Final Report

Project title: European capital markets and macroeconomic stability: The role of equity and debt

Project number: P89/2016

Executive Summary

The main objective of the project “European capital markets and macroeconomic stability: The role of equity and debt” was to provide comprehensive empirical evidence on capital market integration in Europe to inform the debate on how to design financial structures that support macroeconomic performance. The analyses reveal that international risk sharing via capital markets is still limited and quite heterogeneous across EU-countries. While equity funding increased, there remain important barriers to integration and, hence, better shock absorption capacity. Legal harmonization in financial services and a high quality of national insolvency procedures are shown to positively affect cross-border investments. Regarding real effects, it appears that SMEs, especially the most productive ones, invest more if access to equity funding improves. Funding conditions also matter for firms’ relative demand for capital and labor, thus influencing the aggregate labor share of economic activity. While the project analyses show that the integration of financial markets is generally beneficial for macroeconomic stability in European countries, micro-level evidence on portfolio overlap of institutional investors reveals that capital market integration also bears risks for macroeconomic stability and shock absorption capacity. Overall, while supporting international risk sharing capacities via capital markets remains important, our results stress the need for closely monitoring and addressing systemic risks that emerge from a closer integration of European capital markets, especially in the sector of the less regulated financial institutions.

In terms of research output, three articles were published in peer-reviewed outlets, two are under “revise and resubmit”, and seven working papers are either under revision or close to submission. Based on these scientific analyses, the project team regularly participated in transfer activities. On the one hand, team members processed the most important findings in articles targeted at a broader public, like the DIW Weekly Reports, Blog articles, and contributions to financial stability reports of international organizations. The DIW communications department launched press releases and promoted the project output via social media. On the other hand, the project team transferred results during formats like “Leibniz im Bundestag” and during policy-oriented events with the external cooperation partners, e.g. from the Bundesbank.

Regarding career development, the project allowed the project leader to elaborate an individual research agenda with publications in well-known international journals. Moreover, not only did she gain experience in project management, engage in the Leibniz Strategy Forum “European Research,” and guide Ph.D. students, she intensified the internal and external networks. The project allowed doctoral students at DIW Berlin to be more closely integrated in the department of macroeconomics, developing both their scientific and transfer skills. After finalizing their dissertations, Ph.D. students were hired at well-known universities or international organizations.

Due to parental leaves and the Corona pandemic, the project was prolonged in a cost neutral way through May 2022. Related to these circumstances, part of the initially requested funding for travel and workshops was returned at the end of the project period. Further deviations from the initial proposal include adjustments of certain research questions, especially in Module 2, where, for example, the planned analyses on the relation between market concentration and capital market structures remained mostly unanswered, whereas analyses of capital structure

at the firm level appeared to be more promising and in line with developments in the literature on heterogeneous agents. Access to confidential micro-data was more administratively involved than initially expected, resulting in some adjustments to the organization, timing and publication of the related research.

1. Achievement of objectives and milestones

A key objective of the project was to contribute to the debate on how to design a stable and efficient European financial structure that supports macroeconomic performance. First, the research conducted sought to provide comprehensive empirical evidence on capital market structures in Europe. Second, it sought to shed light on the role of debt and equity markets for real and financial stability.

In **Module 1**, the project generated systematic evidence on financial structures, relevant driving factors and barriers to better capital market integration in Europe. Three articles resulted. The first updated stylized facts on the evolution of financial structures and openness before and after the 2008/08 global financial crisis (GFC) (Bremus and Buch, 2019). The analysis shows that the depth of, access to, and efficiency of financial markets was quite heterogeneous across EU-countries, changing only gradually after the GFC. The share of equity in total external positions was lower in the euro area than in other advanced economies, but trended upwards. International risk sharing remained low compared to similar economies.

In the second paper, we empirically analyze the role of legal harmonization and differences in institutional quality for capital market integration (Bremus and Kliatskova, 2020). To examine the potential of CMU by harmonizing the legal and institutional environment, we collected data on the transposition of EU-directives into national law. We find that legal harmonization fosters cross-border investments in equity, while discrepancies in institutional quality matter for cross-border debt holdings. Effects differ across investors, with non-bank financial institutions reacting more to harmonization than banks and the non-financial private sector. Based on these findings, the third paper investigates how increasing the quality of insolvency regulations affects cross-border debt- and equity-holdings (Kliatskova and Savatier, 2021). To analyze how different investor types respond to these rule changes, we use ECB Securities Holdings Statistics (SHS) on cross-border equity and debt positions. Extending OECD data on insolvency rule efficiencies, we hand-collected data on changes in insolvency regimes. Estimations show that countries with better insolvency regimes attract more foreign capital. While pre-insolvency regimes are particularly important for shareholders, debt restructuring tools matter most for debt investors. The findings indicate a positive effect of recent changes in EU-regulations on insolvency procedures to improve the single market for capital.

