

Stylised facts on the effectiveness of macroprudential policy*



By Pedro Duarte Neves (Banco de Portugal)

JEL codes: E65, G28, G51.

Keywords: macroprudential policy, borrower-based measures, lender-based measures, credit growth.

This policy note summarises the main empirical findings on the effectiveness of macroprudential policy: macroprudential policy contributes to a stronger and less volatile growth and is more effective in tightening than in easing episodes; borrower-based instruments are more effective in moderating credit growth, whereas lender-based instruments are more effective in increasing bank resilience; combinations of different types of instruments contribute to a more effective macroprudential policy; macroprudential policy produces important distributional effects and it is subject to regulatory arbitrage and circumvention.

*This policy note should not be reported as representing the views of Banco de Portugal. The views, opinions and conclusions expressed in this policy note are those of the author and do not necessarily reflect those of the Banco de Portugal or the Eurosystem.

Introduction

Macroprudential policies have been widely used since the great financial crisis. This policy note proposes a summary of the key empirical findings on the effectiveness of macroprudential policy, for both advanced economies (AEs) and emerging market and developing economies (EMDEs), drawing on 30 papers published over the last decade, one third of which in 2023. Empirical literature shows effectiveness of macroprudential policy in containing credit growth, as well as in building resilience in banks and households.

Macroprudential policy targets specific financial vulnerabilities and builds ex-ante resilience to face adverse economic shocks. Borrower-based instruments – like Loan-to-Value (LTV), Loan-to-Income (LTI), Debt Service-to-Income (DSTI), maturity limits, and amortisation requirements – affect lending conditions in a way that reflects the riskiness of loans. These tools contribute directly to the resilience of borrowers, as individual probabilities of default are reduced, and indirectly to the resilience of banks, as the quality of the mortgage loan portfolio reflects more prudent lending standards. Lender-based measures – like Countercyclical capital buffer (CCyB), institution specific buffers (O-SII and G-SII), systemic risk buffer (SyRB), risk weights, and LGD floors – correspond to regulatory requirements that apply to financial institutions. These tools increase the loss absorption of banks and therefore increase their resilience directly.

The effectiveness of macroprudential policy: the main empirical findings

This Policy Note presents 10 stylised facts on the effectiveness of macroprudential policy.

Fact 1: Macroprudential policy is associated with stronger and less volatile long-term economic growth

Boar et al (2017) show, for AEs and EMDEs, that non-systematic macroprudential intervention – which corresponds to ad hoc policy measures rather than systematic policy action – tends to produce a less favourable combination of GDP growth and GDP volatility, highlighting the benefits of a well-established macro-prudential framework. Countries that use macroprudential tools more frequently tend to have stronger and less volatile GDP growth, particularly those with lower degrees of financial development and openness of the economy. Kim and Mehrota (2019), likewise for AEs and EMDEs, reach similar conclusions: effects on credit are stronger in economies with a lower degree of financial intensity, lower debt levels, more closed, and with less flexible exchange rate regimes. Bergant et al (2023) conclude, for EMDEs, that macroprudential action dampens the impact of global financial shocks, but with decreasing marginal effects: at higher levels of macroprudential intervention further tightening becomes less effective. The paper provides evidence that macroprudential policy reduces volatility: a higher level of macroprudential action supports (limits) GDP when global finance shocks are adverse (favourable).

Empirical evidence suggests that macro-prudential policy tends to produce negative effects on short-term economic activity but that long-term gains – in terms of higher GDP growth and lower GDP volatility – compensate possible short-term losses. See, for instance, Araujo et al (2020) and Kim and Mehrota (2019). Ampudia et al (2021) conclude, for a sample of European Union (EU) countries, that macroprudential action has a positive impact on long-term growth, translated into longer expansions and shallower recessions.

Galán (2020) provides a description of the effects of macroprudential policy on the quantiles of GDP growth, through a growth-at-risk approach. The paper shows, for a sample of AEs and EMDEs, that macroprudential policy affects the shape of the GDP growth distribution by reducing GDP volatility: the incidence of its left-skewness is reduced and, in parallel, there is a compensating impact on the right tail. Fernández-Gallardo et al (2023) conclude, for a sample of AEs, that tighter macroprudential policy reduces the volatility of GDP growth – by mitigating the incidence of the left tail of GDP distribution – through a reduction in the density of the right tail of credit growth distribution.

