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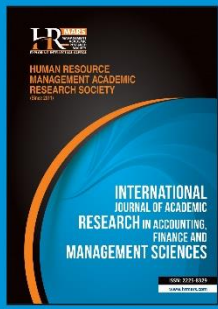
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# Procyclicality Effects on Bank Lending Decisions: A Case Study of the British Banking Sector

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## Abstract

We perform detail analysis and review of capital regulation under Basel II including standardised and internal rating based approaches. We consider the parameters required for both approaches. Linkages between Basel II capital regulation and Procyclicality is established and we established the fact that even though procyclicality is inherent in banking sector, Basel II capital regulation has succeeded in exacerbating it particularly during the recent financial and economic crisis. We review the effects of procyclicality on the United Kingdom Bank lending decisions particularly during the economic crisis. This is compared with bank lending decisions pre crisis and post crisis period with a view to having holistic view of the effects. Our review covers main lending classifications in the UK. These include lending to businesses, secured lending to individuals and consumer lending. We conclude that Basel II capital regulation is not the genesis of procyclicality but one of the exacerbating factors. We assent to the fact that procyclicality genesis could be traced to failure of banks to efficiently allocate resources within the economy. Relevance of Basel II in improving risk management within banking sector is also emphasised.

**Keywords:** Procyclicality, Countercyclicality, Lending Decision, Economic Crisis, Basel II Capital Regulation

## Introduction

Since 1988 when Basle Committee on Banking Supervision issued its first capital adequacy standards with a view to neutralising the substantial differences that characterised international frameworks for bank regulation, the standards have now transited from wave 1 to wave 3. This transition is not unconnected to various loopholes that characterised the previous waves of the regulatory standards despite the fact that it has been argued by many that the most effective supervisory instrument for measuring soundness and resilience of banks and other financial institutions is capital regulation. Most of these loopholes raise their ugly heads upon implementation of the most recent standard. Some were caused by crisis in the economy while some actually precipitated the global economic crisis. In most cases, the emergence of the global financial crisis usually exposes the loopholes that characterised regulatory standards. Admati and Hellwig (2014) argue that determining bank capital charges is one of the most controversial topics in regulating the sector. This perhaps makes it prone to various loopholes that are eventually identified post implementation.

The wave one of the capital regulatory standards adopted a uniform methodology for measuring banks' capital and risk – weighted assets, lending in particular. The introduction of the standards was very crucial to address the volatility and various financial innovations that banks engage in as well as the associated risk being faced by banks. One of the critics of this methodology, Kim and Santomero (1988) argue that adopting simple capital to asset ratio as a tool for measuring banks capital charges encourage banks to increase their business risk by realigning their portfolio. The uniform capital measurement standard motivate banks to shift their risks to non- bank Institutions, thus there was need to ensure bank capital is more sensitive to the risk exposure. In the same vein, Koehn and Santomero (1980) posit that there is possibility that capital regulatory efforts may increase the probability of failure for some institutions. As a result of this and other criticism put forward by commentators, Basel II framework was introduced with the primary objective of closely aligning the banks' capital to the risk they take.

This paper will therefore reviews the effect of Basel II capital adequacy standards on bank capital with major focus on bank lending decisions. Analysis of Basle III which was introduced to address the shortcomings that characterised Basel II particularly during financial crisis is also performed in this study. Due its stake in the global financial system and the fact that it is one of the worst hit economies during the recent financial crisis, United Kingdom banks are focused on in this study with primary objective of assessing the effect of Basel II on the British banks lending decisions and the associated effect on the United Kingdom GDP. Our period of analysis spans across crisis era and post crisis era.

### **Capital Regulation – Basel II Overview**

As mentioned in the introduction session, Basel II<sup>1</sup> was introduced to curb motivation of banks to hold risky assets which are not commensurate with the level of capital charges allocated to them. In other words, BASEL II primary objective was to strengthen the relationship between assets risk and the corresponding capital charges. This is targeted to be achieved using two broad approaches to calculate capital charges for the risks being taken by the banks. In order to enrich the robustness and flexibility of the standards, the regulator made the two approaches optional to banks. These approaches are Standardised Approach and Internal Ratings Based (IRB) Approach and the banks can choose to adopt either of the two.

