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Institutional Supercycles: An Evolutionary Macro-Finance Approach

YANNIS DAFERMOS
SOAS University of London, UK

DANIELA GABOR*
*University of the West of
England, UK*

JO MICHELL
University of the West of England, UK

Working Paper No. 15
Date Published: 30. 07. 2020

<https://www.rebuildingmacroeconomics.ac.uk/publications>

National Institute of Economic and Social Research
2 Dean Trench Street, Westminster
London, SW1P 3HE

This Working Paper is issued under the Globalisation Hub of the ESRC's Rebuilding Macroeconomics network. One or more of the authors of the Working Paper has received support from Rebuilding Macroeconomics or been an active participant in its research hubs and events. This paper was first published as a Bank of England Staff Working Paper.

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* Corresponding author: Daniela.Gabor@uwe.ac.uk

Institutional supercycles: an evolutionary macro-finance approach

Yannis Dafermos*, Daniela Gabor and Jo Michell****

Abstract: We build upon the Minskyan concepts of ‘thwarting mechanisms’ and ‘supercycles’ to develop a framework for the analysis of the dynamic evolutionary interactions between macrofinancial, institutional and political processes. Thwarting mechanisms are institutional structures that aim to stabilise the macrofinancial system. The effectiveness of such structures changes over time, creating a secular cyclical pattern in capitalism: the supercycle. We develop a macrofinancial stability index and identify two supercycles in the post-war period, which we label the industrial and financial globalisation supercycle respectively. For each, we apply a four-phase classification system, based on the effectiveness of institutions, customs and political structures for stabilising the macrofinancial system. The supercycles framework can be used to explain and anticipate macroeconomic, financial and thus political developments, and moves beyond conventional approaches in which such developments are treated as exogenous shocks.

Key words: Minsky, thwarting mechanisms, supercycles, shadow banking, globalisation, macrofinancial stability

JEL codes: E12, E32, E44, E60, F65

July 2020

Acknowledgements: This paper is part of the project ‘Managing supercycles: globalisation and institutional change’ funded by Rebuilding Macroeconomics, ESRC. Previous versions of the paper were presented at the Bank of England (London, July 2019), the Rebuilding Macroeconomics conference (Edinburgh, September 2019), the FMM conference (Berlin, October 2019) and SOAS University of London (London, November 2019). We are grateful to Angus Armstrong and Stephen Kinsella for useful comments.

Address for correspondence: Daniela Gabor, University of the West of England, Frenchay Campus, Coldharbour Lane, Bristol BS16 1QY

* Department of Economics, SOAS University of London, UK

** Department of Accounting, Economics and Finance, University of the West of England, UK

Institutional supercycles: an evolutionary macro-finance approach

1. Introduction

Institutional change is a central and continuous feature of capitalism. Recent decades have seen growing interest in the study of institutions (Hall and Soskice, 2001; Blyth, 2002; Acemoglu et al., 2006; Hodgson, 2015), but a comprehensive theory of institutional change in contemporary capitalism remains elusive. Economics and related disciplines have largely focused on unidirectional accounts in which particular institutional formations promote growth and stability. In reality, institutional structure not only influences economic outcomes, but is also driven by economic events. Turbulent macroeconomic and financial processes drive changes in labour market institutions, systems of macroeconomic management and financial regulation. Financial globalisation leaves governments increasingly beholden to international forces (Rey, 2015). Institutional change alters the balance of power between labour, capital and rentiers that, in turn, influences macroeconomic outcomes (Kalecki, 1943; Baccaro and Pontusson, 2016).

Despite the bidirectional and dynamic nature of the interactions between institutions and macrofinancial processes, analysis is often partial and static. In the political economy literature, institutional change is linked with exogenous macroeconomic or financial shocks, such as shifts in inflation or the policy interest rate (Iversen and Soskice, 2012; Gabor and Ban, 2013). Conversely, macrofinancial developments are explained as arising from exogenous institutional change, such as alterations to financial regulation or labour market legislation. A framework in which institutional change and macrofinancial processes are dynamically interlinked is still missing. Without a proper understanding of this interaction, we are unable to assess the time-varying, path-dependent effects of policy interventions on macroeconomic performance and financial stability, or how macrofinancial developments may affect policy interventions, political stability and institutional change over the long run (Blyth and Matthijs, 2017).

In this paper, we develop an evolutionary framework that connects macrofinancial processes and institutional change. The foundations of this framework lie with two largely overlooked concepts in Minsky's analysis of financial capitalism (Palley, 2011). The first is that of 'thwarting mechanisms.' This concept draws on Minsky's insight that, although capitalism is inherently unstable, this instability rarely becomes explosive because of the existence of 'customs, institutions or policy interventions' that tame destabilising forces (Ferri and Minsky, 1992, p. 84). Thwarting mechanisms counteract the inherent instability of capitalism, allowing for long periods of high economic activity and social and financial stability.

However, the effectiveness of thwarting mechanisms varies over time, eventually diminishing as a result of the profit-seeking actions of economic agents and the generation of new sources of long-run instability. This endogenous erosion gives rise to crises, which, in turn, lead to the development of new thwarting mechanisms. The rise and fall of thwarting mechanisms generates secular cycles in macrofinancial stability. This 'supercycle' is the second concept we borrow from Minsky and Palley.

We proceed as follows. Section 2 describes how the concepts of 'thwarting mechanisms' and 'supercycles' are used to develop the theoretical foundations of our framework. Section 3 presents an index of macrofinancial stability and applies it to G7 countries for the post-World War II period. We then introduce what we label the industrial capitalism supercycle and the financial globalisation

supercycle. Sections 4 and 5 describe the main features, thwarting mechanisms and phases of each of these supercycles respectively. Section 6 summarises and concludes.

2. The supercycles framework

Minsky is best known for his analysis of expectations-driven financial cycles. In the expansionary phase of a business cycle, firms take on debt in order to invest in profitable capital assets. Initially, firms' receipts are sufficient to repay these debts and, as a result, the expectations of both borrowers and lenders are fulfilled and firms become willing to take higher risks by increasing their debt-financed investment. Debt accumulation renders firms' balance sheets increasingly fragile and, eventually, defaults rise, causing a tightening of credit and a collapse in investment. This leads to a recession that ends only when debt to income ratios have declined sufficiently or through policy interventions (Kregel, 2009; Wray and Tymoigne, 2009; Wray, 2011; Nikolaidi, 2017; Dafermos, 2018).

However, Minsky's writings contain other, less well-known, insights into the interactions between macrofinancial processes and institutional change. Palley (2011) develops these insights, drawing a distinction between 'basic cycles' and supercycles.¹ The basic cycle is a financially-driven business cycle, along the lines of the standard Minsky story. In our framework, however, we define the basic cycle more broadly: it captures all short-run and medium-run economic fluctuations generated by the interactions between financial and real factors. Thus, we do not confine our attention to cycles arising from changes in corporate balance sheets, but also include the cyclical dynamics generated by factors such as accumulation of household debt, shifts in income distribution, and shifting patterns of global demand and trade.² In that sense, our basic cycles capture both the traditional business cycles and the financial cycles that typically have a longer horizon and can be driven by both domestic and global factors (Borio et al., 2014; Aldasoro et al., 2020).

Why do basic cycles rarely become explosive? The answer lies in Minsky's concept of thwarting mechanisms: 'customs, institutions or policy interventions that make observed values of macroeconomic variables different from what they would have been if each economic agent pursued "only his own gain"' (Ferri and Minsky, 1992, p. 84). Thwarting mechanisms reduce the amplitude of basic cycles, constraining instability by imposing ceilings and floors on the dynamic path of the economic system.

We distinguish between *floor* and *ceiling* thwarting mechanisms. Floor mechanisms aim to ensure a minimum level of aggregate demand, thereby placing a floor under the level of economic activity. These mechanisms may be the result of deliberate policy interventions, (e.g. activist fiscal policy), or a side effect of other developments (e.g. expansion of household debt to maintain consumption spending). Conversely, ceiling mechanisms aim to impose upper limits on the economic expansion by restricting activities that may enhance growth but also generate instability. Examples of ceiling mechanisms include inflation targeting, financial regulation aimed at reducing procyclicality and leverage, and capital controls to restrict speculative financial inflows.

¹ Ryoo (2010) has developed a dual cycle framework based on Minsky, which however does not incorporate endogenous institutional change. Institutional change has been analysed within other Minskyan accounts (e.g. Kregel, 2009; Wray, 2011; Whalen, 2012; Argitis, 2017, 2019) but without the explicit use of a cyclical framework, as in Palley (2011).

² This broader approach aligns with the formal Minskyan literature (Nikolaidi, 2017; Nikolaidi and Stockhammer, 2017) which has shown that Minskyan dynamics can be combined, for example, with endogenous changes in income distribution (Goodwin-Minsky models), consumption norms-led household debt (Minsky-Veblen models) and housing prices (real estate price Minsky models).

The supercycle is a long-run institutional and political cycle over which the effectiveness of a particular configuration of thwarting mechanisms first increases and then declines. The configuration of thwarting mechanisms shapes the supercycle, hardwiring powerful macroeconomic ideas into policy regimes (see Blyth and Matthijs, 2017). We postulate that macrofinancial stability is primarily driven by the effectiveness of thwarting mechanisms. On this basis, we define four phases of the supercycle: expansion, maturity, crisis and genesis. During the *expansion* phase, newly introduced thwarting mechanisms are effective, leading to economic expansion and broad social and financial stability: economic and financial activity is disrupted by the recessions of the basic cycles, but thwarting mechanisms prevent a systemic crisis.

Economic agents learn how to adapt to the new institutional environment, however, innovating to preserve or increase their profits and thereby reducing the effectiveness of thwarting mechanisms.³ Further, mechanisms introduced to reduce one source of instability may over time create others, potentially as a result of interaction with other thwarting mechanisms. For example, a mechanism that stabilises economic activity might simultaneously generate inflationary pressures or lead to rising private indebtedness. Once the effectiveness of thwarting mechanisms starts to decline, the cycle enters the *maturity* phase, during which economic expansion continues but the macrofinancial stability of the system is diminishing.

The declining effectiveness of thwarting mechanisms ultimately leads to *crisis*, because the institutional framework is no longer sufficient to constrain the dynamics of the basic cycle. At this point, a basic-cycle recession leads to deep economic, political and social instability, and institutional restructuring. While government intervention may stabilise the economy, broad-based recovery is impossible because existing thwarting mechanisms are ineffective: the institutional structure is can no longer ensure macrofinancial stability. The ensuing *genesis* phase sees attempts to establish a new configuration of thwarting mechanisms, attempts shaped by political struggles. When – or if – effective new mechanisms are introduced, the next supercycle begins. In the case that – for political, social or technological reasons – such mechanisms cannot be introduced, the crisis phase will be prolonged, likely accompanied by political and social turmoil.

