Credit and Capital Markets, 46. Jahrgang, Heft 3, Seiten 357–387
Abhandlungen

Towards a More Stable and Sustainable Financial Architecture – A Discussion and Application of the Quantity Theory of Credit

By Richard A. Werner, Southampton

Abstract

Thanks to the banking crisis, there has been a greater awareness that leading economic theories and models, as well as influential advanced textbooks in macroeconomics and monetary economics may have been amiss when they neglected to include banks in their analyses. Economists are now labouring to include banking in their models. However already sixteen years ago a paper was published in this journal which presented probably the simplest possible framework that incorporates the economic consequences of banking into a macroeconomic framework: The 'Quantity Theory of Credit' (QTC, *Werner* (1997)). It resolves a number of perceived 'anomalies' in macroeconomics and finance, can be used to explain and predict banking crises, and carries a number of policy implications about how to enhance financial stability and deliver sustainable growth. Unlike many better known and far more complex models and theories, it has fared well during the turbulent period since it was proposed. In this paper QTC is revisited and a number of questions that have been raised in the profession concerning it are discussed. It is then applied to the following questions: how to detect and avoid banking crises; how to deliver sustainable and stable economic growth; how to end post-crisis recessions quickly – such as those in many European economies – while minimising costs to the tax payer; and finally, what a financial architecture would look like that has a higher chance of delivering the latter goals on a regular basis. (E41, E52, E58)

Zusammenfassung

Auf dem Weg zu einer stabileren und nachhaltigeren Finanzarchitektur – Eine Diskussion und Anwendung der Quantitätstheorie des Kredits

Dank der Bankenkrise hat sich die Meinung weiter verbreitet, daß die Vernachlässigung der Rolle der Banken in führenden volkswirtschaftlichen Modellen und Theorien sowie einflussreichen Lehrbüchern nicht angemessen war. Daher sind Wissenschaftler nun bemüht, dieses Problem zu beheben. Doch wurde bereits vor

sechzehn Jahren ein Beitrag in Kredit und Kapital veröffentlicht, der das wohl einfachste mögliche Modell vorstellte, wie die volkswirtschaftliche Auswirkung des Banksektors makroökonomisch dargestellt werden kann: Die ‚Quantitätstheorie des Kredits' (*Werner* (1997)). Sie erklärt einige scheinbare ‚Anomalien', trägt zur Erklärung, Vorhersage und Beendigung von Rezessionen und Bankenkrisen bei und führt zu neuen Impulsen in der Geld-, Wirtschafts- und Bankenpolitik, insbesondere in der Verfolgung des Ziels, stabiles und nachhaltiges Wachstum ohne Finanzkrisen sicherzustellen. Die seit ihrer Veröffentlichung aufgetretenen Krisen stellten zwar eine Herausforderung für die viel besser bekannten und komplexeren konventionellen Modelle und Theorien dar, doch nicht für die Quantitätstheorie des Kredits. In diesem Beitrag wird die Quantitätstheorie des Kredits neu betrachtet und einige Fragen beantwortet, die oft über sie gestellt werden. Dann wird sie auf die Fragen angewandt, wie man Bankenkrisen erkennen und verhindern kann; wie nachhaltiges und stabiles Wachstum erzeugt werden kann; wie Rezessionen (auch nach Bankenkrisen, und auch in den von der Staatsschuldenkrise betroffenen Ländern der Eurozone) schnell und ohne neue Kosten für die Steuerzahler beendet werden können; und, schließlich, wie eine Finanzarchitektur aussehen sollte, die eine bessere Chance hat, diese Ziele regelmäßig zu erreichen. (E41, E52, E58)

I. Introduction

Thanks to the banking crisis, there has been a greater awareness that leading economic theories and models, as well as influential advanced textbooks in macroeconomics and monetary economics may have been amiss when they neglected to include money into their analyses (e.g. *Woodford* (2003)) and banks (*Walsh* (2003); *Woodford* (2003)). Likewise, the Vice-Chairman of the Federal Reserve conceded in the face of the 2008 banking crisis that it may not have been ideal that "the core macroeconomic modelling framework used at the Federal Reserve and other central banks around the world has included, at best, only a limited role for … credit provision, and financial intermediation" (*Kohn* (2009)). The problem may have arisen, because economists knew too little about banking and finance (and for some reason lacked curiosity), while researchers in these disciplines were not interested in macroeconomics. This has been reflected in their respective modelling strategies: macroeconomic models tend not to include a banking sector or its key features, and banking and finance models tend not to include the macroeconomic consequences of bank behaviour.

Sixteen years ago a paper was published in this journal which presented probably the simplest possible framework that incorporates the economic consequences of banking into a basic macroeconomic model (*Werner* (1997)). It was first presented five years earlier (*Werner* (1992)),

has been applied largely unchanged over the years (for instance, *Werner* (2005, 2012); *Lyonnet/Werner* (2012); *Ryan-Collins* et al. (2012)), and has not been challenged in the literature. This framework, called the 'Quantity Theory of Credit' (QTC), resolves a number of perceived 'anomalies' in macroeconomics and finance, can be used to explain and predict banking crises, and carries a number of important policy implications about how to enhance financial stability and deliver sustainable, stable growth. Unlike many better known models and theories, it has fared well during the past twenty years, an era of major banking and economic crises – including the Japanese and Asian crises, the North Atlantic financial crisis and the build-up and then bursting of major credit bubbles in the eurozone, with concomitant effects on sovereign debt. QTC has also provided a useful analytical tool to define policy responses to such challenges.

The aim of this paper is to review this model, address a number of questions that have been raised in the profession concerning it, and then apply it to the concrete set of problems faced by crisis-stricken eurozone countries in order to identify what kind of policies, but also policy framework, would deliver stable and sustainable growth. The paper is structured as follows: First, the QTC is briefly restated, recent empirical support is briefly reviewed and questions frequently raised are discussed. Secondly, the framework is applied to the following questions: how can banking crises be detected and avoided; how can sustainable and stable economic growth be ensured; how can post-crisis recessions – such as those in many European economies – be ended quickly while minimising costs to the tax payer; and finally, what would a financial architecture look like that has a higher chance of delivering the latter goals on a regular basis?

