Democracy, Public Debt Transparency, and Sovereign Creditworthiness

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Abstract:

Democratic Advantage (DA) arguments explicitly and implicitly assume that democracies have more transparent public debt, enhancing sovereign creditworthiness. This study questions the assumed link between transparent public debt practices and democracy in developing countries. It finds that such practices, which are crucial for investors, (a) do not depend on democratic governance and (b) largely erase the effect that DA variables regime type, rule of law, and property rights have on creditworthiness. In other words: transparent public debt and democracy should not be assumed to go together, and transparent debt practices affect creditworthiness more than DA variables. The findings identify public debt transparency as a statistical and theoretical confounder for current iterations of the DA thesis, which must be addressed to better understand the relationship between democratic governance and sovereign creditworthiness. The policy implication is to not assume that transparent public debt practices are only available to democracies.

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Introduction

A 2018 IMF-World Bank report submits that "comprehensive debt data" is essential for ratings agencies and investors to "make accurate assessment of sovereign financing needs and creditworthiness, and to appropriately price debt instruments" (International Monetary Fund and World Bank 2018a, 5). Implicit is that, because transparency reduces uncertainty about the risks associated with holding a country's debt, more debt-transparent countries should be more creditworthy. In the words of a recent study corroborating this link in OECD countries: "states providing more information will have lower… borrowing costs [while] investors penalize countries where they are unable to assess risks" (Copelovitch, Gandrud, and Hallerberg 2018, 23).

While a few empirical studies establish a link between transparency and creditworthiness, this literature is limited in scope and specification (Brown and Sienaert 2019, 6). On scope, studies of the link between transparency and creditworthiness typically focus on rich countries. But because developed and developing economies have different relationships with markets (Copelovitch, Gandrud, and Hallerberg 2018, 25; Mosley 2003, chap. 4), transparency's effect on creditworthiness in developing countries is a separate question. On specification, studies of developing country creditworthiness often do not explicitly account for transparency. Most work considers economic fundamentals or democratic governance, and studies that do consider transparency do not assess the effect of *transparent public debt practices* as opposed to transparency in the private sector, other areas of macroeconomic management, or government broadly-conceived. But this is an important omission because transparent public debt practices (providing data, publishing forward-looking debt management plans and assessments, using

transparent borrowing processes) should, all else equal, make countries more creditworthy in the eyes of various market actors.

This study accordingly limits its scope to developing countries and specifies the extent to which transparent public debt practices affect creditworthiness. Two arguments emerge. First: using measures from the Public Expenditure and Financial Accountability (PEFA) dataset, we show developing countries with more transparent public debt practices are more creditworthy, reflecting a reduction in perceived default risk when public debt is transparent. Second: regime type, rule of law, and property rights, three variables that underpin Democratic Advantage (DA) arguments that democracies are more creditworthy, are largely insignificant when public debt transparency is accounted for. To date, the DA literature assumes these democratic governance variables implicitly account for transparency's effect on sovereign creditworthiness, but this study shows that (a) public debt transparency is not collinear to, and only moderately-correlated with, DA variables so these factors should be partialed out from one another when modelling creditworthiness and (b) public debt transparency is more significantly and consistently associated with creditworthiness than DA variables.

These arguments have three implications. First, since the inclusion of public debt transparency largely erases the significance of DA variables, this study identifies public debt transparency as a theoretical and statistical confounder for current versions of the DA thesis. Transparent public debt management does not depend on democratic governance and is more strongly associated with variation in creditworthiness than DA variables. This is an important point for the literature on the relationship between democracy and sovereign creditworthiness moving forward. Second, the study suggests how institutions may affect public debt outcomes despite significant political constraints, adding to recent literature on the political economy of

sovereign debt management (Sadeh and Rubinson 2018; Sadeh and Porath 2019; Cormier 2021). Relatedly, the third and practical implication is that transparent public debt practices are not strictly available to democracies. Since public debt transparency is an area in which many developing countries "fall short" (International Monetary Fund and World Bank 2018b, 8), the study is relevant to those seeking to promote transparent practices in the name of public debt sustainability. In this sense, the study is also an example of the gains to be made by following recent calls in political economy, development, and public policy to unpack ideas about state capacity, and reconsider regime-based assumptions about the presence or availability of practices that shape how states manage their macroeconomies (on this theme see Bertelli et al. 2020; Centeno et al. 2017; Williams 2020).

Literature: Developing Country Creditworthiness

Developing country governments increasingly rely on bond markets for financing. JP Morgan's benchmark emerging market sovereign bond index included more than 70 countries' bonds in 2019, up from 14 in 1992. Increased market use has also led more developing countries to obtain credit ratings. From 2009-2018, nearly 30 previously-unrated developing countries obtained sovereign ratings from Moody's alone (Brown and Sienaert 2019, 5–6). This makes it important to understand what affects developing country creditworthiness: a borrower's ability to access, and cost when accessing, debt markets.

A prominent argument in the literature is that democracies are more creditworthy. The "Democratic Advantage" (DA) thesis is that democracies face public pressure to follow through on commitments to repay debts, giving rise to "superior access to credit" (Schultz and Weingast 2003, 5). Features of democratic governance, particularly the rule of law and property rights as

identified in subsequent refinements of the DA thesis, "lower political risk" in the eyes of market actors like ratings agencies (Biglaiser and Staats 2012, 516). The DA has been identified in both access to the market in the first place, as well as prices once in the market (Beaulieu, Cox, and Saiegh 2012). Research continues to "confirm these democratic advantage mechanisms" in developing countries, particularly when creditors are more selective due to low liquidity (Ballard-Rosa, Mosley, and Wellhausen 2021, 3).

Transparency is an essential aspect of any version of the DA thesis. In the Schultz and Weingast case studies, a democracy is more creditworthy because it is not "permitted… to obfuscate its total indebtedness" (2003, 25). Latter studies extensively discuss how transparency shapes credit ratings, and that "a democratic tradition is usually supportive of [such] openness and accountability" (Biglaiser and Staats 2012, 520). Others explain that "democracy that supports greater transparency and higher bond ratings are positive features for reduced risk," particularly in developing countries (Biglaiser, Hicks, and Huggins 2008, 1111). The general idea is that "because democracies tend to be more transparent in their release of economic and financial information, as well as policymaking processes, investors may be more confident in their ability to price risk" (Ballard-Rosa, Mosley, and Wellhausen 2021, 3). Even those who question the DA thesis highlight that the "transparency of democratic governments" and subsequent accountability is central to why the DA would exist at all (Archer, Biglaiser, and DeRouen 2007, 350; see also DiGiuseppe and Shea 2015, 562; Saiegh 2005, 369). This assumption that democracy and transparency are intimately related may be why most DA studies do not account for transparency empirically (Biglaiser, Hicks, and Huggins 2008, 1111; Biglaiser and Staats 2012; Archer, Biglaiser, and DeRouen 2007, 350, 358).

But this is a questionable theoretical and empirical reduction, particularly in developing contexts. While democracies are more transparent overall (Hollyer, Rosendorff, and Vreeland 2011), this distinction is less clear in poorer economies (Hollyer, Rosendorff, and Vreeland 2014, 417). And in line with recent work in political economy questioning assumptions about systematic variation in audience costs by regime type (Hyde and Saunders 2020), as well as calls for more precise analysis of state practices in specific policy areas (Bertelli et al. 2020; Centeno et al. 2017; Williams 2020), it is limiting to rely on regime-based assumptions about the transparency of macroeconomic management. Indeed, to preview descriptive statistics below, transparent public debt practices are not collinear to DA variables regime type, rule of law, or property rights. This indicates the current DA literature cannot assume its standard variables account for the transparency of a country's public debt management practices. If we are to understand the effects of transparency on developing country creditworthiness, it cannot be assumed to be captured by DA variables.

Transparency and Creditworthiness

The degree to which developing countries exhibit specific *transparent public debt practices* (providing debt data, publishing forward-looking debt management plans and forecasts, using transparent borrowing processes) has not been considered in the literature on transparency and sovereign creditworthiness. The literature is thus limited in scope and specification. On scope, studies of transparency and creditworthiness typically focus on developed countries. But because developing and developed countries have different relationships with markets (Copelovitch, Gandrud, and Hallerberg 2018, 25; Mosley 2003, chap. 4), assessing transparency's relationship to creditworthiness in developing economies is a separate task. On specification, studies of developing country creditworthiness do not quantify the effect of

transparent public debt practices as opposed to transparency in the private sector, other areas of macroeconomic management, or government broadly-conceived.

For example, transparency in OECD countries' private financial sectors has been shown to affect sovereign borrowing costs because debt burdens in the private sector might eventually pose problems for government finances (Copelovitch, Gandrud, and Hallerberg 2018). While capturing the relationship between some forms of transparency and borrowing costs, that study (reasonably for its purposes) scopes out developing countries and does not analyze the effect of public debt transparency.

And studies focused on the developing country context use broad transparency measures rather than public debt-specific forms of transparency. A recent World Bank study uses the World Bank's Country Policy and Institutional Assessment, aggregate measures which assess "how well countries' policy and institutional frameworks function in support of growth, poverty reduction, and the effective use of development assistance" (Brown and Sienaert 2019, 9). Transparency's role, then, is unclear at best and understood as an aggregate measure across the entire public sector. This makes it hard to specify the effect of public debt transparency on creditworthiness.

IMF studies also take a general approach to codifying transparency. Providing general macroeconomic information through IMF Article IV reports, Special Data Dissemination Standard adherence, and Reports on the Observance of Standards and Codes in financial market regulation, corporate governance, and transparency broadly-defined have been shown to improve borrowing costs (Cady and Pellechio 2006; Glennerster and Shin 2008). Those studies' focus on private sector transparency and qualities across government functions means the studies do not specify the extent to which the transparency of public debt practices affect sovereign borrowing

costs. Similarly, while budget transparency may lead to lower borrowing costs, this bundles debt management into broader fiscal processes and developing country coverage is limited to only the wealthiest emerging markets (Kemoe and Zhan 2018).

Practices: Public Debt Management Practices and Degrees of Transparency

While the transparent provision of the public debt information and management plans, which is the information investors want most (International Monetary Fund and World Bank 2018a, 5) is not reflected in the studies above, other literature highlights three debt management practices that, if transparent and all else equal, should improve creditworthiness. First, raw data provision allows market-based actors to assess and price how risky it is to hold a country's debt (International Monetary Fund and World Bank 2018a, 5). At the general macroeconomic level, among the most obvious but still-important data practices are hosting annual IMF Article IV missions and reporting public debt data to collators like the World Bank and IMF (Glennerster and Shin 2008, 187–89). At the transaction level, detailed reporting on all loan agreements and guarantees in regular bulletins provides precise information about a government's borrowing activity, allowing for an accurate assessment of risk by ratings agencies and markets (World Bank 2015, 22).

Second are formalized and transparent forward-looking public debt management plans. Particularly important here are Debt Sustainability Assessments (DSAs) and Medium-Term Debt Strategies (MTDSs). DSAs forecast long-term public debt outcomes (10-25 years) under various macroeconomic conditions (World Bank 2015, 30). Publicizing DSAs provides clarity about a government's assumptions and forecasts, allowing audiences to better assess the risk involved in holding the country's debt under various scenarios. Relatedly, MTDSs detail plans for navigating

nearer-term risks that government may be exposed to given its current debt portfolio (World Bank 2015, 18). As with DSAs, transparent MTDSs allow rating agencies and investors to understand a government's plans for managing risks, enhancing credibility of repayment plans. Indeed, if DSAs and MTDSs are not transparent but "poorly … communicated, it can induce adverse investor sentiment, raise debt-servicing costs, damage the government's reputation, and exacerbate financial market instability" (Wheeler 2004, 7; see also Cabral 2015, 9).

Third are transparent and reliable public debt governance systems and financial decision-making processes. Key here is the legal codification of public debt management procedures and responsibilities, which helps solidify accountability for debt management across DMOs, the finance ministry, other macroeconomic institutions in the state, and policymakers. World Bank best practices see transparent governance systems as "essential for… credible debt management" (Wheeler 2004, 55) and research in OECD contexts finds countries with formal public debt management guidelines have more credibility with creditors (Sadeh and Porath 2019).