The supercycles framework intersects with multiple strands of the literature on institutional change and macroeconomics. In economics, following Alchian (1965), Demsetz (1967) and Williamson (1987), institutions, understood as ‘rules of the game’ (North 2018, p. 190) provide mechanisms to facilitate market exchange in the presence of transactions costs that prevent an optimal frictionless equilibrium. Causation is largely unidirectional: given the presence of transactions costs, exogenously imposed ‘good’ institutions – usually understood as the rule of law, secure property rights, well-developed financial markets etc. – produce good economic outcomes (see Williamson, 1998). North (2018) goes beyond this to analyse the processes of endogenous institutional evolution. Changes in institutional structure, understood as formal ‘rules of the game’ result from ongoing optimisation by market participants over the costs of reconfiguration relative to the benefits, given incomplete information sets, technology, and firm-specific knowledge.

Recent work goes beyond this micro-based analysis to examine the possibility of emergent properties in complex evolutionary systems, using agent-based modelling techniques (see e.g. Asano et al. 2019; Dosi and Roventini, 2019). Our approach has much in common with this (emerging and evolving) literature: thwarting mechanisms can be viewed as constraining the macrofinancial instability that arises from the emergent properties of such complex systems. In much of the agent-based literature, however,

³ The Keynesian concept of fundamental uncertainty is implicit in both Minsky’s ideas and our supercycles framework. Agents innovate and adapt to shifting institutional and macroeconomic environments by extrapolating past trends, using simple heuristics and by imitating others.

the institutional framework is taken as given. In our framework, the interaction of profit-seeking agents does not simply occur within a given institutional framework, but institutional structure itself, understood as the configuration of thwarting mechanisms, emerges and evolves as a result of the profit-seeking behaviour of agents. The agent-driven erosion of thwarting mechanisms can give rise to macrofinancial instability.

In response to recent criticism that the varieties of capitalism (VoC) literature ignores macro dynamics,⁴ and issues of power, recent scholarship attempts a synthesis between comparative political economy and post-Keynesian growth models (Baccaro and Pontusson, 2016; Stockhammer, 2016; Barreto-Zuriarrain, 2019). The supercycles framework shares some of its features. A growth model (for example, a wage-led regime) reflects the existence of thwarting mechanisms that ensure that a specific component of aggregate demand (consumption demand) is strong enough to maintain economic growth. The development of such growth models is affected both by global factors, and national and regional factors such as the distribution of power between various social blocs. Importantly, in our framework, any given growth model will ultimately lose effectiveness because of endogenous institutional erosion.

Another criticism of the VoC literature points to common trends, most obviously liberalisation, occurring across high-income countries (Baccaro and Howell, 2011). The supercycles framework likewise highlights common features but goes beyond a story about the arrival of ‘neoliberalism’. Drawing on the *Régulation* School (see e.g. Boyer, 2000), we provide a new Minsky-inspired classification of institutional mechanisms and a more explicit account of the long-run cyclical patterns that result from macroeconomic and institutional interactions. We also offer new insights into the evolutionary changes in shadow banking that have taken place over the last decades, and their role in the erosion of thwarting mechanisms of the financial globalisation supercycle.

The supercycles framework thus further develops the macro-regimes in Blyth and Matthijs (2017), wherein the target of macroeconomic policy is central to the growth regime. The selection of such targets reflects the balance of power: a full employment target reflects strong labour, while inflation targets reflect a powerful finance sector. First, we postulate that the distribution of power influences the design of thwarting mechanisms; it does not merely affect macroeconomic targets and the associated policy design. Policy makers need to establish mechanisms that keep a range of key macroeconomic variables within certain bounds, irrespective of the primary macroeconomic target; otherwise, macroeconomic instability would undermine political stability. Second, in our framework, the way that thwarting mechanisms are eroded is specific to each supercycle: the strength of labour in the 1970s undermined the wage-price consensus, giving rise to inflationary pressure, while the strength of finance in the 2000s placed limits on the effectiveness of mechanisms to constrain financial instability. Understanding the nature of the factors driving the erosion of thwarting mechanisms is crucial for the analysis of the endogenous forces that lead to long-run instability.

3. Macrofinancial stability and the two supercycles

In order to quantitatively capture the evolution of macrofinancial stability in high-income countries over the last decades, we develop the Macrofinancial Stability Index (MSI). The MSI is constructed using a number of ‘floor’, ‘ceiling’ and ‘corridor’ macroeconomic and financial variables. These are variables that thwarting mechanisms aim to constrain, either to prevent the variable decreasing without limit (e.g. economic growth, the employment rate, financial asset prices), increasing without limit (e.g. current account deficits, credit-to-GDP ratios), or both (inflation, house prices).

⁴ For a recent critical account of the VoC literature, see Hay (2020).



Figure 1: Macrofinancial Stability Index (MSI) and supercycles, US and UK, 1952-2018

Note: The method for constructing the index, and the variables and the data sources used, are described in the Appendix. The figure depicts the 5-year moving average of the MSI.

The MSI is calculated as one minus an average of the normalised distances of floor, ceiling and corridor variables from their maximum, minimum and average values respectively (over the period under investigation, see Appendix). The MSI thus takes values between 0 (minimum stability) and 1 (maximum stability). We estimate the MSI for the G7 countries since the 1960s/1970s (the starting year differs for each country depending on data availability)⁵:

Figure 1 shows the MSI for the US (top pane) and the UK (bottom pane) alongside a timeline of key events and institutional developments. The figure also highlights the phases of the two post-war supercycles, (see following sections).

⁵ We have estimated alternative versions of the index in which house price growth is removed as a corridor variable and/or share price growth is included as a floor variable. The evolution of the index remains almost the same.

Macrofinancial stability in the US was high and improving until the late 1960s. It then deteriorated from around 1968 until the early 1980s. Thereafter macrofinancial stability improved, achieving a peak in the late 1990s before declining steadily to reach its lowest level during the global financial crisis. From around 2012 to 2018, macrofinancial stability increased.

A similar pattern is observed in the UK, with the exception that there was a decline in stability in the years preceding the UK's exit from the European Exchange Rate Mechanism, followed by a recovery. The MSI for the other G7 countries behaves in a similar way (See Figure A1 in the Appendix). Germany is however an exception: macrofinancial stability deteriorated in the 1990s and improved in the 2000s, reflecting highly specific circumstances, such as the positive effect of adopting the euro for German exports.⁶ Moreover, in Japan macrofinancial stability started declining in the 1990s which captures the well-known stagnation of this decade. But despite these disparities, it can be overall argued that high-income countries experienced common secular cyclical movements in their macrofinancial stability in the post-World War II period.

The supercycles framework can be used to explain these broadly common cyclical movements. We do so by using our four-phase supercycles classification to identify the two post-war supercycles, the industrial capitalism (IC) supercycle and the financial globalisation (FG) supercycle. These are identified on the basis of (i) the evolving architecture of thwarting mechanisms and (ii) our postulated positive relationship between the MSI and the effectiveness of thwarting mechanisms. The MSI and thwarting mechanisms effectiveness increase during the expansion and genesis phases, while they decline during the maturity and crisis phases. Table 1 summarises the main features of each supercycle, along with the drivers of basic cycles, the main thwarting mechanisms and the causes of erosion of these mechanisms. In the following sections, we provide a detailed account of the institutional architecture and thwarting mechanisms that prevailed during each of the two supercycles, and the outcomes for macrofinancial stability.⁷

⁶ The MSI for Germany is not reported in Figure A1, but is available upon request.

⁷ It is important to note that we do not focus explicitly on the role of technology. However, we implicitly consider technological change to be one of the prerequisites for the emergence of an institutional supercycle, in broad line with the literature on the Kondratieff waves (see e.g. Grinin et al., 2017). For example, following Perez (2002, 2010, 2016), the IC supercycle corresponds to the 'deployment' period of the 'Age of Oil, Autos and Mass Production', while the FG supercycle largely coincides with the 'installation' period of the 'Age of Information and Communication Technologies'. Although technological change interacts with macrofinancial structures and institutional configurations, we abstract from these interactions in order to focus on the analysis of macrofinancial and institutional processes.

Table 1: Two post-war supercycles

	Industrial capitalism (IC) supercycle	Financial globalisation (FG) supercycle
Key feature	Financing expensive capital assets	Production and preservation of tradable financial assets
Basic cycle drivers	Fragile corporate balance sheets Cyclical functional distribution	Neorentier driven fragile financial balance sheets Global financial cycle Cyclical functional distribution
	<i>Ceiling mechanisms</i>	Glass-Steagall Act Bretton Woods
		Basel II Monetarism/Inflation targeting
Thwarting mechanisms	<i>Floor mechanisms</i>	Wage policy Fiscal policy Industrial policy Welfare state Accommodative banking system/Lender-of-last-resort
	<i>Innovations</i>	Eurodollar markets
		Shadow banking Collateral-based liquidity provision
Causes of erosion	<i>Long-run processes</i>	Wage/price spiral Oligopoly structures
		Excess accumulation of private debt

4. The industrial capitalism supercycle

4.1 Main features and basic cycles

The end of World War II marks the start of the expansion phase of the IC supercycle. The defining feature of this period is the relationship between the capital investment of industrial firms and macroeconomic dynamics (Kalecki, 1943). The financial systems of high-income capitalist nations financed the production of expensive and long-lasting capital assets: in this age of weak and immobile finance, bankers sought to ensure that the debts of corporations could be serviced without disruption to the development of the industrial capital structure. The architecture of thwarting mechanisms – from labour market institutions to the welfare state and capital controls – created a balance of power between labour and big capital, which, constrained in its movements across borders, was subject to the restraining hand of government (Blyth, 2002; Blyth and Matthijs, 2017).

The basic cycle was driven by the interacting dynamics of corporate investment and financing (as in Minsky's financial instability hypothesis), and by the interaction of functional income distribution and aggregate demand (see Table 1). On the latter, debate persists on whether such cycles should be regarded as 'profit-led' (Goodwin, 1967; Barbosa-Filho and Taylor, 2006) or 'wage-led' (Kalecki, 1945; Stockhammer and Stehrer, 2011): the central issue is whether the 'profit squeeze' or distribution-driven shifts in aggregate demand are the dominant force in generating cycles. All three forces: finance, aggregate demand and profit-driven investment spending can be incorporated into our framework as thwarting mechanisms (Stockhammer and Michell, 2017, provide a synthesis of financial and demand-driven cycles).