II. The Quantity Theory of Credit – The First Twenty Years

1. The Simplest Macro Model Incorporating Banking

The simplest macroeconomic model that incorporates the monetary sector is the quantity equation:

$$M\,V = P\,Y \tag{1}$$

whereby M stands for the money supply (usually measured and defined variously as M0, M1, M2, M3 or M4), V denotes the (income) velocity of

money, which is assumed to be stable to obtain a reliable relationship between money and the economy, P the GDP deflator (the appropriate price level) and Y symbolises real GDP. PY hence represents nominal GDP.[1]

It is well documented that this equation has not fared well empirically since the 1980s, as velocity has not been stable, producing a substantial literature on the anomalies of the 'velocity decline', 'instability of the money demand function' or the 'mystery of the missing money' (see *Werner* (1997, 2005)). As a result, it has fallen into disuse. *Werner* (1992), (1997) explained this unconvincing empirical performance by pointing out two flaws:

Firstly, equation (1) was derived from Irving *Fisher's* (1911) formulation (who himself drew on *Newcomb* (1885), and John Stuart *Mill* (1848)):

$$M\,V = P\,Q \tag{2}$$

The 'effective' money MV (assumed to circulate and be used for transactions) is equal to the value of transactions (the sum of all pairs of prices times quantities transacted).[2] Thus a verbal description of the original quantity equation is:

> The total value of transactions during any time period must be the same as the amount of money used to pay for these transactions.

Fisher's original transactions equation is true by definition. The jump from this to the far more restrictive equation (1) was explained by proponent Milton Friedman as follows:

> "Fisher, in his original version, used T to refer to all transactions – purchases of final goods and services …, intermediate transactions …, and capital transactions (the purchase of a house or a share of stock). In current usage, the item has come to be interpreted as referring to purchases of final goods and services only, and the notation has been changed accordingly, T being replaced by y, as corresponding to real income"
>
> (*Friedman* (1990), p. 38).

He goes on using equation (1), by simply and casually inserting: "if we restrict purchases to final goods and services …" ((1990), p. 38). The assumption that PY = PQ, or, more generously formulated, that nominal GDP is a reliable proxy of all transactions, does not hold whenever financial transactions are significant (and, in the growth formulation, in-

[1] Expressed in logarithms, equation (1) can also be stated as: $m + v = p + y$.

[2] Fisher originally used the notation MV = PT, whereby T stands for the quantity of transactions.

crease or fall substantially, compared to GDP-transactions). Given the incorrect formulation of equation (1) an increase in money used for financial transactions would then generate the illusion of a velocity decline, when in actual fact velocity may have been stable. The solution is to break up the use of money into two streams: money used for financial (i.e. non-GDP) transactions and money used for GDP transactions (which can be proxied by GDP itself). Theoretically, this is not a problem: as Friedman pointed out

> "Each side of this equation can be broken into subcategories: the right-hand side into different categories of transactions and the left-hand side into payments in different form"
>
> (*Friedman* (1968)).

Fisher (1926) indeed tried to distinguish between income and financial transactions, *Keynes* (1930) between 'industrial' and 'financial circulation'. But these proposals came to naught, because money was defined as deposit aggregate and, as *Friedman* (1956) noted, "dollars of money are not distinguished according as they are said to be held for one or the other purpose" (as quoted by *Werner* (2005), p. 187). This is true for the standard definition of the 'money supply' (M1, M2, M3, M4), which leads us to another flaw in the application of the standard 'quantity equation'.

Secondly, *Werner* (1992, 1997) argued that traditional measures of the 'money supply' (e.g. M2 or M4) are not useful in this context, since they do not measure money used for transactions, but money deposited in the banking system.

> "… this is merely potential, not effective purchasing power … Deposits do not represent spending but the opposite, namely savings."
>
> (*Werner* (1997), p. 281).

While 'currency in circulation' measures coins and bank notes not held in the banking system, such cash is mainly used for petty transactions (we would not dream of purchasing a car, or a house, with cash) and amounts to a small fraction of the money supply. What is the money that is used for the majority of our transactions, and where does it come from? *Werner* (1992, 1997, 2005) pointed out that our money supply is mainly created by banks. How do banks create money? As *Werner* (2005) explains, banks simply invent 97 % of the money supply when they credit borrowers' bank accounts with sums of money that nobody transferred into these accounts from other parts of the economy. In other words, banks create money out of nothing when they extend bank credit (or

purchase other assets). This is why the process of granting bank loans is better described by the expression 'credit creation'.

Textbooks are still reluctant to make this clear, and many a trained economist, even banking expert or banking regulator seems unaware of this fact. However, thanks to the banking crisis and recent publications (for instance *Ryan-Collins* et al. (2012)), this is becoming more widely known.[3] For instance, the chief economics correspondent of the Financial Times wrote in 2012:

> "… it is the normal monetary system, in which the 'printing' of money is delegated to commercial banks, that needs defending. This delegates a core public function – the creation of money – to a private and often irresponsible commercial oligopoly."
>
> (*Wolf*, 2012)

Werner (1992, 1997) thus argued that bank credit creation offers a superior measure of 'money' in the quantity equation, since it measures the money that, at the moment of measurement, is being used for transactions. Further, it can also be readily disaggregated into the use of loans – information that bank loan officers always gather and most central banks collect from the banks. Addressing these flaws, *Werner* (1992, 1997) further added the empirically and theoretically well supported credit rationing argument (*Jaffee/Russel* (1976); *Stiglitz/Weiss* (1981); which however were microeconomic theories without explicit macroeconomic consequences) and further justifications for the supply-determination of the credit market (small firms are always credit rationed; and, during expansionary periods, supply-dominance continues due to "a kind of 'Say's law of credit': credit supply creates its demand via appreciating collateral values", *Werner* (1997), p. 285) and formulated his Quantity Theory of Credit, whereby behaviourally credit supplied by banks is the driving variable: In an economy with a banking system, the amount of money actually used for transactions can only increase when banks create new credit (*Werner* (1992, 1997)). So bank credit creation should have a direct

[3] See, for instance, *Turner* (2012) for an example of a senior regulator who has recently come to recognise this. The media is also beginning to cover this fact, such as in Martin Wolf's columns in the Financial Times. Ryan-Collins et al. (2012), which prominently employed the Quantity Theory of Credit, was cited by Paula *Skypala* (2013) of the Financial Times in an article in which she also noted: "There are fierce differences of opinion among economists over the question of how money is created and how banks operate. It is odd that such questions even arise. It suggests bankers are either unaware of how the institutions they run really work, or are just not telling."

impact on transaction volumes, demand, and hence also prices. QTC thus must rank as the simplest macroeconomic theory incorporating the banking sector (via banks' key function of producing credit-money):

(3) $$CV = PQ$$

(4) $$CV = C_R V_R + C_F V_F$$

(5) $$PQ = P_R Q_R + P_F Q_F$$

(6) $$C_R V_R = P_R Q_R$$

Since $P_R Q_R$ is defined as the value of all GDP-based transactions, it can be proxied by nominal GDP ($P_R Y$):

(6') $$C_R V_R = P_R Y$$
$$\text{with } V_R = (P_R Y)/C_R = \text{const.}$$

(7) $$C_F V_F = P_F Q_F$$
$$\text{with } V_F = (P_F Q_F)/C_F = \text{const.}$$

With a stable 'real' velocity of money, V_R, the effective amount of money used for GDP transactions during any period of time ($C_R V_R$) is approximately equal to nominal GDP (6'). Meanwhile, the amount of money effectively used for non-GDP transactions will be equal to the value of these non-GDP transactions (7).