Standardised approach is an extension to Basel I with substantial amendment. Under Basel I, capital charge rate was fixed at 8 percent without taking into cognisance any rating of the assets. On the contrary, standardised approach takes into consideration the external ratings of the borrowers. 100 percent fixed rate of risk weighting is allocated to uncollateralised corporate loans when there is no external rating for the borrower. The approach is actually designed for banks that do not have sufficient resources to implement costly internal ratings based model. Standard approach is considered cheaper since capital charges determined at the beginning of the loan term and this remain constant throughout the life of the loans thus no additional or continuous calculation is required.

For internal ratings based (IRB) approach, global supervisory bodies saw the need to welcome economic capital calculation among banks and to grant consent to the use of internal risk calculation model among banks. This approach therefore (in most cases) allows banks to consider both the systematic and idiosyncratic risk associated with their lending

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<sup>1</sup> See Basel Committee on Banking Supervision (1988, 2006) for Basel Capital Standards as agreed by the committee.

portfolio while calculating the corresponding capital charges. Systematic risks are potential unexpected macroeconomic changes as well as unexpected financial market conditions that could impact the performance of the borrowers. This is usually modelled to obtain a single systematic risk factor used in the capital calculation. One way of doing this is to bucket lending portfolio into homogenous sectors or industry or by bucketing the portfolio into region or country etc. Contrast to this, Idiosyncratic risk are those unexpected circumstances which are triggered by individual borrowers such as bankruptcy of a particular borrower.

Following the categorisation, banks that are adopting IRB approach therefore determines (for each of its borrower) parameters such as probability of default of the client (PD), loss given default (LGD) which is the percentage of exposure the bank might lose in the event of default by the client, exposure at default (EAD) which is the estimate of the outstanding exposure for a client in the event of default and, effective maturity of the loan. The risk weight attributable to the any specific loan portfolio therefore relies on the outcome of the parameters estimation. In other words, the higher the parameter estimate, the higher the specific loan risk, and by extension, the higher the capital charge for overall loan portfolio of the bank.

As in the case of standardised approach, banks also have the option to adopt either of the two versions of the IRB approach. These are foundation IRB and advanced IRB approach. The major difference between the two versions is that banks that are adopting foundation IRB are allowed to only determine and/or estimate probability of default of their borrowers using their internal model and other parameters (LGD, EAD e t c) are provided by the national regulators<sup>2</sup> using agreed portfolio classifications e.g. by industry, by maturity, by region e t c. On the other hand, banks that are adopting advanced IRB approach are permitted not only to estimate probability of default of their borrowers but also allowed to use their internal model to estimate other parameters such as loss given default (LGD), exposure at default (EAD) e t c. Consequently we argue that under IRB approach, capital charges are both endogenous and exogenous to credit risk. This is contrary to the argument of Behn et al (2015) that capital charges are only endogenous to credit risk using IRB approach.

### **Is Basel II Capital Regulation the Genesis of Pro-cyclicality?**

According to Financial Stability Forum (2009), Pro-cyclicality is viewed as the tendency of any financial variable to move with the business cycle thus triggers financial stress for the participants. Bank of England (2014) viewed pro-cyclicality from two main perspectives. These are – from short term perspective and from medium term perspective. In the short term, pro-cyclicality is viewed as investment which is characterised by the capability to exacerbate market conditions and its volatility. From the medium term perspective, pro-cyclicality is defined as investment decision which is tailored to reflect asset price and economic cycles, such that willingness to withstand risk diminishes in the period of stress and increase upturns. Athanasoglou and Daniilidis (2011) describe pro-cyclicality as an underestimation of or estimation of the risks to which the banking sector is exposed to. Berlin (2009) views Pro-cyclicality as a situation when banks reduce credit supply due to economic downturn, and this precipitates weak demand for new credit since potential alternative investments with positive net present values are very limited. Based on the aforementioned definitions, we define pro-cyclicality in the context of lending decision as any economic and/or regulatory

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<sup>2</sup> Prudential Regulation Authority (PRA) in the United Kingdom is a part of Bank of England responsible for the prudential regulation and supervision of banks, building societies, credit unions, insurers and major investment firms in the United Kingdom.

tendency which impact firms particularly banks' lending decision such that motivation to give out credit diminishes in periods of financial stress and upturns. In other words, when banks react to regulation in the form of capital requirement, by cutting down their loan portfolio, then credit availability in the economy becomes pro-cyclical. This direction of banks' lending decision therefore contributes to a large extent to the global financial stability and economic growth. In the subsequent section, impact of this on the British economy particularly during the last decade which covers recent economic crises shall be examined.