4.2 Thwarting mechanisms

Over a long period during the IC supercycle, a range of mechanisms ensured – or aimed to ensure – that the growth of total expenditure kept pace with the expansion of capacity, by setting a floor under the level that total expenditures could fall to in periods of crisis and recession (see Table 1). Wages kept pace with productivity growth, alongside a generous welfare system, so that consumption expenditures grew in line with productive capacity. In many high-income countries, investment spending was supported by bank credit, in the context of long-run relationships between industrial capitalists and banks. Government investment grew steadily in rich countries, and counter-cyclical government spending was widely accepted as a policy tool.

The supercycle was characterised by a wage policy consensus under which it was broadly accepted that real wages should grow in line with productivity (Ferri and Minsky, 1992; Blyth and Matthijs, 2017; Levy and Temin, 2007). A range of institutional mechanisms, including support for trade union membership and incorporation of trade unions into wage bargaining processes, ensured that wages kept pace with rising productivity. Crouch (2017) characterises the model, exemplified by the United States, but emulated across Europe, as 'business unionism' – eschewing broader political struggles, unions focussed on the narrower aim of achieving wage increases. Since bargaining was fragmented, with each union focused on achieving relative wage gains in their particular sector, this model required a broad policy commitment to full (male) employment in order to function as an effective stabilisation mechanism. In the context of labour shortages following World War II and rapid growth and upgrading of the capital stock, strong demand for labour alongside substantial union membership and commitment to collective bargaining saw real wage growth of around 3% per annum between 1950 and 1974, broadly in line with productivity (Armstrong et al., 1984, p. 120).

Steady wage growth translated into growth in consumption, and with it, demand for the rapidly increasing industrial output. This in turn ensured that profits were maintained, stimulating sustained growth in capital investment. Between 1940 and 1970, government consumption spending (on health, education and so on) and transfer payments rose more rapidly than GDP, while military expenditures declined as a share of total spending. Government investment grew steadily, at roughly the same pace as GDP. Overall, government spending rose by around 10% of GDP, contributing to demand both directly, and indirectly through transfer payments (Glyn et al., 1986). Contrary to some narratives, this spending was not substantially deficit financed. While government did not explicitly adopt Keynesian ideas until the 1960s, it was widely believed that government deficit spending would be used in the case of downturns, leading to expectations of steady growth in aggregate demand. Overall, as Glyn et al. (1986) argue,

Wages were determined by a bargaining procedure that was increasingly collective and centralised in nature. In wage and price determination the state took an increasingly active

role via incomes and prices policies, welfare state provisions, and its role as a major employer and producer (Glyn et al., 1986, p. 57)

Central banks and the commercial banking system accommodated this regime of steady growth in wages, consumption and government expenditure (Epstein and Schor, 1986; Ferri and Minsky, 1992). Policy was more accommodative in France, Italy and Japan, and less so in the case of the UK, the US and Germany.⁸ Bank financing was predominant in the former group, credit markets relatively underdeveloped and the banking system domestically focussed. Relatively weak labour meant that greater monetary accommodation of credit demand was possible without generating inflationary pressure from wage increases. Conversely, in the latter group, with more independent central banks, less bank intermediation and stronger labour, monetary policy was less accommodative.

Notwithstanding these national differences, Ferri and Minsky (1992) argue that banks were willing to finance long-lived capital assets because it was expected that non-financial firms would be able to meet their debt payment commitments since (i) steady growth of aggregate demand was expected and (ii) in the presence of product market regulation and oligopolistic structures, firms would operate under mark-up pricing, meaning that money wage increases would not translate into real wage increases, squeezing profit margins. As a result, both capacity utilisation and profit margins would be preserved, maintaining firms' profitability and ensuring that debts would be repaid. In turn, it was in bankers' interests to ensure that debt could be rolled over at affordable terms.

Throughout the 1950s and much of the 1960s, this institutional structure placed a floor under aggregate demand and investment growth, thwarting stagnationary tendencies and ensuring steadily rising productivity, incomes and living standards.

The IC supercycle was also characterised by a particular configuration of ceiling thwarting mechanisms (see Table 1). Trade unions played a dual role; in addition to ensuring that wage growth kept pace with productivity growth, wage bargaining, particularly in the US also served to hold wage growth in check, ensuring that wages would not grow in excess of productivity, squeezing profits and lowering investment spending (Brenner, 2006). Some countries experimented with income policies that restrained wage growth (Glyn and Sutcliffe, 1972; Tomlinson, 1987). Nonetheless, as trade union membership grew, and wartime national pay bargaining gave way to more localised factory level bargaining, wage growth in excess of productivity led to a gradual decline in the profit share in most advanced nations during the 1950s and 1960s (Glyn and Sutcliffe, 1972).

Finance was constrained by both the international monetary and financial architecture and by national financial regulations. The Bretton Woods system of fixed-but-adjustable exchange rates eliminated both the macroeconomic volatility resulting from exchange rate movements, and the potential for speculation on such movements. Controls on cross-border financial flows, to prevent destabilising 'hot money' flows, were widely implemented under the Bretton Woods system (Helleiner, 1994). Ceilings on deposit and loan rates, and subsidised credit, constrained retail banking, while the Glass-Steagall Act enforced the separation of investment and commercial banking activity, curtailing speculative activities by commercial banks. As a result, 'banking crises were almost non-existent in the heyday of Bretton Woods' (Bordo et al., 2001, p. 57).

4.3 Erosion of thwarting mechanisms, crisis and genesis

⁸ With the exception of Germany, this split reflects two main differences between these economies: stronger labour and weaker links between finance and industry in the UK and the US than in the European economies.

Effective floor thwarting mechanisms during the expansion phase kept unemployment low which, alongside the expansion of the welfare state, reduced the cost of job loss and strengthened the bargaining position of labour: as productivity growth slowed in the late 1960s, unions were able to enforce continued high real wage growth. The resulting squeeze in profits led to slowing capital investment and, as firms raised prices in an attempt to preserve profit margins, growing inflationary pressure (Marglin, 1990). At the same time, the international institutional architecture came under increasing strain. The US trade surpluses of the 1950s and 1960s, driven by post-war reconstruction in Europe and Japan, gave way to deficits by the 1970s, alongside persistent German and Japanese surpluses. The declining effectiveness of key thwarting mechanisms heralded the onset of the maturity phase of the IC supercycle (see Figures 1 and 2).

Downward pressure on the dollar was intensified by a private institutional innovation: the rise of the Eurodollar market. From around 1957, there was rapid growth in dollar-denominated banking outside the US, with London at the centre. This was driven by a number of factors, including US regulatory changes such as the introduction of 'Regulation Q' which placed a ceiling on the rate of interest that US banks could pay on deposits; this led to competition for dollar deposits from offshore subsidiaries in London that could pay higher rates (Strange, 1986; Moffitt, 1984). In the 1960s, the Eurodollar markets provided a mechanism for offshore dollars to be 'recycled' back to the headquarters of US banks, but in the 1970s this flow went into reverse: 'speculators borrowed dollars in the Eurodollar markets and promptly sold them for other currencies, so that foreign central banks found it necessary to buy dollars on a large scale in order to prevent the undue appreciation of their currencies' (Tew, 1977, p. 164).

By 1971, the scale of reserve outflows meant that a run on the gold reserves of the US was becoming inevitable; Nixon announced a 'temporary' suspension of dollar convertibility into gold, with the intention of forcing surplus countries to abandon their pegs to the dollar. The move was successful and marked the beginning of the end of the Bretton Woods system, and the start of the crisis phase of the IC supercycle in which rising inflation and high unemployment accompanied the disorderly transition to floating exchange rates. Oil price hikes in 1973 and 1979 destabilised the system further and helped to cement floating rates, initially intended as a temporary measure when introduced in 1973, as a permanent feature. These hikes also led to substantial surpluses for oil exporters which were recycled, much through the Eurodollar markets, into lending to deficit countries, presaging the developing country debt crises of the 1980s onwards. This also greatly reduced the issue of 'dollar overhang' – the problem of excess dollars held outside the US – because dollar FX reserves were now seen as a blessing not a burden. As a result, interest in coordinated international monetary reform waned and the position of US – which wanted to make floating exchange rates permanent and opposed an enhanced role for IMF special drawing rights (SDRs) – was strengthened. In 1974, capital controls on dollar outflows from the US and inflows into other countries were substantially liberalised.

A run of bank failures in the US and Germany in 1974, including Bankhaus Hersatt, Franklin National and First National of San Diego, led to the founding of the Basel Committee at the end of 1974, but no further action was taken as contagion appeared relatively limited. The economic crisis lasted through most of the 1970s, until the decisive shift in policy direction under Reagan and Thatcher marked the start of the genesis phase (see Figures 1,2 and A1-A5), ushering in the new configuration of thwarting mechanisms that would characterise the financial globalisation (FG) supercycle.

The defining feature of early Reagan and Thatcher years was the drive to curtail inflation by sharply reducing the bargaining power of labour, in many cases in direct confrontations (such as the miners' strike in the UK and the air traffic controllers' strike in the US). Under successive governments in the US and the UK, legal frameworks protecting workers' rights and collective bargaining were progressively dismantled (Silvers and Slavkin, 2009). In the US, the minimum wage, introduced as part of the New Deal in the 1930s, no longer increased in line with prices and productivity. The project of

dismantling the post-war welfare state was initiated (Stedman Jones, 2014). Tax structures became steadily less progressive (Piketty and Saez, 2007). Instead of full employment, the stated objective of macroeconomic policy shifted to control of inflation, to be achieved by constraining the growth of the money supply.⁹

The resulting recession and mass unemployment proved effective in constraining wage demands, but this came at the cost of weakening aggregate demand. As wage growth stagnated, and protection of those on lower incomes was removed, spending could not keep pace with productivity. New thwarting mechanisms were required to sustain demand. At the national level, the expansion of private debt substituted, at least partially, for lost purchasing power. Internationally, the possibility of sustained current account imbalances in the post-Bretton woods system allowed some countries to rely on exports to supplement domestic demand (the promise that flexible rates would eliminate such imbalances was oversold). But debt expansion required further changes; the new national and international institutional structure provided the environment for the emergence of the so-called shadow banking system, facilitating an expansion of private debt and financial system leverage to hitherto unseen scales of magnitude and complexity. Several features of the crisis and genesis-era environment are of particular relevance.

