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Diverse Outreach of Macroprudential Policy: An Indication of Policy Leak?

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Abstract

Despite increasing awareness of the importance of countercyclical policies to overcome financial system instability, the potential leak of such policies comes to attention due to economic agents' risk-taking behavior. This paper aims to investigate the potential leaks of the policy. Using the Estimator General Method of Moments-difference (GMM-diff), we found evidence that macroprudential policies are less functional in controlling non-financial firms' credit growth than household credit growth. The result amplifies hesitation about the effectiveness of macroprudential policy caused by potential leaks coming from non-financial firms' risk-taking behavior. We also found that macroprudential policy in developing countries is less effective than in developed countries. Hence, the financial stability goal cannot rely solely on macroprudential policy. Instead, it needs support from other mutual policies, such as the capital control policy and transparent regulatory boundaries, to prevent partial risk shift from regulated financial institutions to unregulated, prevalent in the less developed financial system.

Keywords:

macroprudential policies, policy leaks, household credit growth, non-financial corporate credit.

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INTRODUCTION

Financial system instability is a systemic risk that disrupts financial system processes. It happens due to the deterioration of all or part of the financial system that impacts the real sector (International Monetary Fund, 2009). The origin of systemic risk can endogenously originate from financial institutions' collective behavior that in turn spread through cross-section and time-series dimensions (Smaga, 2014). In theory, the distinction between time series and cross-sectional dimensions concerning systemic risk is clear. However, both dimensions are intertwined in practice, resulting in bidirectional causality to the systemic risk.

The procyclical nature of the financial system is the time-series dimension of the cause of systemic risk. Procyclicality mutually reinforces interaction between the financial and real sectors. These interactions will strengthen the business or economic cycle amplitude. Thus, the impact will encourage faster economic growth during a boom and weaken the economy when it comes into recession (Utari et al., 2012; Warjiyo & Juhro 2016). The financial system institution interconnectivity is the characteristic of the financial system that becomes a cross-sectional dimension of the systemic risk through contagion effect. The contagion effect is the primary mechanism by which widespread financial system instability causes the crisis to reach a systemic dimension (Constancio, 2012; Smaga, 2014). Systemic risk followed by the spread effect brings failure to the financial system. Thus, this situation raises the need for a dedicated policy as a new countercyclical policy that focuses on financial system stability as the goal. The policy aims to identify and prevent systemic risks that threaten financial system stability, reducing the economic costs of disruptions to financial services that underpin financial market performance (Bank for International Settlements, 2009).

Despite no consensus about the precise definition, macroprudential policy emerges as a significant policy framework deliberation to deal with financial system stability goals after the 2008 global financial crisis. The underlying motive is an awareness affirming that targeting stable prices is no longer sufficient as a monetary policy framework without stability in the financial system itself. Maintaining solely on price stability often ignores potential risks arising from macroeconomic interrelationships within the system leading to an economic bubble where the asset price is too high, leading to a high deviation of the nominal from its actual price. When the bubble bursts, systemic risk arises, and financial system instability emerges as a problem (Bank Indonesia, 2016). Therefore, the 2008 crisis opened up the awareness of economists and policymakers that targeting financial system stability is as critical as targeting price stability because financial system instability will disrupt macroeconomic stability, although inflation is maintained (International Monetary Fund, 2013). Thus, the macroprudential policy emerged as a framework for maintaining financial system stability by restricting and reducing systemic risk (Vinals, 2011).