By definition, for economic growth to take place, the value of economic transactions during one time period must exceed that of the previous period of comparison. Considering therefore net changes in variables over the observed time period:

(8) $$\Delta C_R \; V_R = \Delta(P_R Y)$$

From this we know that the rise (fall) in the credit creation for GDP-based transactions is proportional to the rise (fall) in nominal GDP.

(9) $$\Delta C_F \; V_F = \Delta(P_F Q_F)$$

Similarly, equation (9) states that the rise (fall) in the amount of money used for non-GDP transactions is proportional to the change in the value

of non-GDP transactions. In other words, an asset bubble can be caused if more money is created and injected into asset markets.

Due to credit rationing, other markets are also rationed (*Muellbauer/Portes* (1982)). Thus

> "the quantity of credit becomes the most important macro-economic variable, delivering 'exogenous' (external) budget constraints to any particular market"
>
> (*Werner* (2005), p. 198).

Reserve requirements are of limited influence on bank credit creation (*Werner* (1997, 2005)), while capital adequacy rules, even if used countercyclically in the future, are also not a limitation on credit creation: in periods of rising C_F, banks collectively create the excess financial circulation money that can partly be used by banks to raise capital via, for instance, the issuance of preferred shares or subordinated debt (*Werner* (2010)).

2. *The Empirical Track Record*

a) Explaining the Velocity Decline

Werner (1997, 2005) showed that the income velocity of quantity equation (6), the correctly formulated link between the monetary sector and the economy, remained constant in Japan during the 1980s and 1990s, when the velocity in equation (1) collapsed.[4] Evidence for constant velocity of financial transactions in the UK was provided by *Howells* and *Biefang-Mariscal* (1992).

b) Explaining Nominal GDP Growth

Werner (1997, 2005) explained Japanese nominal GDP growth with credit for GDP transactions and *Lyonnet/Werner* (2012) did the same for the UK. There is much other supportive evidence, such as *Capiello* et al. (2010), *IMF* (2008) or *Beck* et al. (2012) (with further citations in *Werner* (2012)).

[4] *Werner* (2012) also called the very concept of velocity into question when applied to the reality of transaction settlement via the banking system.

c) Explaining what Makes Banks Special

The approach places credit creation at its centre and thus resolves another long-standing controversy: what makes banks special? It is of course their ability and function to create and allocate the money supply – something no other agent performs (not even the central bank). Since the credit market is rationed and determines the money supply, the quantity and the quality of credit creation are key factors shaping the economic landscape. This explains why non-bank sources of funding can never compensate in aggregate for a lack of bank credit: neither non-bank financial institutions, nor debt and equity markets can create credit. They merely reallocate existing purchasing power by transferring it. There are many policy implications of this fact, some of which will be explored in the third part of this paper.

d) Explaining the Ineffectiveness of Interest Rate Reductions

The puzzle of why over a decade of significant interest rate reductions (from 7 % to 0.001 %) failed to stimulate the Japanese economy is solved by equation (8). Nominal GDP growth is determined by credit creation used for GDP-based transactions. Interest rates do not enter the equation. Further, an inspection of the link between credit growth and interest rates shows that there is not a robust negative correlation between the two (*Goodhart/Hofmann* (2003); *Werner* (2005)). In other words, it is not surprising that lower interest rates are at times not able to stimulate the economy, if the key variable determining growth – credit for GDP-transactions – is not growing (for instance when banks, burdened by bad debts, had become highly risk-averse). Likewise, raising interest rates should not slow the economy, if credit creation for GDP transactions continues to grow.

e) Explaining what Causes Asset Bubbles

Empirical papers found that banking crises follow a build-up of asset prices (e.g. *Englund* (1999); *Allen* (2001); *Borio/Lowe* (2002); *Reinhart/Rogoff* (2009)). The literature had, however, not presented a plausible mechanism for this in macroeconomic models. Equation (9) offers one, and also a simple theory of aggregate asset price determination: asset price changes are determined by the amount of purchasing power

newly created by banks and used for asset transactions (adjusted for the growth in the volume of assets). Supportive empirical evidence has been presented by *Werner* (1997, 2005). *Liang/Cao* (2007) also found a unidirectional causal relationship from bank credit to property prices in China. *Davis/Zhu* (2011) and *Goodhart/Hofmann* (2003) found significant relationships between bank credit and property prices.

f) Explaining what Causes Banking Crises

Equation (9) indicates that increased credit growth for non-GDP (asset) transactions is a predictor of banking crises. Either observing C_F and its ratio to total credit, or total credit growth and its relation to GDP growth will indicate the presence of excess credit creation for financial speculation. The latter indicator has since also been recommended by the *Economist* (2011) as an indicator of 'overheating' and asset bubbles:

> "The fourth symptom of overheating, and one of the most important, is excessive credit expansion, which can lead to asset bubbles … The best measure of excess credit is the difference between the growth rate in bank credit and nominal GDP" (p. 69).

The only way one can justify this statement is if we recognise that bank credit can be used for two types of circulation, namely for GDP transactions and for non-GDP, namely asset transactions. The Quantity Theory of Credit indicates that if total credit growth exceeds GDP credit growth (and thus GDP growth) then credit growth for non-GDP transactions must be growing, thus pushing up asset prices in an unsustainable fashion.

Financial bank credit creation is always unsustainable: the gains achieved to service and repay loans are capital gains, driven by credit creation. Such bank credit launches a Ponzi scheme that will last while bank credit for financial circulation expands. Whenever the music stops in this game of musical chairs – i.e. the driver, bank credit, slows or contracts – it is found that there are not enough chairs: asset prices fall and speculators will default. Rising non-performing loans quickly cripple the banking system (only a fall in the value of banks' asset holdings by 10 % bankrupts the banks due to their small capital cushion). Becoming more risk-averse, the banks then slow credit further, even to the real economy, resulting in recessions and unemployment.

The reason why credit for non-GDP transactions must be a Ponzi scheme is that only GDP transactions generate the value added that can yield in-

come streams to service and repay loans – that is why national income accountants do not include them in GDP in the first place. Any gains made from selling assets that have appreciated in value constitute a zero sum game: they are transfers from the losers in those financial bets. Credit creation for non-GDP transactions, when large enough, will result in massive resource misallocation consisting of gains by insiders, and bankruptcies, banking crises and unemployment after the inevitable crash.

