



Explaining Variation in Public Debt

Andreas Eisl

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A Quantitative Analysis of the Effects of Governance

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Abstract

This paper examines the main political influence factors accounting for the variation in public debt accumulation on a global scale. This allows for a reassessment of the recent focus on a regime type theory of public debt and for a test of an alternative governance theory. I argue that political stability, the rule of law, the control of corruption, government effectiveness, and regulatory quality promote lower public debt accumulation by reducing the incentives for governments to “borrow from the future,” by increasing state capacity to collect taxes and effectively use public funds, and by providing more security and equity to private investment, inducing higher economic growth and tax revenues. Both theories are tested against a number of controls stemming from theories of public choice, theories of governmental distributional conflict, as well as from politico-institutional and macro-economic explanations of public debt accumulation. Applying different specifications of quantitative models, the two governance indicators political stability and regulatory quality show consistent effects on public debt accumulation, partly confirming the proposed governance theory. Furthermore, the paper can reproduce a public debt-reducing effect of more democratic regime types across a number of model specifications – though without a high degree of robustness.

Keywords: Public debt, governance, regime type, quantitative analysis.

Résumé

[Expliquer la variation de la dette publique par la gouvernance ? Une analyse quantitative] Cet article examine les principaux facteurs politiques d'influence expliquant la variation de l'accumulation de dette publique selon les pays. Ceci permet de reconsidérer les explications en termes de théorie des régimes, actuellement privilégiées, et de mettre plutôt à l'essai une théorie de type gouvernance. L'idée est que la stabilité politique, l'État de droit, le contrôle de la corruption, l'efficacité administrative et la qualité de la réglementation favorisent une moindre accumulation de dette publique en réduisant la tentation des pouvoirs publics d'« emprunter aux générations futures », en accroissant la capacité de l'État à collecter l'impôt et à utiliser efficacement les fonds publics, et en offrant à l'investissement privé davantage de sécurité et d'équité, ce qui induit une croissance économique et des recettes fiscales plus élevées. Les deux théories sont mises à l'épreuve au moyen d'une série de contrôles tirés de la théorie du choix rationnel, de la théorie du conflit de répartition des ressources publiques, ainsi que des explications politico-institutionnelles et macro-économiques de l'accumulation de dette publique. L'application de différentes spécifications de modèles quantitatifs fait apparaître des effets constants de deux indicateurs de gouvernance, « stabilité politique » et « qualité de la réglementation », sur l'accumulation de dette publique, ce qui confirme partiellement la théorie de la gouvernance proposée. On a pu en outre reproduire un effet de réduction de la dette publique des types de régime plus démocratiques pour plusieurs spécifications de modèle, mais avec un degré de robustesse peu élevé.

Mots-clés: Dette publique, gouvernance, régime, analyse quantitative.

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Explaining Variation in Public Debt: A Quantitative Analysis of the Effects of Governance

1 Introduction

The recent European debt crisis and its political and economic fallout have brought the question of public debt forcefully back to the center stage of research in international and comparative political economy. This renewed interest refuels a debate that first flared up in its full intensity with the Latin American and African debt crises of the 1980s (e.g., Avery 1990). Together with the rising public debt levels in the developed world after the first oil shock in 1973, the debt crisis in the developing world brought scholars together in the search of factors that could explain why countries would indebt themselves, why some countries would indebt themselves more than others, and how this rise in public indebtedness could be addressed by political and economic decision-makers (Alesina and Tabellini 1990).

Research efforts in the public choice tradition called the tendency of countries to accumulate debt the “public deficit bias” and have tried to explain this phenomenon by means of two main mechanisms. First, they identified self-interested politicians as creators of fiscal illusion (Buchanan and Wagner 1977), and second, they named inter- and intragovernmental distributional conflicts between governments and constituencies over the common pool resource that a public budget constitutes (e.g., Brender and Drazen 2013) as the causes of accumulated public debt. Scholars in this line of research subsequently suggested that certain political institutions might foster responsible and coordinated behavior among decision-makers and constrain self-interested action. Among academics in political economy more broadly, this has triggered a search for such institutions, – either already in existence or yet to be invented –, in order to explain the variation in public deficits and indebtedness (see Alesina and Passalacqua 2015 for an overview). Identifying and implementing these political institutions might help to reduce the risk of unsustainable deficits and subsequent public debt burdens.

However, most research efforts using political institutions to explain the variation in public debt have so far restricted themselves to specific country groups (e.g., the OECD) or to subtypes of public debt such as foreign debt, which limits our understanding of the decisive factors on a global scale. While a lack of data on specific types of political institutions might have played a role in the exclusion of a more encompassing perspective, a recently emerging literature has started to address this issue by focusing on the effect of a country’s “regime type” on its accumulation of public debt.

The so-called regime type argument comes in two strands, both of which argue that the higher the “degree” of democracy of a country’s political regime,¹ the lower the accumulation of public debt. The first approach, which can be termed an “elite-group security argument,” focuses on the differences in political “discount rates”² between democratic and autocratic governments (Easterly 2002; Oatley 2010). According to Oatley (2010), autocracies are more insecure about their future, which leads them to “borrow from the future” instead of profiting from continuous political rent incomes, augmenting public borrowing, and reducing public investments. The second approach, the “credible commitment argument” (Beaulieu, Cox, and Saiegh 2012; Saiegh 2005), stresses the advantage democracies gain on public bond markets through their more credible commitment to debt repayment secured by their constitutional system of checks and balances. Some authors, however, have challenged the latter argument, contending that it is elements of governance, such as the rule of law or secure property rights, rather than the regime type itself, that lower bond interest rates and subsequently public debt levels. Additionally, Oatley’s (2010) argument about insecurity seems difficult to generalize and may ultimately depend on the quality of governance, conditioning the likelihood of coups d’états.

Consequently, this paper aims at reassessing the regime type theory in light of an alternative governance theory, which I propose in order to explain the variation in public indebtedness between countries on a global scale. I suggest that five different dimensions of governance – political stability, the rule of law, the control of corruption, government effectiveness, and regulatory quality – taken from the Worldwide Governance Indicators (WGIs; Kaufmann, Kraay, and Mastruzzi 2015), as well as a composite index of these dimensions, can account for different degrees of public indebtedness. I claim that higher values of these governance factors lower political “discount rates,” resulting in less “borrowing from the future” by governments and more security of investment for private actors. Moreover, better governance provides incentives for a more effective use of funds by governments, raises their tax collection capabilities, induces more investment, and subsequently ensures higher tax revenues. In turn, all these mechanisms should lower public debt-to-GDP ratios.

To test this governance theory of public debt against the regime type theory, I propose one of the most comprehensive quantitative analyses to date in order to evaluate different political and economic explanations for the variation in public debt accumulation,

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- 1 In this paper, the term “political regime” refers to a country’s form of government, which operates according to a certain set of institutional rules and norms. A country’s regime type can be more or less democratic or autocratic. I approximate the regime type with different indices of democracy, mainly using the Polity IV index.
 - 2 Political “discount rates” refer to the degree of “forward orientation” of a (self-interested) government. Governments with a preference for the present and the short-term should tend to “borrow from the future,” while governments with a preference for the future and the long-term should tend to “invest in the future.” When I talk about the effect of the regime type of a country on its bond interest rates, I do not use the term “discount rate.”

including up to 176 countries from 1996 to 2014. I integrate a number of competing theoretical arguments (depending on data availability), including other politico-institutional explanations, public choice accounts, theories of governmental distributional conflicts, and macroeconomic explanations of public debt. The quantitative analysis entails different specifications of multivariate fixed effects regressions and error correction models with panel-corrected standard errors.

The findings show that higher values of *political stability* and *regulatory quality* have a consistent public debt-reducing effect across a large number of econometric models. The indicators of *rule of law*, *control of corruption*, and *government effectiveness*, as well as the composite index of governance, however, do not seem to be significantly related to public debt accumulation in most of the quantitative analyses, partly reducing confidence in the proposed influence of governance on reducing public debt accumulation on a global scale. The findings further reproduce a public debt-reducing effect of more democratic regime types on public debt levels across several specifications of the empirical models; however, these findings lack robustness using different operationalizations.

This paper is organized in the following order. The second section immediately below reviews the current politico-economic literature aimed at explaining variation in public indebtedness, with a special focus on institutional factors. Building on this review, the third section proposes a governance theory of public debt, laying down the expected causal mechanisms at work. Subsequently, the fourth section presents the data and methodology used to test the different theories at hand. The fifth section then shows and analyzes the empirical evidence using various sets of panel regressions. Finally, the sixth section sums up the findings and provides a short outlook for future research.

2 Explaining variation in public debt

Political and economic explanations of public debt accumulation can be largely grouped into four different categories. *Macroeconomic explanations* provide a useful starting point for understanding public debt by pointing out its possible positive and welfare-improving function. In this view, the government acts as a “benevolent social planner,” using public debt to realize *tax smoothing* (Barro 1979),³ *consumption and investment smoothing* (see Kirchgässner 2013, 117), and *intergenerational redistribution and equity* (see Alesina and Perotti 1994, 13ff.; Kronberger 2012, 7).

