Does securitization make monetary policy less effective?

By

Jalal Qanas & Hamid Raza

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Jalal Qanas[*]   Hamid Raza[†]

Abstract

We re-examine the role of monetary policy and its transmission mechanism through credit channel while focusing on securitisation. We empirically investigate the interactions between securitisation activities and monetary policy using using data from 1995 to 2015 for a panel of 10 European countries. We employ a panel VAR model, and estimate it using a GMM system. Our findings indicate that a contractionary monetary policy shock immediately increases securitisation activities and decreases the growth rate of traditional (non-securitised) loans. The evidence supports the argument that merely raising interest rate is not sufficient to control credit booms, but, on the contrary, may induce credit intermediation, which in turn can increase system risk. Any modern central bank should re-examine and redefine its role as a 'banker's bank' taking into consideration the future developments in shadow banking and financial innovation in order to ensure financial stability.

1 Introduction

Financial development matters. Over the last few decades the relationship between economic and financial development has been a reoccurring research theme in economics and the recent financial crisis has only made the issue more important. The increasing importance of financial sector since the 1980s has been termed as 'Financialisation' by several economists (see, Epstein (2005), Hein (2012), Onaran et al. (2011), Palley (2013) amongst others). Financialisation in general refers to the increasing dominance of the financial sector, fuelled by a rise in shadow banking activities and the introduction of new financial instruments, all of which have made the financial system more complex than ever. While there is little doubt that increased financial sophistication is closely linked with long term economic growth (Levine, 1997), the effects of excessive financialisation can be harmful and lead to negative short term and long term effects (Greenwood and Scharfstein, 2013).

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One of the most important characteristics of financialisation is the rapid growth of the financial innovations such as securitisation, which falls under the umbrella of shadow banking activities. The increasing level of securitisation played a crucial role in contributing to the recent global financial crisis Dymski (2010). Prior to the 2008 crisis, it was widely believed that financial innovation through credit intermediation and liquidity transformation had spread the risk and added stability to the system. However, from the experience of 2008 crisis, it can be argued that this process as a whole has made the entire economic system vulnerable to more serious crises in the long-run.

In contrast to the rapid developments in financial markets, the role of central banks has not evolved with the same pace, e.g., the primary objective of monetary policy is still limited to a more traditional problem of price and output stability while paying less attention to the introduction of complex financial instruments in the markets.[1] One of the main transmission channels of monetary policy is the credit channel; according to this transmission channel, contractionary monetary policy would lead to a decline in the supply of loans, thereby affecting investment in the economy.[2] However, an important question is that how effective is monetary policy in affecting the supply of loans in practice? The process of securitisation has transformed the banking model from 'originate and hold' to 'originate and distribute' Lapavitsas et al. (2010). Securitisation involves transforming illiquid assets to liquid ones, creating more liquidity but at the same time lowering lending standards, and increasing risk taking, which in turn have increased banks ability to create liquidity. Consequently, the influence of central banks in the credit markets in general has become limited. A prime example of this is Iceland, where the central bank - in the years before the crisis - responded to the credit boom by raising interest rates, which resulted in enormous bets in the currency market while having no desirable impact on the size of banks balance sheets.[3]

Given the effects of securitisation, it is therefore important to re-examine the role of monetary policy and its transmission mechanism through bank credit channel. This paper aims to address the question of whether, and how securitisation offsets the effects of monetary policy on bank balance sheets. We empirically investigate the interdependencies between monetary policy and banking activities using data from 1995 to 2015 for a panel of 10 countries. Our sample falls in the period of what is known as the 'Financialisation era'. We particularly focus on the interactions between securitisation activities and monetary policy using a panel VAR model, estimated using a GMM system. Our paper contributes to the evolving literature on the interactions of monetary policy and banks behaviour.

This paper has 5 main sections. Section 2 explains the process of securitisation while focusing on some key aspects, including the role of monetary policy. Section 3 presents data and methodology used to explore the interactions between monetary policy and securitisation activities. Section 4 discusses the results of the model. Section 5 concludes this paper.

