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Prudential bank regulation: a post-Keynesian perspective

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Banks play an important role in the post-Keynesian theory of endogenous money but post-Keynesians have not paid much attention to the prudential regulation of banks. Do post-Keynesian insights into the role of banks cast any light on the way they ought to be regulated, or can the conventional treatment of prudential bank regulation be grafted onto post-Keynesian theory without any significant modification? This paper begins a process of reflection on these questions. It argues that conventional prudential regulation theory can be utilised by post-Keynesians but with important modifications including a renewed emphasis on liquidity and greater recognition of endogenously generated systemic risk. A post-Keynesian approach to prudential bank regulation is shown to be characterised by both liquidity and capital requirements, as well as by a macroprudential framework that facilitates the counter-cyclical adjustment of these requirements in response to endogenous variations in systemic risk.

Keywords: banking, financial crises, prudential regulation, macroprudential supervision

JEL codes: G21, G28

1 INTRODUCTION

Banks play an important role in the post-Keynesian theory of endogenous money originally developed by Nicholas Kaldor and extended by Basil Moore (Cottrell 1994: 588). These institutions lie at the heart of Moore's principle that *loans make deposits*, and a concern with their stability is integral to both Kaldor's and Moore's emphasis on central-bank accommodation of bank reserve demand. Together, these ideas form the core of current post-Keynesian monetary theory. Banks also play an important role in Minsky's (1982) *financial instability hypothesis*.

Despite this theoretical significance, post-Keynesians have paid little attention to the issue of prudential bank regulation and this raises a number of questions. Can the conventional treatment of prudential bank regulation be grafted onto a post-Keynesian understanding of this system without any significant modification? Do post-Keynesian insights into the role of banks cast any light on the way they ought to be regulated? What is the precise objective of prudential bank regulation from a post-Keynesian perspective?

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This paper begins a process of reflection on these questions. Section 2 reviews the role of banks in post-Keynesian monetary thought. Section 3 then examines the treatment of prudential bank regulation in mainstream theory, while Section 4 reviews the small number of post-Keynesian contributions in this area. Section 5 assesses and extends these treatments to propose an overall post-Keynesian theory of prudential bank regulation. Section 6 summarises and concludes.

2 THE ROLE OF BANKS IN POST-KEYNESIAN MONETARY THEORY

The importance of prudential regulation derives from the functions performed by banks within the economic system. If, for example, bank lending is central to the financing of aggregate demand and the employment of workers, but bank managers are periodically tempted to redirect lending into the non-productive activities of friends and relatives, bank regulation may be justified in order to support aggregate demand and promote employment. Further, the shape of this regulation must be such that the redirection of lending is either prevented or discouraged, and that lending returns to the financing of aggregate demand. It would not be useful if regulation prevented the redirection of lending but at the cost of an overall reduction in the level of this lending, causing lower aggregate demand and increased unemployment. The function of banks must, therefore, ultimately govern the nature of how they are regulated. In this section, we therefore review the role of banks within post-Keynesian monetary thought in order to provide the appropriate context for the development of a post-Keynesian theory of bank regulation.

As is well known, a central tenet of post-Keynesian monetary theory is the principle of money-supply endogeneity, and the names of Kaldor and Moore are closely associated with this principle (Cottrell 1994: 588–589; Dow 1996a: 497). Without attempting to trace the historical development of this idea,¹ an important influence on Kaldor's version of endogenous money was the emergence of Monetarism in the 1960s.² Against the Monetarist proposition that inflation is always a monetary phenomenon and that it can be managed by central-bank control over an exogenous money supply (see Friedman 1968: 7–11; cf. Kaldor 1970: 2–3), Kaldor argued that the money supply was not exogenous but was determined endogenously by the needs of trade (Kaldor 1970: 5–7; 1986: 22). Central banks cannot, therefore, control the money supply, and alternative solutions must be sought to manage inflation (Kaldor 1986: 25). Kaldor's version of endogeneity had two dimensions (*ibid.*: 20–30; cf. Docherty 2005: 120–127). Firstly, if the central bank attempts to control some narrowly defined monetary aggregate in an inflationary environment, interest rates will rise, and financial innovation will generate new monetary instruments to complement existing ones that the central bank is attempting to control. The velocity of circulation of narrow instruments will thus increase, and inflation will fail to be prevented. Secondly, if the central bank instead accommodates the increased money demand associated with inflation, the money supply, narrowly defined, will expand at a constant velocity, and inflation will, again, fail to be prevented. According to Kaldor (1986: 25), the standard practice of central banks is to pursue the second of

1. See Rochon (2000) and Docherty (2005) for accounts of how the idea of endogenous money developed.

2. See chapter 5 of Docherty (2005) for an account of Kaldor's formulation of endogenous money in response to Monetarism.

these possibilities, because higher interest rates associated with the first have the potential to generate financial instability, which it is the central bank's duty to avoid. Central banks thus tend to accommodate money demand, but at an interest rate of their choosing (ibid.: 24), and this renders the money supply endogenous.