3 Budget deficits (and surpluses) can serve as buffers when revenues are either low or high (or spending either high or low) to improve general welfare.

Scholars have, however, largely abandoned such macroeconomic explanations for the variation in public debt in favor of theories of public choice and governmental distributional conflict. *Theories of public choice* stress the distortionary role of political agents in (mainly) democratic settings, who behave as opportunistic actors aiming for (re-)election or additional funding, leading to phenomena such as fiscal and bureaucratic illusion and political business cycles (see Buchanan and Wagner 1977; Niskanen 1971). As Alesina and Perotti (1994, 10–11) sum up Buchanan and Wagner’s (1977) model of *fiscal illusion*, voters “overestimate the benefits of current expenditures and underestimate [the] future tax burden ... when offered a deficit financed expenditure program.” In a similar manner, Niskanen (1971) highlights the role of *bureaucratic illusion* in determining and expanding the government budget. In this view, bureaucrats use their monopolistic control over information to hide the true costs of state provided programs and services by overstating the corresponding costs (Liu and Mikesell 2014, 347–48). Nordhaus (1975) puts forward a *political business cycle* model in which incumbent political actors use higher expenditures (usually financed by public debt and not by higher taxation) during election years to secure more votes in the upcoming elections.

Theories of governmental distributional conflicts focus on public debt accumulation caused by inter- and intragovernmental distributional conflicts (especially in democratic settings) and diverging government ideologies. *Intergovernmental approaches* emphasize the strategic and constraining role that public debt can develop on a temporal sequence of different governments. The higher the polarization between alternating governments, and the higher the likelihood of losing office (a form of government fragility), the greater the incentives will be for a current government to issue public debt (Alesina and Tabellini 1990, 403–4), enabling the current government to use additional resources to finance policy projects that it supports and binding the next government to reimbursing this debt instead of financing their own projects. *Intragovernmental approaches*, in contrast, focus on the distributional conflicts inside a government, mainly the role of increasing intra-party and intra-coalition polarization on public debt. Pinho (2004: 18) stresses the debt-increasing impact of coalition governments on public debt through the powerful veto position that each coalition party has to block budgetary proposals. *Government ideology* is equally suspected to play a role in explaining the variation in public indebtedness between countries. The literature is, however, divided over the question of whether economically left- or right-wing ideologies actually lead to higher public debt levels (see Breen and McMenamin 2013; Pettersson-Lidbom 2001; Pinho 2004).⁴

4 Counterintuitively to common perception, Pettersson-Lidbom (2001, 582) finds that “a right-wing government increases its level of debt by 15 percent, whereas a left-wing government decreases its debt by 11 percent” in the case of a “rather” certain replacement after the next elections. Other accounts on government ideology, in contrast, do not find a significant connection with public debt levels (see Breen and McMenamin 2013, 844; Pinho 2004, 29).

Taking the distortionary effects of political decision-making as given, *institutional explanations of public debt* point out which political measures and tools might help to alleviate them. These approaches highlight the role of budgetary and fiscal institutions, the regime type, the role of political stability and certainty, and factors such as corruption and mismanagement in determining public indebtedness. *Budgetary and fiscal institutions* constitute “all the rules and regulations according to which budgets are drafted, approved and implemented” (Alesina and Perotti 1994, 31). Among such rules and regulations are political institutions such as budgetary referenda (Kirchgässner 2001; 2013), deficit caps (Caballero and Yared 2010), balanced budget rules (Wagner 2012), and procedures of budget formation and approval (Alesina and Perotti 1994; Pinho 2004).

Regime type theories of public debt, in contrast, take a step back from the idea of distortionary democratic decision-making proposed by the literature reviewed above. Drawing on the work of Olson (1993) and McGuire and Olson (1996), Oatley (2010, 175) argues that democracies and autocracies have different political “discount rates,” which have an impact on a government’s borrowing and investment decisions. According to Easterly (2002, 1680), perceived or real insecurity about their future stay in power should lead autocrats to continuous “borrowing from the future” by using public debt to keep themselves in power – for example, by rewarding supporters. This equally lowers investments and raises consumption in comparison to democracies. Oatley (2010, 180) concludes that the incentive for governments to minimize the use of country assets and public debt for consumption instead of investment should grow in accordance with the enfranchisement ratio.⁵

Such regime type arguments are complemented by the debate on the *democratic advantage*. Originally brought up by North and Weingast (1989), this line of argument stresses the importance of constitutional checks and balances to solve commitment problems for the repayment of public debt. Through improved credibility, interest rates on public bonds should fall and reduce the need for debt financing (see also Schultz and Weingast 2003). Saiegh (2005) and Beaulieu, Cox, and Saiegh (2012, 715) find a democratic advantage in sovereign bond ratings, while Archer, Biglaiser, and DeRouen (2007) and Biglaiser and Staats (2012) deny such a link. The latter (Biglaiser and Staats 2012, 521) assume a possible confusion between the regime type and other political institutions explaining better bond ratings. They argue that “the democratic advantage for obtaining higher bond ratings comes from democratic regimes’ tendencies to have strong courts, adhere to the rule of law, and protect property rights compared to authoritarian regimes,” denying that autocracies could not have such political institutions. Moreover, Biglaiser and Staats (2012) find, in line with Archer, Biglaiser, and DeRouen (2007), that credit-rating agency bond raters are more interested in the stability of a

5 The enfranchisement ratio describes the population share that is allowed to participate in elections.

certain government system than in the regime type itself.⁶ These critical voices in the literature on the democratic advantage and concerns about the validity of higher political “discount rates” for autocracies led me to formulate a competing governance theory as an institutional explanation for public debt accumulation.

3 A governance theory of public debt

As the review above suggests, certain political institutions might act as powerful minimizers of the distortionary effects that self-interested action by policy-makers and distributional conflicts between them might have on public debt. While there has been much attention given to regime type arguments and the idea of a democratic advantage, scholars so far have not introduced a systematic governance theory to explain the variation in public debt accumulation on a global scale. Previous accounts have either studied a limited set of advanced or developing countries, merely using elements of governance as control variables, or have not directly focused on public debt as a dependent variable. The proposed governance theory of public debt provides a synthesis of these dispersed analyses (these authors are discussed in the respective subsections below). Before laying down the proposed causal mechanisms, I acknowledge, in the words of Kaufmann, Kraay, and Mastruzzi (2010a), that the term *governance* still lacks a “strong consensus around a single definition of governance or institutional quality.” Certain conceptualizations of the term not only include dimensions of rationality and efficiency, but also normative and ethical aspects (see World Bank 2009) that resemble the idea of “good governance.” Kaufmann, Kraay, and Mastruzzi (2010a, 4) navigate between the different possible scopes of the term *governance* and define it as “the traditions and institutions by which authority in a country is exercised.” This paper follows their definition, drawing on the five interrelated dimensions⁷ of *political stability*, the *rule of law*, the *control of corruption*, *government effectiveness*, and *regulatory quality* to explain the variation in public debt accumulation: I contend that these factors are able to minimize distortionary effects of policy-makers and distributional conflicts by having both constraining and enabling effects on public and private actors.

Political stability is the governance dimension most often ascribed a role in reducing public debt accumulation in the literature. Ağca and Celasun (2012, 200), as well as Grilli et al. (1991), deem it likely that political stability, and the quality of governance in general, have a positive influence on fiscal policies and reduce public debt levels.

6 According to Archer, Biglaiser, and DeRouen (2007, 358), some authoritarian governments appear even more stable than their democratic counterparts.

7 The sixth available dimension, *voice and accountability*, closely resembles the idea of the regime type. Hence, I exclude it from the governance theory and use it as a robustness check for the regime type.

Borensztein et al. (2004, 19) conclude, using rather exploratory methods, that political stability is correlated with lower domestic public debt-to-GDP ratios. In the case of public bond ratings, Archer, Biglaiser, and DeRouen (2007, 354), however, reject a significant influence of political stability.

