Credit Money, Collateral and the Solvency of Banks: A Post Keynesian Analysis of Credit Market Failures

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ABSTRACT The discussion on endogenous money has led to a rich understanding of banking. The determination of creditworthiness though remains a black box in Post Keynesian economics. After a critique of the New Keynesian banking literature this paper argues that creditworthiness to a large extent is endogenous to the monetary economy and the credit system. It is argued that a solvency multiplier exists that affects the willingness of banks to grant credit. The multiplier works via the valuation of collateral goods. It can accelerate the growth but also the contraction of credit and explains both endogenous financial crises and credit rationing.

1. Introduction

Fundamental uncertainty and the assumption of an endogenous money supply have become key concepts of Post Keynesian theory. Important aspects of the relationship between uncertainty and endogenous money nonetheless remain unexplored. The evolving nature and interdependencies of bank behavior, creditworthiness and market failures on credit markets is the topic of this paper.

Effective credit markets are indispensable to monetary capitalism. Consequently, market failures of credit markets are an important and emerging field of economic theory. The most important credit market failures are credit rationing up to the potential collapse of credit markets on the one hand (Mankiw, 1986) and bank-centered financial crises on the other hand (Reinhardt & Rogoff, 2008). The biggest problems caused by credit creation thus are (partially) due to excessively low or excessively high credit creation. New Keynesian economics explains both credit rationing and credit-induced bubbles by asymmetric information (Stiglitz & Weiss, 1981; Allen & Gale, 2007). In order to explain the rationing of specific groups such as small and medium-sized enterprises (SMEs) the principal agent
problem and the theory of hierarchical control are added (see Elyasiani & Goldberg, 2004, for a survey of this literature).

Post Keynesians in contrast have produced a substantial body of literature on endogenous money (see Fontana, 2004, for a recent survey of the main arguments of the debate). Credit restrictions hereby are explained as a divergence of credit demand and the assessed creditworthiness under circumstances of uncertainty (Dow, 1996; Lavoie, 1996; Wolfson, 1996; Rotheim, 1998, 2006). Another line of reasoning in the Post Keynesian literature is concerned with the investigations of questions of financial instability in the tradition of Minsky (Toporowski, 2000; Papadimitriou & Wray, 2001; Sebastien, 2008). However, there is a serious lack of a synthetic view that brings together the Post Keynesian monetary macro-models and financial instability, and the relevance of endogenous money as a potential source of instability is regularly neglected (Stockhammer & Ramskogler, 2009). This paper contributes to the Post Keynesian monetary literature by developing a systematic explanation of credit market failures under endogenous money.

The discussion starts in Section 2 with a brief empirical review of the two most significant ‘market failures’ of banking, i.e. credit rationing and bank-based financial crises. Section 3 provides a critical discussion of the relationship lending school and its account of these failures. Section 4 develops a Post Keynesian approach to credit worthiness and bank solvency.

2. Market Failures in Modern Banking: Stylized Facts

The two most obvious symptoms of credit market failure identified by economists are credit rationing and the regular occurrence of financial crises.\(^1\) This section presents a stylized description of the empirical findings on both.

One stream of literature focuses on credit rationing. The three main findings are the following. First, SMEs and hence particularly non-quoted firms are generally constrained in their access to credit (Wagenvoort, 2003; Winker, 1999). Second, small banks seem to lend proportionately more to small enterprises than large banks (e.g. Peek & Rosengreen, 1996; Strahan & Weston, 1996, 1998). This also is indicated by the fact that after mergers that result in large post-merger banks, lending to SMEs drops relatively though not absolutely (Berger et al., 1998; Sapienza, 2002).\(^2\)

A second stream of research focuses on financial instability. It has been shown repeatedly that financial and banking crises are a regular characteristic of capitalism (Kindleberger & Aliber, 2005; Bordo et al., 2001). Despite the fact that it is difficult to lump different financial crises together, some general observations can be made. First, bank- and credit-centered financial crises have been character-

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\(^1\)The discussion in this paper exclusively focuses on domestic aspects of the problem; currency crises and international payment crises are therefore not considered.