Various works have dealt with the cyclical effects that characterised the transition from risk insensitive (Basel I) to risk sensitive (Basel II) capital regulation and the consequential capital requirement. A major concern that arose with the introduction of Basel II was that the regulation would trigger increased volatility in the business cycle and this would negatively impact bank lending decision particularly during economic recession. In other words, banks tend to substantially increase their loan portfolio during economic boom as a consequence of their quest to heighten their leverage level. However, during the economic downturn, the internal rating based (IRD) approach of Basel II require banks to estimate higher value of probability of default (PD) as well as loss given default (LGD) since these inputs are driven mostly by economic conditions. Consequently, increased capital requirement is expected of the banks during economic crisis due to the parameters required for the calculation of Basel II capital. These precipitated and negatively influenced banks' loan portfolio decision, otherwise known as tightened credit supply.

Blum and Hellwig (1995) argue that two key conditions are necessary for the contraction in the credit supply. First, increasing capital during economic crisis by bank with a view to meeting higher capital requirement by issuing new equity shares could be difficult for many banks. Secondly, switching of borrowers to other sources of finance tends to be difficult or at least, expensive during economic crisis. Athanasoglou and Daniilidis (2011) also argue that capital requirements may trigger procyclical behaviour. Gropp and Heider (2009) argue that banks tends to be on top of their economic capital management therefore do not significantly trigger Procyclicality<sup>3</sup>. However, Berrospide and Edge (2010) is of opposite view. Francis and Osborne (2009) conclude in their study on UK banks, that changes in bank's capital requirement may trigger changes to its loan portfolio decisions. This argument is in line with the outcome of studies performed on US banks by Bernanke and Lown (1991) as well as Puri et al (2010) for German banks. They all argue that when banks' capital and liquidity are at their minimum level during economic meltdown, loan portfolio decision is impacted negatively and consequently, reduced loan supply in the economy.

As noted above, capital charges at the individual loan level adopts six parameter formula. These are loss given default expected from the loan(LGD), 1 year PD of a borrower and remaining maturity (M), asset-value correlation ( $\alpha$ ) depending on the involved borrowers as well as targeted one-year solvency probability ( $\beta$ ) for the bank. Parameters  $\alpha$  and  $\beta$  are typically provided to the banks by the regulator. Out of these six parameters, economic cycle does have impact on the estimation of three of these parameters. Impact of economic cycle on probability of default (PD) was empirically confirmed by (Barnhill and Maxwell, 2002; Altman, 2004). During economic meltdown, probability that a borrower would default increases as economic activities slow down. In the same direction, during recession, collateral that are liquid prior to the crises metamorphose to embrace illiquidity tendency or at a minimum, experience decline in value due to the downturn. Consequently, banks are only

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<sup>3</sup> Banks capital can be classified into economic capital and regulatory capital

able to use declined collateral values in the estimation of corresponding loss given default (LGD), thus increase actual loss taken by the banks. Acharya *et al.* (2004) argues that loss given default (LGD) is impacted by the probability of default (PD) of the borrowers as well as the state of the economy. Jimenez *et al.* (2007) argue that exposure at default (EAD) is higher during economic meltdown since borrowers are motivated to fully use their credit lines. This is necessary as borrowers have pressing need to enhance their operating capacity and stabilise within the crisis period.

Studies performed by Kashyap and Stein (2004); Peura and Jokivuolle (2004); Gordy and Howells (2006); VanHoose (2008); Jokipii and Milne (2008), suggest that regulatory capital requirement from the implementation of Basel II reinforces procyclical behaviour particularly during economic crisis when the economy faces weakened liquidity. In addition, they argue that any capital buffers set aside during economic boom are usually not adequate enough to absorb the effect of procyclicality which the banks face in the time of economy downturn.