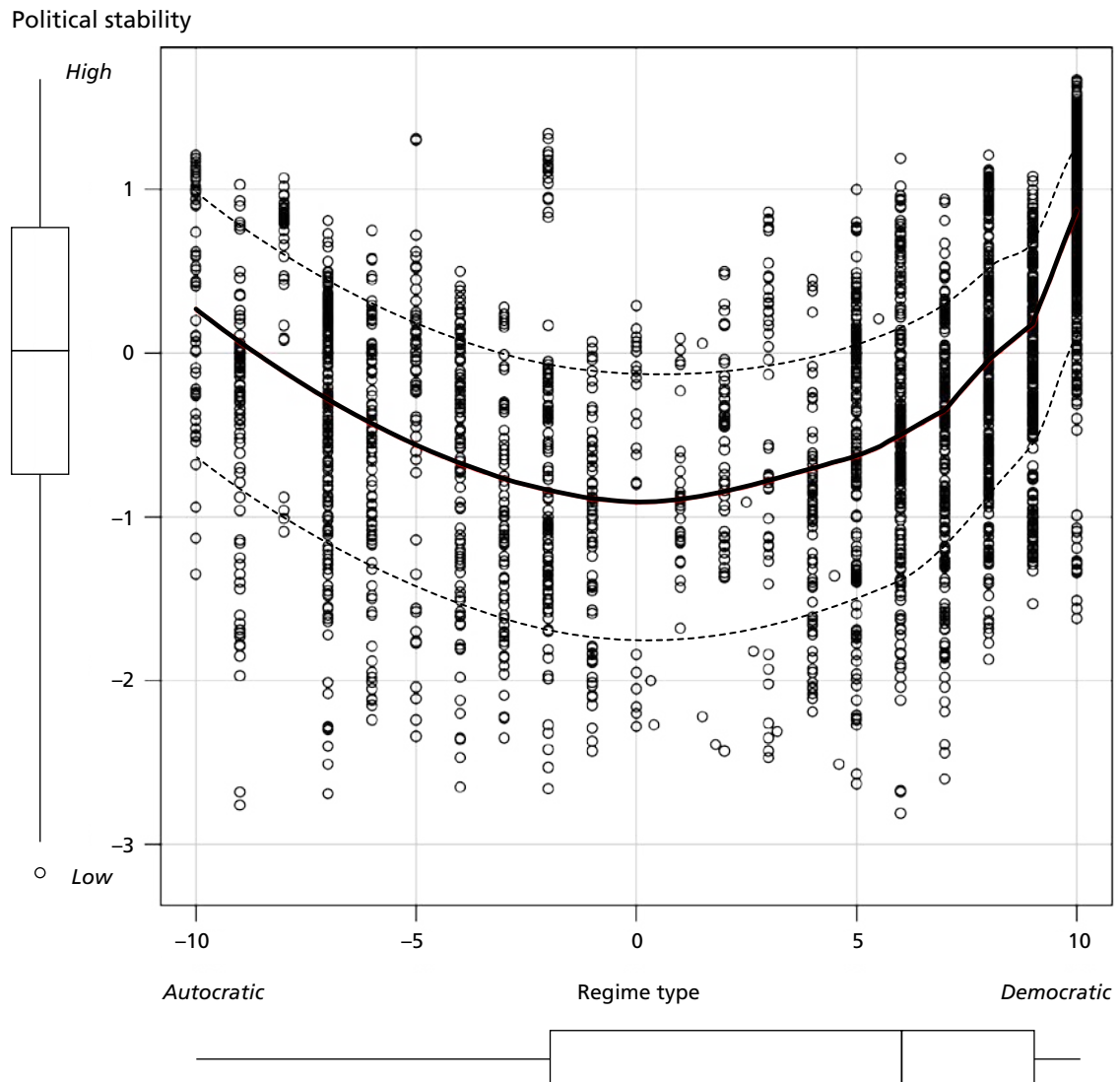
Several authors (Easterly 2002; Oatley 2010; Olson 1993) argue that political stability is an inherent feature of more democratic regimes, while Biglaiser and Staats (2012, 521) and Archer, Biglaiser, and DeRouen (2007, 358) negate such a relationship in their analyses of public bond ratings. To address endogeneity concerns, I made a simple scatter plot using the WGI's variable for political stability (Kaufmann, Kraay, and Mastruzzi 2015) and the Polity IV (2015) index (measuring the regime type) with data on 176 countries from 1996 to 2014 (Figure 1) to graphically discern the actual relationship between the two indicators. The scatter plot displays a rather U-shaped distribution: the more democratic or autocratic the regime type of a country, the higher its political stability, which justifies the use of political stability as a distinct independent variable. The quartiles of the box plot of the regime type in the scatter plot reveal that the distribution is leaning more towards the right-hand side, meaning that the distribution of the regime type is tilted towards democracy. Thus, a linear regression would display a linear relationship between political stability and regime type, even if the visual evidence provides us with a rather different picture.⁸

Political stability is linked very strongly to certainty about the future. The fact that both very autocratic and democratic countries are politically stable means that the ruler or government is not likely to be overthrown by unconstitutional means or by a public revolt. The lack of protest movements or rebel groups, and the absence of strong extremist parties and other forces that could possibly destabilize the current political framework of governing, decreases uncertainty and risk and raises the feeling of security. This, in turn, is expected to lower the political “discount rate” in countries with high political stability, which I propose to have two effects that lower public debt accumulation.

First, in the case of autocracies, the ruling class will feel less need to financially reward supporters – e.g., through a bloated bureaucracy financed by excessive expenditures (“borrowing from the future” through the use of public debt) – if it feels secure in its power (see Easterly 2002). Similarly, in democracies, governments have comparatively fewer incentives to use public debt to keep themselves in power in the absence of upcoming parties threatening to overthrow the current polity. Second, political stability enhances the security of private investments. It lowers the likelihood of wars, civil wars, and radical arbitrary policy changes that could affect private property rights and the

8 Scatter plots exploring the relationship between regime type and the other four dimensions of governance used display similar results. Across all scatter plots we see U-shaped patterns, but with the left-hand side typically slightly flattened – nevertheless suggesting that the variables should be regarded as distinct from the regime type of a country.

Figure 1 Regime type and political stability



Note: The scatter plot displays the relationship between the regime type of a country, as measured with the Polity IV (2015) index, and the governance dimension of political stability, as measured with the respective indicator from the worldwide governance indicators by Kaufmann, Kray, and Mastruzzi (2015). The figure shows the box plots of both variables visualizing the quartile distribution of the values. The continuous curve is a smooth line of the relationship between regime type and political stability, with the confidence intervals shown as dotted curves.

security of investments in different sectors and markets by both domestic and external actors.⁹ This leads to a higher rate of investment, inducing *ceteris paribus* economic growth and higher tax revenues to support public budgets.

9 This increased security of investment through political stability provides for more predictable and longer time frames in which private investors can operate.

The *rule of law* should equally influence public debt accumulation. Borensztein et al.'s (2004, 19) exploratory findings suggest that the rule of law is significantly correlated with the domestic public debt-to-GDP ratio. Biglaiser and Staats (2012, 521–2) show that the rule of law, strong and independent courts, and property rights protection can explain the variation in public bond ratings.

As in the case of political stability, I expect the rule of law to have both restricting and enabling effects for public and private actors. First, a higher valuation of the rule of law is a government's self-restriction to follow formal and publicly known rules and regulations. As argued by Biglaiser and Staats (2012), these rules reduce the likelihood of arbitrary radical policy changes. Hence, it is a governance institution that reduces the political "discount rate" by making government behavior more predictable both for actors within the government and for private actors outside of it. Second, this lowering of the political "discount rate" supported by the government also leads to higher security of investment. The quality of contract enforcement as well as the protection of property rights are likely to give private investors longer time horizons to plan their investments and thus increase the rate of investment. Subsequently, this brings about higher tax revenues that reduce the government's need to finance the state's budget via the accumulation of new public debt.

The *control of corruption* should also have an effect on public debt accumulation. Liu and Mikesell (2014, 346–7, 353) provide one of the most comprehensive analyses of corruption as a determining factor of excessive and wasteful state expenditures. Using data on the United States of America, they find that states with more corruption tend to have higher expenditures (additionally focused in sectors that are prone to corruption, such as the construction sector), leading to larger amounts of debt to finance budgets. Arin et al. (2011, 521) conclude that in the case of an economic crisis, corruption leads to a significant reduction of success rates in budget consolidation attempts. In contrast, Asiedu and Lien (2011, 109) do not find a significant influence of corruption on foreign direct investment (FDI) inflows.

I expect the degree of corruption to have important consequences for action in both the public sector and the private sector, leading to comparatively lower public debt accumulation. First, the control of corruption is another measure that can improve the effective use of public funds. Less corrupt governments launch fewer unproductive or unnecessary public projects, which lowers expenditures and budget deficits. Equally, the focus on productive projects enhances the positive economic effects of public investment, which in turn lead to stronger growth and higher tax revenues. Second, private actors may find it difficult to assess the "expected" number and amount of bribes necessary for a company's activity in a certain domestic or external market, reducing investment. The absence of corruption increases the security of private investment by lowering and rendering visible the "real" costs. Subsequently, this leads to more investment and to higher tax revenues for the government, lowering the need to finance budgets with public debt.

Government effectiveness constitutes another possible influence factor on public debt accumulation, which has so far been largely neglected. Solely Asiedu and Lien (2011, 104) test, at least in an implicit way, the influence of government effectiveness on a related field – namely the inflow of FDI – finding that high levels of bureaucracy in a host country tend to impede such flows. If we assume that the investment decisions of external investors partially reflect the will of domestic actors to invest, then we can relate this finding to the proposed causal mechanisms that connect governance indicators with the variation in public indebtedness.