Module 2 investigated the relation between the debt-equity mix, market structures in the corporate sector, and macroeconomic stability. Clearly, how capital market integration impacts the financing conditions of firms of different size should be investigated. However, while we planned to analyze the role of changes in the debt-equity mix for concentration in the corporate sector, based on concepts from the granularity literature, we deviated due to developments in the related literature and the fit of project members' individual research agendas.

Regarding the role of capital market conditions for heterogeneous firms, we analyzed the importance of access to external equity for investment and, thereby, for macroeconomic performance (König, 2021). The analysis shows that mid-sized firms are increasing equity, while small and large firms' equity funding grew only weakly or even decreased. Yet, the distribution of market capitalization is highly concentrated, with the largest 20% of firms accounting for 80% of aggregate market capitalization. In response to an exogenous improvement in access to equity funding, average firms increase investment and reduce long-term debt. Investment of firms with high expected future profitability is particularly sensitive to equity funding conditions. Thus, the study adds insights about the relevance of improving the access to capital markets for SMEs.

Having analyzed how firm investment reacts after improving capital market funding conditions, a second, closely related, paper addresses the question of how firms adjust their input mix if capital market conditions deteriorate (ElFayoumi, 2020). Using firm-level data for the largest euro area countries, the paper provides new stylized facts on changes in firms' capital structure before and after the GFC. While leverage remained broadly constant, firms increased equity funding and debt maturity. Second, the analysis shows that in response to rising external financing costs, firms want to hold more collateralizable physical capital, thus reducing the labor share of production. The paper indicates that well-functioning capital markets are key for economies where labor could enjoy a larger and balanced share of economic growth.

Motivated by the debate about the importance of corporate taxation for the capital structure – hence the stability – of firms, we, thirdly, focused on interactions between bank levies and corporate taxation for the debt-equity funding mix of banks (Bremus, Schmidt, Tonzer, 2020). Thereby, we assess the effectiveness of bank levies for increasing financial stability, depending on corporate taxation. While levies set incentives for banks to reduce leverage, corporate taxes make debt funding more attractive. Based on balance sheet data for a panel of EU-banks, we find that bank levies reduce leverage. Yet, they only partially counteract the debt bias of taxation: the higher corporate tax rates are, the weaker is the reduction in leverage after the introduction of levies.

In **Module 3**, the goal was to provide evidence on the contribution of capital market integration to macroeconomic stability through international risk sharing. As planned, we document, in detail, using both aggregate and micro-level data, where European countries currently stand with respect to cross-border investment patterns and risk sharing potentials. Based on Module 1's descriptive evidence, along with our cooperation partners from the ECB, we provide evidence on the evolution of risk sharing via capital and credit markets in the euro area, including the beginning of the Covid-19-pandemic (Martin Fuentes et al. 2022). Risk sharing via capital markets was stable throughout the sample period, albeit modest, especially in southern European countries. Regarding geographic patterns, it appears that intra-regional risk sharing within core and periphery countries became more important at the expense of inter-linkages between these country groups.

In a second paper, we concentrate on the ability to smooth shocks to domestic economic activity resulting from natural disasters, asking whether financial integration can help to recover from adverse shocks (Bremus and Rieth, 2022). Our empirical results indicate that financial integration helps advanced economies recover more quickly from natural disasters. Higher external asset positions, more external equity liabilities, and more direct credit from foreign banks to domestic firms help to absorb adverse domestic shocks. However, more external debt funding can be destabilizing. Overall, better integrated capital markets can support advanced economies to recover from extreme weather events.

Turning to a different mechanism of international risk sharing, namely European deposit insurance, we used a DSGE-model to assess the potential of such a scheme for macroeconomic stabilization (Clemens, Gebauer, König, 2021). The model reveals that both fiscal and deposit reinsurance can smooth macroeconomic outcomes. A counterfactual exercise indicates that, during the GFC, deposit reinsurance would have stabilized economic activity in Germany and the rest of the euro area just as well as a fiscal backing of insured deposits. Simulations show that welfare gains would have been higher under a deposit reinsurance scheme and the debt-to-GDP ratio lower.