As already noted, flexible exchange rates did not eliminate the cross-border imbalances that ultimately overpowered the Bretton Woods system: the total surpluses of creditor nations such as Japan and Germany doubled between 1973 and 1979 (Strange, 1986, p. 8). Neither did the adoption of floating exchange rates eliminate exchange rate volatility – on the contrary, volatility increased along with the volume of trading on foreign exchange markets. With central banks no longer committed to intervention in these markets, private actors needed to hedge exchange rate risks: this was achieved by purchasing forward contracts, while investing funds short term. Strange argues that this is the reason for the concurrent growth in both derivatives and money markets: ‘this is the link that connects the foreign exchange market with the short-term credit market, exchange rates with interest rates’ (Strange, 1986, p. 12).

From the 1980s onwards, the system of financial regulation put in place in the US as part of the New Deal, including the Glass-Steagall act separating commercial banking and investment banking activities, began to be unwound. The loosening of regulations on banks and mortgage lenders, and on inter-state mergers and acquisitions activities, paved the way for the boom in mortgage lending. In 1968, Fannie Mae was converted from a government agency into a ‘government-sponsored private institution’: a ‘profit-seeking, shareholder owned company, tasked with creating a secondary market for mortgages made to low- and moderate-income borrowers’ (Silvers and Slavkin, 2009, p. 325). The nascent mortgage-backed securities (MBS) market of the 1970s led to the development of the ‘agency passthrough’ market in the 1980s, in which securities issued by institutions owned or sponsored by the government were traded. In 1982, regulatory changes facilitated the issuance of mortgage-backed securities by financial institutions without government sponsorship, and in 1984 legislation was introduced allowing private investors to hold MBS (Berliner et al., 2016; Kregel, 2008; Thompson, 2009). By 1993, 60% of mortgages were securitised, and, in 2004, private, non-government sponsored firms’ issuance of MBS surpassed issuance by Fannie Mae for the first time (Silvers and Slavkin, 2009).

In the US, the Depository Institutions Deregulation and Monetary Control Act of 1980 (DIDMCA) removed caps on deposit interest rates, allowed mortgage lenders to issue checking deposits, and encouraged competition among bank and non-bank financial institutions. Retail depositors shifted to

⁹ This turned out to be illusory: as central bankers later attested, rather than controlling monetary aggregates, central banks were enacting a policy of tight money in the form of high interest rates.

higher-interest money market funds, while firms replaced bank credit with the issuance of commercial paper. Similar changes had arrived earlier in the UK, with the introduction of Competition and Credit Control by the Bank of England in 1971 (Goodhart, 2014). In London, the Big Bang of 1983 abolished the distinction between stockbroking and market-making and proprietary trading activity. Banks bought out stockbroking firms, and moved into investment banking activity (Chick, 2009). Light touch regulation attracted foreign banks, which joined those involved in Eurodollar lending. Regulators in other jurisdictions came under increasing pressure to maintain competitiveness by following suit and deregulating their financial systems. The stage was set for the financial globalisation supercycle.

5. The financial globalisation supercycle

5.1 Main features and basic cycles

The election of Reagan and Thatcher cemented the foundations of the financial globalisation supercycle. The dynamics of the basic cycle shifted as large corporations turned to capital markets and banks to mortgage borrowers. Cyclical dynamics driven by mortgage lending and household consumption expenditure replaced the interaction between bank lending and corporate investment of the industrial capital supercycle, altering the nature of the monetary circuit (Michell, 2017). This household credit-driven process required greater systemic leverage than a circuit driven by corporate borrowing for capital investment. Shadow banking made this possible: it allowed banks to push against regulatory limits, using securitisation to move assets off balance sheets while simultaneously generating a flow of assets that would provide the collateral needed to satisfy the growing demands of owners and managers of wealth. Growing concentrations of wealth (and liquidity in the form of corporate cash pools and official FX reserves) led to rising demand for financial securities (see Table 1).

The emergence of a securities-based credit system alongside the dismantling of capital controls fundamentally transformed the role and nature of finance. We identify a new class of increasingly powerful *neorentiers*: those (mostly global) financial institutions whose activities are oriented towards the production and collateral-based financing of new asset classes. Neorentier profitability is substantially influenced by daily changes in asset prices via mark-to-market balance sheet effects (Lindo, 2013; Peer, 2016; Gabor 2018; Gabor and Vestergaard, 2016, 2018), underpinning cycles of liquidity and leverage (Adrian and Shin 2010). Neorentiers include market-based banks, global institutional investors (from insurance companies to pension funds and hedge funds) and their asset managers (see Hardie and Howarth 2013; Haldane 2014). As we explain later, neorentiers evolved into global actors capable of influencing the scope and direction of institutional and regulatory change, and therefore the architecture of thwarting mechanisms.

With the *neorentier*, we update the concept of the rentier to reflect evolutionary changes during the FG supercycle. The post-Keynesian financialisation literature defines rentiers as the recipients of income from traditional financial assets such as equities and bonds, and examines phenomena such as share buybacks, rising dividend payments relative to retained profits, increasing financial activity relative to capital investment, and rising household indebtedness (Lavoie, 2008; van Treeck, 2009; Stockhammer, 2004, 2008; Krippner, 2005; Palley, 2007; Hein and van Treeck, 2010; Hein, 2013).¹⁰ This analysis implicitly assumes that institutional evolution towards market-based finance does not fundamentally alter the class composition that prevailed during the IC supercycle. But neorentier activities in securities, repo and derivative markets change the roles played by traditional financial assets, and thus rentiers:

¹⁰ Our analysis is confined to financial rentiers. For an analysis of different types of rentiers, see Christophers (2019). For recent developments in the broader financialisation literature, see Bortz and Kaltenbrunner (2017), Lapavitsas and Mendieta-Muñoz (2018) and Fontana et al. (2019).

developments in repo markets affect the overall liquidity of the financial system (Adrian and Shin, 2010; Gabor, 2016); the provision of bank credit is dependent on liquid markets for securitised loans; equities are packaged into exchange-traded funds (ETFs) to acquire bond-like qualities; and cyclical movements in securities prices and liquidity are synchronised across borders, generating what has been labelled the global financial cycle (Rey, 2015).

The erosion of the IC thwarting mechanisms powered shadow banking. The rollback of public welfare provision, the switch from ‘pay as you go’ to ‘funded’ pension schemes and wealth concentration arising from states’ weaker ability to tax multinationals or wealthy individuals gave rise to large-scale institutional asset management such as insurance and pension schemes (Toporowski, 2000; Haldane 2014; Lysandrou, 2016). Neorentiers successfully pressured for open capital accounts and the re-organisation of local financial systems around collateral-based finance (Gabor 2018), often through international financial institutions (Kentikelenis and Babb, 2019). Hedge funds targeted higher returns through repo-based leverage. Broker dealers, often part of global banking groups, deployed their balance sheets to connect neorentiers seeking leverage to those seeking safety in money market deposits (Pozsar 2014, Gabor and Vestergaard 2018) via collateral-intensive relationships (Bini Smaghi, 2010). Banks transformed their business models towards market-based finance, under pressure from the loss of corporate customers and depositors chasing higher returns via shadow banking (European banks acquiring assets issued via US shadow banking, see Liikanen 2012). With this, traditional rentiers became increasingly dependent on the actions of neorentiers, in what Minsky called ‘money manager capitalism’, with its fragile financial structures and insufficient capital investment (see Wray and Tymoigne, 2009; Kregel, 2009; Lavoie, 2012-3; Whalen, 2012).

In the FG supercycle, the drivers of the basic cycle thus shifted from domestic credit conditions and capital investment to household debt and mortgage lending in an increasingly internationalised and market-based financial system. This shift took place alongside the transition to a new architecture of thwarting mechanisms.

5.2 Thwarting mechanisms

The FG supercycle rose from the ashes of key IC thwarting mechanisms. In many high-income countries, most notably the US, wage growth declined from the high rates of the 1960s more sharply than productivity growth (Glyn, 2007). From the 1990s onwards, increasing concentration led to higher corporate mark-ups, particularly in the US, and a falling wage share in national income.¹¹ Pay restraint and the growing importance of high ‘value added’ and high mark-up sectors, such as technology and finance, eased the profit squeeze from the IC supercycle – at least at the aggregate level. While corporate earnings recovered, shifts in income distribution also brought stagnationary tendencies: weak or even negative income growth for lower income households constrained consumption spending, while business investment remained weak for much of the period, even as profits recovered.

The ideological shift on macroeconomic management at the end of the 1970s brought independent central banks oriented to inflation targeting and fiscal deficits financed on sovereign debt markets.¹²

¹¹ The 1980s saw a wave of mergers and acquisitions activity in the US, with so-called ‘corporate raiders’ mounting hostile takeovers of large corporations, increasingly supported by the investment banks and funded by leverage, following financial deregulation. This was followed in the 1990s by another wave of increasingly cross-border mergers and acquisitions, this time spreading to Europe.

¹² In reality, after the period of high interest rates at the start of the 1980s helped bring inflation under control by producing mass unemployment, monetary policy was gradually loosened as a way to maintain aggregate demand in the face of stagnationary tendencies. Fiscal deficits expanded rapidly following the oil shocks of 1974 and the

Mass privatisation reduced the state's economic footprint, while previous gains on employment protection and unemployment benefits were substantially rolled back (Glyn, 2007). Growth increasingly relied on rapid expansion of leverage and increasing financial activity.

The financial sector, in turn, found that new institutional structures were required to enable leverage to expand beyond traditional constraints. During the expansionary phase of the FG supercycle (see Figures 1, 2 and A1-A5), shadow banking expanded significantly, absorbing the flow of assets resulting from the continued expansion of credit. Securitisation and the originate-to-distribute model allowed banks to transform illiquid assets, mortgage loans in particular, into marketable securities. These securities were financed with short-term liabilities such as repos and asset-backed commercial paper (ABCP) (Krishnamurthy et al., 2014; Gabor and Vestergaard 2016). Growth became increasingly reliant on collateral-based financial activity.

Collateral plays a central role in funding neorentier balance sheets. Neorentiers issue short-term (often overnight) repo deposits secured by tradable collateral (analysed as *shadow money* by Gabor and Vestergaard 2016, 2018). For lenders such as institutional cash pools or money market funds, collateral makes repos a better liquidity management vehicle than unsecured bank deposits (Pozsar 2014, Gabor and Vestergaard 2017). Repo borrowing allows a wide range of institutions to access money market funding, while rising asset prices lead to increasing leverage capacity because repo collateral is marked to market (Adrian and Shin 2010).¹³ The use of collateral functionally, and imperfectly, replaces direct sovereign guarantees on short-term liquid assets (Bini Smaghi 2010). Sudden declines in collateral prices can lead to margin calls, liquidity spirals and fire-sales of collateral securities, amplifying asset price deflation and exacerbating liquidity shortages (Brunnermeier and Pedersen, 2008; Adrian and Shin, 2010).