Bank regulation does not address this problem, since it assumes that banks are mere financial intermediaries that do not create credit (*Werner* (2010), on the Basel rules). Once we recognize that banks are the creators of the bulk of the money supply, it stands to reason that some kind of responsibility goes with this privilege. Hence banks should monitor – ideally following specific rules – the quantity and quality of their credit creation to ensure stable and sustainable growth without boom-bust cycles. More on this below, but it can be stated here that according to equation (9), asset inflation and boom/bust cycles – and hence systemic banking crises – can be avoided if banks do not extend credit for asset transactions. It also follows from equation (8) that credit of the type that increases productivity or the amount of goods and services available in the economy is less likely to produce consumer price inflation than credit creation in the form of consumer loans.

We can thus usefully distinguish between productive, speculative and consumptive credit creation and its monitoring can serve to predict and prevent undesirable outcomes caused by credit creation. This distinction has been used in the German-language literature a long time ago, but even some mainstream economists have been aware of it.[5] For details, see *Werner* (2005). Empirical evidence for this prediction of the Quantity Theory of Credit was provided by *Schularick/Taylor* (2012), who use data on 14 countries over a period of more than 100 years and concluded that financial crises were "credit booms gone wrong". Suffice to mention that the crisis predictions of QTC have been tested out of sample in real world forecasting: it was able to predict the Japanese banking crisis and asset price collapse (*Werner* (1991)), the UK housing bust and banking crisis (*Werner* (2005)) and warn of the looming credit boom-bust cycles and banking crises in the eurozone due to ECB policies (*Werner* (2003)).

[5] "When banks loan money to finance productive and profitable endeavors, the loans are paid off rapidly and bank credit continues to be generally available." "The excess credit which the Fed pumped into the economy spilled over into the stock market – triggering a fantastic speculative boom." *Greenspan* (1967).

g) Supply-determination of the Credit Market

Jimenez et al. (2010) used a large sample of Spanish loan application data to demonstrate that the credit market is supply-determined. This confirms the large body of literature on credit rationing experienced by SMEs, all of which support the supply-determination of the credit market postulated in the QTC.

h) Explaining Further Phenomena

Werner (2012) has argued that the framework has also been able to explain why supply-side structural reforms (such as in Japan in recent decades) have failed to stimulate growth (the problem was a lack of demand, due to a lack of bank credit creation; supply-side reforms, even if they achieve the goal to raise the potential growth rate, fail to boost demand, and hence may exacerbate the deflationary pressures, if bank credit shrinks). *Werner* (2003, 2005) has also argued that the framework can account for the East Asian Economic Miracle (see, e.g. *World Bank*, 1993): The central banks of Japan, Taiwan, Korea and China all adopted policies of bank credit guidance during their high growth phases, whereby the central bank limited or banned bank credit creation for consumption (which would tend to produce consumer price inflation) and bank credit for non-GDP (financial) transactions (which would produce asset price inflation and financial instability), while directing credit to productive purposes (investment in the production of goods and services and the implementation of new technologies and productivity-enhancement measures). QTC also explains why Basel I and II have not been able to prevent banking crises (capital adequacy rules neglect the function of banks as creators of the money supply, rendering such restrictions ineffective), while tighter capital adequacy rules in the aftermath of banking crises exert a pro-cyclical and hence counter-productive effect.

3. Common Queries on the QTC

a) Shadow Banking and Non-bank Financial Institutions

A representative query concerning the QTC is the following: Where does one draw the line between banks and non-banks? Can the effect of bank credit creation nowadays not be produced by many types of institu-

tions that are not formally banks? What about shadow banking and near-bank financial institutions that are still non-banks?

Despite many arguments claiming that it has become increasingly difficult to distinguish banks and non-banks, the fact of the matter is that a clear distinction remains straight-forward: Creation of transferable credit money or money-substitutes can only be undertaken by banks that have a banking license. Non-banks, even if in all other respects similar to or identical with banks, cannot create credit and money. This includes insurance companies and non-bank finance companies that lend money. The difference is that these companies use existing purchasing power to fund loans. In other words, they are pure financial intermediaries (just as textbooks and bank regulations often, wrongly, describe banks) without the power to create money out of nothing. Meanwhile, it should be emphasised that the credit creation described in QTC and *Werner* (2005) does not take the form of the systemic 'money multiplier' of the fractional reserve theory. This theory, more frequent in older textbooks, states that each bank is a mere financial intermediary though collectively banks are able to create money, as each bank that receives a new deposit places a small reserve with the central bank and lends on the rest of the money – which then becomes a new deposit at another bank. There are factual errors in this fractional reserve story, such as the assumption that banks gather deposits and transfer some of those funds to the central bank as reserves. In actual fact, banks can only increase their reserves at the central bank if another bank transfers reserves to them (leaving aggregate bank reserves unchanged) or if the central bank does so (by buying assets from them, increasing aggregate reserves). Likewise, banks cannot 'lend out' reserves (*Werner* (2013d)). Instead, QTC postulates that each bank is able to create credit individually (while an active interbank market is necessary to ensure that banks' balance sheets balance). Shadow banks are special purpose vehicles that become owners of securitised bank credit. When a bank sells off securitised loans and these are bought by non-banks from their own funds, this actually reduces credit creation. In practice, banks often lent money to these vehicles, thus to this extent leaving credit creation unchanged (while the effect is captured by standard data on bank credit creation).[6] Thus the distinction between banks

[6] This is also the official view at the Bank of England, as deputy governor Paul *Tucker* (2009) indicated: "Of course, banks are not the only lenders in our economies. The current crisis owes a lot to the non-bank financial sector – funds, conduits, SIVs, securities dealers, and so on. But the excessive leverage and maturity transformation in the shadow banking system was in general predicated on the

and non-banks remains clear-cut and unambiguous: banks are identifiable by having a banking license.

b) The Monitoring Approach

How does the QTC relate to the monitoring approach to explaining why banks are unique (*Diamond* (1984))?