The nexus between macroprudential policy and financial stability typically works through bank lending channels. Given the significant role of the credit channel in the

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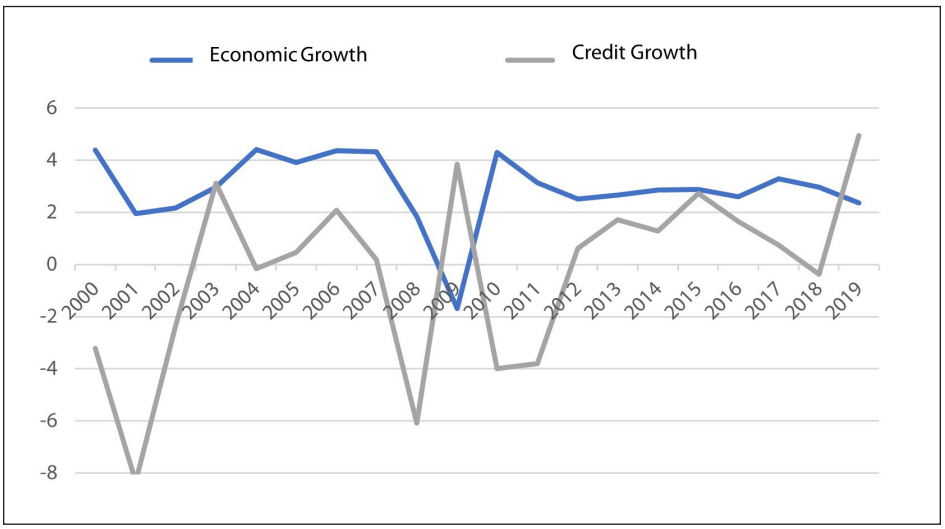
transmission mechanism of the monetary policy, financial volatility often diverges from growth volatility. Figure 1.1 shows credit growth and economic growth volatility, where credit growth is much more volatile than economic growth. The figure also shows that credit growth and economic growth are likely decoupled as each has its nature once the credit bubbles occur. Therefore, controlling excessive credit growth lies at the center of macroprudential policy. Credit growth can have sound and detrimental effects on the economy simultaneously since credit will help increase economic growth, and at the same time, excessive credit growth will disrupt financial system stability. Thus, macroprudential policies are expected to stabilize the financial system by controlling excessive credit growth.

Figure 1. Comparison of World Credit Growth with World Economic Growth (Percent)



Source: World Bank (2020)

Several empirical investigations revealed that macroprudential policies effectively maintain the financial system's stability. For example, Akinci & Olmstead-Rumsey (2018) and Fendoğlu (2017) showed that macroprudential policy instruments such as Loan to Value, Capital Requirements, and other housing measures effectively control the credit growth of the household sector. In other words, macroprudential instruments related to credit and capital requirements are very helpful in controlling credit growth in the economy. In addition, Lee et al. (2016) also found evidence that macroprudential policies can promote financial stability in Asia, where different macroprudential policies are proven effective for different types of macroeconomic risks.

On the contrary, several investigations showed that macroprudential policies were less comprehensive in controlling financial system stability caused by credit segregation, resulting in less effective policy outcomes. Open access to non-bank financial providers beyond the outreach of macroprudential policy provides companies with choices to access loans from the banking sector and non-bank financial services providers at the same time. Hence, when the banking sector's access is tightened, the access is switched to

other financial providers, including foreign sectors (Dumičić, 2018). The nature of the corporate sector's risk-taking behavior enables them to access loans from various sources from domestic and foreign banks, non-bank financial institutions, or shadow banking, resulting in less effective macroprudential policy to achieve financial system stability (Cerutti et al., 2015; Dumičić, 2018; Gebauer & Mazelis, 2019; Hodula & Ngo, 2021)

Another cause of the ineffectiveness was the more emphasis of the policy to target household sector credit rather than the credit to the corporate sector. For example, Cerutti et al. (2015) showed that although the credit in both sectors gets into the outreach of macroprudential policy, the policy approach to control credit growth in the household sector is more prevalent than the corporate sector. Similar evidence was demonstrated by De Schryder & Opitz (2021), in which a typical macroprudential policy tightening shock reduces bank credit and household credit, while the non-financial corporations and total credit, however, do not react significantly.

Different types of credit respond differently to the macroprudential policies, strengthening the conjecture that macroprudential policies in practice are leaking, resulting in the less effective policy to achieve financial system stability. Moreover, the leakages inherently characterize the policy in practice by imperfect regulation enforcement, whether due to shadow banking, regulatory arbitrage, or other regulation circumvention schemes (Bhargava et al., 2018).