Further analyses account for potential contagion effects through indirect capital market interlinkages. Using SHS data, the potential risk of contagion through overlapping portfolios, i.e. common asset holdings in the portfolios of different investors like banks, investment funds, and insurance corporations in the euro area is examined (Bootsma et al., 2019, and Inhoffen, 2022). We provide stylized facts on portfolio overlap in the financial system for different types of debt and equity securities, indicating that investment funds have a particularly high portfolio overlap with the other sectors (up to 44%). Thereby, idiosyncratic shocks can propagate to other investors when assets are fire-sold in a downturn. Relatedly, a further paper looks at one important group of investors, namely mutual funds, and investigates how systemic risks interact with risk sharing through portfolios with correlated investment strategies (Gonzales et al., 2022). Using micro-data on stock-holdings of more than 17,000 international mutual funds, the analysis reveals that overlaps in equity holdings negatively affected fund performance. High portfolio overlap creates negative externalities, as shocks propagate from one connected fund to another. The extrapolation to capital markets suggests that risk sharing can also introduce systemic risks, thus emphasizing the need for macro-prudential supervision.

Having a look at a further risk sharing mechanism, another paper analyzes collateral re-use, a market practice where banks sell high-quality assets that they have received as collateral for loans onward to third parties (Inhoffen and van Lelyveld, 2022). While this intermediation practice benefits the allocation of safe assets and risk sharing in financial markets, it can create default cascades along an opaque re-sale chain and excessive leverage. Using regulatory data for the 50 largest euro-area banks, the paper provides the first stylized facts about the collateral re-use rate at the bank and security level in the euro area. As a response to unconventional monetary policy exacerbating safe asset scarcity, we find that banks increase their re-use activity, thus intensifying opaque dependencies.

We adjusted the initial **financial plan** in the following ways. First, the project duration was prolonged in a cost-neutral way, since the project leader was on parental leave at the beginning and again toward the end of the project period, initially working part-time after returning. Second, as costs for the planned workshops and travel expenses were not realized, these were partially repaid. Covid-19 pandemic restrictions alongside parental leaves are behind these decisions. Third, as the team benefited from access to micro-level datasets at the cooperating institutions, the requested funding for proprietary data was reallocated to personnel expenses and (open access) publication fees.

2. Activities and obstacles

During the project period, besides conducting research, all team members regularly presented their work at internal and external workshops and conferences, including, among others, the DIW Graduate Center Workshops, the DIW Internal Macroeconomics and Finance Brown Bag Seminar, the Humboldt University Macro Brown Bag Seminar, the Free University Berlin Empirical Macroeconomics Seminar, the Bundesbank Internal Seminar of the Financial Stability Division, the Annual Conference of the Verein für Socialpolitik, the Annual Congress of the European Economic Association, the International Conference on Computing in Economics and Finance, and the Annual International Conference on Macroeconomic Analysis and International Finance. The pandemic forced virtual participation and exchange.

Doctoral students used their research output from the project as dissertation chapters. Three doctoral students defended their dissertations during the project period or shortly thereafter, one dissertation will be submitted during the next weeks. The goal of integrating the doctoral students more closely into the macroeconomics department was achieved. The fact that doctoral students had different, mostly external, supervisors led to extensions of the initial research agenda. However, some questions from the initial proposal were not investigated, as related research ideas and thesis topics showed more promise.

One challenge was to fill the (part-time) position for a Post Doc researcher to support the team. Given that candidates from the DIW macroeconomics department moved to other institutions, a new Post Doc was hired joint with the international economics department. Unfortunately, he only joined the project for a short duration, since he received an external offer and decided to leave academia. Thus, the goal that doctoral students would have two Post Docs to work with in the project could not be guaranteed throughout.

The project team actively used the possibilities to cooperate with external project partners at the IWH, the Bundesbank, the ECB and the Dutch Central Bank. Thanks to this, we also profited from access to regulatory micro-data. However, strict data protection rules meant adjusting the timeline and organization of some analyses. Also, the publication of papers based on confidential micro-data was delayed in some cases.

3. Results and successes

Publications and dissertations. Three articles are already published in internationally peer-review outlets and two papers are currently under "revise and resubmit" with the *Journal of Money, Credit and Banking* and the *Journal of International Money and Finance*. Seven further working papers are either under revision or will be submitted to top field journals in the near future. Moreover, the project team worked on related topics that resulted in additional papers. Three doctoral students finished their dissertations during or shortly after the end of the project, one dissertation will be submitted during the next weeks. They were successfully placed in international organizations and academia: Two started careers at the World Bank and at the International Monetary Fund, one junior researcher was hired during the final phase of his dissertation by a central bank, and one junior team member started a Post Doc position at the University of Bonn.