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[1] The developments in financial markets were not the primary concern of of central banks until the 2008 crisis as will be discussed in section 2.3.
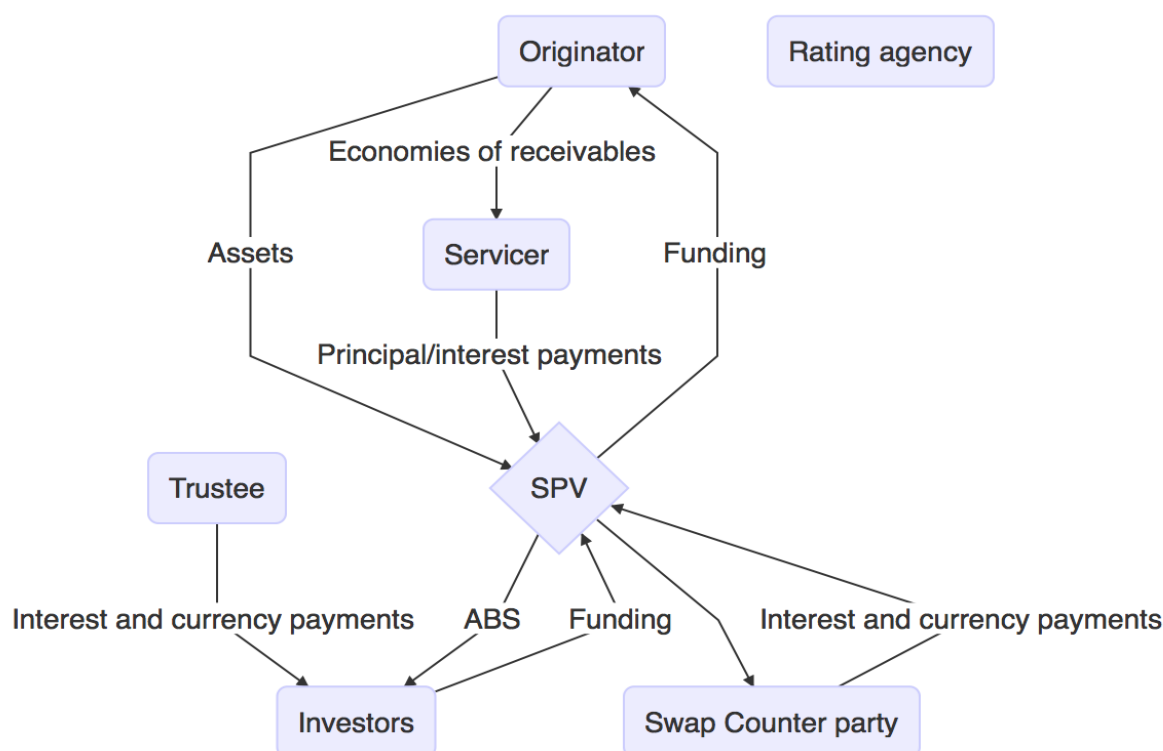
[2] see, e.g., Bernanke and Gertler (1995)

[3] On the contrary, the balance sheets of the banks continued to grow more aggressively until the eruption of the crisis.

2 What is securitisation?

The securitisation process starts when banks (originators) sell their accounts receivables, such as residential and commercial mortgages, auto loans, credit cards and student loans, which are known as 'true sale', to special purpose vehicles (SPVs). The SPVs create pools of loans and issue securities against these loans, depending on maturities and interest rates. These securities are then sold in 'tranches' (senior, mezzanine, and unrated equity tranches) to investors. At the same time, the SPVs appoint a servicer, usually banks, to collect interest and principal payments on the underlying loans (Marques-Ibanez and Scheicher, 2010). This process guarantees the separation of the underlying assets from the solvency of the originator. In this process, there are other three parties involved, the swap counterparty, the trustee, and the rating agency. The swap counterparty is usually involved to hedge the interest rate and currency risk, while the trustee ensures that i) the money is transferred from the servicer to SPV, and ii) investors are paid. Rating agencies are responsible for rating senior and mezzanine tranches using credit risk analysis.

Figure 1: Simplified securitisation process

From the perspective of banking sector, we can identify three main motives for securitisation. First, to increase liquidity and profitability, where banks sell their loans to SPVs, and obtain a lump-sum value by using off-balance sheet techniques. By doing so the banking system can obtain additional funding, and they can satisfy the demand for credit (Gorton and Pennacchi, 1995). Moreover, when banks service the securitsed loans,

they also obtain revenues from this process. Second, securitisation allows banks to transfer credit risk to SPVs and other financial institutions, and acquire funds at a lower cost. Minton et al. (2004), and Bannier and Hänsel (2008) identified that the main purpose of securitisation is credit risk transfer, as well as to serve as a new funding tool; which helps banks to be more efficient, risk sharing, and liquidity increasing. Furthermore, according to Pennacchi (1988) this process provides a lower cost method of financing for banks facing a competitive deposit market. Third, to obtain regulatory capital relief by the removal of loans from banks balance sheets, as also argued by Pennacchi (1988).