The regulators have tried to limit the severity of pro-cyclical effects of Basel II by introducing various measures. For example, banks are required to use historical PDs and LGD such that time horizon of at least one business year cycle is used to estimate the two parameters. Catarieneu-Rabell *et al.* (2005); Saurina (2008) argue that this regulatory capital estimation policy may at a minimum reduce this procyclicality tendency of Basel II. Regulators also introduce the use of stress testing by banks with a view to predicting procyclicality as well cushion the effect of this as a result of implementation of Basel II. Taylor and Goodhart (2004) argue that such policy has successfully dismissed Basel II procyclicality tendency from the economy. Reduced risk weights are also introduced for the SMEs loan portfolio with a resulting lower capital charges for such portfolio.

Even though many studies conclude that Basel II exacerbate, a number of studies have also concluded that there is no basis for this. This group of studies are however limited. Jokipii and Milne (2008) argue that many other factors determine what the actual bank capital ratios and capital buffer would be, and this may impact the lending decision of the bank at any point in time. Among the factors include, banks urge to avoid minimum capital requirement violation fines by the regulators. This is usually driven by the need to mitigate against compliance and resulting reputational risk. Credit rating agencies may also require that the bank have a level of capital buffer in order to main or improve its rating. Jokipii and Milne (2008) argue that capital buffer for 25 banks in the EU. Zakrajsek *et al.* (2001) also conclude that while it is not clear the impact of IRB approach of Basel II on procyclicality, standardised approach is unlikely to trigger material increase in procyclicality.

### **Effect of Procyclicality on Bank Lending in the United Kingdom**

As mentioned in the previous section, procyclicality has been described as a situation when banks reduce credit supply due to economic downturn. Based on this understanding of Procyclicality and the circumstances that trigger its occurrence, this section shall attempt to review aggregate bank lending in the United Kingdom during the recent economic crisis with a view to see the lending trend in the economy during the meltdown.

### **Lending to Private Non-Financial Corporation in the UK (UK Businesses)**

We examine the growth rate of lending to non-financial corporation in the UK between January 2005 and December 2014. Our period of selection made the analysis of the lending growth rate possible pre-crisis as well as post crisis in the UK.

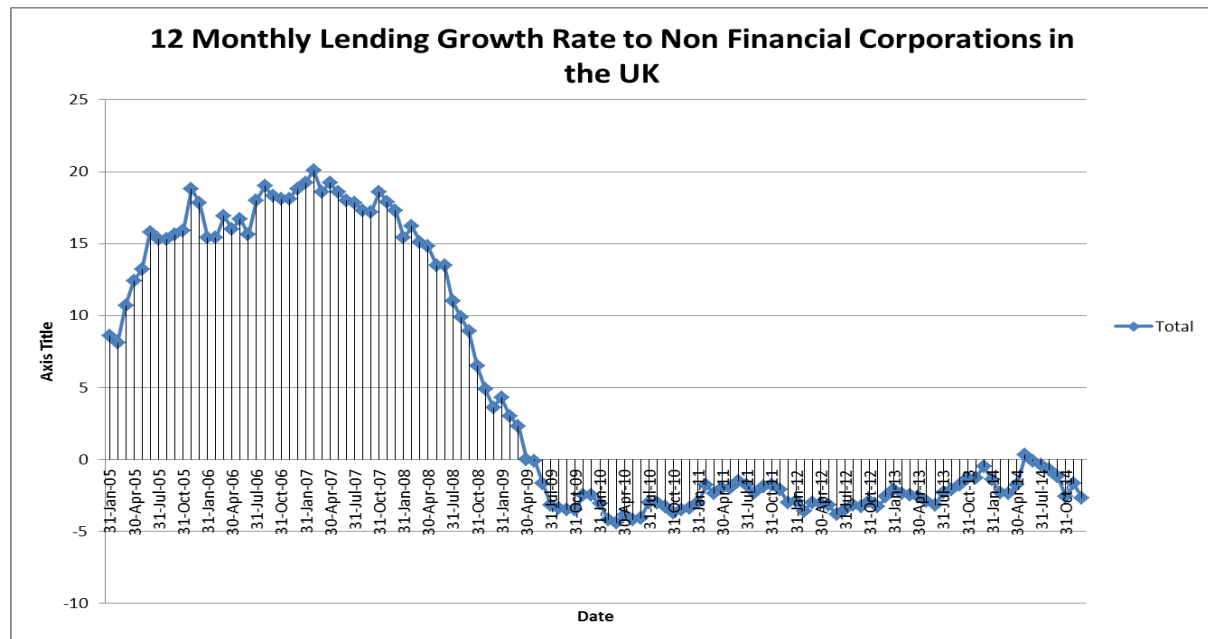


Chart 1. Monthly 12 month growth rate of monetary financial institutions in sterling net lending to Private Non-Financial Corporations (PNFC) in the UK (in %), seasonally adjusted – Data sourced from Bank of England