While credit growth has been firmly accepted as an operational target of macroprudential policy and given the inherent leakages, many countries employ various policy instruments according to the prevailing conditions depending on the economy's financial cycle and economic resilience. As a result, while developed countries sufficiently adopt borrower-based instruments as standards such as loan to value (LTV) and debt to income ratio (DTI), emerging economies complement them with extra instruments. The complementary instruments include exchange rate-related policy to respond to exchange rate fluctuation sensitivity (Cerutti et al. 2015; Ahnert et al. 2021)). Another complementary feature is capital control policy to respond to systemic vulnerability due to low domestic interest rates and strong capital inflows, especially in economies with controlled exchange rates (Zhang & Zoli, 2016).

This paper aims to provide insights in twofold; first, investigating empirical evidence that there is less effective policy due to cross-sectoral dimensions between household sector loans and non-financial corporate loans. As mentioned earlier, the nature of the risk-taking behavior of the corporate loan causes the outreach of macroprudential policy to be less potent on corporate loans than household loans. Second, while existing empirical literature did not emphasize the different nature of economic resilience and prevailing financial cycle in diverse policy outcomes between developed and developing economies, this paper verifies that economic resilience and prevailing financial cycle result in diverse policy outcomes between developed and developed and developing economies.

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METHODS

For the empirical investigation, we employ the General Method of Moments Difference *(GMM-Diff)* method for the dynamic panel data across 38 countries for ten years of observation, from 2007 to 2016. The policy measure involves credit-related instruments and capital-related instruments sourced from Integrated Macroprudential Policy *(iMaPP)* (Alam et al., 2019). The Credit-related mechanisms involve Loan-to-value *(LTV)* limit, Debt-service-to-income *(DSTI)* limit, Loan loss provisions *(LLP)*, and Loan Restrictions *(LoanR).* The Capital Requirement *(CR)* limit represents the capital-related instruments. In addition, we deploy economic growth and interest rate for the macroeconomic predictors to the credit growth of household sector loans and non-financial corporate loan. The empirical model is as follows:

$$CG_{it} = a_0 + \beta_1 CG_{it-1} - a_1 CMP_{it} - a_2 KMP_{it} + a_3 EG_{it} + a_4 IR_{it} + u_{it} \qquad (1)$$

where *CG* denotes credit growth, *CMP* and *KMP* denote credit-related and capital-related policies, respectively; *EG* denotes economic growth, and *IR* is the interest rate. Finally, the empirical model equation (1) is deployed to separately estimate household loans growth and non-financial corporate credit growth against explanatory variables.

We deploy the Arellano-Bond test to cope with autocorrelation issues for the GMM estimate. It is worth mentioning that these estimators are consistent if there is no second-order serial correlation for the idiosyncratic errors of the first-differenced equation (Baltagi, 2005). Furthermore, the issue of the over-identifying restriction is tested using Sargan and Hansen test to ensure that the instruments correlate with endogeneous regressors and, at the same time, are orthogonal to the error term (Baltagi, 2005).

RESULT AND DISCUSSIONS

The Arellano-Bond for AR (1) and AR (2) indicates that the coefficients are not statistically different from zero with (α = 5%) indicating that there was no autocorrelation problem. The Sargan and the Hansen test results show that the coefficients are not statistically different from zero (α = 5%). With full sample observation, the Hansen test for non-financial corporate credit growth indicates that the coefficient is statistically different from zero (α = 5%). This is nothing to worry about because, in a two-step estimation, the value from Sargan is sufficient to ensure the instrument's validity (See Roodman, 2009).