2.1 The rise of securitisation

The process of securitisation is not new. The idea can be traced backed to the 1930s in the US when the Federal National Mortgage Association was created to federally buy and sell insured mortgages. However, it was not until 1970s that securitisation developed from the residential mortgage market. The US was the first to implement this financial innovation by law, where the Government National Mortgage Association (GNMA or Ginnie Mae) has purchased mortgages loans and issued securities against these loans, to support under-capitalized regions (Kotz, 2009). The market for assets backed securities (ABS) started to develop by means of government sponsored agencies, such as the Federal National Mortgage Association, known as Fannie Mae, and the Federal Home Loan Mortgage Corporation, known as Freddie Mack. These agencies enhanced mortgage loan liquidity by issuing and guaranteeing ABS. Mortgage backed securities (MBS) in the secondary market were worth around 7.5 trillion dollars in the middle of 2008. Securitisation in the US evolved under the framework set by the Glass-Steagall Act (1933), where investment banking, commercial banking, and securities firms were separated. In 1999, this regulation was replaced by the Gramm-Leach-Bliley Act (GLBA), which allows banks to associate with securities firms, in order to accommodate the needs of the financial sector.

In contrast to the US experience, the development of asset securitisation market in Europe started in the 1990s, which was driven by a number of factors, including technological and financial innovations, the introduction of the Euro, and the rising demand for ABS. The increasing level of financial integration and the removal of exchange rate risk amongst member countries, contributed to the growth of the securitisation market (Baele et al., 2004). The growth of securitisation in the Euro area has been supported by the financial sector regulatory framework, which has adapted to the needs of this sector. For instance, with the introduction of Law 130 (1999), known as The Italian Securitisation Law, Italian financial institutions were allowed to securitise and act as SPVs. The increase in securitisation activities was different amongst Euro area countries. However, countries such Italy, Spain, Portugal, Ireland and the Netherlands have experienced a significant increase due to the rise of real estate prices. Furthermore, by 2005 commercial and residential mortgage backed securities represented approximately 68% of all Euro area securities (European Securitisation Forum, 2006).

2.2 Financial regulations and securitisation

Securitisation offers to best match market participants' preferred risk/return and holding-period profiles, and it tends to systematically underassess risk (Coval et al., 2009). The expansion of securitisation permitted deeper linkages between the major banks originating credit with non-bank financial firms in need of higher-return assets to purchase. While securitisation improved banks balance sheets and improved their profitability in the shorter run, it hid vulnerabilities that were exposed by the subprime crisis.

The increased importance of shadow banking and non-transparent financial transactions has made the credit circulation as a whole more opaque: loans that are securitised disappear from banks balance sheets, and the process is more reliant on short-term non-deposit funding (Kroszner and Strahan, 2011). Banks liquidity risk - a key source of vulnerability under regulated banking - is apparently less, although banks exposure to risk remains due to recourse risk (Dymski, 2010). Minsky has described this phase of 'Money-Manager Capitalism' with risky short term performance and behaviour that would dominate the new banking business model, rather than building a stable long term model of the overall financial sector's performance and role that serves the overall economy.

All the efforts that have been made, such as: The Dodd-Frank Act and the EU's Banking Union, and Basel Accords to avoid future crises on the basis of capital requirements that properly-structured incentives - enough skin in the game, for banks owners - are thought to be sufficient to avoid repetition of this crisis. However, a new and more comprehensive account of major big banks behaviour casts doubt on such a conclusion. The new challenging banking behaviour under opacity could not be simply controlled through new capital requirements for banks, 'skin in the game' capital standards for shadow-banking subsidiaries or affiliates, greater transparency, and more diligent reporting. Actually, most of these reforms are being implemented. But beyond these elements is the very business model itself that too big to fail banks have pursued over the last few decades. The lack of any baseline function within the broader economic system and the blind insistence on above-average rates of return are, quite simply, an explosive combination, given that the megabanks have become too-big-to-fail, and have largely resisted efforts to rein in their behaviour to date.

2.3 Securitisation and Monetary Policy

Securitisation poses a clear challenge to the effectiveness of monetary policy, as banks have become more dependent on financial market conditions than on bank deposits. Altunbas et al. (2009) used European banks data to demonstrate that securitising banks are less responsive to monetary policy. Altunbas et al. (2010) and Berger and Bouwman (2013) studied the influence of monetary policy of banks liquidity creation (on and off-balance sheet) in the US, finding that medium and large banks liquidity creation is not significantly affected by monetary policy. They found that during economic crisis banks liquidity creation is even less responsive to monetary policy. In contrast, Aysun and Hepp (2011) found that the higher the degree of securitisation, the higher the bank's responsiveness to monetary policy.

Securitisation has also affected the lending standards of banks. Diamond (1984) and Gorton and Pennacchi (1995) have pointed out that the profitability of transferring as-

sets from banks balance sheets to markets has discouraged the screening of borrowers, changing the monitoring function of banks. This is consistent with the lowering of lending standards observed in economies with a high securitisation rates, such as the US (DellAriccia et al., 2012), and with the fact that securitising banks make more loans (Altunbas et al., 2009). The lowering of lending standards is likely to increase the default rate of banks.. Similarly, Maddaloni and Peydró (2011) studied the determinants of banks lending standards in the US and Euro zone, finding that low rates for extended periods of time ('cheap money') lower lending standards regardless of borrowers creditworthiness, while increasing banks risk-taking. The latter is accentuated by the use of securitisation in a short term low interest rate environment, along with weak lending standards supervision.