While banks play an important role in Kaldor's theory, this role was articulated in relatively simple terms. Banks meet rising money demand with additional lending during periods of expansion, and this increases the money supply (ibid.: 22). Bank loans can also be repaid when money is superfluous (in periods of contraction), and this reduces the money supply (Kaldor/Trevithick 1981: 7; cf. Lavoie 1999: 105–110). An important aspect of Basil Moore's contribution to the theory of endogenous money was its development of the role played by banks. In *Horizontalists and Verticalists*, Moore carefully describes bank practices and how these render the money supply endogenous in a manner consistent with Kaldor's analysis (Moore 1988: 22–39; cf. Moore 1979; 1983). A number of features of bank behaviour stand out in this treatment. Firstly, a primary function of banks is to supply firms' working capital needs via loan provision (Moore 1988: 33; cf. Moore 1979: 373; 1983: 545), and in the process, banks assess borrower creditworthiness (Moore 1988: 24). Secondly, aggregate lending occurs at the discretion of borrowers rather than banks (ibid.: 23–26). Thirdly, the resulting accommodation of loan demand presents banks with a problem. As loans are extended, bank deposits also increase as funds are credited to accounts which borrowers can then draw down. In this sense Moore (1988: 46; cf. 1983: 543–544; 1989: 11) argues that *loans make deposits*. But as this happens, the maintenance of depositor confidence, so crucial for bank stability, requires banks to hold additional liquidity (either legal tender or central-bank deposits) (Moore 1988: 48; cf. 1989: 13). Moore argues that the advent of liability management in the 1960s and 1970s provided banks with a means of obtaining this liquidity via wholesale financial markets (Moore 1988: 26–31 and 52–54; 1989: 12–14). Fourthly, in circumstances where the banking system as a whole is expanding, wholesale demand for liquid resources will increase, and central banks will supply this demand in order to prevent interest-rate volatility and to support financial stability just as Kaldor had argued (Moore 1988: 93–94; cf. 1979: 58; 1983: 540; 1989: 11–12). Moore's version of endogenous money was thus characterised by a richer treatment of bank behaviour and wholesale financial markets than Kaldor's, but the two contributions were essentially complementary (Docherty 2005: 173–200).

Post-Keynesian monetary theory also sees banks as producers of liquidity, a commodity which is important for the way economic agents manage uncertainty. According to Dow (1996b), the role of liquidity arises in two contexts. The first is associated with fundamental uncertainty which post-Keynesians identify in key economic decisions (ibid.: 699). This uncertainty requires the formation of expectations, and Dow argues that social conventions provide a basis for the formation of these expectations. Among these conventions is a general confidence in the banking system that makes bank deposits liquid. Liquid deposits are thus able to perform the functions of money, especially the unit of account function, and contracts can be negotiated in the units furnished by this function. This allows economic activity to occur despite the presence of uncertainty (ibid.: 698).

The second context in which the liquidity of bank deposits is important, according to Dow, is when the value of assets is either falling or in danger of falling. In this case, liquidity preference will increase and investors will be attracted to money (ibid.: 699; cf. Ramskogler 2011: 73–74). The financial system will, therefore, be stabilised in potentially unstable circumstances but confidence that banks can continue to provide liquid deposits is crucial for this outcome.

Banks thus play a central role in post-Keynesian monetary theory. They firstly finance the working capital needs of firms, a function which is central to making the money supply endogenous. This endogeneity has, of course, important macroeconomic implications. It implies that causality runs from investment to saving rather than the reverse, giving investment an independence from saving that prevents variations in the rate of interest from automatically pushing the economy to full employment (Moore 1988: 385; cf. Docherty 2005: 354). The possibility of money non-neutrality and unemployment equilibria both follow from this feature of post-Keynesian monetary economics (Cottrell 1994: 593; Docherty 2005: 343–348). Banks, secondly, produce liquid deposits which perform an important function in the management of fundamental economic uncertainty, especially in times of crisis.

These functions will be important for shaping the nature of prudential bank regulation from a post-Keynesian perspective. The following section considers the conventional account of how these functions can be disrupted and thus why banks should be regulated. The section after that considers the small number of post-Keynesian contributions in this area.