Theory: Transparent Public Debt Practices and Uncertainty Reduction

A government's practices in these three areas indicates the extent to which its public debt is transparent. We theorize that the more transparent a country's public debt practices, the more creditworthy it will be. This is because public debt transparency reduces uncertainty for investors holding or contemplating holding a country's debt. The link between transparent information provision, uncertainty reduction, and enhanced creditworthiness is a core principle of contracts across markets (for example, in coroporate debt markets, see Lang and Maffett 2011).

Specific to sovereign debt markets, transparency yields "uncertainty reduction" and a "credibility effect" that improves creditworthiness (Arbatli and Escolano 2012). And because

creditors are "forward-looking" (Tomz 2007, 26), they update views of debtor government creditworthiness given new information or lack of new information. This is why "states providing more information will [be more creditworthy while] investors penalize countries where they are unable to assess risks" (Copelovitch, Gandrud, and Hallerberg 2018, 23) and "comprehensive debt data" is essential for ratings agencies and investors to "make accurate assessments of sovereign financing needs and creditworthiness" (International Monetary Fund and World Bank 2018a, 5). When market actors have more information about a country's public debt position and plans, there is a reduction in uncertainty about the implications of holding a country's debt. When market actors have less information about a country's public debt position and management plans, there is more uncertainty and thus more risk, decreasing creditworthiness.

By extension, transparent public debt practices are the observable implication of a bureaucracy credibly and professionally managing its public debt with best practices (Cormier 2021; Sadeh and Porath 2019; Wheeler 2004; World Bank 2015). A focus on transparency helps move beyond vague references to state capacity, centering analysis on observable practices that shape the ways in which bureaucracies are more or less "effective" in managing areas of the macroeconomy such as public debt (Centeno et al. 2017). Indeed, specific to public debt management, the best technical practices will have less than the desired impact if there is not clear and consistent communication of these practices to investors, other market actors, other ministries or government branches, and citizens (Cabral 2015, 9–11; International Monetary Fund and World Bank 2018b; Wheeler 2004; World Bank 2015). Even in the face of "bad news," transparency allows markets to observe public debt management strategies and understand repayment plans, minimizing the degree to which risk assessments are negatively

shaped by uncertainty rather than true fundamentals (Glennerster and Shin 2008). In this sense, public debt transparency may minimize the role of heuristic informational shortcuts in capital allocation decisions by investors. Since transparent practices provide more information, this should allow markets to scrutinize public-debt-transparent countries with more precision, rather than rely on less-informed heuristic shortcuts and country categories.

Put in the terms of the specific debt management practices outlined above: if developing country governments do not publish raw data, do not publish forward-looking debt management plans, or do not have reliable public debt management governance structures, rating agencies and creditors will be less able to confidently assess the risks associated with holding that country's debt. In turn, if developing country governments publish data, produce DSAs/MTDSs, and exhibit formal public debt management governance structures, market actors can more accurately assess the risks a country's debt presents and allow them to plan more effectively.

Hypothesis: Public Debt Transparency's Independent Effect on Creditworthiness

To reiterate from earlier, there is no *a priori* reason transparent public debt practices are only available to democratic regimes. While democracies are more transparent in the developed world (Hollyer, Rosendorff, and Vreeland 2011), this link is not clear outside of the rich world (Hollyer, Rosendorff, and Vreeland 2014, 417). Below, we confirm transparent public debt practice variables are not collinear but moderately correlated to democratic governance variables. This signals that public debt transparency should not be hypothesized to simply mediate the relationship between democratic governance and creditworthiness, nor should DA variables be assumed to capture the effects of transparency. Instead, public debt transparency should be seen as independent of and thus partialed out from DA variables, despite the DA literature's tendency to assume it is part-and-parcel of democratic governance. This leads to the following hypothesis:

H1: More public debt-transparent developing countries are more creditworthy, independent of and controlling for democratic governance.

Empirical Analysis

Do transparent public debt practices affect developing country creditworthiness? How does this compare to DA relationships? This section describes dependent variables then details the construction of the public debt transparency variable, using the recently updated Public Expenditure and Financial Accountability (PEFA) dataset. It then identifies the moderately positive statistical association between public debt transparency and DA variables, clarifying the need to partial them out from one another and test them as independent effects in models of creditworthiness to see whether public debt transparency confounds traditional DA relationships.

Dependent Variable

The main DVs are credit ratings, which most DA literature uses to proxy creditworthiness (Archer, Biglaiser, and DeRouen 2007; Beaulieu, Cox, and Saiegh 2012; Biglaiser and Staats 2012). We use annual year-end long term sovereign credit ratings from Moody's, S&P, and Fitch. In a similar but inverse fashion to other studies (Biglaiser and DeRouen 2007, 127), AAA ratings are coded as 1, so lower values indicate a country is more creditworthy. This choice is made because not all ratings agencies have the same number of ratings notches at the default end of the spectrum. Starting coding at the best rating and working from there is thus more straightforward. See Appendix C for credit rating coding.

We explicitly consider selection effects in either having or not having ratings, particularly in the context of using the PEFA dataset. First, Appendix B descriptive statistics show ratings in the final Moody's model range from A to Caa3. This means PEFA participants have a wide

range of credit ratings. Appendix D then shows the distribution of credit ratings between PEFA participants and non-participants is not significantly different, further indicating PEFA participants are not more creditworthy than non-participants.

Second, because countries choose whether or not to have ratings, then from which agency or agencies to have ratings (and not having ratings does not mean a country cannot borrow), it is necessary to proxy the creditworthiness of countries that do not have a rating from all agencies (since excluding unrated countries would give rise to sample selection bias). In addition, because many countries only have ratings from one or two of the major agencies, the sample would change across models if unrated country-years were not usefully coded and included.

Four strategies address this. The first is to use research predicting ratings for unrated developing countries. That research estimates most unrated countries would fall between Moody's Ca and Caa2, or CCC and CC- for S&P and Fitch (Ratha, De, and Mohapatra 2011, 304), which makes intuitive sense. It reflects the likelihood that an unrated country is more creditworthy than one in default, but still relatively risky and low-speculative grade.[1] So the first option for coding unrated country-years is to use ratings that lie in the middle of those ranges: Caa3 for Moody's and CCC- in S&P and Fitch.

A second strategy is to take the best rating a country has from any of the agencies and combine them in one DV (Appendix D). A third strategy is to impute unrated country-years with fitted predictions. This increases variation compared to the above strategy but gives rise to other concerns. Most importantly, predicting ratings requires using right-hand side variables that are

[1] Ratha et al. predict some unrated countries would have better ratings than Caa3, but the majority of such predictions are for small island nations and offshore tax havens. Only three PEFA participants in the sample fit this description (Maldives, Solomon Islands, Vanuatu). Furthermore, those authors predict other unrated countries would be rated below the Caa3 rating given here, so in default. Two countries in the sample fit this description (Burundi, Liberia). Such minimal variance on either side of Caa3 signals the utility of coding unrated countries with Caa3 in this study. Still, various sample subsets that show robustness to dropping certain unrated countries, as well as models using some higher or lower rating proxies, are available on request.

also on the right-hand side of the models of interest. We still go through the multiple imputation process via predictive mean matching (Schenker and Taylor 1996), averaging 10 imputations and replacing unrated years with those averages. But the inherent biases mean these results are a helpful robustness check rather than the main analysis (Appendix E).

A fourth option is an alternative DV, the logged year-end CDS spreads on 10-year sovereign bonds, obtained from Bloomberg's CMA Datavision. CDS instruments insure against default, making CDS spreads particularly useful for assessing perceptions about riskier bonds because "upward pressure on prices gets diverted into CDS markets" (Wellhausen 2015, 761–63). Since developing countries are the riskiest sovereign bonds, the relationships of interest in this study are likely strongest in this market. Appendix G reports these models to show that *PDT*'s effect on creditworthiness and DA variables (1) does not only apply in the context of credit ratings and (2) applies when DA variables are made "contingent" on global liquidity (Ballard-Rosa, Mosley, and Wellhausen 2021).

Explanatory Variable

To isolate and codify specific public debt practices in developing countries, this study uses the Public Expenditure and Financial Accountability (PEFA) dataset (PEFA Secretariat 2011). PEFA's first assessment occurred in 2005 and by the time of this research PEFA included at least one assessment in 117 countries across all continents.[2] PEFA is useful here because it explicitly codes, for comparative research purposes, the practices that shape the degree to which a country's public debt management is transparent (PEFA Secretariat 2011, 26, 35; de Renzio 2009).

[2] This study uses PEFA's 2011 scoring rubric. 2011 framework assessments, updated on July 1, 2019, were accessed on July 26, 2019 from https://www.pefa.org/assessments/listing.

The first practice discussed in the theory section was simple data provision. On a scale of 1-4, with zeroes possible if there is no reporting, PEFA rates the quality of a country's debt reporting (PI-17, i). The second practice was communicating forward-looking debt management plans, namely DSAs/MTDS. On a scale of 1-4, with zeroes possible if the country does not produce such reports, PEFA rates a country's scope and frequency of national debt sustainability assessments (PI-12, ii). The third practice was transparent and consistent financial processes and governance arrangements. On a scale of 1-4, with zeroes possible if processes are unidentifiable, PEFA scores the quality of financial contracting and guarantee-issuance systems (PI-17, iii). These scores were summed to make a continuous ranking of public debt transparency, *PDT*, for the independent variable.[3]

There are selection and distribution concerns to address in the construction of *PDT*. Since PEFA participation is voluntary, countries may participate only if they exhibit high transparency and debt management standards in the first place, and thus know PEFA will rate them highly. But Appendix B descriptive statistics show that PEFA participants' summary scores run the full range of possible scores (1 to 12). This minimizes concerns of selection bias in using PEFA to assess public debt transparency, as countries do not participate in PEFA only if their practices are of a high standard. Appendix B also shows the distribution of PEFA scores is normal (if left-skewed because of censoring by maximum values on the right). If PEFA only scored countries at either high or low grades, this would create a bimodal distribution and make it necessary to consider why there are two distinct populations in the sample. But the distribution suggests *PDT* scores are unimodal, distributed across the spectrum of possible scores, and bimodality is not a

[3] PDT scores are brought forward to years until PEFA updated with new report scores, on the assumption that such institutional practices change slowly if at all over time.

concern. Robustness tests below drop the lowest 25% of *PDT* observations to ensure findings persist when eliminating the tail of the distribution.

Democratic Advantage Variables

Three variables control for the DA thesis. *Democracy* is the Varieties of Democracy (V-Dem) categorical regime measure (Coppedge et al. 2016), accounting for the argument that democracies have better market access.[4] V-Dem's *Law* and *PropRights* are included to account for refined versions of the DA thesis: that rule of law and property rights should increase investor confidence about repayment and thus improve creditworthiness.

Given the centrality of assumptions about transparent public debt in the DA thesis, there are two statistical reasons to see *PDT* as a potentially confounding omitted variable for the DA. First, *PDT* is not collinear with *Democracy*, *Law*, or *PropRights*. This means they should be treated as independent effects, since DA variables do not pick up the effect of transparent public debt. Second and simultaneously, *PDT* and DA variables exhibit a moderate positive correlation. Given assumptions about public debt transparency in the DA literature, such correlation means omitting *PDT* leads to biased DA estimations (Gailmard 2014, 347–48). Table 1 shows these relationships in a correlation matrix and Appendix D presents scatterplots of *PDT* against DA variables, showing *PDT* scores do not cluster around certain levels of *Democracy*, *Law*, or *PropRights*. Appendix D also interacts *PDT* with the DA variables to confirm that they do not significantly condition one another's relationship to credit ratings.

[4] Using a categorical regime measure follows Biglaiser & Staats's DA study of credit ratings (2012, 525). Appendix D confirms a continuous rather than categorical regime variable (following Ballard-Rosa, Mosley, and Wellhausen 2021 for example) does not change the findings.