It is important to highlight that the increasing dominance of global financial markets was not seen as a problem for the effectiveness of monetary policy prior to the crisis. Several famous economists were dismissive of the dangers posed by rapid growth of the financial sector in the years preceding the crisis. It was widely argued that the core objective of the central banks should only be price stability. Transparency and financial matters in the markets were not considered primary responsibilities of central banks.[4]

Ben Bernanke, the then Fed Chairman, in his speech on March 2007 at the Fourth Economic Summit, Stanford Institute for Economic Policy Research, Stanford, California argued that, "the globalisation of financial markets has not materially reduced the ability of the Federal Reserve to influence financial conditions in the United States". He further adds that it "has only added a dimension of complexity to the analysis of financial conditions and their determinants" (Bernanke, 2007).

Furthermore, Woodford states:

> "All that matters is that the Fed be able to control overnight interest rates; this gives it the leverage that it needs in order to pursue its stabilization objectives" (Woodford, 2002, p.88)

On the other hand, some economists such as Minsky, argued a long time ago that the central banks should play their 'bank of banks' role, by focusing on the banking system, financial matters and financial stability rather than inflation rate and price stability. Minsky argued that if rapid changes in the structure of the financial markets take place, then central bank actions and efficacy of monetary policy should to be re-examined (Minsky, 1957).

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[4]For example, regarding the developments in financial markets, Jurgen Stark on 15 November 2007 in his speech at Bayerischer Bankenverband, Munich states,

> "...the private sector in the case of the money market, the banks and investors that participate should recognise their own responsibilities for making the market work. They cannot and should not rely on the authorities to ensure the efficiency of trading. Rather they have to create the appropriate conditions transparency, honesty, trust among themselves."

3 Empirical analysis

3.1 Data and Methodology

To explore the efficacy of monetary policy, and understand its transmission channels through credit channel, we use annual data from 1995 to 2015 for a panel of 10 European countries (9 Eurozone countries and the UK).[5]

Figures 2–4 show some important indicators, reflecting the size and activities of the banks in the countries used in our model. The size of the financial sector relative to real economic sector (as measured by total assets to real GDP) follows an upward trend in all countries. There is also an increase in the degree of securitisation, reflected by the ratio of securitised loans to traditional loans. The rising trend before the crisis clearly reflects banks preferences for securitised loans as compared to traditional loans, which are subject to several layers of regulation. Finally, the liquidity ratio of the banks in some countries has declined whereas in some cases it has increased.
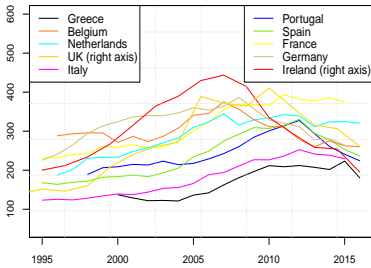

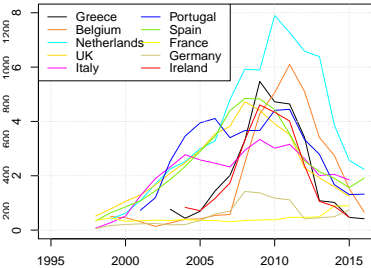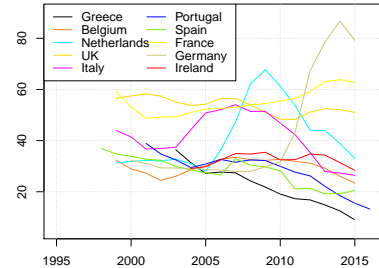Figure 2: Total assets to GDP   Figure 3: Securitised loans to Total loans   Figure 4: Liquidity ratio

We now proceed to explaining the variables used in our model. First, we construct a proxy for securitisation activities following the approach of Altunbas et al. (2009):

$$SEC = \left(\frac{SL_{i,t}}{TA_{i,t-1}} \right) 100$$

where (SL) stands for the flow of securitised lending in year t in country i, and $TA_{i,t-1}$ represents total assets at the end of the previous year. The data for securitised assets include mortgages-backed securities (MBS) and assets-backed securities (ABS). The data for securitised loans issuance are taken from Securities Industry and Financial Markets Associations (SIFMA).

Other variables included in our empirical analysis are policy rates (r) - representing monetary policy; total stock of loans (L), liquidity ratio (LIQ),[6] and real GDP (Y). The data for policy rate (r), real GDP (Y), and stock of loans (L) are taken from Eurostat.