From chart 1 above, lending growth was at its peak in 2007, pre-crisis period. Growth rate during this period reached 20% in the first quarter of 2007. This was not unconnected to the economic boom being experienced during this time. UK banks were willing to lend to business and the business were willing to take on additional risks. Drop in the lending growth rate to this sector actually kicked off in April 2008 when the growth rate dropped from 20.1% in 2007 Q1 to 14.8%. As at this time, the economy already showed red signal to crisis. As at end of Q1 2009, the growth rate was 0% and thereafter, the rate fell into negative. The situation which the United Kingdom economy was yet to completely revised as at end of Q4 2014. One important characteristic of this period is the unwillingness of the lenders to take on additional risk due to uncertainty in the economy. This precipitated higher repayment by the businesses (lenders), compared to the gross lending to the sector.

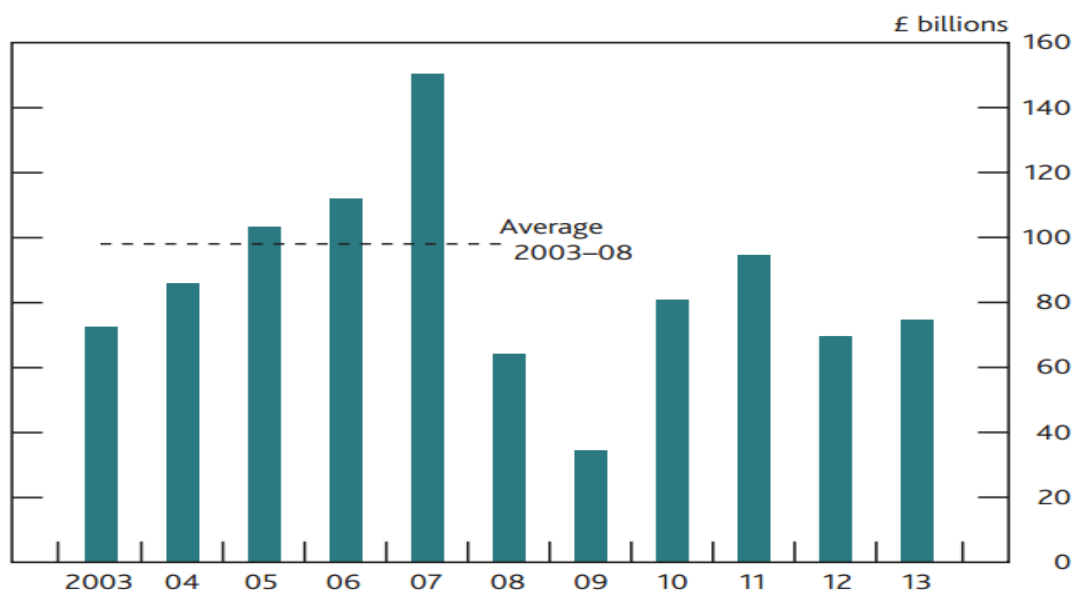


Chart 2. Estimates of new syndicated loan granted to UK businesses (PNFC) – Sourced from Bank of England

Chart 2 above shows that loan facilities to larger companies was at its highest in the pre-crisis period. This group of borrowers have access to credit through the syndicated lending market which is usually driven by factors such as mergers and acquisitions, refinancing etc. One important fact is that syndicated loan market tends to boom alongside economic boom and it declines as the economy go into recession. Chart 2 above depict the fall in the syndicated loan in 2008 and 2009. This is connected to the unwillingness of the bank to lend money to the business due to cyclical in the business cycle.