I expect government effectiveness to have both constraining and enabling effects on public and private actors. First, an effective government is more likely to spend its available funds in a more goal-oriented and results-producing manner than a government for which the quality of policy formulation and implementation is of lesser importance. This should lower the need to finance the public budget with new public debt. Second, the quality of public services and the civil service should raise the amount of invested money, since it provides stable and comparatively advantageous business conditions. This subsequently leads to higher tax revenues that lower the need to accumulate public debt to finance public budgets.

Finally, the *regulatory quality* of a country should influence public debt accumulation. While acknowledging the lack of literature on a possible link between these two variables, we can nevertheless identify a plausible causal mechanism that connects the two dimensions.

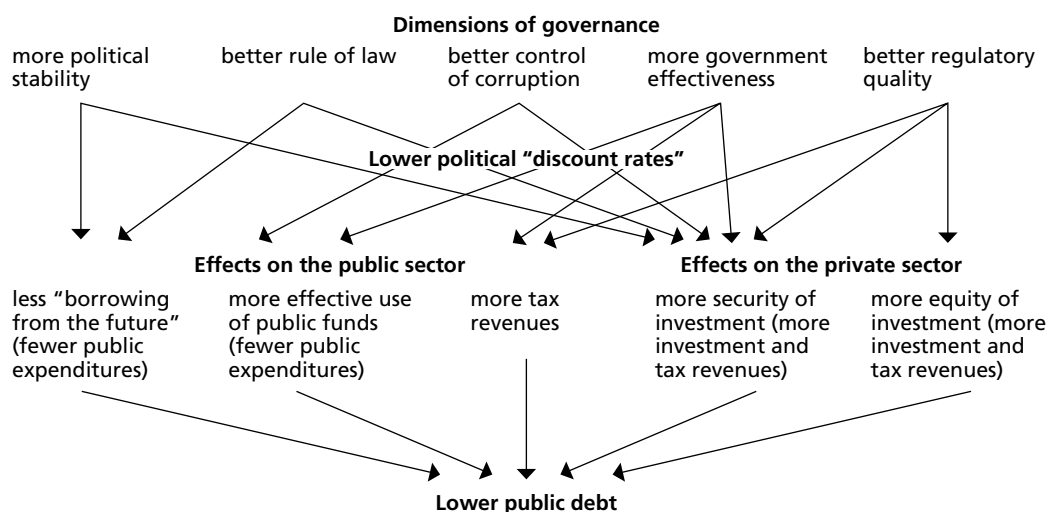
I assume that higher regulatory quality has a twofold effect that leads to lower public debt accumulation. First, it should enable a government to collect imposed taxes more effectively. This, in turn, should create a comparatively higher inflow of revenues into the state budget, which decreases the need to use borrowing to finance budget deficits. Second, regulatory quality should influence the security as well as the equity of investments for the private sector. Higher regulatory quality reduces the likelihood of distortions stemming from unequal treatment and market access for firms and investors. This should lead to a higher rate of investment, higher tax revenues, and subsequently to a lower need to finance public budgets with public debt.

The proposed causal mechanisms between the five dimensions of governance and public debt all focus on a demand-side view and do not take into account possible supply-side effects on the accumulation of public debt. The following points, however, illustrate that supply-side-based arguments explaining the variation in public indebtedness are, in my view, negligible for this study. First, cases in which countries are cut off from a “sufficient” supply of credit are very rare. As public debt is typically only “rolled over” (maturing bonds or loans are repaid by the issuing of new ones), creditors have an interest in ensuring the liquidity and solvency of the debtor, and cutting them off from funding could lead to public debt defaults and restructuring, which could be very costly for creditors. When governments were cut off from debt refinancing – e.g., during the

Latin American debt crisis – countries went rapidly into default and economic crisis, which actually further augmented public debt burdens rather than forcing a reduction. Second, when countries enter into debt default and processes of debt restructuring or relief, they are, in fact, normally cut off from the debt supply. However, I control for this situation in the empirical analysis. Third, most of the time, even countries under high fiscal stress have access to a sufficient supply on financial markets but simply have to pay high risk premiums in order to “roll over” or incur new public debt (Greece faced this situation in 2010), which can also aggravate public debt burdens. If we follow the literature studied above, interest rates and corresponding risk premiums could then be perceived as a function of a country’s governance (or regime type), which provides a proxy for markets to assess the sustainable or unsustainable demand for public debt. This would mean that the type of supply is mainly driven by the nature of demand.

To sum up this governance theory of public debt, I assume that *political stability*, the *rule of law*, the *control of corruption*, *government effectiveness*, and *regulatory quality* can explain the variation in public debt accumulation on a global scale. This can be linked, on the one hand, to a more efficient, reliable, and credible handling of public funds (mostly raised by taxes), creating a reduced need to finance the state via public borrowing. At the same time, on the other hand, effective, credible, and reliable governance is expected to trigger more investment (both domestic and foreign) by providing better security and equity of investment. This, in turn, is expected to foster stronger economic growth and higher tax revenues than in countries that disrespect all of these factors. This also provides leeway for governments which wish to ensure that they remain in power to finance the state budget without public borrowing, since stronger economic

Figure 2 Causal mechanisms between the different dimensions of governance and public debt



Note: This figure shows the hypothesized causal mechanisms between each of the five dimensions of governance and the expected public debt levels. The composite index of governance is not included, as it should simply entail all of the pathways shown.

growth augments the revenues from domestic tax collection without the need to raise taxes (or cut expenditures). Figure 2 sums up the respective theoretical causal mechanisms at work that should be able to explain the variation in public debt accumulation based on the governance theory.¹⁰

4 Data and methodology

In order to operationalize the dependent variable *public debt*, I used IMF (2015a) data on the gross general government debt-to-GDP ratio, with gross debt as a stock. As my main independent variables, I used the five dimensions *political stability*, the *rule of law*, the *control of corruption*, *government effectiveness*, and *regulatory quality* from the Worldwide Governance Indicators (WGIs; Kaufmann, Kraay, and Mastruzzi 2015) spanning from 1996 to 2014. According to Kaufmann, Kraay, and Mastruzzi (2010a, 2), their governance indicators are based on several hundred different variables gathered from 31 different data sources. A crucial point about this data is the exclusive focus on perceptual data which is reported by “survey respondents, non-governmental organizations (NGOs), commercial business information providers, and public sector organizations worldwide” (Kaufmann, Kraay, and Mastruzzi 2010a, 2). To increase the number of yearly observations for the quantitative analysis, I have interpolated the missing values for 1997, 1999, and 2001. I justify this pragmatic decision based on the tendency of the WGI to not change very much from year to year.

The high degree of interrelatedness between the different dimensions of governance has raised some concerns about the actual measurements of the different indicators, which have convincingly been refuted by the data compilers (see Kaufmann, Kraay, and Mastruzzi 2007; 2010b). Nevertheless, the correlation between the different governance indicators could pose some problems in validating the causal mechanisms of my theory in some model specifications and consequently needs to be taken into consideration. Additionally, I constructed a composite “factor WGI” index, using exploratory factor analysis that reduces the five governance variables into one condensed variable measuring an underlying latent variable (see King 1986, 682; Wirtz and Nachtigall 2004, 199–200).¹¹

10 I contend that these arguments about the public debt-reducing effects of better governance on public debt could be extended by considering different debt structures and maturities. Theoretically, it would seem plausible, for example, that better governance leads to a higher relative share of domestic and fixed-rate debt with comparatively longer maturities. However, data compilers have only recently begun to systematically collect detailed public debt data on a global scale. This prohibits me from going into more detail in the framework of this paper, but leaves open some interesting routes for research in the future.

11 I tested different specifications of the Cattell’s Scree Test to determine the optimal number of factors to retain in the exploratory factor analysis. According to the approaches of “optimal coordinates,” the “acceleration factor,” and “parallel analysis,” it is advisable to reduce the five

Since one of the main aims of this paper is to reassess the claims of Oatley's (2010) regime type argument and the existence of a *democratic advantage* (see Beaulieu, Cox, and Saiegh 2012) on a global scale, the *regime type* constituted the main control variable for my empirical analysis. I operationalized it with the Polity IV (2015) index, which is constructed by blending two composite indices of institutionalized democracy and autocracy. It contains the dimensions (1) competitiveness of executive recruitment, (2) openness of executive recruitment, (3) constraint on the chief executive, (4) competitiveness of political participation, and (5) regulation of participation (Marshall, Gurr, and Jaggers 2015, 14–17). According to the compilers, the coded data does not include data on civil liberties, which avoids the risk that elements of the dimensions of governance used will be contained in the regime type data. By focusing on the scope of competitive political participation and the set of existing constitutional checks and balances, the Polity IV index seems suitable to address the arguments by both Oatley (2010) and Beaulieu, Cox, and Saiegh (2012). Additionally, I used both the Freedom House Index (FHI 2015) and the sixth available dimension of the WGI (*voice and accountability*) as robustness checks. The data availability for indices of other *institutional explanations* of public debt, such as budgetary and fiscal institutions, and of procedures of budget formation and approval is, however, limited by a lack of global coverage and consistent time series data (see Alesina et al. 1999; Dabla-Norris et al. 2010; Dincer and Eichengreen 2014; Gollwitzer 2010; IBP 2015; OECD 2015; Wehner 2006).