We employ a panel VAR model, using GMM estimation technique. The implementation of a VAR model is a common practice in the literature to study the effects of

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[5]We use data from 1995-2015 for all countries except Greece (sample: 2000-2015), Ireland (sample: 2001-2015), and Portugal (sample: 1998-2015).

[6]Liquidity ratio here is defined as the ratio of liquid assets to total deposits and short term funding.

monetary policy. The Panel VAR approach that we adopt has the same advantages as the tradition VAR model used for time series analysis.

The panel VAR model can be represented as follows:

$$Y_{i,t} = \alpha_i + A(L)_i Y_{i,t-1} + \beta_i \epsilon_{i,t} \tag{1}$$

where $Y_{i,t}$ represents a vector of endogenous stationary variables for every country $(i = 1, 2, , T)$, α_i represents a vector of country-fixed effects, $A(L)_i$ is a matrix polynomial in the lag operator (L), β_i is the contemporaneous matrix of the disturbances $\epsilon_{i,t}$.

It is well-known that fixed effect estimation in a cross-sectional time-series (panel data) is inconsistent due to the presence of lags of dependent variable, resulting in a correlation between fixed effects and regressors (Nickell, 1981). In the presence of a correlation between fixed effects and regressors, the standard mean-differencing leads to biased estimates (Holtz-Eakin et al., 1988). Following Love and Zicchino (2006), we overcome this problem by adopting the GMM procedure, using the forward mean-differencing - known as the Helmert transformation. This procedure involves the transformation of all variables into deviations from forward means, which preserves the orthogonality between transformed variables and lagged regressors. The lagged regressors are used as instruments in the GMM estimation to obtain unbiased coefficients.

We obtain orthogonal impulse response functions by following a Cholesky decomposition. The ordering of our benchmark model is as follows:

$$Y_{i,t} = [ln(Y), r, ln(L), ln(LIQ), ln(SEC)]$$

Our variables-ordering is consistent with the behaviour of modern central banks. The monetary policy authorities directly respond to output fluctuations to fulfil the objective of stable economic growth. Therefore, output shocks have contemporaneous effects on output whereas policy rates affect output with a lag. Monetary policy authorities do not respond directly to credit growth in the economy whereas the banking behaviour is directly affected by monetary policy decisions. Therefore, monetary policy shocks contemporaneously affect the banking behaviour but banks behaviour in turn affects output and policy rates with a lag. Finally, our proxy of securitisation is directly affected by all variables whereas securitisation affects all variables in the system with a lag. The ordering of first two variables (i.e., real GDP and policy rates) is consistent with the vast empirical literature on the identification of monetary policy shocks in VAR models, where output precedes the policy rate (see, e.g., Christiano et al. (1996, 1999), and Mojon and Peersman (2001) amongst others). The ordering of last three variables is not addressed in the existing literature. In general, the results of Cholesky decomposition are usually sensitive to the ordering of variables, we therefore try different orders to test the sensitivity of our results, as will be discussed later.

Prior to the estimation of a VAR model, we apply several panel unit root tests. First we apply a unit root test for heterogeneous panels proposed by Im et al. (2003), known as IPS test. For completeness, we also apply Hadri (2000), Levin et al. (2002) (LLC), and Fisher-ADF test proposed by Maddala and Wu (1999). If the variables are found to exhibit a unit root, we difference them and re-test them for a unit root. The purpose of this exercise is to ensure that all variables comprising our vector $Y_{i,t}$ are stationary, which will result in a stationary dynamic VAR model.