These relationships (a) confirm public debt transparency is not a function of democratic governance, meaning *PDT* should be partialed out from DA variables as an independent effect in models of developing country creditworthiness and (b) signal that insofar as DA arguments theoretically assume democracies are more transparent and thus empirically do not control for transparency's independent effect, DA arguments are at risk of omitting a confounding factor. To preview the findings, we find strong evidence this is the case. DA effects on creditworthiness are inconsistent at best when *PDT* is included in models, and *PDT's* effect on creditworthiness is always significant in the expected direction.

Table 1: Correlations of Explanatory Variables of Interest (N=745)

	PDT	*Democracy*	*Law*	*PropRights*
PDT	1.00			
Democracy	0.14	1.00		
Law	0.24	0.59	1.00	
PropRights	0.27	0.46	0.48	1.00

Remaining Control Variables

World Development Indicators provide macroeconomic controls. *GDPgrowth* and *GDPpcap* account for the relationship between economic performance or size and market access. *Inflation* should worsen ratings due to foreign repayment problems when currencies devalue (Eichengreen, Hausmann, and Panizza 2007). *IMFprogram* is a dummy indicating whether the country is in a conditional IMF program, controlling for whether a country is in crisis or perceived to face severe macroeconomic instability. *Trade* is %-of-GDP trade volume, which previous DA studies find is more significantly related to credit ratings than current account balances (Biglaiser and Staats 2012, 526–31). *ExtDebtStock* is %-of-GNI total outstanding debt. *Deficit* is the annual gap between revenue and expenditure. These controls ensure that any macroeconomic covariate significant in at least two models in Biglaiser & Staats major DA study (specifically, their Tables 1 and 4) is accounted for here, facilitating comparison.

Other controls include *GenGovTpcy*, V-Dem's general transparency of government measure, ensuring *PDT* does not reflect government transparency broadly-conceived.[5] Region and World Bank Income Category dummy variables control for investor heuristics and peer groups (Brooks, Cunha, and Mosley 2015; Gray 2013). *YrsSinceDefault* controls for the number of years since the country was last in default on any amount of debt to either private or official creditors (Beers and Mavalwalla 2017). Financial openness is controlled for with standard *ka_open* measures (Chinn and Ito 2006). Models controlling for *YrsSinceDefault* and *ka_open* are robustness checks since their inclusion drops dozens of observations and multiple countries. *US Interest Rates* in CDS models account for benchmark rates that shape the liquidity available

[5] Indeed, general transparency could be a potential confounder for the hypothesis, given a weakly positive correlation between *PDT* and *GenGovTpcy* (.19).

to developing countries (Ballard-Rosa, Mosley, and Wellhausen 2021). Finally, all models include year effects. Country effects are controlled for in several ways to account for slowly-moving or time-invariant covariates of interest, as detailed next.

Credit Rating Models

The data forms a panel from 2005, the first year of PEFA assessments, through 2016. High income countries are dropped to limit analysis to developing countries, leaving 63 developing countries in models that include all controls. Appendices A and B list country-years and descriptive statistics.

There are three concerns given the nature of the research question and data: selection bias, slowly-changing or time-invariant explanatory variables of interest, and reverse causality. The modeling strategies below account for these three concerns.

First, selection is an issue because PEFA participation is not random.[6] Two-stage Heckman models address this (Heckman 1979). The first stage is a probit model of whether countries participated in PEFA in the first place. The second stage is an OLS model that controls for the hazard rate from the first stage and provides estimations robust to correlation between the error terms of both stages, allowing for inference despite selection bias.

To satisfy minimum exclusion restrictions, the first-stage should include at least one explanatory variable that is not in the outcome equation (Beaulieu, Cox, and Saiegh 2012, 721). We include additional variables reflecting theories of transparent behavior in the first stage, modeling the probability of PEFA participation. *Opposition*, a V-Dem coding of opposition party power, should increase transparency incentives (Berliner 2014). Official aid flows have been

[6] As mentioned above, it is notable that the distribution of credit ratings between PEFA participants and non-participants is not significantly different, indicating PEFA participants are not more or less creditworthy than non-participants (Appendix D).

shown to affect transparency, so *ODAperGNI* captures aid dependence (de Renzio 2009). *BondDummy* captures whether the country issued a foreign bond that year (coded via Ballard-Rosa, Mosley, and Wellhausen 2021), which may incentivize transparency. V-Dem's continuous democracy measure is included (Hollyer, Rosendorff, and Vreeland 2011, which notably does not make PEFA participation significantly more likely). Controls from the outcome models are also included in the first stage if they might affect PEFA participation. For space, please see Appendix F for further discussion.

The second concern is that the dependent and independent variable of interest are slowly-moving and sometimes time-invariant within countries. This is not a problem for the research question, which is interested in aggregate differences in transparency and creditworthiness across countries. But this is a problem for using country-unit fixed effects since they would cannibalize the effect of important variables that change slowly, if at all, over the timeframe of the sample. But there is still a need to account for unit factors, including the possibility that country effects are not entirely independent but nested within country "types," such as level of democracy.

Random effect and hierarchical models address these issues (Gelman and Hill 2007, 256–64; Schunk 2013, 65–67). Random effect models estimate between-unit effects, avoiding cannibalization of time-invariant covariates by within-unit fixed effects. These effects can then be nested in regime type in hierarchical models. This allows for testing the possibility (or assumption, as left in DA studies) that transparency effects on credit ratings are a function of, or nested within, regime type. Put differently, nested models control for possible clustering of country effects around certain levels of democracy (for similar empirical challenges and modeling strategies, see Manger and Sattler 2020).

Third, reverse causality is a concern since "countries with good news to tell are more likely to [be] transparent" (Glennerster and Shin 2008, 190). Addressing this using a lagged dependent variable is problematic given the slow-changing nature of the key variables. So 2SLS models with valid instruments are needed to address reverse causality. The instrument used on *PDT* is a dummy for whether or not a new PEFA assessment took place that year, since a new report would only affect credit ratings depending on the *PDT* score. Other studies of debt and transparency have also used publishing-timetable instruments in their 2SLS models (Glennerster and Shin 2008, 191). Instrument validity is further reflected in test statistics discussed in the results section below and expanded on in Appendix F. Together, Heckman, nested mixed, and 2SLS models allow for inference despite initial concerns.

Results

Table 2 reports models of Moody's ratings, Table 3 reports models of Fitch ratings, and Table 4 reports models of S&P ratings. All models include at least 63 developing countries. All estimations show higher *PDT* scores, or more transparent public debt practices, improve credit ratings. Figures 1, 2, and 3 plot linear predictions of credit ratings across values of *PDT* in 2SLS models.

All *PDT* estimations and linear predictions provide evidence in support of H1. Moreover, the body of results indicates a consistently significant relationship between transparent public debt practices and creditworthiness, but not between DA variables and creditworthiness. At best DA variables are inconsistent, in fact are mostly insignificant, and at times are associated with worse ratings (recall that because AAA is coded as 1, a negative effect is an improvement in

credit ratings). In sum, when public debt transparency is accounted for as an independent effect in models of creditworthiness, it confounds DA empirical relationships.

Reading Tables 2-4 from left to right makes this clear. In each, models 1-4 estimate baseline OLS models to show that public debt transparency makes DA variables inconsistent or insignificant. Models 5-8 then estimate Heckman, random effect, hierarchical, and 2SLS models which either erase or reverse the effect of DA variables, while *PDT* remains significant in the expected direction.

To review Table 2 (Moody's) in detail: Model 1 confirms significant correlation between *PDT* and Moody's. Model 2 shows DA variables *Law* and *PropRights* have a significant correlation to Moody's in isolation. But Model 3 shows that when *PDT* and DA variables are put together, *PropRights* loses significance and *Law* is significant at only the 10% level. Model 4 then adds controls and DA variables lose significance altogether. Meanwhile, *PDT* remains statistically and substantively significant throughout.

Models 5-8 then account for the number of endogeneity concerns detailed earlier. Model 5 is a Heckman estimation accounting for selection into PEFA participation (to save space for the many tables in this main text, Appendix F reports the selection equation estimations used in the Heckman models in Tables 2-4). Here, *Democracy* takes on significance, *Law* becomes insignificant, and *PropRights* become significantly associated with *worse* ratings. Model 6 is a random effect model. Model 7 is a hierarchical model where *Democracy* is switched from a control to a level in which country effects may be nested. In both, *PDT* maintains significance while DA variables *Democracy, Law,* and *PropRights* are insignificant with variously positive and negative associations to creditworthiness.

Model 8 is a fixed effect 2SLS model, instrumenting *PDT* with a dummy for whether or not there was a new PEFA report that year. As discussed earlier, this is logical as a report would only affect creditworthiness depending on the *PDT* score. In addition, Appendix F discuses and shows how the act of getting a new PEFA report is not systematically correlated to a country's credit ratings. Moreover, the first stage f-statistic adjusted for country clustering is above 10 and statistically different from zero, indicating this is a statistically strong instrument (Skeels and Windmeijer 2018, n. 2). Overidentification is not an issue since there are fewer instruments than explanatory variables, and a valid instrument simultaneously addresses selection as well as reverse causality (Wooldridge 2010, 812).

All else equal, Model 8 estimates a one-point increase in *PDT* is likely to improve Moody's ratings by half a credit rating notch. Standard deviations from means are not entirely useful here, given right-censored *PDT.* But Appendix B shows *PEFA's* interquartile range (IQR) is 3.5, so movement from the low to high end of *PDT's* IQR is associated with +/- 1.75 rating notches. This indicates a moderate adjustment in public debt transparency is associated with a meaningful shift in creditworthiness for a developing country seeking finance. On the whole, moving from the lowest *PDT* score to the highest is predicted to improve Moody's credit ratings by around eight notches. To visualize this, Figure 1 plots the linear predictions of Moody's ratings over the range of *PDT* scores using 2SLS Model 8.

In sum, public debt transparency significantly improves credit ratings and thus borrowing costs for developing countries. And when the transparency of public debt practices is accounted for, DA factors are at best inconsistent, are largely insignificant, and at times are associated with worse ratings. *PDT* confounds DA expectations.

Tables 3 and 4 report the same battery of models using Fitch and S&P as DVs. Figures 2 and 3 report fitted predictions of each table's 2SLS model 8.[7] Some nuanced differences emerge. For example, *Democracy* takes on significance in some S&P models but is associated with worse ratings in Fitch models. Similarly, while always significant in the expected direction, *PDT* coefficient size depends on the rating agency used as the DV, indicating potential differences in the import each rating agency places on the practices captured by *PDT*. Meanwhile, *Law* and *PropRights* remain largely insignificant. Across the three credit ratings agencies, the story is the same: transparent public debt practices are consistently associated with better ratings while DA variables are at best inconsistent, mostly insignificant, and at times associated with worse ratings.

Consistently significant macroeconomic controls perform largely as expected. *GDPpcap* shows greater wealth makes a country more creditworthy. *ExtDebtStock* shows that more debt leads to worse ratings. *IMFprogram* is also associated with worse ratings, since being in crisis or perceived to face economic trouble should make a country less creditworthy. That these controls perform as expected grants validity to the credit rating coding used for this study's DVs.

Robustness Tests

Appendix D reports and discusses many robustness tests. First, since the bottom end of the *PDT* IQR is 6, this means 75% of the observed *PDT* values are in the upper half of possible *PDT* scores. We drop the bottom 25% of *PDT* scores to ensure the distribution's left tail does not drive results. Second, alternative variables check robustness to other measures and datasets. We replace V-Dem's categorical *Democracy* variable with a continuous measure, with a different categorical measure (Boix, Miller, and Rosato 2013), and with Polity. *YrsSinceDefault, ka_open*, and corruption controls are added despite data loss. Alternative and deconstructed *PDT* scores

[7] Fitch 2SLS model 8 is significant at 90% level (P>z = .075) so Figure 3 plots a 90% confidence interval.

are tested and discussed in Appendix D4. Models using the best rating a country has from the three agencies ease concern that results are driven by various imputation or replacement methods for unrated country-years. Probit models of the likelihood that democracy shapes obtaining a rating indicate that it is not likely that the process of obtaining a rating mediates the (non) effect of democracy in Tables 2-4. Lastly, Appendix D7 shows DA variables are associated with creditworthiness in all sample sizes in Tables 2-4 when *PDT* is *not* included as a control. This confirms sample size is not driving the loss of a relationship between DA variables and creditworthiness. The story persists across this variety of checks and tests.