3 THE CONVENTIONAL THEORY OF PRUDENTIAL BANK REGULATION

The importance of banks is also well recognised by mainstream theory and is the basis for the conventional approach to understanding prudential bank regulation (see, for example, Bhattacharya et al. 1998). Banks accept deposits from unsophisticated households, operate the payments system, and finance investment spending by firms in this mainstream view, and these services need to be protected from disruptions that can arise from substantial defaults on bank loans. Such defaults can arise either from poor lending decisions or significant economic events that affect the cash flows of bank borrowers. Unfortunately, banks are prone to such disruption because they accept deposits at relatively short maturities and extend loans at longer maturities, making them susceptible to *confidence problems* when loan defaults increase. In the absence of central-bank support, increased loan defaults can create concern about a bank's ability to repay deposits, and this can trigger a *bank run*. Under certain conditions, these problems can spread from bank to bank, and such *contagion* has the potential to threaten the entire banking system, in the conventional theory.

Conventional theory also recognises that governments can and should provide safety nets, typically in the form of either *lender of last resort* (LLR) facilities or *deposit insurance* schemes to support the banking system in such circumstances (Mishkin 2001: 5–6). The first of these ensures that banks have access to liquidity so that deposit repayment is possible without asset fire-sales. The second is designed to make depositors less likely to withdraw funds because they know the insurance scheme will repay their deposits if the bank collapses.

The problem with safety nets, however, is that they create *moral hazard* whereby bank managers are *more likely* to make loans that will default (Bhattacharya et al. 1998: 755–756; Mishkin 2001: 6–7). Since potential profits from more risky lending are high, and losses from increased defaults are limited by the safety net, risky lending can be advantageous to banks. Containing this moral hazard is the traditional function of prudential regulation (Bhattacharya et al. 1998: 756–760; Mishkin 2001: 8). It ensures that the government safety net can be provided while at the same time reducing the likelihood that poor lending practices will generate higher defaults.

Mishkin (2001: 8–15) outlines the various approaches that have been taken to such regulation. The two most common have been *liquidity regulation*, which mandates minimum

holdings of liquid assets as a proportion of deposit funds, and *risk-based capital regulation*, which requires loans to be financed with a minimum proportion of capital and for this proportion to rise as loan risk increases. The objective of liquidity regulation is to ensure that banks can repay deposits on demand, bolstering depositor confidence in periods of bank stress. The objective of capital regulation is twofold. It firstly ensures sufficient bank shareholder funds to absorb losses from loan defaults so that depositor funds are not lost. It secondly discourages bank managers from pursuing risky lending strategies. Capital is a more expensive funding source than deposits or wholesale funds, and so managers will think carefully about taking on excessive risk if it also raises funding costs. The trend in western economies after the 1980s was to substitute capital for liquidity regulation because solvency was seen as the key issue for confidence, and this is best addressed by ensuring that banks have sufficient capital (see Hoggan/Sharpe 1990: 134).

The approach to prudential regulation outlined above has come to be called *microprudential* regulation because of its focus on the solvency of individual banks. Since the global financial crisis (GFC), an apparently new approach to prudential regulation recognises the possibility that interconnections and common characteristics across banks may mean that default shocks can affect more than one bank (Basel Committee on Banking Supervision 2010). Such variations in *systemic* risk warrant, according to this approach, periodic recalibration of prudential measures in order to protect banks from these increased risks. This approach is referred to as *macroprudential* regulation (see Borio 2005; Galati/Moessner 2013) and the counter-cyclical capital buffer of the Bank for International Settlements' Basel III regime is an example of this type of regulation (Basel Committee on Banking Supervision 2011).

The fundamental principle underlying the conventional theory of prudential regulation is, therefore, that banking systems are periodically subject to exogenous shocks (which can be bank-specific or systemic in nature) and these shocks increase the probability of loan defaults, bank failures, and contagion that can spread across the entire banking system. Such possibilities warrant the provision of bank support, and this support justifies the imposition of bank regulation to minimise the moral hazard it creates.

4 POST-KEYNESIAN LITERATURE ON PRUDENTIAL BANK REGULATION

Post-Keynesian contributions to the theory of prudential bank regulation have been small in number and have focused on two particular issues. Firstly, Dow (1996b) makes a case for prudential regulation based on the importance of the liquidity-producing function of banks. Secondly, Palley (2003; 2004) and others have made the case for macroprudential bank regulation based on the role of banks in Minsky's *financial instability hypothesis*. We consider each of these approaches in turn.