It does not relate to it. The monitoring approach fails to take any institutional, regulatory or legal differences between banks and non-banks into account, and assumes that banks are no different from other financial intermediaries. It fails to recognise that the most important function of banks, which also clearly distinguishes them from non-banks and makes them unique, is their ability to create money out of nothing by inventing the deposits 'lent' to the borrower. Further, the approach is a microeconomic one, lacking integration of such financial intermediaries into a macroeconomic model. If a macro model was formulated, it would likely assume that the money supply is entirely created by the government or the central bank. Given such features, it is not surprising that this approach has not been able to explain or predict any of the salient features of banking, financial markets and macroeconomics, such as the recurring credit cycles, asset inflation/deflation and banking crises. It has also been wrong in its sparse 'predictions', such as that "The centralisation of monitoring each loan by a single intermediary will mean that there are not active markets for these assets" (p. 410), which failed to predict the importance of securitisation and the 'originate and distribute' model of banking witnessed until the outbreak of the North-Atlantic financial crisis. But then again, one should not blame the model for this: it was developed following the deductive methodology, based on unrealistic but result-critical assumptions (*Werner* (2005)). Many such models, including macroeconomic models that do not include credit creating banks, are simply not about the world we live in. Drawing any kind of policy conclusion relating to actually existing economies from such models is of course not permissible, and would be dangerous. This does not diminish

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plentiful availability of credit on too-easy terms from the commercial banking system. Up to a point, the same goes for the abundant liquidity in asset markets that preceded the crisis. Of course, persistently strong demand for financial assets – crudely, rising prices – created liquidity. But, beyond that, the willingness and terms on which 'market-makers' and traders underpinned liquidity depended on generous access to credit for financing inventory and positions. And the ultimate private sector providers of such credit are always the commercial banks."

their usefulness in training the mind, if employed appropriately (although the author prefers learning Latin or Japanese for this purpose, since languages have the benefit of having a lot to say about our world). By contrast, the Quantity Theory of Credit was developed following the inductive methodology and does not employ result-critical assumptions.

c) What About the Diamond/Dybvig (1983) Model of Bank Runs?

The authors argue that "Illiquidity of assets provides the rationale both for the existence of banks and for their vulnerability to runs" (p. 403). They make no distinction between banks and non-banks and thus do not explain why we have heard of bank runs, but not of 'insurance runs' or 'finance company runs', although the latter also hold illiquid assets and give out loans. Clearly, there must be another rationale for the existence of banks and their vulnerability to runs. But to identify it one has to be clear about what makes banks special. Their model, like many others, postulates a 'transformation' that banks are said to undertake, of illiquid assets into liquid deposits. It thus ignores the accounting reality that banks do not 'transform' but create both credit and deposits when they extend a loan. This is only hinted at obliquely: The authors hazily refer to 'banks issuing deposits'. The question of how one 'issues' a deposit without anyone depositing anything is glossed over. But accounting for observed empirical reality is not the purpose of the model, as it is also based on the deductive methodology. Although the authors talk about the 'lessons' of the 1930s concerning bank runs, there is no central bank in the model that could be a lender of last resort and provide liquidity to banks, so their conclusion is the endorsement of deposit insurance since the "taxation authority of the government makes it a natural provider of the insurance" (p. 404). Thus their recommendation amounts to getting the tax payer to bail out banks, which is the costliest method (the cheapest being using the central bank – at zero cost to tax payers; on which more below – or the abolition of banks' ability to create credit, introduction of state money, and then orderly dissolution of troubled banks).

The paper 'shows' that banks can prevent runs by freezing bank accounts – called an 'optimal contract' in the paper. The queues outside banks in Cyprus this year constituted a run, and few cynics would have dared to tell those in the queues that freezing their accounts constitutes the execution of an 'optimal contract'. It is in fact a breach of the actual

contract between banks and depositors. They also conclude that "much of the economic damage in the Great Depression was *caused* directly by bank runs" (p. 404). But we know from QTC – and empirical observation – that deep and persistent recessions are caused by a reduction in credit creation for GDP transactions, and this frequently happens without any bank run (such as in Japan during the past 20 years).

d) Trade Credit

"Nearly every supplier creates credit and some important business strategies combine supplier credits with a fast turnover rate, because credit costs are zero."

Bilateral trade credit can result in transactions without money or bank credit changing hands. Trade credit will always augment bank credit, but usually has different features. It can only fully substitute for bank credit (and thus also expand the money supply) when there are transferable instruments of trade credit. In England since the 17th century and earlier in Italy, France and the Netherlands, however, such trade credit has been connected to banks (and later central banks), as they discount and rediscount bills of trade. Trade credit is then rendered transferable through the discounting (acceptance) by banks. This is captured by bank credit data so that no data adjustment is required in empirical formulations of QTC (for this reason the definition of the bank loan aggregate is sometimes referred to as 'loans and discounts' by central banks).[7] When this is empirically important and not proportionate to bank credit (thus not being represented well by bank credit when considering growth rates), the definition of credit 'C' in the QTC should be widened to include it (*Bezemer/Werner* (2009)). An entire system based on trade credit without bank credit is also conceivable, and would mean that C is identical with trade credit. Such a system is appealing for various reasons: there could not be the unsustainable and costly C_F (credit for financial circulation) since bills of trade are connected to real economy transactions. This, indeed, is a workable definition of 'real bills' and is likely what proponents of the 'real bills doctrine' really had in mind. Such a system could be organised free of usury. It existed in England for a considerable time period, so that

[7] For instance, the Bank of Japan's statistics until today, or the US series on National Bank data before the founding of the Fed. The ECB abolished the Bundesbank's substantial and important rediscounting activity. This is likely to have been a factor in causing the credit crunch of 2002–3 in Germany, as bank credit for productive GDP transactions shrank.

the government did not have to borrow at interest, thus significantly reducing the burden on the tax payer (*Werner* (2013a)). QTC has indeed recently been applied to a model of state money creation (*Jackson/Dyson* (2012)), which is an effective way to avoid banking crises.

e) How Can One in Practice, Using Data, Distinguish Between C_F and C_R?

The theoretical disaggregation of credit into C_R and C_F is straight-forward, for it follows the definition of GDP, which has been worked out by national income accountants. While most transactions can therefore be easily classified, the need to disentangle housing transactions between the asset component and the part that adds value (and hence is part of GDP) may not always be straight-forward. In the case of purchases of existing homes we are witnessing an asset transaction, but purchase and renovation projects or new builds constitute a combination of both aspects. In principle, one should follow the national income accounting definitions concerning these, although they themselves may on occasion be ambiguous. In practice there may be other difficulties: The disaggregation of credit is reliant on the publication of detailed credit data. Such information exists, as it is gathered by all loan officers and reported to headquarters. In most countries it is further reported to the central bank or bank regulator. Whether it is then aggregated and (usually partially) announced and published or not depends on the country. Given the importance of disaggregated bank credit, *Werner* (1997) called for all relevant authorities to be asked to gather and publicise such information in as much detail and in as timely a fashion as possible (nowadays central banks often possess such data close to real time, while publication schedules still conform with the era of manual ledger entries). The US Home Mortgage Disclosure Act of 1975 requires lenders to disclose detailed data about mortgage applications, approvals and home purchases, including the precise geographic location of the lending. Since many of the almost 9,000 US lenders supplying such data are very small, it is clear that the burden of gathering and publishing such data is manageable. Banks should be required to publish monthly data on all their lending activities, down to individual loans and geographical area, as each bank loan uses the public prerogative of money creation. This could be used to implement an even more detailed QTC (with further disaggregation of real economy credit into consumer credit, and various types of investment credit, such as credit for investment in the export sector etc.) and thus

improve banking, monetary and economic policy, apart from likely delivering superior estimates of equations (8) and (9).

f) Is the QTC Not a Closed Economy Model? Does it Apply in a Globalised World?