Appendix E reports models that replace unrated country-years with imputed credit ratings. As noted above, the biases of using fitted replacements for unrated country-years are intuitive: predicting ratings then using them as a dependent variable regressed on the same covariates used to predict them overfits the estimated relationships. But it is notable that *PDT* still confounds DA variables when using such fitted replacements. *PropRights* is always associated with worse ratings and *Law* is never significant in these models, while *PDT* is always significant in the expected direction.

Table 2: Models of Moody's Ratings

	OLS				Heckman	RE	Nested RE	2SLS
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
PDT	-0.505***		-0.386***	-0.355***	-0.466***	-0.202***	-0.226***	-0.600***
	(0.109)		(0.112)	(0.125)	(0.074)	(0.055)	(0.042)	(0.229)
Democracy		0.125	-0.525	-0.258	-1.521***	-0.411		-0.256
		(0.576)	(0.530)	(0.515)	(0.324)	(0.251)		(0.315)
Law		-4.104***	-2.428*	-3.766	-1.281	0.225	-0.884	0.521
		(1.563)	(1.438)	(2.481)	(1.191)	(1.382)	(2.665)	(2.746)
PropRights		-2.973*	-2.001	-1.292	4.179***	-0.010	-0.337	0.830
		(1.508)	(1.442)	(2.136)	(1.527)	(1.582)	(1.443)	(3.778)
GenGovTpcy				1.174**	0.819**	-0.004	0.224	-0.041
				(0.543)	(0.411)	(0.252)	(0.413)	(0.562)
GDPpcap				-0.001***	-0.001***	-0.001***	-0.001**	-0.001**
				(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
GDPgrowth				-0.067	-0.009	-0.009	-0.013	0.005
				(0.043)	(0.087)	(0.021)	(0.037)	(0.018)
Inflation				0.024	0.009	-0.007	-0.010	-0.011
				(0.024)	(0.025)	(0.015)	(0.014)	(0.016)
ExtDebtStock				0.020	0.021***	0.017***	0.016***	0.017
				(0.012)	(0.006)	(0.006)	(0.006)	(0.015)
Deficit				-1.962	-2.290**	-0.051	-0.240	0.155
				(1.225)	(1.003)	(0.599)	(0.700)	(0.961)
IMFprogram				1.475**	2.057***	0.490**	0.544*	0.250
				(0.566)	(0.409)	(0.210)	(0.300)	(0.372)
Trade				0.012	0.014**	0.009	0.012	0.001
				(0.010)	(0.006)	(0.007)	(0.008)	(0.016)
N	791	1470	745	463	548	453	453	453
# of Countries	96	123	89	63	67	63	63	63
Selected N					330			
Year FEs	YES	YES	YES	YES	YES	YES	YES	YES
Country Effects	NO	NO	NO	NO	NO	RANDOM	RANDOM	FIXED
Region Dummies	NO	NO	NO	NO	YES	YES	YES	YES
Inc Group Dummies	NO	NO	NO	NO	YES	YES	YES	YES
Regime Levels							YES	
Inv Mills Ratio					0.342			
					(1.615)			
FE Cluster Adj 1st Stage F								467.61
Prob > F								0.000***

* p<0.1 ** p<0.05 *** p<0.01

Notes:

Constants Suppressed; first-stage of Heckman models suppressed and reported in Appendix F

Cluster-Robust SEs in OLS, Nested RE, and 2SLS Estimations; Heckman Two-Step SEs in Heckman Estimations

Nested RE models allow for unstructured covariance between levels

Table 3: Models of Fitch Ratings

	OLS				Heckman	RE	Nested RE	2SLS
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
PDT	-0.485***		-0.392***	-0.300**	-0.436***	-0.075*	-0.085**	-0.305*
	(0.115)		(0.122)	(0.127)	(0.083)	(0.041)	(0.037)	(0.172)
Democracy		0.433	0.063	0.391	0.947**	0.040		0.047
		(0.564)	(0.570)	(0.680)	(0.373)	(0.187)		(0.231)
Law		-2.934*	-2.497*	-4.190	-3.824***	0.232	-0.506	1.230
		(1.695)	(1.406)	(2.916)	(1.342)	(1.124)	(3.264)	(2.328)
PropRights		-4.767***	-2.204	-4.064*	0.882	1.868	1.664	3.127
		(1.517)	(1.403)	(2.241)	(1.717)	(1.328)	(2.406)	(2.684)
GenGovTpcy				0.961	0.773	0.109	0.211	0.078
				(0.712)	(0.471)	(0.191)	(0.499)	(0.460)
GDPpcap				-0.000**	-0.000**	-0.001***	-0.001	-0.001***
				(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
GDPgrowth				-0.008	-0.020	-0.008	-0.008	-0.003
				(0.042)	(0.101)	(0.015)	(0.029)	(0.013)
Inflation				0.043	0.003	0.017	0.013*	0.018
				(0.029)	(0.029)	(0.011)	(0.007)	(0.011)
ExtDebtStock				0.018	0.024***	0.025***	0.024***	0.026**
				(0.013)	(0.007)	(0.005)	(0.002)	(0.011)
Deficit				0.049	-1.421	0.304	0.177	0.269
				(1.499)	(1.159)	(0.451)	(0.295)	(0.641)
IMFprogram				1.513***	2.287***	0.160	0.273	0.053
				(0.547)	(0.475)	(0.155)	(0.241)	(0.235)
Trade				0.022	0.044***	-0.006	-0.001	-0.014
				(0.013)	(0.007)	(0.005)	(0.005)	(0.013)
N	791	1470	745	463	548	453	453	453
# of Countries	96	123	89	63	67	63	63	63
Selected N					330			
Year FEs	YES	YES	YES	YES	YES	YES	YES	YES
Country Effects	NO	NO	NO	NO	NO	RANDOM	RANDOM	FIXED
Region Dummies	NO	NO	NO	NO	YES	YES	YES	YES
Inc Group Dummies	NO	NO	NO	NO	YES	YES	YES	YES
Regime Levels							YES	
Inv Mills Ratio					1.483			
					(1.860)			
FE Cluster Adj 1st Stage F								467.61
Prob > F								0.000***

* p<0.1 ** p<0.05 *** p<0.01

Notes:

Constants Suppressed; first-stage of Heckman models suppressed and reported in Appendix F

Cluster-Robust SEs in OLS, Nested RE, and 2SLS Estimations; Heckman Two-Step SEs in Heckman Estimations

Nested RE models allow for unstructured covariance between levels

Table 4: Models of S&P Ratings

	OLS				Heckman	RE	Nested RE	2SLS
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
PDT	-0.510***		-0.393***	-0.259**	-0.175***	-0.078**	-0.088***	-0.454**
	(0.100)		(0.112)	(0.125)	(0.067)	(0.038)	(0.028)	(0.195)
Democracy		0.636	0.067	0.371	-1.328***	-0.515***		-0.461**
		(0.556)	(0.509)	(0.617)	(0.294)	(0.173)		(0.222)
Law		-3.856**	-3.357**	-7.156**	-7.972***	-1.055	-2.380	0.325
		(1.661)	(1.499)	(2.765)	(1.069)	(1.032)	(2.029)	(1.882)
PropRights		-5.122***	-2.292	-4.144**	1.861	1.475	1.192	2.694
		(1.533)	(1.538)	(2.024)	(1.369)	(1.217)	(1.189)	(2.822)
GenGovTpcy				1.490**	2.290***	0.530***	0.654**	0.527
				(0.627)	(0.372)	(0.176)	(0.269)	(0.366)
GDPpcap				-0.000**	0.000	-0.000***	-0.000	-0.001**
				(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
GDPgrowth				-0.018	0.028	-0.000	-0.004	0.006
				(0.043)	(0.079)	(0.014)	(0.017)	(0.015)
Inflation				0.030	0.033	0.013	0.010**	0.012
				(0.027)	(0.023)	(0.010)	(0.005)	(0.013)
ExtDebtStock				0.026*	0.038***	0.014***	0.014**	0.012
				(0.013)	(0.006)	(0.004)	(0.006)	(0.008)
Deficit				0.707	1.982**	-0.170	-0.221	-0.387
				(1.480)	(0.913)	(0.416)	(0.176)	(0.630)
IMFprogram				1.567***	1.996***	0.390***	0.416***	0.243
				(0.482)	(0.374)	(0.143)	(0.021)	(0.268)
Trade				0.015	0.019***	-0.002	0.002	-0.009
				(0.010)	(0.005)	(0.005)	(0.004)	(0.011)
N	791	1470	745	463	548	453	453	453
# of Countries	96	123	89	63	67	63	63	63
Selected N					330			
Year FEs	YES	YES	YES	YES	YES	YES	YES	YES
Country Effects	NO	NO	NO	NO	NO	RANDOM	RANDOM	FIXED
Region Dummies	NO	NO	NO	NO	YES	YES	YES	YES
Inc Group Dummies	NO	NO	NO	NO	YES	YES	YES	YES
Regime Levels							YES	
Inv Mills Ratio					0.896			
					(1.468)			
FE Cluster Adj 1st Stage F								467.61
Prob > F								0.000***

* p<0.1 ** p<0.05 *** p<0.01

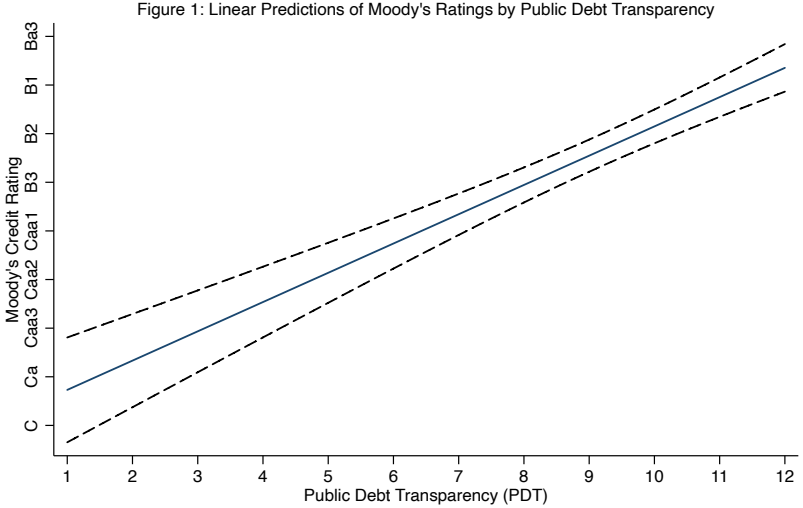
Notes:

Constants Suppressed; first-stage of Heckman models suppressed and reported in Appendix F

Cluster-Robust SEs in OLS, Nested RE, and 2SLS Estimations; Heckman Two-Step SEs in Heckman Estimations