Dow's (1996b) emphasis on the need for liquidity in bank portfolios follows in a straightforward way from her emphasis on banks as liquidity-producers. Regulations which assure the ongoing existence (solvency) of banks are important, according to Dow, but more specifically, these regulations should ensure the continued provision of liquidity services in contexts where there is increased liquidity preference. While Dow does not articulate what this looks like in terms of specific recommendations for the structure of regulation, one might expect it naturally to focus on some form of reserve requirement which we saw above characterised many approaches to bank regulation in the post-war period. Such regulations, where reserves are set against the level of bank deposits, ensure that banks have access to adequate stores of assets that can be liquidated if customers wish to redeem their deposits. This would, according to Dow's analysis, strengthen

confidence in the banking system, enhance the liquid nature of bank deposits, and allow agents to manage increased uncertainty during periods of economic stress. As observed above, it is interesting that prudential bank regulation around the world moved away from this form of regulation in the post-financial-deregulation period after the 1980s, as risk-based capital regulation was increasingly embraced. It is also to be noted that such liquidity regulation was reintroduced following the GFC (see Basel Committee on Banking Supervision 2013).

Palley's (2003; 2004) contribution reflects an emphasis in post-Keynesian theory on the endogenous nature of systemic bank risk. The implicit assumption in mainstream theory is that increased loan defaults, which can begin a chain reaction of bank failure and financial contagion, are exogenous to the banking system. They occur because of shocks to the real economy that compromise the ability of borrowers to repay loans. Post-Keynesian theory, on the other hand, recognises that in addition to such shocks, the banking system *itself* will periodically contribute to the creation of conditions within which there will be increased loan defaults, bank failure and financial contagion. This perspective largely arises from the work of Hyman Minsky (1964: 333; 1975: 112ff; 1982: 66–68; cf. Keen 1995: 610–613; Lavoie 1996: 277 and 286; Kindleberger 2000: 13–18; Kregel 2008: 4–6). According to Minsky's financial instability hypothesis, periods of sustained economic growth can lead to more optimistic expectations about investment profitability, increased investment spending by firms, stronger demand for financial assets, and increased bank lending to finance investment and asset purchases with an associated rise in debt-to-equity ratios (see especially Minsky 1982: 62–68). Asset-price inflation can be generated from this process which reinforces the optimistic expectations and leads to further asset demand and increases in debt ratios. Eventually, however, the upward momentum of asset prices and economic activity comes to an end, and this can be associated with asset-price deflation, loan defaults, and general financial stress. Bank failure can characterise such periods and economic depression can be a consequence of these phenomena (cf. Minsky 1964: 325–331).³

Addressing this possibility will thus shape bank regulation in distinctive ways and Palley's recommendations specifically address the problems that arise in response to asset-price inflation. Palley contrasts his approach in dealing with this phenomenon to the use of monetary policy conducted within a conventional inflation-targeting framework. The core of his approach is an *asset-based reserve requirement* (ABRR). This requirement is linked to the size and composition of a bank's *asset* portfolio, rather than to its *deposit* base (as was the case with traditional reserve requirements) (Bhattacharya et al. 1998: 756–757). As their asset portfolios grow, banks would be required, under Palley's ABRR, to hold more liquid assets such as reserves at the central bank. Different asset classes might well be assigned different reserve requirements, according to Palley (2004: 46), so that changes in the *composition* of the bank's loan portfolio as well as changes in its size could lead to changes in its required holding of reserves.

Palley (2003: 65–66) argues that such an approach is more effective for managing asset-price bubbles than either traditional liquidity requirements or capital regulation for a number of reasons. Firstly, he suggests, the reserve requirement can be varied by asset class so that the approach generates not one additional policy instrument but as many additional policy instruments as there are different asset-specific liquidity ratios. Since these requirements impose an additional cost upon banks for holding particular types of asset (because banks must also hold an associated amount of low-yielding liquidity

3. Tymoigne (2014) provides a detailed treatment of how systemic risks can be measured along Minskyan lines.

along with their holding of the asset in question), they affect a bank's willingness to make finance available for these asset types. Secondly, this differential effect can be used to favour or discourage particular asset classes for social reasons in addition to economic ones. Thirdly, the ABRR has inherent counter-cyclical effects. As an economy booms and banks are tempted to increase lending, the associated requirement to hold additional liquidity as assets expand will operate as a brake on lending, and vice versa. The ABRR for asset purchase lending could also be varied across the cycle as necessary to address periodic asset-price inflation, and this could be done without affecting the general level of interest rates. And, lastly, the increased demand for liquidity that would be generated by the ABRR would deepen liquidity markets and allow general monetary policy to be implemented more efficiently.

Palley (2003: 67) also claims that the ABRR is superior to risk-based capital requirements because the latter are pro-cyclical rather than counter-cyclical. Risk perceptions are usually lower in upturns when the economy appears to be doing well and in these circumstances risk-based capital requirements are relaxed, allowing banks to lend more, thus fueling the boom. In a downturn, the opposite happens. Palley also argues that capital is difficult and costly to raise when its levels must be increased, compared to the purchase of additional liquidity which is relatively easy.

