International Banking, Fiscal Institutions and Public Debt: Essays on Financial Market and Fiscal Policy

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CONTENTS

LIST OF FIGURES

LIST OF TABLES

1. INTRODUCTION

The recent sequence of crises (global financial crisis 2007-2009, Great Recession 2008-2009, European sovereign debt crisis 2009-today) sparked off historic and often indispensable reforms in the spheres of banking regulation and financial market policy as well as in the sphere of fiscal policy. The bursting of the real estate price bubble in 2007 led to an overall credit and banking crisis, which brought a rather exceptional period of expansion of banks' balance sheets to a provisional end. The financial crisis not only adversely affected investment decisions by financial intermediaries, but also infringed on real sector firms and households. This development culminated in an economic downturn in many countries worldwide, which came to be known as the Great Recession.

As a political response to the banking and real economic crises, numerous countries tried to stabilize their impaired financial sectors as well as their real economy by setting up funds to recapitalize banks and by running large fiscal stimulus programs to boost aggregate demand. In consequence of the discretionary public spending programs, but also to a large extent due to the unfavorable economic development and the functioning of automatic stabilizers with declining revenues and increasing expenditures, public debt levels in relation to gross domestic product (GDP) skyrocketed in numerous countries in the years after 2007, reaching unforeseen highs (see e.g. Eyraud and Wu, 2015). By 2009, some euro area countries even encountered severe liquidity problems due to persistently high public deficits and elevated public debt levels.

This dissertation addresses several important aspects of the above mentioned crises, their consequences and relevant policy reactions. In a **first part (Chapter 2)**, it is concerned with the effects of the global financial crisis as well as the (re-)regulation of banking markets on the internationalization strategies of (German) banks.

In a **second part (Chapters 3 and 4)**, the thesis is concerned with the credibility of fiscal rules, which have been revised, strengthened and newly implemented in many European countries[1] as a response to the high public deficits and ever rising public debt levels. Specifically, it looks at expectation building of German subnational policy makers with respect to the future compliance with the so-called constitutional German 'debt brake' that was implemented in 2009 but will only take effect for German Länder in the

[1] See Eyraud and Wu (2015) for a thorough stock taking of recent fiscal governance reforms in Europe.

year 2020. In this context, it also addresses potential problems for the adherence to such rules like the lack of subnational revenue autonomy in federal countries like Germany and investigates the determinants of politicians' preferences for either more revenue autonomy or more fiscal equalization across jurisdictions.

In a **third part (Chapters 5 and 6),** the thesis digs into the highly topical issue of sovereign debt restructurings. After the Greek debt restructuring of 2012 and in the face of Greece's continuing liquidity and even debt sustainability problems, the repeated ad hoc reactions of the European Union and the Eurogroup seem to be stretched to their limits. In this context, the thesis examines the phenomenon of serial sovereign debt restructurings in the absence of binding international restructuring rules and presents a proposal for a statutory sovereign debt restructuring mechanism for the euro area.

Finally, Chapter 7 concludes by giving both an overview of the main findings of the different papers as well as a brief outlook. Before immersing into the above mentioned Chapters, though, the following three sections provide short outlines of Chapters 2 through 6.

1.1 The Financial Crisis, Banking Market Regulation and International Banking

The global financial crisis has terminated a rather unprecedented period of expansion of banks' international financial assets and liabilities. This first thematic priority of the dissertation is treated in **Chapter 2**, which engages in finding the drivers of the adjustments of internationally active German banks. In response to the financial crisis, banks have decreased their international activities as, also due to regulatory restrictions, they had to deleverage and shrink their balance sheets. One important question is whether this withdrawal of German banks from foreign markets will be a temporary phenomenon or whether it marked the beginning of a sustained period of financial disintegration, as was observed after the Great Depression during the 1930s (Rajan and Zingales, 2003).

Chapter 2 particularly studies bank internationalization before and during the crisis from a bank-level perspective. The data used give detailed information on the international activities of German banks. These banks engage in internationalization either directly via their bank holding companies out of Germany or indirectly through their respective branches and subsidiaries abroad. Stylized facts show that the decline in

international banking during the crisis is most pronounced in terms of the volume of international activities (the intensive margin), but there has also been a notable decline in the number of foreign subsidiaries (the extensive margin). However, this decline had already started well before the crisis and has hardly accelerated since then.

The results from running so called gravity equations, largely following Okawa and van Wincoop (2012) as well as Brüggemann et al. (2012), suggest the following interpretation of these trends and their persistence:

First, banks with market-based funding models have higher international assets. Hence, persistently tighter conditions on funding markets would have an impact on the internationalization strategies that banks will pursue in the future, at least if they do not find appropriate substitutes for their present refinancing activities. How persistent this adjustment is going to be is quite difficult to predict. To the extent that the re-regulation of the banking industry with stricter capital requirements that is currently taking place changes market structures in banking and banks' funding markets permanently, the adjustment is likely to be persistent.

Second, policy interventions seem to matter. Some German banks which received state support during the crisis period have significantly lowered their international assets, as this was also a condition for the eligibility of state aid measures. Foreign macroprudential policies have had a negative impact, too. To the extent that reductions in international assets are associated with the permanent closure of foreign affiliates they are indeed likely to be persistent.

Third, the documented withdrawal from foreign markets may also reflect a slight increase in home bias on the part of banks (see also Giannetti and Laeven 2011, Hildebrand et al. 2012, Rose and Wieladek 2011). Financial frictions, as proxied by gravity-type variables like geographical distance, common language, common legal origin, etc. do indeed matter for international banking. However, their impact has remained quite stable throughout the crisis. The variables for which stronger effects during the crisis period could be identified are adjacency and the presence of bilateral trade agreements. This suggests that trade-related finance has become relatively more important over the crisis.

1.2 Compliance Expectations for the German Debt Brake and Revenue Autonomy Preferences in German Länder

The second part of the thesis (Chapters 3 and 4) is concerned with fiscal institutions in Germany. The European sovereign debt crisis with soaring debt-to-GDP-levels has triggered the implementation of statutory budget rules. Germany, in particular, reformed its fiscal governance framework by implementing, among other European rules, the national constitutional debt brake (Schuldenbremse)[2], which constrains the federal government to run a maximal structural deficit of 0.35 percent of GDP as of 2016 and the subnational governments (the 16 German Länder) to run a structurally balanced budget as of 2020.

Even though the German debt brake has already become part of the constitution in 2009, it will only take effect in 2016 at the federal level and in 2020 at the Länder level. Thus, the standard ex post strategy to evaluate the potency of numerical fiscal rules based on the analysis of aggregate fiscal performance, as is done in the literature for different regional contexts (see Heinemann et al. (2015) for an overview of the literature and a meta-regression-analysis), is no possibility here. Furthermore, this literature cannot reveal how fiscal rules impact on the expectations and beliefs of fiscal decision makers regarding future compliance and, hence, the credibility of the fiscal rule. **Chapter 3**, thus, presents a dynamic theoretical model of lagged implementation (Buchanan, 1994) of a deficit rule as well as an empirical analysis of the drivers of compliance expectations of Länder politicians.

The theoretical model features a deficit rule which is implemented in period 0 but only takes effect in the distant future (period 2). A fiscal shock in period 1 makes compliance with the fiscal rule uncertain when the rule is not credible. The government can take decisions in period 1, too, trading off the benefits and costs of complying with the fiscal rule. The model suggests that compliance is more likely, (i) the lower the initial deficit in period 0, (ii) the lower bailout expectations of Länder politicians (vis-à-vis the federal government), (iii) the tighter the fiscal rule, and (iv) the higher the deficit reduction in period 0.

Furthermore, one key prediction of the model is the fact that insiders' (defined as members of incumbent government parties and/or within-state members of

[2] See Article 109 Section 3 of the German Constitution (Grundgesetz).

parliament) compliance expectations are more optimistic than those of outsiders (opposition members and/or out-of-state parliamentarians). The model provides two thinkable explanations for this phenomenon: asymmetric information between insiders and outsiders on the occurring fiscal shocks or sheer overconfidence on the part of insiders.

The empirical analysis, which uses a unique self-conducted survey of members of all 16 German state parliaments, is guided by these theoretical findings and shows that the debt brake's credibility is far from perfect. The heterogeneity of compliance expectations corresponds to the theoretical predictions. Furthermore, the asymmetry in compliance expectations between insiders and outsiders can, on the basis of the empirical findings of probit regressions, be attributed to overconfidence on the part of insiders rather than noisy information on the part of outsiders. This systematic overconfidence bias might be problematic in practice since it could lead to too little consolidation effort.

The drastic changes to the fiscal governance framework as well as the expiration of laws specifying the institutional details and the extent of Germany's horizontal and vertical fiscal equalization scheme necessitate reforms with respect to the revenue side of the Länder. Until the fiscal equalization scheme expires in 2019, Länder have little tax autonomy and the extent of fiscal equalization is quite large. Thus, for now, Länder largely have to rely on consolidation on the expenditure side to be able to fulfill the requirements of the German debt brake as of 2020. Since the sunset clause in the fiscal equalization laws tends to weaken the status quo bias, **Chapter 4** is concerned with the drivers of decision makers' preferences for fiscal equalization and tax autonomy at the Länder level.

Again, using a self-conducted survey of all members of the 16 state parliaments, the paper tries to establish to what extent Länder self-interest, party ideology, and individual characteristics influence parliamentarians' reform preferences. This also helps to understand the sources of political controversies regarding reforms of fiscal federalism. Furthermore, the paper is concerned with the degree of polarization among Länder and simulates potential majorities in favor of or against reforms of the current system of fiscal federalism.

The empirical results of ordered probit regressions suggest that party ideology and special interests of the Länder are jointly linked to federal reform preferences. General political views on the role of the government translate into federal views, i.e. politicians who are in favor of lower taxes and a smaller government are also in favor of a more competitive type of fiscal federalism. With regard to jurisdictional special interests, the paper finds evidence that poorer Länder as well as Länder with high legacy debt burdens and/or high fiscal consolidation needs are less inclined to accept more tax competition and a lower intensity of fiscal equalization. Finally, by simulating politicians' voting behavior with respect to fiscal equalization and tax autonomy the paper identifies a majority for less intense fiscal equalization while, at the same time, there seems to be a (fragile) blocking minority against more tax autonomy. Thus, in terms of policy implications, the paper concludes that a promising reform of fiscal federalism could include more revenue autonomy, if, at the same time, the problem of high legacy debt and fiscal consolidation needs were to be addressed.

1.3 Serial Sovereign Debt Restructurings and a Viable Insolvency Procedure for Sovereigns in the Euro Area

When sovereign countries end up with short-term liquidity problems or even unsustainably high debt burdens in the long term – either due to a lack of or in spite of fiscal rules – they often face debt renegotiations with their private and public creditors (as it is the case in Greece). Since there are still no enforceable common rules, neither within the IMF framework nor within the European Union, each and every debt restructuring seems to be a new endeavor with unknown ramifications. Thus, the third part of the dissertation examines the phenomenon of serial sovereign debt restructurings (Chapter 5) and looks at potential drivers of the probability of a country having to restructure again shortly after a debt restructuring has taken place. Following this empirical analysis, Chapter 6 presents a proposal for a viable statutory insolvency procedure for sovereign countries in the euro area, which builds on insights of economic and especially public finance research as well as earlier proposals of restructuring regimes for sovereign states.

Traditionally, literature on sovereign defaults has been concerned with the costs of restructurings because these costs are often viewed to be the main reason why

countries repay their debt (see Das et al. (2012), Panizza et al. (2009), Sturzenegger and Zettelmeyer (2006), and Tomz and Wright (2013) for thorough reviews of the literature as well as stylized facts). When taking a closer look at the data for the past decades, however, one can make out entire series of sovereign debt restructurings for numerous countries. Since there is still no systematic analysis of this phenomenon, **Chapter 5** attempts to explain potential determinants of such (near-term) follow-up restructurings. Some authors (Das et al., 2012; Moody's, 2012) as well as the IMF (2013) speculate, that sovereign debt restructurings "have often been too little and too late" (IMF, 2013, p.1), which hindered many countries to re-establish debt sustainability and regain market access in a timely manner after a default.

Chapter 5 puts such propositions to the test descriptively and econometrically by conducting so-called survival time analyses in the spirit of Cox (1972). The data on debt restructurings and their different features come from Cruces and Trebesch (2013). The empirical analysis verifies that higher haircuts (in terms of net present value) are associated with a lower probability of serial restructurings. Most interestingly, however, cuts in face value have a stronger negative impact on this probability than equally sized reductions in net present value by means of maturity extensions and/or interest rate reductions. This finding is, at first, quite puzzling but could be explained by the fact that timing seems to be important: a cut in face value provides immediate and outright debt relief (in terms of debt sustainability), whereas interest rate cuts and especially maturity extensions merely buy an insolvent and illiquid country some time until it becomes illiquid again.

Chapter 6 argues that a mechanism to restructure the debt of an insolvent country is still missing in the emerging institutional architecture of the euro area because private creditors do not internalize solvency risks properly, but rather seem to speculate on public bailouts. A credible insolvency procedure would make debt renegotiations a realistic scenario, thereby strengthening market discipline. However, the introduction of an insolvency procedure for sovereigns bristles with difficulties: in the next few years, its introduction would risk pushing Europe back into acute crisis because numerous euro area countries still exhibit high public debt levels and large deficits. On the other hand, an indefinite postponement of such a reform would impair the credibility of a future regime change. Therefore, the chapter reviews arguments and existing blueprints

for sovereign insolvency procedures in the euro area (see e.g. Gros and Mayer, 2010; Gianviti et al., 2010; European Economic Advisory Group, 2011; Committee on International Economic Policy and Reform, 2013) and develops a Viable Insolvency Procedure for Sovereigns (VIPS). The VIPS-proposal avoids sudden measures that could destabilize the present fragile situation. Instead, it prudently designs an irreversible bridge towards the new regime characterized by lagged implementation (Buchanan, 1994). The proposal, thus, comprises two pillars: a specification of an insolvency mechanism for the long run and a credible transition path towards the new system.

2. How the Crisis Affected International Banking[3]

2.1 Motivation

The global financial crisis has brought a rather unprecedented period of expansion of banks' international financial assets and liabilities to an end. In response to the crisis, banks have lowered their international assets and liabilities in the process of deleveraging and shrinking their balance sheets. While total international assets of German banks grew, on average, by 8 percent per year between 2002 and 2007, international assets dropped by almost 20 percent in 2008 alone. These adjustments have mainly taken place due to changing risk perceptions and changing regulations. The key question is whether this withdrawal of banks from foreign markets will be short-lived or whether it marks the beginning of a sustained period of financial disintegration, as was observed after the Great Depression (Rajan and Zingales 2003).

In this paper, we study bank internationalization before and during the crisis from a bank-level perspective. Our data give detailed information on the internationalization of German banks. The "External Position Reports" provided by the Deutsche Bundesbank contain information on the international assets of German banks and their foreign affiliates (branches and subsidiaries), month-by-month and country-by-country. Our sample starts in December 2002, when minimum reporting thresholds were abolished, and ends in December 2011. We investigate the determinants of the stocks of banks' assets at the end of each year.

Data similar to ours have been used in previous work to analyze the importance of bank productivity for the international activities of banks (Buch et al. 2012, 2011b), the determinants of short-term adjustments of internationally active banks during the crisis (Düwel et al. 2011), the portfolio investment decisions of German banks in emerging markets (Wildmann 2011), the impact of international activities of German banks on performance at home (Buch et al. 2013), or the impact of crisis-related policy measures on international banking (Buch et al. 2011a). Düwel et al. (2011) find that rising risk aversion, measured through the capital-asset ratio of a German parent bank, has a negative impact on cross-border lending activities of the corporate banking group, even

[3] This chapter is based on joint work with Claudia M. Buch and Katja Neugebauer, which has been published as "Changing forces of gravity: how the crisis affected international banking", Deutsche Bundesbank Discussion Paper No. 48/2013, Frankfurt a.M. See Buch, Neugebauer, and Schröder (2013).

more so during the crisis. Düwel (2013) analyzes the adjustment of international banks through the internal capital market.

In contrast to this research, we explicitly distinguish between three modes of international banking activities: direct activities by the German bank holding companies in different destination countries and indirect activities via branches and subsidiaries located abroad (in what we call host countries) to different destination countries. Hence, we distinguish the direct mode from the branch mode and the subsidiary mode (Figure 2.1). Assets held through either of these modes are labeled "international assets" of banks. Thus, we can exploit a richer geographical structure of the data compared to previous work: Instead of analyzing the activities of domestic banks in certain foreign destination countries only, we also analyze international activities of German banks' foreign affiliates. In fact, a little more than half of our observations are related to such 'export-platform' FDI, i.e. to activities of German banks' foreign affiliates outside the market in which these affiliates reside.

We find that the decline in international banking in response to the crisis is most pronounced in terms of the volume of international activities and thus for the intensive margin. We also describe the adjustment along the extensive margin, and we find a decline in the number of foreign subsidiaries. However, this decline started well before the crisis and has hardly accelerated since then. In terms of the composition of foreign activities, we observe a shift away from assets held through subsidiaries towards assets held through branches.

Overall, our findings suggest three explanations for the decline in international banking.

First, banks have responded to changing funding conditions. During the crisis banks had to economize on their use of capital. This could explain why banks have reduced the share of international assets held through the subsidiary mode, which is the most expensive way of entering foreign markets. Also, wholesale and short-term funding have become more costly during the crisis, thus affecting in particular those banks with a market-based funding model. However, the sensitivity of banks' international activities to bank-specific variables measuring the funding structure has not changed much during the crisis.

Second, government support during the crisis has been conditional on the requirement that banks close some of their foreign affiliates (EU 2009, Zimmer and

Blaschczok 2012). In our empirical results we show that banks which have received state support during the crisis from the German federal government or from state governments have indeed reduced their international assets.

Third, the withdrawal from foreign countries could reflect an increasing home bias in banks' activities, as has been documented in other work analyzing the response of banks to the crisis (Giannetti and Laeven 2011, Hildebrand et al. 2012, Rose and Wieladek 2011). Note that the reasons are difficult to disentangle: If withdrawal is due to increased risks and/or lower (relative) returns, it may in fact be a rational response to market conditions rather than an increased bias in investment decisions. Generally, we find a significant effect of financial frictions on the international activities of German banks: Adjacency, common language, common legal origins, and regional trade agreements have a positive impact on international assets; distance has a negative impact. In the international trade literature, the distance coefficient is interpreted as a proxy for transportation costs. In international banking physical transportation costs are of limited importance. Here, the geographic distance between two countries is a proxy for informational frictions or monitoring costs (Brüggemann et al. 2012, Okawa and van Wincoop 2012). Perhaps contrary to conventional wisdom, the effects of most of these financial frictions have remained rather unchanged during the crisis. If anything, the effects of adjacency and of regional trade agreements being in place have become more important.

Our research complements previous work analyzing the transmission of shocks across borders and the impact of the crisis on banks' investments at home. A first set of papers looks at the impact of government interventions. Rose and Wieladek (2011) use information on local lending by foreign banks residing in the UK to analyze how support measures, such as capital injections targeted at these banks, have affected lending in the UK. After nationalization foreign banks reduced the share of their loans going to the UK, which can be interpreted as evidence for financial protectionism. Giannetti and Laeven (2011) analyze the geographic structure of syndicated loan issuances and find a "flight home" effect in response to the crisis. The strength of this effect is not affected by government intervention, measured by a dummy variable that equals one if a bank was nationalized or received state support in the form of asset or capital guarantees. Our findings show that state support (capital injections, credit lines, and guarantees) had a

negative impact on the international activities of banks since these aids were given only subject to certain conditions.

De Haas and Van Horen (2011) use individual loan data from syndicated loan issuances for the world's largest banks. During the crisis, foreign banks have remained more committed to countries hosting an affiliated subsidiary, that are geographically close, and that have built up relationships with local banks. Our findings confirm the importance of geography for international bank assets, indicating a negative and strongly significant effect of distance on international lending. Furthermore, we also find a positive effect of affiliate lending within host countries.

Finally, our results are in line with previous studies for German banks documenting an impact of the crisis on lending at home and an increasing home bias in banks' security portfolios. Puri et al. (2011) study the impact of the crisis on lending at home. They find that savings banks which are linked to Landesbanken affected by the crisis reject substantially more loan applications than non-affected banks. Hildebrand et al. (2012) use the Bundesbank's Securities Holdings Statistics to analyze the securities portfolios of banks. During the crisis banks have increased the share of domestic sovereign bonds in their portfolios.

Our research is motivated by recent theoretical work justifying a gravity equation in banking, which suggests taking into account variables proxying for information asymmetries in gravity equations for international asset holdings as a measure of financial frictions. Work by Brüggemann et al. (2012) and Niepmann (2013) provides a direct motivation for international bank loans, while most other models focus on international equity investments. We also borrow from the empirical analysis presented by Okawa and van Wincoop (2012) in the sense that we use a broad measure of financial frictions and that we test how their importance has changed over time, across countries, and – as a new element – across banks.

In section 2.2, we summarize recent theoretical work motivating the use of gravity equations in international banking and finance. In section 2.3, we describe our data and our empirical methodology. In section 2.4, we present the regression results. Section 2.5 concludes.

2.2 Theoretical Background

Empirical gravity models have a long-standing tradition in the international banking literature. The distance between countries, the size of markets, regulatory barriers and variables capturing information frictions explain international asset holdings quite well (Aviat and Coeurdacier 2007, Berger et al. 2004, Buch 2003, Buch and Lipponer 2007, Claessens and van Horen 2012, Focarelli and Pozzolo 2005).[4] However, there has been, until recently, very little theoretical motivation for why international banking should depend on gravity-type variables. Recent theoretical work takes up the issue of motivating the use of gravity models in international banking and finance. These models differ with regard to the specific financial friction they assume and the type of asset they focus on. Yet, the empirical specifications following from this research are similar.

2.2.1 Gravity Equations for International Bank Assets

Brüggemann et al. (2012) provide a theoretical motivation for an empirical gravity equation of banks' international assets. They develop a search model in which a firm *g* located in country *i* seeks a bank loan with specific characteristics in terms of maturity, volume, interest rates, or other contractual features. Search is done across a number of possible countries *N*, including the home country. The firm chooses a bank *k* in a particular country *j* if this bank offers the most attractive loan conditions. The lowest cost at which the bank can supply a loan is given by c_{igjk}. This cost depends on observable factors such as geographic distance, which generates monitoring costs (τ_{ij}). Banks also differ along other dimensions, hence total costs are composed of the average interest rate in a particular country r_j, average bank characteristics a_j, and a term capturing any unobservable cost or bank-firm-specific traits (ε_{igjk}): $c_{igjk} = \beta r_j + \gamma \tau_{ij} + \delta a_j + \varepsilon_{igjk}$. Any variation in costs across countries can be summarized as $\overline{c}_{ij}$: $c_{igjk} = \overline{c}_{ij} + \varepsilon_{igjk}$.

A firm then compares offers of banks located in different countries. The probability that a firm chooses a specific bank depends on the average cost structures, on the characteristics of the country pair, and on an unobservable cost component. Brüggemann et al. (2012) use their model to study aggregate credit relationships

[4] For an extensive survey of literature on home bias in international asset portfolios, see Coeurdacier and Rey (2011).

between banks and firms located in countries *i* and *j* as a function of the average interest rate in the host country, bilateral observable monitoring costs (geographic distance), the number of banks active in the foreign market, and the size of the foreign banking market. They also include time-varying measures of multilateral resistance, i.e. country-year fixed effects for the host and the destination country. The multilateral resistance term refers to the average financial barrier of any country vis-à-vis all other countries (Anderson and van Wincoop 2003, Baldwin and Taglioni 2007) (see section 2.2.3).[5]

2.2.2 Gravity Equations for International Financial Assets

While the above models focus on international banking, it is generally straightforward to derive a gravity equation for international financial asset holdings as well. Martin and Rey (2004) model a portfolio choice for international holdings of equity in an environment with risk-averse agents, an endogenous number of assets, and costs of international transactions. This leads to a theoretical gravity equation in which bilateral asset holdings depend on the distance between two countries and the size of their markets. Aviat and Coeurdacier (2007) use a similar theoretical modeling approach. They focus on the relationship between bilateral trade and financial linkages, arguing that there can be two-way causality. Empirically, they find that accounting for asset trade reduces the impact of distance on trade in goods.

Okawa and van Wincoop (2012) have taken up the role of gravity in international finance. Their portfolio model consists of risky assets, which could capture equity assets or fixed income securities such as corporate bonds. In addition, there is a risk-free bond. Each risky security has a payoff which depends on country-specific as well as global factors. The demand for an asset depends on the expected asset return (relative to the risk-free asset) and the variance of country-specific returns.

The main non-standard element is the assumption of an information asymmetry: domestic agents have better information about the idiosyncratic risk of the domestic securities as compared to foreign investors. As in Brüggemann et al. (2012), there is a

[5] While Brüggeman et al (2012) focus on the role of information cost as a motivation for the gravity equation in banking, Niepmann (2013) focuses on relative efficiency. In her model, banks intermediate savings between the home and the foreign economy. There are two sources of heterogeneity: Countries differ in their factor endowments, and banks differ in their efficiency of intermediation. Efficiency is reflected in a fee banks collect for their services. Financial intermediation is subject to a moral hazard problem because firms can choose between good and bad projects, this choice being unobservable by the banks. In her model, bilateral bank assets between two countries depend on relative capital endowments and levels of bank efficiency.

bilateral cost term τ_{ij}, but the interpretation is different. In Okawa and van Wincoop (2012), this term affects the variance of a particular asset, i.e. $\tau_{ij}\sigma_i^2$ where $\tau_{ij} > \tau_{ii}$ when $i \neq j$. Okawa and van Wincoop (2012) estimate their model using bilateral data on equity holdings. They include variables capturing information frictions such as geographic distance, bilateral trade links, common language, adjacency, a common legal system, regulatory similarity, or currency unions.[6]

2.2.3 Implications for Empirical Work

The models reviewed above differ in terms of the assets considered, the type of informational friction, and the optimization approach. However, there are two important parallels.

The first parallel is that bilateral asset holdings depend not only on bilateral information frictions τ_{ij} but also on the *relative* friction τ_{ij}/D_iD_j, where D_i and D_j are the average financial frictions in the host and the destination country. These relative frictions can be captured by a full set of country-year fixed effects. The importance of dummy variables capturing multilateral resistance was first brought up in the international trade literature. In gravity regressions country-year dummies capture omitted variables, which are correlated with trade costs and with the error term (Baldwin and Taglioni 2007). Anderson and van Wincoop (2003) show that time-varying country fixed effects account for multilateral resistance. In their model multilateral resistance captures country-specific price indices: for a given bilateral trade barrier, higher trade barriers between *j* and all its other trade partners will reduce the relative price of country *i*'s exports to *j* and thereby cause a rise of *i*'s exports to *j*. High multilateral resistance of one country thus increases bilateral trade of all other countries. Including multilateral resistance terms addresses the concern that early empirical applications of the gravity equation found implausibly high border effects. In our context, multilateral resistance terms capture portfolio effects and the effects of financial frictions in one host market relative to all other countries.

[6] Bergin and Pyun (2012) extend a model by Devereux and Sutherland (2011), which allows for an endogenous choice of international assets in an open economy macro model, to an *N*-country setting. Their theoretical setup is different from the papers discussed so far because they do not assume frictions in asset trade between countries. Instead, their multilateral resistance terms capture third-country correlation effects. The authors show that including these terms addresses the "correlation puzzle", i.e. the inability of previous literature to show an impact of return correlations on asset holdings as predicted by standard theory.

The second parallel across the theoretical papers is the similarity of control variables which should be included in an empirical gravity equation. Brüggemann et al. (2012) or Niepmann (2013) regress log bank assets between countries *i* and *j* on distance, proxies for the size and development of foreign banking systems as well as on a full set of host country and receiving country fixed effects. Okawa and van Wincoop (2012) use a larger set of measures for informational frictions as well as time-varying destination- and host country fixed effects. They also replace the host country-year dummies by explanatory variables at the country level, while including separate country and year fixed effects. We proceed similarly in order to check the robustness of our results.

Our specific empirical model thus looks as follows. We estimate a baseline gravity equation which relates the log of bank *k*'s international assets *A* in host country *i* and destination country *j* to fixed effects as well as to bank- and country-pair specific explanatory variables:

$$\ln\left(A_{kij,t}\right) = -\sum_{m=1}^{M} \phi_m z_{ij,t}^{m} + X'_{k,t}\,\alpha_{k,t} + d_k + d_{i,t} + d_{j,t} + \varepsilon_{ij,t} \qquad (1)$$

where $z_{ij,t}^{m}$ is a vector of observable bilateral financial frictions between countries *i* and *j* including bilateral distance, adjacency, common language, a common legal system, and regional trade agreements being in place. ϕ_m are coefficient estimates on these observables, $X_{k,t}$ are explanatory variables at the bank level, $\alpha_{k,t}$ are the coefficients to these observables, and $\varepsilon_{ij,t}$ is an error term. d_k are fixed effects for each parent bank, $d_{i,t}$ and $d_{j,t}$ are time-varying destination and source country dummies. Standard errors are clustered at the level of each host-destination country pair.[7]

As an alternative to our model with country-year fixed effects, Fitzgerald (2012) suggests modeling multilateral resistance terms by including price terms for all countries. This approach has the advantage that additional variables which vary along the country-time dimension can be included. Claessens and van Horen (2012) apply a similar empirical model to banking data. They include a measure of competitor remoteness by explaining the location decision of banks with a variable measuring the weighted distance of all competing banks in a specific host country. They find that

[7] We have experimented with different clustering options such as destination country, host country, or bank-host country clusters, but the results are hardly affected.

competitor remoteness has an impact on the locational decision of banks. We do not follow the same route here for two reasons. First, we do not have a full set of bilateral trade data for all countries in the sample. Second, our main focus is on the effects of measures of bilateral financial frictions and their changing importance over time. Hence, the specific results for time-varying destination country variables such as GDP are of lesser interest for us.

In terms of the geographic dimension, the structure of our dataset differs from previous work in the following sense: firms and households in any destination country can choose between loans granted by German banks, their respective foreign branches and subsidiaries, or loans by banks from countries other than Germany. In each market, German banks and their foreign affiliates are thus assumed to compete against many other domestic and foreign banks. Unobserved third-country characteristics, such as changes in the competitive environment, are also captured through the full set of time-varying host- and destination country fixed effects.

2.3 Data

This section gives an overview of the data that we use. Data definitions and sources can be found in Table A.2.1 in the appendix to Chapter 2. Descriptive statistics are presented in Table A.2.2.

2.3.1 External Position Reports

Our main data source are the External Position Reports of the *Deutsche Bundesbank* (Fiorentino et al. 2010). The data can be used for research purposes on the premises of the *Bundesbank* only. The dataset provides a full sample survey of German banks' international activities. The *Bundesbank* receives mandatory reports on external positions by all banks located in Germany and by their foreign affiliates, including assets and liabilities vis-à-vis foreign counterparties. These data serve, inter alia, as inputs to the bilateral banking statistics provided by the Bank for International Settlements. Reporting occurs monthly, and reporting thresholds have been abandoned in 2002. We use the data at an annual frequency (2002-2011) because we are interested in the long-run structure of international asset holdings and also because most of our explanatory variables are available only at an annual frequency.

Modes of foreign activities

Our empirical model differs from previous work applying the gravity model to banking or financial markets in two regards. First, we use bank-level data, which allow us to analyze the importance of individual bank-related factors such as their size, their funding structure, as well as the fact that some banks have received state support during the crisis. Second, we restrict our analysis to banks which are headquartered in Germany. However, we have information not only on the international activities of the banks located in Germany, but also on the cross border activities of their foreign affiliates located in host countries other than Germany. Hence, we can still exploit the bilateral nature of international banking relations, which would not be the case if we estimated a model of the consolidated foreign exposure of each bank group. We distinguish three different modes of foreign activities (Figure 2.1):

- Mode 1 captures the assets held in a given foreign country by domestic banks located in Germany. We label this the "direct mode".
- Mode 2 captures assets held in a given destination country by branches located in a particular foreign host country. We label this the indirect "branch mode".
- Mode 3 captures assets held in a given destination country by subsidiaries located in a particular foreign host country. We label this the indirect "subsidiary mode". Subsidiaries are legally independent, hold their own equity, are subject to host country control, and frequently run large-scale retail operations. Therefore, they incur the highest costs in terms of capital requirements, regulatory (start-up) burden, and fixed investments (Cerutti et al. 2007, Fiechter et al. 2011).

Figure 2.1 shows the structure of the dataset: Suppose that there is a bank holding company *Banco Teutonia*[8] (BHC) in Germany. *Banco Teutonia* can now engage in direct or indirect international asset holdings. Direct asset holdings, or the "direct mode", imply that *Banco Teutonia* lends money to a firm, a household, a bank, or the government in country A or in country B. Let us call country A the host country and country B the destination country. *Banco Teutonia* now also has branches and subsidiaries in host country A. If assets are held through a branch or a subsidiary, we call these indirect international asset holdings. These branches and subsidiaries in the host country can either lend to firms, households, banks, or the government in host

[8] This name is purely fictitious. Any resemblance to real banks, living or dead, is purely coincidental.

country A, or they can lend to firms, households, banks, or the government in destination country B.

Overall, there are about 1,800 banks active in Germany. Many of these banks are small regional cooperative or savings banks without any active international business.[9] Activities of many of these banks remain confined even within small regional domestic market segments. International banking is dominated by the largest banks in Germany, in particular when it comes to direct investment abroad through foreign affiliates (Buch et al. 2012).

For this reason, we include all banks with foreign affiliates in our dataset, which is an unbalanced panel with information on (the largest) 100 bank holding companies plus almost all remaining bank holding companies (54), which are not among the largest 100 banks, but which have foreign branches or subsidiaries. Overall, the number of banks in our sample has declined from 154 to 123 over the sample period (2002-2011). Because we do not observe all of these bank holding companies at each point in time, we restrict our panel to those 92 bank holding companies (34 commercial banks, 45 savings banks, and 13 cooperative banks) that appear throughout the entire dataset. This means that we are left with a "balanced" panel, when it comes to bank holding companies and years. Of course, these bank holding companies are not present in all markets through all modes. Thus, the dataset is not entirely balanced along the foreign dimension. The banks reside in up to 68 host countries and are active in 79 destination countries. Our data cover 70-78 percent of all direct international activity by the bank holding companies, as well as 88-100 percent of all foreign subsidiaries, and 84-92 percent of all foreign branches of German banks (Figure 2.2).

[9] Our dataset includes all large cooperative and savings banks as well as their head institutions (including Landesbanken). These, of course, are active abroad to a considerable extent.

Figure 2.1: Modes of International Asset Holdings

This figure illustrates the different modes through which German Bank Holding Companies (BHC) are active abroad. The BHC can either directly lend to households and firms in different countries (oval shapes) or indirectly via its subsidiaries and branches that are located abroad. The direct mode is labelled by the solid lines and the indirect modes are labelled by the dashed lines.

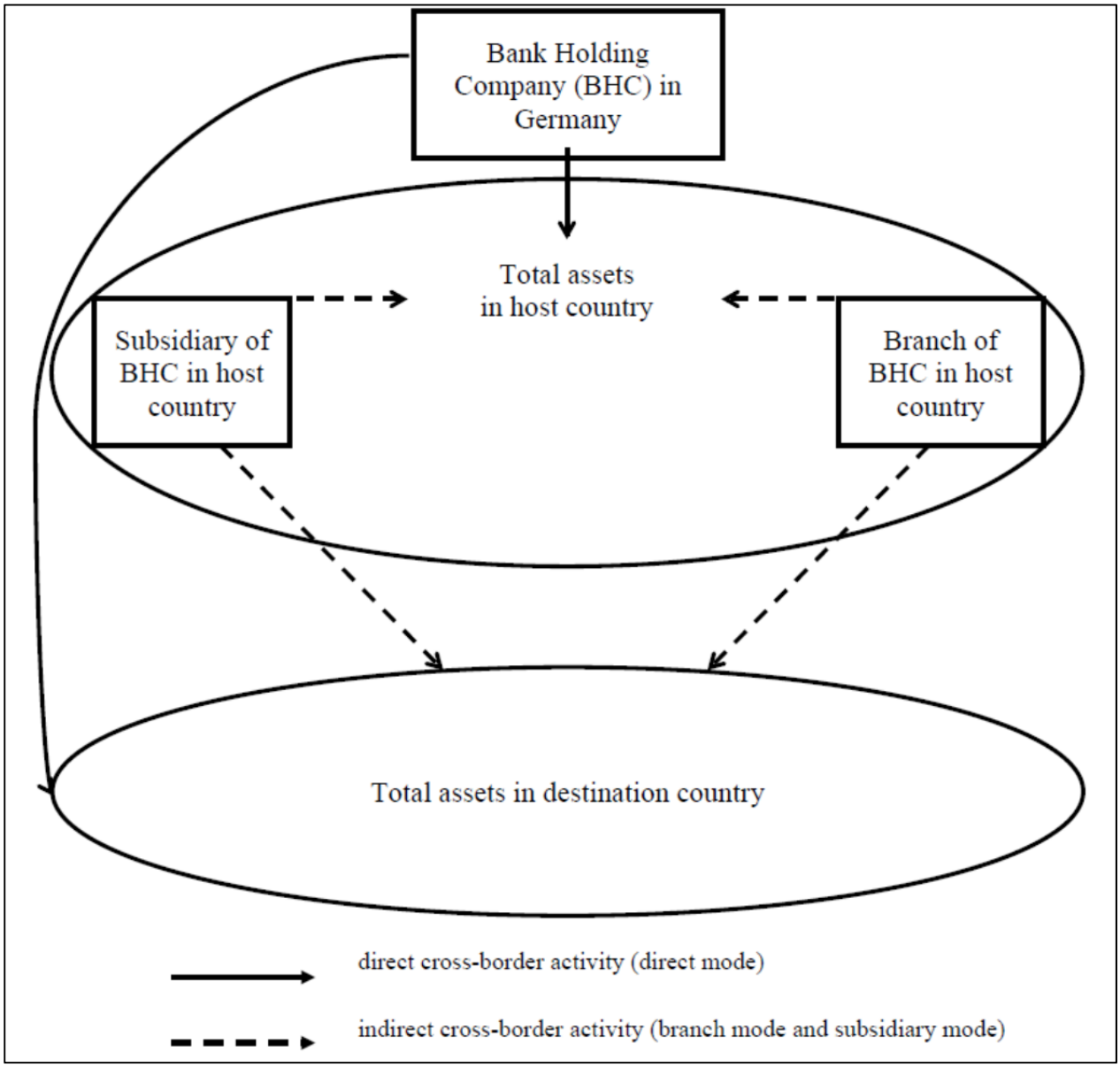
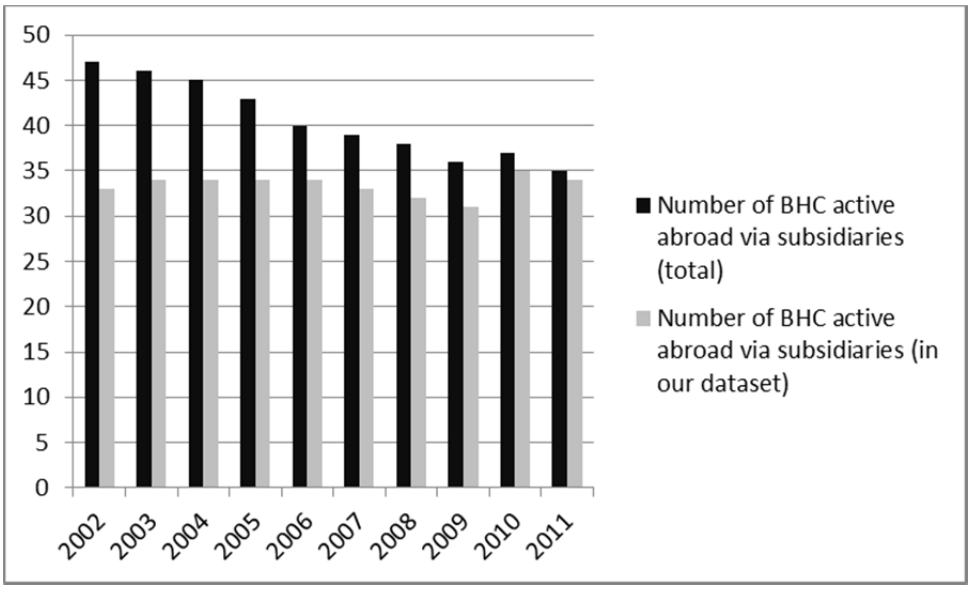


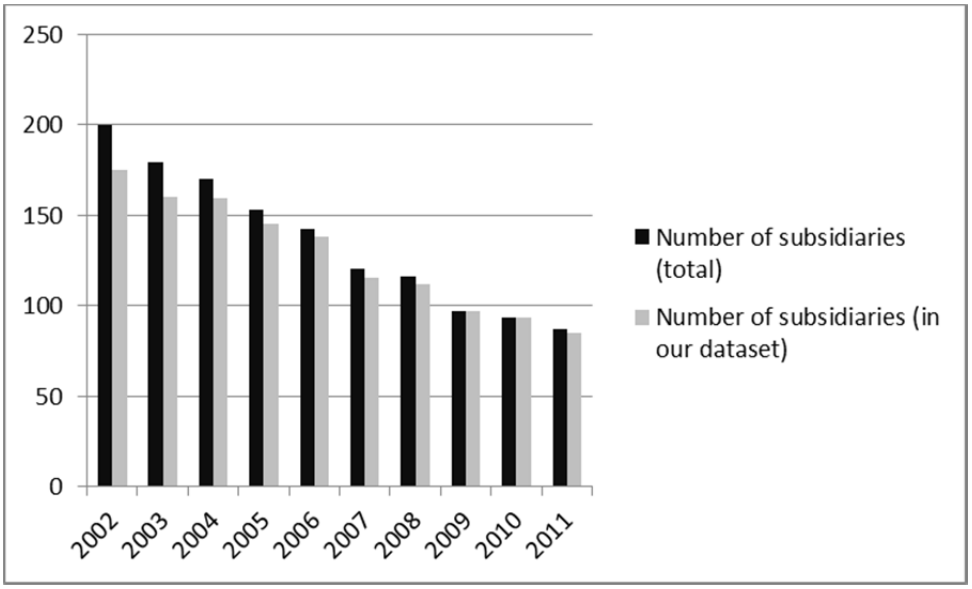
Figure 2.2: Number of Bank Holding Companies, Branches, and Subsidiaries

The graphs report the absolute number of bank holding companies active in non-German destination countries via subsidiaries and branches as well as the absolute number of subsidiaries and branches via which these bank holding companies are active abroad. Source: Own calculations based on the External Positions Report of the Deutsche Bundesbank.

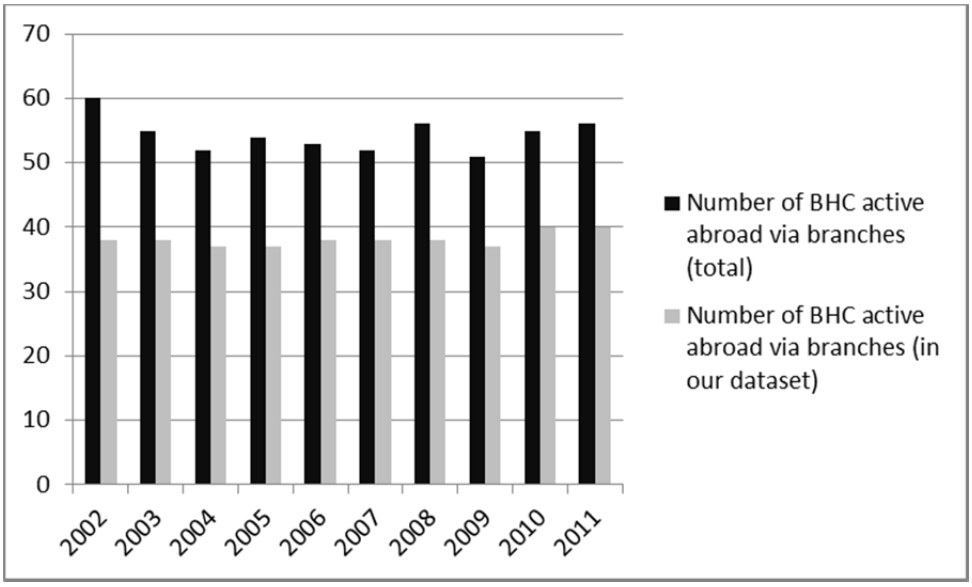
(a) Bank Holding Companies with Foreign Subsidiaries



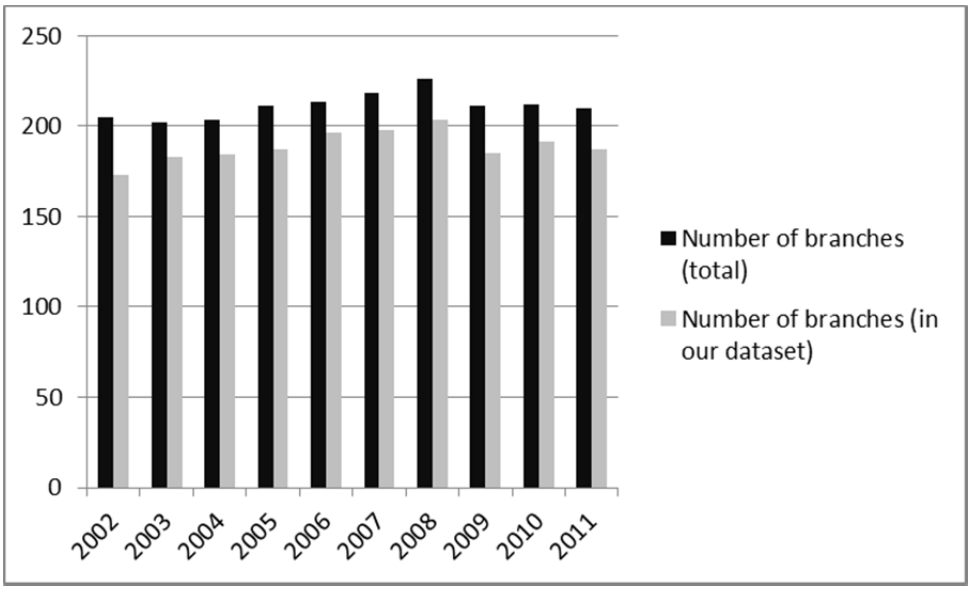
(b) Number of Foreign Subsidiaries



(c) Bank Holdings Companies Active via Branches



(d) Number of Foreign Branches



2.3.1.1 Extensive Margin

We are interested not only in the *volume* of international activities (the intensive margin) but also in the *number* of banks that are active abroad (the extensive margin). If banks withdraw from foreign markets, i.e. if they adjust along the extensive margin, adjustment is likely to be more persistent than in a situation in which they lower the volume of international assets only. Our analysis of the extensive margin is purely descriptive. Analyzing the extensive margin in a regression-based model is difficult

given the nature of our dataset. In order to provide results comparable to those of the intensive margin, we would need a dataset which spans options for all banks and all foreign affiliates to invest into all foreign markets.

Figure 2.2 shows the total number of bank holding companies active abroad via subsidiaries and branches. In the year 2011, there have been fewer bank holding companies with subsidiaries (35) than at the beginning of the sample period (47 in 2002). In terms of the number of subsidiaries, there has been quite a remarkable decline from 200 to 87 over the reporting period. The total number of banks active through the branch mode has been more stable (around 54). The total number of branches has increased from 205 in the year 2002 to 226 in the year 2008. In immediate response to the crisis, 16 branches have been closed.

The bank holding companies in our dataset had on average 1.9 subsidiaries in 2002 and 0.9 subsidiaries in 2011, where the average number of subsidiaries declined steadily in between. When only looking at the average of those BHCs that actually have at least one subsidiary, they had 5.3 subsidiaries on average in 2002 and 2.5 subsidiaries in 2011. As concerns branches, the bank holding companies in our dataset had on average 1.9 in 2002, 2.2 branches in 2008, and 2 branches in 2011. The number of branches rose up to 2008 and declined again thereafter. When only looking at the average of those BHCs that actually have at least one branch, they had 4.6 branches on average in 2002, 5.3 branches in 2008 and 4.7 branches in 2011.

2.3.1.2 Intensive Margin

Our data cover a time period which is characterized by two distinct trends in international banking. Prior to the crisis, banks have increased their exposure vis-à-vis foreign markets to a significant extent. This expansion of international activities reflects, both, enhanced financial market integration and the buildup of excessive credit on banks' balance sheets. After the start of the financial crisis in August 2007 and, at an accelerated path, after the fall of Lehman Brothers in September 2008, banks have withdrawn from foreign markets (Figures 2.3 (a) and (b)).[10]

[10] The share of international assets in Figure 2.3 (a) is calculated as the amount of total international assets of the bank holding company and all subsidiaries and branches relative to the balance sheet total of the bank holding company. Since subsidiary assets are not part of the bank holding company's balance sheet, shares can exceed 100%.