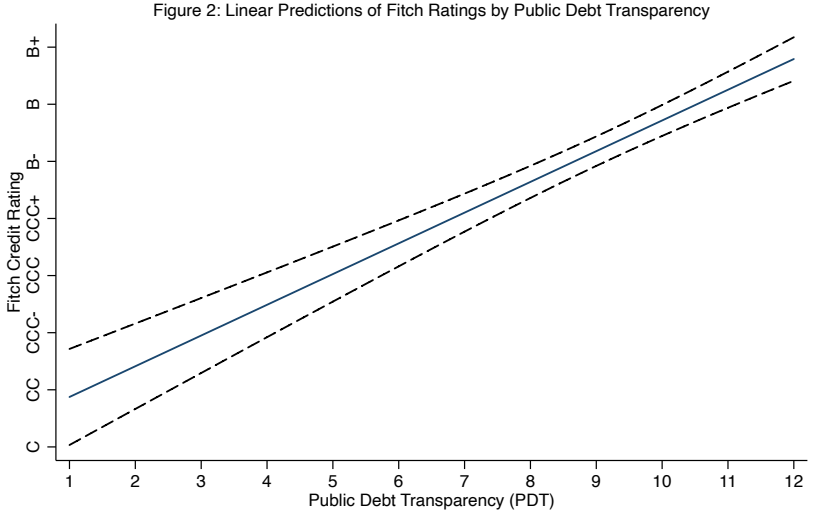
Nested RE models allow for unstructured covariance between levels

Figure 1: Linear Predictions of Moody's Ratings by Public Debt Transparency



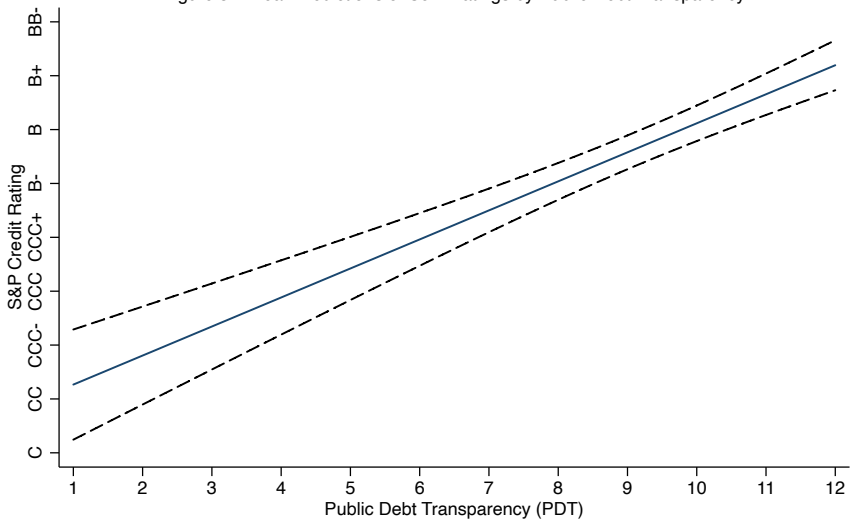
2SLS from Table 2, Model 8
95% Confidence Interval
Slope inverted from table estimation for ease of interpretation

Figure 2: Linear Predictions of Fitch Ratings by Public Debt Transparency



2SLS from Table 3, Model 8
90% Confidence Interval
Slope inverted from table estimation for ease of interpretation

Figure 3: Linear Predictions of S&P Ratings by Public Debt Transparency



2SLS from Table 4, Model 8
95% Confidence Interval
Slope inverted from table estimation for ease of interpretation

Conclusion

By limiting scope to developing countries and focusing on public debt management practices, this study shows that transparently providing data, publishing forward-looking debt management strategies, and using reliable public financial processes improves sovereign creditworthiness. Moreover, these practices do not depend on democratic governance and, in both theoretical and statistical senses, confound the DA thesis. When the transparency of public debt is included in models of developing country creditworthiness, traditional DA factors are not reliable predictors of creditworthiness.

For political economy, this means the relationship between democratic governance and sovereign creditworthiness warrants revision that theoretically and empirically accounts for variation in public debt transparency. For public policy, the implication is not only that transparent public debt management enhances creditworthiness, but that such practices are not only available to democracies. This signals the importance of further research on variation in public debt transparency. And since public debt transparency is an area in which the IMF and World Bank find most developing countries "fall short" (International Monetary Fund and World Bank 2018b, 8), the study may also be a reference point for practitioners interested in promoting transparent public debt management practices in the name of public debt sustainability.

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Web Appendices

Appendix A: Country-year list
Appendix B: Descriptive Statistics
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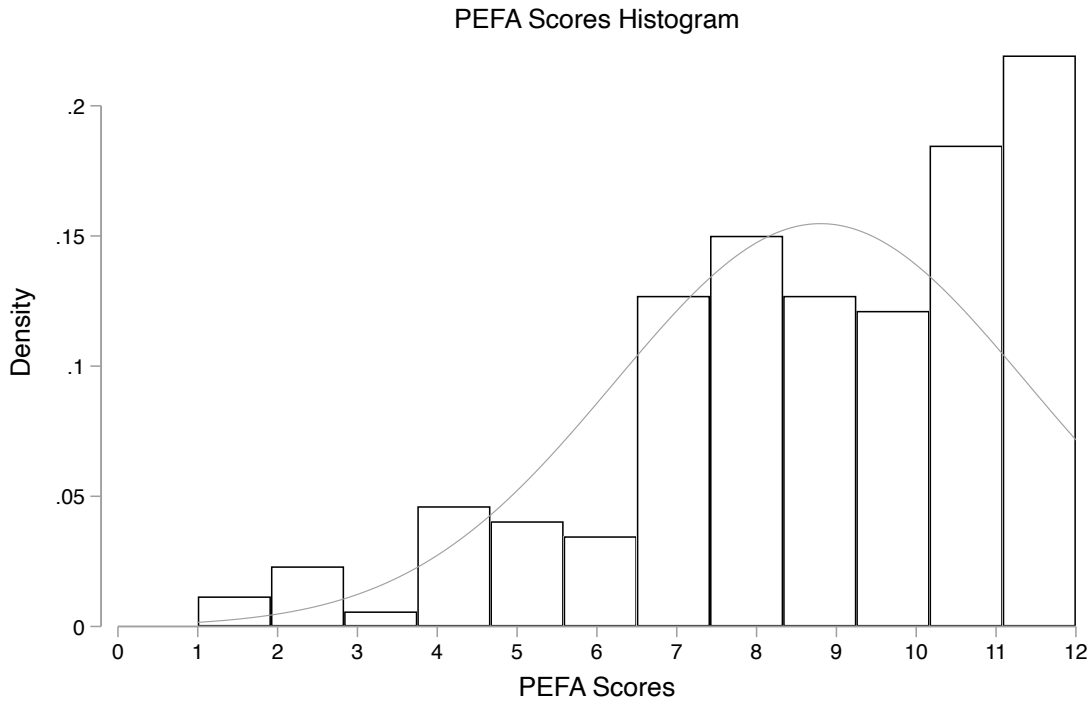
Appendix E: Alternative ways of handling Unrated Country-Years
Appendix F: Heckman first-stage and further IV analysis and discussion

Appendix A: Table 2, Model 8 Country-Years (63 countries)

Country	Years	Country	Years
Afghanistan	2006-2016	Lesotho	2007-2016
Albania	2011-2016	Liberia	2010-2013
Armenia	2008-2016	Madagascar	2006-2016
Azerbaijan	2014-2016	Malawi	2009-2016
Bangladesh	2006-2016	Maldives	2009-2011; 2014
Belarus	2009-2016	Mali	2008-2016
Bhutan	2010-2016	Mauritius	2007-2016
Bosnia and Herzegovina	2014-2016	Moldova	2006-2016
Botswana	2009-2016	Mongolia	2015-2016
Brazil	2009-2016	Morocco	2009-2016
Burkina Faso	2007-2016	Myanmar	2012-2016
Cabo Verde	2008-2016	Nepal	2010-2016
Cambodia	2011-2016	Paraguay	2008-2016
Central African Republic	2010-2012; 2014-2015	Peru	2009-2016
Colombia	2009-2016	Philippines	2010-2016
Congo	2006-2016	Rwanda	2014-2016
Costa Rica	2010-2016	Senegal	2015
Côte d'Ivoire	2008-2016	Serbia	2007-2012
Dominican Republic	2007-2016	Solomon Islands	2011-2015
El Salvador	2009-2016	South Africa	2008-2016
Ethiopia	2011-2016	Sudan	2010; 2011-2015
Gabon	2012-2016	Tanzania	2009-2016
Georgia	2008-2016	Thailand	2009-2016
Ghana	2006-2011; 2014-2015	Timor-Leste	2010-2016
Guatemala	2010-2016	Togo	2006-2016
Honduras	2009-2015	Tunisia	2010-2012
India	2010-2016	Uganda	2015-2016
Indonesia	2008-2015	Ukraine	2007-2016
Jamaica	2007-2016	Vanuatu	2009-2014
Jordan	2007-2016	Zambia	2005-2016
Kenya	2014-2016	Zimbabwe	2012; 2015-2016
Kyrgyzstan	2014-2016		

Appendix B: Table 2, Model 8 Descriptive Statistics

variable	mean	p50	min	max	sd	iqr
Moodys	15.45	17.00	6.00	19.00	4.05	7.00
PDT(PEFA)	9.13	10.00	1.00	12.00	2.60	3.50
Democracy	1.68	2.00	0.00	3.00	0.74	1.00
Law	0.52	0.56	0.02	0.96	0.24	0.39
PropRights	0.69	0.73	0.18	0.93	0.16	0.21
GenGovTpcy	0.62	0.71	-2.23	3.11	0.97	1.38
GDPpcap	3276.83	2884.44	334.11	11993.49	2611.95	3682.72
GDPgrowth	4.09	4.19	-25.91	21.39	4.00	4.01
Inflation	6.27	4.99	-6.81	59.22	6.93	5.77
ExtDebtStock	44.00	33.98	0.00	250.74	28.08	35.86
Deficit	0.75	0.76	0.12	1.92	0.22	0.27
IMFprogram	0.33	0.00	0.00	1.00	0.47	1.00
Trade	80.98	76.46	19.10	170.77	32.03	48.44



Appendix C: Credit Rating Coding

Fitch	S&P	Moody's	Fitch Order	S&P Order	Moody's Order
AAA	AAA	Aaa	1	1	1
AA+	AA+	Aa1	2	2	2
AA	AA	Aa2	3	3	3
AA-	AA-	Aa3	4	4	4
A+	A+	A1	5	5	5
A	A	A2	6	6	6
A-	A-	A3	7	7	7
BBB+	BBB+	Baa1	8	8	8
BBB	BBB	Baa2	9	9	9
BBB-	BBB-	Baa3	10	10	10
BB+	BB+	Ba1	11	11	11
BB	BB	Ba2	12	12	12
BB-	BB-	Ba3	13	13	13
B+	B+	B1	14	14	14
B	B	B2	15	15	15
B-	B-	B3	16	16	16
CCC+	CCC+	Caa1	17	17	17
CCC	CCC	Caa2	18	18	18
CCC-	CCC-	Caa3	19	19	19
CC	CC	Ca	20	20	20
C	C		21	21	
DDD	SD	C	22	22	21
DD	D		23	23	
RD			24		
D			25		

Appendix D (Robustness Checks, Additional Descriptive Data on PDT-DA Variable Associations and PEFA participation)

- Robustness Tests and Details
  - D1- Alternative variables and sample subsets (estimations and explanatory notes)
  - D2- Add control variable for years since last default (estimations and discussion)
  - D3- Add control variable for financial openness (estimations and discussion)
  - D4- Alternative DV & alternative & deconstructed PEFA (estimations and discussions)
- Additional Descriptive Statistics of DA-PDT variable relationships
  - D5- Scatterplots of PDT and DA variables further confirming they are not collinear and should be partialed out as independent effects in models (summarized in main text via Table 1 correlation matrix)
- PEFA participant and non-participant credit rating distributions
  - D6- Box plots showing little difference in distribution of credit ratings between PEFA participants and non-participants
- DA relationship to Credit Ratings robust to sample size
  - D7- Confirm DA variables (especially law and property rights) are consistently associated with creditworthiness in smaller sample sizes when PDT is removed, showing sample size is not driving findings.