The rise of collateral-based finance fundamentally changed the relationships between central banks and governments. In the 1990s, central banks in high-income countries collectively sanctioned neorentiers' turn to shadow deposits by liberalising repo markets, often to enable Ministries of Finance to develop liquid government bond markets (Gabor 2016; Dutta 2017). States turned to neorentiers in the age of independent central banks and capital market financing of budget deficits, introducing reforms in sovereign bond markets designed according to neorentier preferences: regular auctions facilitated by primary dealers and deregulated repo markets (UK Treasury and Bank of England, 1995).

The promise of liquidity for sovereign bonds entrenches the 'infrastructural power' of finance (Braun 2018): neorentiers promise liquidity to Ministries of Finance, and well-functioning monetary transmission mechanisms to central banks, improving their ability to oppose policy innovations or tighter regulatory measures (Gabor 2016). The rising power of neorentiers thus serves to discipline states, curbing fiscal and regulatory thwarting mechanisms: market financing of fiscal deficits privileges neorentiers as mediators between the monetary and the fiscal arms of the state, and creates conflicting objectives for the central bank and the Treasury.

Easy credit conditions allowed sustained expansion of private debt, enabling aggregate demand to keep up with productive capacity in the face of weak income growth and government retrenchment. Savings ratios fell throughout the 1980s and 1990s in Anglo-Saxon economies, sustaining consumption spending in the face of stagnant household incomes. Credit-financed consumption took over from

breakdown of the Bretton Woods system, and persisted in Europe and the US—despite sustained efforts to limit them—until the mid-1990s.

¹³ Mechanically, a repo entails the sale and repurchase of collateral (financial securities) such that the difference in price implies the interest rate of the 'loan', while that the cash borrower retains economic ownership of collateral for the duration of the contract.

capital investment as the driver of growth in many countries, placing a floor under aggregate demand (Baccaro and Pontusson, 2016; Stockhammer and Wildauer, 2016). Critically, not all countries relied on debt-financed consumption expenditure. Without exchange rate mechanisms to curb trade and financial imbalances, northern European and East Asian countries turned to export demand to maintain growth. Thus, the debt-financed consumption expenditures of Anglo Saxon economies provided a floor to both domestic and *global* aggregate demand; at the same time, financial activity became increasingly cross-border, as neorentiers increasingly looked to global bond markets to fill their portfolios. Basic cycles became increasingly synchronised across borders, shaped by the global financial cycle (Rey, 2015).

The FG thwarting mechanisms could not match the performance of the IG supercycle: growth in income per capita and productivity was substantially lower than in the expansion and maturity phase of the previous supercycle. Despite anti-inflation rhetoric, the period was characterised by progressively looser credit conditions, resulting from both financial system expansion, and progressively lower policy interest rates. Volatility in asset prices increased, forcing central banks to extend lender-of-last-resort (LOLR) support, for instance with the secondary bank crisis in the UK or the Continental Illinois and Savings and Loans crises in the US.¹⁴ But the effectiveness of this thwarting mechanism would come under pressure in a financial supercycle increasingly reliant on collateral-based liquidity provision.

5.3 Erosion of thwarting mechanisms and crisis

The FG supercycle relies on two ceiling thwarting mechanisms: bank capital regulation, and inflation targeting (see Table 1). Neither proved effective. The microprudential focus of Basel regulations effectively ignored shadow banking and cross-border market-based financial activity. The success of inflation targeting framework in generating the so-called ‘great moderation’, albeit due to forces largely outside of central bank control (Michell and Toporowski, 2019), fed the belief that ‘macroeconomics [had] succeeded’ (Lucas, 2003, p. 1). When confronted with the ‘risk-taking channel’ of monetary policy, according to which low policy rates encourage leverage, central banks decided that it was more expedient to clean up after asset bubbles than lean against them. The shift to monetarism and inflation targeting thus encouraged shadow banking and cemented the (infra)structural power of neorentiers.

While shadow banking initially facilitated debt-led economic expansion, it rendered this expansion progressively more fragile due to rising systemic leverage and collateral-based interconnectedness. This became apparent with the failure of Long-Term Capital Management (LTCM) in 1998, the first episode of global volatility triggered by fragile neorentier business models: leveraged positions in securities and derivative markets financed with repo deposit liabilities.¹⁵ Following the Asian financial crisis of 1997 and the Russian crisis the following year, LTCM saw increasingly large margin calls on these liabilities, and was eventually rescued by its largest counterparties to avoid fire sales of collateral securities (Rubin et al., 1999). Central banks in the BIS Committee on the Global Financial System described LTCM as the first global crisis of collateral (Gabor, 2016).

The collapse of LTCM marked the start of the maturity phase of the FG supercycle in most high-income countries (see Figures 1, 2 and A1-A5): the point at which shadow banking began to actively erode the thwarting mechanisms of the supercycle in a system with two key vulnerabilities. First, the floor

¹⁴ For a historical account of the LOLR facility, see Kindleberger (1996).

¹⁵ The LTCM Fund participated in government bond markets, mortgage-backed securities markets, corporate bond markets, emerging bond markets, and equity markets. The LTCM Fund held long and short positions in these markets, and supported these positions in many cases through repo and reverse repo agreements and securities lending agreements with a large number of other market participants. (Rubin et al, 1999, p12).

imposed by credit expansion turned out to be weak and reliant on repeated loosening of monetary conditions in order to support asset prices, the famous ‘Greenspan put’, after Chairman of the Federal Reserve, Alan Greenspan. Second, neorentiers’ increasing reliance on daily mark-to-market across repo and derivatives contracts introduced new pro-cyclical financial mechanisms, reinforcing movements in asset prices, market liquidity (see Brunnermeier and Pedersen 2008) and leverage (Adrian and Shin 2009) and thus credit conditions.

Rather than stronger financial regulation, the technocratic response to LTCM’s collapse was greater market discipline via collateral. Collateral would become a ‘disciplinary’ thwarting mechanism: if neorentiers were to value collateral to market on a daily basis and generally improve their risk management regimes (see Ruben et al 1999), the prospect of falling collateral prices and the attending funding pressures for their collateral-based liabilities would keep leverage in check.

To encourage the shift to collateral, central banks adopted neorentier practices of collateral-based liquidity provision. By 2000, central banks in high-income countries replaced outright interventions in government bond markets, whether for monetary policy implementation or lender of last resort support, with repo lending (Gabor and Ban 2016). Central banks also promoted government bonds as safe assets for collateral-based finance (CGFS, 1999), downplaying the possibility that relatively low volumes of public debt would generate shadow banking innovation to increase the supply of ‘safe assets’ via securitisation (Coeuré, 2016, Gabor, 2016; Gabor and Vestergaard, 2018).

The discipline of collateral proved illusionary. After Lehman’s collapse, neorentiers turned away from private collateral (Gorton and Metrick, 2009), triggering liquidity and haircut spirals on previously ‘safe’ assets (Brunnermeier and Pedersen, 2008; Bini Smaghi, 2010).

The collapse of Lehman further called into question the effectiveness of central banks’ lender of last resort function, due to its inability to stabilise securities prices. The classic LOLR function was premised on restoring trust in banks. But in collateral-based finance, trust is reoriented from banks (whose complexity and interconnectedness makes it difficult for counterparties to form expectations) to collateral. This hardwires collateral liquidity as the key condition for the resilience of neorentiers’ liabilities, and the main financial stability challenge for central banks. LOLR repo loans against collateral are ill-equipped to deal with the endogenous change in collateral markets liquidity (Dooley, 2014). If central banks lend emergency liquidity against collateral securities that fall in price, they have to call margin on those loans, thus worsening funding liquidity conditions for borrowers (see Mehrling et al., 2013; Gabor and Ban, 2016). If dealer-brokers become unwilling to make markets in securities, the only way to maintain the liquidity of a securities-based credit system in the face of sustained selling is for the ultimate provider of liquidity—the central bank—to absorb a flow of securities onto its own balance sheet as they are sold, stabilising the price.

In response to the erosion of the traditional LOLR mechanism, central banks introduced two innovations: first, an expansion of the LOLR framework to include new types of collateral and collateral swaps and, second, a securities market-maker-of-last-resort (MMLR) function. The former enables banks to access emergency liquidity against a broader set of assets on their balance sheet, including illiquid loans, and dealers to obtain the collateral needed to fund market-making activity. But this may not be always effective to stabilise systemic neorentier balance sheets, if banks and dealers remain unwilling to purchase securities on the scale required to restore market liquidity. Further, as the Eurozone crisis shows, LOLR lending may reinforce falling securities prices as a result of central banks making margin calls on their repo loans (Gabor and Ban, 2016; Barthelemy et al., 2018).

This is why some central banks expanded their crisis repertoire with the formal adoption of market-maker of last resort facility. MMLR targets collateral market liquidity instead of banks' funding liquidity: central banks step in to purchase securities when no one else will, placing a floor on the prices of securities used as collateral by neorentiers (Gabor, 2016).¹⁶ Despite some overlap, MMLR is functionally different to quantitative easing (QE): QE involves active purchases of government securities with the intention of raising the price of both public and privately-issued securities; this makes liabilities collateralized with these securities cheaper, easing financing conditions for neorentiers. Notably, the Bank of England was the first central bank to adopt QE in 2009, and before the COVID-19 pandemic, the only one to formalize MMLR in 2015 (Carney, 2015).

In other polities, political constraints impeded central banks from institutionalizing this new thwarting mechanism. The Euro area equivalent, Outright Monetary Transactions (or 'whatever it takes') was directed at distressed sovereign debt, not private assets, and was accompanied by conditionality, thus weakening its effectiveness as stabilisation tool. The difficulties faced by the European Central Bank (ECB) in adapting its crisis interventions to evolutionary changes in finance highlight the fragile status of government debt as a safe asset for neorentiers: the safe asset privilege of the fiscal authority is not automatic, is enjoyed by only a handful of high-income countries, and requires the central bank to backstop it should it come under pressure (Gabor and Vestergaard 2018).

While crisis-era innovations succeeded in preventing financial system collapse and depression, growth has not returned. In our framework, this less due to 'secular stagnation' (Summers 2014) than to the institutional architecture of the FG supercycle – weak and 'flexible' labour, high inequality and government retrenchment. Without a change in this architecture – without a new set of thwarting mechanisms – it is difficult to identify a likely source of sustained demand growth other than a return to credit expansion.