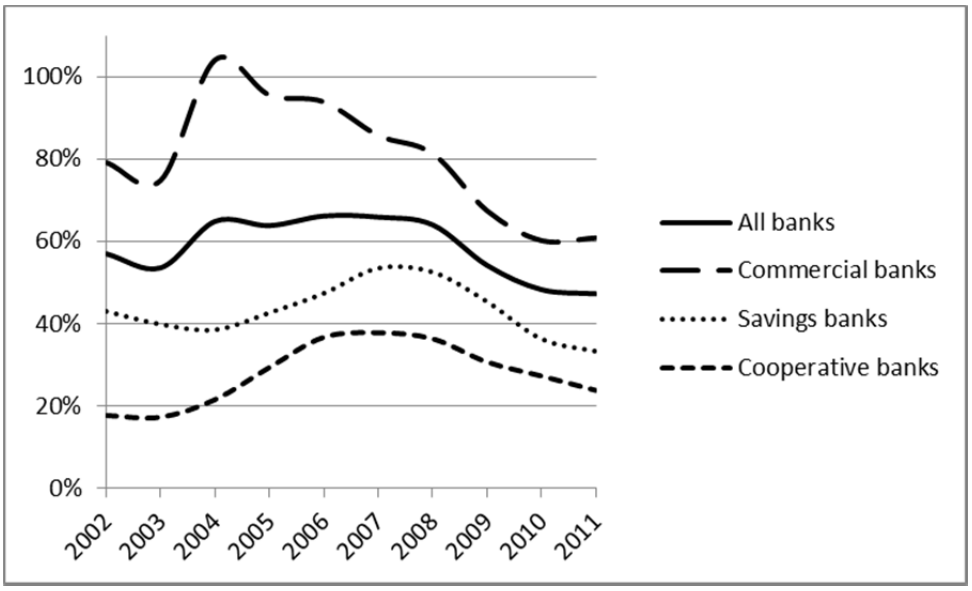
Figure 2.3: Foreign Activity of German Banks by Mode

Graph (a) reports aggregated total international assets of the entire banking groups in percent of the balance sheet total of the German bank holding companies for all banks as well as for the different groups of banks (commercial, savings, cooperative).

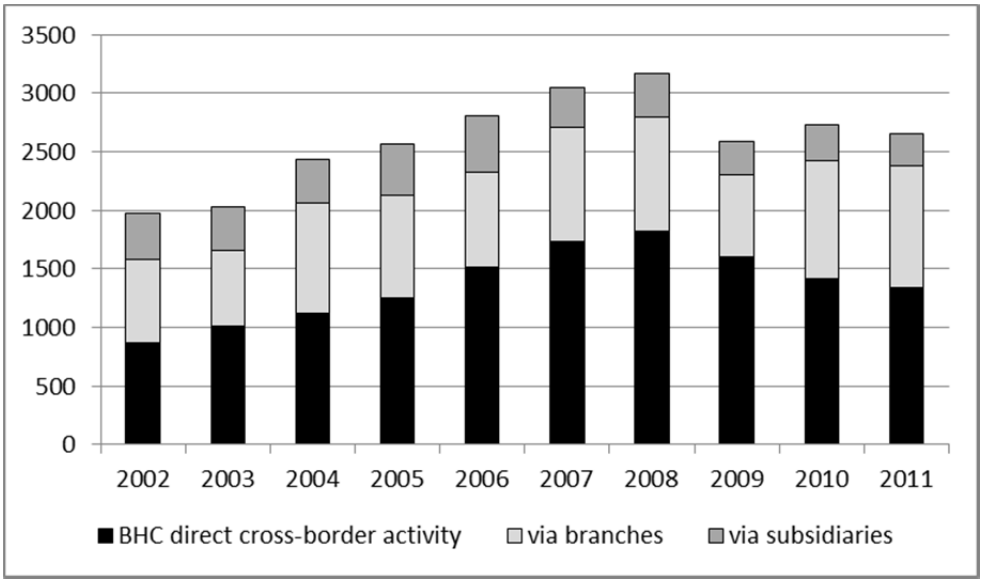
Graph (b) reports the absolute amount of total international assets of bank holding companies (residing in Germany, i.e. direct international activity) as well as their branches and subsidiaries (not residing in Germany) in millions of €.

Graph (c) reports the relative shares in total international assets attributable to the different modes of foreign activity (i.e. direct international activity by the bank holding company, via foreign branches, or via foreign subsidiaries).

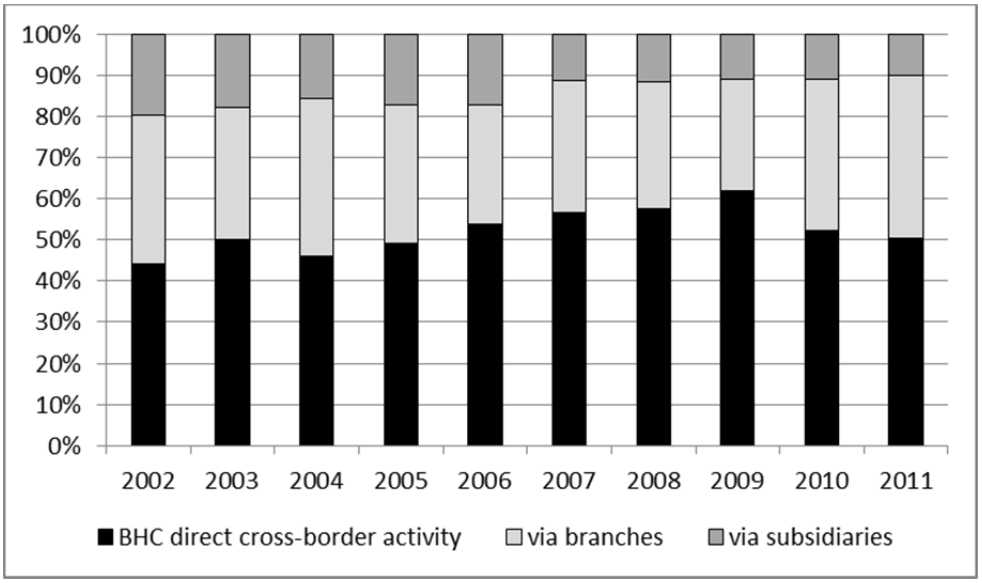
(a) International Assets in percent of Total Assets by Banking Group



(b) International Assets in Million €



(c) International Assets by Mode in percent of Total International Assets



Banks have not only shifted their activities across regions, but there has also been a shift in the composition of international activities across modes. While international assets held through the direct mode had increased from below 50 percent of total international assets in 2002 to more than 60 percent in 2009, they stood at 50 percent in 2011 (Figure 2.3 (c)). The overall importance of subsidiaries has declined from 17-20 percent at the beginning of the sample until 2006 to only 10-12 percent between 2007 and 2011. Branch activity fluctuated between 27 and 40 percent over the sample period, where it decreased during the crisis, but has been increasing again since 2010.

2.3.1.3 Summing up

Our data show five stylized facts:

- First, more German banks are active abroad via branches than via subsidiaries.
- Second, the number of subsidiaries has declined, but this decline has accelerated only marginally over the course of the crisis.
- Third, the number of foreign branches had increased before the crisis, and it has returned to the pre-crisis level subsequently.
- Fourth, the amount of international assets of large German banks increased steadily up until 2008 and dropped rapidly thereafter.
- Fifth, commercial banks started to lower their international assets already prior to the crisis; cooperative and savings banks increased their foreign exposures until 2007 and only started withdrawing from abroad in 2008.

2.3.2 Proxies for Financial Frictions

One aim of our paper is to assess whether financial frictions have become more important during the financial crisis. Financial frictions are not directly observable, and we thus refer to proxies that have been used in the literature. These include the log *distance* between the host and destination country, dummies for *adjacency*, a *common legal origin*, a *common language*, a *common membership in a regional trade agreement*, and a dummy for countries that share the *Euro as their common currency*. In all models we include dummies for countries hosting *financial centers* (Great Britain[11], Hong Kong, Ireland, Luxembourg, Singapore, Switzerland) and a dummy for the *financial crisis* (i.e. a variable that takes on the value of one after the period following the collapse of Lehman Brothers in September 2008).[12]

It could be argued that there is little variation in, say, the language dummy because we consider German banks only. Therefore, the common language dummy might capture asset holdings in Austria and Switzerland only. Note that our data include information not only on asset holdings of German parents, but also of assets held via subsidiaries or branches in different host and destination countries. This adds additional variation to these dummy variables. More than 50 percent of our observations cover these indirect relations. Hence, there is sufficient variation in the data to identify the effects of these dummies.

In column (5) of Table 2.1, we also include one specification with information on bilateral trade. Note that these data are not available for all country-pairs in the sample. Therefore, the total number of observations declines from about 59,000 to 49,000. Trade has the expected positive sign, being significant at the 10 percent-level. Because the remaining results are not affected much, we leave out this variable in all subsequent regressions in order to work with the full sample.

The above proxies for financial frictions and other transaction costs are country-pair-specific. To check the robustness of our results, we also include variables that vary across countries. *Indicators of financial and business freedom* from the Heritage Foundation measure the degree of economic and financial development, including

[11] Great Britain is treated as a financial center because the data do not allow discriminating between the United Kingdom and the Channel Islands Jersey, Guernsey and Isle of Man, which are all considered to be financial centers. Also, this dummy captures the role of the City of London as a financial center.

[12] Alternatively, we use a financial crisis dummy that equals one for the period following August 2007.

potential unilateral informational frictions. Furthermore, we include host countries' GDP per capita (from the World Bank) to control for the level of economic development.

2.3.3 Bank-Level Controls

The intensity and the mode through which banks are active abroad are affected strongly by bank-specific traits. We control for characteristics of the German bank holding company by including log *size* (total assets), the degree of *capitalization* (the ratio of capital to total, non-risk-weighted assets), the dependence on *wholesale funding* (liabilities vis-à-vis banks / total liabilities), and the share of *short-term funding* (short-term liabilities / total liabilities). The source for this information are the "Monthly Balance Sheet Statistics" provided by the *Deutsche Bundesbank*. Bank-level controls are lagged by one year to account for simultaneity issues.

We also include a dummy variable which equals one for those banks that have received state support from the German government. Several German banks, including IKB and Landesbanken like WestLB, BayernLB, and SachsenLB, have received capital injections, credit lines, and guarantees by the German government (federal and state-level) between August 2007 and August 2008. In October 2008, the German government announced a blank guarantee for bank deposits and it set up a € 400 billion bank guarantee fund and a € 70 billion recapitalization facility. The government created a special institution to administer these funds, the so-called SoFFin (*Sonderfonds Finanzmarktstabilisierung*, Special Fund Financial Market Stabilization). As of August 2010, a total of € 152.6 billion in guarantees by the SoFFin has been taken up by eight German banks in addition to € 29.3 billion in equity stakes in four German banks (Aareal Bank, Commerzbank, Hypo Real Estate, WestLB). Additionally, capital support has been provided by the federal states to their Landesbanken (BayernLB, HSH Nordbank). This information has been made publicly available on the SoFFin's website (see also Table A.2.1).

To capture the effects of these state support measures, we use a combined indicator which assumes the value of one from the time when the German parent has received some kind of support measure. A reason for using a combined indicator rather than treating capital injections and guarantees separately is that most banks have received different rescue measures. While the timing of these measures has differed to some extent, there is insufficient variation in the data to clearly identify the effects of capital

injections or guarantees. Overall, 10 out of our over 92 parent banks have received government support in one form or another. The expected effect of the state support measures is negative because state support has been linked to requirements to close foreign affiliates.

In terms of the bank-level variables, the expected sign for bank size is straightforward, International asset holdings involve fixed and variable costs. Larger and thus presumably more productive banks should be able to shoulder these costs more easily. The expected effects on the funding variables are not clear cut a priori. Ceteris paribus, weakly capitalized banks, banks with a high share of wholesale funding, and banks with a high share of short-term funding are more risky. This could induce the banks to be less active internationally; hence the expected sign would be positive for capitalization and negative for the two funding variables. At the same time, internationalization may be seen as a channel for risk diversification and for access to market-based funding. If this aspect dominates the decisions of banks to expand internationally, we would expect to see a negative effect of capitalization and positive effects of wholesale and short-term funding.

Bank-level controls are potentially endogenous. Because we lack convincing instruments for the bank-level variables, we present results including and excluding bank-level variables to check the sensitivity of our results. Our main interest lies in the country-level proxies for financial frictions. We will show below that our results are fairly robust to including or excluding the bank-level variables. Therefore, endogeneity of bank-level controls does not affect our results regarding the impact of financial frictions to any important degree.

2.3.4 Country-Level Controls

In our baseline specification, we use country-year fixed effects in order to capture multilateral resistance (see section 2.2.3). Hence, we cannot include country-level variables such as GDP or trade, which vary across countries and years at the same time.

Nevertheless, we test whether regulatory policies have affected the international activities of banks. The IMF (2011) shows that macroprudential policies affect the cyclicality of bank lending. One channel through which these policies affect domestic lending could be their impact on the international activities of banks. Hence, we include dummy variables capturing regulatory indicators, which have kindly been provided as

summary statistics by the IMF from a survey among central banks. These regulatory measures can be divided into three groups: asset measures, asset/liability measures, and capital measures. These indicators are converted into indicator variables ranging from 0-5 for the asset measures and from 0-3 for the asset/liability measures or for the capital measures. The dummies for the individual measures are switched on for the countries and years in which the respective measures have been in place. Sample size shrinks somewhat to 57 host and 77 destination countries if we add these variables at the country level. Hence, we use these variables as robustness tests only (Table 2.6).

2.4 Estimation Results

This section analyzes the determinants of banks' international assets and possible changes in these determinants over time. We begin with a set of baseline regressions (Table 2.1). Furthermore, we perform the following robustness tests: We test whether the determinants of banks' international assets have changed significantly over time by introducing interaction terms between all explanatory variables and crisis dummies (Table 2.2) as well as by estimating our model for pre- and post-crisis sample splits (Table 2.3). We distinguish the determinants of the intensive margin by mode of foreign activity (direct, subsidiary, branch) (Table 2.4), for the three pillars of the German banking system (Table 2.5), and we examine the effects of specific host country characteristics and banking regulation (Table 2.6).

2.4.1 What Determines the Volume of Banks' International Assets?

In Table 2.1, we analyze the volume of international assets of banks. Our full sample has almost 60,000 bank-country-year observations. All regressions include a full set of country-year effects; the exception is column (4), which includes separate host country, destination country, and year fixed effects to check for the sensitivity of all other results with respect to the level of fixed effects. Results are extremely robust. Additionally, we include fixed effects for each bank holding company in all regressions presented in this paper. We vary the empirical model with regard to the set of regressors included. Most of the variation in the data is driven by the overall cross-section of bank holding company-affiliate-destination combinations: while the overall R^2 is 0.50, the within R^2 takes a value of only 0.07.

In terms of bank-level explanatory variables, two results are in line with expectations and with previous literature: larger banks and banks with a higher share of wholesale funding hold higher international assets. Quantitatively, a rise of one percentage point in the share of wholesale funding is associated with a one percent increase in total international assets in a particular destination country. Hence, the strains that the crisis has induced for the wholesale funding market are causes for the decline in banks' international assets during the crisis. Capitalization and short-term funding do not impact international assets though. It is thus difficult to draw a straight line from the riskiness of banks' funding models to their internationalization. State support has the expected negative effect on international assets: banks which received state support during the crisis hold approximately exp(-0.13)-1= -12.19 percent[13] lower international assets than those that did not have to be supported.

With regard to the proxies for financial frictions, we obtain the expected result: A one percent increase in distance lowers international assets by a little more than half a percent; sharing a common border or a common language increases foreign asset holdings by 95 or 59 percent, respectively; so does membership in a regional trade agreement (73 percent). A dummy for international assets held in the Euro Area is insignificant in all specifications which include country-year fixed effects.

Acknowledging the special nature of our dataset, we also include a set of dummies capturing the mode through which banks hold their international assets (host is the same as destination, host or destination are financial centers). All these dummies are positive and significant. This can be interpreted as evidence that lower information costs or lower regulatory barriers increase the volume of international bank activity. The results for financial frictions do not change qualitatively or in terms of significance when the bank-level variables are excluded. This is important because it shows that the potential endogeneity of bank-level variables does not affect our main results.

How important are the different explanatory variables? To answer this question we have calculated standardized beta-coefficients (unreported) in order to assess the magnitude of the different variables with respect to the overall model.[14] In the baseline

[13] This formula to calculate the change in international assets will be applied to all coefficients on dummy variables throughout the rest of the paper.

[14] Beta coefficients are given by the coefficient estimate of a particular variable, multiplied by the standard deviation of this variable, and divided by the standard deviation of the dependent variable. Hence, beta coefficients give the contribution of each explanatory variable to the variance of the banks' international assets.

model in Table 2.1, column (1), the most important variables are distance, size, and the dummies for financial centers and local lending in the host country.

Table 2.1: Baseline Fixed Effects Regressions

	(1) Baseline	(2) Excluding country-specific regressors	(3) Excluding bank-specific regressors	(4) Separate country- and years dummies	(5) Including bilateral trade
Log size (t-1)	0.662***	0.661***		0.663***	0.496***
	[0.094]	[0.094]		[0.091]	[0.106]
Capitalization (t-1)	0.003	0.003		0.009	-0.019
	[0.013]	[0.013]		[0.012]	[0.014]
Wholesale funding (t-1)	0.010***	0.010***		0.007***	0.011***
	[0.002]	[0.002]		[0.0029]	[0.002]
Short-term funding (t-1)	-0.002	-0.001		0.000	-0.003
	[0.002]	[0.002]		[0.002]	[0.002]
State support (0/1)	-0.130***	-0.130***		-0.370***	-0.122**
	[0.050]	[0.050]		[0.056]	[0.053]
Subsidiary activity (0/1)	-8.252***	-8.610***		-6.831***	-9.611***
	[2.810]	[2.827]		[0.590]	[3.238]
Branch activity (0/1)	-7.448***	-7.836***		-6.052***	-8.982***
	[2.804]	[2.823]		[0.559]	[3.235]
Log distance	-0.554***		-0.549***	-0.619***	-0.695***
	[0.156]		[0.160]	[0.142]	[0.169]
Adjacency (0/1)	0.666***		0.685***	0.644***	0.326
	[0.241]		[0.241]	[0.239]	[0.247]
Common legal origin (0/1)	0.200		0.191	0.197	0.170
	[0.127]		[0.127]	[0.124]	[0.142]
Common language (0/1)	0.461**		0.459**	0.440**	0.252
	[0.216]		[0.216]	[0.216]	[0.209]
Regional trade agreement (0/1)	0.546**		0.525**	0.267	0.223
	[0.240]		[0.239]	[0.178]	[0.245]
Common currency (Euro) (0/1)	0.255		0.267	0.313**	0.073
	[0.207]		[0.209]	[0.148]	[0.196]
Log bilateral trade					0.137*
					[0.070]
Host is destination (0/1)	2.877***	4.480***	2.898***	2.750***	2.062***
	[0.470]	[0.422]	[0.474]	[0.476]	[0.541]
Host is financial center (0/1)	5.120*	5.083*	0.912	4.182***	6.767**
	[2.823]	[2.845]	[0.575]	[0.600]	[3.250]
Destination is financial center (0/1)	1.939***	2.105***	1.895***	1.397***	2.275***
	[0.365]	[0.491]	[0.363]	[0.385]	[0.453]
Country-year fixed effects	Yes	Yes	Yes	No	Yes
Country fixed effects	No	No	No	Yes	No
Year fixed effects	No	No	No	Yes	No
Number of observations	59,701	59,701	59,701	59,701	49,716
Number of panel units	11,159	11,159	11,159	11,159	9,318
R^2 within	0.071	0.070	0.065	0.018	0.065
R^2 between	0.514	0.486	0.509	0.509	0.522
R^2 overall	0.500	0.474	0.498	0.491	0.494

*Notes: This table presents results from regressions with bank holding company fixed effects using the full sample, i.e. pooling across the three different modes of international banking. The dependent variable is the log of banks' total international assets held in different destination countries by the domestic headquarters, their foreign branches, or their foreign subsidiaries located in different host countries. Standard errors are in parentheses. All bank-level covariates are lagged by one year. ***Significant at 1% level. **Significant at 5% level. * Significant at 10% level.*

2.4.2 Have the Determinants of Banks' International Assets Changed During the Crisis?

Given the reversal of banks' international assets during the crisis as documented in Figures 2.2 and 2.3, the natural question to ask is whether this has been due to a change in the determinants of banks' foreign activities or due to a changing sensitivity of banks with regard to these determinants. This question can be answered by either splitting the sample to estimate the model for the pre-crisis and for the crisis period or by including interaction terms between all variables and a crisis dummy. Both methods require defining a crisis and a pre-crisis period. We perform two splits, using the periods 2002-2007 or 2002-2008 as the pre-crisis periods, and the subsequent years (2008-2011 or 2009-2011) as the crisis years. The main results are not affected by this choice.

Table 2.2 reports the results including interaction terms between crisis dummies and all explanatory variables. It shows that the impact of bank-level controls and most of the proxies for financial frictions has not changed over the course of the crisis with two exceptions. For the case of the financial crisis dummy being one after the Lehman collapse (i.e. starting in 2008), adjacency has become more important and common language has become less important.

Table 2.3 presents the results splitting the sample into pre-crisis and crisis period. In terms of the bank-level variables, it shows that the positive effect of size significantly increased during the crisis and that capitalization changed from being negatively significant before the crisis to being a positive and significant determinant of international assets during the crisis. In terms of the financial frictions, the effect of distance, common legal origin, and common language did not change over time. Like in the model with interaction terms, the data do not support the conventional wisdom that banks have become more sensitive to financial frictions or to cultural factors during the crisis.

The sample splits detect three changes in the country-level determinants of banks' international assets, though: the importance of adjacency, of bilateral trade agreements, and of the Euro Area dummy has become stronger over time. One interpretation is that banks have re-focused their international assets on trade-related activities during the crisis. The positive effect of the Euro Area dummy for the crisis-period could reflect a general home bias effect or increasing sensitivity to exchange rate risk.

Table 2.2: Regressions with Crisis Dummies and Crisis Interaction Terms

	(1) Baseline with crisis dummy (August 2007)	(2) Baseline with crisis dummy (August 2007) and crisis interaction terms		(3) Baseline with crisis dummy (September 2008)	(4) Baseline with crisis dummy (September 2008) and crisis interaction terms	
		Baseline	Interaction term		Baseline	Interaction term
Log size (t-1)	0.662***	0.653***	0.018	0.662***	0.663***	0.011
	[0.094]	[0.098]	[0.021]	[0.094]	[0.098]	[0.022]
Capitalization (t-1)	0.003	0.004	-0.014	0.003	0.009	-0.018
	[0.013]	[0.015]	[0.012]	[0.013]	[0.014]	[0.013]
Wholesale funding (t-1)	0.010***	0.010***	-0.000	0.010***	0.011***	-0.001
	[0.002]	[0.002]	[0.001]	[0.002]	[0.002]	[0.001]
Short-term funding (t-1)	-0.002	-0.002	-0.000	-0.002	-0.003	0.001
	[0.002]	[0.002]	[0.001]	[0.002]	[0.002]	[0.001]
State support (0/1)	-0.130***	-0.172***		-0.130***	-0.152***	
	[0.050]	[0.050]		[0.050]	[0.054]	
Subsidiary activity (0/1)	-8.252***	-6.340***	-2.157	-8.252***	-7.211***	-1.221
	[2.810]	[0.621]	[2.633]	[2.810]	[0.572]	[2.599]
Branch activity (0/1)	-7.448***	-5.874***	-1.514	-7.448***	-6.627***	-0.719
	[2.804]	[0.584]	[2.630]	[2.804]	[0.533]	[2.595]
Log distance	-0.554***	-0.510***	-0.083	-0.554***	-0.519***	-0.076
	[0.156]	[0.159]	[0.059]	[0.156]	[0.160]	[0.059]
Adjacency (0/1)	0.666***	0.590**	0.140	0.666***	0.565**	0.229**
	[0.241]	[0.239]	[0.106]	[0.241]	[0.241]	[0.111]
Common legal origin (0/1)	0.200	0.123	0.124	0.200	0.143	0.101
	[0.127]	[0.135]	[0.084]	[0.127]	[0.133]	[0.078]
Common language (0/1)	0.461**	0.584***	-0.203*	0.461**	0.577***	-0.225**
	[0.216]	[0.225]	[0.114]	[0.216]	[0.223]	[0.110]
Regional trade agreement (0/1)	0.546**	0.457*	0.128	0.546**	0.475*	0.126
	[0.240]	[0.246]	[0.158]	[0.240]	[0.249]	[0.145]
Common currency (Euro) (0/1)	0.255	0.229	0.082	0.255	0.281	0.010
	[0.207]	[0.212]	[0.129]	[0.207]	[0.209]	[0.133]
Host is destination (0/1)	2.877***	3.038***	-0.302*	2.877***	3.008***	-0.294
	[0.470]	[0.473]	[0.180]	[0.470]	[0.477]	[0.185]
Host is financial center (0/1)	5.120*	3.877***	1.270	5.120*	4.500***	0.642
	[2.823]	[0.632]	[2.641]	[2.823]	[0.584]	[2.602]
Destination is financial center (0/1)	1.939***	1.437***	0.515**	1.939***	1.662***	0.297
	[0.365]	[0.376]	[0.232]	[0.365]	[0.364]	[0.224]
Crisis dummy (0/1)	-1.750	0.462		-1.034	0.405	
	[2.615]	[0.685]		[2.578]	[0.685]	
Country-year fixed effects	Yes	Yes		Yes	Yes	
Country fixed effects	No	No		No	No	
Year fixed effects	No	No		No	No	
No. of observations	59,701	59,701		59,701	59,701	
Number of panel units	11,159	11,159		11,159	11,159	
R^2 within	0.071	0.074		0.071	0.073	
R^2 between	0.514	0.516		0.514	0.515	
R^2 overall	0.500	0.501		0.500	0.501	

*Notes: This table presents results from regressions with bank holding company fixed effects using the full sample, i.e. pooling across the three different modes of international banking. The dependent variable is the log of banks' total international assets held in different destination countries by the domestic headquarters, their foreign branches, or their foreign subsidiaries located in different host countries. The second columns of regressions (2) and (4) display the coefficients for the interaction terms of the variables with the crisis dummy. Standard errors are in parentheses. All bank-level covariates are lagged by one year. ***Significant at 1% level. **Significant at 5% level. * Significant at 10% level.*

Table 2.3: Sample Splits Pre-Crisis versus Crisis Sample

	(1) Before 2007	(2) After 2007	(3) Before 2008	(4) After 2008
Log size (t-1)	0.163	0.851***	0.547***	0.838***
	[0.151]	[0.100]	[0.131]	[0.107]
Capitalization (t-1)	-0.027*	0.046***	-0.033**	0.052***
	[0.016]	[0.017]	[0.016]	[0.017]
Wholesale funding (t-1)	0.001	0.007***	0.005**	0.005***
	[0.003]	[0.001]	[0.002]	[0.001]
Short-term funding (t-1)	0.003	-0.003**	0.003	0.001
	[0.003]	[0.001]	[0.003]	[0.001]
State support (0/1)	0.000	-0.137***	0.095	-0.268***
	[0.000]	[0.044]	[0.155]	[0.092]
Subsidiary activity (0/1)	1.024	-8.083***	0.000	-7.507**
	[2.362]	[2.939]	[0.000]	[3.144]
Branch activity (0/1)	1.331	-6.853**	0.429**	-6.276**
	[2.343]	[2.932]	[0.172]	[3.136]
Log distance	-0.528***	-0.549***	-0.521***	-0.555***
	[0.171]	[0.161]	[0.169]	[0.160]
Adjacency (0/1)	0.439*	0.778***	0.432*	0.913***
	[0.239]	[0.253]	[0.238]	[0.256]
Common legal origin (0/1)	0.135	0.221*	0.158	0.211
	[0.152]	[0.134]	[0.147]	[0.136]
Common language (0/1)	0.589**	0.375*	0.571**	0.327
	[0.248]	[0.215]	[0.243]	[0.222]
Regional trade agreement (0/1)	0.434*	0.869***	0.428*	0.826**
	[0.249]	[0.329]	[0.242]	[0.329]
Common currency (Euro) (0/1)	0.269	0.407*	0.306	0.460**
	[0.229]	[0.216]	[0.217]	[0.232]
Host is destination (0/1)	3.066***	2.602***	3.082***	2.596***
	[0.536]	[0.483]	[0.527]	[0.485]
Host is financial center (0/1)	-2.266**	4.718	-2.794***	4.238
	[0.931]	[2.950]	[0.828]	[3.153]
Destination is financial center (0/1)	1.994***	1.965***	1.296***	1.936***
	[0.507]	[0.380]	[0.449]	[0.381]
Country-year fixed effects	Yes	Yes	Yes	Yes
Country fixed effects	No	No	No	No
Year fixed effects	No	No	No	No
No. of observations	26,933	32,768	33,693	26,008
Number of panel units	8,607	9,571	9,012	9,034
R^2 within	0.056	0.066	0.062	0.063
R^2 between	0.544	0.516	0.550	0.499
R^2 overall	0.515	0.505	0.518	0.498

*Notes: This table presents results from regressions with bank holding company fixed effects using the full sample, i.e. pooling across the three different modes of international banking. The dependent variable is the log of banks' total international assets held in different destination countries through the domestic headquarters, its foreign branches, or its foreign subsidiaries located in different host countries. The samples are split as indicated in the top of the columns. Standard errors are in parentheses. All bank-level covariates are lagged by one year. ***Significant at 1% level. **Significant at 5% level. *Significant at 10% level.*

Generally, a comparison between the two methods reveals that simply including interaction terms for the crisis period fails to detect changes in the determinants of cross-border banking that have evolved over the years. Most importantly, the growing importance of regional trade agreements is not detected by the interaction terms. However, both methods detect a growing importance of adjacency, pointing into the direction of an increasing concentration on familiar markets during the crisis.

2.4.3 What is the Impact of the Mode of Foreign Banking?

So far, we have pooled the data across the different modes and we have not distinguished differences in foreign business models. Given that foreign branches and subsidiaries differ in terms of their costs and in terms of their business model, the natural question to ask is whether our main results hold when splitting the sample into different modes. Table 2.4 thus shows the baseline model from Table 2.1 for all three modes of activities separately.

Many results are qualitatively similar across the different modes, which justifies our pooling assumption. For the bank-level variables at the level of the bank holding company, results are similar with some exceptions: capitalization has a negative impact on branch activity but no impact on all other modes. Size plays a role only for the direct mode, and short-term funding impacts only the two indirect modes negatively.

Financial frictions are somewhat less important for subsidiaries than for the branch or the direct mode. One might think that retail-focused subsidiary activity is more information sensitive than wholesale oriented direct and branch activity. However, the lower information sensitivity might result from the fact that subsidiaries, which are engaged in local and geographically close retail markets and also rely on local deposits and deposit guarantees (see also Cerutti et al. 2007, Fiechter et al. 2011), have better knowledge of the greater region than only wholesale oriented branches or even bank holding companies that are situated in Germany. Information and monitoring costs as proxied by bilateral gravity-type variables might thus be lower than for branches and bank holding companies that do not have this advantage of a better knowledge of the local retail market, which in turn is very important for wholesale activity, too. The effect of common legal origin is negative for the direct mode and positive for the branch or subsidiary mode.

Table 2.4: Regressions by Mode of Foreign Activity

	(1) Direct Mode	(2) Subsidiary Mode	(3) Branch Mode
Log size (t-1)	0.875***	-0.277	-0.101
	[0.107]	[0.207]	[0.205]
Capitalization (t-1)	0.012	0.039*	-0.125***
	[0.018]	[0.020]	[0.032]
Wholesale funding (t-1)	0.007***	0.011**	0.019***
	[0.002]	[0.004]	[0.003]
Short-term funding (t-1)	0.003*	-0.018***	-0.019***
	[0.002]	[0.005]	[0.004]
State support (0/1)	-0.075	-0.440***	0.033
	[0.074]	[0.095]	[0.100]
Log distance	-1.195***	-0.345**	-0.486***
	[0.135]	[0.172]	[0.136]
Adjacency (0/1)	0.132	0.145	-0.025
	[0.379]	[0.251]	[0.269]
Common legal origin (0/1)	-1.366***	0.410***	0.666***
	[0.031]	[0.155]	[0.150]
Common language (0/1)	0.679***	0.261	0.608***
	[0.022]	[0.223]	[0.234]
Regional trade agreement (0/1)	0.682***	0.422	0.464*
	[0.022]	[0.287]	[0.237]
Common currency (Euro) (0/1)	-1.132***	-0.018	-0.673***
	[0.050]	[0.260]	[0.252]
Host is destination (0/1)		3.342***	3.088***
		[0.606]	[0.434]
Host is financial center (0/1)		2.942***	5.105*
		[0.752]	[3.014]
Destination is financial center (0/1)	1.892***	-1.603***	3.004***
	[0.012]	[0.559]	[1.134]
Country-year fixed effects	Yes	Yes	Yes
Country fixed effects	No	No	No
Year fixed effects	No	No	No
Number of observations	28,691	14,219	16,791
Number of panel units	4,218	3,359	3,582
R^2 within	0.104	0.102	0.092
R^2 between	0.760	0.488	0.470
R^2 overall	0.689	0.466	0.448

*Notes: This table presents results from regressions with bank holding company fixed effects using sample splits according to the three different modes of international banking (direct, branch, subsidiary). The dependent variable is the log of banks' total international assets held in different destination countries by the domestic headquarters, their foreign branches, or their foreign subsidiaries located in different host countries, respectively. Standard errors are in parentheses. All bank-level covariates are lagged by one year. ***Significant at 1% level. **Significant at 5% level. * Significant at 10% level.*

2.4.4 What is the Impact of Banks' Business Models?

While Table 2.4 accounts for differences across the foreign business models of banks, Table 2.5 takes into consideration that the domestic business models differ as well. The German banking system is characterized by a three-tier structure consisting of commercial, savings, and cooperative banks. These banks have different business models: the private banks are traditionally more active in the wholesale business and on international markets, while the savings and cooperative banks focus more on retail activities in local markets.

To check how pooling across the different domestic business models affects our results, we split the sample into observations for banks in each of these groups (Table 2.5). Given these different business models and differences in the probability of going

abroad, the determinants of international activities of banks in these three groups are surprisingly similar. One exception is the effect of short-term funding which is associated with lower international assets for commercial banks, but with higher international assets for savings banks.

Table 2.5: Regressions by Bank-Group

	(1) Commercial Banks	(2) Savings Banks	(3) Cooperative Banks
Log size (t-1)	0.713***	0.090	1.447***
	[0.114]	[0.212]	[0.415]
Capitalization (t-1)	-0.005	-0.067*	-0.067
	[0.014]	[0.035]	[0.127]
Wholesale funding (t-1)	0.011***	0.003	0.016***
	[0.003]	[0.003]	[0.004]
Short-term funding (t-1)	-0.007***	0.013***	0.011*
	[0.002]	[0.003]	[0.006]
State support (0/1)	0.221***	-0.233***	0.000
	[0.077]	[0.082]	[0.000]
Subsidiary activity (0/1)	-8.143***	-5.515***	1.269
	[2.846]	[1.012]	[5.018]
Branch activity (0/1)	-7.402***	-5.106***	2.961
	[2.840]	[0.970]	[4.838]
Log distance	-0.472***	-0.678***	-1.101***
	[0.137]	[0.193]	[0.305]
Adjacency (0/1)	0.464*	0.709***	0.537
	[0.244]	[0.265]	[0.436]
Common legal origin (0/1)	0.249*	0.161	-0.219
	[0.135]	[0.176]	[0.301]
Common language (0/1)	0.537***	0.356	0.585
	[0.206]	[0.290]	[0.451]
Regional trade agreement (0/1)	0.700***	0.341	-0.806
	[0.214]	[0.336]	[0.798]
Common currency (Euro) (0/1)	0.107	0.129	1.002**
	[0.233]	[0.243]	[0.427]
Host is destination (0/1)	3.454***	1.928***	-0.261
	[0.399]	[0.741]	[1.512]
Host is financial center (0/1)	4.540	3.326***	-4.741
	[2.860]	[1.039]	[4.974]
Destination is financial center (0/1)	2.440***	1.606***	0.028
	[0.608]	[0.480]	[0.823]
Country-year fixed effects	Yes	Yes	Yes
Country fixed effects	No	No	No
Year fixed effects	No	No	No
Number of observations	27,908	24,900	6,893
Number of panel units	5,800	4,319	1,066
R^2 within	0.088	0.106	0.229
R^2 between	0.436	0.626	0.740
R^2 overall	0.440	0.585	0.682

*Notes: This table presents results from regressions with bank holding company fixed effects using sample splits according to the type of the bank (commercial, savings (including Landesbanken), cooperative). The dependent variable is the log of banks' total international assets held in different destination countries by the domestic headquarters, their foreign branches, or their foreign subsidiaries located in different host countries. Standard errors are in parentheses. All bank-level covariates are lagged by one year. ***Significant at 1% level. **Significant at 5% level. * Significant at 10% level.*

The most interesting difference across the different banking groups is that for the state support variable though: commercial banks which have received state support have increased rather than decreased their international assets. The negative effect for the pooled regressions is driven by the savings banks. This result is interesting as it suggests an alternative interpretation of the effect of state support: on the one hand, state support was associated with the requirement to divest international activities. On

the other hand, however, state support has also allowed banks to stabilize their activities and to expand their international activities relative to total assets (which we include as a control variable). Analyzing whether these international expansions have increased or decreased bank risk would be an interesting extension of our study.

Finally, most results for the financial frictions are similar across the different specifications as well. The main exceptions are that the positive effect of adjacency found for the full sample is driven to a large extent by the savings banks, reflecting the regional nature of their business model. But adjacency is positive for all three banking groups and significant at the ten percent level for commercial banks, too. Common legal origin, common language, and regional trade agreements play a role only for the commercial banks.

2.4.5 What Are the Effects of Host Country Characteristics and Regulations?

Table 2.6 presents the results for augmenting the baseline specification by additional (lagged) host country characteristics. Host country and year fixed effects are now included separately because host-year dummies would be collinear with the additional variables. We also estimate this specification for samples before and during the crisis.

The country-level variables proxying for financial and business freedom enter significantly with the expected positive signs. The remaining results are hardly affected. Bank-level covariates and proxies for financial frictions are quite robust compared to the baseline specification in Table 2.1, column (1). The joint significance of all seven variables proxying for financial frictions hardly changes. The null hypothesis for those variables being jointly zero can be rejected with a $\chi^2(6)$-value of 189.02 at the one percent significance level, which is almost the exact same value as in the baseline model.

All three macroprudential regulations are jointly significantly different from zero at the one percent level. Asset measures are strongly significant whereas asset/liability measures and capital measures are not significant. More restrictive asset side measures in the form of limits on exposure concentration and caps on foreign currency lending lower international bank assets. This is in line with expectations because these measures impact a bank's international assets directly, as opposed to capital and liability measures.

Table 2.6: Regressions with Host Country Characteristics and Banking Regulation

	(1) Baseline	(2) Baseline with regulatory measures	(3) Before 2007	(4) After 2007	(5) Before 2008	(6) After 2008
Log size (t-1)	0.609***	0.603***	0.305*	0.136	0.731***	0.062
	[0.106]	[0.106]	[0.158]	[0.146]	[0.130]	[0.165]
Capitalization (t-1)	-0.018	-0.015	-0.008	-0.075***	-0.016	-0.070***
	[0.014]	[0.014]	[0.016]	[0.021]	[0.017]	[0.021]
Wholesale funding (t-1)	0.008***	0.008***	0.001	0.012***	0.005**	0.014***
	[0.002]	[0.002]	[0.003]	[0.003]	[0.002]	[0.004]
Short-term funding (t-1)	0.001	0.001	0.004	-0.006***	0.004	-0.005**
	[0.002]	[0.002]	[0.003]	[0.002]	[0.003]	[0.002]
State support (0/1)	-0.253***	-0.233***	0.000	-0.138***	-0.126	-0.107
	[0.054]	[0.055]	[0.000]	[0.045]	[0.227]	[0.088]
Subsidiary activity (0/1)	-6.142***	-6.172***	-8.176***	-9.190***	-6.137***	-10.144***
	[0.892]	[0.931]	[1.272]	[1.044]	[1.109]	[1.327]
Branch activity (0/1)	-5.175***	-5.206***	-7.659***	-7.576***	-5.475***	-8.478***
	[0.873]	[0.904]	[1.257]	[1.022]	[1.088]	[1.310]
Log distance	-0.587***	-0.587***	-0.606***	-0.593***	-0.603***	-0.615***
	[0.202]	[0.202]	[0.212]	[0.218]	[0.208]	[0.223]
Adjacency (0/1)	0.370	0.371	0.273	0.401	0.230	0.535**
	[0.246]	[0.246]	[0.242]	[0.262]	[0.240]	[0.269]
Common legal origin (0/1)	0.301*	0.303*	0.286	0.321*	0.266	0.330*
	[0.168]	[0.168]	[0.191]	[0.177]	[0.183]	[0.186]
Common language (0/1)	0.527**	0.528**	0.569**	0.516**	0.610**	0.413
	[0.252]	[0.252]	[0.270]	[0.256]	[0.264]	[0.270]
Regional trade agreement (0/1)	0.482*	0.486**	0.326	0.863**	0.306	0.862**
	[0.247]	[0.248]	[0.255]	[0.375]	[0.244]	[0.385]
Common currency (Euro) (0/1)	0.241	0.233	0.293	0.282	0.339	0.293
	[0.201]	[0.202]	[0.238]	[0.212]	[0.224]	[0.239]
Financial freedom (t-1)	0.014***	0.014***	0.003	0.006	0.008**	0.015*
	[0.003]	[0.003]	[0.004]	[0.008]	[0.004]	[0.008]
Business freedom (t-1)	0.010***	0.009***	0.002	-0.019*	0.008**	0.004
	[0.003]	[0.003]	[0.003]	[0.012]	[0.003]	[0.014]
GDP per capita (t-1)	0.079***	0.083***	-0.031	0.035	0.063	-0.072
	[0.030]	[0.029]	[0.043]	[0.041]	[0.040]	[0.049]
Host is destination (0/1)	3.133***	3.131***	3.142***	3.068***	3.234***	2.972***
	[0.497]	[0.496]	[0.560]	[0.528]	[0.541]	[0.536]
Host is financial center (0/1)	2.074**	2.134**	4.986***	4.916***	2.218*	6.444***
	[0.984]	[0.988]	[1.396]	[1.244]	[1.223]	[1.491]
Destination is financial center (0/1)	1.872***	1.899***	-0.079	1.934***	-0.092	1.995***
	[0.353]	[0.346]	[0.470]	[0.386]	[0.461]	[0.400]
Asset measures (0-5)		-0.147**	-0.033	-0.134**	0.088	-0.066
		[0.063]	[0.227]	[0.054]	[0.178]	[0.048]
Asset/liability measures (0-3)		0.049	0.118	0.158	-0.027	-0.007
		[0.111]	[0.293]	[0.109]	[0.192]	[0.149]
Capital measures (0-3)		-0.110	0.038	0.200	-0.433	-0.018
		[0.181]	[0.079]	[0.184]	[0.630]	[0.206]
Country-year fixed effects	Destination	Destination	Destination	Destination	Destination	Destination
Country fixed effects	Host	Host	Host	Host	Host	Host
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	45,691	45,691	23,203	22,488	29,030	16,661
Number of panel units	8,694	8,694	7,371	7,312	7,712	6,796
R^2 within	0.056	0.056	0.047	0.040	0.051	0.039
R^2 between	0.544	0.544	0.555	0.550	0.561	0.535
R^2 overall	0.522	0.522	0.526	0.535	0.530	0.532

*Notes: This table presents results from regressions with bank holding company fixed effects using the full sample, i.e. pooling across the three different modes of international banking. The dependent variable is the log of banks' total international assets held in different destination countries through the domestic headquarters, its foreign branches, or its foreign subsidiaries located in different host countries. Standard errors are in parentheses. All bank-level as well as the host country level covariates are lagged by one year. ***Significant at 1% level. **Significant at 5% level. *Significant at 10% level.*

2.5 Conclusion

The past decades have witnessed a substantial increase in international banking which the recent financial crisis has brought to an abrupt end. International banking has declined significantly, and it is not clear whether it will revert to its pre-crisis level in the near future. This paper has examined the extent of the decline and its determinants. Using a novel bank-level dataset for German bank holding companies and their branches and subsidiaries, we have examined their international activity for the period 2002-2011.

Stylized facts show that German banks have withdrawn from foreign markets, both along the extensive and the intensive margin. This withdrawal has been relatively stronger for activities of foreign subsidiaries compared to direct cross-border assets or assets held through branches.

Our results suggest the following interpretation of these trends and their persistence.

First, banks with market-based funding models and, in particular, with a high share of wholesale funding have higher international assets. Hence, persistently tighter conditions on funding markets would have an impact on the internationalization strategies that banks will pursue in the future. How persistent this adjustment is going to be is hard to predict. To the extent that the re-regulation of the banking industry that is currently taking place changes market structures in banking and banks' funding markets, the adjustment is likely to be sustained.

Second, policy interventions matter. Some banks receiving German state support during the crisis have lowered their international assets, and foreign macroprudential policies had a negative impact as well. To the extent that reductions in international assets are associated with the closure of foreign affiliates, they are likely to be persistent.

Third, financial frictions matter for international banking. As in previous studies, we find that geographical and cultural proximity has a positive impact on banks' international assets. Perhaps contrary to conventional wisdom, the impact of financial frictions has remained relatively stable throughout the crisis as well. The variables for which we find a stronger effect during the crisis period are adjacency and the presence of bilateral trade agreements. This suggests that trade-related finance has become relatively more important over time.

2.6 Appendix to Chapter 2

Table A.2.1: List of Variables and Definitions

Variable	Definition	Source
Dependent variable		
Log total international assets (intensive margin)	Natural logarithm of gross total assets (in million €) held in any destination country by any bank located in any host country	External Position Reports, Deutsche Bundesbank
Bank-level covariates		
Log size	Natural logarithm of banks' gross total assets	Monthly Balance Sheet Statistics, Deutsche Bundesbank
Capitalization	Ratio of total equity capital to gross total assets	Monthly Balance Sheet Statistics, Deutsche Bundesbank
Wholesale funding	Liabilities vis-à-vis banks (including central bank) / total liabilities	Monthly Balance Sheet Statistics, Deutsche Bundesbank
Short-term funding	Total short-term liabilities (with maturity of up to one year) / total liabilities	Monthly Balance Sheet Statistics, Deutsche Bundesbank
State support	Dummy variable equal to 1 for bank holding companies that received state support during the crisis, 0 otherwise	SoFFin (German Restructuring Fund) http://www.fmsa.de/de/fmsa/soffin/instrumente/SoFFin-Massnahmen/SoFFin-Massnahmen.html
Subsidiary	Dummy variable equal to 1 for subsidiary activity, 0 otherwise	External Position Reports, Deutsche Bundesbank
Branch	Dummy variable equal to 1 for branch activity, 0 otherwise	External Position Reports, Deutsche Bundesbank
Bilateral financial frictions		
Log distance	Natural logarithm of the population weighted distance (in km) between host and destination country	Centre d'Etudes Prospectives et d'Informations Internationales, CEPII
Adjacency	Dummy variable equal to 1 if two countries share a common border, 0 otherwise	CEPII
Common legal origin	Dummy variable equal to 1 if two countries have the same legal origin, 0 otherwise	CEPII
Common language	Dummy variable equal to 1 if two countries share a common language that is spoken by at least 9 percent of the population in both countries, 0 otherwise	CEPII
Regional trade agreement	Dummy variable equal to 1 if two countries are both members of a regional trade agreement, 0 otherwise	CEPII
Common currency (Euro)	Dummy variable equal to 1 if two countries share the Euro as same currency, 0 otherwise	
Bilateral trade	Total yearly bilateral trade flows in thousands of euros, total trade in goods (grand total)	OECD, STAN Bilateral Trade Database
Unilateral financial frictions		
Business freedom	Index from 0 (repressive) – 100 (completely free business environment) "measure of the ability to start, operate, and close a business that represents the overall burden of regulation as well as the efficiency of government in the regulatory process."	Index of Economic Freedom, The Heritage Foundation
Financial freedom	Index from 0 (repressive) – 100 (negligible government interference) "measure of banking efficiency as well as a measure of independence from government control and interference in the financial sector."	Index of Economic Freedom, The Heritage Foundation
GDP per capita	In thousands of euros	World Governance Indicators, World Bank
Asset measures	Index of macroprudential regulations running from 0 to 5 capturing whether caps on loan-to-value ratios, caps on debt/loan-to-income ratios, limits on exposure concentration, caps on foreign currency lending, and ceilings on credit or credit growth have been in place for a given year. The index is the sum of individual dummy variables for the specific asset measures being in place (=1) or not (=0).	International Monetary Fund (IMF), Survey of Central Banks
Asset/liability measures	Index of macroprudential regulations running from 0 to 3 capturing whether limits on net open currency positions, limits on maturity mismatch, and reserve requirements have been in place for a given year. The index is the sum of individual dummy variables for the specific asset/liability measures being in place (=1) or not (=0).	IMF

Capital measures	Index of macroprudential regulations running from 0 to 3 capturing whether countercyclical capital requirement, dynamic provisioning, and restrictions on profit distribution have been in place for a given year. The index is the sum of individual dummy variables for the specific capital measures being in place (=1) or not (=0).	IMF
Other country level covariates		
Host is destination	Dummy variable equal to 1 if host country is destination country, 0 otherwise	
Host (destination) is financial center	Dummy variable equal to 1 if host (destination) country is a financial center, 0 otherwise	Deutsche Bundesbank
Financial crisis dummies		
August 2007	Equal to 1 after (and including 2007), 0 before	
September 2008	Equal to 1 after (and including 2008), 0 before	

Table A.2.2: Summary Statistics for Variables

An asterisk (*) indicates that minima and maxima for these variables cannot be disclosed due to confidentiality reasons.