Fact 2: Macroprudential policy is more effective in tightening episodes than in easing episodes

The preventive nature of macroprudential instruments means that they are more efficient in the building phase of the financial cycle. This result holds for both AEs and EMDEs. Araujo et al (2020), drawing on meta-analysis techniques, find that tightening actions have stronger impact than loosening ones, as they are more likely to impose binding constraints on economic agents. Cerutti et al (2015) present evidence that macroprudential policy works better in booms than in busts. Bhargava et al (2023) also provide evidence supporting policy interventions at the early stages of the credit cycle.

Altunbas et al (2017) conclude, for AEs and EMDEs, that macroprudential policies are more effective in tightening than in easing episodes. The inclusion of bank-specific characteristics reinforces this conclusion, documenting the fact that macro-prudential policies produce heterogeneous effects. Kim and Mehrota (2019) show that macroprudential shocks have greater effects on real GDP – and not on credit – when the stock of debt is higher, as the existing financial vulnerabilities make the economy more sensitive to shocks.

Gambacorta and Murcia (2017) conclude that tightening borrower-based measures provides much rapid effects on credit growth than policies aiming at fostering banking resilience. Brandao-Marques et al (2020) find that tightening lender-based measures is more effective when credit is lower relative to GDP, whereas when credit relative to GDP is already at a high level, tightening borrower-based measures is more effective. Valderrama (2023) claim that when interest rates increase from low levels exposing borrowers' vulnerabilities, increases in capital buffers should be considered, particularly if banks' profitability has augmented and if there is no risk of impairing credit supply.

Galán (2020) finds that the impact of macroprudential policy depends on the phase of the financial cycle and on the specific policy tool. Tightening capital measures in an expansionary phase of the financial cycle may take up to two years to produce effects, whereas borrower-based measures produce results over a more reduced horizon. Loosening lender-based measures in the downturn produces results in a short period of time, whereas the impact of borrower-based measures is extremely limited.

These papers reinforce the message that macro-prudential policy is meant to have mostly an ex-ante nature – a preventive role – helping to contain credit expansion in a boom, as macroprudential policy is more difficult to conduct when indebtedness levels are (very) high and growth is slow.

Fact 3: The effectiveness of macroprudential policy increases when reinforced by monetary policy, particularly for EMDEs

Monetary policy conditions affect the effectiveness of macroprudential instruments. Bruno et al (2017) conclude, for a sample of Asia-Pacific economies, that macroprudential policies are more effective when they complement monetary policy - that is when there are two tightening actions – than when they act in opposite directions; when those policies work in opposite directions economic agents are told, at the same time, to borrow more and to borrow less. Gambacorta and Murcia (2017) present evidence, for AEs and EMDES, that macroprudential policy has a greater effect on credit growth when monetary policy works in the same direction: the effects on credit growth are larger if both policies are tightened (or if both are eased). They provide a survey on the interaction of monetary and macroprudential policies, supporting the prevailing view that the two policies function better when they are complementary rather than substitutes. Bergant et al (2023) claim that stringent levels of macroprudential intervention allow for a countercyclical monetary policy (i.e. reduction of policy intervention rates) when global financial conditions become more adverse. Biljanovska et al (2023) conclude that tightening monetary and macroprudential policy simultaneously has a stronger impact on credit among EMDEs, particularly when credit is growing strongly. They do not find evidence of such reinforcing effects in AEs.

Fact 4: Macroprudential policy may have unintended consequences, as regulatory arbitrage and circumvention

Macroprudential policies are subject to regulatory arbitrage corresponding to either a credit shift at national level from the regulated banking sector to the unregulated financial sector, or to a shift from the domestic financial sector to foreign financial players. Cerutti et al (2015) show, for a sample of AEs and EMDEs, that the use of macroprudential measures can be associated with relatively larger cross-border borrowing, highlighting the presence of regulatory arbitrage. Poghosyan (2019) finds evidence of a shift to non-bank credit and/or to foreign branches, as tightening measures are adopted. Araujo (2022) presents statistically significant evidence of leakages and spillovers – defined respectively as having a national or a cross border dimension – contributing to a reduction in the effectiveness of macroprudential policy. Kim and Mehrota (2019) argue that international leakages are a likely explanation for stronger responses to macroprudential tightening in more closed economies.