But for a period of sustained credit expansion to occur, there must be demand for credit from borrowers, lenders must perceive those borrowers as creditworthy, and the banking and financial system must have spare lending capacity. In a securities-based credit system, both loan originators and the buyers and funders of securitised loans must perceive loans as sufficiently safe. In the post-GFC period, high debt stocks, low growth, weak investment, fiscal retrenchment and the persistence of inequalities limit the perceived creditworthiness of much of the private sector; the most creditworthy sector, large corporations, has direct access to the bond markets.

Further, banks and financial institutions are subject to stricter capital regulations, risk assessments and scrutiny of off-balance sheet accounting, limiting the potential for credit expansion even in the case that creditworthy borrowers can be found. Simultaneously, liquidity requirements impose constraints on credit expansion, both for institutions that lend directly (as loan originators) or indirectly (as buyers of securities) to the non-financial sector.

Basel III introduced requirements for increased holdings of high-quality liquid assets (HQLA), but this was not matched by a sufficient supply of safe assets: although there is now a larger pool of public securities, the growth of private safe assets has slowed (partly because of the lower perceived creditworthiness of ultimate borrowers). This shortage may not be apparent at the aggregate level – following QE, reserve balances are substantial and government debt to GDP ratios remain high – but

¹⁶ Mehrling frames the policy as a 'dealer of last resort', with the central bank offering a bid-ask spread, but in reality the central bank acts as buyer of last resort. As Tucker (2009, p. 11) put it: 'the Bank of England has embarked on what could, perhaps, be viewed as two variants of MMLR in the sterling corporate financing markets. Both have been focused on our being a buyer, rather than operating on both sides of the market, but arguably that is what the various MMLR ideas really amount to in crisis conditions'.

this stock of assets is unevenly distributed throughout the system: much is held by a small number of large institutions, so that smaller and medium-sized institutions struggle to acquire sufficient HQLA.

Overall, while institutional changes improved the effectiveness of stabilising mechanisms in the period prior to the coronavirus pandemic (see Figures 1 and A1), the continuous push for asset-based welfare (Finlayson, 2009) reinforced the structural drivers of neorentier capitalism without delivering a new engine of growth. When the coronavirus crisis struck, a new configuration of thwarting mechanisms that could foster economic expansion alongside financial stability had not yet emerged. The thwarting mechanisms of the next supercycle will be, at least in part, the result of the rapid institutional change that has taken place as a result of this crisis, and of greater awareness of the potential for future pandemics. Inevitably, the next supercycle will also be conditioned by the even greater crisis of climate change.

6. Conclusion

Drawing on Minsky, this paper develops a theoretical framework for the analysis of institutional ‘supercycles’ in capitalism. We develop an index that demonstrates the secular cyclical pattern of macrofinancial stability in high-income countries in postwar capitalism. We explain this pattern as resulting from the emergence and erosion of thwarting mechanisms over two post-war supercycles.

Our approach opens up possibilities for a wider research programme in macroeconomics, political economy and evolutionary finance. Future research could explore how macrofinancial stability can be more systematically connected with the effectiveness of thwarting mechanisms, using both qualitative and quantitative approaches. The links between technological developments and our institutional supercycles also deserve detailed study. What is most urgently required, in light of the COVID-19 and climate crises, is a detailed understanding of the current genesis phase and the prospects for the emergence of a new set of thwarting mechanisms that would underpin a green supercycle.

References

- Acemoglu, D., Johnson, S. and Robinson, J.A., 2005. Institutions as the fundamental cause of long-run growth, *In: Aghion, P., Durlauf, S., ed., Handbook of Economic Growth*, North Holland: Elsevier.
- Adrian, T. and Shin, H.S., 2010. Liquidity and leverage. *Journal of Financial Intermediation*, 19 (3), 418-437.
- Alchian, A., 1965. Some Economics of Property Rights, *Il Politico*, 30 (4), 816-29.
- Aldasoro, I., Andjiev, S., Borio, C., and Disyatat, P., 2020. Global and domestic financial cycles: variations on a theme, BIS Working Paper 864.
- Argitis, G., 2017. Evolutionary finance and central banking. *Cambridge Journal of Economics*, 41 (3), 961-976.
- Argitis, G., 2019. *Evolutionary Financial Macroeconomics*, London: Routledge.
- Armstrong, P., Glyn, A., Harrison, J., and Harrison, J., 1991. *Capitalism since 1945*, vol. 20, Oxford: Basil Blackwell.
- Asano, Y. M., Kolb, J. J., Heitzjip, J. and Farmer, J. D., 2019. Emergent inequality and endogenous dynamics in a simple behavioural macro model, Rebuilding Macroeconomics Working Paper no. 2.
- Baccaro, L. and Howell, C., 2011. A common neoliberal trajectory: The transformation of industrial relations in advanced capitalism. *Politics & Society*, 39 (4), 521-563.
- Baccaro, L. and Pontusson, J., 2016. Rethinking comparative political economy: the growth model perspective. *Politics & Society*, 44 (2), 175-207.
- Baccaro, L. and Pontusson, J., 2018. *Comparative Political Economy and Varieties of Macroeconomics*. MPIfG Discussion Paper No. 18/10, Max Planck Institute for the Study of Societies.
- Barbosa-Filho, N.H. and Taylor, L., 2006. Distributive and demand cycles in the US economy—a structuralist Goodwin model. *Metroeconomica*, 57 (3), 389-411.
- Berliner, B., Quinones, A. and Battacharya, A., 2016, Mortgage loans to mortgage-backed securities. *In: F.J. Fabozzi, ed. Handbook of Mortgage-backed Securities*, Oxford: Oxford University Press.
- Barthélemy, J., Bignon, V., and Nguyen, B., 2018. *Monetary policy and collateral constraints since the European debt crisis*. Banque de France Working Paper No. 669.
- Juan Barredo-Zuriarrain, 2019. The nature of capitalist money and the financial links between debt-led and export-led growth regimes, *New Political Economy*, 24 (4), 565-586
- Bini Smaghi, L., 2010. *Monetary policy transmission in a changing financial system – lessons from the recent past, thoughts about the future*. Speech at the Barclays Global Inflation Conference, New York City, 14 June 2010.
- Blyth, M., 2002. *Great Transformations: Economic Ideas and Institutional Change in the Twentieth Century*. Cambridge: Cambridge University Press.
- Blyth, M., and Matthijs, M., 2017. Black swans, lame ducks, and the mystery of ipe’s missing macroeconomy. *Review of International Political Economy*, 24 (2), 203-231.
- Bordo, M., Eichengreen, B., Klingebiel, D., Martinez-Peria, M. and Rose, A., 2001. Is the crisis problem growing more severe? *Economic Policy*, 16 (32), 53-82.
- Borio, C., 2014. The financial cycles and macroeconomics: What have we learned? *Journal of Banking and Finance*, 45, 182-198.
- Bortz, P. G. and Kaltenbrunner, A., 2017. The international dimension of financialization in developing and emerging economies. *Development and Change*, 49 (2), 375-393.
- Boyer, R., 2000. The political in the era of globalization and finance: Focus on some regulation school research. *International Journal of Urban and Regional Research*, 24 (2), 274-322.
- Braun, B., 2018. Central banking and the infrastructural power of finance: The case of ECB support for repo and securitisation markets. *Socio-Economic Review*, DOI: 10.1093/ser/mwy008.
- Brenner, R., 2006. *The Economics of Global Turbulence*, London and New York: Verso.
- Brunnermeier, M. K., and Pedersen, L. H., 2008. Market liquidity and funding liquidity. *The Review of Financial Studies*, 22 (6), 2201-2238.

- Carney, M., 2015. *Building real markets for the good of the people*. Speech at the Lord Mayor's Banquet for Bankers and Merchants of the City of London at the Mansion House, 10 June 2015, London.
- Committee on the Global Financial System (CGFS), 1999. *Implications of repo markets for central banks*. Basel: Bank for International Settlements.
- Chick V., 2013. The current banking crisis in the UK: An evolutionary view, In: J. Pixley and G.C. Harcourt, eds. *Financial Crises and the Nature of Capitalist Money*. London: Palgrave Macmillan.
- Christophers, B., 2019. The renterization of the United Kingdom economy. *Environment and Planning A: Economy and Space*, advance access: September 2019.
- Coeuré, B., 2016. *Sovereign debt in the euro area: Too safe or too risky?* Keynote address at Harvard University, 3 November 2016.
- Copeland, A., Duffie, D., Martin, A. and McLaughlin, S., 2012. Key mechanics of the US tri-party repo market. *Federal Reserve Bank of New York Economic Policy Review*, 18(3), 17-28.
- Crouch, C., 2017. Membership density and trade union power. *Transfer: European Review of Labour and Research*, 23 (1), 47-61.
- Dafermos, Y., 2018. Debt cycles, instability and fiscal rules: a Godley-Minsky synthesis. *Cambridge Journal of Economics*, 42 (5), 1277-1313.
- Davis, E. P., 2008. *Liquidity, financial crises and the lender of last resort—how much of a departure is the sub-prime crisis?* Brunel University.
- Demsetz, H. 1967. Towards a theory of property rights, *American Economic Review*, 57, 347-349.
- Dosi, G. and Roventini, A., 2019. More is different...and complex! The case for agent-based macroeconomics. *Journal of Evolutionary Economics*, 29, 1-37.
- Dooley, M. P., 2014. *Can emerging economy central banks be market-makers of last resort?* BIS Paper No. 79.
- Epstein, G. and Schor, J., 1986. Macropolicy in the rise and fall of the golden age. In: M. Schor, ed. *The Golden Age of Capitalism*. Oxford: Oxford University Press.
- Ferri, P. and Minsky, H., 1992. Market processes and thwarting systems. *Structural Change and Economic Dynamics*, 3 (1), 79-91.
- Finlayson, A., 2009. Financialisation, financial literacy and asset-based welfare. *The British Journal of Politics and International Relations*, 11 (3), 400-421.
- Fontana, G., Pitelis, C. and Runde, J., 2019. Financialisation and the new capitalism? *Cambridge Journal of Economics*, 43 (4), 799-804.
- Gabor, D., 2016. The (impossible) repo trinity: the political economy of repo markets. *Review of International Political Economy*, 23 (6), 967-1000.
- Gabor, D., 2018. Goodbye (Chinese) shadow banking, hello market-based finance. *Development and Change*, 49 (2), 394-419.
- Gabor, D. and Ban, C., 2013. Fiscal policy in financialized times: investor loyalty, financialization and the varieties of capitalism, available at SSRN: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2201518.
- Gabor, D. and Ban, C., 2016. Banking on bonds: the new links between states and markets. *Journal of Common Market Studies*, 54 (3), 617-635.
- Gabor, D., and Vestergaard, J., 2016. *Towards a theory of shadow money*. Institute for New Economic Thinking Working Paper.
- Gabor, D., and Vestergaard, J., 2018. Chasing unicorns: The European single safe asset project. *Competition & Change*, 22 (2), 139-164.
- Glyn, A., 2007. *Capitalism Unleashed: Finance, Globalization, and Welfare*, Oxford: Oxford University Press.
- Glyn, A. and Sutcliffe, R., 1972. *British Capitalism, Workers and the Profit Squeeze*, London: Penguin Books Ltd.