Variable	Observations	Mean	Std. Dev.	Min	Max
Dependent Variable					
Log total international assets	59,701	1.39	3.96	*	*
Bank level covariates					
Log size	59,701	11.27	1.58	*	*
Capitalization	59,701	4.29	2.05	*	*
Wholesale funding	59,701	42.12	20.37	*	*
Short-term funding	59,701	63.17	22.49	*	*
State support (0/1)	59,701	0.12	0.33	0	1
Savings bank (0/1)	59,701	0.42	0.49	0	1
Cooperative bank (0/1)	59,701	0.12	0.32	0	1
Subsidiary activity(0/1)	59,701	0.24	0.43	0	1
Branch activity (0/1)	59,701	0.28	0.45	0	1
Bilateral financial frictions					
Log distance	59,701	7.71	1.30	2.13	9.88
Adjacency (0/1)	59,701	0.14	0.34	0	1
Common legal origin (0/1)	59,701	0.21	0.41	0	1
Common language (0/1)	59,701	0.12	0.33	0	1
Regional trade agreement (0/1)	59,701	0.60	0.49	0	1
Common currency (Euro) (0/1)	59,701	0.22	0.41	0	1
Log bilateral trade	49,716	8.97	2.25	-0.61	21.07
Unilateral financial frictions (host country)					
Financial freedom	45,691	63.13	14.65	10	90
Business freedom	45,691	84.04	10.21	40	100
GDP per capita	45,691	24.67	6.98	9	92
Asset measures	45,691	0.17	0.48	0	5
Asset/liability measures	45,691	0.06	0.27	0	3
Capital Measures	45,691	0.02	0.15	0	3
Other country level covariates					
Host is destination (0/1)	59,701	0.04	0.19	0	1
Host is financial center (0/1)	59,701	0.29	0.45	0	1
Destination is financial center (0/1)	59,701	0.17	0.38	0	1
Financial crisis dummies					
August 2007 (0/1)	59,701	0.55	0.50	0	1
September 2008 (0/1)	59,701	0.44	0.50	0	1

3. Fiscal Rules and Compliance Expectations[15]

3.1 Introduction

Constitutional fiscal rules such as a balanced budget requirement have been used for decades in federal countries such as Switzerland and the US states to limit deficits and debts of sub-national jurisdictions (for a survey of current fiscal rules see IMF, 2012). On the national level, the euro area debt crisis has triggered a wave of new statutory and constitutional budget constraints in order to boost public borrower reputation. The Fiscal Compact, accepted by all EU countries except the UK and the Czech Republic in 2012, has been another milestone for the spread of numerical fiscal constraints. The signatory countries commit to the introduction of national debt brakes with well-defined numerical contents (i.e. governments are required to limit structural deficits to a maximum of 0.5 percent of GDP, and to lower debt levels systematically when exceeding 60 percent of GDP, European Council, 2011).

A growing literature examines the impact of numerical fiscal rules based on aggregate fiscal performance in different regional contexts. The standard approach is the estimation of cross-section or panel models for the selected jurisdictions and their deficit or debt performance (for the US see Eichengreen and Bayoumi, 1994, Poterba, 1996; for Europe see Debrun, 2000, Lagona and Padovano, 2007, Debrun et al., 2008; for OECD countries see Dahan and Strawczynski, 2010; and for Swiss cantons and municipalities see Feld and Kirchgässner, 2008; Krogstrup and Wälti, 2008). A shortcoming of these highly aggregated approaches is that they do not reveal how fiscal rules impact on the beliefs of fiscal decision makers regarding the credibility of the fiscal rule and hence their expectations for compliance. The present paper aims to fill this gap by examining theoretically and empirically the intermediate step between fiscal rules on the one hand and decision makers' expectations on future fiscal outcomes on the other hand.

A defining characteristic of an effective and credible rule is that it anchors expectations consistent with the rule's constraints. This logic has long been the key for assessing monetary rules. In the monetary context, incentives to generate surprise

[15] This chapter is based on joint work with Friedrich Heinemann, Eckhard Janeba, and Frank Streif, which has been published as "Fiscal Rules and Compliance Expectations – Evidence for the German Debt Brake", ZEW Discussion Paper No. 14-034, Mannheim. See Heinemann, Janeba, Schröder, and Streif (2014b).

inflation may undermine the credibility of an inflation rule (Kydland and Prescott, 1977; Barro and Gordon, 1983). Hence, a monetary rule's effectiveness can be assessed by analyzing its impact on inflationary expectations. For fiscal policy, an analogy applies for a deficit rule and its impact on compliance expectations. Due to the political costs of fiscal consolidation, politicians may face incentives not to comply with the deficit rule in the future. Whether and to what extent the new rule is seen as a binding constraint should be detectable from compliance expectations. This should hold in particular for the expectations of those political actors who take the relevant budgetary decisions. Therefore, the impact of fiscal rules on politicians' expectations offers a natural way to assess the credibility and effectiveness of a new rule-based fiscal regime.

Although the underlying idea is of obvious and fundamental importance, our contribution is the first to study through a survey of politicians to what extent policy makers expect compliance with a new fiscal rule. Thus, it serves to fill a striking gap in the literature on fiscal rules' effectiveness. The approach has a further strength: While studies on the link between rules and observable fiscal performance are only applicable on an ex post-basis (i.e. after many years of experience with an existing rule) our method can be employed ex ante (i.e. once a rule has come into existence but performance data are not yet available). Furthermore, it opens the black box of aggregation and, instead, looks into the impact of a fiscal rule on the (heterogeneous) expectations of those individual politicians who actually take the budgetary decisions.

The institutional context of our analysis is the German debt brake. We explore expectation formation for the members of all German state parliaments regarding an existing fiscal rule that becomes binding only several years from now. The case of Germany's debt brake is of interest for the understanding of fiscal rules more generally and beyond Germany: First, the German government has been a major advocate for establishing the Fiscal Compact in Europe. In fact, in many dimensions the provisions of the Fiscal Compact are similar to that of Germany's debt brake. Therefore, a better understanding of the German debt brake will also be helpful for assessing the Compact's consequences for other EU countries. Second, the German debt brake is characterized by lagged implementation since its binding constraints are phased in over a longer period (for the central level until the year 2016 and for the state level in 2020). Lagged implementation is a frequent strategy to realize far reaching institutional reforms since it helps to overcome reform resistance (see Buchanan, 1994, for a general discussion).

At the same time, the transition process raises substantial credibility questions and the German debt brake example offers the opportunity to better understand the general conditions under which lagged implementation can nevertheless be credible.

Our analysis of expectation formation comprises a theoretical and an empirical contribution. First we develop a theoretical model with three periods (labelled 0, 1, 2) describing the dynamic fiscal decision situation in an environment characterized by phasing in a zero deficit rule. Decisions on deficits are dynamic by nature and imply trade-offs between instant and future political costs from fiscal consolidation. The model's key feature is the existence of a fiscal rule which takes effect only in the future (period 2). A fiscal shock in the near future (period 1) makes compliance with the fiscal rule uncertain when the fiscal rule is not credible. In period 1, the government trades off the benefits and costs of adhering to the fiscal rule. We show that compliance is more likely i) the lower the initial deficit in period 0, ii) the lower the bailout expectations, iii) the tighter the fiscal rule, and iv) the higher the deficit reduction in period 0. Furthermore, the model predicts that insiders (defined to be members of parties of the incumbent government or within-state parliamentarians) have more optimistic compliance expectations than outsiders (opposition members, out-of-state politicians). Here, the model makes a distinction between two possible explanations: asymmetric information between insiders and outsiders on the occurring fiscal shocks and overconfidence on the side of insiders. The model thus captures key features of the German debt rule as well as similar institutional innovations elsewhere (e.g. the joint implementation of European and national fiscal rules) and guides the empirical analysis.

In a second step, we test these model predictions on the drivers of compliance expectations based on a unique survey of members of all 16 German state parliaments, who have been contacted with a questionnaire relating to the new debt brake. In the survey we elicited responses for the politicians' expectations on the own state complying with the new rule by the year 2020, on other states' compliance, and on the likelihood of sanctions or bailout if a state violates the new rule in 2020. Since the survey was not anonymous, individual characteristics (such as education, party membership, etc.) and state characteristics (such as current fiscal position and future need for fiscal consolidation) can be used to systematically study the determinants of compliance expectations. We obtained answers from 639 politicians who provided their

compliance expectations for 16 states, which leaves us with more than 10,000 observations.

The survey shows that the debt brake's credibility is far from perfect. The heterogeneity of compliance expectations in the survey closely corresponds to our theoretical predictions. States' initial fiscal conditions, specific state fiscal rules and bailout perceptions matter. In addition, there is a robust asymmetry in compliance expectations between insiders and outsiders (both for in-state versus out-of-state politicians and the government versus opposition dimension). Insiders tend to be significantly more optimistic than outsiders regarding the likelihood of their state's compliance. Based on the guidance of our theoretical model we diagnose overconfidence of insiders (and not noisy information) as driving this asymmetry. These detailed insights improve our understanding on how the credibility of a new national fiscal rule can be strengthened in general. Our results point to the importance of no-bailout rules, sustainable initial fiscal conditions and complementary sub-national rules.

Our paper is related to various other literatures. A few recent papers analyze theoretically the role of fiscal rules in a political economy framework, such as Azzimonti, Battaglini and Coate (2008). Janeba (2012) considers the role of delay in making a German type debt brake binding when the fiscal rule itself is credible. The incentives of bailouts in a federal context are considered by Goodspeed (2002). Kirchgässner (2002) and Voigt and Blume (2011) examine empirically the effects of fiscal constraints on fiscal outcomes. Expectation effects of fiscal rules with respect to bond market investors play a role for studies which look into the impact of fiscal rules on risk premia of government bonds (Heinemann, Osterloh and Kalb, 2014; Iara and Wolff, 2014). Surveys of politicians have been used in recent research by two of the present authors. Heinemann and Janeba (2011) use a survey of members of Germany's national parliament to study ideological bias in tax policy. Janeba and Osterloh (2013) use a survey of mayors in the German state of Baden-Württemberg to empirically motivate the spatial structure of local tax competition in a theoretical tax competition model. Heinemann and Osterloh (2013) survey members of the European Parliament regarding the introduction of a minimum tax for companies in the EU in order to disentangle ideological and national preferences of politicians.

The rest of the paper is organized as follows. Section 3.2 sets up the theoretical model and derives comparative statics for the likelihood of compliance with the debt

brake. Section 3.3 describes the original survey and provides background information on Germany's political and fiscal system and the debt brake. Our main findings are presented and discussed in section 3.4. Finally, section 3.5 concludes.

3.2 A Model of Compliance with a Fiscal Rule

We model the dynamic fiscal decision of an incumbent government to reduce its deficit in order to meet the target of a fiscal rule becoming effective only in the distant future. Political costs of deficit reduction are modeled in a reduced form in order to focus on the likelihood of compliance with the fiscal rule. Lack of government commitment and deficit shocks make compliance non-trivial and uncertain. Specifically, we assume that the economy lasts for three periods, $t = 0,1,2$, where period 0 is the present, period 1 is a future point in time when a fiscal shock occurs, and period 2 is the time when the fiscal rule becomes binding (i.e., 2020 in the context of the German debt brake).

The main variable of interest is the government deficit d_t. The initial deficit is given by $d_0 > 0$ and is exogenous from the viewpoint of the incumbent government in period 0. The fiscal rule (i.e., the debt brake) requires the government to run (at least) a balanced budget in period 2. If this target is met, that is, $d_2 \leq 0$, the government obtains payoff u_c (subscript c for compliance). Otherwise the government is noncompliant and obtains payoff $b \cdot u_{nc}$, where $b \leq 1$ is an endogenous variable that is discussed in more detail below (subscript nc for non-compliance). We assume $u_c - u_{nc} > 0$ so that the gross gain from compliance is positive. The government can reach the target of the fiscal rule in two steps by reducing the deficit in periods 0 and 1 by the amounts r_0 and r_1, respectively. A negative value of r_t, for $t = 0,1$, represents the opposite of fiscal consolidation, called fiscal profligacy. We model deficit reduction in a reduced form without specifying the nature of the fiscal adjustment (i.e., tax increases and/or expenditure cuts).

Deficit reduction is costly for the government in the period when it takes place because approval ratings of the government or reelection chances are harmed. An increase in the fiscal deficit works in the opposite direction. We focus on the concurrent cost even though the cost of permanent deficit reduction may spill over to future periods. We thus implicitly assume that voters and politicians care mostly about the *change* of the deficit, rather than its level. The cost function for permanently reducing

the deficit by r is c(r) in the period when the adjustment is made, and has the properties $c(r) \gtreqless 0$ for $r \gtreqless 0$, and c'>0, c'' > 0 . Strict convexity implies that spreading a given deficit reduction over time is efficient, all else being equal.

The deficit in period 1 is a function of the initial deficit d_0 and the reduction r_0 undertaken in period 0. The deficit d_1 is stochastic due to a shock influencing the deficit in period 1. The shock is labeled s and is drawn from the uniform distribution with support $[\underline{s}, \overline{s}]$. The probability density function is thus $(\overline{s} - \underline{s})^{-1} =: S^{-1}$. When putting these elements together the actual deficit in period 1 is

$$d_1 = d_0 - r_0 + s. \tag{1}$$

In period 1 the government changes the deficit by choosing r_1 so that

$$d_2 = d_1 - r_1. \tag{2}$$

By assumption no shock is assumed to take place in period 2. The government payoff is given by

$$U = -c(r_0) + \delta[v - c(r_1)], \tag{3}$$

where $v = u_c$ when the government is compliant in period 2, that is $d_2 \leq 0$, and $v = bu_{nc}$ when not. Let $\delta \leq 1$ be the discount factor.[16]

3.2.1 Credible Fiscal Rule

We start with a benchmark situation in which the fiscal rule $d_2 \leq 0$ is credible and the government must comply with it regardless of the realization of the shock in period 1. In this situation the government exactly meets the fiscal target because further deficit reduction is costly. Therefore deficit reduction in period 1 is $r_1 = d_0 - r_0 + s$. The expected utility from compliance is then

$$E[U] = -c(r_0) + \delta\left[u_c - \frac{1}{S}\int_{\underline{s}}^{\overline{s}} c(d_0 - r_0 + s)\, ds\right], \tag{4}$$

where we made use of the assumption that shocks are uniformly distributed. The costs of compliance come from the cost of deficit reduction in period 0 plus the discounted, probability weighted cost in period 1, which depend on the initial deficit d_0, period 0 deficit reduction r_0, and the magnitude of the realized shock s.

The government influences the expected utility by choosing r_0, which in turn affects the amount and costs of deficit reduction in period 1. The optimal initial deficit

[16] We could discount utility in period 2 by δ^2 instead of δ. Doing so would simply rescale the utility level v, without affecting results. We omit the complication in order to save on notation.

reduction is found by maximizing (4) with respect to r_0. The optimum $\widetilde{r_0}$ is implicitly given by the condition

$$\frac{\delta[c(d_0-\widetilde{r_0}+\overline{s})-c(d_0-\widetilde{r_0}+\underline{s})]}{s} = c'(\widetilde{r_0}). \qquad (5)$$

Strict convexity of the cost function ensures that the second order condition holds. The right hand side of (5) represents the marginal cost of increasing deficit reduction in period 0. The left hand side captures the marginal benefit of doing so. An increase in period 0 deficit reduction decreases the range of feasible deficits in period 1, which on net saves cost $c(d_0 - \widetilde{r_0} + \overline{s}) - c(d_0 - \widetilde{r_0} - \underline{s})$. Inserting the optimal value $\widetilde{r_0}$ into (4) gives the maximal utility from compliance with a credible deficit rule.

3.2.2 Lack of Commitment

In contrast to the previous section, we now assume that the compliance decision is not forced by a credible rule. The cost of compliance in period 1 becomes high if the level of deficit reduction in period 0 is low and/or the realization of the fiscal shock in period 1 is bad. In such a situation, a government may find it attractive not to comply. We analyze the conditions under which it is in the government's interest (not) to comply with the fiscal target. For the time being we focus on the political decision maker and her interest in compliance. Later we consider how other individuals (such as opposition politicians or observers from outside of state) assess the likelihood of compliance.

On the one hand, the government may still choose to comply. Then the payoff is exactly as described in the previous section. If, on the other hand, the government does not comply with the fiscal rule we assume that the degree of non-compliance matters. This seems economically reasonable and makes the analysis more tractable. Specifically, the gross benefit to non-compliance is $b(r_1)u_{nc}$, where $b(r_1) \leq 1$. The function $b(r_1)$ is increasing and strictly concave in the amount of deficit reduction in period 1: $b'(r_1) > 0 > b''(r_1)$. Above we made the assumption that the additional gross benefit of compliance $u_c - u_{nc}$ is always positive. This implies that even for large values of r_1, and thus $b(r_1) \to 1$, a small level of non-compliance carries a non-negligible loss in payoff. In other words, missing the target even slightly, carries a significant penalty.[17]

[17] The function $b(r_1)$ could depend on the realization of the shock s and/or the amount of deficit reduction in period 0, r_0. In practice voters may have an imperfect memory about the amount of fiscal consolidation in the more distant past, and an incomplete understanding of the origins of fiscal deficits (high initial deficit vs. size of fiscal shock). We therefore choose the analytically much simpler approach and assume that the function *b* depends only on deficit reduction in period 1.

The stochastic nature of the government deficit in period 1 makes it uncertain whether compliance occurs. An important variable in our subsequent analysis is the probability of compliance p. We are interested in the relationship between p and exogenous parameters of the model, such as the initial deficit d_0, the gross gain from compliance u, possible bailout expectations, as well as additional fiscal rules restricting the maximum deficit level in period 1 (prior to the existing fiscal rule in period 2). The lack of commitment requires that we solve the model by backward induction.

Period 1.

The simple payoff structure $(u_c, b(r_1) \cdot u_{nc})$ combined with costly deficit reduction makes the analysis straightforward. When the government complies with the fiscal rule it chooses $r_1 = d_0 - r_0 + s$, which implies $d_2 = 0$. There is no benefit of overachieving the fiscal target because deficit reduction is costly. The payoff to compliance from a period 1 perspective is then

$$U_c = u_c - c(d_0 - r_0 + s). \tag{6}$$

If the government does not comply with the fiscal rule its payoff is $b(r_1)u_{nc} - c(r_1)$. The optimal level of fiscal consolidation (or fiscal profligacy) in this regime is found by maximizing the payoff with respect to r_1. The first order condition reads $b'(r_1)u_{nc} - c'(r_1) = 0$, and the second order condition is fulfilled by assumption on the properties of functions $b(r_1)$ and $c(r)$. Denote the optimal choice by r^*_{1nc} and the (period 1) net benefit from optimal non-compliance by

$$U^*_{nc} = b(r^*_{1nc})u_{nc} - c(r^*_{1nc}). \tag{7}$$

A comparison of (6) and (7) reveals that compliance is preferable to non-compliance if and only if

$$c(d_1) \leq \Delta u := u_c - U^*_{nc}, \tag{8}$$

that is, the cost of reducing the deficit to zero under compliance is not higher than the gross gain from compliance measured by Δu. The cost of deficit reduction $c(r)$ is a monotone function of r and U^*_{nc} is independent of d_0, r_0 and s. We can therefore invert (8) when it holds with equality, and define a critical level of the period 1 deficit for compliance to occur, namely, $d^*_1 = c^{-1}(\Delta u)$. For d_1 less than or equal to d^*_1, the government will choose to be compliant, otherwise not.

Using (1), the threshold level defines implicitly a maximum level of the deficit shock s, called s^*, that is consistent with $d_2 = 0$. The critical level is given by

$$s^* = d_1^* + r_0 - d_0 = c^{-1}(\Delta u) + r_0 - d_0. \qquad (9)$$

Instead of stating government compliance in terms of period 1 deficit (d_1^*), condition (9) allows us to restate the same decision in terms of the realized value of the shock *s*: For $s \leq s^*$ the government is compliant, otherwise not. Note that the threshold level s^* is a positive function of the additional gain from compliance and of the deficit reduction in period 0, but depends negatively on the initial deficit d_0. We thus write $s^* = s(r_0, \Delta u, d_0)$. Recall that r_0 is exogenous from the viewpoint of period 1, but endogenous ex ante (unlike the other variables).

Given a uniform probability density function for *s* we now use (9) to introduce the probability of compliance with the fiscal rule (when $s^* \in [\underline{s}, \overline{s}]$)

$$p = \frac{s^* - \underline{s}}{\overline{s} - \underline{s}} = \frac{c^{-1}(\Delta u) + r_0 - d_0 - \underline{s}}{S} \qquad (10)$$

where $S = \overline{s} - \underline{s}$. The probability p is the key object for our further analysis and lies between 0 and 1 under suitable assumptions on the size of d_0 and S.[18] We make those assumptions, as this leads to an empirically relevant setup. The probability depends on $(r_0, \Delta u, d_0)$. Note in particular that

$$\frac{\partial p}{\partial r_0} = -\frac{\partial p}{\partial d_0} = \frac{1}{qS} > 0, \frac{\partial p}{\partial (\Delta u)} = \frac{c^{-1'}(\Delta u)}{S} > 0, \frac{\partial p}{\partial d_0} = -\frac{1}{S} < 0. \qquad (11)$$

The probability of compliance *p* increases (decreases) with the level of period 0 deficit reduction (initial deficit).

The above setup is fairly simplistic overall. At the same time, it captures a reasonable and intuitive aspect of the compliance with fiscal rules. Compliance with a fiscal rule in the distant future requires that fiscal conditions in the near future turn out to be somewhat favorable and the current fiscal conditions are not too bad.

Period 0.

We now turn to the analysis of period 0, in which the government chooses r_0 and therefore affects the probability of compliance via (10). From the incumbent government's view in period 0 the utility is uncertain due to the shock *s*. The expected payoff is

[18] First, the probability is strictly positive when $s^* > \underline{s}$, which for given r_0 requires d_0 and $\underline{s}$ to be relatively small. The probability of compliance is less than one when $s^* < \overline{s}$, which holds for relatively high values of the initial deficit d_0 and maximum shock $\overline{s}$.

$$E[U] = -c(r_0) + \frac{\delta}{S}\left[\int_{\underline{s}}^{s^*}(u_c - c(d_0 - r_0 + s))ds + \int_{s^*}^{\overline{s}} U_{nc}^* \, ds\right]$$

$$= -c(r_0) + \delta\left[U_{nc}^* + p\Delta u - \frac{1}{S}\int_{\underline{s}}^{s^*} c(d_0 - r_0 + s)\, ds\right] \qquad (12)$$

The first line shows in square brackets the utility (periods 1 and 2) under compliance and non-compliance, respectively, depending on the realization of the shock *s*. For low levels of *s*, $s \leq s^*$, the government complies in period 1 by deficit reduction leading to $d_2 = 0$ (the first integral). If *s* is higher than *s**, the government does not comply (the second integral). Rewriting terms, the second line in (12) shows in brackets the same expression as before, now as the sum of the guaranteed utility under non-compliance and the expected gross gain from compliance, minus the cost of deficit reduction in period 1 when *s* is sufficiently small ($s < s^*$).

First period deficit reduction r_0 affects (12) via the cost of effort in period 0 (the first term in (12)), the probability of realizing the gross gain of compliance *p*, and the cost of effort in period 2 under compliance. Recall that the threshold level *s** is a function of r_0. The derivative of expected payoff with respect to r_0 is

$$\frac{\partial E[U]}{\partial r_0} = -c'(r_0) + \delta\left[\Delta u\frac{dp}{dr_0} - \frac{1}{S}\int_{\underline{s}}^{s^*}\frac{dc(d_0 - r_0 + s)}{dr_0}ds - \frac{1}{S}c(d_0 - r_0 + s^*)\frac{ds^*}{dr_0}\right]$$

$$= -c'(r_0) + \delta\left[\frac{\Delta u - c(d_0 - r_0 + \underline{s})}{S}\right]. \qquad (13)$$

Derivative (13) has the following interpretation: An increase in r_0 increases the marginal cost of deficit reduction in the current period. The marginal benefit of doing so is the discounted increase in the expected gross gain of compliance (due to the increase in the probability of compliance) adjusted for the cost of reducing the deficit by $d_0 - r_0 + \underline{s}$. Recall that $(S)^{-1}$ represents the increase in the probability of compliance when r_0 is raised marginally. The optimal level of first period deficit reduction $\hat{r}_0$ is found by setting (13) equal to zero[19]

$$\frac{\delta[\Delta u - c(d_0 - \hat{r}_0 + \underline{s})]}{S} = c'(\hat{r}_0). \qquad (14)$$

[19] It is worth pointing out that the second order derivative of (12), $-c''(r_0) + \frac{\delta c'(d_0 - r_0 + \underline{s})}{S}$, is not automatically negative. We use techniques from the theory of monotone comparative statics to sign comparative statics effects.

3.2.3 Results

We now study the determinants of the probability of compliance p, which depends on exogenous model parameters both directly, as shown in (10), but also indirectly via the optimal level of initial deficit reduction r_0, as implicitly defined in (14). We use insights from the theory of monotone comparative statics to sign the effects; see van Zandt (2002).

1. Initial deficit: We first wish to analyze the effect of a change in the initial deficit on period 0 deficit reduction. Based on Remark 5 and Theorem 4 in van Zandt (2002), the expected payoff function (12) has the property of strictly decreasing differences in (r_0, d_0)

$$\frac{\partial^2 E[U(r_0,d_0)]}{\partial r_0 \partial d_0} = -\frac{\delta c'(d_0 - r_0 + \underline{s})]}{S} < 0. \qquad (15)$$

Theorem 1 in van Zandt then implies that an increase in the initial deficit lowers deficit reduction in period 0, that is

$$\frac{\partial \hat{r}_0}{\partial d_0} < 0. \qquad (16)$$

The probability of compliance p (see (10)) is also lowered by the direct effect so that the total effect becomes

$$\frac{\partial p}{\partial d_0} = \frac{1}{S}\left(\frac{\partial \hat{r}_0}{\partial d_0} - 1\right) < 0. \qquad (17)$$

States with a larger initial deficit are less likely to comply with the fiscal rule in period 2 (Hypothesis 1: H1).

2. Bailout expectations: Up to now we did not explicitly address the role of a possible bailout in case of non-compliance with the fiscal rule. Rather we assigned a utility level for the case of non-compliance, assuming it to be lower than in case of compliance. Suppose now that a bailout is possible but less than certain. We maintain the assumption that non-compliance is worse than compliance in expected terms: $u_{nc} < u_c$, and consider that the exogenous probability of a bailout goes up. This affects the government effort in reaching the deficit target. Formally, we capture the bailout probability by interpreting the utility from non-compliance u_{nc} as expected utility, which comprises the utility when no bailout occurs and when it does occur. An increase in the bailout probability leads to a higher level of u_{nc}, a higher net utility U_{nc}^* (the indirect effect on optimal deficit reduction in period 1, r_{1nc}^*, can be ignored as a result of the

envelope theorem), and thus lower net utility gain Δu. Looking again at the cross partial derivative of (12)

$$\frac{\partial^2 E[U(r_0,\Delta u)]}{\partial r_0 \partial(\Delta u)} = \frac{\delta}{S} > 0, \tag{18}$$

the expected payoff function has the property of strictly increasing differences in $(r_0, \Delta u)$. An increase in Δu, which is equivalent to a lower bailout probability, leads to a an increase in period 0 deficit reduction

$$\frac{\partial \hat{r}_0}{\partial(\Delta u)} > 0. \tag{19}$$

Moreover, a lower bailout utility increases the probability of compliance because an increase in Δu raises p both directly and indirectly:

$$\frac{\partial p}{\partial(\Delta u)} = \frac{1}{S}\left(c^{-1'}(\Delta u) + \frac{\partial \hat{r}_0}{\partial(\Delta u)}\right) > 0. \tag{20}$$

We conclude that higher bailout expectations (= smaller Δu) make compliance with the balanced budget requirement less likely (Hypothesis 2: H2).

3. *State fiscal rule in period 1*: The fiscal rule under consideration becomes effective in period 2. Some states in Germany have introduced fiscal rules at the state level with constraints becoming effective prior to the national debt brake's crucial year 2020. These state rules are supposed to strengthen the effort and likelihood of compliance. In the present framework we capture this idea by allowing for an additional fiscal rule to be already effective in period 1. We assume that the additional fiscal rule is credible, perhaps because there is no one to bail out the government within its state. Yet we allow for the possibility that the fiscal rule may be of different strictness. We express the strictness in terms of the maximum feasible deficit that can occur in period 1, $d_0 + \overline{s}$. The upper limit of the deficit in period 1 must obey

$$d_1 \leq \bar{d}_1 = \alpha(d_0 + \overline{s}). \tag{21}$$

The parameter α from [0,1] represents the strength of the fiscal rule. The fiscal rule has no bite whatsoever when $\alpha = 1$ because no deficit reduction is necessary in period 0 to be compliant with the new rule in period 1. By contrast, $\alpha = 0$ means that the government is not allowed to run a government deficit in period 1 regardless of the value of the shock s (assuming that the additional fiscal rule is credible). In that case deficit reduction in period 0 must be $d_0 + \overline{s}$, thus inducing $d_1 \leq 0$. Lower values of α thus correspond to a tighter fiscal rule in period 1. Using (2) we can reformulate the requirement in (21) in terms of initial deficit reduction:

$$r_0 \geq (1-\alpha)(d_0 + \overline{s}) =: \overline{r_0}. \qquad (22)$$

Note that $\overline{r_0}$ is decreasing in α. A tighter fiscal rule in period 1 requires a higher deficit reduction effort in period 0, if the additional fiscal rule is binding. Whether the additional fiscal rule has bite depends on the magnitudes of $\overline{r_0}$ and $\hat{r}_0$, where the latter is taken from (14) and represents the optimal choice of initial deficit reduction in the absence of the additional fiscal rule in period 1. When $\overline{r_0} > \hat{r}_0$, the new fiscal rule is binding, otherwise it is not. This result has further ramifications for the probability of compliance with the original fiscal rule in period 2. When binding, compliance with the fiscal rule is more likely because probability *p* depends positively on r_0.

We conclude that the likelihood of compliance (weakly) increases in the strength of a credible fiscal rule at state level which restricts the period 1 deficit (Hypothesis 3: H3).

4. *Individual Beliefs*: Consider now the beliefs in government compliance after the decision on period 0 deficit reduction has been taken, but before the shock *s* realizes. We thus focus on the expectations at an interim stage for a given level of r_0. We wish to compare the beliefs in compliance of two types of politicians: the incumbent government or in-state legislators on the one hand (the "insiders"), and opposition politicians or out-of-state politicians on the other hand (the "outsiders").

The psychological literature (see Moore and Healy, 2008) suggests that a large number of individuals (more than half) believe to perform better than the average (or more precisely, the median), which is impossible. This is termed overconfidence. Ortoleva and Snowberg (2015) recently presented a theoretical and empirical analysis confirming that overconfidence is an important driver of ideological extremeness and partisan identification. In the present context, overconfidence could mean that the insiders believe that the range of fiscal shocks is more favorable than what outsiders believe, perhaps due to their self-perceived competency in managing the economy. To capture this, we define the upper and lower bound of the fiscal shock as

$$\overline{s} = s^{max} - \gamma \quad \text{and} \quad \underline{s} = s^{min} - \gamma, \qquad (23)$$

where s^{max} and s^{min} are the base values of the maximal and minimal fiscal shock. A higher value of γ means that the distribution of the fiscal shock shifts lower, leading to a smaller expected value of the shock $E[s] = (s^{max} - s^{min} - 2\gamma)/2$, but unchanged variance $Var[s] = (s^{max} - s^{min})^2/12$. Note that $S = \overline{s} - \underline{s} = s^{max} - s^{min}$ is independent of γ. If

incumbent governments or in-state politicians are overconfident, they believe in a higher value of γ than outsiders.

We can immediately derive the implications for the probability of compliance by inserting definition (23) into (10), then differentiate to find for given r_0 that

$$\frac{dp}{d\gamma} = \frac{1}{S} > 0. \tag{24}$$

Hence at an interim stage in period 1 insiders believe in a higher probability of compliance than outsiders. This effect is reinforced if we consider the *ex-ante* perspective in period 0 when r_0 is endogenously chosen. The effect of γ on period 0 deficit reduction can be signed by looking at the cross-partial derivative to (12)

$$\frac{\partial^2 E[U(r_0,\gamma)]}{\partial r_0 \partial \gamma} = \frac{\delta c\prime(d_0 - r_0 + s^{min} - \gamma)}{S} > 0. \tag{25}$$

Hence a higher value of γ makes it more attractive to reduce the deficit in period 0, which in turn increases the probability of compliance even further. *Overconfident insiders believe more strongly in compliance than outsiders*.

Alternatively, we may assume that insiders have more precise information about the range of fiscal shocks than outsiders. Specifically, we assume that the fiscal shock is bounded by the values

$$\overline{s} = s^{max} + \sigma \quad \text{and} \quad \underline{s} = s^{min} - \sigma, \tag{26}$$

In this case variations in σ leave the expected value of the fiscal shock $E[s] = (s^{max} - s^{min})/2$ unaffected, while the variance increases in the parameter σ. We also note that $S = \overline{s} - \underline{s} = s^{max} - s^{min} \mp 2\sigma$ is a function of the shift parameter σ. We assume now that outsiders have a noisier signal about the range of fiscal shock realization, and thus a larger value of σ.

Inserting (26) into p and differentiating with respect to the parameter σ gives

$$\frac{dp}{d\sigma} = \frac{1-2p}{\overline{s}-\underline{s}}. \tag{27}$$

Condition (27) allows us to rank the beliefs of insiders and outsiders: If insiders believe in compliance with more than 50 percent probability, $p^{ins} > 0.5$, then outsiders attach a lower probability ($p^{out} < p^{ins}$). If, on the other hand, insiders find compliance less likely than non-compliance ($p^{ins} < 0.5$), outsiders are more optimistic than insiders, that is $p^{out} > p^{ins}$. *In other words, insiders have more extreme views than outsiders when the latter have noisier information than the former.*

Combining the insights from the two alternative setups we formulate our fourth hypothesis: Insiders (the incumbent government or in-state politicians) are more

optimistic about the probability of compliance than outsiders (political opposition or out-of-state politicians) when insiders either are overconfident or if under the noisy information hypothesis insiders consider compliance with the fiscal rule more likely than non-compliance. Insiders are less optimistic about compliance than outsiders only under the noisy information hypothesis and when insiders believe compliance is less likely than non-compliance. (Hypothesis 4: H4). It is the latter case which allows us to distinguish the two alternative hypotheses empirically. Looking at states with generally low expectations regarding compliance, the finding that insiders are more optimistic than outsiders favors the overconfidence explanation.

Thus, our model arrives at hypotheses on the heterogeneity of compliance expectations across individual politicians. These hypotheses are derived for a setting where jurisdictions are confronted with an identical fiscal rule, as it is the case for German states and the national debt brake. Our survey among members of German state parliaments offers the basis for testing their relevance.

3.3 Institutional and Survey Details

3.3.1 Germany's Federal System and the Constitutional Debt Brake

Before we introduce the survey we provide a brief introduction to Germany's electoral, political and fiscal system (for a more detailed description of the German party and electoral system the reader is referred to Roberts, 1988, and Poguntke, 1994).

Democracy. Germany is a parliamentary democracy with a bicameral legislation at the federal level: the lower house, called *Bundestag*, is elected by all citizens and the upper house, called "*Bundesrat"*, represents the 16 states of Germany and its members are delegates of state governments. The debt brake was approved in 2009 by more than the required two thirds majority in both chambers in order to change the constitution. At the state level, there exists only one chamber like the lower chamber at the federal level. We surveyed members of these state parliaments, called MSP henceforth.

Parties. The number of political parties has some regional variation. We describe the main parties: The Christian Democratic Union and Christian Social Union (CDU/CSU[20]) are center-right parties forming an alliance at the federal level. They pursue a relatively market oriented policy but are socially conservative in some states

[20] Instead of the Christian Democratic Union (CDU), Bavaria has a party called the Christian Social Union (CSU). At the federal level, these two parties always form an alliance.

(like Bavaria) and on some policy issues (such as the traditional role of the family). The Social Democratic Party (SPD) is the other major party and represents the center-left (less market oriented than the Christian Democrats, socially progressive, trade-union friendly, and in favor of more intense redistribution than CDU/CSU). The Free Democratic Party (FDP) is the most market oriented party which favors small government and low taxes. On civil liberty issues it is more progressive than the Christian Democrats. The Left Party unites rather pragmatic former communists from East Germany and disappointed left wing Social Democrats with a strong anti-capitalist ideology from West Germany. The Green Party is also on the center-left. It pushes for environmental and social reforms with diverse views on economic issues. The party is especially popular with well-educated individuals from the middle class.

Fiscal Federalism. The German state features three government layers with partly overlapping areas of policy responsibility: (1) the federal level, (2) the states, and (3) the municipal level. Tax autonomy at the state level is relatively low. Revenues are equalized to a significant degree across states and in addition through vertical tax sharing. Differences in state revenues per capita are reduced via a fiscal equalization system, whose legal foundation is set in Article 106 of the German constitution ("*Grundgesetz"*), according to which material living conditions should be comparable across German states. Through the large degree of revenue sharing the German federal system is closer to being an example of cooperative fiscal federalism rather than competitive federalism (Braun, 2007; for details on equalization and tax sharing see also Heinemann et al., 2015).

Fiscal Rules. The fiscal rule is the German debt brake ("*Schuldenbremse*"), which became part of the German constitution ("*Grundgesetz"*) in 2009. It was motivated by the continuing buildup of public debt across all levels of government since the 1970s. The new constitutional rule requires the federal government to run a (cyclically adjusted) budget deficit of no more than 0.35 percent of GDP starting in 2016 (see Federal Ministry of Finance, 2009 for a detailed description). For German states ("*Länder*") the new rule is more stringent and requires them to run a zero deficit (cyclically adjusted). The zero deficit constraint for the states does not become legally effective until the budgetary year 2020. The rule for the federal government is accompanied with a specific plan detailing how the structural deficit shall be reduced between 2011 and 2015 so that the target is reached in 2016. For the states, no specific

path exists in general. However, five states (Berlin, Bremen, Saarland, Saxony-Anhalt und Schleswig-Holstein) receive "consolidation aids" in total of €800 million annually until 2019. In return they are required to reduce their 2010 budget deficit in equal steps until 2020. As a reaction to the new national constitutional rule, several states have adjusted their state constitutions or state budgetary laws with rules echoing or even sharpening the national rule (for a survey see Ciaglia and Heinemann, 2013).

Enforcement. The Stability Council ("*Stabilitätsrat*") has the task to supervise fiscal performance and compliance both at the federal and the state level. It represents the federal ministers for finance and economics as well as all state finance ministers. The Council has relatively little power to enforce fiscal rules and improve fiscal performance because it is not allowed to impose monetary sanctions directly. In the case of the five states receiving consolidation aids the Council is entitled to withhold aids in case of non-compliance. Non-monetary sanctions for all states originate from the possible publicity of the Stability Council's statements or from political costs materializing if a state budget is ruled as unconstitutional by the Federal Constitutional Court.

Economic Performance. The lack of comprehensive monetary sanctions and the long transitory period raise serious questions about the new rule's credibility. In addition, the highly diverse fiscal situations of states feed diverging expectations. Table 3.1 provides information on key indicators and shows the large difference in economic activity. GDP per capita in Hamburg, for example, is more than twice as large as in most eastern states. Debt to state GDP is particularly high for the city states of Berlin and Bremen (both above 60 percent). Often high debt levels go hand in hand with large projected fiscal adjustments, as identified by the German Council of Economic Advisors' calculation of consolidation need (an index ranging from -0.6 to +3.5, where Berlin and Bremen are near the maximum). In the light of these fiscal performances it is somewhat surprising that credit ratings are fairly positive in all states (all in the A range). One explanation consistent with these observations is that bailout expectations exist. Because these rankings apparently do not reflect the strength of the debt rule at the state level in great detail, the last column of Table 3.1 provides an index for the stringency of German individual states' fiscal rules as developed by Ciaglia and Heinemann (2013). This index takes account of the rule's contents and precision, legal basis and enforcement.

Hence, both the legal setting and the fiscal divergence leave ample space for highly heterogeneous expectations on state compliance, which we study through our survey among members of state parliaments.

Table 3.1: Economic and Fiscal Indicators

	Population 2011 (in millions)	GDP per capita 2011 (in thousands of €)	Total debt to GDP ratio 2011 (in %)	Need for Consolidation 2011-2020 (in % of GDP)	Bond Rating 2012[a]	Index of stringency of state debt rule
Federal Government	81.84	44.02	49.79[e]	-	AAA[d,e]	
Baden-Württemberg	10.79	34.89	17.16	0.10	AAA[d]	0.62
Bavaria	12.60	35.44	6.79	-0.60	AAA[d]	0.48
Berlin	3.50	28.95	61.64	3.50	Aa1[c]	0.65
Brandenburg	2.50	22.08	35.77	2.10	Aa1[c]	0.51
Bremen	0.66	42.39	73.63	3.40	-	0.64
Hamburg	1.80	52.49	26.86	0.30	-	0.47
Hesse	6.09	37.51	17.28	1.30	AA[d]	0.50
Mecklenburg-West Pomerania	1.63	21.40	29.11	1.70	-	0.46
Lower Saxony	7.91	28.35	25.42	1.30	-	0.55
North Rhine-Westphalia	17.84	31.88	33.22	1.60	AA-[d]	0.45
Rhineland-Palatinate	4.00	28.31	32.49	1.80	AAA[b]	0.69
Saarland	1.01	30.10	41.83	2.80	-	0.70
Saxony	4.14	22.98	9.99	0.60	AAA[d]	0.76
Saxony-Anhalt	2.31	22.43	39.84	2.50	AA+[d]	0.77
Schleswig-Holstein	2.84	25.95	38.57	1.30	AAA[b]	0.77
Thuringia	2.22	21.66	35.04	2.30	AAA[b]	0.66

Notes: [a] from http://www.welt.de/finanzen/article107267058/Bundeslaender-profitieren-von-Deutschland-Bonds.html last access on 23 July 2013; [b] Fitch; [c] Moody's; [d] S&P, [e] referring to federal level alone, not to aggregate for Germany. Need for consolidation is taken from Sachverständigenrat (2011) and is based on the average budget deficits from 2007 to 2010. It indicates the extent of consolidation necessary to comply with the debt brake by 2020. For that purpose, it takes account for pension obligations and the reduction of transfers from the federal level (Special Purpose Grants) which will both come into effect until 2020. The Index of stringency of the debt rule is normalized between 0 and 1, where higher values indicate a more stringent debt rule (Ciaglia and Heinemann, 2013).

3.3.2 The Survey Among Members of State Parliaments

Our survey was sent to all 1861 members of the 16 German state parliaments during a period of 14 months in 2011 and 2012. We conducted the survey in three waves in order to make sure that it did not collide with election times (surveys were conducted approximately at mid-term of an electoral cycle). We approached members of parliament by written letters and subsequent follow-up emails. If still unsuccessful, we contacted them by phone. Taking all three waves together 639 politicians finally participated in the survey, which resulted in a response rate of 34 percent. Response rates differ along state and party affiliation. Table 3.2 provides an overview. Possible concerns about the effect of different response rates are dealt with in the econometric analysis below.

The survey was non-anonymous, but politicians were guaranteed confidentiality for individual responses. Thus, we are able to match the survey responses with personal characteristics such as education, committee membership, etc. from public sources (personal or parliamentary websites) and with state characteristics such as GDP per capita, debt, need for fiscal consolidation, etc. (see Table A.3.1 in the appendix to this chapter for all variables).

Table 3.2: Response Rates and Survey Waves

	Number of MSPs	Number of responses	Response rate	Survey wave[a]	Last state election before survey
Overall	1861	639	34.34%		
Baden-Württemberg	138	77	55.80%	3	3/2011
Bavaria	187	75	40.11%	1	9/2008
Berlin	149	30	20.13%	3	9/2011
Brandenburg	88	19	21.59%	1	9/2009
Bremen	83	18	21.69%	3	5/2011
Hamburg	124	39	31.45%	2	2/2011
Hesse	114	50	43.86%	2	1/2009
Mecklenburg-West Pomerania	71	17	23.94%	3	9/2011
Lower Saxony	152	54	35.53%	1	1/2008
North Rhine-Westphalia	181	51	28.18%	2	5/2010
Rhineland-Palatinate	101	50	49.50%	3	3/2011
Saarland	51	20	39.22%	1	8/2009
Saxony	133	45	33.83%	2	8/2009
Saxony-Anhalt	106	47	44.79%	2	3/2011
Schleswig-Holstein	95	29	30.53%	1	9/2009
Thuringia	88	36	40.91%	1	8/2009

Notes: [a] The first survey wave (1) took place in March and April 2011, the second wave (2) took place in December 2011 and January 2012, and the third wave (3) took place in April and May 2012

The questionnaire consisted of eight questions covering preferences for revenue autonomy and fiscal equalization, spending preferences as well as questions related to the debt brake (for a full description see Heinemann et al., 2014a). For our study, we focus on the following two questions:

Question on compliance expectations: *Which of the 16 German states will comply with the constitutional debt brake as of 2020 with high probability?*

Each of the 16 states could be ticked individually or options "*all*" or "*none*" could be chosen.

In order to illuminate the expected impact of the debt brake we also asked for the consequences of non-compliance:

Question on consequences of non-compliance: *What will happen if German states do not comply with the constitutional debt brake as of 2020? (multiple answers possible)*

- Constitutional courts (on state and federal levels) will enforce budget consolidation
- The constitution will be changed so as to relax the debt brake
- Transfer payments to non-complying states are given, which help to lower the deficit
- There will be sanctions against non-complying states, e.g., lower transfers within the federal fiscal equalization scheme
- There will be ordinary legal or constitutional interventions in non-complying states' budget autonomy
- Merger of states
- Nothing will happen
- Other:_____

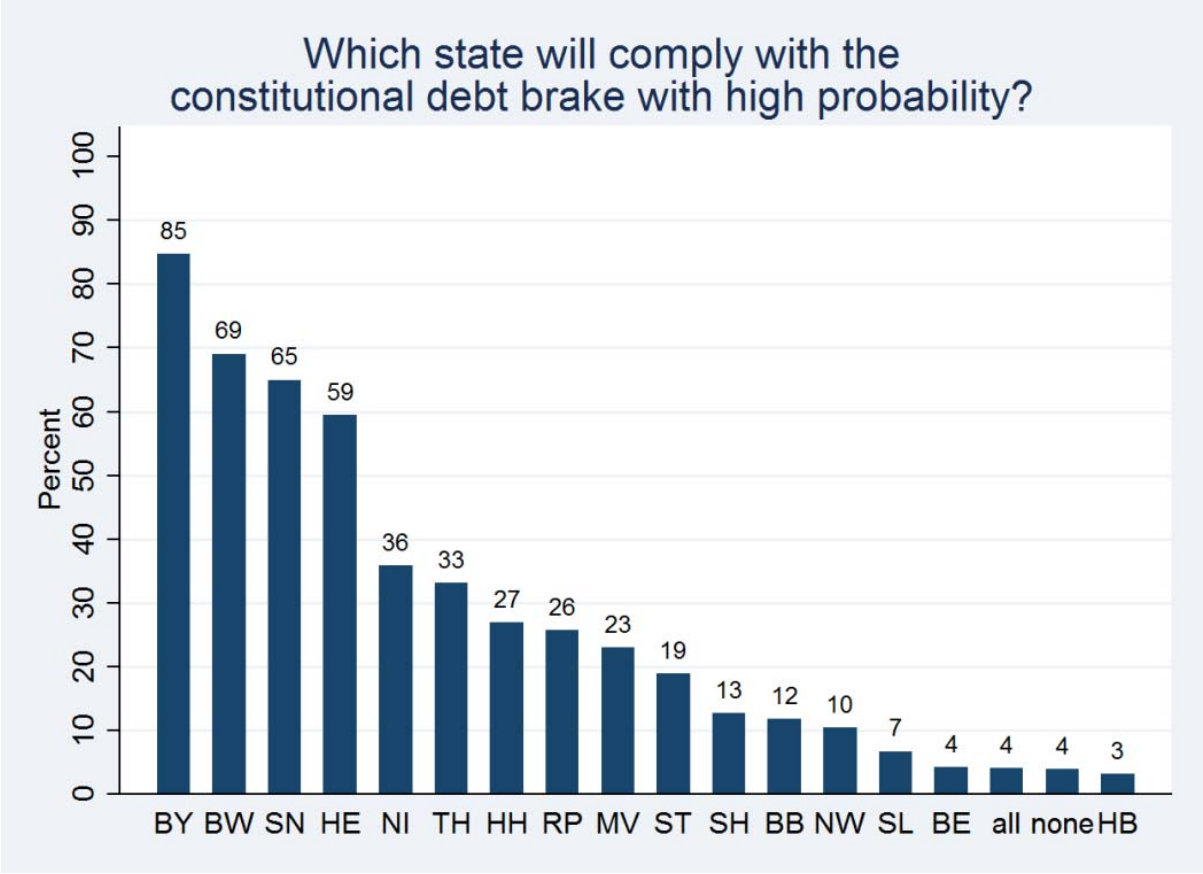
Figure 3.1 indicates that the debt rule credibility is imperfect and compliance expectations differ remarkably for different states. While Bavaria is seen as an almost certain case of compliance (85 percent believe it is highly probable) the prospects of the city states of Bremen (3 percent) and Berlin (4 percent) are highly pessimistic. These expectations obviously correlate closely with current consolidation needs and debt levels (see Table 3.1). Note again, that expectations for a particular state *i* come from legislators in state *i* and legislators from all other fifteen states $j \neq i$. In addition, a strong asymmetry emerges for insider/outsider expectations on financially weak states (see Figure 3.2 with the example for Mecklenburg-West Pomerania): While MSPs from other states are highly skeptical, a large majority of politicians from economically weaker states expect their state to respect the debt brake's zero deficit cap by the year 2020 (see Table A.3.2 in the appendix to this chapter for full information on cross-state expectations which confirms this asymmetry in general).

Figure 3.3 summarizes the results for the non-compliance question: A significant number of politicians expects a strong role of constitutional courts (both from federal and state level) to enforce consolidation or sanction. However, a large fraction of politicians expect the government budget constraint to be soft due to bailout-transfers or a relaxation of the strict debt brake. Overall, these descriptive findings point to the

possible relevance of our model's prediction on the role of the initial fiscal situation, bailout expectations or the expected asymmetry between insiders and outsiders. We substantiate the model's explanatory power in the subsequent regression analyses.