Appendix D1: Robustness Tests

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
DV	Moodys	S&P	Fitch	Moodys	Moodys	Moodys	Moodys	Moodys	Moodys	Moodys	Moodys	Moodys	Fitch	S&P
PDT	-0.634***	-0.425**	-0.573***				-0.384***	-0.276**	-0.326**	-0.396***	-0.359***			
	(0.190)	(0.186)	(0.185)				(0.124)	(0.137)	(0.133)	(0.123)	(0.114)			
Democracy	-0.467	0.429	0.096							-1.305**	-1.164*	0.182	0.101	0.101
	(0.576)	(0.523)	(0.715)							(0.569)	(0.593)	(0.127)	(0.113)	(0.113)
Law	-2.519	-4.114***	-2.973*				0.079	-2.222	-1.575	-1.432	-5.242			
	(1.542)	(1.541)	(1.682)				(2.805)	(2.584)	(2.689)	(2.605)	(3.473)			
PropRights	-1.773	-2.929	-1.993				-1.311	-1.908	-0.869	-1.645	-1.507			
	(1.769)	(1.842)	(1.781)				(1.742)	(1.939)	(2.081)	(1.960)	(1.782)			
PDT x Democracy				-0.099										
				(0.195)										
PDT x Law					-0.799									
					(0.551)									
PDT x PropRights						-0.685								
						(0.461)								
GenGovTpcy							1.340**	1.303**	1.075*	1.329**	1.541***	-0.086	0.049	0.049
							(0.522)	(0.580)	(0.624)	(0.539)	(0.558)	(0.092)	(0.082)	(0.082)
GDPpcap							-0.000*	-0.001**	-0.001**	-0.000**	-0.000**	0.000***	0.000***	0.000***
							(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
GDPgrowth							-0.070*	-0.076*	-0.048	-0.055	-0.061	-0.021	-0.014	-0.014
							(0.036)	(0.040)	(0.054)	(0.038)	(0.038)	(0.016)	(0.015)	(0.015)
Inflation							0.023	0.025	0.005	0.021	0.019	-0.009	-0.009	-0.009
							(0.027)	(0.027)	(0.022)	(0.027)	(0.026)	(0.010)	(0.009)	(0.009)
ExtDebtStock							0.020	0.021*	0.020	0.020*	0.020*	0.007***	0.000	0.000
							(0.012)	(0.012)	(0.014)	(0.012)	(0.011)	(0.002)	(0.002)	(0.002)
Deficit							-2.045*	-1.316	-2.259	-1.750	-1.766	1.358***	0.174	0.174
							(1.148)	(1.218)	(1.355)	(1.149)	(1.126)	(0.344)	(0.304)	(0.304)
IMFprogram							1.498***	1.479***	1.534***	1.396***	1.460***	-0.414***	-0.072	-0.072
							(0.507)	(0.527)	(0.551)	(0.491)	(0.510)	(0.159)	(0.133)	(0.133)
Trade							0.024**	0.020**	0.025**	0.025**	0.024**	-0.011***	-0.017***	-0.017***
							(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.002)	(0.002)	(0.002)
v2x_libdem							-6.820**							
							(2.848)							
polity2								-0.175**						
								(0.068)						
bmr_democracy									-1.731***					
									(0.552)					
WGIcorruption										-0.074				
										(0.988)				
Corruption											-2.949			
											(2.294)			
N	621	621	621	745	745	745	453	432	380	453	453	730	730	730
Country Effects	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Year FEs	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Region FEs	NO	NO	NO	NO	NO	NO	YES	YES	YES	YES	YES	YES	YES	YES
Inc Group FEs	NO	NO	NO	NO	NO	NO	YES	YES	YES	YES	YES	YES	YES	YES

* p<0.1 ** p<0.05 *** p<0.01

Constants Suppressed
Cluster-Robust SEs in Models 1-11; conventional SEs in Models 12-14 to allow greatest chance of inferring significance in relationship between democracy and obtaining a credit rating
Models 1-3: OLS dropping bottom 25% of PDT scores from sample
Models 4-6: OLS interaction confirming PDT effect not conditional on DA variables
Models 7-11: Alternative Democracy and Institutional Variables and Datasets
Models 12-14: Probit of obtaining a rating (to confirm democracies are not statistically more likely to have obtained a rating from agencies)
A note on interactions (Models 4-6 here): These are tests to simply confirm PDT effects are not significantly conditioned by DA variables. The estimations of the PDT on its own in these models is relatively meaningless. This is because they estimate PDT when their fellow interaction terms takes on a value of Zero, which is not a case that happens in real-life in this application (the minimum values of democracy, law, and property rights are all above 0.0- see Appendix B descriptive statistics). Similarly, the DA values are relatively meaningless on their own as they estimate effects when PEFA is 0, a case that does not appear in this sample (all have a PDT score of at least 1 - again see Appendix B). We accordingly suppress these values in this appendix in order to minimize risk of mis-interpretation. The estimations can be found via the replication code if interested.

Appendix D2: Control for Years Since Last Default Robustness Tests

	Moodys	S&P	Fitch
PDT	-0.786**	-0.514**	-0.363*
	(0.310)	(0.234)	(0.202)
Democracy	-0.355	-0.569***	-0.025
	(0.366)	(0.218)	(0.260)
Law	0.772	0.232	1.486
	(3.234)	(2.064)	(2.610)
PropRights	1.312	3.153	3.464
	(4.225)	(3.188)	(3.043)
GenTpcy	0.042	0.611	0.147
	(0.612)	(0.391)	(0.488)
GDPpcap	-0.001*	-0.001	-0.001***
	(0.001)	(0.000)	(0.000)
GDPgrowth	-0.005	-0.000	-0.007
	(0.023)	(0.025)	(0.019)
Inflation	-0.009	0.016	0.016
	(0.015)	(0.017)	(0.015)
ExtDebtStock	0.018	0.013	0.030***
	(0.017)	(0.008)	(0.012)
Deficit	1.550	0.311	1.211
	(1.827)	(1.212)	(0.986)
IMFprogram	0.341	0.215	-0.033
	(0.381)	(0.259)	(0.253)
Trade	-0.005	-0.011	-0.017
	(0.020)	(0.015)	(0.015)
YrsSinceDefault	-0.085	-0.009	-0.022
	(0.078)	(0.051)	(0.038)
N	419	419	419

* p<0.1 ** p<0.05 *** p<0.01
Notes: 2SLS models (model 8 in each table with extra control for years since default)

Discussion: These models add a control for *YrsSinceDefault,* which captures whether any amount of debt is in default to any lender (private or official, such as IMF or World Bank). 0 means the country is currently in default on any amount, and years since such position otherwise. The estimated effect of the variable is insignificant but in the expected direction: more years since last default should improve credit ratings. PDT's effect is the same across models when *YrsSinceDefault* is included. Of the 9 DA variable estimations in the models above, only one is significant in the expected direction. So, results persist with *YrsSinceDefault* despite the slight drop in N from the main models.

Appendix D3: Control for Years Since Last Default Robustness Tests

	Moodys	S&P	Fitch
PDT	-0.680**	-0.518**	-0.328*
	(0.268)	(0.228)	(0.199)
Democracy	-0.284	-0.460**	0.081
	(0.333)	(0.229)	(0.230)
Law	0.854	0.330	1.120
	(2.830)	(2.088)	(2.172)
PropRights	0.919	2.877	3.507
	(4.115)	(3.136)	(2.836)
GenTpcy	0.045	0.579	0.102
	(0.595)	(0.387)	(0.462)
GDPpcap	-0.001*	-0.000	-0.001**
	(0.001)	(0.000)	(0.000)
GDPgrowth	-0.010	-0.004	-0.024
	(0.031)	(0.028)	(0.022)
Inflation	-0.007	0.016	0.025*
	(0.017)	(0.015)	(0.013)
ExtDebtStock	0.020	0.012	0.025**
	(0.016)	(0.009)	(0.011)
Deficit	1.690	0.224	1.117
	(1.699)	(1.328)	(0.991)
IMFprogram	0.204	0.205	0.064
	(0.406)	(0.289)	(0.235)
Trade	-0.001	-0.012	-0.018
	(0.020)	(0.014)	(0.015)
ka_open	0.077	0.285	1.193
	(1.302)	(0.490)	(0.918)
N	423	423	423

* p<0.1 ** p<0.05 *** p<0.01

Notes: 2SLS models (model 8 in each table with extra control for ka_open)

Discussion: These models control for ka_open from the Chinn-Ito index. Results persist despite the loss of a few dozen N and some countries

Appendix D4: Alternative DV and PDT Robustness Tests

Model	1	2	3	4	5	6	7	8	9
DV	BestRtg	BestRtg	Moodys	Fitch	S&P	BestRtg	BestRtg	BestRtg	BestRtg
PDT	-0.344***	-0.467**							
	(0.116)	(0.204)							
PDT_avg			-0.965**	-1.358***	-0.915*	-1.214***			
			(0.479)	(0.443)	(0.487)	(0.448)			
RcdDebt							-1.324***		
							(0.448)		
LoanPrcssQual								-1.064***	
								(0.361)	
DSAs									-0.161
									(0.317)
Democracy	0.163	-0.280	-0.269	0.242	0.308	0.080	-0.016	0.222	0.448
	(0.427)	(0.280)	(0.534)	(0.666)	(0.627)	(0.441)	(0.465)	(0.446)	(0.507)
Law	-1.529	-0.920	-4.425*	-4.572	-7.568***	-2.079	-1.859	-1.896	-2.788
	(2.283)	(2.220)	(2.618)	(2.828)	(2.709)	(2.243)	(2.158)	(2.185)	(2.440)
PropRights	-3.411*	2.552	-1.512	-4.052*	-4.226**	-3.522*	-2.954	-2.984	-4.195**
	(2.005)	(3.155)	(2.065)	(2.207)	(1.974)	(1.935)	(1.943)	(2.095)	(2.063)
GenTpcy	0.048	0.340	1.294**	1.133*	1.605**	0.199	0.231	-0.061	0.193
	(0.498)	(0.460)	(0.590)	(0.677)	(0.616)	(0.496)	(0.494)	(0.463)	(0.561)
GDPpcap	-0.001***	-0.001***	-0.001***	-0.000**	-0.000**	-0.001***	-0.001***	-0.001***	-0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
GDPgrowth	-0.054	-0.002	-0.071*	-0.013	-0.022	-0.059	-0.053	-0.011	-0.061
	(0.044)	(0.015)	(0.043)	(0.042)	(0.044)	(0.045)	(0.044)	(0.059)	(0.042)
Inflation	0.027	0.004	0.025	0.033	0.027	0.023	0.032	-0.003	0.042
	(0.026)	(0.015)	(0.024)	(0.028)	(0.026)	(0.025)	(0.027)	(0.029)	(0.028)
ExtDebtStock	0.014	0.020**	0.019	0.020	0.026*	0.014	0.014	0.017	0.009
	(0.012)	(0.010)	(0.012)	(0.014)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)
Deficit	-1.419	-0.234	-1.618	-0.001	0.825	-1.260	-1.332	-2.386*	-0.739

	(1.293)	(0.593)	(1.281)	(1.438)	(1.432)	(1.316)	(1.241)	(1.339)	(1.326)
IMFprogram	1.700***	0.143	1.354**	1.465***	1.500***	1.611***	1.600***	1.674***	1.437***
	(0.467)	(0.274)	(0.575)	(0.549)	(0.473)	(0.464)	(0.447)	(0.478)	(0.497)
Trade	0.003	-0.006	0.014	0.022*	0.016	0.004	0.006	0.001	0.014
	(0.011)	(0.013)	(0.011)	(0.013)	(0.011)	(0.012)	(0.012)	(0.012)	(0.013)
N	463	463	463	463	463	463	463	463	463