Other post-Keynesians have, however, advocated the active management of capital requirements to deal with asset-price bubbles in a similar spirit to Palley's approach. Docherty (2008: 97–101) argues that risk-based capital requirements can be set differentially for various asset classes in precisely the way that Palley suggests for liquidity requirements, and that these capital requirements can also be varied in a counter-cyclical manner as demanded by movements in asset prices. These ratios could thus be raised when the economy experiences a build-up in systemic risk as suggested in the financial instability hypothesis considered above. This would make the cost of supplying these loans higher, and would, therefore, encourage banks to raise associated lending rates. This should discourage borrowing for asset purchases, and dampen asset-price inflation (ibid.: 98–99; cf. Crotty/Epstein 2009: 22).

Two differences are, therefore, apparent between post-Keynesian and conventional perspectives on prudential bank regulation. The first is a stronger emphasis on the liquidity-producing role of banks and ensuring that banks have adequate stores of liquidity on their balance sheets which are available during periods of financial stress. The second is greater recognition of asset-price inflation as a source of risk to the banking system, and the possibility that such risk can arise *endogenously* within the banking system rather than simply constituting an exogenous shock.

5 TOWARDS AN OVERALL POST-KEYNESIAN THEORY OF PRUDENTIAL BANK REGULATION

Taken together, the two distinctive features of the post-Keynesian treatment of prudential bank regulation considered in the previous section place a strong emphasis on liquidity. While Dow (1996b) does not specify the precise way in which banks should be regulated, her emphasis on their liquidity-producing function suggests that they should be required to maintain sufficient balance-sheet liquidity to ensure deposits can be redeemed for the circulating medium at short notice. Palley (2004), on the other hand, recommends the imposition of liquidity requirements that are linked to the riskiness of a bank's asset portfolio because he regards this as a method of addressing systemic risk that is superior to variable capital requirements. But neither of these contributions, as useful as they are

on the specific issues they address, provides a comprehensive post-Keynesian treatment of prudential bank regulation that parallels the mainstream theory outlined in Section 3 above.

This raises the question of whether any components of mainstream prudential bank regulation theory can be adapted for use in a comprehensive post-Keynesian approach, or whether such an approach needs to be built from the ground up. This paper argues for the former. To justify this stance, let us restate the key features of conventional regulation theory. There are *six* such features: the possibility of *individual bank failure* from a significant increase in loan defaults; the *contagious nature of bank failure* due to the existence of asymmetric information; the economic significance of *disruption to bank services*; the logic of extending a *safety net* to prevent bank failure; the problem of *moral hazard* that results from the safety net; and *specific measures* to limit the effects of moral hazard. We may thus speak of a *bank support and regulation infrastructure* to prevent disruption to the ongoing provision of banking services: bank support in the form of LLR facilities or deposit insurance to prevent the collapse of banks; and regulation to deal with adverse incentives generated by the provision of this support.

Post-Keynesian support can be articulated for each of these features. Palley's (2003; 2004) contribution, considered earlier in the paper, addresses the first of the above features regarding the possibility of bank failure. He analyses this failure, however, in terms of endogenously generated systemic risk rather than simply in terms of exogenous shocks to individual banks (cf. Minsky 1986: 279–282; Dymski 2010: 241–244).

The second feature of conventional theory, that financial contagion is linked to the existence of asymmetric information, receives post-Keynesian support from Sau (2003: 508), who explicitly acknowledges the effect of asymmetric information in generating panic and financial contagion in the Asian financial crisis of the late 1990s. Ramskogler (2011: 72–73) also accepts the existence of asymmetric information in complex contexts such as the beginnings of financial crises, although he questions its implications for credit rationing at the macroeconomic level. From the perspective of post-Keynesian theory, therefore, we may argue that there is likely to be an increase in uncertainty when loan defaults rise and financial distress occurs at some banks in the presence of asymmetric information. According to Dow's (1996b) analysis, this increase in uncertainty would lead to a stronger general preference for liquidity, and depositors would, therefore, withdraw bank funds, preferring instead to hold cash (the circulating medium) or other liquid assets such as government bonds. This would cause bank runs and contagion in just the manner outlined by the second feature of conventional theory.

The third feature of conventional theory, that contagion negatively disrupts banking services, is given a post-Keynesian interpretation in the work of Dow and Moore, who conceive of these services in particular ways. Dow's (1996b) contribution emphasises the liquidity-producing function of banks, while Moore sees banks as supplying the working capital needs of firms and assessing borrower creditworthiness. Moore thus imbues banks with the significance of supporting the *creation* of aggregate demand, income and employment via the financing of new investment spending *before* saving is generated (cf. Dow 2017: 1551). Disruption of these services thus causes significant economic damage and requires some kind of policy response.