Table 1. Specification Test

Specification Test		Household Credit Growth			Non-financial Corporate Credit Growth		
		All Countries	Developed Countries	Developing Countries	All Countries	Developed Countries	Developing Countries
Serial correlation	AR (1)	0.022	0.001	0.071	0.053	0.009	0.231
	AR (2)	0.273	0.183	0.351	0.354	0.311	0.295
Sargan test	*chi-squared*	0.244	0.286	0.996	0.101	0.818	0.843
Hansen test	*chi-squared*	0.257	0.296	0.973	0.032	0.524	0.567

Table 2 shows estimation results for household credit growth. The results indicate that tightening credit-related macroprudential instruments by one point will reduce household credit growth by 12.77% for the entire observation. However, when the sample was split into developed and developing countries, the results indicate that tightening credit-related macroprudential instruments in developing countries is stronger than that in developed countries. As a result, contraction one-point credit-related macroprudential instruments will reduce 12.11% household credit growth in developing countries and 3.83% in developed countries.

Table 2. Difference GMM Estimator Result on the Household Credit Growth Model

Variables	Dependent Variable: Household Credit Growth		
	All Countries	**Developed Countries**	**Developing Countries**
Credit Growth			
Household Credit (t-1)	0.5775378*	0.1404395	0.2869947
	(0.2513077)	(0.0867568)	(0.2981133)
Macroprudential Policy			
Credit-related Instrument	-12.77488*	-3.832094*	-12.1131*
	(5.935017)	(1.803127)	(6.734246)
Capital-related Instrument	-51.49703*	2.876703	-19.80134***
	(25.43906)	(3.610149)	(7.253431)
Macroeconomic Variebles			
Economic Growth	-1.093638*	-1.91815***	-1.512709
	(0.5672463)	(0.5029341)	(2.453654)
Interest Rate	-4.925922*	-3.19901***	-20.66754***
	(2.213365)	(0.9768783)	(4.707909)
Wald-stat	16.99***	35.40***	49.23***
Observations	304	208	96
Observations per group	8	8	8
Instruments	16	8	8
Groups/countries	38	26	12

Notes: (i) respectively, the signs ***, ** and * describe the significance level at 1%, 5% and 10%; (ii) standard errors are in parentheses; (iii) estimation result of two-step difference GMM

Similar to the effect of credit-related instruments on credit household growth, capital-related instruments have the same direction effect for full sample. Contraction capital-related instruments by one point reduces household credit growth by 51.49% for full observation. Similar to credit-related tools, the impact of capital-related policy tools on household credit growth in developing countries is vigorous, with a coefficient of -19.80, which means that tightening the capital-related instruments by one point, reduces household credit growth by -19.80%. On the contrary, contracting capital-related policy tools intensifies household credit growth in developed countries. The opposite effect of capital-related policy tools in developed countries is not surprising

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since developed countries tend to use macroprudential instruments related to credit, especially housing loan-related tools such LTV and DSTI. Therefore, the capital-related tools appear irrelevant. Even instead of withholding the credit growth, tightening capital-related policy tools will have a credit-escalating effect as a response to cyclical response policy behavior (See Akinci & Olmstead-Rumsey, 2018).

Table 3 shows the estimation results for non-financial corporate credit growth in response to the macroprudential policy. The results indicate that both credit-related and capital-related policy tools have no significant effect on the credit growth of non-financial companies for the entire observation. These findings catch the eye of interest in terms that while credit and capital-related policy tools appear to influence household credit growth effectively, both policy tools fail to control non-financial corporate credit growth. The nature of corporate risk-taking behavior allows them to maintain their risk appetite even when the policy is tightened. Moreover, access to various financial sources, including the international market, gives them extensive alternative financial sources other than banks' credit (Dumičić, 2018). Due to the tightened macroprudential policy in developing countries, higher domestic interest rates will induce a higher interest rate differential. Hence, international loans are more attractive than costly domestic credit. Therefore, the tightened macroprudential policy will generate capital inflows in open economies. As a result, tightened macroprudential policy is not responded to by the corporate credit growth.