Werner (1997, 2005) include open economy versions, which have been omitted here for brevity. This work has re-considered the issue raised by *Kindleberger* (1966):

> "A favourite European banking view is that the capital outflow from the USA [in the 1950s and 1960s] is the result of excessive credit creation in the latter. It is sometimes said that the USA exports inflation, although it is not explained how it happens that the USA has lower rates of increase in prices and money supply than European countries. (In one view, the USA has no inflation because it exported it to Europe!) … John Exter of the First National City Bank of New York has gone so far as to say that a dollar in credit creation is a dollar of capital outflow (p. 216)."

The QTC was employed to test this proposition, using data for the parallel Japanese experience of excess domestic credit creation and vast spill-overs in the form of capital outflows during the 1980s. This also has provided evidence for the substitutability of foreign direct investment and portfolio investment (*Werner* (1994)).

g) What is the Link to the Work on Money Demand Functions?

The voluminous literature on 'money demand functions' defines money as deposits and hence focuses on what are essentially savings aggregates: as explained, bank deposits are, at the moment of measurement, money not spent, and it is not possible to know which part will be spent; further it is not possible to disaggregate such data by use of the money – since at the moment of measurement it is not used by the depositors at all. In addition, it is misleading to refer to such money aggregates as constituting 'demand for money'. Would we all not like to have more deposits in the bank? Is not our demand for deposits, indeed the demand for money virtually infinite? This is precisely why the markets for money and credit are rationed, with the supply being the short side and hence the determining factor. This also explains why interest rates are empirically not 'behaving well' (often either not significant or showing the 'wrong' sign in empirical formulations): prices are crucial in equilibrium, but with imperfect information (and rationed time and money) all markets are rationed, render-

ing quantities more important. The short side principle tells us which quantity matters: whichever of demand or supply is smaller. With money and credit this is in aggregate always going to be the supply. This also links to the 'endogenous money' work (e.g. *Wray,* 2001): it is true that money (defined as deposits) is endogenous to credit (since credit creates money). But credit is not endogenous to borrowers – it is exogenous for them, since banks ration credit. Thus the determining factor is bank behaviour and their decision of how much credit to create and who to allocate it to. This is a function of a number of factors, including past nonperforming loans, the remuneration system, but most of all bank regulation and central bank policies (see *Werner*, 2003, 2005). Since central banks can choose to control bank credit via their regulatory powers and their market powers in the interbank market (which is crucial to the survival of banks), it ultimately must be considered an exogenous factor decided by policy choices. The QTC is a theory of exogenous credit.

h) Is the Credit Rationing Argument not Sufficient to Account for Credit Crunches?

Credit rationing is a microeconomic argument that does not explain why bank credit cannot be substituted by other sources of finance, such as credit by non-banks, foreign banks or capital markets. It cannot explain why, for instance, foreign banks could not offer credit in Japan during the 1990s, when the banking market was open, and also why non-bank financial institutions that have bank-like features in dealing with asymmetric information could not do so. Further, if banks are not the creators of the money supply (the credit rationing argument does not assume that they are) then direct finance can also make up for lacking bank credit. Indeed, direct finance rose significantly in Japan during the 1990s, but this did not have a positive effect on the economy (because it does not create credit).

i) What is the Role of Models of Risk and Risk Measurement?

The main problem with such work is that so far it has neglected the role of banks as creators of the money supply, and thus ignored the systemic risk emanating from unsustainable credit creation for financial transactions. This causes the boom-bust cycles and banking crises, and risk models that ignore this (such as the value-at-risk approach) cannot capture this main source of financial instability. See *Werner* (2010).

III. Policy Implications

1. How to Predict and Avoid Banking Crises

Equations (6') and (7), together with the institutional knowledge that the creators of credit, the banks, are themselves only minimally capitalised (less than 10 % of assets) reveal just how prone to crises the system is: only a drop in bank asset values of 10 % would bankrupt the banking system and thus bring the process of credit creation to an abrupt halt – in turn causing a recession. But financial asset prices are themselves a function of bank credit (for financial transactions), according to equation (7). Thus a rise in bank credit for financial transactions (C_F) is the best warning sign of future asset price bubbles and busts and the subsequent banking crises. We know it must be the best lead indicator, because it is the variable driving the process. This has indeed been supported by work on crisis prediction models. As discussed, close monitoring of C_F, its growth rate and share of total credit, are required. Further, especially when the data made available by the central bank is insufficiently disaggregated to clearly identify C_F, equations (3) to (9) tell us that we can use a simple, usually readily available proxy for C_F: whenever C, total bank credit, grows significantly faster than nominal GDP (PY) for a considerable time period, this usually means that C_F has been growing rapidly. The dynamics and risks were described in *Werner* (1997) and expanded upon in *Werner* (2005).

This also informs us about the best policy to avoid asset bubbles, boom-bust cycles and the banking crises which must follow, if the former are large enough: Bank behaviour is shaped by the structure and details of bank regulation. Their core function of creating and allocating the money supply is the result of regulations. Thus regulations must be shaped to produce the results that are desirable from a social welfare perspective. And this surely includes the avoidance of costly resource misallocation due to growth of C_F. In other words, since banks are by themselves not incentivised to ensure an optimum creation and allocation of credit, there is a market failure that requires regulatory intervention. A simple regulation can solve the problem: a ban (or tight limits on size or growth) of bank credit for transactions that do not contribute to GDP (C_F). This can be implemented via the loan officers who obtain the information about the use of loans in all cases. Such a regulation cannot be called 'financial repression'. To the contrary, a system whereby profit-oriented private sector enterprises have an oligopoly on money creation and allo-

cation and are allowed to abuse this privilege by creating large-scale resource misallocation and effectively also divert public funds for bank bailouts cannot but be called a system of 'financial oppression'. However, there is an alternative to such credit regulation or credit guidance (more on which in *Werner* (2005)). This is the design of a suitable financial architecture that ensures stable and sustainable growth, as will be discussed in the last section.