\(^2\)There is conflicting evidence whether the length of a relationship increases credit availability (yes: Berger & Udell, 1995; Petersen & Rajan, 1994; no: Blackwell & Winters, 1997; Cole et al., 2004). The more recent literature in particular has failed to find empirical support for an impact of the length of a relationship on credit availability.
doi by a run-up of equity and housing prices as well as by a sudden and harsh decline immediately after the onset of the crisis. The growth rates of GDP appear to slightly precede this development without, however, making asset ‘bubbles’ counter-cyclical (Bordo & Jeanne, 2002; Reinhardt & Rogoff, 2008). The next section now turns to the theoretical explanations for these market failures. First, we will be concerned with the New Keynesian banking school. Then a Post Keynesian explanation is developed.

3. The New Keynesian Theory of Banking

3.1. Asymmetric Information and Loanable Funds: Microeconomic Foundations

The starting point of the New Keynesian banking literature is the theory of information-based banking. Banks here play a pivotal role in the retrieval and interpretation of information, which is their most important function (Diamond, 1984). They can perform these activities more efficiently than a single lender and thus create information-based intangible values. This is the background in which banks have to pursue the sole motive of their actions: profit-maximization.

The pursuit of that goal, however, is difficult. The environment is complex and it is impossible for decision makers—even highly specialized banks—to achieve full information about the objective risk properties of borrowers. Strict optimization therefore is not possible due to a lack of access to and computability of information. However, uncertainty is merely an epistemological category. Thus, decision-makers develop decisional rules that abstract from the complex environment and rely on a reduced subset of information. After an evolutionary process, only those rules survive that enable the prevalent (presumably unalterable) probability distribution to be accurately approximated.

The information that is required for these risk-evaluation procedures however is not easy to obtain, and problems of asymmetric information are central (Akerlof, 1970). It is possible that the risk exposure of a potential borrower cannot be fully identified. Consequently, it is not possible to match each borrower with the correct, risk-adjusted loan rate. The pool of applicants might be heterogeneously constituted and modifications in the loan rate can alter its risk structure. An increase in the loan rate might change the average riskiness of the pool of borrowers either by driving out the less risky projects, i.e. those at the margin (adverse selection), or by inducing borrowers to behave in a more risky fashion (moral hazard). There is thus a ceiling to the loan rate after which banks’ profits become depressed. Yet, banks have to obtain funds on the market for loanable funds before they are able to lend. Given a sufficiently low loan rate this might only allow for a rate paid on deposits that is too small to attract sufficient funds on the markets for loanable funds. Quantitative credit restrictions are the result.
(Stiglitz & Weiss, 1981; Jaffee & Russell, 1976), and these might sometimes lead to a total collapse of certain credit markets (Mankiw, 1986).

The intensity of these informational problems is further shaped by the size of an organization. The larger an organization becomes the larger becomes the number of hierarchical levels between an operative agent and the ultimate principal (Williamson, 1975); this aggravates the principal-agent problem. Thus, the control of agents is more difficult the larger is an organization. In order to be able to control and sanction agents in an impersonal environment with many hierarchical levels, it is necessary to standardize their tasks and targets. The information that is used in large organizations consequently comes in the guise of hard facts. As both large banks and large firms rely on ‘hard’ information it is easier for them to communicate. In smaller organizations, on the other hand, the monitoring of agents comes in a more direct form. In a small bank, loan officers can be monitored more directly and can be granted more (informational) discretion. Therefore, it is possible for them to derive their information by establishing ‘relationships’ with lenders (Berger & Udell, 1995; Cole et al., 2004). Due to the thereby alleviated communication with smaller firms—according to this approach—SMEs find it easier to obtain credit from small banks.

The informational problems described above are also identified as the causes of bank-centered financial crises. Banks, according to their risk averse or risk neutral nature, provide credit to sound investment projects. However, given the risk-taking behavior of creditors, the funds are used to finance speculative behavior. This leads to a run-up of asset prices. At some point, however, asset prices start to fall, as they have moved too far from their ‘fundamental’ values. Delinquency ratios start to rise, and more and more assets are liquidated. This triggers further falls in asset prices which might even lead to negative deviations from ‘fundamental values’ (Allen & Gale, 2007). Another interpretation sees banks as being subject to moral hazard and excessive risk-taking due to the likelihood of their being bailed out in the case of a crisis (Mishkin, 1997).