- Glyn, A., Hughes, A., Lipietz, A., and Singh, A., 1986. The rise and fall of the golden age: an historical analysis of post-war capitalism in the developed market economies. In: M. Schor, ed. *The Golden Age of Capitalism*. Oxford: Oxford University Press.
- Goda, T. and Lysandrou, P., 2014. The contribution of wealth concentration to the subprime crisis: a quantitative estimation. *Cambridge Journal of Economics*, 38 (2), 301-327.
- Goodhart, C.A.E., 2014. *Competition and credit control*. LSE Financial Markets Group Special Paper Series No. 229.
- Goodwin, R.M., 1967. A growth cycle, in capitalism and growth, In: C. Feinstein, ed. *Socialism, Capitalism and Economic Growth*, Cambridge: Cambridge University Press.
- Grad, D., Mehrling, P. and Neilson, D. H., 2011. 'The evolution of last-resort operations in the Global Credit Crisis', March 2018, available at SSRN: <https://ssrn.com/abstract=2232348>
- Grimmin, L.E., Grinin, A.L., Korotayev, A. 2017. Forthcoming Kondratieff wave, Cybernetic Revolution, and global ageing. *Technological Forecasting & Social Change*, 115, 52-68.
- Haldane, A.G., 2014. *The age of asset management?* speech at the London Business School 4 (4).
- Hall, P.A., Soskice, D., 2001. *Varieties of capitalism: The institutional foundations of comparative advantage*, Oxford: Oxford University Press.
- Hardie, I. and Howarth, D., 2013. *Market-based banking and the international financial crisis*. New York: Oxford University Press.
- Hay, C., 2020. Does capitalism (still) come in varieties? *Review of International Political Economy*, 27 (2), 302-319.
- Hein, E., 2013. Finance-dominated capitalism and re-distribution of income: a Kaleckian perspective. *Cambridge Journal of Economics*, 39 (3), 907-934.
- Hein, E., and van Treeck, T., 2010. Financialisation and rising shareholder power in Kaleckian/Post-Kaleckian models of distribution and growth. *Review of Political Economy*, 22 (2), 205-233.
- Helleiner, E., 1994. *States and the Reemergence of Global Finance: From Bretton Woods to the 1990s*, Ithaca and London: Cornell University Press.
- High-Level Commission on Carbon Prices, 2017. *Report of the High-level Commission on Carbon Prices*, World Bank, Washington, DC.
- Hodgson, G., 2015. *Conceptualising capitalism: institutions, evolution, future*. Chicago: The University of Chicago Press.
- Howell, C., 2015. 'On Kathleen Thelen, *Varieties of Liberalization and the New Politics of Social Solidarity*', New York, Cambridge University Press, 2014, *Socio-Economic Review* 13(2): 399-409.
- Iversen, T. and Soskice, D., 2012. Modern Capitalism and the Advanced Nation State: Understanding the Causes of the Crisis, In: Bermeo, N. and J Pontusson (2012) *Coping with Crisis: Government reactions to the Great Recession*. New York: Russel Sage Foundation.
- Jackson, T., 2019. The post-growth challenge: Secular stagnation, inequality and the limits to growth, *Ecological Economics*, 156, 236-246.
- Kalecki, M., 1943. Political aspects of full employment. *The Political Quarterly*, 14 (4), 322-330.
- Kalecki, M., 1945. On the Gibrat distribution. *Econometrica: Journal of the Econometric Society*, 161-170.
- Kentikelenis, A.E. and Babb, S., 2019. The making of neoliberal globalization: Norm substitution and the politics of Clandestine institutional change. *American Journal of Sociology*, 124 (6), 1720-1762.
- Kindleberger, C. P., 1996. *Manias, panics, and crashes: a history of financial crises*, New York: John Wiley & Sons, Inc, 3rd edition.
- Kregel, J. A., 2008. *Changes in the US financial system and the subprime crisis*. The Levy Economics Institute of Bard College Working Paper No. 530.
- Kregel, J. A., 2009. *The natural instability of financial markets*. The IDEAS Working Paper Series Paper No. 04/2009.
- Krippner, G.R., 2005. The financialization of the American economy. *Socio-economic Review*, 3 (2), 173-208.

- Krishnamurthy, A., Nagel, S. and Orlov, D., 2014. Sizing up repo. *The Journal of Finance*, 69 (6), 2381-2417.
- Lapavitsas, C., and Mendieta-Muñoz, I., 2018. Financialization at a watershed in the USA. *Competition & Change*, 22 (5), 488-508.
- Lavoie, M., 2008. Financialisation issues in a post-Keynesian stock-flow consistent model. *Intervention. European Journal of Economics and Economic Policies*, 5 (2), 335-361.
- Lavoie, M., 2012-3. Financialization, neo-liberalism, and securitization. *Journal of Post Keynesian Economics*, 35 (2), 215-233.
- Levy, F., and Temin, P., 2007. *Inequality and institutions in 20th century America*. Working Paper No. 13106, National Bureau of Economic Research.
- Liikanen, E., 2012. High-level Expert Group on reforming the structure of the EU banking sector. *Final Report, Brussels*, 2.
- Lindo, D., 2013. Political Economy of Financial Derivatives: A Theoretical Analysis of the Evolution of Banking and its Role in Derivatives Markets, PhD dissertation, School of Oriental and African Studies, London.
- Lysandrou, P., 2011. Global inequality as one of the root causes of the financial crisis: A suggested explanation. *Economy and Society*, 40 (3), 323-344.
- Lysandrou, P., 2016. The colonization of the future: An alternative view of financialization and its portents. *Journal of Post Keynesian Economics*, 39 (4), 444-472.
- Marglin, S.A., 1990. Lessons of the golden age: an overview, In: S.A. Marglin and J.B. Schor, eds. *The Golden Age of Capitalism: Reinterpreting the Postwar Experience*. Oxford: Clarendon
- Mehrling, P., Pozsar, Z., Sweeney, J., and Neilson, D., 2013. *Bagehot was a shadow banker: shadow banking, central banking, and the future of global finance*. December.
- Michell, J., 2017. Do shadow banks create money? 'Financialisation' and the monetary circuit. *Metroeconomica*, 68, 354-377.
- Moffitt, 1984. *The World's Money*, New York: Touchstone.
- Murau, S., 2017. Shadow money and the public money supply: the impact of the 2007–2009 financial crisis on the monetary system. *Review of International Political Economy*, 24 (5), 802-838.
- Nikolaidi, M., 2017. Three decades of modelling Minsky: what we have learned and the way forward. *European Journal of Economics and Economic Policies: Intervention*, 14 (2), 222-237.
- Nikolaidi, M., and Stockhammer, E., 2017. Minsky models: a structured survey. *Journal of Economic Surveys*, 31 (5), 1304-1331.
- North, D., 2018. Institutional change: A framework of analysis., in Braybrooke, D. (ed.), *Social rules: Origin; character; logic; change*, NY and London: Routledge.
- Peer, N.O., 2016. *A Constitutional Approach to Shadow Banking: The Early Shadow System*, Doctoral dissertation, Harvard Law School.
- Palley, T.I., 2007. *Financialization: what it is and why it matters*. The Levy Economics Institute of Bard College Working Paper No. 525.
- Palley, T.I., 2011. A theory of Minsky super-cycles and financial crises. *Contributions to Political Economy*, 30 (1), 31-46.
- Perez, C., 2002. *Technological Revolutions and Finance Capital: The Dynamics of Bubbles and Golden Ages*, Cheltenham: Edward Elgar.
- Perez, C., 2010. Technological revolutions and techno-economic paradigms. *Cambridge Journal of Economics*, 34 (1), 185-202.
- Perez, C., 2016. *Capitalism, technology and a green global Golden Age*. Europe 1929: 33.
- Piketty, T. and Saez, E., 2007. How progressive is the U.S. Federal tax system? A historical and international perspective. *Journal of Economic Perspectives*, 21 (1), 3-24.
- Pozsar, Z., 2011. *Can shadow banking be addressed without the balance sheet of the sovereign?* IMF Working paper No. 11/289.
- Pozsar, Z., 2014. *Shadow banking: The money view*. OFR Working Paper No. 14-04.