Figure 3.1: Compliance Across States

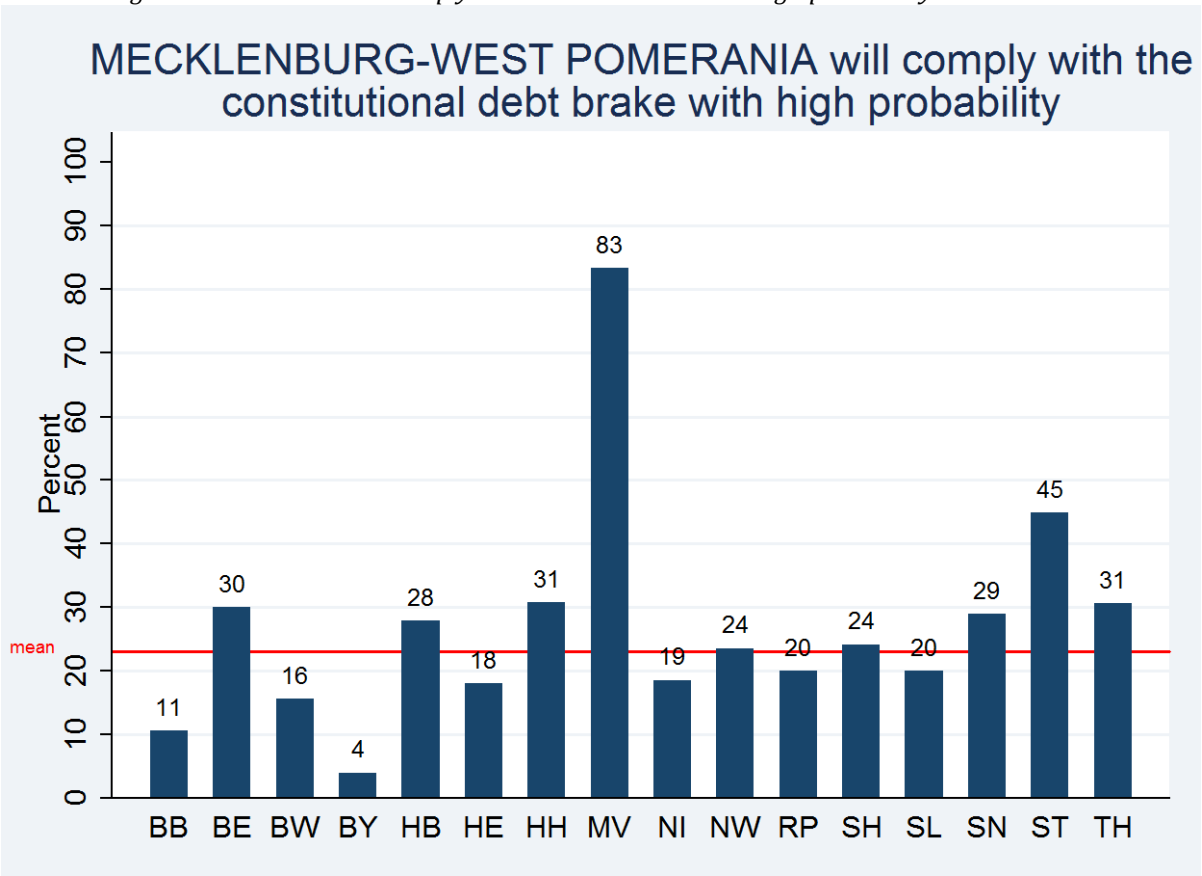
This graph reports the percentage of all respondent MSPs across states who indicated that the respective state will comply with the debt brake with high probability.



BB=Brandenburg, BE=Berlin, BW=Baden-Württemberg, BY=Bavaria, HB=Bremen, HE=Hesse, HH=Hamburg, MV=Mecklenburg-West Pomerania, NI=Lower Saxony, NW= North Rhine-Westphalia, RP=Rhineland-Palatinate, SH=Schleswig-Holstein, SL=Saarland, SN=Saxony, ST=Saxony-Anhalt, TH=Thuringia

Figure 3.2: Compliance Expectations for Mecklenburg-West Pomerania

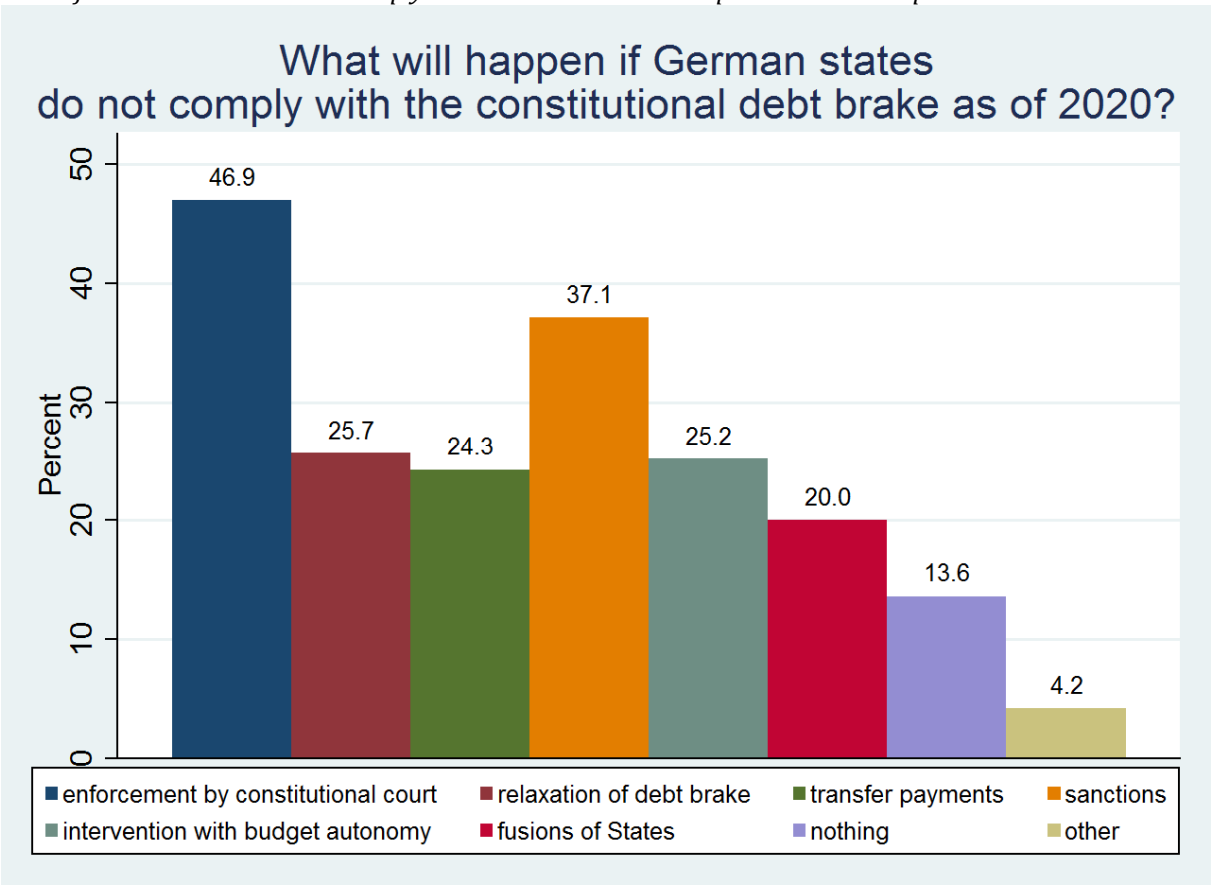
This graph reports the percentage of all respondent MSPs from the respective state who indicated that the Mecklenburg-West Pomerania will comply with the debt brake with high probability.



BB=Brandenburg, BE=Berlin, BW=Baden-Württemberg, BY=Bavaria, HB=Bremen, HE=Hesse, HH=Hamburg, MV=Mecklenburg-West Pomerania, NI=Lower Saxony, NW= North Rhine-Westphalia, RP=Rhineland-Palatinate, SH=Schleswig-Holstein, SL=Saarland, SN=Saxony, ST=Saxony-Anhalt, TH=Thuringia

Figure 3.3: Consequences of Non-Compliance

This graph reports the percentage of all respondent MSPs who indicated that the respective consequence will occur if German states will not comply with the debt brake. Multiple answers were possible.



3.4 Regression Analyses

Our database is sufficiently rich to test whether the predictions from our theoretical model on expectation heterogeneity are consistent with the observable response pattern. Our model predicts that compliance expectations of politicians should be related to the initial deficit, or more general, the initial economic and fiscal conditions of the state in question (H1), the individual politician's bailout expectations (H2), the existence and characteristics of state rules which complement the national debt brake (H3), and the individual politician's insider/outsider status (due to either asymmetric information or overconfidence on the side of insiders, H4). We cover these four dimensions as follows (for precise variable information on the state being assessed see Table A.3.1 in the appendix to this chapter):

- The state characteristics merged to the politician's responses include GDP per capita and the need for consolidation (see Table 3.1). The latter gives a comprehensive picture of the current fiscal and economic conditions (H1). The

need for consolidation is taken from the German Council of Economic Advisors (Sachverständigenrat, 2011) and reflects the extent to which states need to consolidate their budgets until 2020 when the debt brake comes into effect.

- For bailout expectations (H2) we exploit the survey question on the expected consequences of non-compliance (Figure 3.3). From this question we construct an index which captures the individual perception of the strength of the budget constraint. A larger indicator value represents the perception of a stricter budget constraint and lower bailout expectations.[21]
- For the existence and stringency of a state rule (H3) we use data from Ciaglia and Heinemann (2013), who develop an index for the stringency of German individual states' fiscal rules, which takes account of the rule's contents and precision, legal basis and enforcement.
- The insider-outsider-differentiation (H4) has two dimensions: First, we can distinguish between incumbents as insiders and all others, whereby "incumbents" are defined as members of one of the governing parties in the respective state. Second, we can compare the expectations for a specific state's compliance between in-state and out-of-state legislators. We include both dimensions in our testing.

We enrich this theory-guided choice of variables through the inclusion of further individual and state controls. A growing empirical literature points to the importance of these variables for economic, monetary and fiscal performance (Besley et al., 2011, Göhlmann and Vaubel, 2007, Moessinger, 2014). We take account of the politician's gender, age, education (tertiary degree, type of degree, such as in business/economics), role in parliament (membership in budget committee) and experience (number of years in parliament). Inter alia, these variables proxy differences in the individual information level.

Furthermore, we add party dummies to allow for the impact of ideology. Ideology might influence expectations since perceptions of economic constraints can be biased by strong ideological positions (see, for example, Heinemann and Janeba, 2011, for the

[21] Indicator construction is as follows: We add one point if a politician expects one of the "tough" reactions to a state non-complying (i.e. "enforcement through constitutional courts", "sanctions", "intervention in budget autonomy" or "merger of states") and subtract one point for each of these reactions which is not expected. Analogously, we subtract one point for each of the expected "soft" reactions to a state-non complying (i.e. "change of constitution", "transfers" or "nothing") and add one point for each of these reaction which is not expected.

perception of globalization constraint on tax policy). Among state controls we include a dummy for those states receiving consolidation aid and the extent of fiscal equalization transfers received. These variables cover transfer dependency. Finally, we add a dummy for the political orientation of the incumbent government which allows for the possibility that the incumbent's political orientation has an impact on compliance expectations for the respective state.

3.4.1 Baseline Results

We estimate a probit model with the compliance expectation as dependent variable (dummy equals 1: Politician expects a state to comply with the debt brake as of 2020; 0: expects a state not to comply). Since we have expectations of 639 politicians on 16 states, we can exploit a total of 10,224 observations. We cluster standard errors for state pairs. Column (1) in Table 3.3 summarizes our starting point with the full set of control variables. The results show that compliance expectations are related both to the individual and own state characteristics of respondents. We include fixed effects for MSPs' states of origin to account for the possibility that politicians of particular states may be more or less optimistic in general (as it is suggested by the descriptive analysis, see Table A.3.2 in the appendix to this chapter).

All proxies related to our four hypotheses are highly significant. Signs are in line with the theoretical expectations for the H1-, H2- and H3-related indicators: Compliance expectations for states with unfavorable starting positions (lower GDP per capita or larger need for consolidation) are less optimistic. The belief in bailout-transfers or other relaxations of the fiscal rule (lower index for strength of budget constraint) lowers compliance expectations. A stricter state-individual fiscal rule is correlated with a more favorable view for this particular state. Judged on the basis of average marginal effects, the size of the effects is substantial: A one percentage point increase of a state's consolidation need (H1) lowers the probability that this state is expected to be compliant by about 10 percentage points. The difference between a very soft (-7) and very hard (+7) perception of the budget constraint (H2) amounts to an impact of 24 percentage points. And the difference between the weakest (0.45) and strongest (0.78)

observable state debt rule (H3) is associated with a probability increase of 16 percentage points that a state is predicted to comply.[22]

H4-related proxies are highly significant for both insider-outsider-dimensions: Insiders (members of parties who form a state's government/in-state-politicians) are more optimistic than outsiders (members of opposition parties/out-of-state-MSPs). The size of the effect is much larger for the in-state vs. out-of-state-dimension (21 percentage points) than for the government-opposition-distinction (4 percentage points). In the light of our theory, the positive sign of insider status points to the role of overconfidence as driving insider-outsider-asymmetry. If outsiders had an information disadvantage, they should sometimes over- and sometimes underestimate the fiscal shock more than insiders do, but not necessarily be systematically more pessimistic than insiders. Therefore, the systematically larger optimism of insiders is consistent with overconfidence rather than with noisy information.

Our theoretical analysis in section 3.2.3 suggests, however, that the existence of more optimistic insiders is not necessarily inconsistent with the noisy information explanation. We therefore deepen our econometric analysis with respect to H4 by splitting the sample on the basis of compliance expectations of insiders (Table 3.4).[23] Specifically, we approximate the theory-based probability of compliance of insiders (p^{ins}) by the average compliance expectation of own-state-politicians, as recorded on the diagonal of Table A.3.2. We follow our theoretical model by splitting the sample into states with $p^{ins} < 0.5$ and states with $p^{ins} > 0.5$. Our implicit assumption is that a politician's subjective belief in the own state's compliance is well approximated by the relative frequency of this belief across all politicians from the same state, i.e. the average subjective expectation of own-state compliance. Doing this, we end up with one smaller sample of five "pessimistic" states ($p^{ins} < 0.5$, see column (1) of Table 3.4) and a larger sample of eleven "optimistic" states ($p^{ins} > 0.5$, see column (2) of Table 3.4). We especially make use of the subsample for "pessimistic" states to distinguish between the two competing theories which can cause insiders to be more confident than outsiders.

The estimated coefficient for the dummy for own-state evaluation remains significantly positive in both subsamples, indicating that even those politicians from

[22] (0.78-0.45)*49 = 16 where 0.78 is the largest observed value of the index and 0.45 is the smallest observed value.

[23] We have to use sample splits because we cannot estimate interaction effects reliably due to the non-linearity of the probit model used.

pessimistic states are more confident when it comes to the evaluation of their own state. According to our theory, this finding is only consistent with the explanation based on overconfidence, not noisy information. The finding is robust to splitting the sample on the basis of a stricter rule (i.e. $p^{ins} < 0.34$ and $p^{ins} > 0.66$). The own state dummy enters significantly with a positive sign, thereby confirming our H4 hypothesis on overconfidence.[24] Compared to our baseline regressions, most of the other coefficients remain robust in signs and significance in both samples.

All other control variables in column (1) of Table 3.3 are important to understand the heterogeneity of expectations as well. The observed education characteristics do not show up significantly. Members of the budget committee view adherence to the debt brake as more difficult. Moreover, a longer parliamentary experience reduces compliance expectation. This finding is not driven by an age effect which points into the opposite direction, with older members being more confident. Female legislators are more pessimistic than their male colleagues. Party imprint on compliance expectations is moderate: For example, there are no significant differences between parties from the opposite ends of the political spectrum (i.e. between the market-liberal FDP and the socialist Left Party).[25] States with a government consisting of center right parties (i.e. Christian Democrats and/or FDP) are perceived to have a higher chance of compliance. Consolidation aid does not seem to compensate for the less favorable economic and fiscal conditions of the five related states since the related dummy is significantly negative.

To check for the general validity of our results, we employ various model variants: In column (2) of Table 3.3 we allow for individual fixed effects.[26] This specification accounts for the risk that unobserved individual characteristics may bias the results for state indicators. No substantial differences in the coefficients to the state characteristics emerge. Further model variants and robustness checks are described in the next section.

[24] Results are not shown here but are available on request.
[25] Weighted regressions, however, indicate that Left Party politicians are more confident that the debt brake will be respected than politicians from the FDP, see below section 3.4.2.
[26] Due to perfect collinearity of individual and home state fixed effects, we have to exclude the latter in this specification.

Table 3.3: Likelihood of State's Compliance – Baseline Results

Probit regressions with compliance expectation as dependent variable (1: compliance expected, 0: not expected)

	(1)		(2)	
Independent Variables	Baseline 1	Average marginal effects	Baseline 2	Average marginal effects
Individual: education				
Tertiary degree	0.023	0.006		
	[0.035]	[0.010]		
Economics/Business degree	0.038	0.010		
	[0.039]	[0.011]		
Individual: parliamentary role				
Member of governing parties in state (H4)	0.195***	0.053***		
	[0.044]	[0.012]		
Member of budget committee	-0.149***	-0.041***		
	[0.039]	[0.011]		
Number of years in parliament	-0.006***	-0.002***		
	[0.002]	[0.001]		
Individual: other				
Female	-0.106***	-0.029***		
	[0.032]	[0.009]		
Age in years	0.002*	0.001*		
	[0.001]	[0.000]		
Individual: bailout-expectation				
Index for perceived strength of budget constraint (H2)	0.062***	0.017***		
	[0.005]	[0.001]		
Individual: party affiliation[a]				
CDU/CSU	-0.139**	-0.038**		
	[0.070]	[0.019]		
SPD	-0.194***	-0.053***		
	[0.074]	[0.020]		
Green Party	0.053	0.015		
	[0.087]	[0.024]		
Left Party	0.119	0.033		
	[0.085]	[0.023]		
Other Parties	-0.079	-0.022		
	[0.127]	[0.035]		
State characteristics[b]				
Average budget deficit over last three years (H1)	-0.311***	-0.085***	-0.485***	-0.088***
	[0.033]	[0.009]	[0.049]	[0.008]
Debt rule index (H3)	2.626***	0.717***	3.776***	0.687***
	[0.286]	[0.077]	[0.398]	[0.071]
GDP per capita	0.027***	0.007***	0.032***	0.006***
	[0.005]	[0.001]	[0.007]	[0.001]
Dummy for consolidation assistance	-0.763***	-0.208***	-1.162***	-0.211***
	[0.092]	[0.024]	[0.127]	[0.023]
Fiscal equalization transfers to GDP	-0.328***	-0.090***	-0.539***	-0.098***
	[0.052]	[0.014]	[0.081]	[0.014]
Government coalition consists of right parties	0.587***	0.160***	0.843***	0.153***
	[0.073]	[0.019]	[0.100]	[0.017]
Cross state dimension:				
Own state (H4)	0.794***	0.217***	1.168***	0.213***
	[0.106]	[0.028]	[0.162]	[0.029]
Home state fixed effects	Yes	Yes		
Person fixed effects			Yes	Yes
Regression diagnostics:				
Observations	10,224		10,224	
Pseudo-R^2	0.243		0.491	
p-value joint significance of all variables	0.000		0.000	
p-value joint significance of all individual variables	0.000		n.a.	
p-value joint significance of party-dummies	0.000		n.a.	
p-value joint significance of state characteristics	0.000		0.000	

*Notes: */**/*** denote significance at the 10%/5%/1% level; Standard errors in brackets; [a] base category is the market oriented liberal democratic party "FDP"; [b] State characteristics are 2010 data for survey waves 1 and 2, which both took place in 2011, and 2011 data for survey wave 3, which took place in 2012.*

Table 3.4: Likelihood of State's Compliance – Check H4 (Sample Splits by Table A.2.)

Probit regressions with compliance expectation as dependent variable (1: compliance expected, 0: not expected)

	(1) $p^{ins} < 0.5$		(2) $p^{ins} > 0.5$	
Independent Variables	Baseline 1 for BE, HB, NW, SL, TH	Average marginal effects	Baseline 1 for BB, BW, BY, HE, HH, MV, NI, RP, SH, SN, ST	Average marginal effects
Individual: education				
Tertiary degree	0.134*	0.024*	-0.016	-0.005
	[0.075]	[0.014]	[0.041]	[0.012]
Economics/Business degree	-0.198**	-0.036**	0.108**	0.032**
	[0.083]	[0.015]	[0.046]	[0.014]
Individual: parliamentary role				
Member of governing parties in state (H4)	0.214**	0.039**	0.211***	0.062***
	[0.099]	[0.018]	[0.054]	[0.016]
Member of budget committee	-0.169**	-0.031**	-0.151***	-0.044***
	[0.082]	[0.015]	[0.046]	[0.014]
Number of years in parliament	-0.012**	-0.002**	-0.005*	-0.001*
	[0.005]	[0.001]	[0.003]	[0.001]
Individual: other				
Female	-0.262***	-0.048***	-0.064*	-0.019*
	[0.073]	[0.013]	[0.037]	[0.011]
Age in years	0.004	0.001	0.002	0.001
	[0.004]	[0.001]	[0.002]	[0.000]
Individual: bailout-expectation				
Index for perceived strength of budget constraint (H2)	0.075***	0.014***	0.062***	0.018***
	[0.011]	[0.002]	[0.006]	[0.002]
Individual: party affiliation[a]				
CDU/CSU	-0.161	-0.029	-0.147*	-0.043*
	[0.155]	[0.028]	[0.081]	[0.024]
SPD	-0.365**	-0.066**	-0.161*	-0.048*
	[0.176]	[0.032]	[0.087]	[0.026]
Green Party	0.073	0.013	0.044	0.013
	[0.168]	[0.031]	[0.110]	[0.032]
Left Party	0.129	0.023	0.114	0.034
	[0.176]	[0.032]	[0.100]	[0.029]
Other Parties	-0.104	-0.019	-0.082	-0.024
	[0.226]	[0.041]	[0.157]	[0.046]
State characteristics[b]				
Average budget deficit over last three years (H1)	-0.049	-0.009	-0.617***	-0.182***
	[0.197]	[0.036]	[0.043]	[0.012]
Debt rule index (H3)	4.021**	0.732**	2.421***	0.714***
	[1.670]	[0.306]	[0.281]	[0.081]
GDP per capita	0.007	0.001	-0.003	-0.001
	[0.025]	[0.004]	[0.004]	[0.001]
Dummy for consolidation assistance	-1.139***	-0.207***	-0.754***	-0.222***
	[0.202]	[0.036]	[0.102]	[0.029]
Fiscal equalization transfers to GDP	-0.039	-0.007	-0.869***	-0.256***
	[0.122]	[0.022]	[0.061]	[0.016]
Government coalition consists of right parties	0.024	0.004	0.268***	0.079***
	[0.292]	[0.053]	[0.057]	[0.017]
Cross state dimension				
Own state (H4)	0.490***	0.089***	0.889***	0.262***
	[0.128]	[0.023]	[0.106]	[0.030]
Home state fixed effects	Yes	Yes	Yes	Yes
Regression diagnostics:				
Observations	3,195		7,029	
Pseudo-R^2	0.194		0.231	
p-value joint significance of all variables	0.000		0.000	
p-value joint significance of all individual variables	0.000		0.000	
p-value joint significance of party-dummies	0.001		0.003	
p-value joint significance of state controls	0.000		0.000	

*Notes: */**/*** denote significance at the 10%/5%/1% level; Standard errors in brackets; a base category is the market oriented liberal democratic party "FDP"; b State characteristics are 2010 data for survey waves 1 and 2, which both took place in 2011, and 2011 data for survey wave 3, which took place in 2012. BB=Brandenburg, BE=Berlin, BW=Baden-Württemberg, BY=Bavaria, HB=Bremen, HE=Hesse, HH=Hamburg, MV=Mecklenburg-West Pomerania, NI=Lower Saxony, NW= North Rhine-Westphalia, RP=Rhineland-Palatinate, SH=Schleswig-Holstein, SL=Saarland, SN=Saxony, ST=Saxony-Anhalt, TH=Thuringia.*

3.4.2 Robustness of Regression Results

First, the results presented above are robust with respect to the use of different variables capturing state fiscal conditions (Hypothesis 1). No matter whether we include either a state's total debt stock relative to its GDP or the need for consolidation instead of the average budget deficit (over the last three years) relative to GDP, our above findings are confirmed (see Table 3.5): Just like the average deficit the debt stock and the need for consolidation enter highly significantly and with a negative sign. Higher debt or a stronger need for consolidation also decreases the compliance expectations of legislators. The impact of almost all other variables remains as in the baseline regressions. Only the coefficients to the fiscal equalization transfers change significance and signs across specifications. We believe that this can be explained by the fact that debt is highly correlated with financial equalization transfers[27], whereas the average deficit is not.

Second, a concern about the validity of our data could originate from sample selection. For our survey, Heinemann et al. (2015) have conducted a unit non-response analysis. They make use of data on the personal characteristics for all 1683 legislators, not only those who responded.[28] The non-response analysis identifies variables at the individual and state level that affect politicians' participation decision. According to these results, significant drivers of survey participation are: education (degree in economics or business), budget committee membership, membership in government coalition parties and gender. Thus, our regressions comprise as controls those factors which are important drivers of non-response. This greatly reduces the potential for selection bias. Yet, we cannot fully exclude a selection bias (Little and Vartivarian, 2005). As a further robustness check, we therefore employ a weighted regression (see Table 3.6). For the weighting, we use the inverse response probability based on party and state affiliation. The weighted regression slightly changes the findings for party dummies: The Social Democrats dummy loses significance whereas the difference between the Left Party and the Free Democrats now becomes significant. Interestingly, in this regression variant left-leaning politicians are more optimistic than their right-leaning colleagues. The essential findings for our four key hypotheses are confirmed,

[27] The correlation coefficient amounts to 0.76.

[28] We do not face severe item non-response but predominantly unit non-response. Item non-response amounts to less than 1% of respondents and is therefore negligible for the survey at hand.

however. Compared to the non-weighted regression there are only minor changes in the size of average marginal effects.

Table 3.5: Likelihood of State's Compliance – Robustness Checks 1 (alternative variables for H1)

Probit regressions with compliance expectation as dependent variable (1: compliance expected, 0: not expected)

	(1)		(2)	
Independent Variables	Baseline 1 (with total debt)	Average marginal effects	Baseline 1 (with budget deficit)	Average marginal effects
Individidual: education				
Tertiary degree	0.022	0.006	0.021	0.006
	[0.035]	[0.009]	[0.035]	[0.009]
Economics/Business degree	0.039	0.010	0.039	0.011
	[0.039]	[0.011]	[0.039]	[0.011]
Individual: parliamentary role				
Member of governing parties in state (H4)	0.186***	0.050***	0.196***	0.053***
	[0.044]	[0.012]	[0.044]	[0.012]
Member of budget committee	-0.152***	-0.041***	-0.150***	-0.041***
	[0.039]	[0.011]	[0.039]	[0.011]
Number of years in parliament	-0.006***	-0.002***	-0.006***	-0.002***
	[0.002]	[0.001]	[0.002]	[0.001]
Individual: other				
Female	-0.106***	-0.028***	-0.106***	-0.029***
	[0.033]	[0.009]	[0.032]	[0.009]
Age in years	0.002*	0.001*	0.002*	0.001*
	[0.001]	[0.000]	[0.001]	[0.000]
Individual: bailout-expectation				
Index for perceived strength of budget constraint (H2)	0.063***	0.017***	0.062***	0.017***
	[0.005]	[0.001]	[0.005]	[0.001]
Individual: party affiliation[a]				
CDU/CSU	-0.141**	-0.038**	-0.140**	-0.038**
	[0.070]	[0.019]	[0.070]	[0.019]
SPD	-0.196***	-0.053***	-0.195***	-0.053***
	[0.075]	[0.020]	[0.075]	[0.020]
Green Party	0.050	0.013	0.052	0.014
	[0.088]	[0.024]	[0.087]	[0.024]
Left Party	0.116	0.031	0.119	0.032
	[0.085]	[0.023]	[0.084]	[0.023]
Other Parties	-0.086	-0.023	-0.078	-0.021
	[0.128]	[0.035]	[0.127]	[0.034]
State characteristics[b]				
Total debt to GDP (H1)	-0.050***	-0.013***		
	[0.005]	[0.001]		
Need for consolidation (H1)			-0.376***	-0.102***
			[0.048]	[0.013]
Debt rule index (H3)	1.057***	0.284***	1.926***	0.523***
	[0.326]	[0.088]	[0.288]	[0.078]
GDP per capita	0.022***	0.006***	0.008*	0.002*
	[0.005]	[0.001]	[0.005]	[0.001]
Dummy for consolidation assistance	-0.198*	-0.053*	-0.789***	-0.214***
	[0.115]	[0.031]	[0.108]	[0.029]
Fiscal equalization transfers to GDP	0.112**	0.030**	-0.071	-0.019
	[0.055]	[0.015]	[0.047]	[0.013]
Government coalition consists of right parties	0.179**	0.048**	0.589***	0.160***
	[0.079]	[0.021]	[0.074]	[0.020]
Cross state dimension				
Own state (H4)	0.782***	0.210***	0.764***	0.208***
	[0.088]	[0.023]	[0.103]	[0.028]
Home state fixed effects	Yes	Yes	Yes	Yes
Regression diagnostics:				
Observations	10,224		10,224	
Pseudo-R^2	0.253		0.244	
p-value joint significance of all variables	0.000		0.000	
p-value joint significance of all individual variables	0.000		0.000	
p-value joint significance of party-dummies	0.000		0.000	
p-value joint significance of state characteristics	0.000		0.000	

*Notes: */**/*** denote significance at the 10%/5%/1% level; Standard errors in brackets; [a] base category is the market oriented liberal democratic party "FDP"; [b] State characteristics are 2010 data for survey waves 1 and 2, which both took place in 2011, and 2011 data for survey wave 3, which took place in 2012.*

Table 3.6: Likelihood of State's Compliance – Robustness Checks 2 (weighting by inverse response probability based on party and state affiliation)

Probit regressions with compliance expectation as dependent variable (1: compliance expected, 0: not expected)

	(1)		(2)	
Independent Variables	Baseline 1 (Weighted regression)	Average marginal effects	Baseline 2 (Weighted regression)	Average marginal effects
Individidual: education				
Tertiary degree	0.010	0.003		
	[0.040]	[0.011]		
Economics/Business degree	0.077*	0.021*		
	[0.042]	[0.012]		
Individual: parliamentary role				
Member of governing parties in state (H4)	0.173***	0.048***		
	[0.046]	[0.013]		
Member of budget committee	-0.139***	-0.039***		
	[0.041]	[0.011]		
Number of years in parliament	-0.015***	-0.004***		
	[0.003]	[0.001]		
Individual: other				
Female	-0.084**	-0.023**		
	[0.036]	[0.010]		
Age in years	0.007***	0.002***		
	[0.002]	[0.001]		
Individual: bailout-expectation				
Index for perceived strength of budget constraint (H2)	0.057***	0.016***		
	[0.006]	[0.002]		
Individual: party affiliation[a]				
CDU/CSU	-0.023	-0.006		
	[0.076]	[0.021]		
SPD	-0.135*	-0.038*		
	[0.082]	[0.023]		
Green Party	0.040	0.011		
	[0.097]	[0.027]		
Left Party	0.294***	0.082***		
	[0.097]	[0.027]		
Other Parties	-0.504**	-0.140**		
	[0.204]	[0.057]		
State characteristics[b]				
Average budget deficit over last three years (H1)	-0.299***	-0.083***	-0.476***	-0.087***
	[0.033]	[0.009]	[0.050]	[0.009]
Debt rule index (H3)	2.530***	0.705***	3.704***	0.677***
	[0.287]	[0.078]	[0.403]	[0.072]
GDP per capita	0.025***	0.007***	0.030***	0.005***
	[0.005]	[0.001]	[0.007]	[0.001]
Dummy for consolidation assistance	-0.740***	-0.206***	-1.143***	-0.209***
	[0.091]	[0.025]	[0.130]	[0.024]
Fiscal equalization transfers to GDP	-0.307***	-0.085***	-0.504***	-0.092***
	[0.049]	[0.013]	[0.082]	[0.014]
Government coalition consists of right parties	0.574***	0.160***	0.820***	0.150***
	[0.073]	[0.020]	[0.102]	[0.018]
Cross state dimension				
Own state (H4)	0.843***	0.235***	1.265***	0.231***
	[0.122]	[0.034]	[0.193]	[0.035]
Home state fixed effects	Yes	Yes	Yes	Yes
Regression diagnostics:				
Observations	10,224		10,224	
Pseudo-R^2	0.234		0.493	
p-value joint significance of all variables	0.000		0.000	
p-value joint significance of all individual variables	0.000		n.a.	
p-value joint significance of party-dummies	0.000		n.a.	
p-value joint significance of state characteristics	0.000		0.000	

*Notes: */**/*** denote significance at the 10%/5%/1% level; Standard errors in brackets; a base category is the market oriented liberal democratic party "FDP"; b State characteristics are 2010 data for survey waves 1 and 2, which both took place in 2011, and 2011 data for survey wave 3, which took place in 2012. Weighting based on inverse response probabilities based on party and state affiliation.*

3.5 Conclusion

Fiscal rules are designed to influence fiscal performance of states. When a fiscal rule is effective, it must impact on the expectations and beliefs of those politicians who decide on the government budget. Our study of the new debt brake in Germany reveals an imperfect credibility of the fiscal rule and points to highly heterogeneous expectations with respect to sub-national compliance.

An essential result relates to the asymmetric expectations of insiders and outsiders. This holds both for the government versus opposition and the in-state versus out-of-state dimension. This result might be considered unproblematic, if the governing parties and politicians in the state under consideration were better informed and therefore more trustworthy in their judgments than outsiders. Our empirical findings based on a theoretical model point into a different direction, however. Insiders (in-state politicians, members from governing coalition parties) are more optimistic than outsiders and are likely to be subject to an overconfidence bias, which could lead to too little consolidation effort. The asymmetry has the potential to undermine a fiscal rule's effectiveness: The prevalent expectation that other jurisdictions might not comply could also weaken the perceived pressure for the own state.

Our analysis allows us to draw a few tentative conclusions that should be taken into account in the design of fiscal rules also in the European context. First, a weak initial fiscal situation is a burden for rule credibility. The phasing-in of a new rule should be paralleled by attempts to remove or at least reduce the problem of unsustainable budgetary legacies such as high initial debt. Second, sub-national rules might be a helpful complement to a national rule in a federal context like Germany where states have substantial spending and deficit autonomy. And third, clear and comprehensive sanctions and consequences in case of non-compliance are important to anchor compliance expectations.

3.6 Appendix to Chapter 3

Table A.3.1: List of Variables and Definitions

Variable	Unit	Explanations
Individual: education		
Tertiary degree	Dummy	Degree from university or polytechnic
Economics/Business degree	Dummy	Tertiary education in business or economics
Individual: parliamentary role		
Member of governing parties in state	Dummy	Member of one of the ruling parties
Member of budget committee	Dummy	Deals with state government budget
Number of years in parliament	Discrete	Calculated as 2011/2012 minus year of parliament entry (interruptions taken into account)
Individual: other		
Female	Dummy	Member of parliament is female
Age in years	Discrete	Calculated as 2011/2012 minus year of birth
Individual: bailout-expectation		
Index for perceived strength of budget constraint	Discrete	Measure ranging from -7 to +7, with higher values indicating a higher expectation of the debt brake being enforced in case of non-compliance, see footnote 3
Individual: party affiliation		
CDU/CSU	Dummy	Member of Christian Democratic or Christian Social Party
FDP	Dummy	Member of Free Democratic Party
Green Party	Dummy	Member of Green Party
Left Party	Dummy	Member of Left Party (not included into regressions since it serves as base category)
SPD	Dummy	Member of Social Democratic Party
Other	Dummy	Member of other Party
State characteristics		
GDP per capita	Continuous	Gross domestic product per capita, in thousands of Euros, *source:* German Statistical Office
Need for consolidation	Continuous	In percent of GDP, consolidation needed to comply with debt brake by the year 2020, *source:* Sachverständigenrat (2011)
Total debt to GDP	Continuous	Total debt divided by gross domestic product, in percent, *source:* German Statistical Office
Three year average budget deficit to GDP	Continuous	Weighted average of the last three budget deficits divided by gross domestic product, in percent, *source:* German Statistical Office
Index of stringency of state debt rule	Continuous	Normalized between 0 and 1, larger values indicating stricter rule, *source*: Ciaglia and Heinemann (2013)
Dummy for consolidation assistance	Dummy	Takes the value of 1 for states receiving consolidation assistance
Fiscal equalization transfers to total spending	Continuous	Total net intra-state transfer payments divided by total spending, in percent, *sources:* Federal Ministry of Finance, German Statistical Office
Government coalition consists of right parties	Dummy	Takes the value of 1 for a purely right-leaning government (coalition), a value of 0.5 for a mixed government coalition and a value of 0 for a purely left-leaning government (coalition)
Cross state dimension		
Distance	Continuous	Distance in 100 km between any two state capital cities
Adjacency	Dummy	Takes on the value of 1 if the home state of the respondent and the state to be evaluated share a common border (and if the state to be evaluated is the home state of the respondent)
Own state	Dummy	Takes on the value of 1 if the state to be evaluated it the home state of the respondent

Table A.3.2: Cross-State Compliance Expectations

		Evaluated states															
		BB	BE	BW	BY	HB	HE	HH	MV	NI	NW	RP	SH	SL	SN	ST	TH	Ø
Evaluating states	BB	53	5	68	89	0	58	53	11	37	16	32	5	11	68	16	37	35
	BE	13	33	70	73	0	67	37	30	47	10	23	13	10	57	27	50	35
	BW	5	0	75	93	1	58	22	16	17	9	19	8	4	71	5	19	26
	BY	3	3	57	89	3	53	21	4	25	5	17	7	4	61	5	32	24
	HB	11	0	67	72	11	56	28	28	50	11	28	6	6	56	28	22	30
	HE	10	2	56	76	2	78	26	18	34	10	16	8	8	58	16	32	28
	HH	21	8	72	74	0	62	67	31	44	15	36	8	3	54	21	28	34
	MV	6	0	72	78	0	53	41	83	24	0	12	0	6	78	12	29	31
	NI	4	0	74	91	2	57	24	19	56	11	26	11	6	54	20	26	30
	NW	6	4	67	82	0	53	10	24	45	16	29	10	4	61	20	31	29
	RP	14	0	76	78	4	64	28	20	36	14	52	12	4	64	22	40	33
	SH	10	7	65	86	10	55	17	24	38	10	21	66	10	52	28	31	33
	SL	20	5	95	100	5	85	45	20	55	10	35	20	30	55	25	35	40
	SN	11	0	67	80	2	42	11	29	20	0	13	4	0	89	16	42	27
	ST	24	3	76	83	7	52	28	45	35	14	28	17	17	72	59	45	38
	TH	22	11	67	97	11	69	22	31	47	19	33	28	11	89	28	47	40
$Ø_{MSP}$		12	4	69	85	3	59	27	23	36	10	26	13	7	65	19	33	31
$Ø_{State}$		15	5	70	84	4	60	30	27	38	11	26	14	8	65	22	34	32
# of times where outsiders are more optimistic than insiders		0	0	3	4	0	1	0	0	0	1	0	0	0	0	0	1	

Note: Figures are in percent and indicate the share of MSPs who expect that the evaluated state will be compliant. $Ø_{MSP}$ *indicates the average over all MSPs.* $Ø_{State}$ *indicates the unweighted average over the state figures.*

Notes:

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4. REVENUE AUTONOMY PREFERENCES OF SUBNATIONAL POLITICIANS[29]

4.1 Motivation

Federal systems are subject to constant adjustments. The spectrum of observable changes ranges from piecemeal adjustments of competencies up to comprehensive reforms such as the establishment of new regional authorities.[30] Previous research (surveyed below) has focused on the structural and, increasingly, dynamic drivers of federal reform processes. While the empirical part of this literature exploits the experience from country case studies or comparative aggregate country data, there is, however, a striking knowledge gap: We hardly know how individual politicians form their federal reform preferences. Here, our contribution comes into play. For the example of German federalism, and in particular the issue of subnational revenue autonomy, we explore reform preferences for members of parliaments of all sixteen German states ("Länder" henceforth). Beyond the German case, the insights are of general interest for federalism research in other national contexts by highlighting federal reform preference formation of individual politicians at the subnational level.

Germany's fiscal federalism is characterized by extensive joint decision making, intense fiscal equalization across subnational jurisdictions, and a large extent of vertical tax sharing (Benz 1999; Rodden 2003; Stegarescu 2005; Broschek 2011). Fiscal sovereignty with respect to tax autonomy is particularly low at the Länder level. However, the system has gone through several reforms over the last decade increasing Länder independence. Greater Länder revenue autonomy or less intense fiscal equalization have been important issues in the reform debate, but a consensus for a far-reaching change has so far been out of reach (Burkhart 2009). A new reform momentum originates from both the new constitutional debt brake, which requires structurally balanced budgets of the Länder from the year 2020 onwards, and the expiration of laws which specify the institutional details and the precise extent of vertical and horizontal equalization in Germany by the end of 2019. This sunset clause tends to weaken the status quo bias since the status quo (like any alternative arrangement) needs the new

[29] This chapter is joint work with Friedrich Heinemann, Eckhard Janeba, and Marc-Daniel Moessinger, which has been published as "Who Likes to Fend for Oneself? Revenue Autonomy Preferences of Subnational Politicians in Germany", *Publius: The Journal of Federalism,* 45 (4): 653-685. See Heinemann, Janeba, Moessinger, and Schröder (2015).

[30] For a summary on recent reforms of subnational government systems in the EU see Nam (2013).

backing by majorities in both parliamentary chambers, the Bundestag and the Bundesrat.

Therefore, federalism reform is an ongoing issue in the political debate, which makes it worthwhile to study the views of important veto players in constitutional reforms. We employ a unique database to study individual reform preferences with respect to both revenue autonomy at the Länder level and the fiscal equalization. The core of our database is a survey among the parliaments of all sixteen German Länder, which was in the field in 2011–2012. We obtained answers from 639 politicians (out of 1861 Länder MPs) across all Länder and parties. German Länder have a decisive say in all reforms of fiscal federalism through the German upper house, the Bundesrat. In the Bundesrat, each German Land is represented through its government, which casts a block vote. Länder governments in turn are elected by the respective Länder parliaments. Hence, federal reform preferences of Länder parliamentarians should be one of the factors shaping the use of the Bundesrat block votes and veto power in federal reforms.

In particular, we use the survey data to address two interrelated issues: First, we want to understand the determinants of reform preferences such as Länder self-interest, party ideology, and individual characteristics (e.g., education or parliamentary experience). We are able to address these different dimensions by combining the survey answers with both individual characteristics of the Länder MPs and general Länder characteristics. Second, we aim to identify the degree of polarization among German Länder and their politicians with an eye toward the underlying majorities in favor of or against fiscal federalism reforms. In particular, we analyze whether more subnational revenue autonomy or less fiscal equalization would garner the necessary support in the Bundesrat, thus approximating future reform decisions as closely as possible.

Our results indicate that ideology and specific Länder interests are jointly linked with federal reform preferences. Those politicians who prefer lower taxes and a smaller size of government are also more inclined to accept a more competitive type of federalism for Germany where Länder may compete for (human) capital allocation, e.g., through autonomous tax setting. Länder characteristics are of importance as well: Politicians from poorer Länder and from Länder with particularly high public debt and consolidation needs (i.e., the amount of fiscal adjustment necessary to comply with the constitutional debt brake until 2020) are more hesitant to support tax autonomy or

lower fiscal equalization intensity. A key result arises from our simulated majorities for the Bundesrat: A majority exists for lowering the degree of fiscal equalization, while there is a (fragile) blocking minority against more tax autonomy. Our insights point to a strategy which is promising to foster reform acceptance: a reform package which addresses budgetary legacies like high pre-existing debt in combination with more revenue autonomy.

The rest of the chapter is structured as follows: After a short survey of relevant literature (section 4.2), we give a summary of German fiscal federalism and describe the more recent reform momentum (section 4.3). Section 4.4 develops the hypotheses followed by descriptive and econometric evidence (section 4.5). Section 4.6 simulates voting behavior of all Länder in the Bundesrat and the final section 4.7 draws some conclusions.

4.2 Endogenous Decentralization in the Literature

Decentralization has proven to be a relevant impact variable for many social, political, or economic outcomes, which explains the ongoing interest in the drivers of decentralization. In this context, a first wave of contributions has focused on structural long-term factors like wealth, ethnic fractionalization, colonial history, or democracy, which determine a country's likely degree of decentralization (surveyed, e.g., by Amat and Falcó-Gimeno 2013).

A natural limitation of these static approaches is the lack of insight into shorter term reforms of federal systems as they have occurred in OECD countries over the last decades. These reform activities have inspired a growing line of research on endogenous decentralization processes. Related contributions point to the role of changing economic constraints, democratization, supra-national influence, or fundamental political regime change clearing the way for decentralizing reforms (for a survey see Tafel 2010).

In addition, political constraints and (changing) party preferences have attracted substantial attention with a particular focus on country-wide political parties. For example, O'Neill (2003) points out that larger subnational autonomy could be an attractive option even for politicians at the central level if their party's power at the central government level is uncertain and they expect to win a substantial proportion of subnational offices. Conversely, country-wide parties with good federal career prospects for successful Länder politicians can explain these politicians' support for further

centralization, which seemed to be the case in Germany (Feld and von Hagen 2007). For the case study of the United Kingdom, Hopkin (2009) describes how the Labour Party moved toward the support of devolution as a reaction to electoral competition from Scottish and Welsh nationalist parties. In her case study on Spain, Verge (2013) points out that federal ideology and power interact: A state-wide party's federal ideology is a more significant constraint if this party is in opposition and not in government. Related to the same federal context as our study, Turner and Rowe (2013) find that partisan, ideological, and territorial factors help to understand the reform views of important actors on the recent reforms of German federalism.

Our study shares the objective of this literature insofar as it aims to understand the drivers of decentralizing reforms and their political constraints. However, it contributes several novelties to the literature. First, its focus is on one particular dimension of decentralization, which is subnational revenue autonomy and fiscal equalization. In contrast, the existing literature's dependent variable of interest tends to be "decentralization" or "devolution" as a comprehensive qualitative or quantitative measure.[31]

While this broad and comprehensive picture is important, it needs to be complemented through more targeted studies on single decentralization dimensions. We provide these insights for revenue decentralizing reforms where specific studies are rare and of a qualitative nature. Garman, Haggard and Willis (2001) note that regional politicians tend to prefer unconditional transfers from the center rather than taxing their regional voters through an autonomous tax.

Second, our quantitative basis is unique since we exploit a direct confidential survey of more than 600 individual subnational policy makers. Thus, we observe direct measures of individual politicians' decentralization preferences. In contrast, the existing literature on endogenous decentralization is either qualitative or derives preferences from textual analyses of party manifestos (Amat and Falcó-Gimeno 2013), a limited number of interviews (Turner and Rowe 2013), or recorded votes (Bräuninger, Gschwend, and Shikano 2010; Träger and Leuning 2014).[32]

[31] A typical comprehensive decentralization indicator used in the literature (e.g., by Amat and Falcó-Gimeno 2013) is the "Regional Authority Index" by Hooghe, Marks, and Schakel (2010) which codifies the extent to which regional authorities enjoy political power either through autonomous decisions over citizens in the region or through shared power for the country as a whole.

[32] Studies on recorded votes in the Bundesrat, the upper house in Germany, have the particular problem that there is only one block vote per Land, i.e., no individual variance is observable.

The third contribution is methodological. We do not limit the analysis to the scrutiny of reform preferences, reform constraints, and the ex post explanation of observable reform activity. Based on our empirical analysis of individual preference heterogeneity, we also use the estimated model in a forward looking way to assess Länder-dependent reform preferences and to suggest the design of reform packages that would garner the support of the majority of Länder in the Bundesrat.

4.3 German Länder Autonomy and the Reform Debate

Germany offers a type of federalism which is particularly promising to study preferences for subnational revenue autonomy. In Germany's federal system, legislative autonomy of the sixteen Länder is highly limited. Instead, the Länder derive influence from their major responsibility in administering national laws and their extensive veto power in the federal legislative process. With German "executive federalism", the implementation of federal laws is largely in the responsibility of the Länder (Burkhart 2009). Their veto power originates from the fact that a substantial share of federal laws requires the consent of both chambers, the lower (Bundestag) and the upper house (Bundesrat).

The financing of governmental levels is heavily interdependent. Joint financing makes up 70 percent of total tax income (see Table A.4.1 in the appendix to this chapter). In contrast to other federal countries like the United States or Switzerland, German Länder cannot levy income tax surcharges on top of tax rates determined by the federal level. For this reason, Germany scores far below these federal countries in comparative indicators of revenue decentralization that take account of the subnational autonomy in setting tax rates or defining tax bases (Stegarescu 2005). At the same time, however, the Länder have a fairly large amount of autonomy with respect to the expenditure side of the government budget.

A further defining characteristic of German federalism is that the German constitution (Grundgesetz) stipulates that living conditions in all regions should be equivalent ("Gleichwertigkeit der Lebensverhältnisse"), which is reflected in a complicated system of far-reaching fiscal equalization. The equalization system comprises several elements (for details see Feld and von Hagen 2007; Federal Ministry of Finance 2012): First, in the allocation of tax revenues, poor Länder are privileged by additional shares of VAT revenues. Second, through a formula-based horizontal system

the richer Länder finance unconditional grants to those Länder with a financial capacity below average (see Figure A.4.1 in the appendix to this chapter). Third, the remaining differences in fiscal capacity are further equalized by (partially conditional) grants from the federal government. The overall effect of these different steps is a far-reaching equalization of the initial differences. In 2013, for example, financial capacity per capita before VAT and horizontal redistribution ranges from 55 percent of the average across states in Mecklenburg-West Pomerania to 157 percent in Hamburg. Post-equalization, financial capacity per capita ranges from a minimum of 98 percent (Berlin) to a maximum of 106 percent (Bavaria, see table A.4.2 in the appendix to this chapter).

The system of the Federal Republic of Germany is thus characterized by a high degree of political and fiscal interdependence between the federal level and the Länder, which is the outcome of a post-war centralization process. The early decades of the Federal Republic after 1949 were characterized by centralization and expansion of joint decision making culminating in the 1969 constitutional reforms. These reforms defined joint tasks and federal grants in the constitution and increased joint taxation (Benz 1999; Broschek 2011).