Indices of *public choice theories* to measure fiscal or bureaucratic illusion equally lack global coverage and continuous time series data (see Dell'Anno and Dollery 2012; Dell'Anno and Mourao 2012; Mourao 2007). Using the Legislative Index of Electoral Competitiveness from the Database on Political Institutions (DPI 2012), I constructed a rudimentary dummy variable for political business cycles.¹² The variable was assigned the value 1 if free elections were held in a certain country-year. If the largest party in an election got more than 75 percent of the vote, or if the elections had a biased number of permitted parties and/or candidates (see Keefer 2012, 14) it was assigned the value 0, negating the presence of “real” elections. The effective exclusion of autocratic countries may introduce a significant bias. Hence, I mainly used this indicator as a robustness check.

To control for *governmental distributional conflicts*, I mainly drew on data from the DPI (2015). With the help of the variable “yrsoffc,” which captures the number of years the chief executive of a country has been in office (see Keefer 2012, 4–5), I created an index that operationalizes *intergovernmental fragility*. In contrast, I struggled to create a valid and reliable indicator of intergovernmental (party) polarization, mainly based on

different dimensions of governance to one factor. To do so, I applied the so called Varimax rotation (orthogonal rotation of the factor axes) to calculate the latent variable.

12 It seems plausible that a comparatively more frequent turnover of governments leads to the temporal compression of political business cycles, resulting in excessive pre-election expenses (and hence public debt accumulation) that cannot or can only partially be paid off after the elections.

an analysis of the comprehensive DPI. To control for intragovernmental distributional conflicts, I created two indices relying on data from the DPI database. The first one captures *intragovernmental fragmentation*, taking on three different values: 1 denotes single-party governments; 2 stands for coalition governments with two coalition parties; and 3 collects all governments with three or more coalition partners. Moreover, information on the economic alignment of the three main government parties allows me to create a simple index of *intragovernmental polarization*, based on the presence of economically left, center, and right governing coalition parties. To control for the effects of *government ideology* on public debt, I use the DPI's (2012) information on the economic alignment of the biggest government party. This, however, leads to an exclusion of all cases in which parties without clear economic alignments are in power, and thus reduces the number of cases significantly.

I include control variables for *macroeconomic explanations* of public debt in a set of more general economic influence factors on public debt. Among these are a country size control using population data (World Bank 2015), GDP per capita, total resource rents as a dummy variable (1 for values above 10 percent of GDP; index construction supported by gathering additional data from the CIA 2015 World Factbook), FDI inflows and the unemployment rate (variables based on World Bank 2015 data), and the inflation rate and the current account balance (based on IMF 2015a data). Additionally, I have created two dummy variables to control for public debt relief, drawing on data from the IMF (2015b) and De et al. (2013), and public debt default, using and extending data provided in the chartbook by Reinhart (2010).

To reassess the effect of the regime type and to test my governance theory of public debt against a set of competing political and economic explanations of the variation in public debt accumulation on a global scale, I applied a set of multivariate fixed effects (FE) regression models and error correction models (ECMs), including panel-corrected standard errors that help to more accurately estimate variability in the presence of complicated panel error structures (see Beck and Katz 1995).¹³ To describe the different model equations, I draw on the notation form used by Godechot (2016). The use of country and time fixed effects aims at accounting for country- and time-specific influences that are not captured by the independent or the control variables (see Croissant and Millo 2014; Wooldridge 2002a; 2002b). Including *fixed effects* most notably helps to deal with unobserved heterogeneity between countries and time periods by using additional error terms that are specific to certain countries and/or time periods. The country fixed effects g_i measure the effect of an independent variable b_{it} variation inside a country panel on the dependent variable y_{it} variation inside the same country panel to reduce the bias from confounding constant unobserved variables. Additionally, the year fixed effects p_t capture common temporal variations (e.g., global phases of economic growth and recession) at the different periods in time, creating parameters that capture “only the effects of specific within-country variations in time in each country”

13 I used Hlavac's (2014) R package “stargazer” to compile the regression tables.

(Godechot 2016, 502). To strengthen the causal interpretation of the regression results, I additionally introduce a one-year lag for the independent variables. According to the description above, the actual FE regression model used in this paper takes the following form:

$$\begin{aligned} & \text{FE regression:} \\ y_{it} = \sum_k b_k \cdot x_{ki(t-1)} + g_i + p_t + e_{it} \end{aligned}$$

Applying error correction models helps to capture possible short- and long-term effects of the independent variables on public debt (Beck and Katz 2011; Box-Steffensmeier et al. 2014; Tomaskovic-Devey, Lin, and Meyers 2015). In the case of high serial correlation in the data structure, ECMs can improve the validity of causal claims (refuting concerns of reverse causality) by focusing on and interpreting the long-run effects of the independent variables on the dependent variable. Additionally, the introduction of a lagged dependent variable as an independent variable provides more conservative estimates, since it “captures a substantial share of the first order correlation between my dependent variable” and the independent variable of interest (Godechot 2016, 503). To calculate the short-term and long-term effects, I applied the following two models (see Beck and Katz 2011; Godechot 2016; Lin and Tomaskovic-Devey 2013; Tomaskovic-Devey, Lin, and Meyers 2015):

$$\begin{aligned} & \text{ECM for short-term effects:} \\ \Delta y_{it} = \sum_k a_k \cdot \Delta x_{kit} - c \cdot [y_{i(t-1)} - \sum_k d_k x_{ki(t-1)}] + g_i + p_t + u_{it} \end{aligned}$$

$$\begin{aligned} & \text{Bewley transformation of ECM to estimate valid long-term effects} \\ & \text{(using the formula below as the instrument of } \Delta y_{it} \text{):} \\ y_{it} = \sum_k \beta_k \Delta x_{kit} + \beta_y \Delta y_{it} + \sum_k d_k x_{ki(t-1)} + g_i + p_t + \varepsilon_{it} \end{aligned}$$

I tested four different variable set specifications with the FE regression models and ECMs that I introduced (see Table 1). First, I estimated a small variable set containing the main independent variables of interest, the five different dimensions of governance, and the composite “Factor WGI” index, as well as the regime type. As the basic control variables, I used GDP per capita, debt relief, and debt default in all four variable sets. The variable *GDP per capita* should capture the effect of the variation in wealth in countries on its public debt levels (richer countries might have higher “optimal” debt levels, as national wealth and thus taxing capacities are bigger). *Debt relief* and *debt default* should have major and lasting effects on public debt levels, which make them indispensable as basic control variables. Second, I used a medium variable set, adding political controls to test both my governance theory and the regime type theory (institutional explanations) against competing political explanations of public debt. Third, I test a medium variable, replacing political control variables with macroeconomic ones. Fourth, and finally, I bring all these different explanations of public debt accumulation together.

Table 1 Different variable sets for the empirical analysis

Variable set	Small	Medium (political controls)	Medium (macro- economic controls)	Large
Governance indicators	x	x	x	x
Political stability	x	x	x	x
Rule of law	x	x	x	x
Control of corruption	x	x	x	x
Government effectiveness	x	x	x	x
Regulatory quality	x	x	x	x
Factor WGI index	x	x	x	x
Regime type	x	x	x	x
GDP per capita	x	x	x	x
Debt relief	x	x	x	x
Debt default	x	x	x	x
Government ideology		x		x
Intragovernmental fragility		x		x
Intragovernmental polarization		x		x
Intergovernmental fragility		x		x
Age dependency			x	x
Unemployment			x	x
Inflation rate			x	x
Current account balance			x	x
FDI inflows			x	x
Population			x	x
Resource rents			x	x

Note: To test the effect of governance and the regime type on public debt accumulation, I use four different variable sets containing a varying set of control variables. These four sets are calculated with both fixed-effects regressions and error correction models. The table shows which variables are included in the respective models.

To simplify the reading, especially for the bigger variable sets, I have only included the main variables of interest, the different dimensions of governance, and the regime type in the tables.¹⁴ Additionally, to make the tables more compact, I include all the different governance indicators in one line of the table. This is indicated by the term *governance* to the left. To understand which governance indicator is tested in which model as an independent variable, I list them at the top of the columns. Please refer to the reading notes below the table if there is an additional need for clarification.

5 Findings

Table 2 summarizes the regression results of *the small variable sets* calculated with Ordinary Least Squares FE panel regressions and ECMs. It displays the effects of the five different dimensions of governance and the composite index of governance derived through factor analysis, as well as the regime type, on public debt accumulation. In the

¹⁴ The full results are available from the author upon request.