Circumvention corresponds to risk-shifting in reaction to macroprudential measures. Bhargava et al (2023) conclude that risk-shifting leakages from an unexpected tightening of borrower-based measures are quantitatively material: they result in lending shifts from the household sector to corporates and, in addition, the risk profile of corporate credit increases. Acharya et al (2020) also conclude that the imposition of borrower-based measures on housing credit tends to increase risk taking by banks that are more affected, through increases in corporate credit and securities holdings.

Valderrama (2023), drawing on the European experience, presents a list of possible unintended consequences of macroprudential policy and proposes design solutions for macroprudential instruments that could minimise these distortions.

Fact 5: Borrower-based measures are effective in reducing credit growth and increasing resilience of borrowers

Akinci and Olmstead-Rumsey (2015) show, for AEs and EMDEs, that targeted policies for housing credit are more effective to contain credit growth. Ampudia et al (2021) show, for a sample of EU countries, that borrower-based measures are effective in increasing the resilience of borrowers, as they contribute to a reduction of defaults and leverage. Giannoulakis et al (2023) show, for a sample of EU countries, that borrower-based measures improve the resilience of borrowers and increase the quality of bank portfolios, therefore contributing to higher solvency of the banking sector.

Alam et al (2019) find, for a sample of AEs and EMDEs, statistically significant evidence on the impact of LTV limits on household credit. Moreover, they find evidence of non-linear effects, as the impact tends to decline when LTVs are further increased. Biljanovska et al (2023) also find non-linear effects, characterised by diminishing effects with increasing tightening. Galán (2020) concludes that tightening borrower-based measures produces very fast results, whereas loosening action does not produce visible results in the short term.

Evidence of the effects on housing prices is less conclusive: Akinci and Olmstead-Rumsey (2015) and Poghosyan (2019) find a statistically significant negative effect, whereas Cerutti et al (2015) do not find such an effect. Poghosyan (2019) finds that, for a sample of EU countries, borrower-based measures are effective in curbing house prices and credit, even if the peak of the impact takes three years to materialise. The paper presents two other findings: legally-binding measures are more effective in curbing house prices and credit than recommendations; and measures that are accompanied by non-compliance sanctions have a stronger effect on housing prices and credit than measures that do not have associated sanctions.

Macroprudential policy is more effective in reducing household credit than corporate credit: Cerutti et al (2015) show that the use of macroprudential measures has statistically significant mitigating effects on credit developments, estimated to be larger in EMDEs than in AEs, and stronger for household credit than for corporate credit; Akinci and Olmstead-Rumsey (2015) find that macroprudential tightening is associated with lower bank credit growth and lower housing credit growth; Kim and Mehrota (2019) also conclude that macroprudential policy mostly affects residential investment and household credit.

Fact 6: Tighter lender-based tools are effective in increasing bank resilience

Altunbas et al (2017) show that, for both AEs and EMDEs, macroprudential tools have a significant impact on bank risk: tightening reduces bank risk and, as a result, the probability of default. This means that risk-taking by banks is affected by macroprudential policies. Capital-based tools induce institutions to accumulate capital in upturns, such as they may be reduced during the downturns. Brandao-Marques (2020) conclude, also for AEs and EMDEs, that lender-based tools are particularly useful in building resilience when financial vulnerabilities remain moderate. Ampudia et al (2021) show, for a sample of EU countries, that tighter capital regulation is effective in reinforcing bank resilience, through a reduction on bank leverage and on the probability of bank default.

Fact 7: A combination of macroprudential instruments – borrower-based and lender-based – provides synergies and contributes to a more comprehensive coverage of risks for financial stability

Lo Duca et al (2023) provide a comprehensive description of interactions between policy instruments for the euro area, concluding the following: (i) combinations of borrower-based tools increase the effectiveness of macroprudential policy through enhancing the resilience of the household sector and, indirectly, of the banking sector; (ii) combinations of lender-based tools contribute, directly, to a more resilient banking sector, reducing scope for circumvention (either through ‘risk-weights optimisation’ or ‘risk-shifting effects’); (iii) combinations of borrower-based and lender-based measures contribute to address the main vulnerabilities of the financial sector in a more comprehensive way. Valderrama (2023) presents a framework, with a focus on the housing market, to measure the effectiveness of borrower-based and lender-based macroprudential tools and explicitly modelling the interactions between them.