After unification in 1990, due to the integration of the poorer new Länder into the fiscal equalization system, a growing discontent with the condition of German federalism emerged (Burkhart 2009). In addition, pressure from globalization and demographic change suggested far-reaching institutional reforms in Germany. However, the specific institutional details of Germany's federal system were perceived to block reforms. In particular, the joint decision-making of Bundestag and Bundesrat was largely held responsible for a too slow pace of adjustment. Actually, the veto power of the Bundesrat in combination with the often opposing party majorities in the two chambers since the 1980s prevented the federal government from implementing reforms of the labor market or the tax and welfare system, resulting in the diagnosis that Germany is stuck in a "joint-decision trap" (Scharpf 1988, 2005).

To at least partially loosen this joint decision nexus, two comprehensive reforms of German federalism took place in 2006 and 2009 (Turner and Rowe 2013). Federalism Reform I (FR I) was largely focused on a disentanglement of competencies and a roll-back of joint decision making. One important objective of the reform was to substantially reduce the number of federal laws that need approval from the Länder in the second chamber (Bundesrat). In exchange, the reform gave the Länder more discretionary

power in certain policy areas such as environmental legislation and the pay structure for civil servants. Federalism Reform II (FR II) introduced the "debt brake", i.e., (close to) balanced budget requirements in structural terms for the federal and Länder governments, starting in 2016 and 2020, respectively. While this reform does not directly affect the degree of tax autonomy between the Länder and the extent of fiscal equalization, it may do so indirectly. Without the option to run repeated budget deficits, the need and desire to have access to an independent tax policy may emerge among the Länder themselves.

While reforms of joint legislation and debt constraints have been substantial, political resistance to reforms increasing tax autonomy or limiting far-reaching equalization has been strong. Prior to FR I, Länder prime ministers explicitly criticized reform proposals threatening fiscal equalization and pushing for regional tax autonomy together with territorial reforms (Burkhart 2009). Nevertheless, even in these contested areas small reforms were enacted during the last decade. FR I comprised a small step toward higher tax autonomy by granting the Länder the right to decide autonomously on the rate for the real estate transaction tax. Moreover, the last reform of fiscal equalization introduced a "premium model" from 2005 onwards to alleviate the disincentives of very high marginal equalization payments from additional Länder tax revenues. The new premium model exempts a share of short-run increases in Länder tax revenues from equalization (Fuest and Thöne 2009). These examples indicate that at least in those areas incremental reforms are feasible.

After FR II, the reform debate on German federalism continues. The expiration of the current Fiscal Equalization Law (FEL) by the year 2019 makes a renegotiation of the system unavoidable. Changing constraints should have an impact on negotiations: First, the debt brake implies new financing constraints for the Länder, which could change the perspective both on the importance of tax autonomy and the equalization needs. Second, the new system for 2020 is unlikely to offer privileges comparable to those provided to the former Eastern German Länder, given that thirty years will have passed since unification and these three decades have seen large transfers and a virtually complete rebuilding of public infrastructure in the east.

Changes of the constitutional rules of governing German federalism require a qualified majority of two-thirds both in the Bundestag and the Bundesrat.[33] In the Bundesrat, votes are cast as a block vote by the delegates of the respective Länder governments. The latter are elected by the Länder parliaments and, for all legislative projects, depend on majority support in their Länder parliaments. Due to this dependence, preferences of the members of Länder parliaments have informational value as to which reform options could find the acceptance of the Bundesrat as one of the decisive institutional veto players.

4.4 Determinants of Preferences

We assume that federal reform preferences of politicians are driven by three factors: (i) Länder self-interest, (ii) ideology and government self-interest, as well as (iii) individual characteristics related to information, education, and parliamentary role/experience. The distinction between Länder factors and partisan aspects shaping the views of Länder politicians is also a key aspect of the literature studying voting behavior in the Bundesrat (Bräuninger, Gschwend, and Shikano 2010; Träger and Leuning 2014). Contrary to Bundesrat voting studies, our data base allows for the inclusion of the individual dimension as a third one.

4.4.1 Länder Self-Interest

The predictions related to Länder self-interest are straightforward in the context of fiscal equalization but less so for tax autonomy. Politicians from Länder that are regular recipients of (contributors to) the fiscal equalization system should tend to be in favor of (against) more intense equalization.

With respect to tax autonomy the prediction is more complex. Since Zodrow and Mieszkowski (1986) the public finance literature has paid close attention to the normative side of tax autonomy and tax competition (Fuest, Huber, and Mintz 2005). In our context, it is important to note that Länder that fall above and below median levels of income may benefit or suffer from tax competition in different ways. In the political debate, it is often argued that poor jurisdictions would lose from tax autonomy and

[33] It is contested to which extent a change of the German constitution is required for more tax autonomy. Feld, Kube, and Schnellenbach (2013, 52) contend that changes of tax laws are sufficient to enable Länder to set surcharges on federally defined taxes. For these tax law changes, the Bundesrat would still be a veto player, albeit with simple majority sufficient for reform acceptance (instead of two-thirds for a constitutional change).

might even be confronted with a vicious cycle of rising taxes and outward flows of mobile tax bases (high-income individuals, companies). This argument is reinforced when agglomeration externalities play a role (Baldwin and Krugman 2004). Other authors, however, point out that both very poor and very rich Länder might particularly welcome an autonomous tax setting since it offers both types leeway to adjust public good provision compared to Länder with an average income level (Fuest 2008). Rich (poor) Länder could increase (decrease) the supply of public goods and increase (lower) taxes. According to this view, we should expect that Länder at the tails of the income distribution welcome tax autonomy, whereas Länder close to the median position may prefer the status quo.[34] In addition, a high existing debt level should dampen the enthusiasm for tax competition because it would disadvantage the Länder in their attempt to offer "value for money" (i.e., public goods in exchange for the tax burden) and to offer an attractive location for mobile factors. Finally, the size of the Länder could matter (Bucovetsky and Wilson 1991): Smaller Länder might have an incentive to exploit autonomous tax setting through lowering tax rates and attracting capital from larger Länder. The reason is that smaller Länder are confronted with a larger tax elasticity of a mobile tax base compared to larger Länder.

Our brief discussion leads us to make the following hypotheses:

- H1 (on tax autonomy): Länder "handicaps" should matter: Parliamentarians from Länder with high debt and/or permanently high deficits should be more opposed to tax competition than those from low debt Länder.
- H2 (on tax autonomy): Politicians from small Länder (in terms of population) are relatively more supportive of tax autonomy than representatives from large Länder.
- H3 (on tax autonomy): For income, we expect a nonlinear impact: Members of parliament from Länder with incomes (far) above and below the mean income should favor tax autonomy, whereas Länder with an average position should have less interest in tax autonomy.

[34] There is the subtle problem that a uniform national tax rate under the status quo may not be equal to the average tax rate in the non-cooperative equilibrium with Länder tax autonomy. Our subsequent analysis goes through if members of Länder parliaments take today's uniform tax rate as a proxy for the expected average tax rate in a possible future non-cooperative situation.

- H4 (on fiscal equalization): Members of parliament from Länder which are net contributors to the fiscal equalization system should be more opposed to extensive equalization than those from net receiving Länder.

4.4.2 Ideology and Government Self-Interest

Party programs differ with respect to the weights they assign to objectives or values such as "solidarity", "incentives", or "individual responsibility". Furthermore, ideology impacts on the perception of economic constraints. Heinemann and Janeba (2011) show how ideology influences the perception of firm mobility in the context of tax policy decisions. Similar to welfare state reforms or tax policy, decisions on the parameters of a federal constitution imply decisions on trade-offs between distributive preferences and efficiency. We expect that parties from the left will assign a larger weight to the notion of solidarity between different Länder relative to the individual responsibility. In contrast, market-liberal parties should rather stress the importance of Länder competition and incentives with a critical view on intense equalization and the lack of tax autonomy. This expectation is backed by the findings of Benoit and Laver (2006), who construct an indicator for the positioning of different parties with respect to different policy dimensions by conducting expert surveys. Their results for Germany (Benoit and Laver 2006, 261) confirm the notion that center right parties (Christian Democratic Party, Free Democratic Party) are more market oriented and rather more in favor of decentralization than left parties (Social Democratic Party, Green Party, Left Party).

Independent of party affiliation it could make a difference whether a member of parliament belongs to the parties of the Länder government coalition or not. From the perspective of an opposition member, receipts to a poor Land from a generous equalization system may be less appealing since the political advantage of this resource inflow goes mainly to the incumbent government. Vice versa, opposition politicians in rich Länder might view payments into the equalization system less critically since it constrains the incumbent government.

Our expectation is as follows:

- H5 (on fiscal equalization): Compared to politicians from Länder government coalition parties, opposition politicians in poor Länder (rich Länder) should be more opposed to (supportive of) intense equalization.

- H6: (on tax autonomy and fiscal equalization): Politicians from the political left should be more supportive of equalization payments and more opposed to tax autonomy than politicians from other/market-liberal parties.

4.4.3 Individual Characteristics

Besides Länder interests and ideological imprint, individual education, information and parliamentary experience could be of relevance for views about the reform of federalism. There is a growing literature which looks at the impact of individual characteristics of policy makers on beliefs, preferences, and performance. Referring to education, for instance Besley, Montalvo, and Reynal-Querol (2011) show that the education of political leaders affects economic growth. The more educated a political leader is, the higher the growth of GDP. Furthermore, the field of academic studies matters. U.S. congress members trained in economics are less likely to support minimum wage increases (O'Roark and Wood 2011), and members of the European Parliament with an economics education are more opposed to the introduction of an EU tax than their parliamentary colleagues (Heinemann, Mohl, and Osterloh, 2009). Information and former professional positions seem to play a role, too: Göhlmann and Vaubel (2007) find that inflation preferences of central bankers are driven by their former occupation (the results are confirmed by Farvaque, Hammadou, and Stanek 2011). Evidence in a similar vein is presented by Dreher et al. (2009), who show that a leader's professional background (such as being a former entrepreneur) is a statistically significant determinant in explaining a country's reform performance. With respect to fiscal performance, Jochimsen and Thomasius (2014) present evidence suggesting that the financial expertise of Länder finance ministers in Germany matters for their jurisdiction's budgetary performance. A link between experience and budgetary performance is found by Moessinger (2014) for European finance ministers and by Feld and Schaltegger (2010) for Swiss finance ministers.

In the empirical analysis, we are able to control for individual characteristics, such as age, gender, educational attainments, membership in the budget or legal committee, and the number of years in parliament. Thus, the characteristics included refer both to education and the individual level of information about the details of the German reform debate (proxied by membership in specialized committees or length of parliamentary membership). We do not have a sign prediction for these individual characteristics.

4.4.4 Survey Details

We conducted our survey among the members of all sixteen German Länder parliaments in three different rounds. The parliaments of Bavaria, Brandenburg, Lower Saxony, Saarland, Schleswig-Holstein, and Thuringia were surveyed in March and April 2011. The second round was conducted in Saxony, Saxony-Anhalt, North Rhine-Westphalia, Hesse, and Hamburg in December 2011 and January 2012. The third round in April and May 2012 included the parliamentarians of Baden- Wuerttemberg, Rhineland-Palatinate, Bremen, Berlin, and Mecklenburg-West Pomerania. This sequential implementation was important given the different timing of elections at the Länder level. Specifically, surveys were conducted approximately at mid-term of an electoral cycle, such that members of parliament did not face electoral campaigns or pressure from post-election government formation.

The first step in each survey was to contact each parliament's presidential office. We informed the presidency on the survey's academic intentions and asked him or her to recommend participation to the Länder MPs. Subsequently, the politicians were approached individually by written letters. Letters were addressed to offices in their electoral district and not to the parliament's address. This decentralized addressing was chosen to lower the risk of any coordinated answering, e.g., through staff in the parliamentary factions. During the first round, non-answering members of parliament received a follow-up email with the questionnaire attached. If they did not answer, we contacted them by phone. In the second and third rounds, the email to non-answering politicians additionally included a link to an online platform which allowed them to answer the questionnaire online. Some 639 members of Länder parliaments in Germany participated in the survey which resulted in a response rate of 34 percent. Response rates differ between various Länder (between 20 and 56 percent) and party affiliations (between 24 and 42 percent, see Table A.4.3 in the appendix to this chapter for response rates across Länder and parties) and along individual characteristics of the Länder politicians.

Politicians were guaranteed confidentiality on the individual response but were informed that aggregate results would be published. Confidentiality on individual responses improve the chances that parliamentarians reveal their individual preferences and pay less attention to issues of public opinion or party discipline as compared to statements in public. Data were collected non-anonymously so that it is

possible to match answers with individual characteristics of politicians, which are publicly available on official websites. The survey consists of questions related to the new German constitutional debt brake, expenditure preferences and preferences on fiscal equalization and tax autonomy (see Heinemann et al. 2014a for a detailed description and Heinemann et al. 2014b for debt brake-related results). The latter two are the focus of this analysis:

Tax autonomy question: *It is repeatedly discussed to grant German Länder more tax autonomy. One of the options debated is, for example, the right to levy surcharges on income or corporate taxes. Would you be in favor of Länder being allowed to levy these surcharges and determining their level autonomously?*

Answers are given on a discrete 9 point scale from –4 ("absolutely no") to +4 ("*absolutely yes*") with 0 indicated as "*undecided*". Values between –4 and 0 or 0 and +4 can thus be interpreted as nuances of "*rather no*" or "*rather yes*", respectively.

Fiscal equalization question: *The current design of the Länder fiscal equalization system is also subject to an ongoing debate. How do you assess the current extent of redistribution among the German Länder (including all instruments of the federal equalization system)?*[35] *The current equalization of the financial capacity across the Länder through the fiscal equalization scheme is …*

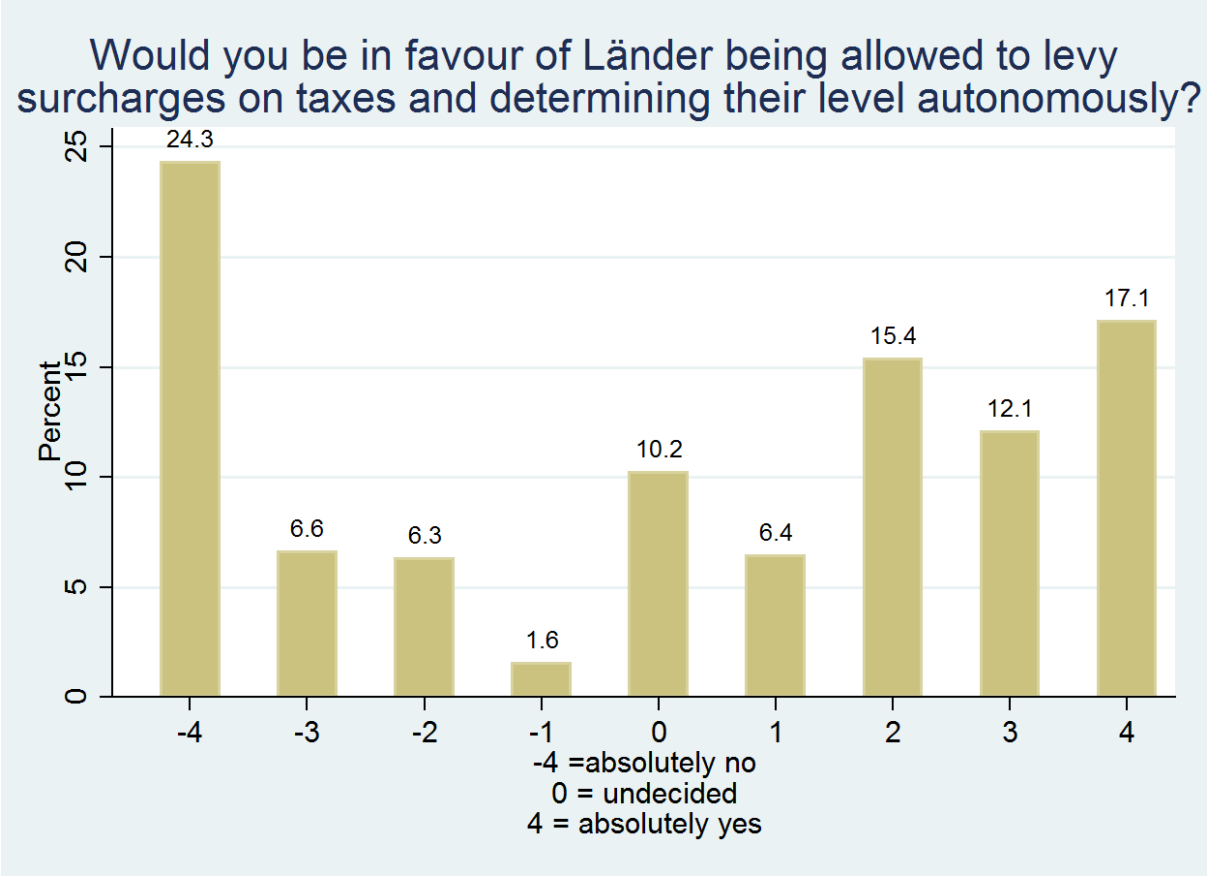
Answers are given on a discrete 9 point scale from –4 ("*absolutely too low*") to +4 ("*absolutely too far reaching*") with 0 indicated as "*appropriate*". Values between –4 and 0 or 0 and +4 can thus be interpreted as nuances of "rather too low" or "*rather too far reaching*", respectively.

The descriptive results point to highly diverse tax autonomy preferences. Figure 4.1 shows that there is – with a thin margin – an absolute majority of respondents (51 percent) who tend to support higher Länder tax autonomy compared to the status quo, whereas 10 percent have a neutral position and 39 percent are opposed. However, nearly one-fourth of respondents were in the most negative category (–4). Thus, opponents have a more determined view compared to the supporters of tax autonomy.

[35] Through the reference to "all instruments of the federal equalization system" the question activates a comprehensive assessment of the redistributive intensity. However, we cannot fully exclude the possibility that individual respondents, in their assessment, may focus on special provisions in the equalization formula which give an advantage or disadvantage to their Land.

Figure 4.1: Tax Autonomy Preferences – Overall Results

This graph reports the percentage of all respondent MSPs in each answer category.

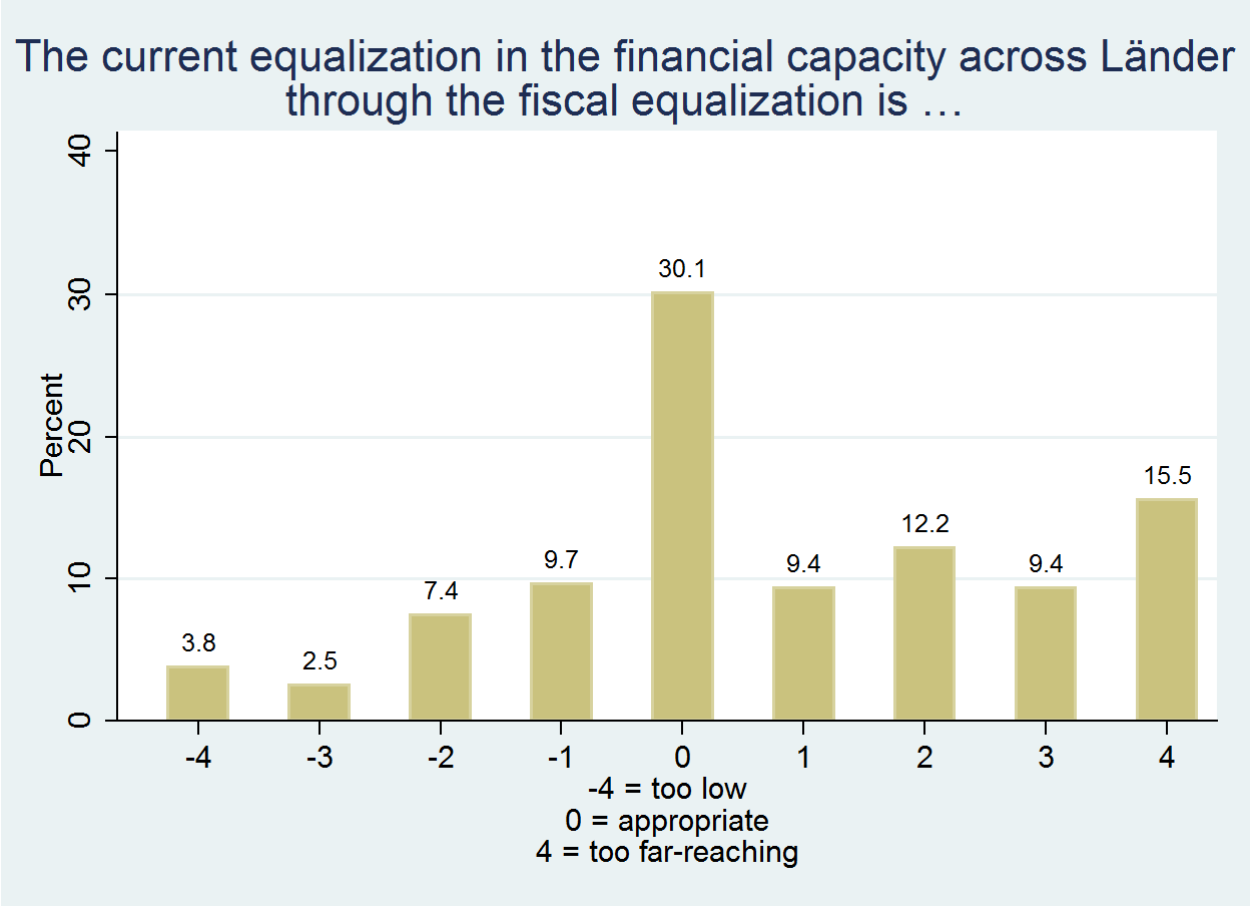


Preferences on fiscal equalization show systematic differences compared to those for tax autonomy. Figure 4.2 reveals that the mode is the neutral position with a share of 30 percent, implying that most members of Länder parliaments prefer the status quo. The share of politicians who reveal preferences for a lower extent of equalization (47 percent), however, clearly exceeds the share of those who are in favor of an even higher transfer level (23 percent).[36]

[36] The far-reaching equalization under the status quo may help to explain this frequency distribution. However, even the highly equalizing status quo does not preclude a further increase in equalization intensity. For example, the current horizontal Länder equalization formula only partially accounts for the financial capacity of a Land's municipalities and a full inclusion is one of the debated reform options which would even increase the size of transfers from the richer to the poorer Länder.

Figure 4.2: Fiscal Equalization Preferences – Overall Results

This graph reports the percentage of all respondent MSPs in each answer category.



4.5 Econometric Analysis

Through our econometric testing, we want to understand the relative importance of Länder characteristics, ideology, and individual drivers in the formation of federal preferences. In addition, we aim at identifying a model which, in the subsequent analytical step, serves the double purpose of both simulating majorities and of guiding us in the development of viable federal reform packages.

At the outset, we have to take account of several possible caveats originating from our survey data. First, unlike in incentivized experiments, survey respondents do not face monetary incentives to reveal their true preferences. While this criticism is valid in principle, our survey is superior to recording votes because the confidential treatment of individual responses offers the possibility to study preferences of politicians that are not affected by, e.g., the fear of party sanctions.

Second, we have to pay attention to the different response rates of politicians and their possible consequences for statistical inference.[37] Nonresponse may cause a biased sample (Rubin 1976; Allison 2002). However, concerns regarding nonresponse are limited if we are able to include those variables in our regressions which drive participation (Allison 2002). The regression then adjusts for all observable differences between non-respondents and respondents. Our nonresponse analysis (Table 4.1) guides us as to which variables drive participation and thus need to be included in the subsequent regressions (see Table A.4.4 for variable descriptions).[38] In addition, we provide robustness checks based on weighted regressions, which is one way of reducing bias from unit nonresponse (Little and Vartivarian 2005).

The results of our regression analyses are shown in Table 4.2 (tax autonomy preferences) and Table 4.3 (fiscal equalization preferences). All specifications display marginal effects for the maximum response category (= +4) based on ordered probit estimations. In line with our theoretical considerations, the regressions include proxies for Länder self-interest, political ideology and government self-interest as well as individual characteristics (see Table A.4.5 for descriptive statistics on the variables used in the main regressions).

[37] Fortunately, we do not have a significant item nonresponse problem but predominantly face unit nonresponse. The latter can cause serious problems in the measurement of actors' positions if they want to hide some views for strategic reasons (König, Finke, and Daimer 2005). Item nonresponse is negligible in our case (0.3 percent for the tax autonomy and 0.9 percent for the fiscal equalization question), presumably because our questions do not touch sensitive issues.

[38] For example, we find that politicians who studied economics or business and/or are a member of the respective parliament's budget committee of the Land exhibit a significantly higher inclination to having answered our questionnaire. This is in line with the insight on the role of topic interest for participation (Groves, Presser, and Dipko 2004).

Table 4.1: Non-Response Analysis, Probit Estimation with Response (=1, 0 otherwise) as Dependent Variable

	(1)	(2)	(3)	(4)
Ideology and government self-interest:				
Party affiliation[a]				
CDU/CSU		0.242**	0.250*	0.283**
		[2.347]	[1.705]	[2.496]
SPD		0.004	0.026	0.102
		[0.036]	[0.152]	[0.810]
Green Party		-0.033	0.043	0.065
		[-0.254]	[0.232]	[0.506]
Left Party		-0.148	-0.259	-0.118
		[-1.044]	[-1.404]	[-0.739]
Other Parties		0.121	-0.094	0.059
		[0.485]	[-0.291]	[0.240]
Power				
Member of government coalition of Land	-0.106		-0.204**	-0.169**
	[-1.502]		[-2.185]	[-2.328]
Individual characteristics:				
Education				
College entrance qualification	-0.162		-0.158	-0.138
	[-1.153]		[-1.131]	[-0.975]
Tertiary degree	0.140		0.151	0.150
	[1.074]		[1.105]	[1.140]
Economics/Business degree	0.200**		0.182*	0.170*
	[2.236]		[1.831]	[1.834]
Law degree	0.117		0.089	0.068
	[1.270]		[0.963]	[0.744]
Information				
Member of budget committee	0.353***		0.333***	0.360***
	[4.623]		[4.384]	[4.680]
Member of legal committee	0.032		0.029	0.046
	[0.353]		[0.335]	[0.500]
Number of years in parliament	0.000		-0.002	-0.004
	[0.002]		[-0.341]	[-0.697]
Other individual characteristics				
Female	-0.308***		-0.280***	-0.274***
	[-4.583]		[-4.256]	[-4.122]
Age in years	0.003		0.005	0.003
	[0.807]		[1.321]	[0.822]
Regression diagnostics:				
Länder fixed effects	Yes	Yes		Yes
Observations	1,861	1,861	1,861	1,861
Pseudo R^2	0.059	0.043	0.038	0.065

*Notes: This table displays regression coefficients; */**/*** denote significance at the 10%/5%/1% level; standard errors in brackets are clustered at the Länder level; a base category is the liberal democratic party.*

Table 4.2: Ordered Probit Results for Tax Autonomy Question (-4=not in favor; +4=in favor)

	Ideological variations		Legacy variation	
	(1)	(2)	(3)	(4)
Länder self-interest:				
Länder characteristics[a]: income and size				
GDP per capita	0.0115***	0.0097***	0.0124***	0.0082***
	[0.0024]	[0.0022]	[0.0018]	[0.0018]
Absolute deviation of Land GDP per capita from federal GDP per capita	-0.0122**	-0.0098**	-0.0172***	-0.0111**
	[0.0050]	[0.0048]	[0.0038]	[0.0046]
Population	-0.0021	-0.0020	-0.0083**	-0.0039
	[0.0043]	[0.0043]	[0.0035]	[0.0042]
Länder characteristics[a]: legacies				
Total debt to GDP	-0.0022*	-0.0021*		
	[0.0012]	[0.0011]		
3 year average of deficit to GDP			-0.0576***	
			[0.0135]	
Consolidation needs as share of GDP				-0.0384***
				[0.0149]
Länder characteristics[a]: equalization				
Fiscal equalization transfers to GDP	0.0211	0.0143	-0.0074	0.0141
	[0.0202]	[0.0197]	[0.0117]	[0.0161]
Ideology and government self-interest:				
Party affiliation[b]				
CDU/CSU	-0.0595			
	[0.0534]			
SPD	-0.0786			
	[0.0558]			
Green Party	-0.0995*			
	[0.0575]			
Left Party	0.0180			
	[0.0651]			
Other Parties	-0.0223			
	[0.0679]			
Alternative individual ideological indicator				
Preference for lower taxes and fees		0.0028**	0.0026**	0.0029**
		[0.0011]	[0.0012]	[0.0011]
Power				
Member of government coalition of Land	0.0118	-0.0001	-0.0029	-0.0001
	[0.0230]	[0.0218]	[0.0196]	[0.0212]
Individual characteristics:				
Education				
Tertiary degree	-0.0348	-0.0355	-0.0402	-0.0329
	[0.0252]	[0.0255]	[0.0256]	[0.0251]
Economics/Business degree	0.0223	0.0236	0.0219	0.0199
	[0.0288]	[0.0291]	[0.0293]	[0.0292]
Information				
Member of budget committee	-0.0205	-0.0207	-0.0191	-0.0209
	[0.0257]	[0.0262]	[0.0262]	[0.0263]
Member of legal committee	-0.0569*	-0.0569*	-0.0562*	-0.0576*
	[0.0323]	[0.0327]	[0.0316]	[0.0327]
Number of years in parliament	0.0020	0.0016	0.0022	0.0018
	[0.0015]	[0.0015]	[0.0016]	[0.0015]
Other individual characteristics				
Female	-0.0386	-0.0431*	-0.0388	-0.0416*
	[0.0258]	[0.0247]	[0.0245]	[0.0244]
Age in years	-0.0015	-0.0015	-0.0016	-0.0016
	[0.0011]	[0.0011]	[0.0011]	[0.0011]
Regression diagnostics:				
Observations	637	636	636	636
Pseudo R^2	0.0217	0.0205	0.0239	0.0214
p-value joint significance of all variables	0.0000	0.0000	0.0000	0.0000
p-value joint significance of individual characteristics	0.0980	0.0889	0.0998	0.117
p-value joint significance of party dummies	0.1130	n.a.	n.a.	n.a.
p-value joint significance of Länder controls	0.0000	0.0000	0.0000	0.0000

*Notes: This table displays marginal effects for the maximum category (= +4), */**/*** denote significance at the 10%/5%/1% level; standard errors in brackets are clustered at the Land-party level; [a] Länder characteristics are 2010 data for survey waves 1 and 2, which both took place in 2011, and 2011 data for survey wave 3, which took place in 2012; [b] base category for the individual party-dummies is the free democratic party.*

Table 4.3: Ordered Probit Results for Fiscal Equalization Question (-4= too low; +4= too far reaching)

	Ideological variations		Legacy variation	
	(1)	(2)	(3)	(4)
Länder self-interest:				
Länder characteristics[a]: income and size				
GDP per capita	0.0087***	0.0073**	0.0100***	0.0018
	[0.0031]	[0.0031]	[0.0031]	[0.0024]
Absolute deviation of Land GDP per capita from federal GDP per capita	-0.0078	-0.0056	-0.0161**	-0.0040
	[0.0054]	[0.0055]	[0.0064]	[0.0059]
Population	0.0001	0.0007	-0.0090*	-0.0002
	[0.0046]	[0.0044]	[0.0048]	[0.0051]
Länder characteristics[a]: legacies				
Total debt to GDP	-0.0067***	-0.0066***		
	[0.0021]	[0.0019]		
3 year average of deficit to GDP			-0.1100***	
			[0.0239]	
Consolidation needs as share of GDP				-0.0736***
				[0.0248]
Länder characteristics[a]: equalization				
Fiscal equalization transfers to GDP	-0.0033	-0.0077	-0.0842***	-0.0432
	[0.0304]	[0.0297]	[0.0168]	[0.0286]
Ideology and government self-interest:				
Party affiliation[b]				
CDU/CSU	-0.0122			
	[0.0365]			
SPD	-0.0745**			
	[0.0326]			
Green Party	-0.0676*			
	[0.0354]			
Left Party	0.0249			
	[0.0454]			
Other Parties	-0.0114			
	[0.0522]			
Alternative individual ideological indicator				
Preference for lower taxes and fees		0.0027**	0.0025**	0.0030***
		[0.0010]	[0.0011]	[0.0011]
Power				
Member of government coalition of Land	-0.0383	-0.0471	-0.0501*	-0.0431
	[0.0320]	[0.0331]	[0.0286]	[0.0334]
Individual characteristics:				
Education				
Tertiary degree	0.0112	0.0118	0.0027	0.0172
	[0.0150]	[0.0149]	[0.0159]	[0.0149]
Economics/Business degree	-0.0097	-0.0097	-0.0124	-0.0167
	[0.0191]	[0.0181]	[0.0190]	[0.0195]
Information				
Member of budget committee	0.0116	0.0115	0.0165	0.0129
	[0.0196]	[0.0190]	[0.0192]	[0.0188]
Member of legal committee	-0.0095	-0.0106	-0.0105	-0.0116
	[0.0257]	[0.0251]	[0.0243]	[0.0245]
Number of years in parliament	-0.0007	-0.0005	0.0008	0.0000
	[0.0013]	[0.0013]	[0.0014]	[0.0013]
Other individual characteristics				
Female	-0.0100	-0.0193	-0.0120	-0.0161
	[0.0238]	[0.0252]	[0.0245]	[0.0253]
Age in years	0.0001	0.0001	-0.0001	-0.0002
	[0.0009]	[0.0008]	[0.0009]	[0.0009]
Regression diagnostics:				
Observations	0.0912	0.0890	0.0971	0.0834
Pseudo R^2	0.0000	0.0000	0.0000	0.0000
p-value joint significance of all variables	0.953	0.869	0.783	0.870
p-value joint significance of individual characteristics	0.0572	n.a.	n.a.	n.a.
p-value joint significance of party dummies	0.0000	0.0000	0.0000	0.0000
p-value joint significance of Länder controls	0.0912	0.0890	0.0971	0.0834

*Notes: This table displays marginal effects for the maximum category (= +4), */**/*** denote significance at the 10%/5%/1% level; standard errors in brackets are clustered at the Land-party level; [a] Länder characteristics are 2010 data for survey waves 1 and 2, which both took place in 2011, and 2011 data for survey wave 3, which took place in 2012; [b] base category for the individual party-dummies is the free democratic party.*

For both dependent variables in Tables 4.2 and 4.3 we employ the identical set of controls: To proxy Länder interests we include indicators for the current economic position (GDP per capita) and size (population) of the Länder. Following our reasoning on the relative merits of tax autonomy for those Länder above or below the mean (see H3), we also include the deviation of a Land's GDP from the mean. Furthermore, we experiment with other important fiscally related variables, such as the debt-to-GDP ratio (columns (1) and (2)), the three-year-average of the deficit ratio (column (3)), and the need for consolidation (column (4)). The latter has been calculated by the German Council of Economic Experts (Sachverständigenrat 2011) and measures the fiscal adjustment necessary to comply with the constitutional debt brake, which requires the Länder to run a zero structural deficit from the year 2020 onwards. Finally, we account for the current level of fiscal equalization transfers to capture the advantage or disadvantage from the equalization system. All Länder characteristics are included in the regression on a real time basis, that is, we use 2010 data for the survey waves which took place in 2011 and 2011 data for the 2012 waves. To get a gist of the differences in economic and fiscal situations of the Länder see Table A.4.6.

As for Länder characteristics, there is a highly significant link between the income level and the fiscal variables on the one hand and fiscal federal preferences (both on tax autonomy and fiscal equalization) on the other hand. However, the detailed findings only partially correspond to our theoretical expectations. In line with hypothesis H1, politicians from Länder with significant fiscal burdens and need for fiscal adjustment are less ready to accept tax autonomy. This effect is robust and significant no matter how we measure legacies (debt, average past deficit, or consolidation needs). The effect of population size is as expected (see H2). Ceteris paribus, larger Länder are more opposed to tax autonomy. The result, however, is not statistically significant with exception of specification 3. The result for hypothesis H3 on the impact of the absolute deviation of Länder GDP from the mean contradicts our expectation. Politicians from Länder which are either richer or poorer than the country's average show a significantly lower readiness to open the way for tax autonomy. As shown above, some economic models predict positive effects from autonomous tax setting for particularly poor or rich Länder. Members of parliaments do not share this view, though. Our expectation that the beneficiaries of fiscal equalization (see H4) like high transfers clearly shows up in the data—albeit this effect is being hidden behind a multicollinearity phenomenon: Fiscal

equalization receipts are not robustly significant. However, this indicator is highly correlated with subnational GDP and legacy proxies. A re-estimation of our model, but now excluding the GDP per capita or the measure of consolidation needs, leaves the coefficient of fiscal equalization transfers highly significant (results obtainable from the authors). The result supports our hypothesis that Länder self-interest is important: Politicians from Länder with high fiscal equalization transfers are more opposed to cut back transfers than their counterparts in Länder that are in a net-paying position.

We also look at the conditional effect of being a member of a Länder government and the amount of fiscal equalization transfers to GDP or GDP per capita, respectively (see H5). As the estimation of interaction effects is not reliable in a nonlinear estimation model, we rely on an OLS regression for these specifications. However, the F-tests on the joint significance of the interaction effects miss statistical significance at conventional levels which means that we cannot detect any significant preference asymmetry between government party politicians from rich and poor Länder.[39]

To test the hypothesis H6, column (1) and column (2) in both Tables 4.2 and 4.3 include the results for two different specifications of the ideological proxies. In column (1), we use simple dummies separate for each party, where the Free Democratic Party (FDP) is chosen as the base category because it is the most market oriented party in Germany (Benoit and Laver 2006). In columns (2)-(4), we include an alternative individual ideology measure originating from the survey itself. In the survey, we asked how a politician would spend a surplus of 100 Euros in the respective Länder budget with the available options of cutting taxes, redeeming debt or increasing expenditures. We take the percentage allocated to the cut of taxes as our individual ideological proxy with a large (small) amount indicating a right (left) government ideology.

We find that party ideology significantly helps to understand the heterogeneity of federal preferences: politicians of the Social Democratic or the Green Parties are much less likely to accept lower equalization intensity than those of the liberal FDP. The preferences on fiscal equalization of the Christian Democrats and the Left Party do not differ significantly from that of the FDP. For tax autonomy, a (weakly) significant difference only exists between the Green Party and the Free Democrats. All other parties do not differ significantly from the FDP. Our individual ideology proxy is significant in

[39] The results are not presented but are available upon request.

both cases: Preferences for lower taxes are linked to a larger support for tax autonomy and less ambitious equalization.

Finally, we include information on educational achievements (tertiary degree dummy, specialization in economics/business dummy), the amount of information (committee membership dummies and length of parliamentary experience), as well as gender and age. For both dimensions of federal preferences individual characteristics do not play an important role with one exception: Legal committee members are less inclined to accept an increase in tax autonomy. Preference formation may thus be influenced by the awareness of the current legal constraints in the Federal Republic of Germany, which set high hurdles for more tax autonomy at the Länder level and require a change of the constitution. Interestingly, however, there is no equivalent, statistically significant impact of being a member of the budget committee.

Several robustness tests support our model's general validity (Table 4.4). In a first step, we re-estimate the model (starting from the column (4) specification in Tables 4.2 and 4.3) applying a weighted regression with the inverse of responses per party and Land to the party and Land basic population as population weights. The main results are robust. There is a strong positive effect of individual ideology toward lower taxes and fees. Länder characteristics matter as well. This especially holds for consolidation needs for the period 2011–2020. In a second step, we exclude all Länder variables and instead include Länder fixed effects in the regressions. The main result for the personal characteristics is not affected by this change. Referring to the fiscal equalization preferences, however, the alternative model shows an additional statistically significant impact of government membership. Members of Länder government parties are more in favor of increased fiscal equalizations compared to members of opposition parties, which is in line with our theoretical reasoning.

Table 4.4: Ordered Probit Results for Robustness Tests with Alternative Specifications

	Tax autonomy preferences		Fiscal equalization	
	(1)	(2)	(3)	(4)
Länder self-interest:				
Länder characteristics[a]: income and size				
GDP per capita	0.0110***		0.0001	
	[0.002]		[0.002]	
Absolute deviation of Land GDP per capita from federal GDP per capita	-0.0161***		-0.0031	
	[0.005]		[0.005]	
Population	-0.0099**		0.0012	
	[0.005]		[0.004]	
Länder characteristics[a]: legacies				
Consolidation needs as share of GDP	-0.0555***		-0.0650***	
	[0.018]		[0.020]	
Länder characteristics[a]: equalization				
Fiscal equalization transfers to GDP	0.0459**		-0.0345	
	[0.023]		[0.024]	
Ideology and government self-interest:				
Alternative individual ideological indicator				
Preference for lower taxes and fees	0.0022*	0.0026**	0.0028**	0.0026**
	[0.001]	[0.001]	[0.001]	[0.001]
Power				
Member of government coalition of Land	-0.0169	-0.0042	-0.0499*	-0.0556***
	[0.023]	[0.017]	[0.027]	[0.021]
Individual characteristics:				
Education				
Tertiary degree	-0.0384	-0.0402	0.0203	-0.0036
	[0.028]	[0.025]	[0.018]	[0.016]
Economics/Business degree	0.0179	0.0177	0.0102	-0.0042
	[0.027]	[0.029]	[0.022]	[0.018]
Information				
Member of budget committee	-0.0441	-0.0156	0.0089	0.0129
	[0.029]	[0.027]	[0.018]	[0.018]
Member of legal committee	-0.0464	-0.0567*	0.0093	-0.0108
	[0.035]	[0.032]	[0.024]	[0.025]
Number of years in parliament	0.0024	0.0027*	0.0003	0.0003
	[0.002]	[0.002]	[0.002]	[0.001]
Other individual characteristics				
Female	-0.0641**	-0.0394	-0.0061	-0.0195
	[0.031]	[0.024]	[0.025]	[0.023]
Age in years	-0.0020	-0.0016	0.0002	0.0000
	[0.001]	[0.001]	[0.001]	[0.001]
Regression diagnostics:				
Weighted regression[b]	Yes		Yes	
Länder fixed effects instead of Länder characteristics		Yes		Yes
Observations	636	636	630	630
Pseudo R^2	0.026	0.028	0.086	0.110

*Notes: This table displays marginal effects for the maximum category (= +4), */**/*** denote significance at the 10%/5%/1% level; standard errors in brackets are clustered at the Land-party level; a Länder characteristics are 2010 data for survey waves 1 and 2, which both took place in 2011, and 2011 data for survey wave 3, which took place in 2012. b We use the inverse of responses per party and Land to the party and Land basic population as regression weights.*

4.6 Länder-Specific Median Preferences and Simulated Reform Majorities

We now make use of our estimated models to identify the constraints that federal reforms are facing in individual Länder parliaments and the Bundesrat. For that purpose, we use the respective estimates of columns (1) in Tables 4.2 and 4.3 to simulate the (voting) preferences of all Länder politicians regardless of whether they participated in our survey or not. With the exception of the individual ideology proxy (i.e., preference for lower taxes and fees, which originates from the survey itself and thus

cannot be used for the simulation), all control variables are available for politicians who did not participate in our survey.

The first step identifies the preferences of each subnational parliament's median position, which is defined by the middle position when ordering the predicted preferences across the –4/+4 answer scale. The results in Figure 4.3 (upper part) show that median positions in the Eastern German Länder, Lower Saxony, and Rhineland-Palatinate are (mildly) opposed to tax autonomy. With respect to fiscal equalization, the Eastern German Länder (excluding Saxony) as well as Bremen are in favor of, while the others are opposed to more fiscal equalization with the resistance being particularly strong in the net-contributor Länder Bavaria, Baden-Wuerttemberg, and Hesse.

The second step makes use of these predictions to simulate majorities within Länder parliaments and the Bundesrat. We estimate the approval rate per Land for both reform dimensions. The algorithm assigns an approving position to each politician for whom the predicted survey answer is above zero on the –4/+4 answer scale. The approval to both reform dimensions per Land is presented in Figure 4.3 (lower part). There is a slight majority of nine to seven German Länder which would vote in favor of increasing tax rate autonomy and a larger majority of ten to six in favor of less intense equalization. The Eastern German Länder would reject both tax autonomy (with the exception of Berlin) and a reduction of equalization payments (with the exception of Saxony). Western German Länder would collectively (with the dissenter Bremen) vote in favor of a less ambitious equalization system but they agree less when it comes to tax autonomy. According to our model's simulations, the within-Länder agreement against the current equalization intensity is large; approval rates for less equalization frequently reach 100 percent, i.e., all politicians in the respective Länder parliament (at least slightly) think that the current system of fiscal equalization is too far reaching and would thus vote for a reduction. The marked exceptions are Länder in Eastern Germany and the poorer city-states of Berlin and Bremen (with a 0 percent reform support in these two city-states).

As the Länder cast their votes in the Bundesrat as bloc votes (voting weights are summarized in Table A.4.7 in the appendix to this chapter), the key number is not the number of Länder but rather the number of votes in the Bundesrat. Decisions in normal legislation pass with absolute majority (i.e., thirty-five out of sixty-nine total votes),

while a change of the constitution requires the consent of two-thirds of the Bundesrat votes (i.e., forty-six votes).

We further aggregate pro-reform Länder votes according to the bloc vote rule in the Bundesrat. All Länder votes are counted according to the majority position of the Länder. The resulting majorities are forty to twenty-nine in favor of tax autonomy and forty-seven to twenty-two in favor of less intense equalization. Thus, the Länder opposing tax autonomy have the power to successfully veto a constitutional change which would be required to open the way toward individual Länder tax rate setting. However, the veto power is fragile. The switch of Lower Saxony alone into the tax autonomy camp would be sufficient to gain a pro-reform constitution changing majority. A reform toward less intense equalization is more likely than one toward more tax autonomy because our simulations imply a larger majority and an absolute majority rather than a qualified majority would be sufficient to change the fiscal equalization scheme.[40]

Of course, our calculations must be regarded with caution. In a real decision on reforms of Germany's fiscal federal system, the individual politician's preference is not the only determinant. Actual votes will also be influenced by Länder-wide or even country-wide party strategies and party discipline. A further complication is that the composition of Länder parliaments will change in the future and voters might strategically select candidates to influence the upcoming fiscal federalism reform decisions. Accordingly, our simulations cannot be seen as an exact forecast of a future vote. However, they are indicative for the underlying voting tendencies and provide insights into the room for possible political compromises.

[40] The principle of fiscal equalization is enshrined in the German constitution. The formulas and the intensity of equalization are defined in simple laws.

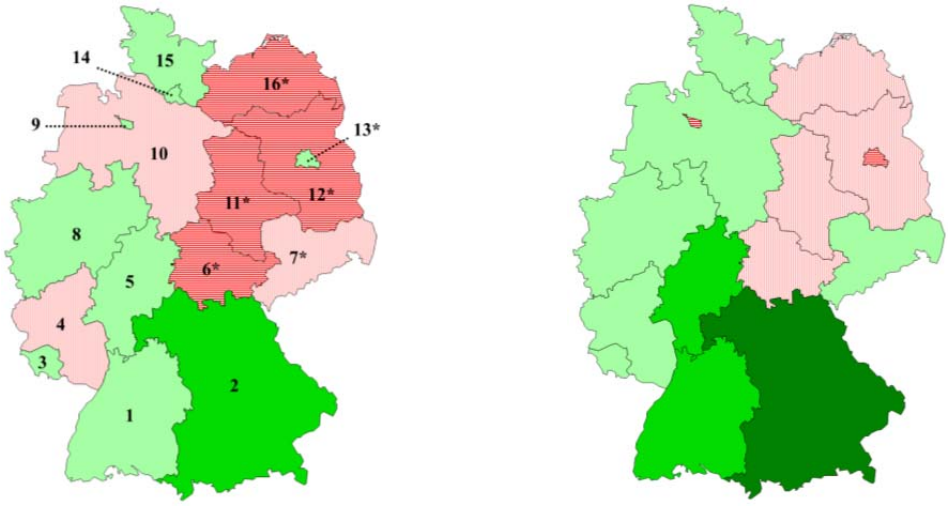
Figure 4.3: Median Parliament Member Preferences and Simulated Voting Behavior by Land

The upper panel of this figure illustrates the simulated preferences of the median parliament member with respect to both tax autonomy and fiscal equalization. The lower panel illustrates the simulated voting behavior of the members of state parliaments.

Preference of the median parliament member

Tax autonomy
(-4=not in favor; +4=in favor)

Fiscal equalization
(-4=too low; +4=too far reaching)



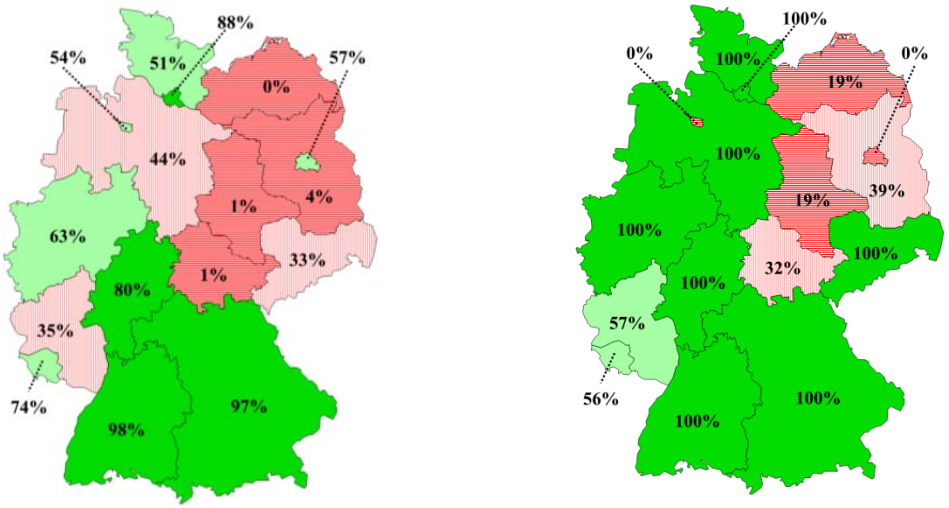
Description: Median of preferences per Land is ∈ of the interval:

(-2,-1)	(-1,0)	(0,1)	(1,2)	(2,3)

Voting behavior of Länder on reform options (approval rates in percent)

Tax autonomy
(approval to implementation of tax surcharges)

Fiscal equalization
(approval to reduction of fiscal equalization)



Länder identifier

1 Baden-Wuerttemberg	5 Hesse	9 Bremen	13 Berlin
2 Bavaria	6 Thuringia	10 Lower Saxony	14 Hamburg
3 Saarland	7 Saxony	11 Saxony-Anhalt	15 Schleswig-Holstein
4 Rhineland-Palatinate	8 North Rhine-Westphalia	12 Brandenburg	16 Mecklenburg-West Pomerania

* Länder of the former German Democratic Republic (GDR) (Note: Berlin was divided in a West and East German part).