The logic of conventional theory's fourth feature, according to which a safety net is extended to prevent bank failure, is also accepted in post-Keynesian thought. This was observed in Section 2, where money endogeneity was explicitly linked to the provision of central-bank LLR support for banks (Kaldor 1986: 24; Moore 1988: 93–94; cf. Minsky 1986: 281; Dymski 2010: 243; Dow 2017: 1542).

Similarly, the fifth feature of conventional theory appears to have been accepted by a number of post-Keynesians. According to this feature, *moral hazard* from safety-net provision gives bank managers an incentive to take greater risks in lending decisions, and this increases the probability that defaults will occur. In the context of exploring the epistemological foundations of limited knowledge and the roles played by convention and expectation as responses to limited knowledge, Dow (2011: 246) considers the nature of confidence in banks. She explicitly contemplates the impact on this confidence of bank failures that result from safety-net-induced moral hazard, thus recognising the existence and effect of moral hazard in bank management. Ramskogler (2011: 73–75) argues that the creditworthiness of bank loans may be an endogenous outcome from the volume and direction of bank lending itself, through its effect on the value of loan collateral, but he explicitly notes that this does not contradict the existence of moral hazard in the choices made by bank managers. Kindleberger (2000: 144) explicitly acknowledges the moral hazard generated by banking support, as he draws on the work of Minsky to consider various policy responses to the onset of financial crises, including the ‘market discipline’ response of *not* providing support.

Thus, the first five features of conventional prudential bank regulation theory can be shown to be compatible with post-Keynesian monetary theory if appropriately amended. This leaves the sixth feature of determining appropriate measures to limit the effects of moral hazard on the decisions of bank managers. We have already observed the strong emphasis on capital regulation in pre-GFC conventional theory, and the associated movement away from liquidity regulation in this period. But the main contributions of post-Keynesian theory suggest the importance of *maintaining* liquidity regulation to support, on the one hand, the liquid nature of bank deposits, and to limit, on the other hand, the provision of finance for speculative asset purchases. We must, therefore, give further consideration to the respective roles of liquidity and capital measures in a post-Keynesian theory of prudential regulation. Let us approach this issue by asking whether the assertion of pre-GFC conventional theory, that capital regulation is sufficient for bank stability, holds up.

To answer this question, consider Bank A, which is well capitalised relative to its risk-weighted loan portfolio but has a relatively low ratio of liquid assets to deposits. Imagine, further, that a number of banks in the same market as Bank A suffer significant increases in loan defaults as a result of an economic downturn but that Bank A does not suffer such default increases. The problem of asymmetric information implies that when it becomes generally known that some banks are experiencing increased loan defaults, depositors at Bank A are likely to withdraw their funds since they cannot distinguish between banks that are directly affected by the increased defaults and banks that are not. Since they are concerned that Bank A might be affected, they decide to withdraw deposits, preferring instead to hold cash or government securities.

While Bank A is solvent because of its strong capital position, its liquid assets will be exhausted if deposit outflows are large enough, and it will then need to borrow liquidity in the wholesale markets. The central bank will ensure that such liquidity is made available in order to promote financial stability, as observed by Kaldor and Moore (see Section 2 above), but Bank A’s costs will rise because wholesale funds are more expensive than deposit funds. Bank A’s profit will, therefore, decline, and when the deteriorating profit position becomes known to shareholders, its share price will fall. The bank is also likely to curtail new lending in order to reduce its need for liquidity.

Overall, there are two offsetting effects from this series of events. The fact that depositors have been able to withdraw funds on demand exerts a calming influence on confidence, and may operate to slow or stop the bank run. On the other hand, the decline

in Bank A's profit and share price may be interpreted by depositors as further evidence of weakness, and may intensify withdrawals, making the run worse. The bank's fate will be determined by which of these two effects is dominant. If the first effect dominates, the bank run will stop and the crisis will be averted. If the second effect dominates, and deposit withdrawals intensify, Bank A's managers may decide to contract the size of the bank in an attempt to contain the scale of the problem. This could be done by selling opaque loan assets which would also generate additional liquid funds, but this may need to be done at fire-sale prices. If this effect is large enough, the value of assets may fall below the value of deposit liabilities, and potentially by enough that the bank's capital is fully absorbed, rendering the bank insolvent. What thus began as a *liquidity* crisis would in this case have evolved into a *solvency* crisis, despite the availability of LLR funds from the central bank, and despite Bank A's strong initial capital position.

This suggests that there may be occasions when adequate capital is *not* sufficient to ensure bank stability. A general lack of confidence places pressure on bank liquidity, and dealing with this can reduce the value of bank assets. Whether this happens will depend on how confidence responds to the successful redemption of deposits on the one hand, and reduced bank profitability on the other. More work may be needed to ascertain which of these effects is dominant, but strong liquidity regulations will undoubtedly enhance the first effect. If banks have greater liquid reserves, this will postpone the point at which they must enter the wholesale market, and delay increases to costs and falls in profit. This will give depositor confidence more time to be restored, and the crisis to be averted. An important aspect of post-Keynesian bank regulation will, therefore, be the specification of minimum bank-liquidity holdings.