Table 3. Difference GMM estimator result on Non-financial companies credit growth model

Variables	Dependent variable: Non-financial companies Credit Growth		
	All Countries	**Developed Countries**	**Developing Countries**
Credit Growth			
Corporates Credit (t-1)	0.3933481	-0.2103845	0.572521
	(0.2672726)	(0.3179125)	(0.5601161)
Macroprudential Policy			
Credit-relatedInstrument	-9.086119	-2.385529	-5.231412
	(6.906179)	(17.64847)	(10.02006)
Capital-related Instrument	-16.19439	-38.06551*	-14.31706
	(20.60767)	(21.99496)	(12.21551)
Economic Growth	-0.2354812	-1.374152*	-1.577132
	(0.4593345)	(0.5378151)	(2.310256)
Interest Rate	-1.754092	-0.5865443	-6.269625*
	(1.213816)	(1.92258)	(3.70663)
Wald-stat	16.90***	26.63***	43.52***
Observations	304	208	96
Observations per group	8	8	8
Instruments	16	9	8
Groups/countries	38	26	12

Notes: (i) respectively, the signs ***, ** and * describe the significance level at 1%, 5% and 10%; (ii) standard errors are in parentheses; (iii) estimation result of two-step difference GMM.

However, splitting the observation into developed and developing countries reveals that capital-related policy instruments in developed countries appear to be statistically significant in withholding non-financial corporate credit growth. While capital-related policy fails to control household credit growth in developed countries effectively, the tools impact non-financial credit growth. Unlike developing emerging economies, capital requirements

We deploy economic growth and money market interest rates as control variables in the model. Economic growth is a proxy for fundamental determinants of credit growth, and interest rate represents credit prices. Remarkably, the results show that the coefficient of the economic growth variable is negative for household credit and non-financial corporate credit growth. While the results do not correspond to the typical positive relationship between credit growth and economic growth, this has augmented the creditless recovery hypothesis. After the crisis marked by a credit boom, economic growth and bank credit expansion experienced an anomaly relationship or even decoupled (Takáts & Upper, 2013).

More profoundly, the phenomenon of creditless recoveries is explained through Abiad et al. (2011), in which economic growth without credit growth is prevalent in a situation after a crisis. In this situation, credit recovery is preceded by the disruption of credit supply, such as banking crises, credit booms, and real estate boom-bust cycles. Therefore, credit recovery results in lower output growth, and investment has a disproportionately lower contribution to output growth than average recovery.

Money market interest rates as a whole had an impact on the decline in credit growth for households and non-financial companies in all countries, both in developed and developing countries. However, interest rates appear to have a minor impact compared to macroprudential policies in controlling credit growth. In this case, it can be said that macroprudential policy is more robust than monetary policy (Cerutti et al., 2015). In controlling the growth of household credit, it can be seen that the interest rates on financial markets in both developed and developing countries have a statistically significant effect on the decline in household credit. However, things are different in the effect of interest rates on the credit growth of non-financial companies. For example, a 1% increase in interest rates will reduce credit growth for non-financial companies by 6.26%. In contrast, the estimated interest rates in developed countries will have no effect on credit growth for non-financial companies. This is again explained by Cerutti et al. (2015) that this may occur because developed countries have more sophisticated financial systems to offer other alternatives as funding sources to replace bank credit.

CONCLUSION

The paper has shown a different response to the macroprudential policy regarding household credit and non-financial corporate credit growth. While household credit growth is sensitive to the policy, non-financial corporate credit growth is not. This finding has opened the eye to the suspicion that although the macroprudential policy

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is critical to control financial stability via credit channels, the outreach has not been comprehensive, leading to policy leakage. This finding should concern the Central Bank because of the policy effectiveness anxieties in achieving the financial system stability goal. This policy leak results from the nature of corporate risk-taking behavior in response to tightening policy.

Moreover, open access to finance, including international finance, allows corporate to switch from domestic finance to international finance when domestic credit policy is tightened. There needs to be a balance that countries worried about capital leakage should accompany macroprudential policy with capital control policies. Lastly, the clear regulatory boundary and its impact on aggregate welfare are required to deal with partial shift risk from the regulated sector to the unregulated one, particularly in the dualistic financial industry countries.

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