Table 2 Small variable set: Institutional effects on public debt

2a. Fixed effects regression models with panel-corrected standard errors

Independent variables	Public debt – dependent variable					
	Model 1 Political stability _{t-1}	Model 2 Rule of law _{t-1}	Model 3 Control of corruption _{t-1}	Model 4 Government effectiveness _{t-1}	Model 5 Regulatory quality _{t-1}	Model 6 Factor WGI _{t-1}
Governance _{t-1}	-0.172*** (0.035)	0.018 (0.058)	0.038 (0.049)	0.007 (0.066)	-0.226*** (0.048)	-0.047 (0.063)
Regime type _{t-1}	-0.109*** (0.026)	-0.134*** (0.027)	-0.135*** (0.028)	-0.132*** (0.027)	-0.122*** (0.027)	-0.129*** (0.027)
Adjusted R ²	0.110	0.102	0.102	0.102	0.108	0.102
Observations	2,436	2,436	2,436	2,436	2,436	2,436

Note: This table shows six models that all have the public debt-to-GDP ratio as the dependent variable. In each model, the relationship of the dependent variable to one of the five governance indicators (political stability, rule of law, control of corruption, government effectiveness, regulatory quality) and a composite indicator of governance is tested against the regime type and a set of other variables. The line labeled *governance* shows the results of the test of the governance indicator at the top of each column with the dependent variable public debt-to-GDP ratio.

The regime type variable refers to an index of democracy–autocracy, operationalized with the Polity IV index. This model additionally contains the variables GDP per capita_{t-1}, Debt relief_{t-1} and Debt default_{t-1}.

*** $p < .01$, ** $p < .05$, * $p < .1$

2b. Error correction models with panel-corrected standard errors

Independent variables	Public debt – dependent variable					
	Model 1 Δ Political stability	Model 2 Δ Rule of law	Model 3 Δ Control of corruption	Model 4 Δ Government effectiveness	Model 5 Δ Regulatory quality	Model 6 Δ Factor WGI
Δ Governance	-0.075** (0.033)	0.059 (0.062)	0.009 (0.044)	-0.020 (0.053)	-0.092* (0.048)	-0.012 (0.077)
Δ Regime type	-0.037 (0.023)	-0.046* (0.023)	-0.042* (0.024)	-0.043* (0.023)	-0.042* (0.024)	-0.041* (0.023)
Lagged public debt _{t-1}	-0.129*** (0.034)	-0.128*** (0.034)	-0.128*** (0.034)	-0.128*** (0.034)	-0.129*** (0.034)	-0.128*** (0.034)
	Political stability _{t-1}	Rule of law _{t-1}	Control of corruption _{t-1}	Government effectiveness _{t-1}	Regulatory quality _{t-1}	Composite WGI _{t-1}
Governance _{t-1}	-0.252 (0.167)	0.412* (0.248)	0.353 (0.221)	-0.141 (0.238)	-0.285 (0.233)	0.199 (0.280)
Regime type _{t-1}	-0.171 (0.127)	-0.259* (0.132)	-0.240* (0.131)	-0.214* (0.130)	-0.212 (0.132)	-0.225* (0.132)
Adjusted R ²	0.154	0.151	0.151	0.150	0.152	0.150
Observations	2,346	2,346	2,346	2,346	2,346	2,346

Note: This table shows six models that all have the public debt-to-GDP ratio as the dependent variable. In each model, the relationship of the dependent variable to one of the five governance indicators (political stability, rule of law, control of corruption, government effectiveness, regulatory quality) and a composite indicator of governance is tested against the regime type and a set of other variables. The line labeled *governance* shows the results of the test of the governance indicator at the top of each column with the dependent variable public debt-to-GDP ratio.

The regime type variable refers to an index of democracy–autocracy, operationalized with the Polity IV index. This model additionally contains the variables Δ GDP per capita, Δ Debt relief, Δ Debt default, GDP per capita_{t-1}, Debt relief_{t-1} and Debt default_{t-1}.

Values in italics are the long-term equilibrium effects obtained using Bewley's transformation.

*** $p < .01$, ** $p < .05$, * $p < .1$

FE specifications, both higher political stability and regulatory quality reduce public debt accumulation in a highly significant manner. The regime type displays a highly significant effect in all of the FE specifications of the small variable model sets, equally lowering public debt. An effect of the rule of law, the control of corruption, government effectiveness, and the composite WGI index on public debt accumulation, however, has to be rejected. The corresponding ECM supports the results of the FE regression. Political stability and regulatory quality exhibit a significant short-term public debt-reducing effect. Rather oddly, the long-term estimate of the rule of law indicates a debt-increasing effect on public debt accumulation. In five of the six different specifications, a more democratic regime type helps to significantly reduce public debt levels.

Of the three basic control variables in the small variable models sets (GDP per capita, debt relief, debt default), all are highly significantly related to public debt accumulation. The higher the GDP per capita, the lower public debt accumulation – and in the case of debt relief or debt default, we see an equal reduction in public indebtedness. The ECM results show that GDP per capita has only a short-term effect, while debt relief and debt default work solely through a long-term effect on public debt.

Table 3 displays the different specifications and quantitative models for the *medium variable set with political controls* (including government ideology, intragovernmental fragility, intragovernmental polarization, and intergovernmental fragility). In the FE regressions, both political stability (99 percent confidence interval [CI]) and the control of corruption (90 percent CI) lower public debt levels; the other indicators of governance, however, do not show any significant relationship with the dependent variable. The FE regressions support the influence of the regime type on public debt in four of the six models (in all cases, at the 90 percent confidence interval). In the ECM specifications of the medium variable set with political controls, the regime type shows a significant effect on public debt neither in the short term nor in the long term. In contrast, regulatory quality lowers debt accumulation in the short and long term (95 percent and 90 percent CI), while political stability (95 percent CI) and the control of corruption (90 percent CI) have a public debt-reducing effect in the long term.

Of the set of political controls, government ideology shows the most consistent effect on public debt accumulation. In the FE regressions as well as in the ECMs, economically right-wing governments are related to higher public debt levels. In the FE regressions, higher intragovernmental polarization leads to higher public debt accumulation in some models; the robustness of this effect is, however, negated by contradictory results in the ECMs, where a few models display a debt-reducing long-term effect of intragovernmental polarization. The other three indicators for governmental distributional conflict do not show significant relationships with public debt levels. The basic control variables *GDP per capita*, *debt relief*, and *debt default* show the same effects on public debt accumulation as with the small variable set.

Table 3 Medium variable set (with political controls): Institutional effect on public debt

3a. Fixed effects regression models with panel-corrected standard errors

Independent variables	Public debt – dependent variable					
	Model 1 Political stability _{t-1}	Model 2 Rule of law _{t-1}	Model 3 Control of corruption _{t-1}	Model 4 Government effectiveness _{t-1}	Model 5 Regulatory quality _{t-1}	Model 6 Factor WGI _{t-1}
Governance _{t-1}	-0.199*** (0.045)	0.117 (0.076)	-0.085* (0.063)	0.071 (0.100)	-0.087 (0.062)	0.001 (0.115)
Regime type _{t-1}	-0.006 (0.009)	-0.018* (0.009)	-0.015 (0.010)	-0.018* (0.009)	-0.015* (0.009)	-0.017* (0.010)
Adjusted R ²	0.125	0.112	0.112	0.111	0.111	0.110
Observations	908	908	908	908	908	908

Note: This table shows six models that all have the public debt-to-GDP ratio as the dependent variable. In each model, the relationship of the dependent variable to one of the five governance indicators (political stability, rule of law, control of corruption, government effectiveness, regulatory quality) and a composite indicator of governance is tested against the regime type and a set of other variables. The line labeled *governance* shows the results of the test of the governance indicator at the top of each column with the dependent variable public debt-to-GDP ratio.

The regime type variable refers to an index of democracy–autocracy, operationalized with the Polity IV index. This model additionally contains the variables Government ideology_{t-1}, Intragovernmental fragility_{t-1}, Intragovernmental polarization_{t-1}, Intergovernmental fragility_{t-1}, GDP per capita_{t-1}, Debt relief_{t-1} and Debt default_{t-1}.