**UK Secured Lending to Individuals**

Growth rate on lending secured on dwellings is another type we examine in this section. Period between January 2005 and December 2014 is also covered to analysis both pre- crisis as well as post crisis impact of this sector in the UK.

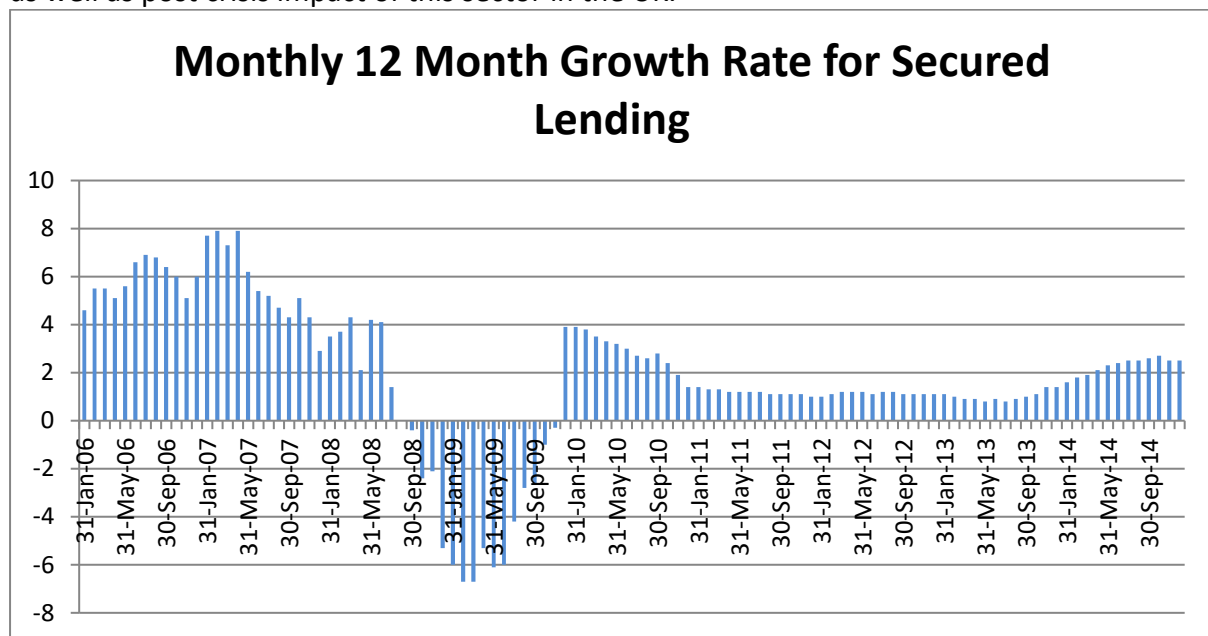


Chart 3. Monthly 12 month growth rate of monetary financial institutions in sterling net secured lending to individuals in the UK (in %), seasonally adjusted – Data sourced from Bank of England

Growth rate on secured lending is depicted in chart 3 above. Similar to the loan growth rate for businesses, UK economy also experienced a sharp decline in secured lending in the wake of the economy crisis. The growth rate dropped sharply to negative at the beginning of 2008 Q3. Net lending in sterling to the UK – resident mortgage lenders dropped to -6.4% due to lack of motivation on the part of the UK-resident mortgage lenders to approve mortgage applications. Another factor which is worthy of mentioning is the fact that re-mortgage application by lenders also dropped during this period and where the applications were submitted for re-mortgaging, lenders were reluctant in their approval. This situation is nothing but a reflection of procyclicality in the economy system. This is underscored by Berlin (2009) as mentioned in the previous section, who views procyclicality as a situation when banks reduce credit supply due to economic downturn, and consequently precipitates weak demand for new credit since potential alternative investments with positive net present



values are very limited. During the economy recession, house prices fell sharply therefore UK-resident mortgage borrowers were not motivated to take on new risk. In the same vein, UK mortgage lenders needed to reduce credit supply due to the downturn.

### UK Consumer Lending

Lastly, we examine the growth rate for unsecured lending in the UK between January 2005 and December 2014.