Fact 8: Counter-cyclical macroprudential instruments are effective in mitigating pro-cyclical effects on credit

The COVID-19 pandemic constituted a natural experiment to assess the impact of the relaxation of macroprudential buffers on credit supply. Avezum et al (2021) conclude, for a sample of EU countries, that the use of counter-cyclical macroprudential tools, through the release of the CCyB and SyRB buffers, contributed to a reduction in the procyclicality of credit to households, and, to a minor extent, for small businesses’ purposes (only in the case of the CCyB). No such effect was found for consumption loans. Goel et al (2021) also conclude that the release of the CCyB, in the UK case, has a positive effect on mortgage credit, particularly for less capital constrained banks.

During the Covid-19 crisis, macro-prudential authorities took varied measures on dividend policies aiming for capital conservation. For instance, the ECB issued a recommendation for banks to refrain from discretionary dividend payments and share buy-backs. There is ample evidence that this recommendation mitigated the occurrence of procyclical adjustments.

Martínez-Miera and Vegas (2021), drawing on a sample of Spanish banks, concluded that banks that limited dividend distribution extended significantly more credit to non-financial corporations than banks that did not limit dividend distribution. Dautovic et al (2021) find similar results for a sample of euro area banks, concluding that the recommendation was effective in mitigating the procyclical adjustment of banks. Banks that followed the recommendation supplied more credit and accumulated more provisions, when compared to banks that did not follow the recommendation. This was particularly the case for banks that exhibited capital levels above the combined buffer requirement by a comfortable amount. Dautovic et al (2023) concludes that dividend measures supported credit to financially constrained firms (particularly small and medium-sized ones) and that there was no significant increase in credit to riskier firms (including “zombies”).

Fact 9: Macroprudential policy tends to be more binding for weaker banks (in terms of capital, liquidity, or profitability)

Altunbas et al (2017) present evidence, for both AEs and EMDEs, that the impact of macroprudential instruments on banks is conditional on idiosyncratic characteristics: banks that are smaller, with higher reliance on wholesale funding, with low liquidity buffers or that are weakly capitalised react more strongly to changes in macroprudential instruments. Cantu et al (2020), for a sample of Asia-Pacific countries, conclude that larger banks and banks with a stronger liquidity position are less sensitive to macro-prudential action. Goel et al (2021), taking the G-SIBs as case study, conclude that banks with lower profitability and closer to capital regulatory thresholds are more reactive to policy measures.

The COVID-19 pandemic provided insightful indications as to how banks with different characteristics react to macroprudential policies. Mathur et al (2023) show, for the UK, that banks which are more constrained in terms of capital presented, in comparison with banks with stronger capital positions, higher loan rates, lower loan values, and lower risk-taking capacity. Couaillier et al (2022), for the euro area, conclude that banks closer to the Maximum Distributable Amount (MDA) trigger provided lower lending supply during the COVID-19 period than banks further away from the MDA. The procyclical reaction of banks facing binding restrictions (as indicated by proximity to the MDA trigger) caused credit constraints to firms more exposed to those banks, which constitutes an unintended consequence of the capital framework.

Fact 10: Macroprudential policy produces relevant distributional effects for households

Borrower-based tools affect households differently. Acharya et al (2020) conclude, drawing on the Irish case, that mortgage credit is reallocated from low to high income borrowers, as the regulatory lending limits tend to be more binding for the former; this new allocation across the income distribution weakens the effect of credit on housing prices. Giannoulakis et al (2023) conclude, for a sample of EU countries, that borrower-based measures have considerable distributional effects: reductions in probabilities of default are stronger for households below the medians of income and net wealth distributions.

Biljanovska and Chen (2023) provide, for a sample of EU countries, evidence on differential effects of lender-based instruments. They consider two different instruments: levies/taxes imposed on the asset size and capital requirements. These instruments treat risk profiles differently, as they target assets and risk-weighted assets, respectively, and have different effects on the amount of loans across the household distribution. Higher levies/taxes increase the cost of lending which is likely to be passed through a higher loan rate. As these instruments do not differentiate the risk of borrowers, they tend to affect high-income households more, as higher borrowing costs are compensated by lower loans. The paper claims that the reverse happens when borrowers are differentiated by risk type, as lenders tend to limit their exposures to riskier mortgages (low-income households).

