

$$\frac{d\psi}{dt} = \delta_7L - \eta$$

$$\frac{dH}{dt} = \frac{dH_\pi}{dt} + \frac{dH_w}{dt}$$

Variables	Description
Y	output
C_w	worker consumption
I	investment
G	government spending
D_{MMMF}	sovereign debt held by money market mutual funds
D_{CB}	sovereign debt held by the central bank
H	high-powered money
H_w	money balances held by worker households
H_π	money balances held by firms
S	financial assets (or savings from firms)
E	employment
L	employment rate
ψ	wage share
W	wage bill
Π	profits
i	return on financial assets
r	real interest rates (yields) on treasuries
Parameters	Description
G_0	autonomous government expenditures
δ	accelerator of investment
δ_1	sensitivity of government deficit to worker clout
δ_2	sensitivity of government deficit to sovereign bond yields
δ_3	elasticity of sovereign bond returns to the debt to output ratio
δ_4	elasticity of financial asset returns to profits
δ_5	elasticity of the central bank interest rate with respect to monetary aggregates
δ_6	effect of the output gap in the change of employment
δ_7	effect of the employment rate in the change of the wage share
τ	effective tax rate (for profits and wages)
$\theta, 1 - \theta$	share of shadow banking returns accrued to firms, workers
\bar{N}	labor force
\bar{Y}	potential output
ξ_L	labor productivity
η	capitalist clout in wage bargaining
ε	incentives to invest in the real sector
r_0	central bank interest rate
i_r	rate of financial profit re-investment