3.2. Shortcomings

Admittedly, the New Keynesian banking school has produced microeconomic explanations that appear to be internally coherent. However, when moving to the macroeconomic level, two fundamental puzzles in the New Keynesian approach become apparent.

First, if small banks are more successful in the production and use of information with regard to particular borrowers and if those borrowers are obviously profitable, there is no reason at all why credit rationing should occur on a macroeconomic level. The profit-maximizing logic of the approach would entail the rise of a legion of small banks specializing in SME-credit. But the ongoing ‘consolidation’ of the banking sector (Huffschmid, 2002), as well as the evidence discussed above tell another story.

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4As the focus of this paper is on credit rationing and credit crunches, the discussions on bank runs are ignored here (see Diamond & Dybvig, 1983, for a seminal contribution).
Second, a central tenet of the New Keynesian explanation of credit rationing is that the supply of loanable funds is a positive function of the interest rate. That is, to say, credit must become increasingly costly as more of it is provided. An increase in the amount of credit available for speculative behavior can therefore occur only at the cost of credit available for real investment. This is possible either through a redistribution of funds or through an increase in the interest rate (and adverse selection or moral hazard) that necessarily accompanies an expansion of credit. Both developments would lead to a suppression of credit for real investment in favor of a propagation of speculation. Put differently, this would tend to raise the output gap (i.e. GDP growth would be suppressed) while triggering asset (but not Consumer Price Index-) inflation. If this is the case it remains a puzzle of contemporary monetary macroeconomics why the New Keynesian banking school endorses the Taylor rule, which proposes that interest rates be set on the basis of the output-gap and the inflation rate. On New Keynesian reasoning, the Taylor rule would not only accommodate bubbles but accelerate them, by holding interest rates low in situations where the institutional constellation (and not the interest rate) has created moral hazard.

The explanation for both of these puzzles lies in the detachment of the micro- and macroeconomic spheres from one another in New Keynesians economics. Due to this, they have failed to systematically recognize a fundamental fallacy of the composition problem of modern credit economies. Even if there were no moral hazard at work at all, creditworthiness is to a large degree endogenous to credit creation. We will discuss this finding in the following section.

4. A Post Keynesian Explanation

4.1. The Role of Banks

A cornerstone of Post Keynesian theory is the assumption of an endogenous money supply. According to this view, banks are not the sober producers of reliable, additive and correct information as in the New Institutional perception. In the Post Keynesian theory, the importance of banks stems from their role in the creation, circulation and credibility-maintenance of money as a capitalist institution. In sharp contrast to the loanable funds theory, the Post Keynesian approach regards banks as ‘producers’ of credit money, which they can create without the need to attract funds in advance. Thus, in Post Keynesian monetary economics loans make deposits (Moore, 1989) and the money supply is endogenous to the banking system (Dow, 1996).

The production of money however has to be performed in an environment of fundamental uncertainty in a world in which no certain ‘information’ about the

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5To be sure, the argument of this paper is not that moral hazard is irrelevant. On the contrary, problems of moral hazard seem to have accompanied financial capitalism ever since its beginning (Kindleberger & Aliber, 2005). However, the major contribution of this paper is an analysis of the current institutional framework that accommodates, rather than mitigates, morally hazardous behavior.
The firm can be viewed as an attempt to cope with the unpredictability of the environment and to maintain flexibility (Dunn, 2000), and it might be argued that banks specialize in the management of uncertainty. Furthermore, it has been argued that the distribution of uncertainty is contingent on specific historical and institutional settings (Stockhammer & Ramskogler, 2008).

The specific institutional aspect of banks is that they engage in the production of credit money. Money is useful only in so far as it can be used to obtain other goods or to settle legal obligations now or in the remote future. This function, however, crucially depends on the deep and universal trust that it does and will fulfill this purpose—a belief that in turn crucially hinges on the stability of the monetary system in general and the banking system in particular.

Hence, banks can produce credit money as long as the general public believes that banks can produce credit money; that is, as long as the general public believes that banks can fulfill their obligations. Put differently, we arrive at the conclusion that banks can produce money as long as their balance sheets are regarded as sound, given their actual and prospective circumstances. The prevailing assessment of the solvency of banks and of the collateralization of their credit becomes central.