* p<0.1 ** p<0.05 *** p<0.01

Model 1: same as OLS model four in tables with "Best Rating" DV

Model 2: same as 2SLS model 8 in tables with "Best Rating" DV

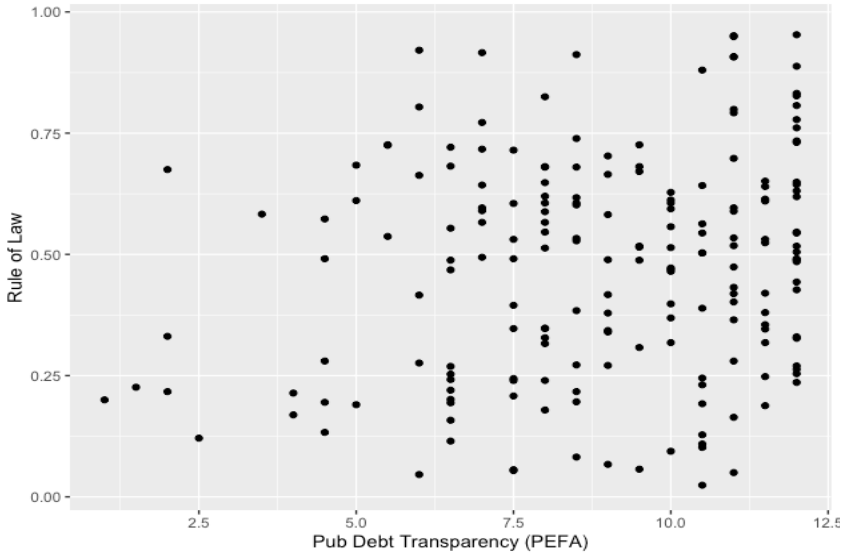
Models 3-6: same as OLS model four in tables with using average of 3 components of PDT score rather than sum

Models 7-9: same as OLS model four in tables with "Best Rating" DV using specific components of the PEFA scores used to construct PDT

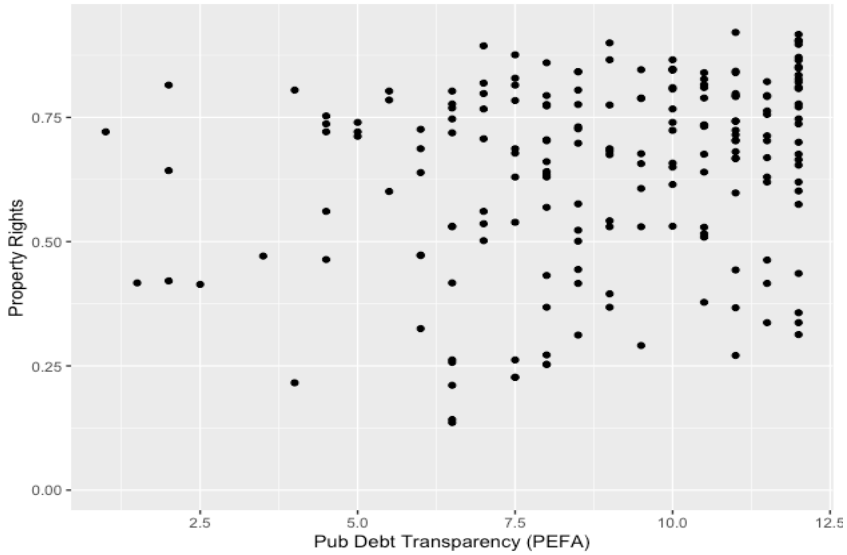
Discussion: Models 1 and 2 combine Moody's, S&P, and Fitch then take the best rating among them as the DV. Results persist. In addition to providing another robustness test, this eases concern that imputing unrated years is driving findings. Models 3-6 use an average, rather than sum, of the 3 PEFA scores used to construct the PDT variable. This shows the effect of public debt transparency does not depend on how the PDT variable is constructed. Higher values, whether in an additive sum index or in an index averaging the quality of the three behaviors, improve creditworthiness and make the DA variables inconsistent. Models 7-9 then use those three components as explanatory variables independently. The story is very strong for the first two components (reporting and financial process quality, no DA variable is significant in models 7 or 8). DSAs are not significant at the 10% level but keep the expected sign, but still affect DA with 2 of the 3 DA variables being insignificant. This might suggest that the three rating agencies are most focused on data provision and "quality" of public debt management processes, and less concerned with forward looking plans and forecasts, despite work by the World Bank and others on the importance of debt sustainability assessments.

Appendix D5: Scatterplots confirming PDT not collinear to continuous V-Dem liberal democracy measure

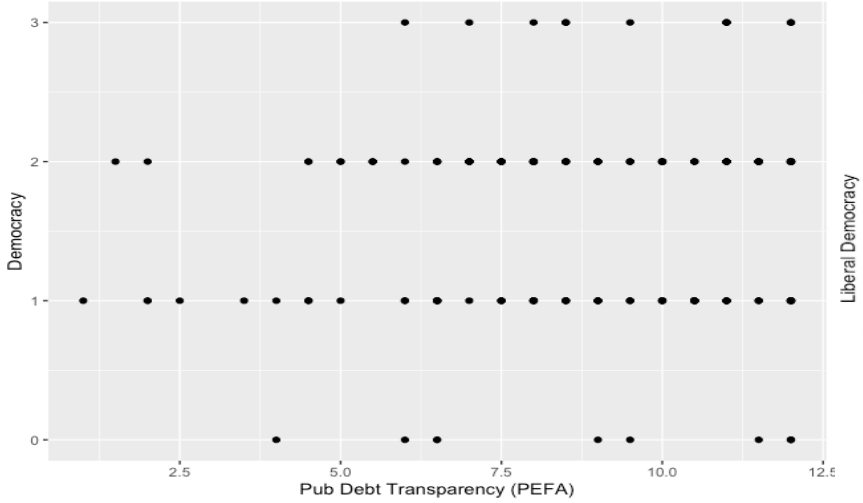
Graph 1: Rule of Law & Public Debt Transparency Scatterplot



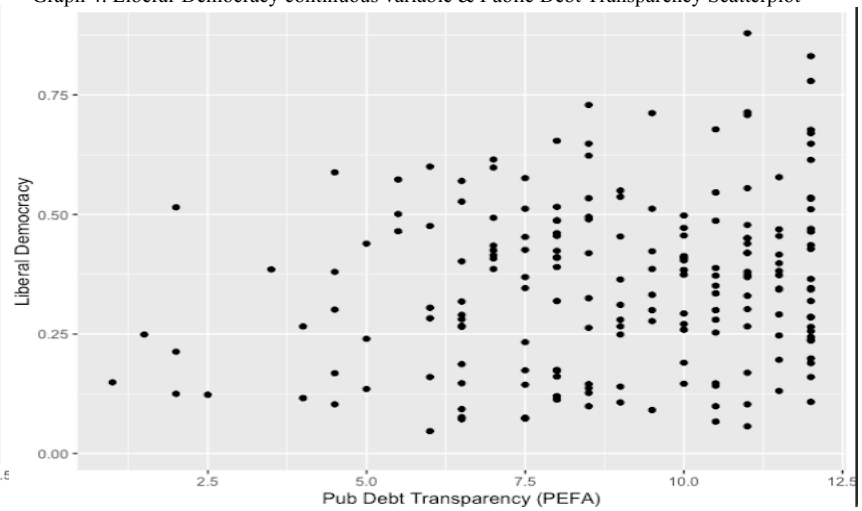
Graph 2: Property Rights & Public Debt Transparency Scatterplot



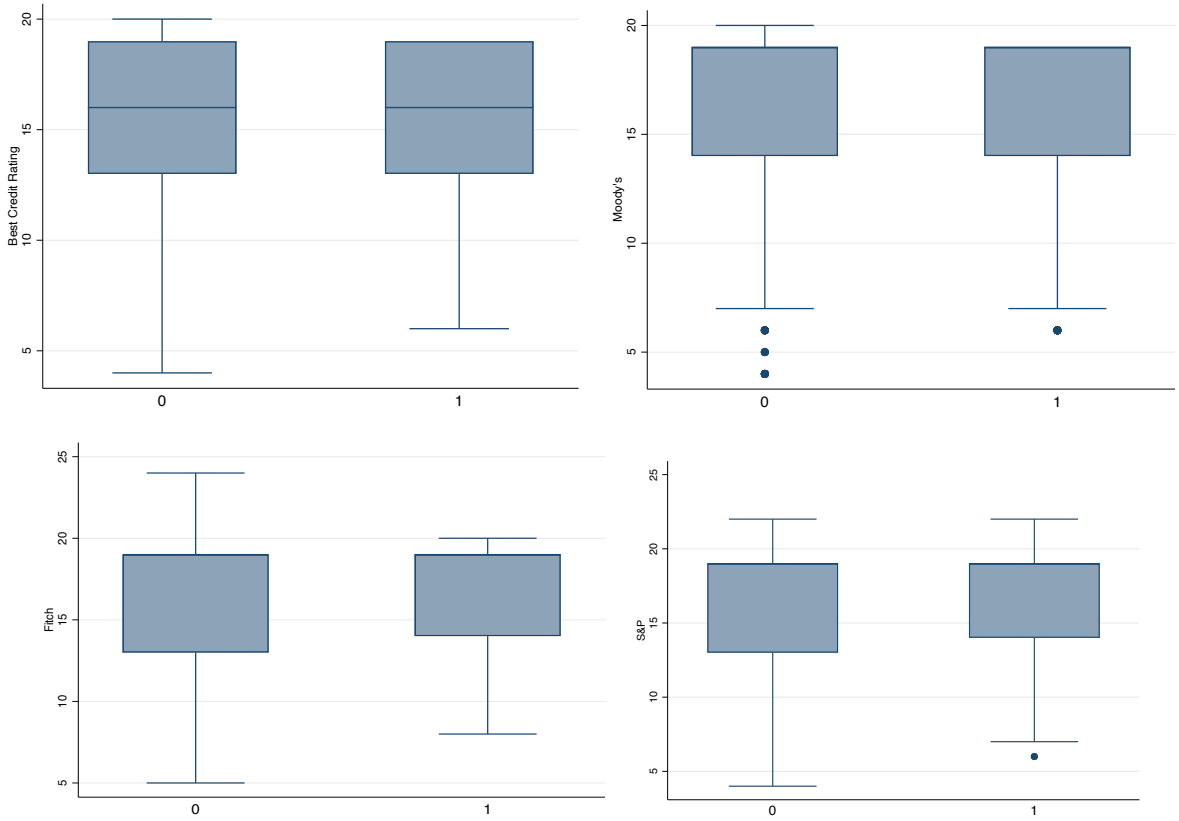
Graph 3: Democracy & Public Debt Transparency Scatterplot



Graph 4: Liberal-Democracy continuous variable & Public Debt Transparency Scatterplot



Appendix D6: PEFA participant and non-participant credit rating distributions (0 = non-participant, 1 = participant)



Discussion: These box plots compare the distribution of credit ratings between PEFA participants and non-participants (using Moody's, Fitch, S&P, and the best rating the country has from all three). All four plots show the distribution of credit ratings between PEFA participants and non-participants is not significantly different, particularly with reference to the IQR range of each sub-population. This suggests that, if non-participants obtained PEFA scores, adding new countries to the sample of participants would not be likely to change findings. Also notable is that non-participants whiskers go further into investment-grade territory than participants, further signaling it is not only creditworthy countries that select into participating in PEFA.