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3.2   Empirical results

Table 1 shows the results of panel unit root tests. Overall, the results indicate that all variables except securitisation contain a unit root. The first-difference of the variables containing a unit root is found to be stationary. The construction of the proxy for securitisation is based on the flow of securitised loans, thus it is not surprising that this variable is stationary as the flow of loans (i.e., the first difference of the stock of loans) is stationary.
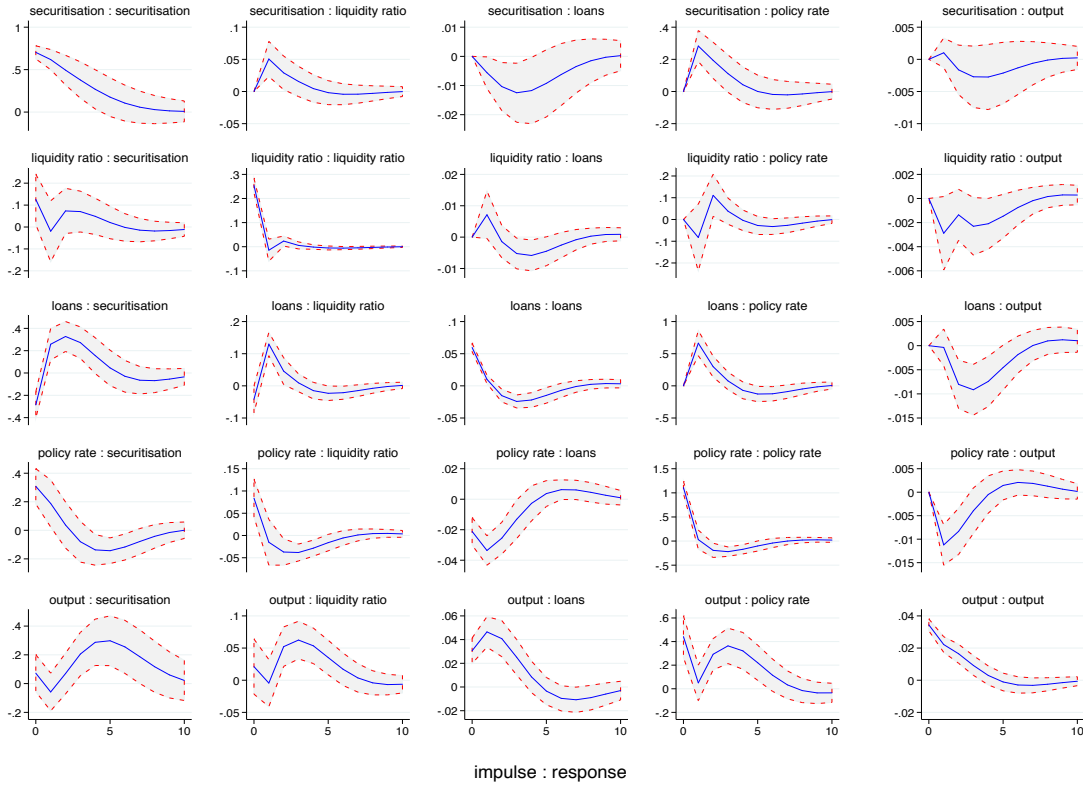
Table 1: Unit root tests

	lnY	$ln\Delta Y$	lnL	$ln\ \Delta L$	r	Δr	$lnLIQ$	$ln\Delta LIQ$	$lnSEC$
LLC	-1.509*	-4.604***	-0.967	-3.745***	-3.506***	-10.141***	-0.509	-12.653***	-3.507***
IPS	1.569	-3.927***	1.518	-2.816***	-0.855	-7.527***	-0.193	-10.709***	-2.710***
ADF	2.164	-3.767***	4.797	-2.957***	-0.805	-7.123***	-0.168	-8.974***	-2.749***
Hadri	6.953***	0.796	7.419***	5.720***	8.517***	0.803	5.719***	-0.16	2.022**

Having the variables tested for a unit root, we proceed to include stationary variables in our model and estimate a dynamic panel VAR model. We use several lag selection criteria, all indicating the inclusion of one lag in the estimation. Figure 5 shows the impulse responses obtained using a Cholesky decomposition.

We focus first on the interactions between monetary policy and the activities of the banking sector. An interesting result emerging from the model is the response of securitisation activities of the banking sector to a monetary policy shock.[7] The results indicate that a one standard deviation positive shock to monetary policy immediately increases securitisation activities. On the other hand, the growth of traditional (non-securitised) loans immediately declines in response to an increase in the interest rate. The empirical evidence here is in line with the argument that the banking sector offloads its balance sheets via shadow entities in response to monetary policy tightening. Thus monetary policy does not seem to be effective in controlling credit growth in the economy but can rather induce credit intermediation, which may further increase system risk. This finding is consistent with some of the recent studies including Kashyap and Stein (1995), Ashcraft (2006), Altunbas et al. (2009, 2010), amongst others.

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[7]The shock is defined as one standard deviation in the policy rate.
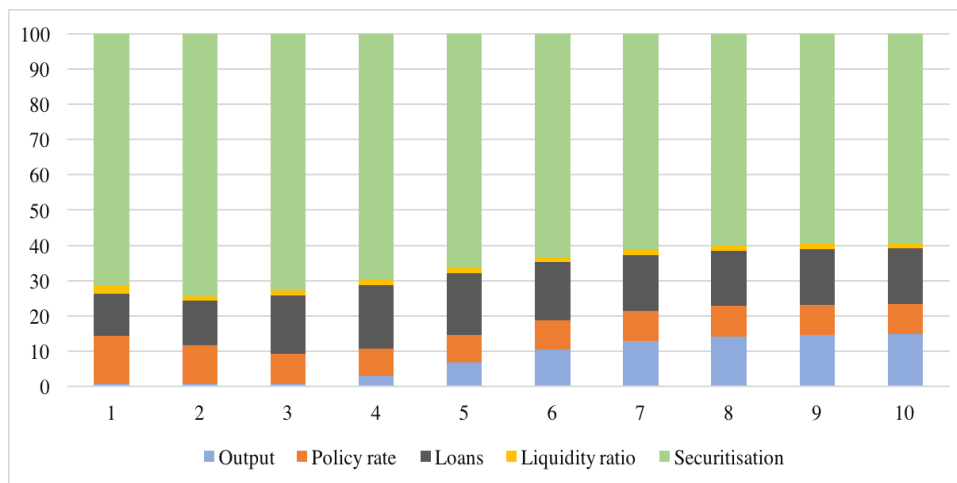
Figure 5: Impulse responses

Note: 95% confidence bands; shock is defined as one standard deviation positive movement in a variable.