Conclusions

Better understanding of how macroprudential tools function at current (close to all-time highs) levels of corporate and household debt as well as on their distributional effects stand as key priorities for further research. In addition – as most borrower-based measures target household debt and not corporate debt, and as most of corporate debt growth since the Great Financial Crisis has come through the unregulated non-bank financial sector – it is of the utmost importance to develop a macroprudential framework for non-banking. ■

References

- Acharya, Viral A., Katharina Bergant, Matteo Crosignani, Tim Eisert and Fergal McCann, (2020), “The Anatomy of the Transmission of Macroprudential Policies”, WP/20/58, IMF, May 2020.
- Akinci, Ozge and Jane Olmstead-Rumsey, (2015), “How Effective are Macroprudential Policies? An Empirical Investigation”, IFDP No 1136, Board of Governors of the Federal Reserve System, May 2015.
- Alam, Zohair, Adrian Alter, Jessen Eiseman, Gaston Gelos, Heedon Kang, Machiko Narita, Erlend Nier and Naixi Wang, (2019), “Digging Deeper – Evidence on the Effects of Macroprudential Policies from a New Database”, WP/19/66, IMF, March 2019.
- Altunbas, Yener, Mahir Binici and Leonardo Gambacorta, (2017), “Macroprudential policy and bank risk”, DP12138, Centre for Economic Policy Research, 11 July 2017.
- Ampudia, Miguel, Marco Lo Duca, Mátyás Farkas, Gabriel Perez Quiros, Mara Pirovano, Gerhard Rünstler and Eugen Tereanu, (2021), “On the Effectiveness of Macroprudential Policy”, SUERF Policy Briefs, No 159, August 2021.
- Araujo, Juliana, Manasa Patnam, Adina Popescu, Fabian Valencia and Weijia Yao, (2020), “Effects of Macroprudential Policy: Evidence from Over 6,000 estimates”, WP/20/67, IMF, May 2020.
- Avezum, Lucas, Vítor Oliveira and Diogo Serra, (2021), “Assessment of the effectiveness of the macroprudential measures implemented in the context of the Covid-19 pandemic”, SUERF Policy Briefs, No 165, August 2021.
- Bergant, Katharina, Francesco Grigoli, Niels-Jakob Hansen and Damiano Sandri, (2023), “Dampening global financial shocks: can macroprudential regulation help (more than capital controls)?”, WP No 1097, BIS, May 2023.
- Bhargava, Apoorv, Lucyna Górnicka and Peichu Xie, (2023), “Leakages from macroprudential regulations: the case of household-specific tools and corporate credit”, WP No 2784, ECB, February 2023.
- Biljanovska, Nina, Sophia Chen, Gaston Gelos, Deniz Igan, Maria Soledad Martinez Peria, Erlend Nier and Fabián Valencia, (2023), “Macroprudential Policy Effects, Evidence and Open Questions”, DP/2023/002, IMF, March 2023.
- Biljanovska, Nina and Sophia Chen, (2023), “Differential Effects of Macroprudential Policy”, WP/23/43, IMF, February 2023.
- Boar, Codruta, Leonardo Gambacorta, Giovanni Lombardo and Luiz Pereira da Silva, (2017), “What are the effects of macroprudential policies on macroeconomic performance”, BIS Quarterly Review, 71-88, September 2017.
- Brandao-Marques, Gaston Gelos, Machiko Narita and Erlend Nier, (2020), “Leaning Against the Wind: A Cost-Benefit Analysis for an Integrated Policy Framework”, WP/20/123, IMF, July 2020.
- Bruno, Valentina, Ilhyock Shim and Hyun Song Shin (2017), “Comparative assessment of macroprudential policies”, Journal of Financial Stability vol. 28, issue C, 183-202.
- Cantu, Carlos, Leonardo Gambacorta and Ilhyock Shim, (2020), “How effective are macroprudential policies in Asia Pacific? Evidence from a meta-analysis”, in “Measuring the effectiveness of macroprudential policies using supervisory bank-level data”, Paper No 110, BIS, February 2020.