*** $p < .01$, ** $p < .05$, * $p < .1$

3b. Error correction models with panel-corrected standard errors

Independent variables	Public debt – dependent variable					
	Model 1 Δ Political stability	Model 2 Δ Rule of law	Model 3 Δ Control of corruption	Model 4 Δ Government effectiveness	Model 5 Δ Regulatory quality	Model 6 Δ Factor WGI
Δ Governance	-0.046 (0.030)	0.034 (0.061)	-0.003 (0.055)	-0.033 (0.053)	-0.155** (0.071)	-0.052 (0.085)
Δ Regime type	-0.001 (0.007)	-0.003 (0.006)	-0.002 (0.007)	-0.002 (0.007)	-0.004 (0.007)	-0.002 (0.007)
Lagged public debt _{t-1}	-0.162*** (0.051)	-0.160*** (0.050)	-0.160*** (0.050)	-0.158*** (0.051)	-0.159*** (0.050)	-0.158*** (0.050)
	Political stability _{t-1}	Rule of law _{t-1}	Control of corruption _{t-1}	Government effectiveness _{t-1}	Regulatory quality _{t-1}	Composite WGI _{t-1}
Governance _{t-1}	-0.389** (0.160)	0.003 (0.293)	-0.418* (0.219)	-0.301 (0.280)	-0.558* (0.274)	-0.578 (0.358)
Regime type _{t-1}	0.055 (0.095)	0.029 (0.092)	0.057 (0.096)	0.044 (0.100)	0.050 (0.091)	0.053 (0.096)
Adjusted R ²	0.178	0.174	0.177	0.175	0.181	0.176
Observations	771	771	771	771	771	771

Note: This table shows six models that all have the public debt-to-GDP ratio as the dependent variable. In each model, the relationship of the dependent variable to one of the five governance indicators (political stability, rule of law, control of corruption, government effectiveness, regulatory quality) and a composite indicator of governance is tested against the regime type and a set of other variables. The line labeled *governance* shows the results of the test of the governance indicator at the top of each column with the dependent variable public debt-to-GDP-ratio.

The regime type variable refers to an index of democracy–autocracy, operationalized with the Polity IV index. This model additionally contains the variables Δ Government ideology, Δ Intragovernmental fragility, Δ Intragovernmental polarization, Δ Intergovernmental fragility, Δ GDP per capita, Δ Debt relief, Δ Debt default, Government ideology_{t-1}, Intragovernmental fragility_{t-1}, Intragovernmental polarization_{t-1}, Intergovernmental fragility_{t-1}, GDP per capita_{t-1}, Debt relief_{t-1} and Debt default_{t-1}.

Values in italics are the long-term equilibrium effects obtained using Bewley's transformation.

*** $p < .01$, ** $p < .05$, * $p < .1$

Table 4 summarizes the results of FE regressions and ECMs for the medium variable set with *macroeconomic controls*. In addition to the general control variables *GDP per capita*, *debt relief*, and *debt default*, these include the following: the *age dependency ratio*, the *unemployment rate*, the *inflation rate*, the *current account balance*, *FDI inflows*, *population size*, and *resource rents*. Both political stability and regulatory quality have a highly significant debt-reducing effect on public debt accumulation in the FE regressions. In contrast, the control of corruption seems to be related to higher levels of public debt (95 percent CI). A more democratic regime type lowers public debt accumulation to a highly significant degree across all FE regression specifications. In the ECM models for the medium variable set with macroeconomic controls, the regime type influences public debt levels only in the long term, across all models with significance at the 90 percent CI. Out of the governance indicators, political stability (90 percent CI) and regulatory quality (95 percent CI) show a public debt-lowering effect in the short term; political stability (again 90 percent CI) also does so in the long term. The other governance dimensions do not seem to be significantly related to public debt levels.

Of the macroeconomic control variables, both more positive current account balances and lower unemployment rates have significant short and long term public debt-reducing effects in the FE regressions and in the ECMs. The results for the inflation rate are contradictory. In the FE regressions, higher inflation leads to an increasing public debt accumulation; in the ECMs, however, higher inflation reduces public indebtedness in the long term. In the ECMs of the medium variable set with macroeconomic controls, high resource rents as a GDP ratio actually have a significant effect on augmenting public debt levels. The results of the FE regressions, however, do not support this effect. Neither the age dependency ratio nor FDI inflows nor the population size show any effect on public debt accumulation. As for the other two variable sets, a higher GDP per capita lowers public debt in the short term, while debt relief and debt default lower public debt in the long term.

Finally, Table 5 summarizes the different FE regression and ECM specifications for the *large variable set* (including both political and macroeconomic control variables). Of the governance indicators, only political stability significantly lowers debt accumulation in the FE regressions – but interestingly, at the 99 percent CI. The regime type, in contrast, does not show any effect on public debt levels. This pattern reproduces itself in the ECMs, where the regime type does not show an effect on public debt. In contrast, regulatory quality in the short term (90 percent CI) and political stability in the long term (99 percent CI) reduce public debt levels.

Of the control variables, a positive current account balance and a low age dependency ratio lower public debt levels in several specifications of the FE regressions and ECMs. For the inflation rate, we see contradictory results, with the FE regressions pointing out a possible debt-increasing effect of high inflation rates on public debt accumulation, and ECM long-term effects pointing in the other direction. In several specifications of the FE regressions (not in the ECMs), higher intragovernmental polarization, higher

Table 4 Medium variable set with macroeconomic controls: Institutional effects on public debt

4a. Fixed effects regression models with panel-corrected standard errors

Independent variables	Public debt – dependent variable					
	Model 1 Political stability _{t-1}	Model 2 Rule of law _{t-1}	Model 3 Control of corruption _{t-1}	Model 4 Government effectiveness _{t-1}	Model 5 Regulatory quality _{t-1}	Model 6 Factor WGI _{t-1}
Governance _{t-1}	-0.116*** (0.032)	0.039 (0.053)	0.073** (0.035)	0.060 (0.051)	-0.156*** (0.042)	0.027 (0.055)
Regime type _{t-1}	-0.012*** (0.004)	-0.015*** (0.004)	-0.015*** (0.004)	-0.014*** (0.004)	-0.013*** (0.004)	-0.015*** (0.004)
Adjusted R ²	0.186	0.180	0.181	0.180	0.184	0.180
Observations	2,392	2,392	2,392	2,392	2,392	2,392

Note: This table shows six models that all have the public debt-to-GDP ratio as the dependent variable. In each model, the relationship of the dependent variable to one of the five governance indicators (political stability, rule of law, control of corruption, government effectiveness, regulatory quality) and a composite indicator of governance is tested against the regime type and a set of other variables. The line labeled *governance* shows the results of the test of the governance indicator at the top of each column with the dependent variable public debt-to-GDP ratio.

The regime type variable refers to an index of democracy–autocracy, operationalized with the Polity IV index. This model additionally contains the variables GDP per capita_{t-1}, Age dependency_{t-1}, Unemployment_{t-1}, Inflation rate_{t-1}, Current account balance_{t-1}, FDI inflows_{t-1}, Population_{t-1}, Resource rents_{t-1}, Debt relief_{t-1} and Debt default_{t-1}.

*** $p < .01$, ** $p < .05$, * $p < .1$

4b. Error correction models with panel-corrected standard errors

Independent variables	Public debt – dependent variable					
	Model 1 Δ Political stability	Model 2 Δ Rule of law	Model 3 Δ Control of corruption	Model 4 Δ Government effectiveness	Model 5 Δ Regulatory quality	Model 6 Δ Factor WGI
Δ Governance	-0.050* (0.027)	0.038 (0.056)	-0.0003 (0.038)	-0.007 (0.046)	-0.088** (0.042)	-0.025 (0.066)
Δ Regime type	-0.004 (0.003)	-0.005 (0.003)	-0.004 (0.003)	-0.004 (0.003)	-0.004 (0.003)	-0.004 (0.003)
Lagged public debt _{t-1}	-0.140***	-0.139***	-0.140***	-0.139***	-0.139***	-0.139***
	Political stability _{t-1}	Rule of law _{t-1}	Control of corruption _{t-1}	Government effectiveness _{t-1}	Regulatory quality _{t-1}	Composite WGI _{t-1}
Governance _{t-1}	-0.226* (0.134)	0.219 (0.206)	0.253 (0.175)	-0.089 (0.190)	-0.297 (0.200)	0.084 (0.227)
Regime type _{t-1}	-0.026* (0.016)	-0.035* (0.016)	-0.033** (0.016)	-0.031** (0.016)	-0.030* (0.016)	-0.032* (0.016)
Adjusted R ²	0.181	0.179	0.179	0.178	0.180	0.178
Observations	2,163	2,163	2,163	2,163	2,163	2,163

Note: This table shows six models that all have the public debt-to-GDP ratio as the dependent variable. In each model, the relationship of the dependent variable to one of the five governance indicators (political stability, rule of law, control of corruption, government effectiveness, regulatory quality) and a composite indicator of governance is tested against the regime type and a set of other variables. The line labeled *governance* shows the results of the test of the governance indicator at the top of each column with the dependent variable public debt-to-GDP ratio.

The regime type variable refers to an index of democracy–autocracy, operationalized with the Polity IV index. This model additionally contains the variables Δ GDP per capita, Δ Age dependency, Δ Unemployment, Δ Inflation rate, Δ Current account balance, Δ FDI inflows, Δ Population, Δ Resource rents, Δ Debt relief, Δ Debt default, GDP per capita_{t-1}, Age dependency_{t-1}, Unemployment_{t-1}, Inflation rate_{t-1}, Current account balance_{t-1}, FDI inflows_{t-1}, Population_{t-1}, Resource rents_{t-1}, Debt relief_{t-1} and Debt default_{t-1}.

Values in italics are the long-term equilibrium effects obtained using Bewley's transformation.