4.7 Conclusion

This study helps to understand federal reform preferences of political decision makers in the context of the current federal reform debates. The results offer insights along two dimensions: First, they contribute to a better general understanding on the drivers of subnational politicians' individual federal reform preferences and the sources of political controversies on federal reform options. Second, they show that a better understanding of subnational politicians' preferences can also be exploited in a forward-looking way to assess reform chances or to develop promising reform strategies, which might overcome traditional reform blockades.

With respect to the more general dimension of federal controversies, one clear result is the joint importance of ideology and jurisdictional interests. Ideology matters in the sense that more general views on the role of government also translate into federal views: Those subnational politicians who prefer lower taxes and a lower size of government are also more inclined to accept a more competitive type of federalism. The impact of Länder interests is not as subtle and differentiated as some theoretical tax competition models would suggest. The clear and simple pattern is that richer Länder are more open for tax competition and less intense equalization than poorer Länder. Politicians from Länder which lag behind the country's economic development do not seem to perceive the chances of tax competition as some theoretical models would predict. This can be taken as an important message to the academic public finance community: Insofar as there is a theoretical consensus that tax competition may also offer opportunities for poorer Länder (without significant budgetary legacies) this insight has not yet reached the political discourse. Interestingly, individual characteristics are of less importance compared to Länder or partisan interests, a finding which points to an effective selection and/or socialization of parliamentarians in line with the interests of Länder and parties.

Although further research cross-checking our results for the second crucial veto player (i.e. the Bundestag) is desirable, our findings indicate that the importance of legacies for the understanding of reform resistance is crucial: Large legacy debt (open or implicit) lowers the support for tax autonomy. This result points to the potential of a political bargain. Given that the resistance towards tax autonomy in some pivotal Länder is only weak, some targeted collective help with respect to the legacy debt problem could open the way for compromise and a move towards tax autonomy in the upcoming

reform decisions on German federalism. It is a general insight that compensation of reform losers can pave the way for reforms. Regarding the German case, the mistrust that the necessary compensation will be fully implemented and of long duration could be one of the obstacles which so far have blocked any serious movement towards more revenue autonomy.

4.8 Appendix to Chapter 4

Table A.4.1: Distribution of Tax Income on Different Types of Taxes

Type of tax	Revenue (million Euro)	Percent of overall tax revenue
Joint taxes	403,567	70.38
Federal taxes	99,134	17.29
Länder taxes	13,095	2.28
Inheritance tax	*4,246*	*0.74*
Real estate transfer tax	*6,366*	*1.11*
Lottery tax	*1,420*	*0.25*
Fire service tax	*365*	*0.06*
Beer tax	*702*	*0.12*
Municipal taxes	52,984	9.24
Custom duties	4,571	0.79
Overall tax revenue	573,351	

Data for 2011. Source: Federal Statistical Office (2012)

Table A.4.2: Redistribution at Different Stages of the FES

This table reports the fiscal capacity of each Land at the different stages of the German fiscal equalization scheme.

	Financial capacity per inhabitant as a percentage of the average financial capacity per inhabitant			
Stages of the FES	Land and municipal (64%) tax income before redistribution[a]	After VAT redistribution and population weighting[b]	After horizontal redistribution between the Länder[b]	With general supplementary federal grants (SFG)[b]
Bavaria	124.4	115.9	105.7	105.7
Hesse	120.1	113.4	105.0	105.0
Baden-Wuerttemberg	115.9	111.2	104.4	104.4
Lower Saxony	88.9	99.1	99.5	99.5
Hamburg	157.1	97.7	98.8	99.3
North Rhine-Westphalia	101.0	97.6	98.8	99.3
Schleswig-Holstein	91.4	96.5	98.3	99.2
Rhineland-Palatinate	93.2	96.4	98.2	99.2
Saarland	78.8	92.8	96.9	98.9
Brandenburg	65.4	89.8	96.0	98.7
Saxony	56.8	88.3	95.6	98.6
Thuringia	55.1	88.1	95.6	98.6
Saxony-Anhalt	55.5	88.2	95.6	98.6
Mecklenburg-West Pomerania	54.8	86.6	95.2	98.5
Bremen	94.7	71.6	91.3	97.7
Berlin	93.7	69.1	90.7	97.5

[a]*Data for 2013, own calculations.*
[b]*The figures in these columns include population weighting, i.e., the number of inhabitants in the three city states Berlin, Bremen, and Hamburg is fictitiously increased by 35 percent.*
Source: Federal Ministry of Finance (2013).

Table A.4.3: Survey Participation by Land and Party

	Number of MSPs	Number of Responses	Response rate
Survey participation by Land			
Baden-Wuerttemberg	138	77	55.80 %
Bavaria	187	75	40.11 %
Berlin	149	30	20.13 %
Brandenburg	88	19	21.59 %
Bremen	83	18	21.69 %
Hamburg	124	39	31.45 %
Hesse	114	50	43.86 %
Mecklenburg-West Pomerania	71	17	23.94 %
Lower Saxony	152	54	35.53 %
North Rhine-Westphalia	181	51	28.18 %
Rhineland-Palatinate	101	50	49.50 %
Saarland	51	20	39.22 %
Saxony	133	45	33.83 %
Saxony-Anhalt	106	47	44.79 %
Schleswig-Holstein	95	29	30.53 %
Thuringia	88	36	40.91 %
Survey participation by party			
Christian Democrats	681	284	41.70%
Free Democrats	123	41	33.33%
Green Party	239	75	31.38%
Left Party	200	47	23.50%
Social Democrats	559	173	30.95%
Other	59	19	32.20%
Total	1861	639	34.34%

Table A.4.4: List of Variables and Definitions

Länder self-interest:		
Länder characteristics: income and size		
GDP per capita	Continuous	Gross domestic product per capita, in thousand Euros, source: German Statistical Office
Absolute deviation of Land GDP per capita from federal GDP per capita	Continuous	Absolute deviation of Land GDP per capita from federal GDP per capita source: German Statistical Office
Population	Continuous	Population in millions source: German Statistical Office
Länder characteristics: legacies		
Total debt to GDP	Continuous	Total debt divided by gross domestic product, in percent, source: German Statistical Office
3 year average of deficit to GDP	Continuous	3 year average of deficit to GDP source: German Statistical Office
Consolidation needs as share of GDP	Continuous	Consolidation needs for the period 2011 – 2020 as a share of calculatory nominal GDP source: Sachverständigenrat (2011)
Länder characteristics: equalization		
Fiscal equalization transfers	Continuous	Total net fiscal equalization transfer payments between Länder divided by GDP, in percent, sources: Federal Ministry of Finance, German Statistical Office
Ideology and government self-interest:		
Party affiliation		
Free Democrats (FDP)	Dummy	Member of Free Democratic Party (base category in regressions)
Christian Democrats (CDU/CSU)	Dummy	Member of Christian Democratic or Christian Social Party
Social Democrats (SPD)	Dummy	Member of Social Democratic Party
Green Party	Dummy	Member of Green Party
Left Party	Dummy	Member of Left Party
Other parties	Dummy	Member of other party
Alternative individual ideological indicator		
Preference for lower taxes and fees	Continuous	Calculated as the percentage of a hypothesized additional Land budget that is allocated to lowering taxes and fees (between 0 and 100 percent)
Power		
Member of government coalition of Land	Dummy	Member of one of the ruling parties
Individual characteristics:		
Education		
College entrance qualification	Dummy	Degree from academic high school (Baccalaureate)
Tertiary degree	Dummy	Degree from university or polytechnic
Economics/Business degree	Dummy	Tertiary education in business or economics
Law degree	Dummy	Tertiary education in law
Information		
Member of budget committee	Dummy	Deals with government budget of Land
Member of legal committee	Dummy	Deals with legal issues of Land
Number of years in parliament	Discrete	Calculated as 2011/2012 minus year of parliament entry (interruptions taken into account)
Other individual characteristics		
Female	Dummy	Member of parliament is female
Age in years	Discrete	Calculated as 2011/2012 minus year of birth

Table A.4.5: Summary Statistics for Variables

	Observations	Mean	Standard deviation	Min	Max
Dependent variables (answer to survey question)					
Tax autonomy question	636	0.113	3.041	-4	4
Fiscal equalization question	631	0.765	2.135	-4	4
Länder self-interest:					
Länder characteristics: income and size					
GDP per capita	636	30.988	7.135	21.402	49.434
Absolute deviation of Land GDP per capita from federal GDP per capita	636	5.680	4.279	0.104	18.901
Population	636	6.769	5.003	0.661	17.845
Länder characteristics: legacies					
Total debt to GDP	636	27.496	15.405	6.920	73.628
3 year average of deficit to GDP	636	0.898	0.863	-0.397	3.604
Consolidation needs as share of GDP	636	1.240	1.135	-0.600	3.500
Länder characteristics: equalization					
Fiscal equalization transfers received to GDP	636	0.237	0.908	-0.794	3.001
Ideology and government self-interest:					
Party affiliation					
Free Democrats	636	0.064	0.246	0	1
Christian Democrats	636	0.443	0.497	0	1
Social Democrats	636	0.270	0.445	0	1
Green Party	636	0.118	0.323	0	1
Left Party	636	0.074	0.262	0	1
Other parties	636	0.030	0.170	0	1
Alternative individual ideological indicator					
Preference for lower taxes and fees	636	3.044	9.882	0	100
Power					
Member of government coalition of Land	636	0.538	0.499	0	1
Individual characteristics:					
Education					
Tertiary degree	636	0.744	0.437	0	1
Economics/Business degree	636	0.176	0.381	0	1
Information					
Member of budget committee	636	0.206	0.404	0	1
Member of legal committee	636	0.142	0.349	0	1
Number of years in parliament	636	8.308	6.939	0	38
Other individual characteristics					
Female	636	0.242	0.429	0	1
Age in years	636	51.481	10.281	23	73

Table A.4.6: Key Data on the Sixteen German Länder

Land	Population (thousands)	Nominal GDP (million €)	Nominal GDP per capita (€)	Total debt of Land (% GDP)	Budget deficit (% GDP)	Former Eastern Germany
Baden-Wuerttemberg	10,786	376,285	34,886	17.16	0.21	
Bavaria	12,596	446,438	35,443	6.79	-0.23	
Berlin	3,502	101,386	28,952	61.64	0.96	in parts
Brandenburg	2,496	55,093	22,076	35.77	-0.36	yes
Bremen	661	28,033	42,391	73.63	3.06	
Hamburg	1,799	94,428	52,494	26.86	0.34	
Hesse	6,092	228,513	37,510	17.28	0.64	
Lower Saxony	7,914	224,354	28,351	25.42	1.00	
Mecklenburg-West Pomerania	1,635	34,987	21,402	29.11	-0.49	yes
North Rhine-Westphalia	17,842	568,861	31,883	33.22	0.60	
Rhineland-Palatinate	3,999	113,224	28,312	32.49	1.77	
Saarland	1,013	30,501	30,099	41.83	2.50	
Saxony	4,137	95,066	22,979	9.99	-1.85	yes
Saxony-Anhalt	2,313	51,882	22,428	39.84	0.26	yes
Schleswig-Holstein	2,838	73,627	25,947	38.57	0.91	
Thuringia	2,221	48,121	21,664	35.04	0.64	yes

Notes: Data for 2011. Berlin was divided in a West and East German part.
Source: Federal Ministry of Finance (2013).

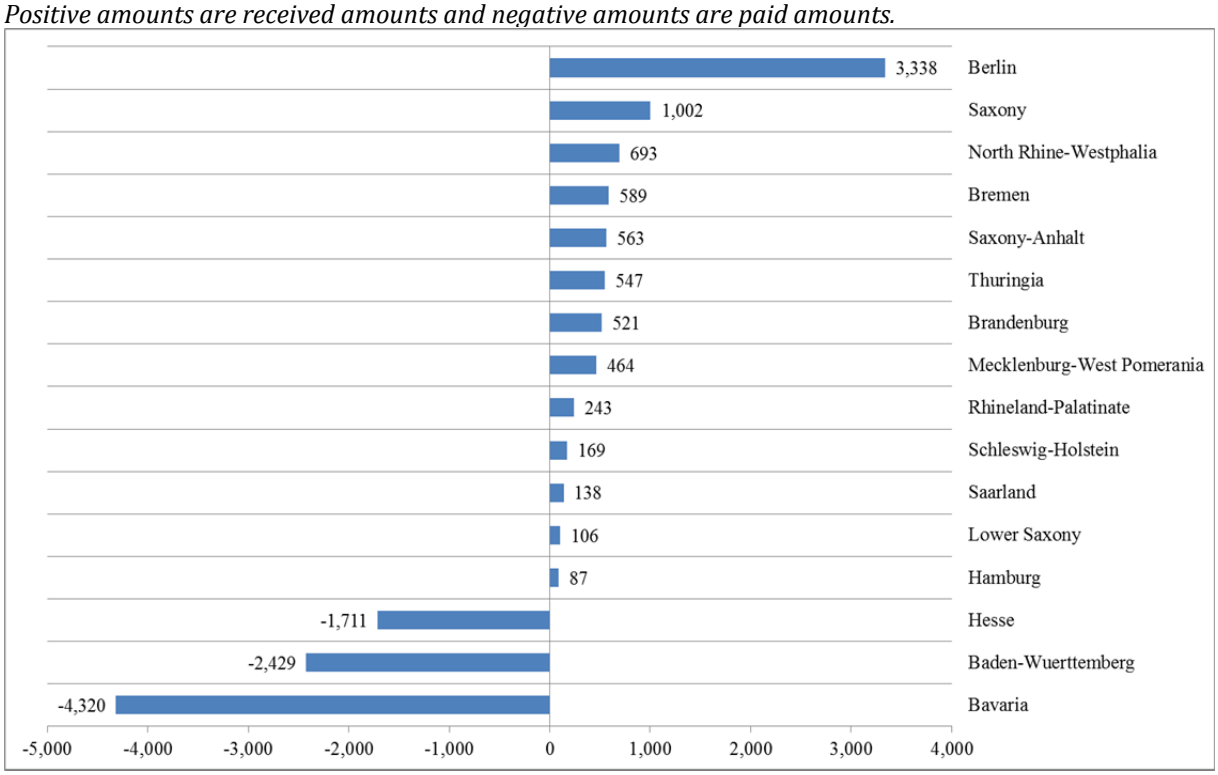
Table A.4.7: Distribution of Votes in the Federal Council of Germany

Land	Number of Votes	Land	Number of Votes
Baden-Wuerttemberg	6	Saxony	4
Bavaria	6	Thuringia	4
North Rhine-Westphalia	6	Saxony-Anhalt	4
Lower Saxony	6	Berlin	4
Hesse	5	Bremen	3
Schleswig-Holstein	4	Hamburg	3
Rhineland-Palatinate	4	Mecklenburg-West Pomerania	3
Brandenburg	4	Saarland	3

Source: German Constitution (Grundgesetz), Article 51; www.bundesrat.de.

Figure A.4.1: Net-Payer and Net-Receiver Länder of the Horizontal FES in 2013

Positive amounts are received amounts and negative amounts are paid amounts.



Source: Federal Ministry of Finance (2013), own calculations, millions of Euro.

Notes:

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5. SERIAL SOVEREIGN DEBT RESTRUCTURINGS[41]

5.1 Motivation

Even though Reinhart and Rogoff (2004, p. 53) acknowledge that "'serial default' is the rule, not the exception", there is still no systematic analysis examining the drivers of this phenomenon. To the contrary, Adam and Grill (2013) show theoretically that gradual adjustment strategies through serial restructurings are not optimal if each restructuring is costly (even in the presence of only very small costs). Furthermore, they show that any costly restructuring is only optimal if the country experienced a large, disaster-like shock to its output.

To complement the literature on sovereign debt restructurings, this paper provides an analysis of potential determinants of serial restructurings. Most importantly, I look for these determinants in sovereign restructurings themselves, asking whether there are certain features to debt renegotiations that are correlated with the probability of (near-term) follow-up restructurings. The results could then also be used for defining possible measures to reduce the probability of a country's debt burden becoming unsustainable again (shortly) after the implementation of a debt restructuring. The paper's findings also contribute to the discussion of a sovereign debt restructuring mechanism for emerging markets (Krueger, 2000) or for European countries (Gianviti, Krueger, Pisani-Ferry, Sapir, and von Hagen, 2010; European Economic Advisory Group, 2011; Committee on International Economic Policy Reform, 2013; Fuest, Heinemann, and Schröder, 2015).

The empirical literature on the phenomenon of serial sovereign debt restructurings is quite scarce. There are merely a few studies relying on basic descriptive observations and case studies. One study by Moody's (2012) suggests that an initial debt exchange was followed by further exchanges when the initial debt exchange was not large enough in relation to a country's total debt (even when the haircut of the initial exchange was large). Das et al. (2012, p. 33) speculate on a similar reason. They argue that debt relief

[41] An earlier version of this chapter has been published as "Haircut Size, Haircut Type and the Probability of Serial Sovereign Debt Restructurings", ZEW Discussion Paper No. 14-126, Mannheim. See Schröder (2014).

in restructurings with official creditors (i.e. within the so-called Paris Club[42]) has been too low before the 1990s, thus triggering serial defaults more often during the 1970s/1980s. The IMF (2013) highlights that debt restructurings have often taken place too late and have been too small in magnitude, which thwarted the re-establishment of long term debt sustainability and durable market access. It further makes a case for the avoidance of outright default[43] and promotes pre-emptive debt restructurings in the view of serious liquidity or solvency problems because pre-emptive restructurings entail predictable cash flows (as opposed to outright defaults), which make the consequences for the economy more predictable, too. The IMF (2013) further argues that materialized defaults may undermine a country's capacity to re-access international private capital markets in the medium term.

I test these partly intuitive statements descriptively and econometrically by estimating so-called survival models following Cox (1972). Specifically, I check whether the relative size of a haircut (in net present value terms) is correlated with the probability of necessary follow-up restructurings. Additionally, I explore whether outright cuts in face value have the same impeding effect on the probability of serial restructurings as equally sized cuts in net present value due to maturity lengthening and the lowering of interest payments. Economic intuition suggests that any reduction in net present value, no matter whether it is effectuated by cuts in face value, maturity extension or a lower interest rate, should have the same impact on a country's debt sustainability. I also investigate which characteristics of the affected debt and the outcomes of the negotiations are correlated with the probability of a follow-up restructuring.

The main findings suggest that higher overall haircuts in net present value are indeed associated with a lower probability of serial restructurings. Interestingly, cuts in face value have a stronger negative impact on this probability than reductions in net present value by the means of maturity extensions and/or interest rate reductions. This puzzling finding challenges the intuitive expectations that it is the overall reduction in net present value which may impact a country's debt sustainability, no matter how this

[42] "The Paris Club is an informal group of official creditors whose role is to find coordinated and sustainable solutions to the payment difficulties experienced by debtor countries." See http://www.clubdeparis.org/

[43] I distinguish between the terms "sovereign debt restructuring" and "sovereign default" because a default occurs when a country misses out on any interest or principal payment on the due date or beyond a pre-specified grace period while a restructuring can take place even in the absence of an outright default, i.e. pre-emptively, in order to prevent a probable default.

reduction comes about. It could be explained, however, by the notion that the timing of relief may play a role. While cuts in face value provide direct relief in terms of solvency, maturity extensions and/or interest rate reductions may unburden the country only temporarily in terms of liquidity. The probability that a truly insolvent and, for the time being, illiquid country becomes illiquid again shortly after maturity extensions and/or interest rate cuts have taken place is thus higher than after an outright cut in the countries debt stock.

Reinhart and Trebesch (2015) present a similar finding: A country's economic growth and credit rating only improve significantly after a debt restructuring, if the agreement included a cut in face value. For deals consisting only of maturity extensions and/or interest rate reductions they do not find significant improvements of economic fundamentals.

The sovereign debt literature has traditionally been concerned with the costs of defaults and/or restructurings because these costs are often viewed to be the main reason why sovereigns repay their debt. The idea is that, in the factual absence of legal enforcement mechanisms, creditors of sovereigns generally cannot count ex ante on a debtor country to repay its debt, if default or restructuring were non-costly alternatives (seminal paper by Eaton and Gersovitz, 1981). The literature[44] specifically discusses (i) direct credit market costs like capital market exclusion or higher borrowing costs[45], (ii) costs in the form of a trade decline or trade sanctions[46], (iii) a decline in economic output[47], (iv) adverse effects on the financial and banking sector[48], (v) negative spill-overs on the private credit sector[49], (vi) adverse effects on FDI inflows[50], and (vii) administrative and negotiation costs[51].

[44] For a thorough review of the literature and an overview of stylized facts about sovereign debt restructurings in general, please see Das, Papaioannou and Trebesch (2012) as well as Panizza et al. (2009), Sturzenegger and Zettelmeyer (2006), as well as Tomz and Wright (2013).
[45] Eaton and Gersovitz (1981), Gelos, Sandleris, and Sahay (2011), Aguiar and Gopinath (2006), Mendoza and Yue (2008), Borensztein and Panizza (2009), Richmond and Diaz (2009), Asonuma (2010), Yue (2010), Cruces and Trebesch (2013).
[46] Rose (2005), Martinez and Sandleris (2011).
[47] Tomz and Wright (2007), Arellano, (2008), Mendoza and Yue (2008), De Paoli, Hoggarth, and Saporta (2009), Levy-Yeyati and Panizza (2011).
[48] Borensztein and Panizza (2009), Levy-Yeyati, Martinez Peria, and Schmukler (2010), Gennaioli, Martin, and Rossi (2014).
[49] Arteta and Hale (2008), Das, Papaioannou, and Trebesch (2012).
[50] Fuentes and Saravia (2010).
[51] Das, Papaioannou, and Trebesch (2012).

Even though many studies provide evidence for the general existence of negative consequences of sovereign defaults and debt restructurings, the empirical literature is not completely at one when it comes to the magnitude, the timing, and the duration of the different costs considered. For example, some studies find that credit markets have a rather short-term memory with respect to direct credit market costs like higher borrowing costs and capital market exclusion (see e.g. Borensztein and Panizza, 2009, Gelos et al., 2004). Nevertheless, at least for "final restructurings"[52] Cruces and Trebesch (2013) find that, when controlling for the sizes of haircuts, capital market exclusion can take a long time and borrowing costs can be significantly higher following a restructuring. Also Richmond and Diaz (2009) estimate the average duration of capital market exclusion to be non-negligible, taking approximately six to eight years. However, these authors do not control for the restructuring history: They do not explicitly take into account whether a country had been a serial defaulter or not, which potentially influences their reputation as good debtors and the resulting capital market sanctions significantly.

In spite of all potential costs mentioned above, debt restructuring can be a well justified measure for a country facing an unmanageable debt burden in order to regain long-term debt sustainability. However, the lack of a reliable sovereign debt restructuring mechanism creates uncertainty for both debtors and creditors and may hamper the enforcement of necessary debt exchanges that could in fact restore debt sustainability. The IMF (2013) argues that debt unsustainability often aggravates before it is resolved and, when restructurings do take place, they do not always manage to restore debt sustainability and market access in the long term. Repeated restructurings would then be a likely consequence. Generally, nothing is gained if a country restructures its debt too late and to an extent that is insufficient for regaining long(er) term debt sustainability. Too little and too late (IMF, 2013) restructurings are likely to have negative consequences for debtors, creditors and, depending on the relative importance of the country in question, for the international financial system. Persistent unsustainable debt levels impede investment and growth in the debtor country, thereby reducing the value of creditors' claims even further.

[52] Cruces and Trebesch (2013) define final restructurings as restructurings that were not succeeded by another restructuring with commercial creditors within four years.

One important assumption in this paper is that serial and apparently insufficient restructurings are in sum more costly than a single deemed-to-satisfy restructuring. In the spirit of Eaton and Gersovitz (1981) as well as Eaton, Gersovitz and Stiglitz (1986), every restructuring destroys a country's reputation because creditors infer a country's future behavior from its past behavior. Repeated restructurings could thus lead to a permanently low borrower reputation, making private debt prohibitively costly in the future. Even if direct sanctions after debt restructurings were more important than the loss of reputation as an incentive to repay (Bulow and Rogoff 1989), serial restructurers would have to expect enduring periods of sanctions. Hence, serial restructurings could be more costly than a single (larger) restructuring. Additionally, the administrative costs as well as the economic costs due to the uncertain outcome of debt renegotiations (in terms of debt sustainability) have to be incurred over and over again.

Fuentes and Saravia (2010) do indeed find that the decrease of FDI inflows is even stronger for serial defaulters than for single defaulters. Adam and Grill (2013) develop a theoretical model to show that frequent debt restructurings are only optimal if the deadweight costs of a single default are zero from the point of view of the sovereign. Already for small but positive costs the authors find that restructuring is only optimal if they face disaster-like shocks. Also the IMF (2013) states that in most instances serial sovereign debt restructurings cannot be desirable because any restructuring process is disruptive and costly, thereby undermining the debtor's perceived creditworthiness. Hence, throughout this paper, I neglect the possibility that a country might restructure its debt serially for completely strategic reasons. Even if single restructurings were strategic in nature, an entire series over many years is likely not to be. Such a strategy is highly precarious, bears high risks and uncertainty, and may therefore be seen as an exception to the rule.

The remainder of the paper is structured as follows. Section 5.2 describes the dataset used and provides some stylized facts. Section 5.3 descriptively analyzes correlations between restructuring characteristics and the probability of (near-term) follow-up restructurings. Section 5.4 presents the estimation results of Cox (1972) proportional hazard models and section 5.5 concludes.

5.2 Data

5.2.1 Data Source for Restructurings with Commercial Creditors

The main dataset I use covers all 180 sovereign debt restructurings with foreign commercial creditors in 68 countries since 1970 and has kindly been provided by Cruces and Trebesch (2013)[53]. They report sovereign debt restructurings of public or publicly guaranteed debt with foreign private creditors. The authors focus on distressed debt exchanges, which they define as restructurings of bonds or bank loans at less favorable conditions than the original bond or bank loan. They restrict the sample to medium and long-term debt restructurings. Short-term agreements like 90-day debt rollovers or the upkeep of short-term credit lines (e.g. trade credit) are disregarded and agreements with maturity extension of less than one year are excluded. Cases where short-term debt is exchanged for debt with a maturity of more than one year are, in turn, included. Finally, the dataset covers only restructurings that have actually been implemented.

The value of the dataset does not only lie in the mere listing of all these restructurings but especially in the provision of information on the characteristics of the restructurings. Most importantly, Cruces and Trebesch (2013) estimate the wealth loss of the average creditor participating in the exchange, i.e. they estimate what is generally called a haircut in net present value. The authors use two different haircut measures: the "market haircut" and the, in their view better suited, "SZ haircut" according to the methodology of Sturzenegger and Zettelmeyer (2006, 2008)[54]. The dataset also includes the magnitude of the cut in the nominal value of the debt, which is zero in 123 of the 180 cases.

Furthermore, Cruces and Trebesch (2013) provide information on the absolute amount of debt (in current US dollars) that had been affected as well as other important features of debt contracts, the debt affected and negotiation outcomes. The features of the debt contracts and the debt affected include information on whether the debt was in the form of bonds or bank loans, whether all of the debt affected had already fallen due

[53] The dataset is freely accessible online: https://sites.google.com/site/christophtrebesch/data

[54] The traditional "market haircut" compares the present value of new debt contracts to the face value of the old debt contracts, whereas the "SZ haircut" is computed according to the methodology by Sturzenegger and Zettelmeyer (2008) who evaluate old debt contracts in present value terms and discount both new and old debt instruments at the same interest rate. See Sturzenegger and Zettelmeyer (2008) as well as Cruces and Trebesch (2013) for a discussion of the advantages and disadvantages of the two haircut concepts.

at the time of debt renegotiations, whether the debt affected included previously restructured debt, and whether short-term debt with a maturity of less than one year had also been restructured such that the new maturity exceeded one year. The features of negotiation outcomes include information on whether the restructuring deal was a buy-back deal (i.e. a country buys back its debt at large discount), whether the restructuring deal was a so-called Brady deal[55] (i.e. loosely speaking an exchange of bank loans for partly collateralized tradable bonds), whether the deal was "donor-funded or supported by bilateral or multilateral money, e.g. via funds by International Development Association Debt Reduction Facility", and whether the deal "include[d] the provision of new money or concerted lending" (Cruces and Trebesch, 2013, online Appendix A5, p. 39).

5.2.2 Data Source for Paris Club Debt Restructurings

Although I focus on debt restructurings with commercial creditors in the descriptive and econometric sections 5.3 and 5.4, I include the restructurings with official creditors (Paris Club) in section 5.2.3 on the stylized facts. This helps the reader to get a more complete picture of the problem.

I gathered the available data on all Paris Club restructurings since 1950 from the Paris Club's website[56] and double-checked this list of restructurings with that of Das et al. (2012). Surprisingly, there are ten Paris Club Restructurings in their list which I cannot find on the official Paris Club's website. I work with those 421 restructurings of 86 countries since 1970 that I could find on the Paris Club's website.

5.2.3 Some Stylized Facts about Serial Restructurings

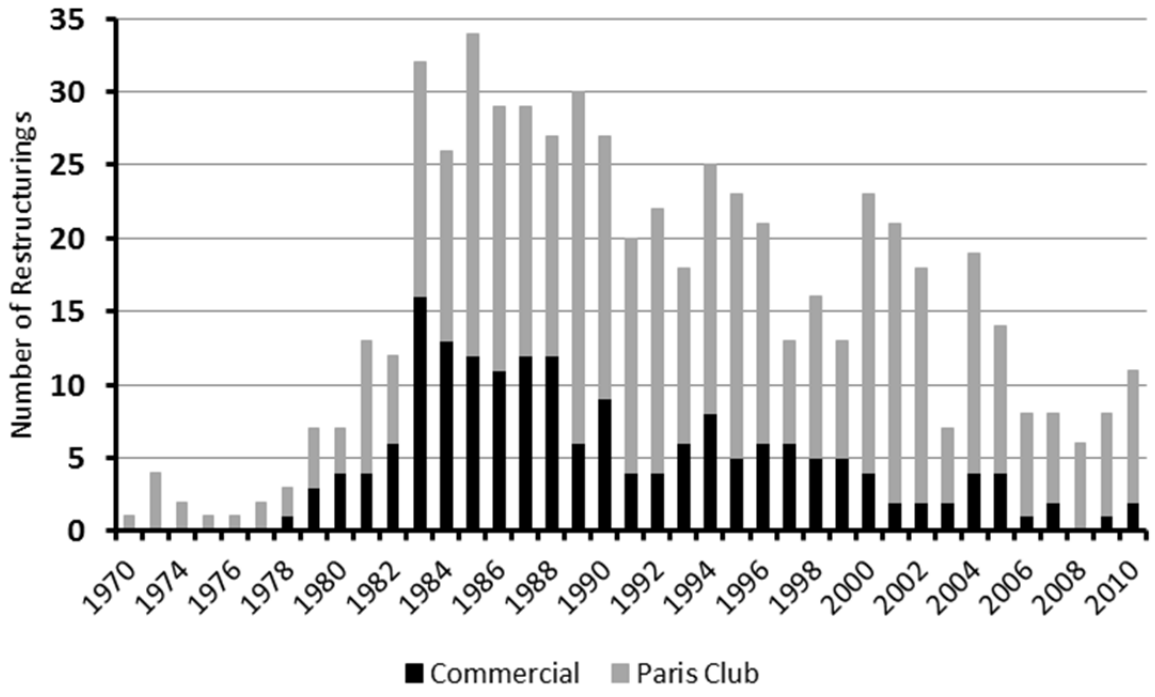
When simply looking at the timing of sovereign debt restructurings, one can easily make out restructuring clusters. Figure 5.1[57] shows a sharp increase in the number of restructurings worldwide in the beginning of the 1980s and an overall peak in 1983. Especially the number of commercial restructurings was highest during this decade and

[55] Brady deals featured the conversion of bank loans to a variety of new tradable bonds for mostly Latin American countries. The new bonds were partly collateralized by U.S. Treasury 30-year zero-coupon bonds. The main advantage was the possibility for commercial banks to exchange their claims on developing countries into tradable debt instruments, which greatly reduced the concentration of risk on their balance sheets. Argentina, Brazil, Bulgaria, Costa Rica, Côte d'Ivoire, Dominican Republic, Ecuador, Jordan, Mexico, Morocco, Nigeria, Panama, Peru, Philippines, Poland, Uruguay, Venezuela and Vietnam deployed the Brady program, named after the U.S. Treasury Secretary Nicholas Brady.
[56] http://www.clubdeparis.org/
[57] A similar figure can be found in Das et al. (2012).

also peaked in 1983. While there were only four commercial restructurings in the 1970s (all of them in the late 1970s) their number declined significantly starting in the late 1980s until 2010. The trend looks similar for Paris Club restructurings, even though the volatility of the number of restructurings per year was much higher. Das et al. (2012, p. 33) explain the higher number and frequency of Paris Club restructurings (as opposed to commercial restructurings) by the "Paris Club's reluctance to grant debt relief" before the 1990s. They hypothesize that "[t]his likely triggered a pattern of serial rescheduling with some debtors."

Figure 5.1: Number of Sovereign Debt Restructurings by Year and Creditor

This graph reports the total number of sovereign debt restructurings in each year from 1970 to 2010.



The phenomenon of serial restructurings as stated by Reinhart and Rogoff (2004) as well as Das et al. (2012) can indeed be confirmed: 13 percent (29 percent, 41 percent) of all commercial restructurings are followed by another commercial restructuring within one (two, three) year(s). The share of follow-up restructurings for Paris Club debt is not as high in the first year (5 percent) but is even higher for the second and third year: 36 percent (55 percent) of all Paris Club restructurings are succeeded by another Paris Club restructuring within two (three) years. When taking into consideration all restructurings, the numbers are even more striking. 35 percent (60 percent, 70 percent) of all commercial restructurings are followed by another commercial or Paris Club

restructuring within one (two, three) year(s) while 24 percent (54 percent, 69 percent) of all Paris Club restructurings are followed by another commercial or Paris Club restructuring within one (two, three) year(s). Overall, 28 percent (57 percent, 70 percent) of all restructurings are followed by another restructuring within one (two, three) year(s). The picture looks just as impressive when inspecting the time differences between any two consecutive restructurings of any country (see Figures 5.2 through 5.4). Both for commercial as well as for Paris Club cases, about 67 percent of all debt restructurings that were preceded at some point in the dataset take place within the first three years after an antedated restructuring. Considering all commercial and Paris Club cases together, over 80 percent of restructurings that were preceded at some point in the dataset take place within three years.

Figure 5.2: Time between Two Subsequent Sovereign Debt Restructurings
This graph reports the total number of sovereign debt restructurings that took place 1 to 30 years after an initial restructuring.

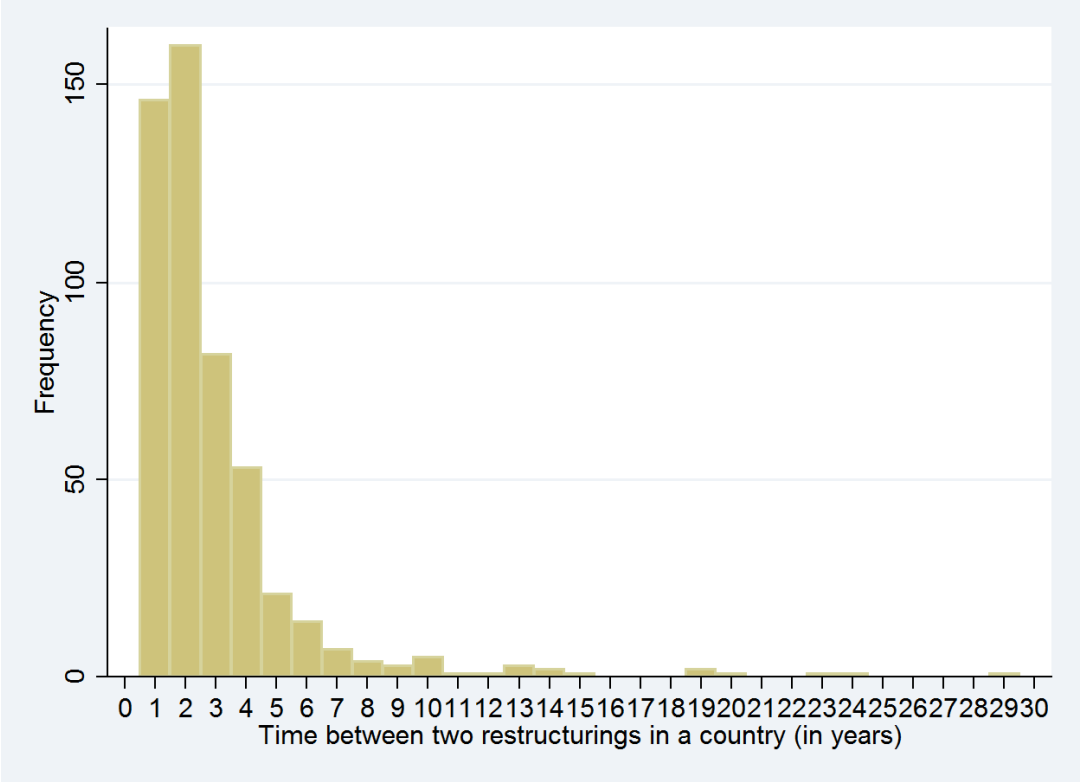


Figure 5.3: Time between Two Subsequent Restructurings with Commercial Creditors

This graph reports the total number of sovereign debt restructurings with commercial creditors that took place 1 to 30 years after an initial restructuring vis-à-vis commercial creditors.

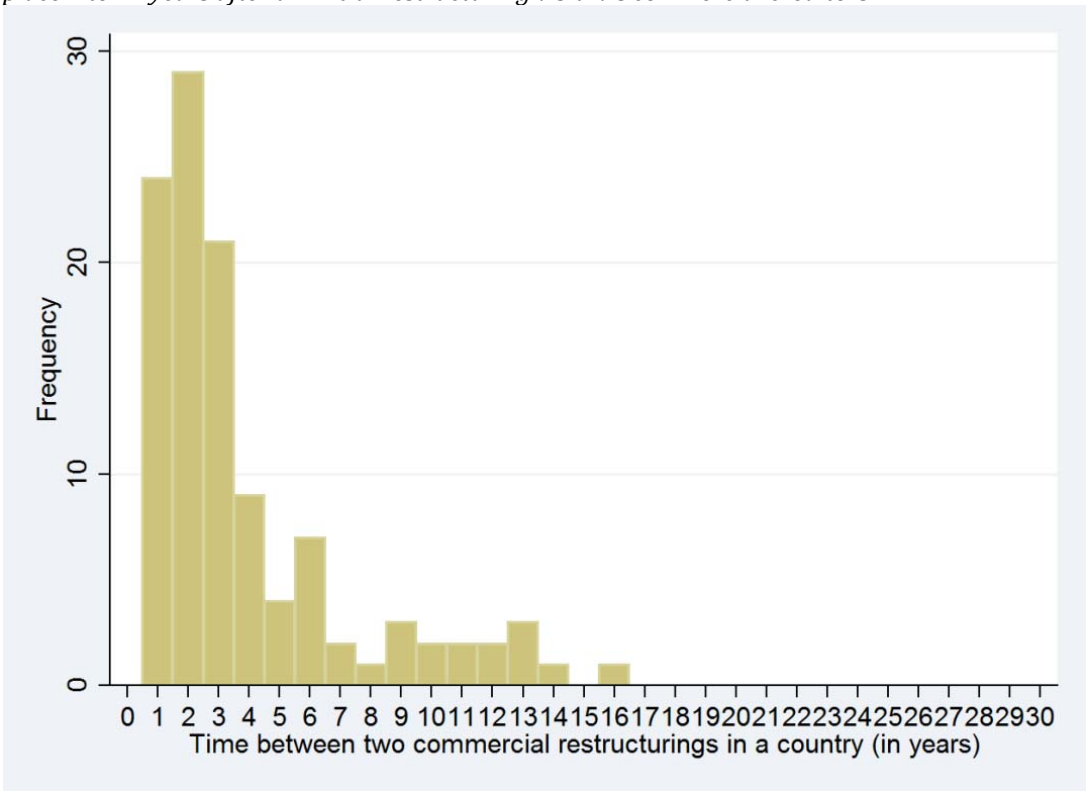
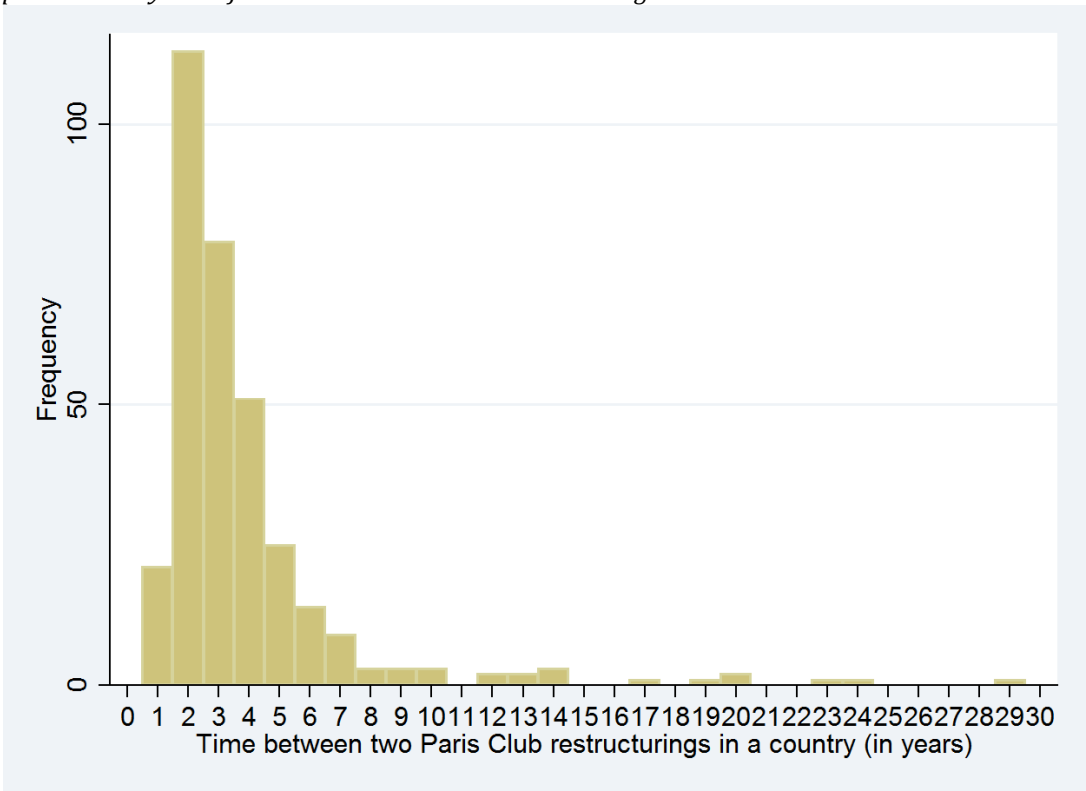


Figure 5.4: Time between Two Subsequent Paris Club Restructurings

This graph reports the total number of sovereign debt restructurings with Paris Club creditors that took place 1 to 30 years after an initial Paris Club restructuring.



5.3 Descriptive Analysis

5.3.1 The Size and Type of Haircuts

One of the central features of any debt restructuring is the size of the haircut, i.e. the reduction of the debt contract's net present value. The size of a haircut is the result of a combination of a direct cut in the nominal value of a debt contract, an extension of maturity, and/or a lowering of interest rates.

As explained in section 5.1 above, I examine whether cuts in face value have a stronger negative impact on the yearly compound probability of follow-up restructurings than lower interest rates or maturity extensions that lead to an equal reduction in net present value. Economic intuition suggests that face value reductions should not differ in their impact. In fact, any modality leading to a reduction in net present value should be observationally equivalent to any other such modality leading to an equally high cut in net present value. However, the timing may also play an important role. While a cut in face value provides direct and instant relief, maturity extensions and/or lower interest rates only unburden a country over time.

Before I take a closer look into face value cuts and other restructuring modalities, however, I first analyze how the size of the total haircut is correlated with the probability to incur near-term follow-up restructurings. Table 5.1 presents two different haircut measures as calculated by Cruces and Trebesch (2013).

No matter which of the two haircut measures are used, restructurings that were followed by at least one other restructuring within one to three years exhibited on average statistically significantly lower haircuts (by about one half) than those restructurings that did not entail follow-up restructurings within this time window. This is a first indication that the size of the haircut is highly correlated with the probability of near-term follow-up restructurings.

A different descriptive way of analyzing the correlation between the size of the haircut and the time until a follow-up restructuring is to plot (unconditional) survival functions and conduct nonparametric hypothesis tests for the equality of these survival functions. Figure 5.5 shows Kaplan-Meier survival functions[58] to differentiate between

[58] The graphs show the probability of *not* incurring another restructuring (following a restructuring) over time. The compound probability for each point in time is calculated as follows: $\hat{S}(t) = \prod_{t_{(i)} \leq t}(1 - \frac{d_i}{n_i})$, where d_i is the number of follow-up restructurings already materialized at $t_{(i)}$ and n_i is the number of subjects that were at risk of incurring another restructuring at time $t_{(i)}$. Note also that: $\hat{S}(0) = 1$.

very high (above 67 percent), medium (between 33 percent and 67 percent), and very low (below 33 percent) – panel (a) – as well as between high (above 50 percent) and low (below 50 percent) haircuts – panel (b). The nonparametric Kaplan-Meier estimator is especially suitable for the task at hand because it can cope with censored data: Since the dataset used ends in 2010 and some follow-up restructurings may still be to come after that date, the data should be treated as right-censored. The Kaplan-Meier curves as well as the hypothesis tests conducted also provide a first indication whether the proportional hazards assumption is valid, which is important for the estimation of the Cox proportional hazard model in section 5.4. In order for proportionality to hold, the Kaplan-Meier curves should exhibit approximately the same shape and the separation between the curves should approximately remain constant.

Table 5.1: Two-Sample t-Tests for Equal Means – Haircuts

*The table reports the mean haircuts/ cuts in face value in percent of net present value. Using two-sample t-tests for equal means, the table compares those restructurings with a near-term follow-up restructuring to those without a near-term follow-up restructuring. *, **, *** indicate statistical significance at the 10%, 5%, 1% level, respectively.*

Mean Haircuts of restructuring cases…				
	obs	SZ Haircut	Market Haircut	Cut in Face Value
… that *were* followed by another commercial restructuring **within one year**.	24	18.4	18.5	1.1
… that *were not* followed by another commercial restructuring **within one year**.	156	39.9	43.3	19.2
Significance		***	***	***
… that *were* followed by another commercial restructuring **within two years**.	53	25.5	27.2	2.7
… that *were not* followed by another commercial restructuring **within two years**.	127	41.8	45.4	22.6
Significance		***	***	***
… that *were* followed by another commercial restructuring **within three years**.	74	24.0	26.3	2.2
… that *were not* followed by another commercial restructuring **within three years**.	106	46.1	49.6	26.9
Significance		***	***	***

As can be seen in Figure 5.5, those restructuring cases with high (above 50 percent) and very high (above 67 percent) haircuts have a significantly lower compound probability to be followed-up upon by another restructuring than those restructurings with lower cuts in net present value. All tests reject the equality of survival functions at the one percent significance level and the curves are approximately parallel.

Not all haircuts include an outright cut in face value (FV). Indeed, only 32 percent of all 180 commercial debt restructurings in the sample featured a reduction of the nominal amount of the debt. When conducting the same exercises as for total haircuts (Table 5.1 and Figure 5.6), I find that restructurings with at least one follow-up within one to three years have in the mean significantly lower cuts in face value by as much as 88-94 percent than those restructurings without subsequent restructurings in the near term. Importantly, the extent of the cut in face value is also highly correlated to the overall size of the haircut[59], which is not surprising since the haircut is indeed a function of, inter alia, the size of the reduction in face value. Figure 5.6 shows Kaplan-Meier curves for restructurings with and without reductions in face value and confirms the findings from Table 5.1. Those restructurings with a (high) cut in face value have a significantly lower compound probability of being followed-up upon by another restructuring at each point in time.

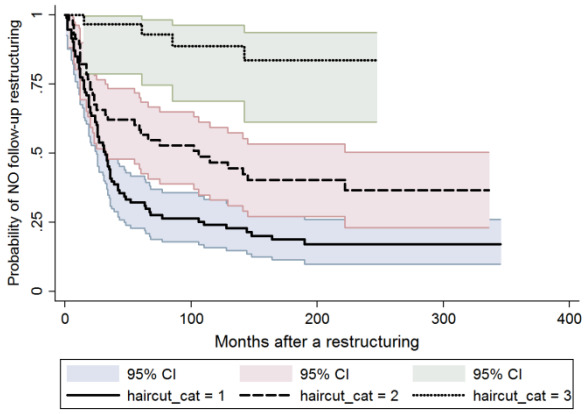
One problem of looking merely at reductions in net present value is that the total amount of the debt affected by the restructuring relative to a country's total debt stock is not taken into account. Of course, the amount of debt cancelled relative to total debt is of crucial importance for debt sustainability. The haircut alone can be very large and have almost no impact if the amount of debt affected is tiny compared to a country's total debt burden (Moody's 2012). In order to control for this fact, I include the amount of debt affected by the restructuring relative to a country's total debt stock as a control variable in the estimations in section 5.5.