Appendix D7: DA (without PEFA) relationships robust to sample size

DV	Moodys				Fitch				S&P			
Model	1	2	3	4	1	2	3	4	1	2	3	4
Democracy	-0.453**			0.052	0.342			0.497*	0.241			0.472*
	(0.222)			(0.271)	(0.225)			(0.259)	(0.224)			(0.267)
Law	-4.111***	-4.492***	-4.719**	-3.606***	-3.107***	-2.671***	-4.056***	-6.654***	-5.264***	-4.928***	-5.058***	-9.176***
	(0.907)	(0.926)	(2.022)	(1.288)	(0.869)	(0.856)	(0.678)	(1.211)	(0.857)	(0.860)	(1.709)	(1.199)
PropRights	-1.958**			-2.033**	-4.256***			-4.309***	-4.116***			-4.356***
	(0.808)			(1.001)	(0.797)			(0.974)	(0.781)			(0.925)
GenTpcy	0.861***	0.636***		0.874***	0.781***	0.654***		1.381***	1.091***	0.943***		1.827***
	(0.226)	(0.221)		(0.309)	(0.227)	(0.236)		(0.293)	(0.231)	(0.226)		(0.283)
GDPpcap	-0.001***	-0.001***		-0.001***	-0.001***	-0.001***		-0.000***	-0.000***	-0.001***		-0.000***
	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)		(0.000)
GDPgrowth	0.042	0.055		-0.068	0.009	0.031		-0.013	0.022	0.044		-0.021
	(0.035)	(0.036)		(0.041)	(0.031)	(0.032)		(0.036)	(0.034)	(0.035)		(0.039)
Inflation	0.059***	0.066***		0.048***	0.064***	0.084***		0.053***	0.051***	0.070***		0.039**
	(0.015)	(0.015)		(0.015)	(0.015)	(0.016)		(0.016)	(0.015)	(0.016)		(0.016)
ExtDebtStock	0.006*	0.005		0.014**	0.002	0.001		0.016***	0.009**	0.007**		0.024***
	(0.004)	(0.003)		(0.006)	(0.004)	(0.004)		(0.005)	(0.004)	(0.004)		(0.006)
Deficit	-1.725***	-1.884***		-0.851	-0.189	-0.278		0.603	-0.432	-0.535		1.190*
	(0.643)	(0.646)		(0.763)	(0.514)	(0.521)		(0.584)	(0.595)	(0.605)		(0.673)
IMFprogram	1.752***	1.659***		1.441***	1.708***	1.531***		1.100***	1.916***	1.743***		1.214***
	(0.251)	(0.245)		(0.296)	(0.249)	(0.250)		(0.312)	(0.222)	(0.229)		(0.284)
Trade	0.012***	0.012***		0.015***	0.028***	0.025***		0.028***	0.017***	0.015***		0.020***
	(0.004)	(0.004)		(0.005)	(0.004)	(0.004)		(0.005)	(0.004)	(0.004)		(0.005)
N	742	742	453	453	742	742	453	453	742	742	453	453

* p<0.1 ** p<0.05 *** p<0.01

Discussion: Given data missingness issues in research on developing countries, it is possible that the reduction in sample size moving from left-to-right in the main text tables is driving the loss of a significant relationship between DA (particularly *Law* and *PropRights*, following Biglaiser & Staats 2012) rather than PDT. To check this, these models show that DA relationships are significant in the expected direction across the various smaller sample sizes in main text Tables 2-4, *when PDT is not included in the regression*. These

Appendix D7 models in turn: (1) repeat model 4, with 742 N, with only DA; (2) repeat model 4, with 742 N with only "Law"; (3) subset the sample to only include the 453 observations in model 8 to check the bivariate relationship between law and creditworthiness in that smaller sample; (4) repeat model 4 with only those 453 observations and not include PDT.
Across all 4 tests, and for all three agencies (so 12 models), both *Law* and *PropRights* are significant in the expected direction without PDT. These all confirm the sample size is not driving the loss of a relationship between DA variables and creditworthiness. It is far more likely that PDT is confounding the relationship when it is included.

Appendix E (Alternative Ways of Handling Unrated Country-Years)

- Imputed Missing Values for Unrated Country Years Robustness Tests
    - Estimations (discussion in main text)

Appendix E: Imputation Robustness Tests

	1	2	3	4	5	6	7	8	9
PDT	-0.280***	-0.151***	-0.265***	-0.177***	-0.163***	-0.187***	-0.193***	-0.167***	-0.200***
	(0.047)	(0.050)	(0.043)	(0.047)	(0.027)	(0.041)	(0.064)	(0.039)	(0.014)
Democracy	-1.016***	-0.413*	-0.569***	-0.644***	-0.270**	-0.402***			
	(0.329)	(0.241)	(0.194)	(0.213)	(0.124)	(0.128)			
Law	-0.519	-1.807	-0.604	-0.069	0.092	0.067	-0.314	-0.326	-0.456
	(1.535)	(1.194)	(0.977)	(0.987)	(0.835)	(0.774)	(1.243)	(0.803)	(0.675)
PropRights	3.200***	2.282***	5.206***	4.231***	2.980***	4.307***	4.495***	2.853***	4.772***
	(0.909)	(0.807)	(0.638)	(0.976)	(0.849)	(0.787)	(0.972)	(0.579)	(0.403)
GenGovTpcy	-0.083	0.328	-0.253	-0.179	0.032	-0.177	-0.129	0.095	-0.191***
	(0.322)	(0.248)	(0.213)	(0.162)	(0.131)	(0.138)	(0.144)	(0.131)	(0.059)
GDPpcap	-0.000***	-0.001***	-0.000***	-0.001***	-0.001***	-0.000***	-0.001***	-0.001***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
GDPgrowth	0.025	-0.010	0.004	0.009	-0.024**	-0.021**	0.008	-0.027***	-0.023***
	(0.015)	(0.015)	(0.015)	(0.008)	(0.012)	(0.010)	(0.011)	(0.007)	(0.004)
Inflation	0.047***	0.034*	0.044***	0.025***	0.014	0.028***	0.024***	0.014***	0.028**
	(0.014)	(0.018)	(0.010)	(0.008)	(0.009)	(0.008)	(0.002)	(0.005)	(0.012)
ExtDebtStock	0.032***	0.030***	0.029***	0.032***	0.023***	0.023***	0.030***	0.022***	0.021***
	(0.006)	(0.006)	(0.004)	(0.003)	(0.003)	(0.003)	(0.002)	(0.004)	(0.003)
Deficit	-1.274**	-1.474***	0.745**	-0.935***	-1.376***	0.509*	-1.007***	-1.334***	0.469*
	(0.538)	(0.412)	(0.308)	(0.314)	(0.279)	(0.274)	(0.144)	(0.138)	(0.245)
IMFprogram	1.216***	0.789***	0.625***	0.753***	0.298***	0.399***	0.789***	0.243	0.345***
	(0.209)	(0.183)	(0.139)	(0.126)	(0.111)	(0.087)	(0.120)	(0.152)	(0.035)
Trade	-0.002	0.002	-0.001	-0.006*	0.003	0.003	-0.007**	0.002	0.001
	(0.003)	(0.004)	(0.003)	(0.004)	(0.003)	(0.004)	(0.003)	(0.001)	(0.002)
N	453	453	453	453	453	453	453	453	453
Year FEs	YES	YES	YES	YES	YES	YES	YES	YES	YES
Region FEs	YES	YES	YES	YES	YES	YES	YES	YES	YES
Inc Group FEs	YES	YES	YES	YES	YES	YES	YES	YES	YES
Regime Level							YES	YES	YES

* p<0.1 ** p<0.05 *** p<0.01

Constants Suppressed

Cluster-Robust SEs in all models

OLS (Models 1-3); REs (Models 4-6); Nested Res with Regime as Level (Models 7-9)

DVs: Imputed Moody's (models 1, 4, 7); Imputed S&P (models 2, 5, 8); Imputed Fitch (models 3, 6, 9)

Appendix F (First-stage and instrument discussion)

- F1: First-stage selection equations in Heckman models
  - Discussion
  - Model estimation table
- F2: Further discussion of instrument in 2SLS models
  - Discussion
  - Correlations

Appendix F1: Heckman first-stages

These are the first-stage estimations for model 5 in each of the estimation tables (2-4) in the main text. They estimate and control for the hazard of selection into PEFA participation, which is then added to the outcome equation. Notably, the Inverse Mills Ratio is insignificant in all three models. Also notable is that democracy does not make PEFA participation more likely.

Variables excluded from outcome equation:

- *Opposition*
  - To the best of our knowledge, opposition party strength has never been shown to systematically shape creditworthiness and, outside of a link to the DA thesis, it is hard to theorize why this would be the case. But it does shape government transparency and thus potentially participation in a program like PEFA (Berliner 2014).
- *ODAperGNI*
  - ODA (for disaster relief, or local, regional, and global health, for example), does not necessarily imply more or less creditworthiness. Developing countries use multiple financial resources when borrowing each year regardless of creditworthiness (Bunte 2019 for example). But ODA is shown to shape transparency through conditionality and monitoring (de Renzio 2009).
- *BondDummy*
  - Bond issuance is a dummy (not amount). It is not clear how issuing a bond would systematically move creditworthiness up or down, so it is not included in the outcome equation (though of course creditworthiness, the Y in those equations, at very low values, may shape the bond dummy). And for the same logic as the above point about ODA, much recent research shows issuing a bond of some size, or drawing on capital markets to some extent, often happens regardless of (or despite) weak credit ratings. However, issuing a bond may incentivize participating in a transparent public finance program like PEFA.

Variables from the outcome equation are also included if they may make participation in IFI programs like PEFA more likely (trade volume, property rights, and rule of law are not included, for example).

Appendix F1: Selection equations in main models

	Moody's	S&P	Fitch
Opposition	-0.053	-0.053	-0.053
	(0.090)	(0.090)	(0.090)
ODAperGNI	0.013	0.013	0.013
	(0.017)	(0.017)	(0.017)
anyDummy	0.340*	0.340*	0.340*
	(0.192)	(0.192)	(0.192)
Democracy	0.181	0.181	0.181
	(0.113)	(0.113)	(0.113)
GenTpcy	0.314***	0.314***	0.314***
	(0.081)	(0.081)	(0.081)
GDPpcap	-0.000***	-0.000***	-0.000***

	(0.000)	(0.000)	(0.000)
GDPgrowth	-0.099***	-0.099***	-0.099***
	(0.019)	(0.019)	(0.019)
Inflation	-0.011	-0.011	-0.011
	(0.010)	(0.010)	(0.010)
ExtDebtStock	-0.002	-0.002	-0.002
	(0.002)	(0.002)	(0.002)
Deficit	0.058	0.058	0.058
	(0.371)	(0.371)	(0.371)
IMFprogram	0.235	0.235	0.235
	(0.149)	(0.149)	(0.149)
ka_open	-0.299**	-0.299**	-0.299**
	(0.126)	(0.126)	(0.126)
_cons	0.435	0.435	0.435
	(0.431)	(0.431)	(0.431)
/			
mills	0.342	0.896	1.483
	(1.615)	(1.468)	(1.860)

* p<0.1 ** p<0.05 *** p<0.01

Heckman SEs

First-stage of Heckman selection models (Probit estimations of PEFA participation); All estimations equal because same first stage model across Heckman models

Appendix F2: More on the IV in each table's Model 8

The main text presents theoretical and statistical reasons for the validity of using a dummy for whether there was a new PEFA report that year as an IV. In general, the claim is that the action of producing a new report itself doesn't affect the outcome, save by reflecting the practices on which it is reporting.

One may still wonder if a country is likely to get a new PEFA report when it is more or less creditworthy, which would mean the instrument is directly correlated with the outcome equation's DV. The box plots of creditworthiness among PEFA participants and non-participants in Appendix D signals that the distribution of creditworthiness in non-participants is broadly the same as participants', and in fact non-participants include more creditworthy countries in its distribution. But other tests are still useful.

Here, the dummy "NewPEFAReportYr," which is the dummy IV, is shown to be (1) insignificantly related to creditworthiness and (2) when unit effects are included, so the within-unit relationship between creditworthiness and getting a new PEFA report is estimated, signs change. There is no systematic relationship between the act of getting a PEFA report and creditworthiness that undermines this dummy variable as an IV.

This further eases concern that countries systematically get new PEFA reports only when they are more or less creditworthy, or that the act of simply getting a new report shapes creditworthiness more than what the score reflects about the transparency of a country's public debt management practices. This along with the theoretical and statistical evidence already discussed, lends significant credibility to the instrument.

Appendix F2: Correlation b/w New Report Timing and Credit Ratings

	Simple correlation			Correlation with unit FE		
	Moody's	Fitch	S&P	Moody's	Fitch	S&P
NewPEFAReportYr	0.134	0.425	0.137	-0.167	-0.038	-0.128
	(0.290)	(0.285)	(0.286)	(0.124)	(0.093)	(0.102)
N	1632	1632	1632	1632	1632	1632

* p<0.1 ** p<0.05 *** p<0.01