2. *How to Deliver Sustainable and Stable Economic Growth*

Equation (8) indicates that credit for GDP transactions – loans to the real economy – will deliver nominal GDP growth. This has most recently been reflected in the design of UK monetary policy, in the form of the funding for lending scheme (FLS). The goal of this new policy, introduced on 13 July 2012, was described as follows:

> "The FLS is designed to incentivise banks and building societies to boost their lending to UK households and private non-financial corporations (PNFCs) – the 'real economy'."
>
> (*Bank of England*, Quarterly Bulletin 2012 Q4)

The Treasury and Bank of England announced an initiative designed to "incentivise banks … to boost their lending to … the 'real economy'" (ibid.). The particular definition employed by the government and Bank of England in this programme was almost identical to the empirical definition of C_R presented to the Bank of England in an application of the QTC in July 2011 (*Lyonnet/Werner* (2011)).

Thus it is clear that QTC is of considerable importance for monetary policy design, not least because nominal GDP targeting, recommended by *Werner* (1997, 2005) has now also been raised to the level of policy debate in the UK and Canada (*Werner* (2013b)). However, QTC also allows us to target nominal and real GDP together: as *Werner* (2005) argues, if credit for GDP transactions (C_R) is further disaggregated into consumptive credit (C_C) and investment credit (C_I), then policies that ensure credit is mainly used for investment credit can be expected to deliver non-inflationary growth. This is precisely what the credit guidance policies utilised by the successful East Asian 'miracle economies' (Japan, Taiwan, Korea and more recently China) attempted to do via their system of 'window guidance' (see *Werner* (2003, 2005)).

Stable and sustainable growth does include the goal to minimise unemployment. The main employer in almost all countries are the small and

medium-sized enterprises (accounting usually for more than 70 % of employment). In countries with banking sectors dominated by few very large banks SMEs are not attractive as loan customers for banks (such as in the UK). The QTC thus also tells us of the need to ensure bank credit for the real economy, and in particular small firms.

Thus a corollary of QTC is that stable, sustainable growth and indeed near-full employment is possible if bank credit is used mainly for productive purposes. There are few limits to growth, since it is the result of the invention of new recipes (technologies, *Romer* (1990)). If credit is created out of nothing to implement new ideas to produce goods and services that are valued higher than the full price (including environmental costs of resource extraction and combustion) of their components, or technologies that enhance productivity (defined to include the requirement for environmental and ecological sustainability) or the quality of life, then there is no reason why such credit creation should be inflationary and costly to society. Again, an incentive-compatible design of credit allocation (via banks or alternative systems of state money) is possible. More research (for instance by central banks) should be devoted to this topic. How to design the structure of the banking sector and bank regulation to achieve stable and sustainable growth is discussed in the last section.

3. *How to End Post-Crisis Recessions While Minimising Costs to the Tax Payer*

After the recent financial crisis, initially many governments increased their expenditure – if largely aimed at bailing out banks. When Japan's bubble burst (due to the slowdown in bank credit following a massive boost to speculative bank credit creation previously), the government embarked on one of the largest peace-time spending programmes in modern times – but with little to show for it. The economy remained mired in recession for almost two decades. QTC has also been applied to this question of the ineffectiveness of fiscal policy. *Werner* (1996, 2005, 2012) pointed out that we know from equation (8) that only fiscal policy backed by credit creation will stimulate nominal growth. This is due not to interest rate-based crowding out, but quantity-crowding out caused by a lack of credit creation, since the quantity of credit is the restrictive factor. If for instance there is no growth of credit for real circulation, then increased fiscal expenditure must crowd out private demand:

$$\Delta C_R = 0 \tag{10}$$

$$\Delta(P_R Y) = \Delta c + \Delta i + \Delta g + \Delta nx \tag{11}$$

Substituting (10) and (11) into equation (8), we obtain:

$$\Delta g = -(\Delta c + \Delta i + \Delta nx) \tag{12}$$

Equation (12) indicates that the change in government expenditure Δg is countered by a change in private sector expenditure of equal size and opposite sign, as long as credit creation remains unaltered. In this framework, just as proposed in classical economics and by the early quantity theory literature, fiscal policy cannot affect nominal GDP growth, if it is not linked to the monetary side of the economy: an increase in credit creation is necessary (and sufficient) for nominal growth.

In the general formulation of the model, with variable ΔC_R, we find, substituting (11) into equation (8):

$$\Delta(c + i + nx) = V_R \ \Delta C_R - \Delta g \tag{13}$$

whereby in an empirical formulation the coefficient for Δg is expected to be close to –1. In other words, given the amount of credit creation produced by the banking system for GDP transactions, an autonomous increase in government expenditure g must result in an equal reduction in private demand. If the government issues bonds to fund fiscal expenditure, private sector investors (such as life insurance companies) that purchase the bonds must withdraw purchasing power elsewhere from the economy. The same applies (more visibly) to tax-financed government expenditure. With unchanged credit creation, every yen in additional government spending reduces private sector activity by one yen.

This conclusion is not dependent on the assumption of full employment. Fiscal policy can crowd out private demand even when there is less than full employment. Instead of the employment constraint in traditional models, the economy is held back by a lack of credit creation. Also, such quantity crowding out occurs irrespective of interest rates.

Put simply, with unchanged credit creation (which determines the size of the income pie), an increase in government expenditure amounts to an increase in the government share of the same income pie – and hence implies a reduction in the private sector share. *Werner* (2005, 2012) provides empirical evidence from Japan: the sizeable fiscal stimulation occurring in Japan during the 1990s failed to trigger a significant and lasting economic recovery, despite sharp interest rate declines, because it was not backed by credit creation.

Policy-makers that wish to stimulate growth can do so by increasing bank credit creation for real economy transactions. There are a number of options available (as *Werner* (1995, 1996b) suggested in Japan, referring to this as 'quantitative easing' – an expression which was later borrowed by central banks to refer mainly to conventional monetarist bank reserve or high powered money expansion – for which many expressions already existed).[8]

There is a policy for governments to monetise fiscal policy even without cooperation from the central bank. The method, first suggested by *Werner* (1996, 1998, 2000a, 2000b) renders fiscal policy effective, according to the above model. The Ministry of Finance could cover the public sector borrowing requirement by substituting bond finance with borrowing from the private sector commercial banks. This would increase credit creation ΔC_R in equation (8) above, which would, in turn, boost nominal GDP. By shifting government funding away from bond finance and replacing it with borrowing from the commercial banks via simple loan contracts, credit creation will be stimulated. Unlike bond markets, banks create new purchasing power when they lend. This means that overall economic activity can be boosted via fiscal policy, without having to increase fiscal spending, but by switching the funding mechanism from bonds to bank loan contracts. This would avoid any quantity crowding out that rendered fiscal policy previously ineffective.[9]

The proposed policy to switch the fiscal funding method would be ideal for Japan, where renewed bank reserve expansion policies are unlikely to quickly raise bank credit growth (while there is a worry about banks being affected by bond holdings that need to be marked to market), and

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[8] In *Werner* (1995) the author argues that a new type of monetary policy was necessary that did not focus on the price of money, but on its quantity, measured by credit creation. In order to distinguish this from traditional definitions of the 'money supply' an expression was formed that conveyed the message – a monetary policy emphasizing the effective quantity of money circulating – but not using standard expressions such as 'money supply'. The author thus added the word 'quantitative' to the standard Japanese expression for stimulatory monetary policy ('monetary easing') to obtain 'quantitative easing'. While the Bank of Japan denied for many years that such a policy would work, it adopted the expression in the 2000s, but redefined it as the traditional monetarist measure of boosting narrow money – bank reserves. This was a policy that the author had predicted would not be able to stimulate the economy, as it does not ensure an increase in bank credit creation.