- Cerutti, Eugenio, Stijn Claessens and Luc Laeven, (2015), "The Use and Effectiveness of Macroprudential Policies: New Evidence", WP/15/61, IMF, March 2015.
- Couaillier, Cyril, Marco Lo Duca, Alessio Reghezza and Constanza Rodriguez d'Acri, (2022), "Caution: do not cross! Capital buffers and lending in Covid-19 times", WP No 2644, ECB, February 2022.
- Dautovic, Ernest, Aurea Ponte Marques, Alessio Reghezza, Costanza Rodriguez d'Acri, Diega Vila Martín and Nadya Wildman, (2021), "Evaluating the benefits of euro area dividend distribution recommendations on lending and provisioning", Macroprudential Bulletin, European Central Bank, vol. 13.
- Dautovic, Ernest, Leonardo Gambacorta and Alessio Reghezza, (2023), "On the effectiveness of dividend restrictions as supervisory policy tool", SUERF Policy Brief, No. 617, June 2023.
- Fernández-Gallardo, Álvaro, Simon Lloyd and Ed Manuel, (2023), "The transmission of macroprudential policy in the tails: evidence from a narrative approach", WP No 1,027, Bank of England, June 2023.
- Galán, Jorge E. (2022), "The benefits are at the tail: Uncovering the impact of macroprudential policy on growth-at-risk", Journal of Financial Stability, 100831.
- Gambacorta, Leonardo and Andrés Murica, (2017), "The impact of macroprudential policies and their interactions with monetary policy: an empirical analysis using credit registry data", WP No 636, BIS, May 2017.
- Giannoulakis, Stelios, Marco Forletta, Marco Gross and Eugen Tereanu, (2023), "The effectiveness of borrower-based macroprudential policies: a cross-country analysis using an integrated micro-macro simulation model", WP No 2795, ECB, March 2023.
- Goel, Tirupam, Ulf Lewrick, and Aakriti Mathur, (2021), "Does regulation only bite the less profitable? Evidence from the too-big-to-fail reforms", WP No 946, Bank of England.
- Kim, Soyoung and Aaron Mehrota, (2019), "Examining macroprudential policy and its macroeconomic effects – some new evidence", WP No 825, BIS, December 2019.
- Lo Duca, Marco, Mehdi Bartal, Edita Giedraitė, Peik Granlund, Niamh Hallissey, Pavol Jurča, Charalampos Kouratzoglou, Petra Lennartsdotter, Diana Lima, Mara Pirovano, Algirdas Prapiestis, Martin Saldias, Ibrahima Sangaré, Diogo Serra, Fatima Silva, Eugen Tereanu, Kristiina Tuomikoski and Jukka Vauhkonen, (2023), "The more the merrier? Macroprudential instrument interactions and effective policy implementation", Occasional Paper Series No 310, ECB, March 2023.
- Martinez-Miera, David and Raquel Vegas, (2021), "Impact of the dividend distribution on the flow of credit to non-financial corporations in Spain", Analytical Articles, Economic Bulletin, 1/2021, Banco de España.
- Mathur, Aakriti, Matthew Naylor and Aniruddha Rajan, (2023), "Useful, usable, and used? Buffer usability during the Covid-19 crisis", WP No 1,011, Bank of England, January 2023.
- Poghosyan, Tigran, (2019), "How Effective is Macroprudential Policy? Evidence from Lending Restriction Measures in EU Countries, WP/19/45, IMF, March 2019.
- Valderrama, Laura, (2023), "Calibrating Macroprudential Policies in Europe, Considerations Amid Rising Housing Market Vulnerability", WP/23/75, IMF, March 2023.

About the author

Pedro Duarte Neves is a former Vice-Governor of Banco de Portugal (2006-2017). His research interests include banking supervision and regulation, macroprudential policy, financial stability, and the economy of the EU in general. He holds a PhD in Economics from Université Catholique de Louvain. Pedro Duarte Neves is Associate at the Systemic Risk Centre, London School of Economics.

SUERF Publications

Find more **SUERF Policy Notes** and **Policy Briefs** at www.suerf.org/policynotes



SUERF is a network association of central bankers and regulators, academics, and practitioners in the financial sector. The focus of the association is on the analysis, discussion and understanding of financial markets and institutions, the monetary economy, the conduct of regulation, supervision and monetary policy. SUERF's events and publications provide a unique European network for the analysis and discussion of these and related issues.

SUERF Policy Notes focus on current financial, monetary or economic issues, designed for policy makers and financial practitioners, authored by renowned experts.

The views expressed are those of the author(s) and not necessarily those of the institution(s) the author(s) is/are affiliated with.

All rights reserved.

Editorial Board:

Ernest Gnan
Frank Lierman
David T. Llewellyn
Donato Masciandaro
Natacha Valla

SUERF Secretariat
c/o OeNB
Otto-Wagner-Platz 3
A-1090 Vienna, Austria
Phone: +43-1-40420-7206
www.suerf.org • suerf@oenb.at