But let us also ask whether liquidity regulation *itself* is sufficient to promote bank stability. To answer this question, imagine Bank B, which has a very high ratio of liquid assets to deposits but a very low ratio of capital to total loan assets. Imagine, as well, that Bank B experiences a significant jump in loan defaults. When depositors hear about the increased defaults, they will begin redeeming deposits. The fact that Bank B has ample liquid reserves implies that there will not be a deterioration in depositor confidence that exacerbates the bank's situation. But, since Bank B has a low capital ratio, it does not take a very large fall in the value of loans before its capital is fully absorbed and it must be liquidated. The bank's high liquidity ratio has indeed acted as a stabilising effect and has meant the absence of a deterioration in the bank's financial position, but the underlying financial weakness in this position, caused by a lack of capital, does mean that liquidity alone is not sufficient to save the bank, and it must be wound up.

We must, therefore, conclude that liquidity alone is not sufficient to ensure bank stability in a financial crisis, and that sufficient amounts of both liquidity *and* capital are necessary for bank solvency in such periods. The post-Keynesian emphasis on liquidity does, therefore, in contrast to the pre-GFC mainstream perspective, imply the need for adequate regulation of bank liquidity. But this does not imply that bank capital can be ignored.

Can we now say anything about Palley's assertion, considered in Section 4 above, that active management of such liquidity regulation is a superior means of minimising endogenously generated systemic risk compared to the management of capital requirements?

Palley's (2003; 2004) assertion is that the asset-based reserve requirement (ABRR) can either be set higher for lending thought to fuel asset-price inflation, or can be varied upwards by the prudential regulator when asset-price inflation is observed to be emerging, thus minimising the level of systemic risk. Palley (2003: 67) argues that such an approach is superior to the use of risk-based capital requirements partly because the latter are static

and pro-cyclical, and partly because additional capital is hard for banks to raise when the policy is applied.

To the extent that bank lending is indeed capable of fuelling asset-price inflation, that liquidity requirements are linked to such lending, and that they are sufficiently sensitive to the emergence of asset-price inflation, Palley's liquidity requirements would certainly increase the cost of bank lending and potentially dampen that lending and the associated inflation. It is, however, less clear that such an approach is superior either to liquidity requirements levied in the traditional way against deposits, or to the use of risk-based capital regulation.

Doubts about the superiority of an ABRR over a deposit-based requirement follow from Basil Moore's principle that *loans make deposits*, noted in Section 2 above. If excessive bank lending is indeed fuelling asset-price inflation, then by Moore's principle, bank deposits will also be growing at a similar rate, so that a traditionally structured liquidity requirement levied against deposits would operate in virtually the same way as Palley's ABRR. Banks would have to hold a greater volume of reserves against the higher deposits, and this would increase bank costs. What is also clear from Moore's theory of endogeneity is that the only effect of this policy would be price-related and not quantity-related.⁴ Banks would go into the wholesale markets to obtain any additional liquidity required under a more biting reserve constraint when lending was growing too fast, and the central bank would accommodate this demand for reserves. Banks would not thus restrict lending because reserves became more scarce under this policy. Bank costs would, however, be increased since wholesale funds are more expensive than deposit funds, and this higher cost would be passed on to customers in the form of higher lending rates. But little is gained from this perspective by levying the reserve requirement on lending rather than deposits.

Next, Palley's argument that an ABRR has greater flexibility compared to capital requirements which are pro-cyclical is premised on the assumption that the capital requirement is not variable. However, both Docherty (2008) and Crotty/Epstein (2009) argue that these requirements should be varied counter-cyclically as part of a macroprudential policy, and this is how they are structured in the counter-cyclical capital buffer of Basel III. Once this is taken into account, a variable capital requirement is just as effective as a variable ABRR for responding to asset-price inflation. In fact the price effect of the capital requirement in raising bank costs is likely to be *larger* than that of an ABRR because the price of capital is substantially higher than the price of wholesale borrowing.

Lastly, Palley's (2003: 67) concern about the difficulty of raising additional capital when capital requirements become more binding overlooks the possibility, again, now built into the Basel III regime, that retained earnings fall under the definition of high-quality capital instruments, and increased earnings retention can be mandated to meet more binding capital requirements.