[9] This policy proposal has recently been endorsed by the Financial Times' Martin *Wolf* (2013).

for the eurozone, where it would solve the conundrum faced by countries affected by the eurozone sovereign debt crisis (see *Werner* (2013c)). The policy would not require the socialization of national debts through Eurobonds or other measures to further centralize authority and decision-making powers in Europe, while it would boost domestic demand, tax revenues and employment, yet at the same time relieving pressure in the bond markets, and helping banks (as they would not have to mark such loans to market).

This policy should be combined with the most efficient way to clean up banks' balance sheets and hence help them increase bank credit growth after a banking crisis: the central bank should purchase all non-performing assets from the banks at face value (via a subsidiary) and not mark these assets to market. The bank balance sheets would be cleaned up and stronger than ever, able and more willing to create credit again. The loans can be forgiven, written off, or enforced – a political decision about a transfer policy that is not directly relevant for growth. This is what the Bank of England did in 1914, the Bank of Japan in 1945, and the US Fed in 2008. Of course, incentive structures should be put in place to avoid such problems in the future, as discussed above (such as credit guidance and redesigning the structure of the banking sector). A more detailed policy package that the ECB could implement is listed in *Werner* (2012).

4. Towards a New, Sustainable Financial Architecture

A sustainable financial architecture would focus on the incentive-compatible design of the banking sector in order to achieve the goal of delivering stable growth without major cycles and banking crises.

Banking crises and the asset bubbles that precede them are avoidable, if an incentive structure is designed that discourages the creation of credit for transactions that do not contribute to GDP (financial and asset transactions). This can be done via regimes of 'credit guidance', as successfully implemented over many years in Japan, Taiwan, Korea and, most recently China (all under the name 'window guidance'). As *Werner* (2003) shows, the negative experience of window guidance in Japan in the 1980s and 1990s was not due to the ineffectiveness of the tool, but the inappropriateness of the goals imposed.[10]

[10] The Bank of Japan chose to set very high credit growth targets for the banks, which window guidance efficiently delivered – demonstrating that window guid-

However, it is possible to achieve the goal of stable and sustainable growth – which requires a concentration of bank credit on productive investment credit mainly to small and medium-sized enterprises – without the more activist regime of credit guidance. This can be done via the design of the financial architecture.

To do this, a financial sector structure has to be designed such that the banking sector is dominated by banks that tend not to engage in credit creation for non-GDP transactions. This may initially appear to be a difficult task. After all, banks often appear to be maximising short term profits by lending for speculative purposes. However, this is especially true for large banks which, for efficiency reasons, seek large-scale borrowers (such as hedge funds). Small banks, on the other hand, are interested in and dependent on lending to many small-scale borrowers. These tend to be SMEs active in the real economy.

So the financial architecture for stable and sustainable growth consists of a banking sector dominated by many small-scale banks. Much empirical support for this argument has been delivered by the German banking system. It has since 1945 been able to avoid major asset bubbles, and has been able to deliver fairly stable and sustainable growth, because it consists of mainly small, locally restricted not-for-profit banks that lend almost exclusively to households and small and medium-sized enterprises: the Sparkassen public savings banks and the cooperative banks (Volksbanken, Raiffeisenbanken) account for about 70 % of the deposit banking market in Germany, and the vast majority of SME lending (see, for instance, *Werner* (2011)).

The German banking sector has been able to deliver stable growth without asset bubbles and banking crises for a long time period, largely because the dominant banks have an inherent interest in lending to small, local borrowers, who are less likely to engage in financial speculation of the type that has fuelled financial credit in countries such as the UK, Iceland, Ireland, Spain, Portugal or Greece. Ironically, this German-style banking structure has been subject to much criticism from mainstream economic and financial analysts – but as we now know, on the basis of models that have failed. Our framework thus underlines the importance of maintaining and furthering the German-style financial architecture, especially within a new framework for European or global

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ance is not a system of limiting or suppressing credit growth, but of enforcing quotas that will not be over- or undershot.

financial architecture. Countries where such banks do not exist or are not dominant should develop a system of such banks (such as in the UK, where civil society is engaged in efforts to re-introduce them). The principles of decentralisation and the restriction of geographical area of activity are pivotal, as the example of the Spanish caixa has shown: abandoning geographical restrictions and introducing market-share competition on a national scale resulted in banks dumping their product (loans), which was possible by raising loan-to-value ratios and inducing an unsustainable property bubble, just as *Werner* (1997) had described the situation in Japan in the 1980s.

In summary, the design of a resilient, sustainable financial architecture could ensure that the extension of bank credit for non-GDP transactions is either discouraged (via the design of the structure of the banking sector, as has been the case in Germany) or restricted by macro-prudential supervision, that limits bank credit for non-GDP transactions (as operated in East Asian economies in the form of 'window guidance', itself a policy introduced from pre-1945 Germany, see *Werner* (2002)). Another option is to rescind the privilege given to banks to create money and use state money issued without creating private or public sector debt (such money would be equity of the state, not debt, as is currently the case with the issuance of coins).

While this paper has emphasized the European perspective, the same mechanisms can be introduced on a global scale by the relevant monetary authorities (whether in national settings or the setting of a currency union). The QTC can be applied to the question of foreign debts by developing countries and ensuring that they are able to catch up with the industrialized countries effectively: QTC tells us that borrowing from abroad is not needed for successful growth and economic development, since domestic credit creation can do the job (as the East Asian economies have demonstrated). While the IMF seems already aware of the role of credit creation on an international scale (its lending conditionality is usually framed in quantitative and qualitative targets for credit creation) the corollary that foreign borrowing by developing countries should not be encouraged, and that appropriately designed credit guidance should be encouraged, has not yet been reflected in its policy recommendations.

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