- Rubin, R.E., Greenspan, A., Levitt, A. and Born, B., 1999. *Hedge funds, leverage, and the lessons of Long-Term Capital Management*. Report of The President's Working Group on Financial Markets, April 1999.
- Rey, H., 2015. *Dilemma not trilemma: the global financial cycle and monetary policy independence*. NBER Working Paper No. 21162.
- Ryoo, S., 2010. Long waves and short cycles in a model of endogenous financial fragility. *Journal of Economic Behavior & Organization*, 74 (3), 163-186.
- Stedman Jones, D., 2014. *Masters of the Universe: Hayek, Friedman, and the Birth of Neoliberal Politics*, Princeton, NJ: Princeton University Press.
- Silvers, D. and Slavkin, H., 2009. *The Legacy of Deregulation and the Financial Crisis: Linkages Between Deregulation in Labor Markets, Housing Finance Markets, and the Broader Financial Markets*, 4 *Journal of Business & Technology Law* 4 (2): 301-347.
- Stockhammer, E., 2004. Financialisation and the slowdown of accumulation. *Cambridge Journal of Economics*, 28 (5), 719-741.
- Stockhammer, E., 2008. Some stylized facts on the finance-dominated accumulation regime. *Competition & Change*, 12 (2), 184-202.
- Stockhammer, E., 2015. Rising inequality as a cause of the present crisis. *Cambridge Journal of Economics*, 39 (3), 935-958.
- Stockhammer, E., 2016. Neoliberal growth models, monetary union and the Euro crisis. A post-Keynesian perspective. *New Political Economy*, 21 (4), 365-379.
- Stockhammer, E. and Michell, J., 2017. Pseudo-Goodwin cycles in a Minsky model. *Cambridge Journal of Economics*, 41 (1), 105-125.
- Stockhammer, E. and Stehrer, R., 2011. Goodwin or Kalecki in demand? Functional income distribution and aggregate demand in the short run. *Review of Radical Political Economics*, 43 (4), 506-522.
- Stockhammer, E. and Wildauer, R., 2016. Debt-driven growth? Wealth, distribution and demand in OECD countries. *Cambridge Journal of Economics*, 40 (6), 1609-1634.
- Strange, S., 1986. *Casino Capitalism*, Oxford: Blackwell.
- Strange, S., 1998. *Mad Money*, Manchester: Manchester University Press.
- Summers, L.H., 2014. US economic prospects: Secular stagnation, hysteresis, and the zero lower bound. *Business Economics*, 49 (2), 65-73.
- Tew, B., 1977. *The evolution of the international monetary system, 1945-77*, Hutchinson.
- Thompson, H., 2009. The political origins of the financial crisis: The domestic and international politics of Fannie Mae and Freddie Mac. *The Political Quarterly*, 80 (1), 17-24.
- Tomlinson, J., 1987. *Employment policy: the crucial years, 1939-1955*. Oxford: Clarendon Press.
- Tooze, A., 2018. *How a Decade of Financial Crisis Changed the World*. London: Penguin.
- Toporowski, J., 2000. *The End of Finance: The Theory of Capital Market Inflation, Financial Derivatives and Pension Fund Capitalism*. London: Routledge.
- Tucker, P., 2009. *The repertoire of official sector interventions in the financial system*. Speech given today at the Bank of Japan's 2009 International Conference in Tokyo, 27-28 May 2009.
- van Treeck, T., 2009. A synthetic, stock-flow consistent macroeconomic model of 'financialisation'. *Cambridge Journal of Economics*, 33 (3), 467-493.
- Williamson, O. E., 1987. *The Economic Institutions of Capitalism: Firms, Markets, Relational Contracting*. New York: Free Press.
- Williamson, O. E., 1998. The institutions of governance. *The American Economic Review*, 88 (2), 75-79.
- Whalen, C., 2012. Money Manager Capitalism. In: J. Toporowski and J. Michell, eds. *The Handbook of Critical Issues in Finance*. Cheltenham: Edward Elgar.
- Wray, L.R., 2011. Minsky's money manager capitalism and the global financial crisis. *International Journal of Political Economy*, 40 (2), 5-20.

Wray, L.R. and Tymoigne, E., 2009. Macroeconomics meets Hyman P. Minsky: the financial theory of investment. *In*: G. Fontana and M. Setterfield (Eds.) *Macroeconomic Theory and Macroeconomic Pedagogy*. London: Palgrave Macmillan.

Appendix

The Macrofinancial Stability Index (MSI) is constructed using a number of floor, ceiling and floor/ceiling macroeconomic and financial variables. Let (i) f_1, f_2, \dots, f_n be n floor variables and $f_{\max 1}, f_{\max 2}, \dots, f_{\max n}$ and $f_{\min 1}, f_{\min 2}, \dots, f_{\min n}$ their maximum and minimum values over the period under investigation (ii) c_1, c_2, \dots, c_m be m ceiling variables and $c_{\max 1}, c_{\max 2}, \dots, c_{\max m}$ and $c_{\min 1}, c_{\min 2}, \dots, c_{\min m}$ their maximum and minimum values and (iii) $cor_1, cor_2, \dots, cor_q$ be q corridor variables and $cor_{\max 1}, cor_{\max 2}, \dots, cor_{\max q}$, $cor_{\min 1}, cor_{\min 2}, \dots, cor_{\min q}$ and $cor_{med 1}, cor_{med 2}, \dots, cor_{med q}$ their maximum, minimum and median values. Let also w_f, w_c and w_{cor} be the weights of floor, ceiling and corridor variables, respectively. The MSI is given by:

$$\begin{aligned}
 MFI_t = & 1 - \frac{w_f}{n} \left[\frac{|f_{\max 1} - f_{1t}|}{|f_{\max 1} - f_{\min 1}|} + \frac{|f_{\max 2} - f_{2t}|}{|f_{\max 2} - f_{\min 2}|} \dots + \frac{|f_{\max n} - f_{nt}|}{|f_{\max n} - f_{\min n}|} \right] \\
 & - \frac{w_c}{m} \left[\frac{|c_{\min 1} - c_{1t}|}{|c_{\max 1} - c_{\min 1}|} + \frac{|c_{\min 2} - c_{2t}|}{|c_{\max 2} - c_{\min 2}|} \dots + \frac{|c_{\min m} - c_{mt}|}{|c_{\max m} - c_{\min m}|} \right] \\
 & - \frac{w_{cor}}{q} \left[\frac{|cor_{med 1} - cor_{1t}|}{|cor_{\max 1} - cor_{\min 1}|} + \frac{|cor_{med 2} - cor_{2t}|}{|cor_{\max 2} - cor_{\min 2}|} \dots + \frac{|cor_{med q} - cor_{qt}|}{|cor_{\max q} - cor_{\min q}|} \right]
 \end{aligned}$$

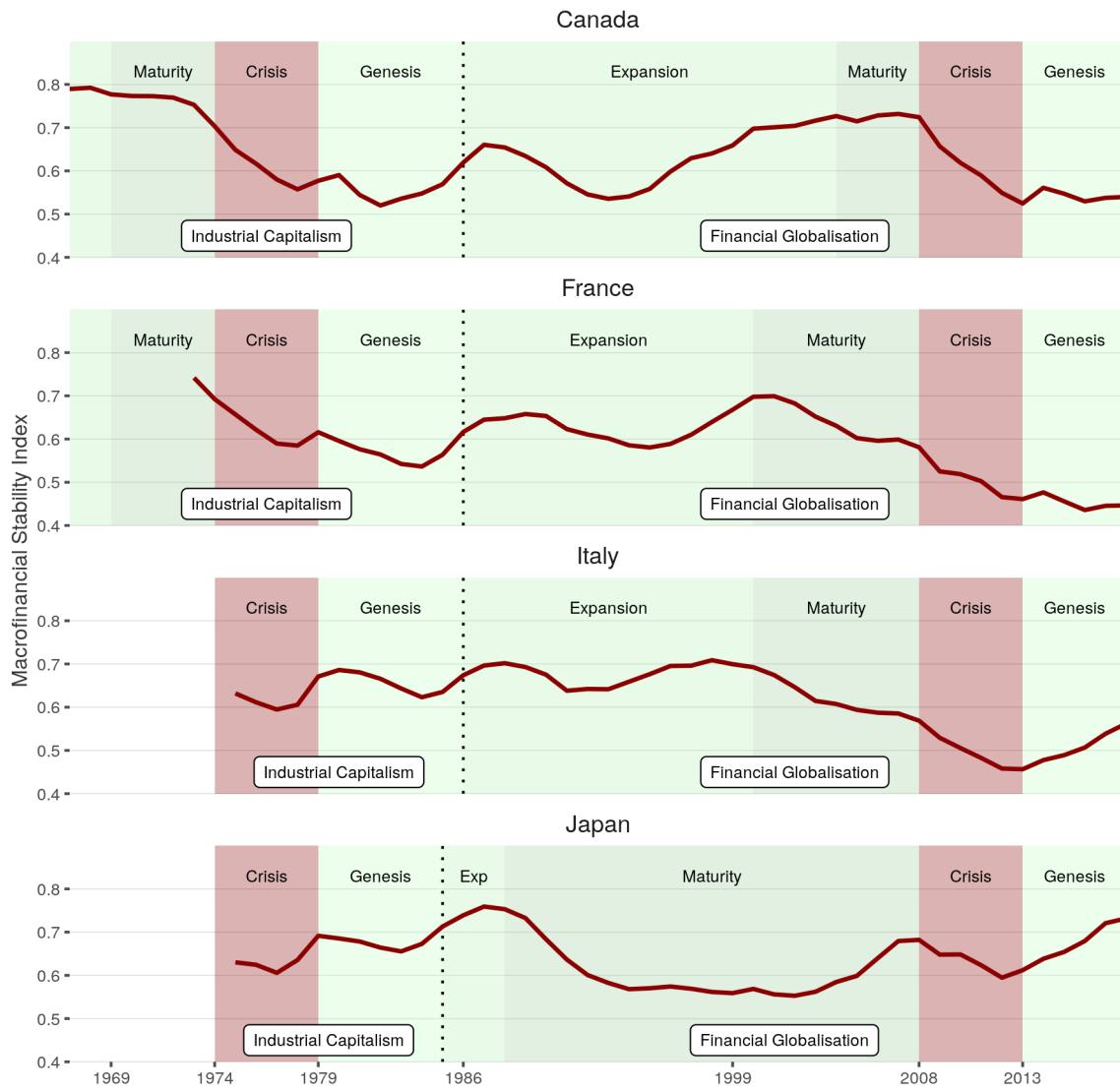
The variables and the data used for construction of the index are shown in Table A1. In the charts in this paper, floor, ceiling and corridor variables are weighted equally (i.e. $w_f = w_c = w_{cor} = 1/3$).

One implication of the index construction method is that the value taken by the index depends on the period selected, because index values are calculated relative to historical country-specific minima, maxima and median values. Another is that the index is primarily of use for analysing relative changes in a single economy, rather than making direct cross-country comparisons.

Table A1: Variables and data sources used for the construction of the Macroeconomic Stability Index (MSI)

Variables	Data source	Definitions/remarks
Floor variables		
Economic growth	OECD [Canada, France, Germany, Italy, Japan, UK] and FRED [US]	–
Employment rate	OECD [Canada, France, Italy, Japan, UK] and FRED [US]	Defined as 1 minus the unemployment rate.
Share price growth	OECD	Growth rate of a share price index estimated by OECD. The index is calculated from the prices of common shares of companies traded on national or foreign stock exchanges.
Ceiling variables		
Credit-to-GDP ratio	BIS [Canada, France, Germany, Italy, Japan, UK] and FRED [US]	The credit to the non-financial sector is used.
Current account deficit-to-GDP ratio	Jordan et al. (2016) [-2016] and OECD [2017-2018]	–
Corridor variables		
Inflation rate	OECD [Canada, France, Germany, Italy, Japan, UK] and FRED [US]	Growth rate of the consumer price index.
House price growth rate	Jordan et al. (2016) [-2016] and OECD [2017-2018]	Growth rate of a house price indicator that captures how residential property prices change over time.

Figure A1: Macrofinancial Stability Index (MSI) and supercycles, four countries, 1967-2018



Note: The index formula is available above. The variables and the data sources used for the construction of the index are reported in Table A1. The figure depicts the 5-year moving average of the MSI.