Scientific events. During the first phase, a joint workshop with the financial stability division of the Bundesbank and IWH on financial cycles took place at the Bundesbank. With colleagues from the DIW Berlin department of macroeconomics, we launched a new format for female researchers, the "Workshop for Women in Macroeconomics, Finance and Economic History (WIMFEH)," where team members acted as organizers and presenters and exchanged ideas with well-known senior researchers. With DIW's international economics department and the Bundesbank, we organized an annual event for professionals from the ministries, politics, associations, and academia to discuss recent developments in financial and macroeconomic stability. Both the WIMFEH and the annual financial stability events will be continued.

Transfer. The project team regularly participated in dissemination activities, contributing to the DIW Weekly Report, DIW Roundups, and economic blogs like Makronom, among other publications targeting the general public. DIW Berlin's communications department facilitated press releases and social media promotion of the project output. We also contributed to a box in the Financial Stability Report 2019 of the Financial Stability Board and to the Financial Stability and Structure Report 2022 of the ECB. Moreover, team members participated in discussions about financial and macroeconomic stability in Europe at various events including "Leibniz im Bundestag" and a CMU conference at the Banque de France. Important information and output of the project was regularly updated and published on the project website.

4. Equal opportunities, career development and internationalisation

DIW Berlin emphasises equal opportunities in hiring and promoting its staff members. All junior team members were hired through the DIW Graduate Center in a transparent and competitive recruiting process with high standards of gender equality and diversity. Ph.D. Agreements were signed to ensure the best possible supervision and support for doctoral researchers to achieve high quality doctoral dissertations. In line with the DIW guidelines for actively recruiting female candidates, besides the project leader, a female doctoral student was part of the core project team. WIMFEH facilitated networking between female researchers in the field. Project funds allowed team members to present their research at scientific events and to submit their work to internationally peer-review journals. Moreover, as doctoral students were part of the DIW Graduate Center, they benefited from a structured, high-quality doctoral program. Besides research skills, doctoral students learned about transfer activities, writing, and presenting, all contributing to a well-developed profile suitable for a high-level career in economics.

5. Structures and collaboration

The project team cooperated with partners within DIW and externally. Internally, cooperation included the joint hiring of a Post Doc in the area of international finance with the international economics department and a joint annual event on “international financial stability.” The planned cooperation with the public economics department was dropped because the partner left the institute. Externally, the project team interacted with partners from the Bundesbank financial stability department, who also acted as co-authors, jointly held workshops, provided valuable feedback, advised on papers and datasets, and hosted a research visit for a doctoral student and a research assistant. Moreover, the team benefited greatly from the collaboration, consulting, and joint papers with colleagues from the ECB and IWH who worked on CMU-related topics. New cooperations with external researchers and institutions were created with the Dutch Central Bank, Humboldt University, and Free University Berlin.

6. Quality assurance

Research work at DIW is subject to the principles of good scientific practice, including transparency and honesty in conducting and presenting research, disclosure of conflicts of interest, and the safe storage and documentation of data. The institute has an ombudsperson who ensures scientific integrity. Research was regularly discussed with colleagues and presented on internal and external scientific events. Further, the quality of analyses and texts was assured through mutual review, through the review of DIW discussion paper publications, through the supervision of the Ph.D dissertations by external professors, and through the peer review process of international journals. Texts were edited by DIW’s academic editor and, for Weekly Reports, by the DIW communications department.Papers were made available as discussion papers and dissertation chapters. Two open access articles are published in the *Journal of Banking and Finance* and in the *Journal of International Money and Finance*. Hand-collected legal data is available from the authors upon request. Due to strict data protection rules, the results from two papers based on confidential micro-data are still under revision, but will be made accessible soon.

7. Additional resources

Not applicable.

8. Outlook

Building on project analyses and results, members of the former project team are continuing work in the field of international financial markets and macroeconomic stability. Both the Covid-19 pandemic and the challenges related to accelerating climate change illustrate the need for stable and integrated financial markets as a source of risk sharing and financing - both for the recovery after negative shocks like pandemics or natural disasters and for the transition to a low-carbon economy. Moreover, the effects of new rules and regulations implemented in the realm of the European Banking and Capital Markets Union should be evaluated with respect to financial stability and for broader consequences for firms and individuals.

Former team members continue to contribute to research, building on the expertise and experience gained under this project. These include a Leibniz funded project on the distributional consequences of macroeconomic and regulatory policies to an analysis of how the Covid-19 pandemic affected capital market structures and how observed changes in capital flows are related to domestic policies and institutions. Moreover, they examine the role of financial markets for the transmission to a sustainable economy, specifically the question of how monetary policy affects financing conditions in the market for green bonds. Based on this analysis, the evolution and potential drivers of the market for green bonds can be analysed. Overall, the interplay between financial structures and the socio-ecological transition will be an important element of ongoing research at DIW Berlin.