Overall, while the objective of Palley's ABRR is valid, and the policy would, in general, work as Palley describes, the case for replacing a traditional approach to liquidity regulation, or for operating an ABRR in place of mainstream capital requirements in a counter-cyclical fashion, is not compelling. What is clear from post-Keynesian analysis, however, is the importance of some form of macroprudential dimension to regulatory bank policy.⁵

4. Palley (2007: 575) later recognises the operation of a price effect in his response to Toporowski's (2007) criticism that reserve requirements are ineffective in a world where banks hold excess reserves.

5. A further objection to both the ABRR and variable capital requirements as instruments of active macroprudential policy is the possibility that financial innovation, such as securitisation or

We may thus argue that an overall post-Keynesian theory of prudential bank regulation can be structured using the six key features of conventional prudential bank regulation theory identified earlier, with appropriate modifications. The first five of these features are either compatible with post-Keynesian theory or can be reinterpreted from a post-Keynesian perspective. The understanding of banking functions which prudential regulation is designed to prevent, for example, can be informed by the post-Keynesian theory of banking outlined in Section 2 above, where banks are understood as suppliers of working capital for firms, assessors of borrower creditworthiness, supporters of aggregate demand creation, and producers of liquidity. The sources of risk for banks can also be understood in terms of the endogenously generated systemic risk of Minsky's financial instability hypothesis in addition to the exogenous economic shocks of conventional theory.

The sixth feature of our adapted theory of prudential bank regulation, the design of *specific measures* to limit moral hazard caused by extending the government safety net, will reflect a post-Keynesian understanding of banking functions and the ways in which moral hazard operates. Dow's (1996b) emphasis on liquidity, and Minsky's (1982; 1986) observation that bank managers will periodically be tempted to over-extend credit, generating periods of increased systemic risk, indicate a regulatory apparatus characterised by *both* liquidity and capital measures. Further, these measures will need to be varied across the cycle in response to changes in systemic risk.

6 SUMMARY AND CONCLUSION

Banks play an important role in the post-Keynesian theory of endogenous money developed by Nicholas Kaldor and Basil Moore, and this justifies more attention to the issue of prudential bank regulation by post-Keynesians. According to post-Keynesian theory, banks finance the working capital needs of firms, evaluate credit risk, produce liquid deposits which perform an important function in the management of fundamental uncertainty, and help to render the money supply endogenous. Post-Keynesian treatments of prudential bank regulation have placed a strong emphasis on liquidity but to date have not provided a comprehensive alternative to the conventional theory of prudential bank regulation. This raises the question of whether this conventional theory can be adapted and used in a post-Keynesian framework characterised by endogenous money or whether such a theory needs to be built from the ground up.

This paper has argued that the core components of conventional prudential regulation theory *can* be appropriated by post-Keynesian theory but must be modified with a renewed emphasis on liquidity and the potential for endogenously generated systemic risk understood in terms of Minsky's financial instability hypothesis. The resulting theory of prudential bank regulation will thus acknowledge the possibility of bank failure from a significant increase in loan defaults, the contagious nature of bank failure due to the existence of asymmetric information, the economic significance of disruption to bank services, the logic of extending a safety net to prevent bank failure, the problem of moral hazard that results from the safety net, and specific measures to limit the effects of this moral

the emergence of shadow banking, could lead to bank disintermediation without preventing asset-price inflation or the emergence of systemic risk (Aiyar et al. 2014: 185–186). See Docherty (2008: 101), however, for the argument that, even in such circumstances, the price effects of macroprudential policies are likely to persist, and stricter capital requirements under a macroprudential policy will insulate the banking sector from the impact of defaults if asset-price inflation is reversed.

hazard. But the sources of bank failure and the nature of bank services are understood in terms of the financial instability hypothesis and the post-Keynesian approach to banking.

The paper has argued that the regulatory measures which follow from this analysis will be characterised by both liquidity *and* capital requirements, as well as by a macroprudential framework that facilitates the counter-cyclical adjustment of these requirements in response to endogenous variations in systemic risk. While the paper has argued for employing capital requirements as the core of this macroprudential framework, it has also acknowledged that Palley (2003; 2004) makes a reasonable case for the use of asset-based liquidity requirements as an alternative. Further work, therefore, is required to model which of these approaches is likely to be most effective, and in which circumstances.

Further work could also explore whether additional measures, such as taxes on capital gains, variations in loan-to-valuation ratios, or restrictions on the international movement of capital, are superior to either liquidity- or capital-based macroprudential measures. In addition, the possibility of macroprudential regulation raises questions about the most appropriate institutional structure for bank regulation. Does the combination of prudential measures and attention to macroeconomic conditions imply that a single institution should be responsible for these policies, or is it appropriate that the central bank and prudential regulator be separate bodies?

There is, therefore, more work to be done in developing a fully mature post-Keynesian theory of prudential bank regulation, but the analysis presented in this paper provides a starting point for drawing together the useful contributions made to date in this area, and for looking at this theory in a holistic way.

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