Focusing on the interaction between securitisation and other developments in the banking sector, our results suggest that a shock to the growth of loans has a positive effect on securitisation, as expected. It is well-known that an increase in the size of banks balance sheets has greatly strengthened their ability to securitise loans over the last few decades. A one standard deviation positive shock to the liquidity ratio also has a positive impact on securitisation. A shock to securitisation activities in turn also raises liquidity ratio as can be seen from the impulse responses. This result is consistent with the fundamental objective of securitisation, which involves the transformation of illiquid assets into liquid ones, thereby increasing liquidity in the system. However, the same shock has a slightly negative impact on growth of traditional loans. This effect can be explained by the process involved in securitisation of loans, i.e., when the banks securitise loans, they directly reduce the stock of loans on their balance sheets. Our results are consistent with the findings of a recent study by Nelson et al. (2015), who find that in response to a contractionary monetary policy, the banks assets decrease whereas the assets of shadow banks increase due to an increase in securitisation activity, making monetary policy less effective.

Focusing on the interactions between real economic growth and the banking sector, the evidence suggests that real economic growth increases securitisation as well as loans. This result simply implies that a rise in economic activity increases the activities in the financial markets, as well-documented in the empirical literature. Finally, our results indicate that securitisation shocks have a negative but insignificant impact on real economic growth.

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Figure 6 shows the forecast error variance decomposition of securitisation. The variation in securitisation is largely explained by shocks to the growth of loans (apart from the shocks to securitisation itself). Monetary policy seems to play a minor role in explaining the dynamics of securitisation, once again calling into question the efficacy of monetary policy.

Figure 6: Forecast Error Variance Decomposition (FEVD)

Causality

Table 2 reports the results of causality, suggesting bidirectional causality in most cases. Focusing on securitisation, the evidence suggests that securitisation is caused by all variables in the model. There is also a causal feedback from securitisation to all variables with the exception of output. This implies securitisation mainly impacts the financial activities in the system, which in turn can affect real side of the economy through various channels. Monetary policy and banking sector activities have bidirectional causality with the exception of monetary policy having no causal effect on liquidity ratio.
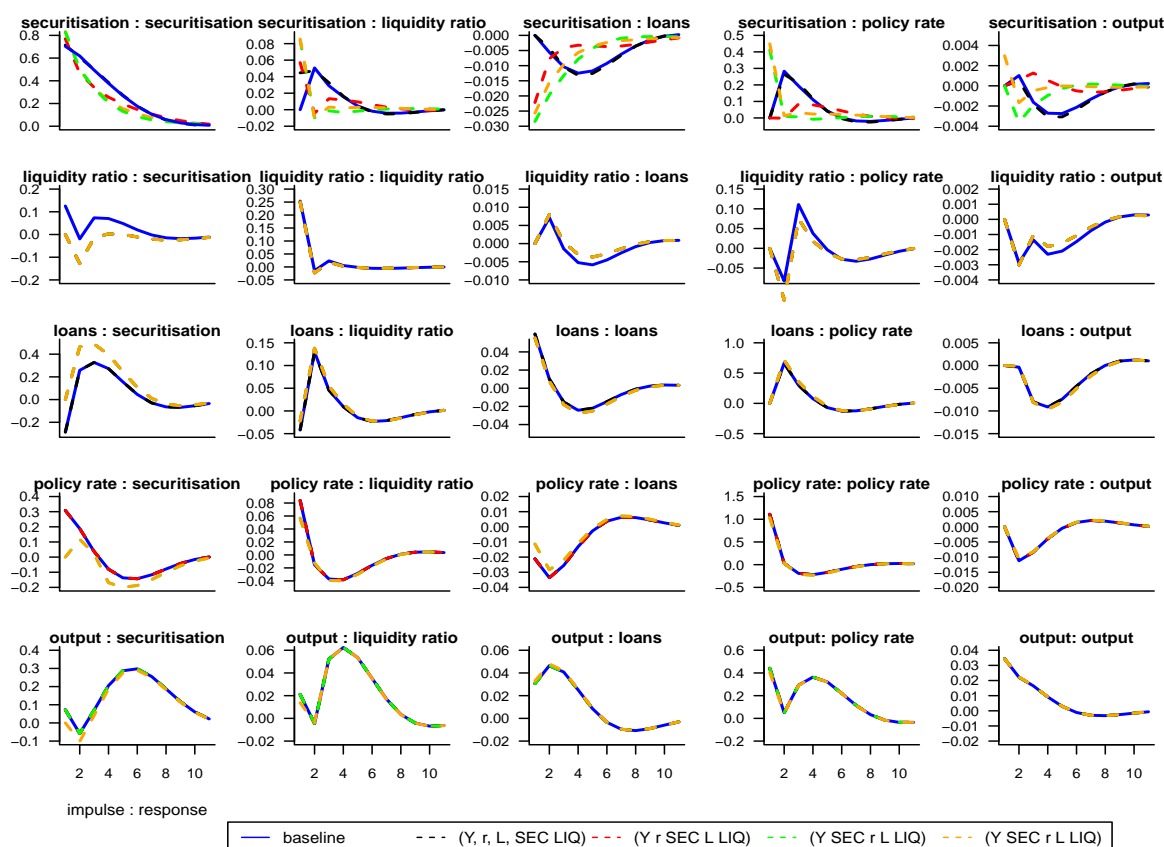
Table 2: Causality