[59] Correlation coefficient is 0.81 for "Market Haircuts" and 0.84 for "SZ Haircuts"

Figure 5.5: Kaplan-Meier Survival Estimates – Size of Haircuts

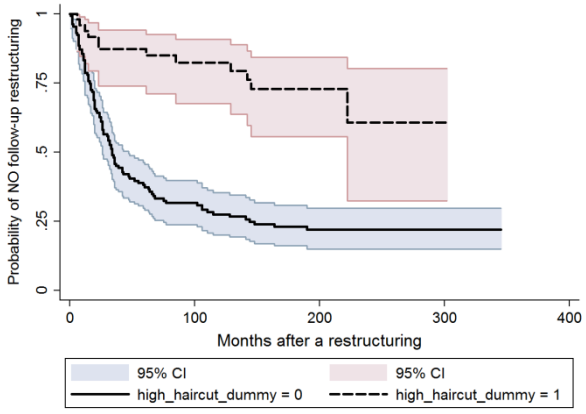
The figure shows Kaplan-Meier curves (see also footnote 58). Shaded regions around the curves mark 95% confidence bands.

(a) Haircut categories[60]



Tests for equality of survival functions:
H_0: Risk of follow-up restructurings is equal across groups
- Log-rank test: p=0.0000
- Wilcoxon (Breslow) test: p=0.0000
- Tarone-Ware test: p=0.0000
- Peto-Peto test: p=0.0000

(b) High (>50%) vs. low (<50%) haircuts

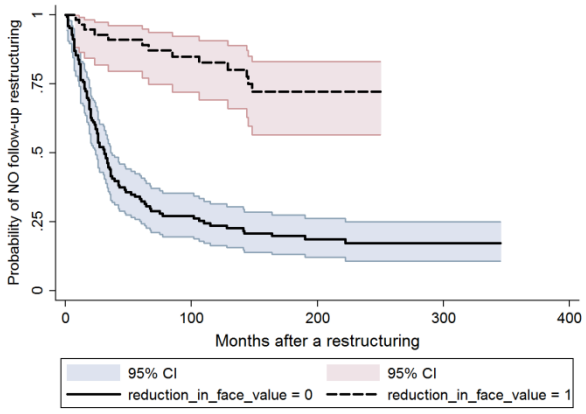


Tests for equality of survival functions:
H_0: Risk of follow-up restructurings is equal across groups
- Log-rank test: p=0.0000
- Wilcoxon (Breslow) test: p=0.0000
- Tarone-Ware test: p=0.0000
- Peto-Peto test: p=0.0000

Figure 5.6: Kaplan-Meier Survival Estimates – Cuts in Face Value

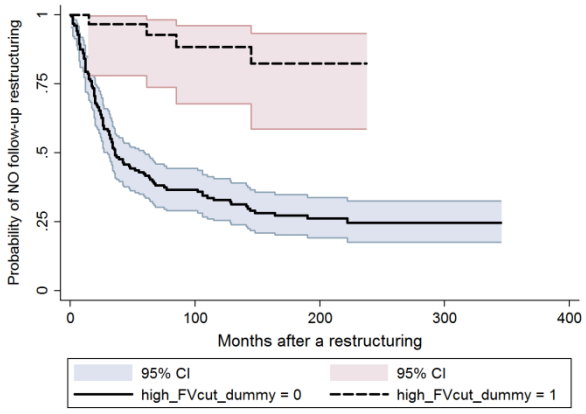
The figure shows Kaplan-Meier curves (see also footnote 58). Shaded regions around the curves mark 95% confidence bands.

(a) Reduction in face value – yes or no



Tests for equality of survival functions:
H_0: Risk of follow-up restructurings is equal across groups
- Log-rank test: p=0.0000
- Wilcoxon (Breslow) test: p=0.0000
- Tarone-Ware test: p=0.0000
- Peto-Peto test: p=0.0000

(b) High (>50%) vs. low (<50%) cuts in FV



Tests for equality of survival functions:
H_0: Risk of follow-up restructurings is equal across groups
- Log-rank test: p=0.0000
- Wilcoxon (Breslow) test: p=0.0000
- Tarone-Ware test: p=0.0000
- Peto-Peto test: p=0.0000

[60] Category 1: Haircut<33%; category 2: 33%<Haircut<67%; category 3: Haircut>67%.

5.3.3 Other Modalities of Debt Restructurings

Of course, the size of a restructuring and the type of haircut is not the only outcome of debt renegotiations that is potentially correlated with the probability of follow-up restructurings. Cruces and Trebesch (2013) also provide information on whether a restructuring has been donor funded, whether it comprised a buy-back of debt contracts, whether the restructuring was a Brady deal (i.e. loosely speaking an exchange of bank loans for partly collateralized tradable bonds) or whether it included the provision of new money or concerted lending. Indeed, all of these features, except for the provision of new money, are negatively and significantly correlated with the compound probability of observing at least one follow-up restructuring (see Figure 5.7).

Donor funded restructurings (panel a) generally seem not to entail (many) near-term follow-up restructurings but the causality is not clear at all. It might well be that donors only provide funds to debtors, if they expect them to have a low probability of their debt stock becoming unsustainable and having to restructure again in the future. Thus, we cannot know whether donor funding just works well with respect to a lower probability of serial restructurings or whether these restructuring cases were characterized by a lower probability of serial default, to begin with.

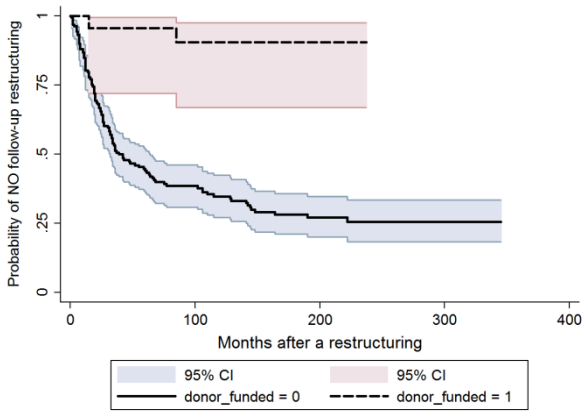
The argument for buy-back deals (panel b) and restructurings that included the provision of new money (panel c) is similar. Countries which can afford to buy back their debt contracts (even if they do so at a large discount) may anticipate a higher probability of being sustainable afterwards. Oftentimes, donor funding and buying back debt even coincide, which makes the exogeniety assumption for these dummy variables with respect to the probability of serial restructurings even more difficult to defend. Due to these potential reverse causality problems, the baseline estimations in the econometric section 5.4.2 will not include these variables. Furthermore, I will check for robustness of overall results by excluding these restructurings in section 5.4.3. This way, I can circumvent any potential omission of variables that should actually be included in order to control for particularities of these restructurings.

The exchange of bank loans for tradable Brady bonds in the 1980s also seems to have worked quite well, when it comes to preventing near-term follow-up restructurings. However, some of the countries had to restructure again 6 to 13 years later.

Figure 5.7: Kaplan-Meier Survival Estimates – Restructuring Modalities

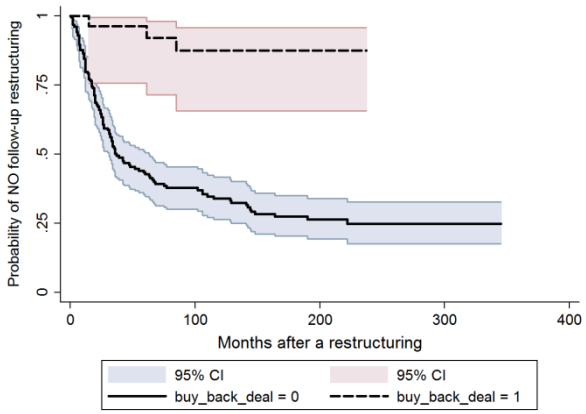
The figure shows Kaplan-Meier curves (see also footnote 58). Shaded regions around the curves mark 95% confidence bands.

(a) Donor-funded Restructurings



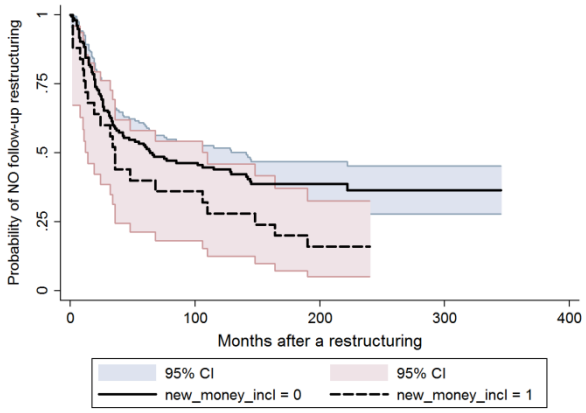
Tests for equality of survival functions:
H_0: Risk of follow-up restructurings is equal across groups
- Log-rank test: p=0.0000
- Wilcoxon (Breslow) test: p=0.0000
- Tarone-Ware test: p=0.0000
- Peto-Peto test: p=0.0000

(b) Buy-back deals



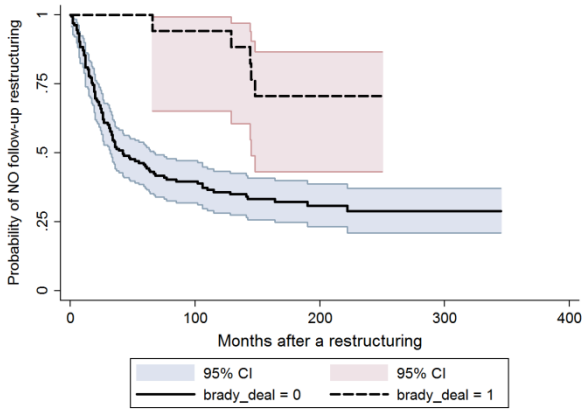
Tests for equality of survival functions:
H_0: Risk of follow-up restructurings is equal across groups
- Log-rank test: p=0.0000
- Wilcoxon (Breslow) test: p=0.0000
- Tarone-Ware test: p=0.0000
- Peto-Peto test: p=0.0000

(c) New money included



Tests for equality of survival functions:
H_0: Risk of follow-up restructurings is equal across groups
- Log-rank test: p=0.0468
- Wilcoxon (Breslow) test: p=0.0921
- Tarone-Ware test: p=0.0711
- Peto-Peto test: p=0.0740

(d) Brady deals



Tests for equality of survival functions:
H_0: Risk of follow-up restructurings is equal across groups
- Log-rank test: p=0.0011
- Wilcoxon (Breslow) test: p=0.0004
- Tarone-Ware test: p=0.0005
- Peto-Peto test: p=0.0004

5.3.4 The Type of Debt Affected

It is important to keep in mind that there are also different types of debt being affected by the restructurings. First, the contracts can be in the form of bank loans or bonds. Second, one has to differentiate between cases where all of the renegotiated debt had already fallen due at the time of the restructuring or not. Third, it might be the case that the very debt being restructured has already been restructured before. Finally,

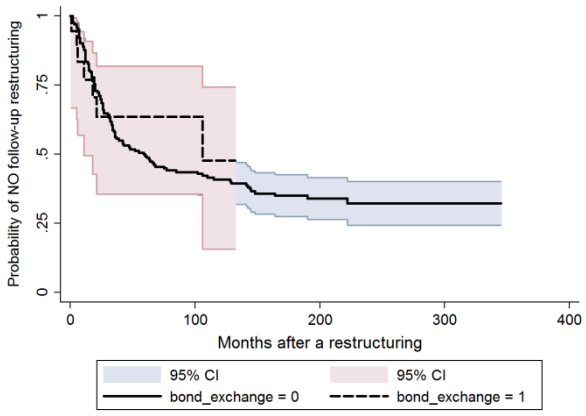
some debt renegotiations included the exchange of short-term debt contracts with an original maturity of at most one year for new debt instruments with a longer-term maturity exceeding one year. When looking at the survival functions (Figure 5.8), only the facts that previously restructured debt (PRD) has been renegotiated again (panel c) and that short-term debt has been exchanged for longer-term debt (panel c) seem to be correlated with the compound probability of follow-up restructurings. Those cases where previously restructured debt has been restructured again, exhibit a statistically significant lower probability of being followed by another restructuring at each point in time. This may be the case because in these restructurings it was clear that the previous restructuring had not been sufficient for the country to regain medium to long term debt sustainability. These restructurings are by definition follow-up restructurings themselves.

Those restructurings where originally short-term debt was exchanged for longer-term debt exhibit a higher compound probability of follow-up restructurings at each point in time, which may initially be surprising. However, short-term debt being affected is a sign of perceived liquidity problems (rather than real solvency problems). Exchanging short to longer term debt is an attempt to reduce any acute liquidity pressure. Therefore it is also not surprising that only two out of a total of 54 cases, where short-term debt had been included, featured a (low) reduction in face value. The other 52 cases only comprised maturity lengthening and at best interest rate reductions. These cases may well have developed to become real solvency problems, though. Thus, they are followed by further restructurings with higher probability.

Figure 5.8: Kaplan-Meier Survival Estimates – Type of Debt

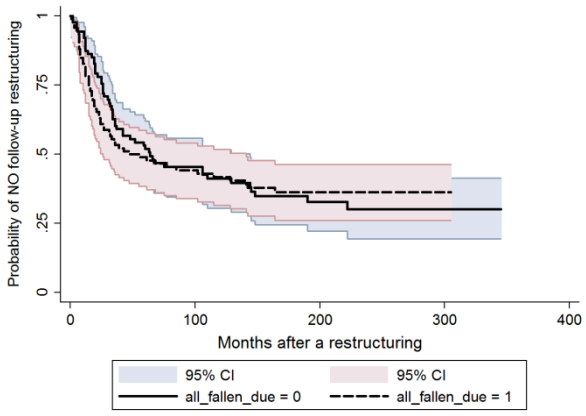
The figure shows Kaplan-Meier curves (see also footnote 58). Shaded regions around the curves mark 95% confidence bands.

(a) Bond exchange



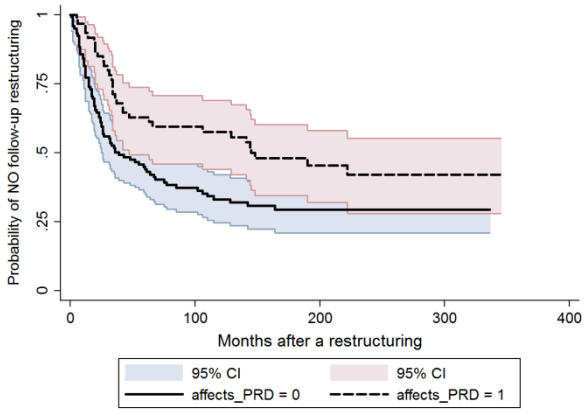
Tests for equality of survival functions:
H_0: Risk of follow-up restructurings is equal across groups
- Log-rank test: p=0.6019
- Wilcoxon (Breslow) test: p=0.8524
- Tarone-Ware test: p=0.7176
- Peto-Peto test: p=0.8633

(b) All debt fallen due at time of restruct.



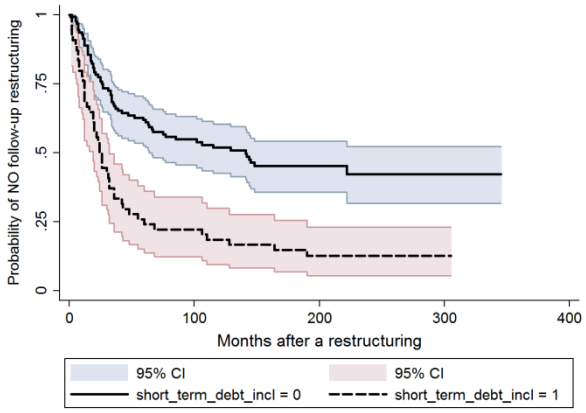
Tests for equality of survival functions:
H_0: Risk of follow-up restructurings is equal across groups
- Log-rank test: p=0.7403
- Wilcoxon (Breslow) test: p=0.2747
- Tarone-Ware test: p=0.4419
- Peto-Peto test: p=0.3208

(c) Affects previously restructured debt



Tests for equality of survival functions:
H_0: Risk of follow-up restructurings is equal across groups
- Log-rank test: p=0.0063
- Wilcoxon (Breslow) test: p=0.0015
- Tarone-Ware test: p=0.0026
- Peto-Peto test: p=0.0018

(d) Short term debt included in restruct.



Tests for equality of survival functions:
H_0: Risk of follow-up restructurings is equal across groups
- Log-rank test: p=0.0000
- Wilcoxon (Breslow) test: p=0.0000
- Tarone-Ware test: p=0.0000
- Peto-Peto test: p=0.0000

5.4 Econometric Investigation

5.4.1 The Cox Proportional Hazard Model

The above graphs and tests merely provide a first rough picture of the way certain features of debt restructurings may be correlated with the probability of serial restructurings. To complete the picture and check for the general validity of some of the above findings I run semi-parametric Cox proportional hazard regressions (Cox, 1972) in order to model the simultaneous impact of certain debt renegotiation outcomes and debt characteristics on the probability of a follow-up restructuring taking place at any point in time. The main variables of interest are the overall size of the haircut as well as the reduction in face value and the residual haircut due to maturity extensions or/and interest rate reductions.

The Cox proportional hazard model allows estimating the hazard rate $h(t)$ (i.e. the risk of a follow-up restructuring to occur at a time t) and can be written as follows:

$$h(t) = h_0(t) * \exp(\beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_n X_n) ,$$

where $X_1, \dots, X_n$ denote the covariates and $\beta_1, \dots, \beta_n$ are the corresponding coefficients. The term $h_0(t)$ is the baseline hazard rate at time t for all covariates being equal to zero (similar to the constant term in simple linear regressions). The baseline hazard rate is then shifted up or down by an order of proportionality when one of the covariates changes.

The main advantage of the Cox proportional hazard model is the fact that the baseline hazard function is left unparameterized, meaning that one does not have to assume a specific functional form. This, of course, can also be a disadvantage since the proportionality assumption must hold for the reduced form model to be correct. In addition to the Kaplan-Meyer plots and the hypotheses tests for the equality of survival functions in section 5.3 above, I also conduct post-estimation tests on the basis of Schoenfeld residuals to check for the validity of the crucial proportional hazard assumption.

Another big advantage of the Cox model is that it can cope with left truncation and right censoring, which is the case for the data at hand. Countries enter the dataset at different points in time and some potential future follow-up restructurings cannot be observed because the dataset ends after 2010.

The Cox proportional hazard model is estimated using pseudo maximum likelihood and I use the Efron (1977) method to handle ties (i.e. if two observations have the same

survival time).[61] Each regression includes country dummies to control for time invariant particularities. Standard errors are clustered at the country level.

As control variables I use most of the ten macroeconomic variables suggested by Manasse and Roubini (2005) plus a polity indicator to control for the political system. Manasse and Roubini (2005) identified these ten variables to be suitable – and apparently sufficiently so – to predict debt crises. Unfortunately, data for the computation of the public external debt to fiscal revenue ratio, the number of years to the next presidential election as well as external financial requirements are not sufficiently available for the countries and time span at hand.

This also makes it difficult to clearly and unchallengeably identify potential causal relationships econometrically. The number of observations is arguably low, ranging between 144 and 157 for the baseline case, depending on which covariates are included. Nevertheless, some of the found robust correlations contribute to a better understanding of what kind of restructurings entail serial restructurings with high probability.

5.4.2 Baseline Estimation Results

Table 5.2 shows baseline estimation results for the full sample. The haircut measure used here is computed according to the method by Sturzenegger and Zettelmeyer (2008) as explained in section 5.2.1 above. Moreover, the estimations contain only those restructuring characteristics that have been shown to be suitable for inclusion into the Cox proportional hazard regressions in section 5.3. Specifically, the variables included have been tested for significantly different and approximately parallel Kaplan-Meier functions. The dummy variables indicating donor-funding, buy-back deals, Brady deals, and new money being included are disregarded in the estimations due to potential endogeniety issues. All variables are described in more detail in Table A.5.1 in the appendix to this chapter. Table A.5.2 provides some descriptive statistics.

Each regression is estimated twice: first, with the overall haircut as a regressor and, second, with separate regressors for the cut in face value and the residual reduction in net present value due to maturity extensions and/or interest rate cuts. Control variables are included subsequently in Table 5.2. Column (1) comprises only the haircuts, column (2) includes debt characteristics, countries' economic and political fundamentals as

[61] When using the exact method overall results do not change (see column (2) of Table 5.3).

suggested by Manasse and Roubini (2005) are included in column (3), and the U.S. treasury bill rate (see also Manasse and Roubini, 2005) as a proxy for international capital market conditions is added in column (4). The estimation results are tested for robustness in Tables 5.3 and 5.4 in section 5.2.3.

The regression output confirms the descriptive findings as well as the IMF's (2013) claim that higher haircuts lead to a lower compound probability of follow-up restructurings. A higher overall haircut in net present value of 1 percentage point is on average associated with a $(\exp(-0.04) - 1) * 100 = -3.9$ percent lower compound probability of observing a follow-up restructuring. The IMF's (2013) call for higher haircuts thus seems to be justified, if – as explained in the introductory section 5.1 – one assumes that a single haircut is less expensive than serial restructurings (with the same aggregate haircut).

When discriminating between the effects of a haircut in face value and the residual haircut due to maturity prolongation or/and interest rate reductions, only the coefficient for the cut in face value is significantly different from zero. Still, the coefficient on the residual haircut is negative as expected. Surprisingly, we can reject the null hypothesis that the two coefficients are equal on the 1-3 percent significance levels, depending on the specification. This implies that a reduction in face value has a stronger negative impact on the probability of serial restructurings than a reduction of net present value due to maturity extension and/or an interest rate reduction. While a one percentage point increase in the face value haircut reduces the probability of a follow-up restructuring by roughly 6.7 percent, an equally sized haircut due to maturity extension and/or interest rate reduction reduces the probability of serial default by only about 2.0 percent. The intuitive expectation that it should not matter how the cut in net present value is achieved cannot be confirmed on the basis of these findings. One possible explanation for this finding might be that a cut in face value provides outright debt relief, whereas interest rate cuts and especially maturity extensions merely buy an insolvent and illiquid country some time until it becomes illiquid again.

The amount of debt affected itself also has a significant impact on the probability of serial restructurings. It is an important control variable for the true size of the haircut with respect to the overall debt burden. The higher the amount of debt affected relative to GDP, the lower the probability of incurring a follow-up restructuring because even a

low haircut erases a large part of a country's debt relative to GDP. Estimations where this variable is omitted nevertheless generate very similar results (not shown here).

The covariates describing the type of debt affected and fulfilling the statistical requirements for inclusion into the Cox proportional hazard model are the two dummy variables indicating whether the restructuring affected previously restructured debt and whether short-term debt was exchanged for debt contracts with longer-term maturities. The coefficient to the dummy for short term debt being included is not significantly different from zero in most specifications. The coefficient to the dummy indicating whether previously restructured debt had been affected is significantly negative in all specifications, though. Those cases, where previously restructured debt was restructured again have, on average, a 65-75 percent lower compound probability of being followed-up by another restructuring. One possibility would be that these restructurings complement the previous restructuring in such a way, that the country finally becomes or at least comes far closer towards medium- to long-term debt sustainability.

A country's real GDP growth around the time of restructuring does not enter significantly. However, a country's debt ratio after the considered debt restructuring is statistically highly significant. Economically speaking, a one percentage point higher debt-to-GDP ratio is associated with a 1.8 percent higher probability of having to restructure again.

Finally, I include the three month U.S. treasury bill rate to control for the overall international credit market environment. As expected, the sign is positive, implying that the more tense the situation on international capital markets (i.e. the higher the treasury bill rate), the higher the probability of observing follow-up restructurings. However, the coefficients are not significantly different from zero in this specification.

Generally, the coefficients to the haircut variables are left almost unchanged by the successive inclusion of all the controls. The validity of the proportionality assumption is tested on the basis of Schoenfeld (1982) residuals for each covariate individually as well as for the full specifications and can be confirmed. The null hypothesis that the proportionality assumption holds cannot be rejected for any of the specifications. Furthermore, Figures A.5.1 to A.5.4 in the appendix to this chapter seem to confirm the time-independence (i.e. zero slopes against time) of the Schoenfeld residuals for the three main variables in the baseline specification presented in column (4) of Table 5.2:

the overall SZ-Haircut (left column) as well as the reduction in face value and the residual haircut (right column).

Table 5.2: Semi-Parametric Cox Proportional Hazard Model – Baseline

Independent Variables	Only Haircut (1)		+ Type of debt affected (2)		+ country characteristics (3)		+ U.S. treasury bill rate (4)	
Haircut size and type:								
Haircut (%)	-0.048***		-0.038***		-0.042***		-0.042***	
	[0.009]		[0.009]		[0.010]		[0.011]	
Reduction in face value (%)		-0.069***		-0.054***		-0.071***		-0.072***
		[0.012]		[0.011]		[0.019]		[0.019]
Residual haircut (%)		-0.028*		-0.013		-0.019		-0.020
		[0.015]		[0.012]		[0.012]		[0.012]
Amount of debt affected	-3.086***	-2.987***	-2.529***	-2.502**	-2.582**	-2.787**	-2.521**	-2.780**
(% of GDP)	[1.084]	[1.010]	[0.934]	[0.997]	[1.108]	[1.130]	[1.145]	[1.113]
Type of debt affected:								
Affects previously			-1.065***	-1.287***	-1.277***	-1.372***	-1.249***	-1.347***
restructured debt (0/1)			[0.243]	[0.314]	[0.347]	[0.414]	[0.341]	[0.415]
Short-term debt			0.152	-0.041	-0.031	-0.191	-0.036	-0.192
included (0/1)			[0.482]	[0.441]	[0.594]	[0.564]	[0.616]	[0.579]
Country characteristics:								
Central government					0.018**	0.017**	0.019**	0.018**
debt (% of GDP)					[0.007]	[0.007]	[0.009]	[0.009]
Short term debt					0.002	0.002	0.002	0.002
(% of reserves)					[0.001]	[0.001]	[0.001]	[0.001]
Real GDP growth (%)					-0.018	-0.021	-0.014	-0.018
					[0.044]	[0.043]	[0.050]	[0.051]
CPI inflation (%)					-0.001	-0.001	-0.001	-0.001
					[0.001]	[0.001]	[0.001]	[0.001]
Exchange rate volatility					0.000	0.000**	0.000	0.000**
([0,1])					[0.000]	[0.000]	[0.000]	[0.000]
Real effective exchange rate					0.000***	0.000	0.000***	0.000
(index where 100 = PPP)					[0.000]	[0.000]	[0.000]	[0.000]
Polity index (-10 to +10)					0.042	0.049	0.050	0.055
					[0.052]	[0.050]	[0.068]	[0.064]
International credit market environment:								
U.S. treasury bill rate (%)							0.044	0.029
							[0.142]	[0.134]
Fixed effects	Country	Country	Country	Country	Country	Country	Country	Country
Number of observations	157	157	157	157	144	144	144	144
Number of months at risk	13892	13892	13892	13892	12309	12309	12309	12309
Number of "failures"	98	98	98	98	95	95	95	95
Number of countries	60	60	60	60	51	51	51	51
Pseudo R^2	0.140	0.150	0.155	0.166	0.165	0.176	0.165	0.176
P-value for global test of proportional hazards assumption	1.000	1.000	1.000	1.000	0.999	0.913	0.999	0.852
	(H_0: Proportional hazards assumption is correct)							
P-value for Wald test		0.018		0.005		0.023		0.026
	(H_0: Coefficients of "reduction in face value" and "residual haircut" are equal)							

*Notes: The table reports coefficient estimates. Standard errors [in brackets] are clustered at the country level. *, **, *** indicate statistical significance at the 10%, 5%, 1% level, respectively.*
The residual haircut is the difference of the overall Haircut and the reduction in face value. The test of the proportional hazards assumption is based on Schoenfeld residuals.

5.4.3 Robustness of Results

The main results presented in section 5.4.2 are very robust to using a different haircut measure in column (1) of Table 5.3 (the "market" haircut, see Cruces and Trebesch, 2013), a different estimation method to handle tied observations with equal survival times (column (2)), or to including region[62] or no fixed effects at all instead of country dummies. Table 5.4 documents estimation results for the baseline model including all covariates for important subsamples, to check whether not controlling for other restructuring features affects the results in any significant way because any variable omissions may lead to biased coefficients. Table 5.3 confirms all findings presented in section 5.4.2. Most importantly, higher haircuts lead to a lower probability of serial restructurings and the impact of cuts in face value is significantly stronger than that of maturity extensions and/or interest rate reductions. These effects are a bit less pronounced in the specification including region dummies instead of country dummies (column (3)).

The estimation results for different subsamples in Table 5.4 further substantiate the main results. The overall haircut as well as the cut in face value and the residual haircut all enter negatively and (mostly) statistically significantly. The coefficients' sizes are extremely similar to all previous estimations, too. Tests for the equality of the effects of a cut in face value and the residual haircut largely confirm the above finding: The coefficient to a cut in face value is significantly larger in absolute value than the coefficient to the residual haircut in the first two columns. Even though this significance is lost in columns (3) and (4), the magnitudes of the coefficients remain very stable.

When running all the regressions using the full sample with a dummy variable controlling for a Brady deal, a donor-funded deal, a buy-back deal and/or a debt exchange including the provision of new money (not shown here), results are still robust. The coefficient to this dummy variable is generally significantly negative.

Finally, tests for the validity of the proportional hazard assumption imply that specifications in Tables 5.3 and 5.4 fulfill this critical assumption.

[62] UN-subregions: Caribbean, Central America, South America, Eastern Africa, Middle Africa, Northern Africa, Southern Africa, Western Africa, South-Eastern Asia, Southern Asia, Western Asia, Eastern Europe, Southern Europe.

Table 5.3: Semi-Parametric Cox Proportional Hazard Model – Robustness Checks 1

Independent Variables	"Market" haircut measure (1)		Exact method for ties (2)		Region fixed effects (3)		No fixed effects (4)	
Haircut size and type:								
Haircut (%)	-0.052***		-0.057***		-0.029***		-0.030***	
	[0.012]		[0.014]		[0.006]		[0.005]	
Reduction in face value (%)		-0.074***		-0.078***		-0.039***		-0.038***
		[0.017]		[0.021]		[0.010]		[0.008]
Residual haircut (%)		-0.034**		-0.040**		-0.016**		-0.018***
		[0.016]		[0.016]		[0.008]		[0.007]
Amount of debt affected	-1.825	-2.231*	-3.311**	-3.430**	-0.381	-0.388	-0.631	-0.587
(% of GDP)	[1.159]	[1.152]	[1.578]	[1.554]	[0.655]	[0.704]	[0.544]	[0.579]
Type of debt affected:								
Affects previously	-0.793**	-1.018**	-1.601***	-1.713***	-0.500***	-0.542**	-0.485***	-0.521**
restructured debt (0/1)	[0.336]	[0.426]	[0.497]	[0.490]	[0.187]	[0.213]	[0.185]	[0.206]
Short-term debt	-0.023	-0.145	-0.730	-0.862	0.343	0.321	0.276	0.309
included (0/1)	[0.608]	[0.596]	[0.625]	[0.611]	[0.355]	[0.356]	[0.259]	[0.246]
Country characteristics:								
Central government	0.022**	0.020**	0.027***	0.025**	0.003***	0.004***	0.003***	0.004***
debt (% of GDP)	[0.010]	[0.009]	[0.010]	[0.010]	[0.001]	[0.002]	[0.001]	[0.001]
Short term debt	0.002	0.002	0.003*	0.003*	-0.000	-0.000	0.000	-0.000
(% of reserves)	[0.001]	[0.001]	[0.002]	[0.002]	[0.000]	[0.000]	[0.000]	[0.000]
Real GDP growth (%)	-0.014	-0.014	-0.029	-0.032	0.006	-0.003	0.011	0.005
	[0.049]	[0.049]	[0.042]	[0.041]	[0.024]	[0.024]	[0.022]	[0.022]
CPI inflation (%)	-0.001	-0.001	-0.001	-0.002	-0.000	-0.000	-0.000	-0.000
	[0.001]	[0.001]	[0.002]	[0.002]	[0.000]	[0.000]	[0.000]	[0.000]
Exchange rate volatility	0.000*	0.000**	0.000	0.000	0.000***	0.000***	0.000***	0.000***
([0,1])	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Real effective exchange rate	0.000***	0.000*	-0.002	-0.003	0.000***	0.000	0.000***	0.000**
(index where 100 = PPP)	[0.000]	[0.000]	[0.003]	[0.003]	[0.000]	[0.000]	[0.000]	[0.000]
Polity index (-10 to +10)	0.046	0.053	0.147***	0.153***	-0.009	-0.015	0.004	0.006
	[0.067]	[0.066]	[0.056]	[0.055]	[0.031]	[0.029]	[0.019]	[0.018]
International credit market environment:								
U.S. treasury bill rate (%)	0.046	0.033	0.095	0.062	0.096*	0.080	0.086**	0.075*
	[0.139]	[0.137]	[0.108]	[0.107]	[0.052]	[0.052]	[0.041]	[0.042]
Fixed effects	Country	Country	Country	Country	Region	Region	none	none
Number of observations	144	144	144	144	144	144	144	144
Number of months at risk	12309	12309	12309	12309	12309	12309	12309	12309
Number of "failures"	95	95	95	95	95	95	95	95
Number of countries	51	51	51	51	51	51	51	51
Pseudo R^2	0.174	0.181	0.180	0.192	0.095	0.102	0.083	0.089
P-value for global test of proportional hazards assumption	1.000	0.923	n.a.	n.a.	0.845	0.914	0.869	0.889
			(H_0: Proportional hazards assumption is correct)					
P-value for Wald test		0.069		0.009		0.032		0.034
		(H_0: Coefficients of "reduction in face value" and "residual haircut" are equal)						

*Notes: The table reports coefficient estimates. Standard errors [in brackets] are clustered at the country level (except for column (2)). *, **, *** indicate statistical significance at the 10%, 5%, 1% level, respectively.*
The residual haircut is the difference of the overall Haircut and the reduction in face value. Region dummies are based on the United Nations' definition of 13 geographical sub-regions. The test of the proportional hazards assumption is based on Schoenfeld residuals.

Table 5.4: Semi-Parametric Cox Proportional Hazard Model – Robustness Checks 2

Independent Variables	All 18 bond exchanges excluded (1)		All 17 Brady deals excluded (2)		All 28 donor funded and/or buy-back deals excluded[63] (3)		All 25 restructurings with provision of new money excluded (4)	
Haircut size and type:								
Haircut (%)	-0.044***		-0.041***		-0.030***		-0.054***	
	[0.014]		[0.013]		[0.010]		[0.013]	
Reduction in face value (%)		-0.086**		-0.086***		-0.059***		-0.087***
		[0.041]		[0.025]		[0.022]		[0.031]
Residual haircut (%)		-0.021*		-0.017		-0.017		-0.033*
		[0.013]		[0.015]		[0.012]		[0.019]
Amount of debt affected	-2.396	-2.463	-3.143*	-3.927**	-3.067**	-3.203***	-1.425	-1.177
(% of GDP)	[1.625]	[2.054]	[1.634]	[1.618]	[1.238]	[1.195]	[3.874]	[3.859]
Type of debt affected:								
Affects previously	-1.508***	-1.739***	-1.177***	-1.269***	-1.516***	-1.488***	-1.649***	-1.738***
restructured debt (0/1)	[0.373]	[0.471]	[0.417]	[0.455]	[0.375]	[0.411]	[0.495]	[0.557]
Short-term debt	-0.019	-0.337	0.102	-0.017	-0.052	-0.200	0.792	0.472
included (0/1)	[0.734]	[0.730]	[0.690]	[0.652]	[0.523]	[0.543]	[1.256]	[1.245]
Country characteristics:								
Central government	0.022**	0.020*	0.021	0.019*	0.018**	0.017**	0.029***	0.028***
debt (% of GDP)	[0.011]	[0.011]	[0.013]	[0.010]	[0.008]	[0.008]	[0.011]	[0.010]
Short term debt	0.004**	0.004*	0.001	0.001	0.002	0.002	0.002	0.002
(% of reserves)	[0.002]	[0.002]	[0.001]	[0.001]	[0.002]	[0.001]	[0.001]	[0.001]
Real GDP growth (%)	0.028	0.015	-0.024	-0.025	-0.025	-0.032	-0.012	-0.005
	[0.053]	[0.056]	[0.063]	[0.062]	[0.050]	[0.052]	[0.059]	[0.064]
CPI inflation (%)	-0.001	-0.002	-0.001	-0.001	-0.001*	-0.002	-0.000	-0.000
	[0.001]	[0.001]	[0.002]	[0.002]	[0.001]	[0.001]	[0.001]	[0.001]
Exchange rate volatility	0.044***	0.046***	0.000	0.001**	0.000	0.000**	0.000	0.000
([0,1])	[0.017]	[0.016]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Real effective exchange rate	0.000***	0.000	0.000***	0.000	0.000	-0.000	0.000**	0.000
(index where 100 = PPP)	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Polity index (-10 to +10)	0.052	0.068	0.055	0.073	0.048	0.049	-0.003	0.040
	[0.082]	[0.078]	[0.071]	[0.068]	[0.066]	[0.064]	[0.145]	[0.154]
International credit market environment:								
U.S. treasury bill rate (%)	0.065	0.016	0.031	0.036	-0.022	-0.024	0.173	0.132
	[0.148]	[0.141]	[0.156]	[0.160]	[0.144]	[0.137]	[0.196]	[0.209]
Fixed effects	Country	Country	Country	Country	Country	Country	Country	Country
Number of observations	131	131	127	127	121	121	121	121
Number of months at risk	11590	11590	9204	9204	9061	9061	10541	10541
Number of "failures"	88	88	90	90	92	92	76	76
Number of countries	51	51	48	48	38	38	51	51
Pseudo R^2	0.204	0.214	0.158	0.172	0.137	0.142	0.204	0.213
P-value for global test of proportional hazards assumption	1.000	0.192	0.958	0.925	0.997	0.709	1.000	0.770
			(H_0: Proportional hazards assumption is correct)					
P-value for Wald test		0.143		0.014		0.129		0.198
		(H_0: Coefficients of "reduction in face value" and "residual haircut" are equal)						

*Notes: The table reports coefficient estimates. Standard errors [in brackets] are clustered at the country level. *, **, *** indicate statistical significance at the 10%, 5%, 1% level, respectively.*
The residual haircut is the difference of the overall Haircut and the reduction in face value. Region dummies are based on the United Nations' definition of 13 geographical sub-regions. The test of the proportional hazards assumption is based on Schoenfeld residuals.

[63] Many buy back deals are also donor funded, which is why these two categories largely overlap. Results are almost identical, if only one of the categories is excluded.

5.5 Conclusion

This paper complements the existing empirical literature on sovereign debt restructurings by analyzing whether the often stated claims that higher haircuts reduce the probability of (near-term) follow-up restructurings are valid. I further distinguish between reductions in net present value of the debt in the form of cuts in face value as opposed to reductions in net present value due to maturity extensions or/and reductions in interest rates. Finally, I investigate whether other restructuring features are correlated with the probability of serial restructurings.

The most important finding is that higher total debt remissions are significantly negatively related to the probability of serial restructurings – most likely because higher debt remissions move a country closer to a sustainable debt level than low alleviation. This finding is rather straight-forward and some studies already anticipated it anecdotally (IMF, 2013; Das et al., 2012; Moody's, 2012). An immediate implication for future restructurings would be that debtors and creditors should, whenever possible, dare to accept higher debt remissions in order to prevent the debtor country from having to restructure over and over again. If serial restructurings are indeed more costly than single deemed-to-satisfy restructurings, this strategy could prevent many enduring sovereign liquidity and solvency crises. If uncertainty and administration costs are high, the strategy of accepting one single large restructuring rather than several small restructurings may even be desirable for the creditor.

The estimation results also suggest that haircuts in face value reduce the probability of serial restructurings by about twice as much as haircuts due to maturity extensions or/and reductions in interest rates. This result refutes the intuitive logic that it is the overall reduction in net present value which may impact a country's debt sustainability, no matter how this reduction comes about. One potential explanation for this finding may be that a cut in face value provides immediate and outright debt relief (in terms of debt sustainability), whereas interest rate cuts and especially maturity extensions merely buy an insolvent and illiquid country some time until it becomes illiquid again.

Reinhart and Trebesch (2015) seem to confirm this finding: A country's economic growth and credit rating only improves significantly after a debt restructuring, if the agreement included an outright cut in face value. For deals consisting only of maturity extensions and/or interest rate reductions they do not find significant improvements of economic fundamentals.

Finally, the effects of donor funded restructurings, buy-back deals, Brady deals and restructurings including the provision of new money cannot be conclusively resolved because the expectations with respect to a country's future debt sustainability may drive decisions to provide funding along with granting debt relief. Nevertheless, descriptive statistics suggest that these restructuring features are highly and significantly correlated with a lower probability of serial restructurings.

5.6 Appendix to Chapter 5

Table A.5.1: List of Variables and Definitions

Variable	Unit	Explanations and Source
Haircut size and type:		
Haircut ("SZ" or "Market")	percent of net present value of debt	Cruces and Trebesch (2013)
Reduction in face value	percent of net present value of debt	Cruces and Trebesch (2013)
Residual haircut	percent of net present value of debt	Own computation: "Haircut" minus "reduction in face value"
Amount of debt affected	percent of GDP	Absolute amounts in US Dollars from Cruces and Trebesch (2013) Own computation of ratios to GDP (GDP from World Bank World Development Indicators)
Other Modalities of debt restructurings:		
Donor-funded restructurings	Dummy=1 if restructuring was donor funded	Cruces and Trebesch (2013)
Buy-back deals	Dummy=1 if country bought back its debt	Cruces and Trebesch (2013)
New money included	Dummy=1 if new money or concerted lending was provided	Cruces and Trebesch (2013)
Brady deals	Dummy=1 if restructuring was a so-called Brady deal	Cruces and Trebesch (2013)
Type of debt affected:		
Affects previously restructured debt	Dummy=1 if previously restructured debt was affected by restructuring	Cruces and Trebesch (2013)
Short term debt included	Dummy=1 if short term debt (with a maturity of less than one year) was exchanged for longer-term debt (with a maturity of more than one year)	Cruces and Trebesch (2013)
Bond exchange	Dummy=1 if the debt affect was in the form of tradable bonds	Cruces and Trebesch (2013)
All debt fallen due at time of restructuring	Dummy=1 if all of the debt being affected had already fallen due at the time of restructuring	Cruces and Trebesch (2013)
Country characteristics:		
Central government debt	percent of GDP	Abbas et al. (2010)
Short-term debt to reserves	percent of total reserves	World Bank World Development Indicators
Real GDP growth	percent	World Bank World Development Indicators
CPI inflation	percent	World Bank World Development Indicators
Exchange rate volatility	Between 0 and 1	World Bank World Development Indicators, Own computation of Coefficient of Variation
Real Effective Exchange rate	Index, 100 means that PPP holds	World Bank World Development Indicators and Darvas (2012), where not available
Polity index	-10 to +10, where "autocracies" (-10 to -6), "anocracies" (-5 to +5) and "democracies" (+6 to +10)	Marshall et al. (2011)
International credit market environment:		
U.S. treasury bill rate	percent	World Bank World Development Indicators

Table A.5.2: Summary Statistics for Variables

Variable	Number of observations	Mean	Standard deviation	Min	Max
Haircut size and type:					
Haircut (SZ)	180	37.04	27.28	-9.80	97.00
Haircut (Market)	180	40.01	27.02	-9.80	97.00
Reduction in face value	180	16.77	30.55	0.00	97.00
Residual haircut	180	20.27	16.62	-14.00	73.20
Amount of debt affected	157	0.15	0.17	0.00	0.78
Other Modalities of debt restructurings:					
Donor-funded restructurings	180	0.12	0.33	0	1
Buy-back deals	180	0.14	0.35	0	1
New money included	180	0.14	0.35	0	1
Brady deals	180	0.09	0.29	0	1
Type of debt affected:					
Affects previously restructured debt	180	0.34	0.47	0	1
Short term debt included	180	0.30	0.46	0	1
Bond exchange	180	0.10	0.30	0	1
All debt fallen due at time of restructuring	180	0.51	0.50	0	1
Country characteristics:					
Central government debt	159	85.61	67.94	15.67	711.94
Short-term debt to reserves	158	266.95	948.05	5.21	11235.10
Real GDP growth	175	2.95	5.53	-17.15	34.39
CPI inflation	170	56.15	187.73	-8.48	2075.89
Exchange rate volatility	171	39.38	454.77	0	5948.22
Real Effective Exchange rate	171	2043.99	13412.44	10.41	136987.50
Polity index	168	0.77	6.86	-9	10
International credit market environment:					
U.S. treasury bill rate	180	6.44	2.71	0.13	14.08

Figure A.5.1: Schoenfeld Residual Plot for Overall SZ-haircut Measure

A Schoenfeld residual plot exhibiting a non-random pattern in time (i.e. a non-zero slope) is evidence of a violation of the proportional hazards assumption.

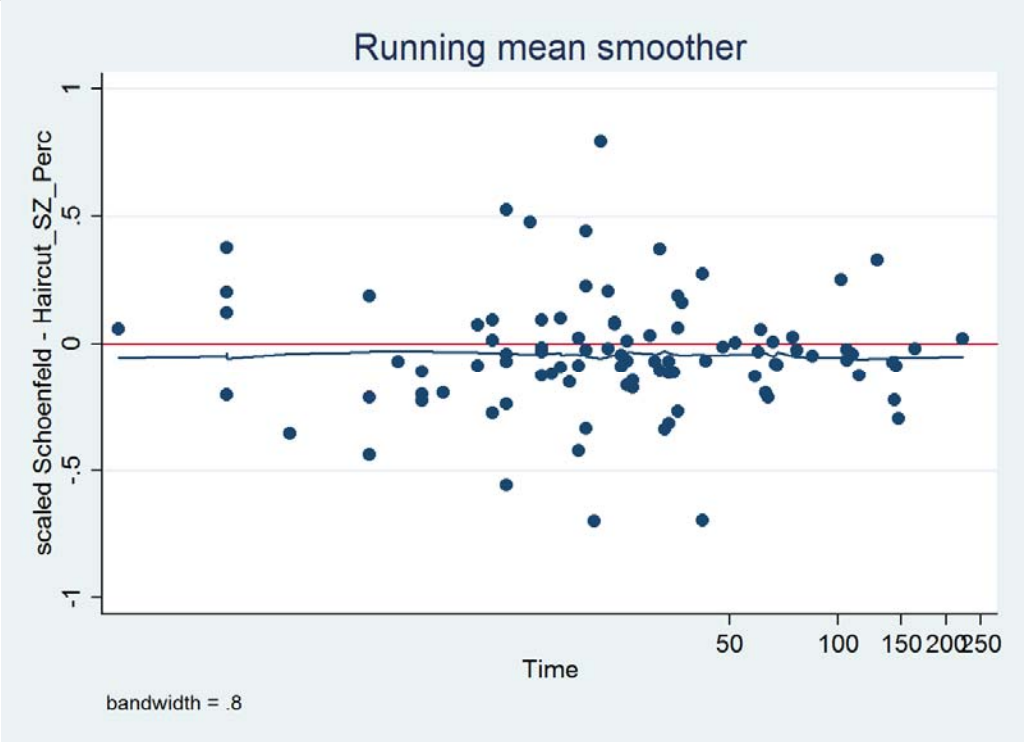


Figure A.5.2: Schoenfeld Residual Plot for Reduction in Face Value

A Schoenfeld residual plot exhibiting a non-random pattern in time (i.e. a non-zero slope) is evidence of a violation of the proportional hazards assumption.

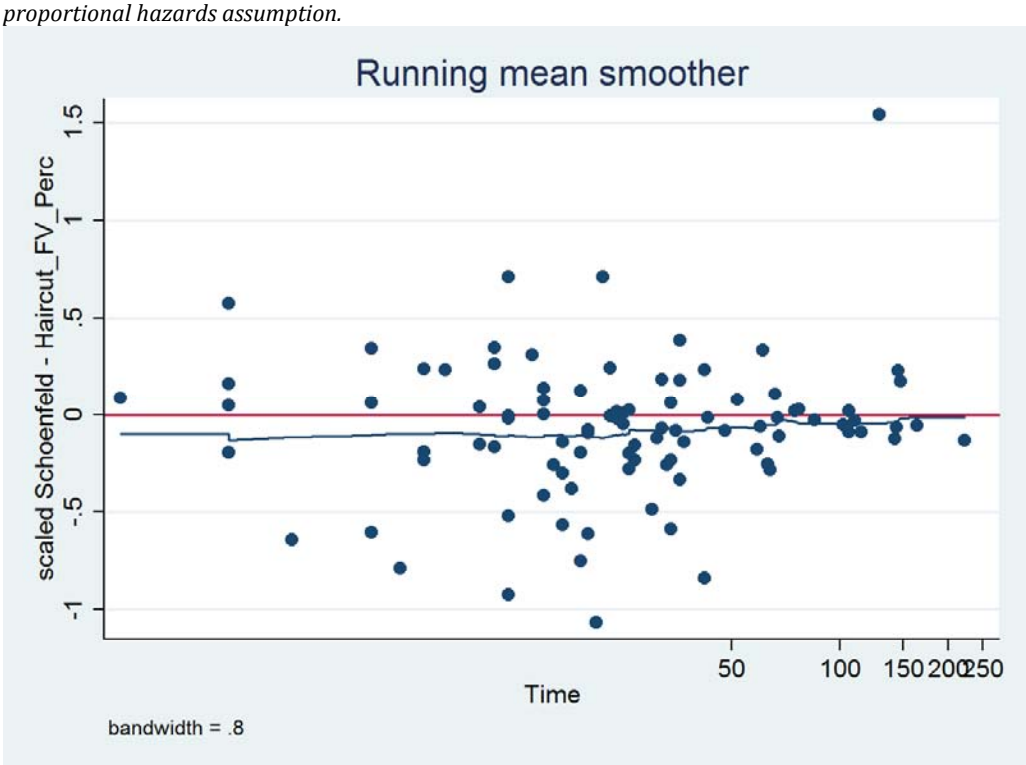


Figure A.5.3: Schoenfeld Residual Plot for Residual Haircut

A Schoenfeld residual plot exhibiting a non-random pattern in time (i.e. a non-zero slope) is evidence of a violation of the proportional hazards assumption.