*** $p < .01$, ** $p < .05$, * $p < .1$

Table 5 Large variable set: Institutional effects on public debt

5a. Fixed effects regression models with panel-corrected standard errors

Independent variables	Public debt – dependent variable					
	Model 1 Political stability _{t-1}	Model 2 Rule of law _{t-1}	Model 3 Control of corruption _{t-1}	Model 4 Government effectiveness _{t-1}	Model 5 Regulatory quality _{t-1}	Model 6 Factor WGI _{t-1}
Governance _{t-1}	-0.118*** (0.041)	0.023 (0.065)	-0.002 (0.066)	0.148 (0.099)	0.049 (0.075)	0.075 (0.115)
Regime type _{t-1}	-0.0004 (0.009)	-0.006 (0.009)	-0.005 (0.009)	-0.008 (0.009)	-0.006 (0.009)	-0.007 (0.010)
Adjusted R ²	0.230	0.225	0.225	0.228	0.226	0.226
Observations	893	893	893	893	893	893

Note: This table shows six models that all have the public debt-to-GDP ratio as the dependent variable. In each model, the relationship of the dependent variable to one of the five governance indicators (political stability, rule of law, control of corruption, government effectiveness, regulatory quality) and a composite indicator of governance is tested against the regime type and a set of other variables. The line labeled *governance* shows the results of the test of the governance indicator at the top of each column with the dependent variable public debt-to-GDP ratio.

The regime type variable refers to an index of democracy–autocracy, operationalized with the Polity IV index. This model additionally contains the variables Government ideology_{t-1}, Intragovernmental fragility_{t-1}, Intragovernmental polarization_{t-1}, Intergovernmental fragility_{t-1}, Political business cycle_{t-1}, GDP per capita_{t-1}, Age dependency_{t-1}, Unemployment_{t-1}, Inflation rate_{t-1}, Current account balance_{t-1}, FDI inflows_{t-1}, Population_{t-1}, Resource rents_{t-1}, Debt relief_{t-1} and Debt default_{t-1}.

*** $p < .01$, ** $p < .05$, * $p < .1$

unemployment rates, and comparatively smaller countries (measured in population size) have a public debt-increasing effect. Economically right governments accumulate higher public debt levels according to some measures in the ECMs. The basic control variables show the same results once again, with higher GDP per capita lowering public indebtedness (according to FE regressions and ECM short-term effects) and debt relief and default equally reducing debt (FE regressions and ECM long-term effects).

Summing up these regression results, we see that with political stability and regulatory quality, only certain dimensions of the proposed governance theory have a consistent significant effect on public debt accumulation. The estimates for political stability show very consistent support across all eight different model specifications, including FE regressions and ECMs. This resonates with arguments from the literature, which I can reproduce in this analysis with extensive quantitative models on a global scale. Regulatory quality shows equally substantive support across a number of models, with significant effects on public debt in all of the four ECM models and in two of the four FE regression models, introducing a rather new explanation of public debt levels. The results are robust in comparison to other indicators, meaning that we do not see confounding results among the other model specifications, especially when conducting additional robustness checks.

The reassessment of the regime type theory shows modest support for a public debt-reducing effect of more democratic governments. In five of the eight main model sets, the regime type seems to consistently influence public debt levels, as the theory predicted. The effect is consistent across all models that include only economic control variables.

5b. Error correction models with panel-corrected standard errors

Independent variables	Public debt – dependent variable					
	Model 1 Δ Political stability	Model 2 Δ Rule of law	Model 3 Δ Control of corruption	Model 4 Δ Government effectiveness	Model 5 Δ Regulatory quality	Model 6 Δ Factor WGI
Δ Governance	–0.034 (0.031)	0.004 (0.061)	0.014 (0.055)	0.003 (0.053)	–0.122* (0.070)	–0.026 (0.084)
Δ Regime type	–0.0001 (0.006)	–0.002 (0.006)	–0.002 (0.007)	–0.002 (0.006)	–0.003 (0.007)	–0.002 (0.007)
Lagged public debt $_{t-1}$	–0.197*** (0.051)	–0.198*** (0.051)	–0.197*** (0.051)	–0.199*** (0.052)	–0.194*** (0.050)	–0.196*** (0.051)
	Political stability $_{t-1}$	Rule of law $_{t-1}$	Control of corruption $_{t-1}$	Government effectiveness $_{t-1}$	Regulatory quality $_{t-1}$	Composite WGI $_{t-1}$
Governance $_{t-1}$	–0.437*** (0.152)	–0.154 (0.226)	–0.236 (0.186)	0.019 (0.221)	–0.442* (0.258)	–0.392 (0.285)
Regime type $_{t-1}$	0.074 (0.088)	0.057 (0.087)	0.073 (0.090)	0.052 (0.091)	0.073 (0.087)	0.072 (0.091)
Adjusted R^2	0.232	0.226	0.227	0.226	0.230	0.227
Observations	755	755	755	755	755	755

Note: This table shows six models that all have the public debt-to-GDP ratio as the dependent variable. In each model, the relationship of the dependent variable to one of the five governance indicators (political stability, rule of law, control of corruption, government effectiveness, regulatory quality) and a composite indicator of governance is tested against the regime type and a set of other variables. The line labeled *governance* shows the results of the test of the governance indicator at the top of each column with the dependent variable public debt-to-GDP ratio.

The regime type variable refers to an index of democracy–autocracy, operationalized with the Polity IV index. This model additionally contains the variables Δ Government ideology, Δ Intragovernmental fragility, Δ Intragovernmental polarization, Δ Intergovernmental fragility, Δ GDP per capita, Δ Age dependency, Δ Unemployment, Δ Inflation rate, Δ Current account balance, Δ FDI inflows, Δ Population, Δ Resource rents, Δ Debt relief, Δ Debt default, Government ideology $_{t-1}$, Intragovernmental fragility $_{t-1}$, Intragovernmental polarization $_{t-1}$, Intergovernmental fragility $_{t-1}$, GDP per capita $_{t-1}$, Age dependency $_{t-1}$, Unemployment $_{t-1}$, Inflation rate $_{t-1}$, Current account balance $_{t-1}$, FDI inflows $_{t-1}$, Population $_{t-1}$, Resource rents $_{t-1}$, Debt relief $_{t-1}$ and Debt default $_{t-1}$.

Values in italics are the long-term equilibrium effects obtained using Bewley's transformation.

*** $p < .01$, ** $p < .05$, * $p < .1$

The additionally included political control variables in one of the medium and in the large model sets seem to eliminate the effect of the regime type on public debt. This might be due to the fact that most of these variables can only meaningfully show variation among democracies, such as polarization.

Robustness checks with different indicators for the regime type (Freedom House Index, the *voice and accountability* indicator from the WGIs) could not, however, reproduce the public debt-reducing effect of democracy. Replacing the Polity IV index with the Freedom House Index, the results for the two governance indicators *political stability* (8 times significant out of 8 model sets) and *regulatory quality* (5 times out of 8) remain basically the same; but surprisingly, in 4 of the 8 model sets (all FE regressions and thus possibly misspecified), there is a significant public debt-increasing effect of more democratic countries. Only one ECM model shows a significant effect of the regime type in the expected direction. The results when using *voice and accountability* as a regime type indicator again remain practically the same for the two governance dimensions *political stability* (8 times out of 8) and *regulatory quality* (5 times out of 8). In the FE regressions,

there is one significant effect of the regime type to the opposite of the expected relationship, while one of the ECM models shows a significant public debt-reducing effect of democracy.

The findings partly negate my proposed multidimensional governance theory of public debt, since the *rule of law*, the *control of corruption*, *government effectiveness* and the composite WGI index do not show any consistent or coherent relationship to public debt accumulation. Nevertheless, the results provide very valuable insights into the principal politico-institutional factors affecting public debt accumulation on a global scale.

6 Conclusions

The aim of this paper was threefold. My first aim was to provide a comprehensive study of public debt on a global scale, based on an extensive literature review. This allowed me, secondly, to reassess the value of a regime type theory of public debt (including the idea of a democratic advantage) based on a new data foundation, as well as to test a competing governance theory of public debt – which I laid out in the chapters above – against other competing claims. The main findings show strong support for the public debt-reducing effect of higher political stability and better regulatory quality. As other dimensions of governance, such as the rule of law, the control of corruption, and government effectiveness, did not show any consistent effect on public debt accumulation, further research needs to solidify the findings, using additional operationalizations of the different governance dimensions. The International Country Risk Guide (ICRG) is one of the other principal data sources for governance data on a global scale, but unfortunately, the high costs for obtaining the data prevented me from using it for robustness checks on the indicators provided by Kaufmann, Kray, and Mastruzzi (2015). In general, subsequent research must go into more detail by (1) decomposing the different characteristics of political stability and regulatory quality that may exert the main influence on public debt accumulation, and (2) further investigating the non-robust results of the reassessment of the regime type theory of public debt. If different operationalizations provide such contradictory results, this may also explain the opposing points of view in the debate on a democratic advantage.

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