Dependent variable	Chi-square (χ^2) statistics				
	$ln\Delta Y_{t-1}$	$ln\Delta r_{t-1}$	$ln\Delta L_{t-1}$	$ln\Delta LIQ_{t-1}$	$lnSEC_{t-1}$
$ln\Delta Y_t$	-	-0.009*** [28.32]	-0.007 [0.05]	-0.012* [3.75]	0.001 [0.72]
$ln\Delta r_t$	-12.87*** [34.85]	-	12.68*** [75.52]	-.524* [3.22]	0.40*** [32.18]
$ln\Delta L_t$	1.56*** [71.38]	-.027*** [53.88]	-	.031** [4.12]	-.007** [3.59]
$ln\Delta LIQ_t$	-2.67*** [27.01]	0.02 [0.95]	2.45*** [86.77]	-	0.07*** [13.30]
$lnSEC_t$	-12.05*** [88.06]	0.12*** [7.27]	8.18*** [145.21]	-0.51*** [6.75]	-

Note: GMM estimation

Robustness

As discussed earlier, the results of VAR models are sensitive to the ordering of variables when Cholesky identification is used. We pay considerable attention to the model sensitivities that might emerge from our ordering assumptions. In this regard, we estimate the model using various orderings. In particular, we focus on the position of our variable of interest - securitisation, which is modelled in every possible position in the VAR matrix. It is natural to expect that the shapes of impulse responses would differ due to different constraints on contemporaneous effects as can be seen in the first row of Figure 7. However, it is important to highlight that the results are quite robust to the ordering in a sense that they do not affect our overall conclusion in any fundamental way. This increases our confidence in the validity of the model.

Figure 7: Impulse responses

4 Conclusion

The increasing importance of financial sector since the 1980s has been identified as 'financialisation' by several economists. One of the most important characteristics of financialisation phenomenon is the rapid growth of the financial innovations such as securitisation. The securitisation process transformed the banking model from 'originate and hold' to 'originate and distribute', i.e., selling loans and transforming illiquid assets into liquid ones. This process creates more liquidity which allows banks to expand their balance sheets (off-balance sheets activities), issuing more loans, lowering credit standards, taking more risk, and more importantly being more independent of central banks. The securitisation process naturally calls into question the effectiveness of monetary policy through its credit channel.

This paper re-examined the role of monetary policy and its transmission channels through credit channel while focusing on securitisation. The evidence suggests that a contractionary monetary policy aimed at reducing credit, can induce securitisation activities. This in turn can increase liquidity ratio which empowers banks in expanding credit. The capability of banks to create their own liquidity in the financial market through shadow banking activities, makes them more powerful and independent of central bank action. Overall, our results imply that monetary policy is likely to be less effective for credit growth in the presence of such financial innovation.

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The securitisation model by design entails greater financial risk. The credit-creation process, funnelled through securitisation processes, prioritise asset price booms over productive credit. As Keynes argued, 'when the goal of credit issuance is not the financing of productive activities, but the creation of financial commodities, the job is likely to be highly noxious for the economy'.

There is a need for central banks to re-examine and redefine their role as a 'banker's bank', taking into consideration the future developments in shadow banking and financial innovation in order to ensure financial stability. Traditionally, the role of central banks was limited to acting as a lender of last resort, which inolved commitments to help illiquid but solvent banks. However, complex securitisation process has also changed this role; as described by Mehrling (2012) central banks are also acting as a 'dealer of last resort' where they rescue the money market positions by which the banks fund themselves, so as to protect the interwoven circuits of borrowing and lending that support derivative and repurchase-agreement positions.

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