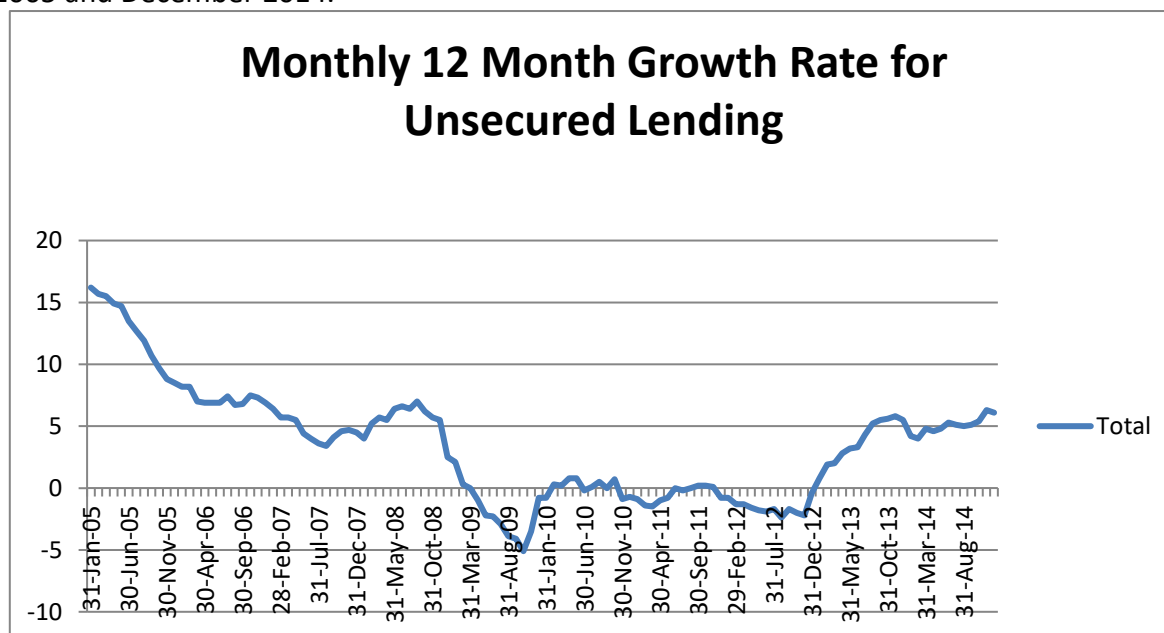


Chart 4. Monthly 12 month growth rate of monetary financial institutions in sterling net secured lending to individuals in the UK (in %), seasonally adjusted – Data sourced from Bank of England

Unsecured lending in the UK for the period under analysis follows the same trend with secured lending and lending to businesses. From chart 4 above, consumer lending growth rate fell sharply to negative during the economic crisis in the UK. Annual write-off rate on consumer credit i.e. the ratio of write-offs on unsecured loans to the stock of unsecured loans, during 2008 and 2009 when the crisis was at its peak, was enormous. This was because borrowers could not discharge their regular obligations to the lenders.

In summary, it is with no doubt that procyclicality which is a major characteristic of financial and economic crisis which was experienced recently do have a substantial negative impact in the UK with regards to lending decisions during the crisis. This impact was in two folds – lenders were motivated by the crisis to reduce credit supply and borrowers were unwilling to take on additional risks due to the crisis. See (Berlin, 2009). Other argument put forward cl particular sectors such as real estate or small businesses may have been affected by pressure on bank capital in some regions (Hancock and Wilcox, 1997; Hancock and Wilcox, 1998; Peek and Rosengren, 1997a, 1997b).

### Is Procyclicality the Bane of Capital Regulation?

The global financial crisis highlighted that there were some important missing elements in the international regulatory framework of the financial system. The Basel III package intends to fill some of the most relevant gaps identified in this framework, most notably by providing tools to address the risks arising from excessive leverage and maturity mismatches.

While micro prudential regulation and supervision will be substantially enhanced with this reform, the first steps in setting up an international framework for macro prudential regulation were also taken. The crisis made clear that even if banks are unquestionably sound when taken individually, systemic risks may still be building up. As such, traditional micro prudential regulation, focused essentially on the solvency of each financial institution individually, must be complemented by macro prudential oversight. The latter should focus on collective behaviours that potentially increase the risk within the financial system, such as excessive leverage, interconnectedness, or common exposures to similar asset classes or funding sources. Even if these behaviours do not imply a significant increase in risk for each individual institution, their systemic nature may still have important impacts on the stability of the financial system and, ultimately, on long-term economic growth. Against this background, one of the most important tools available to macro prudential authorities will be the countercyclical capital buffer (CCB). According to the Basel Committee (2010), the main objective of the CCB is to ensure that banks hold a sufficiently large buffer of capital that allows them to absorb.