This is why, in Post Keynesian monetary theory, money has been treated as determined solely by the demand of creditworthy borrowers (Moore, 1989). It has been argued that as long as borrowers are creditworthy their demand will be accommodated and that therefore something like a notional and an effective demand for credit exists of which only the effective demand drives actual credit creation (Lavoie, 1996; Wolfson, 1996). The argument that the principle of increasing risk has any systematic relation to the creditworthiness of borrowers has been rejected as being only valid in the microeconomic context (Rochon, 1999a). Still, a coherent discussion of what then drives the determination of creditworthiness is lacking. We try to fill this gap in the next subsection.

4.2. The Solvency Multiplier: The ‘Invisible Hand’ of Modern Banking

In light of what has been said above, the critical question is not what determines the creditworthiness of a borrower as judged by an individual bank but how the credit extended to a particular borrower affects a bank’s creditworthiness in the view of the general public. The solvency of banks has been central to the creation of credit money, and therefore the assessment of a bank’s assets is crucial. The Basel

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6 Under conditions of fundamental uncertainty, there is no definite benchmark (such as a fundamental value) to assess the creditworthiness of a borrower. Given the state of expectations, credit rationing might even be too small. What we can see from the evidence is only that large firms have better access to credit than do SMEs. Although a different terminology might seem to be in order, we will retain the term creditworthiness to avoid confusion.

7 The importance of collateral is occasionally noticed by New Keynesians (Greenwald & Stiglitz, 1988). However, in this case collateral only (and only occasionally) serves as a mean to reduce asymmetric information. The view presented here regards collateral as a mean to produce credit money, which yields substantially different implications, as will be shown below.
II accord has focused our attention in this respect but only by standardizing long-standing procedures. By now, credit risk has to be assessed either by rating agencies or by approved bank-intern rating procedures. Two criteria are relevant for this assessment. The first is the formation of a guess or bet about the probability of repayment (Rochon, 1999b). This part of the risk assessment process inevitably involves a random element. It is nevertheless reasonable to suppose that 'in tranquil periods confidence develops in the conventional view that there will be a great deal of continuity between the future and the relevant past. Under this convention, forecasts may, for a time, take on the character of self-fulfilling prophecies that reinforce confidence in the conventions that sustain extrapolative expectations’ (Crotty, 1994, p. 124; see also Dymski, 1988, 1993). This allows us to focus on the institutional framework in which given expectations generate economic activities.

In these ‘tranquil periods’ the most important basis of credit creation is the assessment of collateral. The problem is that in some markets the purchased goods themselves serve as collateral. While this is perfectly reasonable from an actuarial point of view, it is potentially fatal from a macroeconomic perspective. In markets where a purchased good is used as collateral, the valuation of collateral is not independent of the creation of credit. While this effect might be negligible as long as credit-financed purchases play a subordinate role, it is crucial in markets where credit finance is important. Then, the creation of credit itself can create the collateral for the creation of further credit.

Indeed, there is a solvency multiplier at work. The credit supply depends on the availability of collateral goods. We can assume that there is a given target ratio of the collateralization of credits (using \( P \) for prices, \( S \) for stocks and \( L \) for loans) which can be conceptualized as \( \frac{PS}{L} \). Consequently two channels are central when it comes to an increase in loans (\( \Delta L \)): first, an increase in credit-fuelled demand leads to an increase in the real stock of collateral goods (\( \Delta S \), which is identical to the flows triggered by the initial creation of credit). Second, this change of demand can lead to an additional change in the price level (\( \Delta P \)). Taken together, the increase in stocks and the increase in prices might lead to a bigger increase in the nominal stock of assets than in the nominal stock of outstanding credit. This means that the actually realized ratio of collateralization \( \left( \frac{PS}{L} \right) \) may be increased in aggregate through the creation of further credit as the increase in real stocks (\( \Delta S \)) is accompanied by a revaluation of the entire stock of collateral goods (\( \Delta P \)).

This is a situation in which a nominal flow (i.e. loans) is triggered by a nominal stock (i.e. collateral in market prices). Paradoxically, however, this nominal stock (or more precisely its book value) again might be strongly influenced by the creation of the nominal flow itself. The outcome might be an explosively unstable situation of a self-feeding credit/asset-price-inflation in which sufficient collateralization is primarily based on changes in nominal values.