Figure A.5.4: Schoenfeld Residual Plot for the Dummy Variable Indicating whether Previously Restructured Debt has been Affected in a Restructuring

A Schoenfeld residual plot exhibiting a non-random pattern in time (i.e. a non-zero slope) is evidence of a violation of the proportional hazards assumption.

6. VIABLE INSOLVENCY PROCEDURE FOR EURO AREA SOVEREIGNS[64]

6.1 Introduction

The euro area debt crisis has revealed serious flaws in the institutional setup of the European Monetary Union (EMU) as it had been designed in the late 1990s (Buti and Carnot, 2012; De Grauwe and Ji, 2012; Hodson, 2013). In 2010, the crisis started a wave of reforms to adjust this deficient setting. The temporary EFSF (European Financial Stability Facility) and the permanent ESM (European Stability Mechanism) are multilateral loan facilities created with the intention of stabilizing the government bonds market (European Central Bank, 2011; Olivares-Caminal, 2012). A key element of this reform program consists in developing the banking union. It includes a single supervisory mechanism (Howarth and Quaglia, 2014) and bank resolution systems (European Commission, 2014). In addition, the European Central Bank partially assumed the responsibility of a lender of last resort in case of government bond market panics and established the OMT (Outright Monetary Transactions) program (European Central Bank, 2012b). Finally, the feeble and ineffective SGP (Stability and Growth Pact) was reformed, specified and complemented with national debt brakes, which all euro area member states accepted by signing the European Fiscal Compact (Burret and Schnellenbach, 2014; European Central Bank, 2012a).

While this reform program is comprehensive, another serious incompleteness strikes: to this point, there is no well-defined and feasible insolvency procedure which could be applied to restructure the sovereign debt of a euro area member state. This lack of a specified insolvency procedure remains a much neglected subject in the emerging new institutional structure of the euro area in at least two respects.

First, the conditionality claim of EFSF, ESM and OMT loans can only be credible if creditors have a real alternative to keeping a crisis country liquid under any circumstances. As long as the prospect of restructuring remains an unacceptable high-risk scenario, any threat to stop liquidity provision in case of non-compliance lacks credibility. Only a credible restructuring prospect can prevent a system which is intended to merely provide conditional liquidity assistance in the short run from turning

[64] This chapter is based on joint work with Clemens Fuest and Friedrich Heinemann, which has been published as "A Viable Insolvency Procedure for Sovereigns in the Euro Area", *Journal of Common Market Studies*, doi: 10.1111/jcms.12287. See Fuest, Heinemann, and Schröder (2015).

into a system of potentially unconditional permanent transfers (Committee on International Economic Policy and Reform, 2013).

Second, and closely related, the prospect of sovereign insolvency is crucial to safeguard market discipline as a complement to rule-based fiscal discipline. If restructuring individual euro area member states' debt is no realistic option, creditors hardly face any default risk when lending money to these borrowers. Only the realistic possibility of some kind of sovereign default can induce borrowers to carefully examine the creditworthiness of euro area countries before buying their bonds.

While there is a strong case for an insolvency procedure for sovereigns in a newly designed EMU setup, its introduction is challenging. The financial and economic situation in the euro area will remain fragile for a considerable period of time as a consequence of the crisis. In this situation, the introduction of a detailed and credible insolvency procedure could be seen as a signal for an imminent restructuring, which might trigger a new flight from peripheral government bond markets. Thus, there is an underlying dilemma with respect to the introduction of any sovereign insolvency procedure (Mody, 2013): calm and stable years would offer ideal conditions to establish transparent restructuring rules; but it is only during acute debt crises that the need for such rules is recognized.

Our proposal of a 'Viable Insolvency Procedure for Sovereigns' (VIPS) takes this dilemma seriously. It builds on the existing models (surveyed below) for the euro area but develops them further with a particular focus on the transition problem. It designs a realistic reform path based on lagged implementation which could overcome the dilemma described, thereby complementing the literature on proposals of statutory sovereign debt restructuring mechanisms for the Eurozone, which has traditionally treated the short-term challenges of the transition toward a new long-term system as an orphan.

On the one hand, VIPS avoids any sudden measures which could further destabilize the present fragile situation. Full effectiveness of the procedure is delayed until important objectives for the new institutional setup have been achieved and a more solid market environment (including a stabilized banking system, a functioning banking union and progress in cutting back public indebtedness) has been created. On the other hand, VIPS comprises immediate decisions and the beginning of phasing-in institutional

adjustments which are to make the (later) full introduction of the insolvency procedure irreversible.

In section 6.2 we will discuss why, under the specific conditions of EMU, a well-defined insolvency procedure is preferable to flexible ad hoc solutions. Subsequently (section 6.3), we review existing models for sovereign insolvency procedures with a focus on those developed for the euro area. Section 6.4 describes VIPS' long-run elements and section 6.5 its transition path, followed by a conclusion in section 6.6.

6.2 Ad Hoc Solutions versus Pre-Defined Procedures

The history of public debt (Reinhart and Rogoff, 2008) and the more recent experience with the European debt crisis clearly showed that sovereign countries may end up in a situation of insolvency.[65] There are two essentially different ways to deal with fundamentally insolvent members of the euro area: Either a bailout is organized through (open or hidden) transfers from other euro area members or debt has to be restructured. So far EU law has explicitly excluded bailouts but, at the same time, has shown no explicit interest in other options. Negating a solution based on transfers without offering a perspective on debt restructuring is a major inconsistency in the institutional framework of the euro area.

Opponents of statutory insolvency procedures argue that an insolvency procedure would unduly limit market participants (Gianviti et al., 2010). According to this view, the recommendation of non-binding 'Codes of Good Conduct' for creditors and borrowers or an agreement on CAC (collective action clauses) in bond contracts should be sufficient. However, solely relying on ad hoc solutions brings about challenges, which the proponents of euro area insolvency procedures stress (see for similar reasoning Gianviti et al., 2010; Committee on International Economic Policy and Reform, 2013; Mody, 2013).

Nowadays, public debt is predominantly financed through bonds, which are held by a large number of dispersed investors. This makes ad hoc negotiations between the borrower and the numerous creditors difficult and time-consuming. Collective action problems are notorious in this context. A first problem of that kind is related to the

[65] If one accepts the notion that multiple equilibria can drive solvent countries into illiquidity this insight does not negate the possibility of fundamental insolvency. However, the empirical distinction between illiquidity in a 'bad' equilibrium and fundamental insolvency is difficult in reality. An insolvency procedure has to deal with this difficulty. VIPS takes account of this challenge through its 'shelter period': see section 6.4.

downward dynamics in an acute debt crisis: without an insolvency procedure which equates losses for all creditors (and hence equates ex ante risks for investors), there is a detrimental first mover advantage (Roubini and Setser, 2004). By contrast, a defined procedure offers the prospect that, in case of illiquidity, rules will ensure equal treatment of creditors. This prospect can be a stabilizing factor in itself.

Pre-defined procedures can also address a second collective action problem: In ad hoc negotiations, single creditors have an incentive to refuse a debt settlement (holdout problem). The underlying coordination problem creates costly uncertainties and delays (IMF, 2013; Krueger, 2002).

CACs, which state that a qualified majority of bondholders' capital can take decisions binding for all bondholders, may alleviate but not necessarily solve these collective action problems entirely. Even with limited capital, holdout strategists could buy majorities (or blocking minorities) of single bond issues and litigate for full repayment. Assuming that this problem could be tackled through aggregation clauses in CACs,[66] these clauses still do not offer any hint as to the trigger of restructuring, the time perspective of negotiations, the expected loss in case these clauses were to be used, or ways of interim financing during negotiations. In sum, improved CACs may be a reasonable complement to a full insolvency procedure but they are no substitute.

While the aforementioned aspects apply to any regional context, the specific circumstances and recent experiences of the euro area strengthen the case for a defined procedure even more. The Greek insolvency became obvious in 2010. At that time, bondholders had no information about applicable procedures, the realistic final loss in case of a Greek default, or the time perspective for a settlement. This uncertainty created a massive rush to the exit, with immediate contagion to other country segments in the euro area government bond markets.

The fact that PSI (private sector involvement) was eventually achieved for Greece in 2012 hardly points toward the merits of ad hoc negotiations (Zettelmeyer et al., 2013). The long delay between the point in time at which Greece lost its bond market access and the implementation of PSI was effectively financed by taxpayers in other euro

[66] With current euro area CACs, which became mandatory as of 1 January 2013 in all newly issued euro area government bonds with a maturity of over one year, not only a majority of 75 per cent of capital invested in the aggregate but also an additional majority of at least two thirds in each individual bond have to be achieved (see Zettelmeyer et al., 2013). With this weak feature of a double majority, vulture funds could still easily accumulate bond volumes amounting to a blocking minority for a single issue which leaves the collective action problem as described rather unsolved.

countries. Maturing Greek bonds and the continuing primary deficit were covered by the new European loan facilities. The long-lasting uncertainties about a sustainable Greek debt settlement added to the dramatic and persistent decline of the real economy.

Apart from the Greek experience, general features of the euro area underline the need for well-defined procedures (Gianviti et al., 2010). European conditions are characterized by high real and financial integration, very high public debt levels (relative to world GDP) and a particular investor structure (with a heavy involvement of euro area financial institutions). All of these features increase both the risks and the complexities of any attempts at ad hoc restructurings. Therefore, relatively favorable experiences with ad hoc negotiations in the cases of insolvent developing or emerging economies (Das et al., 2012) are unlikely to apply in the euro area.

A key political argument put forward against a global insolvency procedure like the SDRM (Sovereign Debt Restructuring Mechanism, see below) is the decisive role of multilateral institutions like the IMF and the implied reduction of national autonomy. Such arguments are significantly less relevant in the institutional context of the European Union and the euro area (Gianviti et al., 2010). In the ongoing process of integration, member countries have already transferred substantial sovereignty to the European level. At this advanced stage of integration it would be a natural further step that a European institution plays a prominent role in an insolvency procedure.

6.3 Survey of Proposals for Sovereign Insolvency Procedures

The design of insolvency procedures is rooted in the proposals for statutory restructuring procedures for developing countries, which have been put forward since the 1980s (for surveys see e.g. Rogoff and Zettelmeyer, 2002; Das et al., 2012; IMF, 2013).

SDRM (Sovereign Debt Restructuring Mechanism)

A milestone in the debate, and the most prominent model so far, is the SDRM (Sovereign Debt Restructuring Mechanism) developed by Anne O. Krueger (2002). The SDRM was supposed to be established under the control of the IMF. However, the amendment to the IMF's Articles of Agreement, which had already been accepted by its board of governors, was never implemented (see Gianviti et al., 2010, for a summary of the debate over this proposal). The IMF (2013) argues that the necessary majority for an

amendment could not be achieved because many IMF members (including the US and important emerging market economies) were not willing to give up the degree of sovereignty needed to establish such a framework.

Krueger (2002) proposes four main elements of an SDRM to warrant equal treatment of all creditors and preserve asset values. First of all, and most importantly, she stresses the necessity of majority decisions (including aggregation across debt instruments) to overcome the collective action problem. Second, Krueger calls for a stay on creditor enforcement as well as payment moratoria while negotiations are underway, in order to ensure that these negotiations cannot be undermined by legal actions on the part of single creditors. Third, creditor interests must be protected by prohibiting the servicing of any junior claims. Fourth, any potential provision of new money during negotiations should be facilitated and incentivized by ensuring that these new credit lines would be senior to all pre-existing debt. Through the implementation of the SDRM, the IMF was to become the main institution for supervising and financing debt restructurings. The transition process toward full implementation did not receive much attention in the SDRM proposal. When designing the SDRM, the focus was on developing and emerging countries, where the perspective of debt restructuring is less sensitive for global systemic stability than in the case of euro area countries.

By its nature, the SDRM does not take into account the specific European conditions. Nevertheless, many proposals for the European context, including VIPS, refer to original ideas of the SDRM. Naturally, the earlier proposals could have been more creative with respect to institution-building while the more recent ones then took newly established institutions such as the ESM as given and as a building block for an insolvency procedure.

EMF (European Monetary Fund)

Gros and Mayer (2010) propose the establishment of an EMF (European Monetary Fund), which is supposed to provide conditional guarantees or loans to countries in need and manage a potential restructuring of the sovereign debt in question. Euro countries would capitalize the fund through weighted contributions which would increase with the debt and deficit-to-GDP levels once they violated the Maastricht criteria. Countries facing illiquidity, in a first step, could obtain EMF funds up to the amount they had contributed if their fiscal adjustment program had previously been

approved by the Eurogroup. In a second step, the country could call on more funds if it agreed to a customized adjustment program supervised by the European Commission and the Eurogroup.

In the case that none of the liquidity aid measures were effective, the proposal would allow for the restructuring of sovereign debt. The haircut should reduce the debt level to the Maastricht level of 60 percent of GDP. The remaining debt would be guaranteed by exchanging national debt against claims on the EMF, which would follow the construction of Brady bonds and which would credibly limit the losses of investors.

The proposal does not suggest specific precautions against the holdout problem and litigation. It does not refer to the transition problem, either. However, restructuring with the help of the EMF could only take place in the future, i.e. once the members' contributions have capitalized the funds of the EMF to a sufficient degree.

ECRM (European Crisis Resolution Mechanism)

The ECRM (European Crisis Resolution Mechanism) proposed in 2010 (Gianviti et al., 2010) has much in common with the SDRM but adapts it to European requirements. It consists of four main elements. First, euro area members would have to agree on a procedure to initiate negotiations between creditors and the debtor country. Second, the decisions made by a qualified majority of the capital (aggregated across all debt issues in question) would be binding for all creditors. Third, negotiations should be supervised or moderated by a politically independent judicial body. The authors propose establishing a new chamber at the European Court of Justice for this 'first body'. The 'second body' would provide analytical and financial assistance. These responsibilities could be taken up by the European Commission for the analytical part and by a permanent version of the EFSF for the financial assistance aspect (which would now be the ESM). The ECRM proposal does not contain any detailed discussion about the extent of restructurings. Furthermore, the ECRM does not pay any attention to the challenges of transition toward the new regime either.

EEAG Proposal for a New Crisis Mechanism for the Euro Area

In 2011, the EEAG (European Economic Advisory Group, 2011) suggested a new crisis mechanism for the euro area. As the establishment of the ESM was underway at the time, the EEAG saw the ESM as the central institution to provide rescue funds and

supervise fiscal adjustment programs. Their proposal of a three-stage procedure for Eurozone members in financial distress refers to different degrees of crises.

In case of (short-term) 'illiquidity' – i.e. in the expectation that a country will be able to refinance itself at acceptable conditions in the near future – a euro area member country should be supported by means of short-term loans with a maximum maturity of two years provided by the ESM. The maximum volume should only cover a deficit that is in line with the Maastricht criteria and the country would have to undergo fiscal reforms in order to balance its budget. After having received two years of fiscal aid, the country would not be eligible for assistance throughout the following five years. Should it nevertheless need new funds, it would have to declare 'pending insolvency' and thereby would reach the next step.

In the case of 'pending insolvency' the authors first rely on a market solution. However, in order to make this solution viable, all bonds should contain CACs with aggregation rules in order to overcome the collective action problem. The country would have to negotiate a debt restructuring program with its private creditors. In the case that no agreement could be reached, the ESM, ECB (European Central Bank) and IMF would be called into the negotiation process. In this situation, however, there would be an automatic haircut in the nominal value of the bond. Only the size of the haircut would be subject to negotiation; in any case it should amount to at least 20 percent and at most 50 percent of the debt affected. Just like Gros and Mayer (2010), the EEAG advocates Brady bond type guarantees by the ESM of up to 80 percent of the new nominal value. The maximum exposure of the ESM should, however, amount to only half of the Maastricht debt ratio, i.e. to 30 percent of GDP.

In the face of 'actual insolvency', i.e. if the country was still not able to refinance its debt on the market at acceptable conditions after a three-year adjustment period, it would have to declare an outright debt moratorium for all of its outstanding debt and renegotiate all outstanding private debt. At this stage, the ESM would no longer provide financial assistance.

Details of a transition period are not specified in the proposal. However, the proposal acknowledges the fact that the banking sector may still not be able to absorb large debt reductions for the time being.

ESDRR (European Sovereign Debt Restructuring Regime)

The ESDRR (European Sovereign Debt Restructuring Regime) suggested by the Committee on International Economic Policy and Reform (2013) takes advantage of the newly implemented institutional framework of the euro area and the creation of the permanent ESM. Unlike earlier designs it contains well-elaborated legal details and precautions against holdout investors. The authors suggest defining the new procedure through an (already pre-formulated) ESM Treaty change and assigning a central role to the restructuring procedure including liquidity aid by the ESM.

Countries with a debt-to-GDP ratio of up to 60 percent (i.e. those in line with the Maastricht criteria) which were to face illiquidity would receive unconditional liquidity aid from the ESM. Those countries with a debt-to-GDP ratio of 60–90 percent would receive conditional funding and would quasi-automatically have to restructure their debt if the debt sustainability analysis suggested outright insolvency. Countries facing illiquidity/insolvency and having a debt-to-GDP ratio of over 90 percent would receive funding only after a prior (automatic) restructuring had taken place. Any restructuring should result in a debt-to-GDP ratio below 90 percent.

The ESM Treaty change would offer reliable protection against holdouts by granting the assets and revenue streams of ESM program countries immunity from judicial processes, recommended previously (Buchheit et al., 2013; Krueger, 2002). Furthermore the treaty change would comprise a supermajority rule according to which 75 percent consent of bondholders' capital aggregated across all issues would be a condition for an ESM-endorsed restructuring.

Compared to preceding proposals, the ESDRR has been developed with full awareness of the transition problem. The authors expect that, in the short run, their mechanism would trigger immediate instability, and therefore explicitly consider their model to be only a long-term solution.

The ESDRR, with its detailed legal provisions and the mentioned awareness of the transition problem, advances the literature. However, it does not yet offer a strategy on how to cope with time-inconsistency problems, which arise due to the postponement of the reform up to an uncertain date.

Contingent Convertible Bonds

The procedures described above rely on ex post negotiations which are to define the conditions of a restructuring after insolvency occurs. A different strand of proposals targets ex ante rules embedded in government bond contracts. Contingent convertible bonds ('cocos') would automatize restructurings conditional on certain quantified criteria (mainly public debt-to-GDP thresholds). They have been suggested by Barkbu et al. (2012) in a global and by Mody (2013) in a European context. Cocos have the obvious merit that they offer a swift and clearly predictable outcome once the contractual threshold is reached. However, an ex ante-defined formula can hardly be fully sufficient for all types of solvency shocks which a country may face. Hence, cocos can be regarded as a natural complement rather than a full substitute for a comprehensive insolvency procedure.

6.4 VIPS: Liquidity Provision and Insolvency Procedure

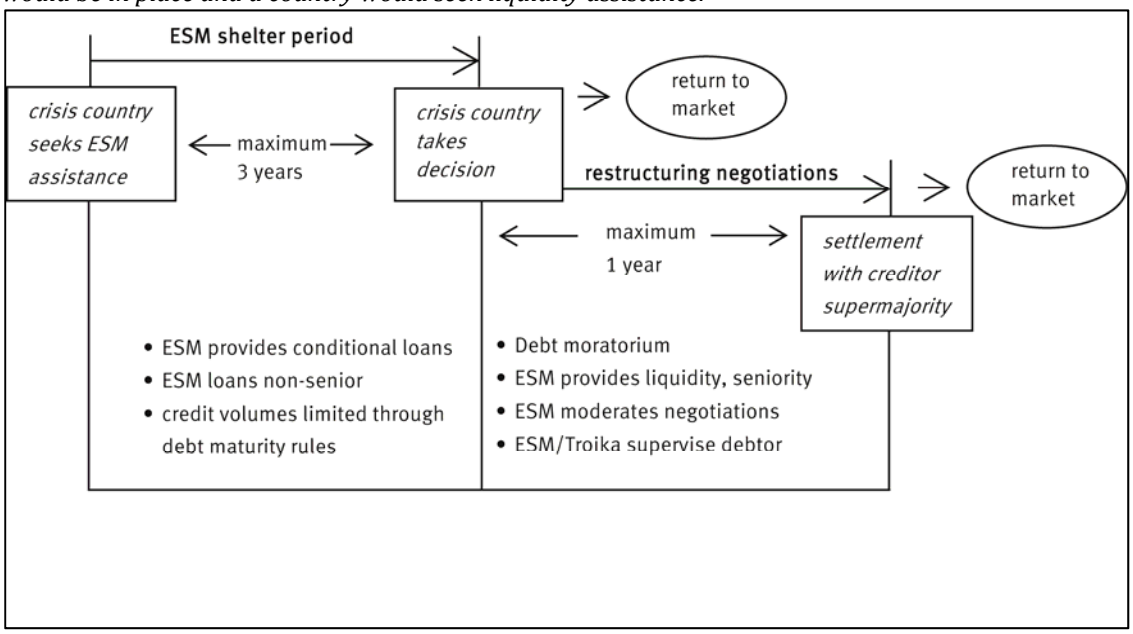
VIPS shares the understanding of the proposals described above that, under the conditions of EMU, a defined insolvency procedure is superior to reliance on ad hoc negotiations. It furthermore recommends a particular European approach for such a procedure. An international, IMF-centered setup could serve a similar function and may, compared to a European solution, have advantages. It might be less susceptible to the special interests of, e.g., European banks. However, the failure to establish SDRM indicates that such an international system is not available for the foreseeable future, whereas recent European innovations such as the ESM offer a promising starting point for the establishment of a comprehensive insolvency procedure. Finally, VIPS follows the assessment in the ESDRR proposal (also put forward by Mody, 2013) that the establishment of any insolvency procedure is a risky phase.

VIPS tackles this difficulty through lagged implementation: the details of an insolvency procedure are defined today, but the procedure will only become effective 'in the long run'. To this end, VIPS comprises two components: first, a design of a sovereign insolvency procedure which is to be established in the future; second, an explicit transition path, the 'VIPS bridge', into the 'long-run' stage. In this section, we first present the description of the ultimate regime and then we provide details on the bridge in the next section.

When designing an insolvency procedure for sovereigns the following fundamental decisions have to be taken: The procedure must comprise a trigger which defines the conditions under which the procedure is activated. It must define rules and set up institutions for the subsequent negotiations comprising the provision of liquidity in the negotiation phase. Specifically, the procedure should define how a decision on a haircut is to be taken and whether quantitative criteria can be defined to determine the extent of a debt restructuring. Furthermore, the insolvency procedure must minimize the risk of lengthy and costly litigation. The VIPS insolvency procedure tackles these issues as shown in Figure 6.1.

Figure 6.1: VIPS – The Long-Run Insolvency Procedure

This figure illustrates the timing of events once the long-run insolvency procedure of the VIPS-framework would be in place and a country would seek liquidity assistance.



Trigger

Any euro area member state could continue to rely on ESM assistance according to the rules as they exist today, i.e. loans conditional on consolidation and reform measures. Unlike today, the ESM would be the only source of emergency liquidity. The ECB would be relieved from backing the system up with its controversial OMT program, which comes close to the monetary financing of governments prohibited by the Maastricht constitution. A further major difference compared to the current situation is that, under the VIPS rules, ESM assistance would be strictly limited to a period of three years, the 'shelter period'. A time limit of that sort was suggested by Fuest (2011) and is

also roughly in line with the EEAG proposal (which suggests two years). It proved to be reasonable in the course of the euro area debt crisis. Three years were sufficient for a country such as Ireland to launch substantial reforms, to leave ESM assistance and to return to the bond markets for new loans. Subsequent to the shelter period, the debtor country has to choose between returning to the market and initiating the insolvency procedure. If the country does not consider market conditions for new bond issues to be acceptable, the only remaining option is to trigger the opening of the procedure with the objective of restructuring its debt. The scheme would hardly encourage a reckless and 'too early' use of the insolvency procedure as an easy escape from high debt levels. The conditionality of the ESM's liquidity assistance will indeed prevent any precipitous application for funds because it always comes at the expense of a substantial loss of autonomy. While a country is allowed to leave the ESM shelter earlier than the three-year period to return to the market, it may only seek restructuring after full compliance with all conditions of ESM aid over the full three-year duration. This precaution excludes the risk of debtor moral hazard and a too quick and convenient way out of high debt. Equally, the defined rules for the strict upper limit of three years for the shelter period would address the converse problem that insolvency procedures are often triggered 'too late' (IMF, 2013).

The shelter period has several further merits. It prevents short-run market turbulences from forcing an immediate debt restructuring; thus, it limits the damaging potential of a temporary bad equilibrium driven by market panics. Moreover, the shelter period can lead to higher availability of information on the fundamental situation of the debtor country, which will make multiple equilibria less likely and, hence, reduce uncertainty (Morris and Shin, 2001).

The time limit prevents a system designed primarily for liquidity assistance from degenerating into a permanent transfer mechanism. Moreover, the shelter period also helps to clarify the underlying causes of an acute liquidity problem. In reality, it is difficult to theoretically distinguish between a situation of panic-driven illiquidity and fundamental insolvency. If this decision was based on a simple debt-to-GDP threshold like in other proposals, it would be arbitrary and might provoke premature restructurings. The temporary protection over three years provided in the VIPS procedure would be highly informative. If a government, in spite of three years of

assistance, was unable to return to the market, this could be seen as a strong indication of fundamental insolvency.

Finally, the shelter period would reduce the risk of contagion (Fuest, 2011). If the activation of the insolvency procedure for one country is seen as a precedent for other euro countries some time thereafter, these other countries could benefit from the full shelter period themselves. Hence, the occurrence of multiple simultaneous restructurings and the resulting massive stress for financial stability could be avoided.

Negotiations

In the VIPS design, the ESM is the institution responsible for moderating negotiations. For that purpose, the ESM establishes and heads a committee composed of representatives from the debtor country and the group of creditors. The ESM must have veto power in all restructuring decisions since its own loans from the shelter period are also at stake. Through the ESM the interests of all guarantors (all euro member states) are represented. The ESM may rely, for all negotiations and underlying analyses, on the support of the 'Troika' (European Central Bank, European Commission and IMF), as it does today. Continuing involvement of the International Monetary Fund is not required for the procedure but may be desirable due to the Fund's expertise. Here, the VIPS design is open for a differentiated institutional structure along the lines of the ECRM proposal, which envisages different bodies. While the ESM is the body providing financial assistance, and also the natural candidate to moderate negotiations, the ECB and the European Commission would be the natural candidates to take up the analytical responsibility.

The start of the procedure has the following consequences, which correspond to the main elements of insolvency procedures such as the SDRM proposal, with the difference that the ESM steps in for the IMF in the SDRM blueprint:

- When starting negotiations, an immediate moratorium on the debtor country's debt service takes effect in order to protect the interests of the collective of creditors. Such a standstill on private and public investors could be made legally binding for all debt contracts issued in euro area jurisdictions.[67]

[67] Buchheit et al. (2013) formulate a potential amendment to the Treaty Establishing the European Stability Mechanism, which has also been taken up by the Committee on International Economic Policy and Reform (2013).

- The ESM (possibly assisted by the Troika) is responsible for supervision of the debtor country in order to prevent it from impairing the value of its assets.
- During the negotiation phase, the ESM provides the liquidity which is necessary to guarantee basic governmental functions. The extent of this intermediate financing is defined in a bilateral agreement between the ESM and the debtor country. The maximum duration of this liquidity assistance is 12 months, which, consequently, is also the maximum time span that restructuring negotiations may last.

Extent of Restructuring

A pre-defined mechanical formula for the extent of a haircut is neither realistic nor conceptually convincing. Restructuring negotiations are subject to a complicated trade-off: too modest debt relief may prevent the debtor country from returning to the bond market and a too generous haircut would unduly impair the interests of creditors. During the negotiations, it is the responsibility of the ESM (with the assistance of the Troika) to strike the right balance between these two extremes and take account of the economic conditions of each single case.

However, an insolvency procedure can offer a more effective expectation anchor if it includes a rule which indicates the possible maximum loss. Similar to the EMF proposal, the following rule should be enshrined in the VIPS procedure: under no circumstances should the debt settlement push the debt-to-GDP ratio below the Maastricht reference value of 60 percent. Haircuts which leave subsequent debt levels above 60 percent should remain possible if the debtor country is deemed to be solvent with higher debt levels, for example due to a favorable growth perspective or high assets. Linking VIPS to the Maastricht debt-to-GDP reference value would not only stabilize expectations of the maximum loss in case of sovereign insolvency; it would also increase sensitivity to risk premia and increasing debt levels, in particular for levels exceeding the 60 percent limit. Market discipline and the reformed SGP would then both consistently sanction debt levels above that limit.

ESM loans from the shelter period have to be included in the debt restructuring, which is a fundamental difference compared to earlier proposals like the ESDRR or the EEAG proposal. We regard this taxpayer risk exposure as unavoidable. A preferred creditor status for ESM loans provided over the shelter period would damage the

stabilization chances of that construction. In the case of seniority of ESM claims, the quality of private loans to a crisis country would continuously deteriorate with the increasing share of ESM loans. A similar problem occurred with the implicit seniority of Greek bonds purchased by the ECB since 2010 (which actually did not take part in the PSI in 2012; see Mody, 2013). The potential losses for the ESM (and, hence, taxpayers) should, however, be limited by appropriate rules on the maturity structure of government bonds, which would limit the liquidity needs within the shelter period and also contain creditor moral hazard. The latter issue arises since ESM financing offers insurance to investors who then could expect to pass on their losses to the taxpayer during the ESM shelter period. Obligatory long maturities limit this problem. Equally, a requirement of a minimum share of 'cocos' (see section 6.3 above) would further reduce the costs and disincentives of ESM protection. Such new rules would hardly constrain the politicians currently in power because debt contracts would only be penetrated by these features over time, i.e. they can only be phased in over the course of several years. This makes severe political resistance less likely.

The waiver for preferential treatment of ESM loans must only be ensured for the loans from the shelter period, but not for the intermediate liquidity provided subsequently during the restructuring negotiations. These new loans should, in fact, have a preferred creditor status as they are provided only after the insolvency procedure has already been triggered and it therefore has become obvious that the crisis country does not suffer from a mere liquidity crisis.

Precautions Against Holdout Investors and Litigation

VIPS minimizes the risks and uncertainties from lengthy legal fights with holdout creditors by installing two precautions: first, the obligatory use of refined aggregation rules as an element of the euro area CACs; second, an adjustment of the ESM Treaty granting immunity of program countries' assets from any creditor attachment, thereby following the exact route of the ESDRR strategy.

Since 1 January 2013, the ESM Treaty has mandated CACs for all newly issued government bonds of euro countries with a maturity above one year (Benzler et al., 2012; Buchheit, Gulati und Tirado, 2013). These clauses state that majorities of bondholders are able to take binding restructuring decisions for all bondholders with the intention to preclude holdout strategies. Standard CACs only define majorities for

the individual bond issue and, therefore, are hardly effective in this regard. This merely brings the holdout problem to a different level instead of solving it once and for all. Even with limited capital, holdout investors could still buy blocking minorities of single smaller bond issues and successfully proceed with their strategy. Aggregation clauses can thwart potential holdouts since they define majorities across all bond issues whose decisions are binding for each single issue. With the current euro area CACs, not only a quorum of 75 percent of capital invested in the aggregate but also an additional majority of at least two thirds in each individual bond must be achieved (Zettelmeyer et al., 2013). With these weak features, vulture funds could still easily accumulate bond volumes amounting to a blocking minority for a single issue.

For that reason, CACs as prescribed in the ESM Treaty must be revised to a stronger aggregation principle. Bond-by-bond quorums must be deleted completely with the aggregate quorum being the necessary and sufficient condition for binding creditor decisions, and the aggregate quorum should be reduced to two thirds of the capital invested. Even if such single majority aggregation CACs were to be included right away, it would take some time until these rules penetrate a significant amount of public debt contracts. Hence, current politicians would hardly constrain themselves.

The risk that lawsuits against restructurings can be successful at courts in third countries (such as the US) or would at least imply lengthy legal uncertainties can be addressed through a further adjustment of the ESM Treaty (Buchheit et al., 2013; Committee on International Economic Policy and Reform, 2013). A new provision should grant immunity from creditor attachments to the assets of euro area countries which participate in an ESM supported adjustment program.[68] Such an amendment would be sufficient to comprehensively exclude legal risks.

6.5 VIPS: The Bridge

VIPS would expose private creditors of euro countries to significant potential losses if these countries were to end up in insolvency. Hence, VIPS' prompt and full implementation would possibly cause concerns about the quality of euro area government bonds in general. This regime change could induce new turbulences and market panics, which might lead to a new acute debt crisis. Therefore, VIPS' full

[68] See Buchheit, Gulati and Tirado (2013, p. 8) for a precise suggestion for the wording of a respective new article taken up by the Committee on International Economic Policy and Reform (2013, p. 40).

effectiveness requires an environment which is resilient and characterized in the following way:

- The European banking union needs to be established and fully operational.
- Bank claims against sovereign debtors no longer benefit from regulatory privileges. Claims vis-à-vis sovereigns have to be backed-up with equity just like claims vis-à-vis private debtors (of comparable creditworthiness) and are subject to the same rules in order to prevent risk concentration (like upper limits on large value credits).
- Fiscal recovery has made considerable progress. Debt-to-GDP ratios are down substantially compared to crisis levels and reach maximum values in the range between 60 percent and 100 percent for the most compromised countries.
- The remaining public debt is financed with long average maturities. As a result, the annual refinancing need of euro countries is moderate. This long-run debt structure limits the maximum credit volumes required, if ESM financing is needed for the three-year shelter period.
- A significant part of (but not necessarily the total) volume of debt would need to be penetrated by the abovementioned refined CACs.
- Monetary policy is disburdened from its controversial role in the provision of emergency liquidity. The ECB's OMT program is scrapped.

In such an environment, the conditionality of ESM liquidity funding as well as the maximum duration of the shelter period would indeed be credible, because systemic risks of a sovereign debt restructuring at the end of the shelter period would be reduced significantly and a perspective of monetary financing which could replace ESM loans would no longer exist.

Obviously, the current situation is still far from being shaped by such resilience. However, delaying any reform and waiting for better times is no option, as lacking a procedure for dealing with an insolvent euro member country is a risk factor in itself. VIPS' solution for that dilemma is based on the principle of lagged implementation through the construction of a transition path, the 'VIPS bridge'. Other concepts lack this bridge. Even the ESDRR, which pays attention to the transition problem, simply delays any reform until the legacy debt problem has been dealt with (Committee on

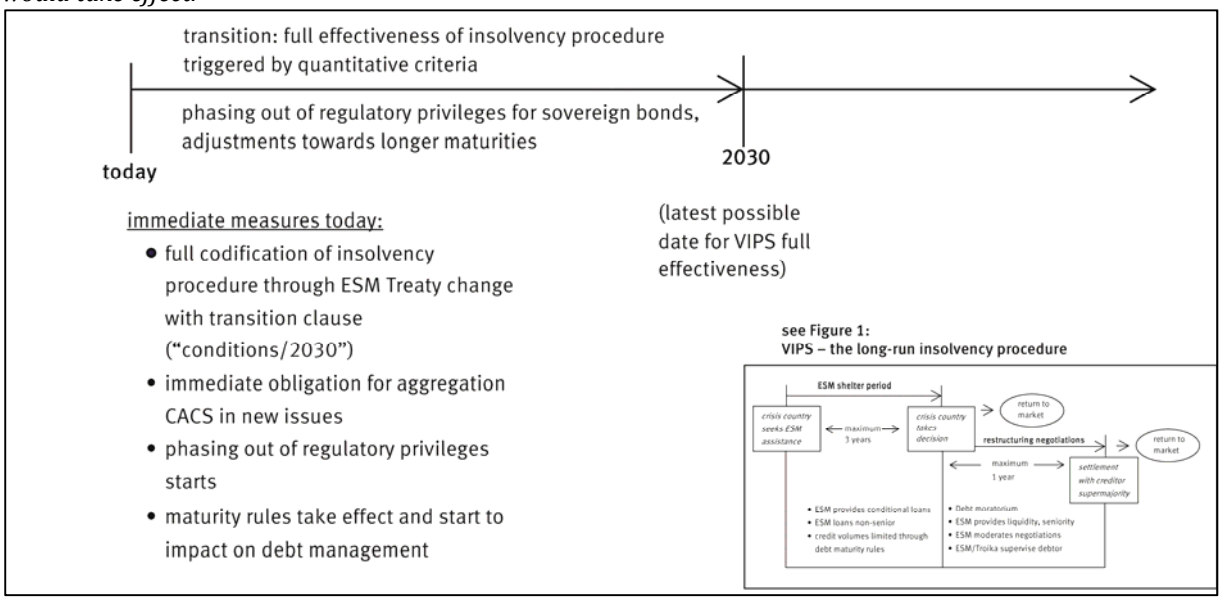
International Economic Policy and Reform, 2013) – a solution which would obviously be confronted with time-inconsistency problems and lack of credibility.

By contrast, VIPS pays close attention to the time-inconsistency problem. The VIPS bridge fosters immediate irreversibility by setting the course for the new regime today. Such a model of lagged implementation creates precedents for the future and makes use of the current crisis-related opportunity to implement reforms (Buchanan, 1994) without destabilizing the currently still fragile financial situation.

A critical condition for the success of lagged implementation is the irreversibility of the reform decision. With the approaching deadline for full effectiveness of the pre-announced new regime, resistance could grow and finally impede full implementation. Against the backdrop of this strategic difficulty, VIPS offers the guarantees shown in Figure 6.2 as a bridge into the long-run solution.

Figure 6.2: VIPS – The Bridge

This figure illustrates the transitory phase until the long-run insolvency procedure of the VIPS framework would take effect.



The insolvency procedure, as described in the preceding section, would be codified in all details through an amendment of the ESM Treaty today. In this amendment, one article would stipulate that this defined insolvency procedure only takes effect on a pre-specified date. Hence the phasing in of the new regime would be determined by international law and the unanimity requirement for any treaty changes offers protection against later reversals.

The date for full implementation is to be defined in the following way: The VIPS insolvency regime becomes fully effective no later than a fixed date (e.g. starting with the year 2030) or earlier, if the average euro area government debt-to-GDP ratio has fallen below a critical value (e.g. 80 percent from currently 96 percent) and the European Resolution Fund for banks has reached a certain capitalization level. Further quantifiable criteria relating, e.g., to bank capitalization could be added. It is crucial that such conditions are quantifiable without any significant margin of interpretation.

The fixed date defines the latest possible date for the regime change. It has the function of a fallback condition in case politicians were to try to strategically delay the fulfilment of the quantifiable criteria. Criteria-guided effectiveness of the insolvency procedure clearly is the preferable scenario. It would imply that the full VIPS implementation occurs in a friendly financial and fiscal environment. Times in which public debt levels fall tend to be times in which government bond markets are stable.

The transitory phase of the ESM Treaty change and the move toward final full effectiveness of VIPS in the future must not be misunderstood as a phase during which restructurings of sovereign debt are precluded. Certainly, ad hoc restructurings as in the case of Greece remain an available option throughout the transition path, which is defined by the VIPS bridge. The ESM Treaty change must avoid any contents which could be mistaken for a signal indicating guarantees against restructurings in that transitory phase.[69] Ad hoc restructurings in the transitory phase may also be used to apply certain elements of the long-run regime such as giving the ESM a key role in negotiations. This would allow for institutional learning and also contribute to backing the credibility of the future regime change. However, the ultimate frameworks of VIPS can only be fully available at the end of the transitory phase.

Immediately changing the ESM Treaty would be an important, but not the only, precaution against the time-inconsistency problem. Several accompanying measures would emphasize the irreversibility of the transition path starting from today. With immediate effect, the ESM Treaty change would define a more convincing aggregation clause as an obligatory element of the euro area CACs for all government bonds issued in the future. The ESM Treaty change should also include precise prescriptions for the maturity structure of new government debt issues. The transitory phase toward full

[69] In this regard, no grandfathering clauses for bonds issued before the full effectiveness of the insolvency procedure must be granted. Once the final VIPS provisions were fully effective, all future restructurings would relate to all outstanding bonds.

VIPS effectiveness should go hand in hand with the phasing-out of regulatory privileges for sovereign debtors with respect to bank and insurance capital requirements.

Thus, the credibility of the VIPS bridge is firmly grounded on two pillars: first, the precise determination of full VIPS effectiveness through a change in the ESM Treaty which employs the commitment devices of international law; second, immediate reforms which already launch the (quasi-) irreversible regime change.

An underlying assumption of the VIPS bridge is that the state of public finances can be improved in the transitory period to such a degree that euro area government bond markets will finally cope with the regime change. VIPS is no substitute for any strategy which addresses excessive debt today. Possible strategies in this respect comprise perseverant consolidation, growth policies, financial repression, or surprise inflation. In addition, one-off measures have been suggested in a complementary strand of literature which discusses the potential, e.g., of a partial and transitory collectivization of debt through a European Debt Redemption Fund (Sachverständigenrat, 2011, pp. 109-118) or an involvement of the ECB as suggested through the PADRE plan (Pâris and Wyplosz, 2014). A successful VIPS bridge requires that, in the meantime, some of these strategies or a combination will be successful to bring debt levels down significantly.

6.6 Conclusion

VIPS would contribute to fostering the credibility of the no-bailout clause and would countervail the deficit bias of budgetary decision-making, which has contributed to the pile-up of unsustainable government debt in euro area countries. It would build a bridge toward a more consistent institutional architecture for the euro area.

In particular, it offers a model to deal with insolvent member countries in the future while paying attention to the current fragility. It avoids any abrupt institutional change at present, but does not simply delay reforms for an indeterminate duration. It makes use of the reform momentum of the current crisis to initiate a cautious but steady and irreversible reform transition. And with respect to the stuck debate on an international insolvency procedure governed by the IMF, VIPS could serve as a blueprint for a more comprehensive global insolvency system.

Of course, chances for the model's political realization are uncertain. The current temporary calming of the situation may dampen the sense of urgency and therefore the readiness for reforms. Governments are always reluctant to accept reforms which would

increase financial market constraints for their borrowing. On the other hand, VIPS promotes a responsible use of deficit finance: for countries with sustainable debt levels, it offers reliable protection against the risks of liquidity crises. Furthermore, its construction is fully consistent with the new euro area fiscal governance (the reformed SGP and the Fiscal Compact). All of these innovations stress the Maastricht 60 percent objective for the debt-to-GDP level and, under VIPS, countries which respect that objective would not be at risk of becoming subject to potential restructurings. Hence, political resistance against VIPS is inconsistent, assuming that governments take the recent reforms of fiscal rules seriously. Apart from that, the lagged implementation inherent in VIPS is helpful to overcome potential political resistance: by accepting VIPS and the VIPS bridge, today's governments would not tie their own hands but those of their (distant) successors.

A well-defined insolvency procedure would also remove one of the obstacles on the way toward a consistent fiscal union for the euro area. It would make the upper limits on collective guarantees provided by the ESM credible, harden national budget constraints and thus set stronger incentives for sound national fiscal policies. At the same time it could foster acceptance of more ambitious fiscal union projects such as euro-wide fiscal insurance systems which counteract asymmetric shocks and their dangerous self-enforcing effects in a monetary union (Allard et al., 2013). Without a credible insolvency procedure, the concern that fiscal insurance turns into transfers undermines any acceptance of such ambitious reform proposals. Therefore, VIPS must not be misunderstood as part of a reform strategy which would preclude more European solidarity and macro-economic stability. On the contrary, this blueprint could be a decisive step toward a comprehensive fiscal union built on the consistency between national fiscal responsibility and European insurance.

7. CONCLUDING REMARKS

The dissertation at hand studies several aspects of recent debates as well as actual changes and reforms in the spheres of financial market and fiscal policy. Each of the aspects considered is in one way or another concerned with the issue of financial stability, which is, with regard to the recent sequence of crises, at the core of the regulatory and supervisory discussion in Europe. Many economists, politicians and practitioners tried and still try to design an incentive compatible regulatory and supervisory environment for financial intermediaries and sovereign states, which ideally should be able to foreclose moral hazard but at the same time allow for an appropriate degree of risk sharing within the European community. In the attempt to contribute to this undertaking, the thesis assembles five essays on financial market and fiscal policy.

The thesis starts off with **the question whether and how the global financial crisis and the policy reactions (especially bank rescue measures and regulatory tightening) have changed the quality and quantity of (German) banks' international activities.**

Using a new and comprehensive data set on the foreign activities of German banks, Chapter 2 shows that these banks have reduced their international assets during the crisis, both along the extensive (number of affiliates abroad) and the intensive (volume of foreign activity) margin. This partial withdrawal from foreign markets is found to be the result of changing market conditions due to re-regulation as well as direct policy interventions during the crisis. If the ongoing re-regulation permanently changes banks' funding possibilities, part of the downward adjustment is likely to be of permanent nature. Similarly, to the extent that decreased international activities can be traced back to closures of foreign affiliates, they are also likely to be persistent.

The sensitivity of German banks towards international financial frictions generally remained fairly stable over time. However, trade-related finance has become more important – at least during the crisis. Whether this type of international banking activity will continue to play an important role has to be shown by future research, when more and even better data are available.

The policy reactions to the global financial crisis and the Great Recession, which featured bank rescue measures and fiscal stimulus programs, as well as the effect of automatic stabilizers with falling revenues and rising expenditures during the crisis led to a worsening of public finances in many European countries. For the sake of fiscal sustainability, most of them introduced new or revised and strengthened existing fiscal rules to limit public deficits more effectively. In this context, the thesis addresses **the question of whether the German constitutional 'debt brake' is credible at the subnational Länder level. It investigates what influences policy makers' expectations regarding compliance with the debt brake in terms of Länder characteristics, party ideology and individual characteristics of the members of parliament**.

Chapter 3, therefore, first presents a dynamic theoretical model characterized by lagged implementation of the new rule, which raises credibility issues. The hypotheses from this model are then tested with the help of empirical probit estimations using a unique self-conducted survey among members of all 16 German state parliaments. The heterogeneity of compliance expectations corresponds to the theoretical hypotheses: Compliance is more likely, (i) the lower is the initial deficit (ii) the lower are bailout expectations of Länder politicians (vis-à-vis the federal government), (iii) the tighter is the future fiscal rule, and (iv) the higher is the current deficit reduction. Additionally, the paper finds a robust asymmetry in compliance expectations between insiders (in-state politicians or members of incumbent governments) and outsiders (out-of-state or opposition politicians), which can be attributed to overconfidence rather than noisy information on the basis of the empirical findings.

Due to the limited revenue autonomy of German Länder, adherence to the debt brake has to be achieved to a large extent via the expenditure side, which restricts policy leeway at the Länder level. Thus, **the third question addressed in this thesis revolves around the preferences of Länder politicians with respect to subnational revenue autonomy and the appropriateness of the current German fiscal equalization scheme.**

Again, using a self-conducted survey of Länder politicians of all 16 German states, the results of ordered probit estimations in Chapter 4 hint at the joint importance of ideology and jurisdictional vested interests. Estimation results are also used to simulate

which type of reform would garner the necessary support in Germany's Upper Chamber, the Bundesrat. Länder legacies (like high debt levels) seem to be especially crucial for the understanding of reform resistance. Hence, there would be potential for political bargain in this field.

The European sovereign debt crisis has demonstrated that statutory fiscal rules may potentially prevent but cannot solve acute liquidity and debt sustainability problems of sovereign countries. In such a situation, the illiquid country either has to rely on financial aid from international institutions and third countries or it has to renegotiate the debt contracts with its private and public creditors. History has shown that, for the case of sovereign debt renegotiations, many countries had to restructure several times in a row. Hence, the dissertation tries to answer **the question which restructuring features potentially affect the probability of serial sovereign debt restructurings.**

Using Cox (1972) proportional hazard models and a comprehensive dataset on sovereign debt renegotiations provided by Cruces and Trebesch (2013), Chapter 5 finds that greater debt remissions decrease the probability of serial restructurings. Furthermore, reductions in net present value due to outright face value haircuts reduce the probability of serial restructurings more strongly than equally sized reductions in net present value due to maturity extensions and/or interest rate reductions.

Finally, the thesis acknowledges the fact that the European sovereign debt crisis has not yet been overcome and argues that the European institutional framework is still missing a credible mechanism that leads to the internalization of credit risk on the part of private creditors of sovereign countries. Thus, Chapter 6 of this thesis presents a **proposal of a statutory restructuring framework for sovereign countries in the euro area that would be suited to (re-)establish the lacking market discipline**. The chapter specifically analyzes political and economic hurdles to the implementation of such a restructuring framework.

The Viable Insolvency Procedure for Sovereigns in the euro area combines and refines existing proposals (e.g. Krueger, 2002; Gros and Mayer, 2010; Gianviti et al., 2010; European Economic Advisory Group, 2011; Committee on International Economic Policy and Reform, 2013). However, concerning the timing of the implementation and

the becoming effective of the specific procedure that is supposed to protect sovereign countries and their creditors in the long run, the proposal avoids any sudden measures that could destabilize the still delicate situation in the euro area. Instead, it carefully designs an irreversible and credible transition path towards the new regime characterized by lagged implementation (Buchanan, 1994).

All in all, the dissertation has shown that fiscal and financial market policies are not being implemented in a politically empty space. Even though certain policies may be completely rational and reasonable in pure economic terms, they may not be implemented or, if they are, they may not have the intended effects, if the politico-economic circumstances are not taken into account properly. The reactions of banks, the expectations, preferences, and the striving for power of political decision makers, or the perceptions and sensitivities of private and public creditors of sovereign countries must always be considered when designing specific policies and reforms. Thorough (politico-) economic research with respect to relevant and specific policy options is essential to be able to evaluate their desired and actual impact before, during and after the implementation of these policies.

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