### **Basel III Countercyclical Capital Buffers**

The primary aims of introducing countercyclical capital buffer (CCB) are to accomplish a supervisory regime which shields banking sector from the build - up of the system-wide risk that characterised period of excessive aggregate credit growth. Secondly, in the previous section, we argued that prior to the crisis period, there was excessive credit growth. This exacerbated procyclicality in banking, a phenomenon which is inherent and its eradication may be impossible. Countercyclical capital buffer is therefore aim to lessen the severity of the procyclicality in the banking sector. Additionally, Basel Committee on Banking Supervision (BCBS) introduced the countercyclical capital buffer to ensure that credit is available during crisis period; banking sector is protected during the period of stress from losses that excessive credit growth trigger; and to discourage excessive bank lending during economic boom or build up phase by requesting for higher capital defence from banks

In line with Basel III, countercyclical capital buffer range from 0 to 2.5% of the risk weighted assets (RWA) at consolidated level or at solo level national supervisors deem it appropriate to conserve resources in a particular segment of the group. The 0- 2.5% rule depends on the extent of the system wide risk build up in a particular jurisdiction as opined by the local regulator. National supervisors may implement CCB in excess of 2.5% in their jurisdiction provided it is considered appropriate. CCB is expected to be fulfilled with common equity capital (CET1) or other fully loss absorbing capital. BCBS define countercyclical capital buffer as the proportion (in percentage) of bank's total credit risk charge that relates to private sector credit exposures in a jurisdiction<sup>4</sup> to the bank's total credit risk charge for private sector credit exposures across all jurisdictions.

In setting up countercyclical capital buffer, a good indicator of increase in systemic risk that triggers cyclicity in banking sector is credit – to - GDP ratio<sup>5</sup> , the credit gap (see Drehmann et al., 2010). This has been adopted by the BCBS with a caution that the national regulators should use their judgement in adopting it.

Even though the implementation of countercyclical capital buffer will phase in between 1 January 2016 and December 2018 and will become fully effective on 1 January 2019, countercyclical capital buffer has the tendency to shrink credit growth particularly in the time

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<sup>4</sup> Jurisdiction is the country where the guarantor of the exposure resides and not where the exposure booking took place.

<sup>5</sup> The credit to GDP gap is the deviation of the credit-to-GDP ratio from its long-term trend, in percentage points.

of credit boom and at the same time eliminate or at least, ease credit contraction when the buffer is released thus lessen procyclicality effect in banking

### Conclusions

From our analysis and review above, Procyclicality has been seen as an inherent characteristic of the banking sector which its total eradication may not be attainable. This study tries to dichotomise causes of procyclicality from exacerbating factors. Whilst in this literature, the main cause of procyclicality is identified as failure of banks to efficiently allocate resources within an economy, thus hindered both financial and economic stability, Basel II has been identified as one of the exacerbating factors with its ability to increase the volatility of capital requirement of banks over the business cycle.

We identified that even though there are many critics of Basel II, its contribution to effective risk management in the banking sector and its quest for more stable banking system cannot be over-emphasised. The severity of Basel II in contributing to procyclicality depends on various factors such as capital requirement calculation model adopted, size of capital buffers, time horizon adopted for probability of default (PD) and loss given default (LGD) calculation, loan portfolio types etc.

The recent global financial crisis in the United Kingdom is also examined and analysed from the Procyclicality and bank lending decision point of views. The study analysed procyclicality behaviour both from supply and demand sides particularly during economic crisis in the United Kingdom. This is really noble because to our knowledge, previous literatures have only dealt with supply side and not demand side of procyclicality in the banking lending decisions.

Countercyclicality capital buffer which is one of the tenets of newly introduced Basel III is also examined and its ability to lessen the effect of procyclicality in the banking sector was iterated. It is considered as the capital requirement buffer with great potentials of eliminating procyclicality in the business cycle.

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