The working of the solvency multiplier is illustrated by means of a very simple graphical model in Figure 1.\(^8\) In the upper right quadrant \( L^S \) is the

\(^8\)Note that the slope of \( L^s \) has no implications for the debate between horizontalists and structuralists; that is, it says nothing about the relation between the amount of outstanding
creditworthiness curve that shows the creditworthiness of demand as evaluated by supply for given values of collateral. $L^D$ is the demand for credit, which for the sake of simplicity is assumed to be independent of available collateral. Starting from an initial value of collateral $C_{t-1}$ loans are created (we arbitrarily assume full collateralization of loans, however this need not be the case), let us say, to buy houses. The initially created sum of loans leads to an increase in prices given the fact that this creates demand for housing—as is shown in the lower right quadrant by $D$—and assuming a low elasticity of demand, as is shown by the relatively flat course of $S$ in the lower left quadrant. While a relatively small number of houses actually might be traded at this price, the book value of all houses is increased. With a positive stock of houses available at the initial period, the nominal increase in the stock of available collateral is bigger than the real increase that has been initiated by the creation of loans. This increases the overall creditworthiness of households despite the fact that real stock of collateral goods has not increased relative to the amount of outstanding credit.

4.3. Credit Rationing and Symptomatic Failures of Credit Markets

The constellation described in Figure 1 usually occurs in markets with a low elasticity of supply, such as equity or real estate markets. By lending in these markets in order to increase its own profits, the banking industry inadvertently advances the further creation of credit. Unfortunately, this process works in two directions, credit and the interest rate. We are looking at a particular aggregate sub-segment of the credit market that is homogeneous in respect of the type of collateral that is used.

This assumption, while in all likelihood unrealistic, changes nothing analytically but makes the discussion less cumbersome.
and a shift in expectations can transform the multiplier into a contractionary mechanism. If, for instance, through an increase in the delinquency rate there is a shift in expectations of banks (the slope of $L^S$ increases) or if the price elasticity of supply is shifted as speculators try to cash in on the high price level (the slope of $S$ increases) the whole process can be reversed. The devaluation of collateral leads to a devaluation of the solvency of banks. This leads to a reduction in the creation of credit, which again leads to a devaluation of collateral and so forth. This is the process that has made recent bank-based financial crises so deep and so damaging.

The model also enables us to explain why certain credit applicants are rationed and others not. If, for instance, the demand elasticity of prices for a collateral good is zero (that is if the $S$-curve is vertical) the solvency multiplier is unity. This explains the striking difference in credit availability of SMEs and large enterprises. If SMEs have to take on debt, the goods that are purchased with the borrowed funds usually have to serve as collateral. But these goods, which often are produced on demand, tend to lose value when being adapted for the productive process. Collateral on these markets (and solvency) then has to be created in the old-fashioned way; that is by accumulating profits. There is no solvency multiplier. If, on these markets, asymmetric expectations between borrowers and lenders persist, there will be quantitative credit rationing. Large and quoted firms on the other hand can use equities as collateral for expansionary credit creation. The use of equities—either the firm’s own equities or the equities of firms acquired in mergers and acquisitions—as collateral has the additional effect of reducing the supply of these equities. It is obvious that in this case the solvency multiplier will be strong. The fact that large banks tend to grant more credit to large enterprises appears mainly to reflect the fact that there are economies of scale associated with the provision of credit in large batches.

5. Conclusion

This paper has discussed the two most important credit market failures of contemporary capitalism, i.e. credit rationing and bank-based financial crises. It has found that the New Keynesian banking literature suffers from the fallacy of composition flaws due to its microeconomic focus.

An alternative approach has been developed that is based on endogenous money and decision-making under fundamental uncertainty. The paper identifies and discusses a solvency multiplier based on asset inflation that is responsible for both unevenly distributed credit as well as bank-based financial crises. The analysis demonstrates that the assessment of creditworthiness in the current institutional environment is endogenous to credit creation for large groups of borrowers. Both credit rationing and financial crises, therefore, are caused by the way in which collateral is assessed and credit is granted.

While the ex ante explanation of a sudden shift in expectations seems to be an unrealistic pipedream of economics, the development of an institutional design that promotes stability is not. This paper has contributed to this by clarifying the causes of the most important credit market failures.
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