


December Fever in Public Finance

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Eichenauer, Vera 

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Vera Z. Eichenauer

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KOF

ETH Zurich
KOF Swiss Economic Institute
LEE G 116
Leonhardstrasse 21
8092 Zurich, Switzerland

Phone +41 44 632 42 39
Fax +41 44 632 12 18
www.kof.ethz.ch
kof@kof.ethz.ch

December Fever in Public Finance*

Vera Z. Eichenauer[†]

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Abstract

Public spending often increases at the end of fiscal years. This is undesirable because late spending tends to be inefficient. The causes for these spending spikes are however poorly understood. This paper offers a novel identification strategy that relies on the historic variation in countries' fiscal years to analyze their effect on government disbursements. We show that the end of fiscal years rather than alternative explanations cause spending spikes at the end of fiscal years. Our accounting data includes discretionary contributions of 27 OECD countries to the World Bank from 2002 to 2013 at the daily level. As suggested by the principal-agent theory, we find that the end of year effect is smaller in countries with high administrative quality. We analyze the pertinent budget institutions as possible mechanism. For the first time, we can show that unexpected positive demand shocks decrease year-end spending, a common assumption in the literature. Finally, we revisit the complementary explanations for year-end effects in public spending.

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[†] KOF Swiss Economic Institute, ETH Zurich, Switzerland. Email: eichenauer@kof.ethz.ch

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JEL codes: F35, H50, H61, F53

1 Introduction

It is undisputed that fiscal performance impacts countries' long-run economic growth (see e.g., Fischer, 1993; Easterly and Rebelo, 1993; Easterly et al., 2008). Above-average spending at the end of the budget year is a recurring and unresolved issue that affects fiscal performance.¹ There is no cross-country comparison of the size of above-average spending at the end of the fiscal year is available but evidence for such spending spikes in the public sector comes from a variety of countries and government activities. Year-end spikes are reported for Canadian military spending (Hurley et al., 2014), United States government procurement (e.g., Liebman and Mahoney, 2017), job training programs by German local governments (Fitzenberger et al., 2016), the British central government and Northern Irish departments (e.g., Baumann, 2019).² Until recently, data limitations have prevented researchers to analyze this budgetary phenomenon that policy makers have discussed for decades.

Bureaucrats, economists, and policy makers seem to agree that year-end spending is less efficient than spending at other times of the fiscal year. In bureaucracies, the ubiquity of year-end spending spikes (YESS) is illustrated by their apt nicknames, reflecting the common wisdom that year-end spending are different and 'unhealthy': 'March Madness,' 'Spring Sale,' and 'December Fever' refer to the season in which the respective fiscal year ends. Economic theory also predicts that year-end expenditures have lower returns because the incentives at the end of the fiscal year are different. In most government agencies, the returning of left-over funds is not rewarded or may even be punished, for example by a lowered budget in the next budget periods. Consequently, the budget authority's opportunity cost of spending are close to zero. These incentives make spending at the end of the fiscal year different from spending at other times of the year, predicting a lower concern for spending money well. For decades, U.S. government reports raised concerns about the rationale and quality of year-end spending³. Recent research suggests that these efficiency concerns are justified. Liebman and Mahoney (2017) offer the first econometric evidence that end-of-year spending is wasteful. They find that the average information technology (IT) project procured by the U.S. federal government at the end of the fiscal year offers less value for money than those procured at other times. Common wisdom, theory, and statistical evidence thus align: year-end spending is less efficient.

These inefficiencies are consequential from an aggregate perspective. The U.S. Senate Subcommittee (1980) on Oversight of Government Management notes that despite the share of year-end spending being small relative to total government budgets, spending at the end of the fiscal year amounts to large sums of money. Even small efficiency losses lead to major costs. The ability to reduce such wasteful spending and improve fiscal performance will depend on the identification of the adequate policy. However, the empirical evidence on the causes and remedies for YESS is limited and sometimes even contradictory.

¹Budget holders face disbursement pressure at the end of the year as authorized budgets need to respect the *bona fide* principle. This principle requires that budget appropriations for a given fiscal year are spent within that fiscal year. This does not explain the unequal spending pattern within the fiscal year as bureaucrats are well aware of the end of the budget period throughout the fiscal year.

²See also: Douglas and Franklin (2006); McPherson (2007); Fichtner and Greene (2014).

³(Comptroller General of the United States, 1980; Government Accountability Office, 1980, 1985, 1998, 2004)

This paper provides causal evidence of a year-end spending spree using internationally comparable accounting data from the World Bank.⁴ The data contain 13,209 transfers of 27 OECD donor countries over the Bank’s 2002-2013 fiscal years at the daily level.⁵ The financial flows originate from donor countries’ foreign aid budget and are earmarked to one of the up to 1669 World Bank funds set up to the benefit of specific countries or issues. From the perspective of the donor country, the contributions to these accounts are discretionary in terms of timing. The financial flows represent neither multilateral membership fees, debt repayments nor are they related to bills that need to be paid before the end of a fiscal year.

As we explain in more detail in Section 2, earmarked aid to multilateral organizations is a new trend in foreign aid provision. There is an increase in the analyzed contributions over the sample period, which represent roughly USD 12.1 billion in the World Bank’s fiscal year 2012 and total almost USD 98.1 billion from 2002-2013. Figure 1 puts these numbers into perspective: gross disbursements by the International Development Association (IDA), the concessional lending arm of the World Bank Group, amounted to USD 10.9 billion in the 2012 fiscal year. The accounting data contain subannual public expenditures by OECD countries that is comparable across budgeting and accounting regimes. This provides us with the unique opportunity to study the effect of the budget year on public spending. Moreover, our institutional setting allows us to identify the pure supply-side effect of the end of the fiscal year. On the World Bank side, there are no absorption constraints for the analyzed financial flows from donor countries. For much of discretionary government spending where quantity, quality and the price can be adjusted to ensure that remaining funds are fully spent (e.g. acquisition of IT and other equipment, staff training, repairs and maintenance (Hyndman et al., 2005)), there are no absorption constraints for spending either. This aspect of the data allows for a clean identification of the extent of disbursement pressure across countries. In further analyses, we suggest and test a new explanation for YESS and analyze existing mechanisms.

Our cross-country panel results complement and extend the two theoretical models and calibration evidence on YESS from three Anglo-Saxon entities – the United States, the United Kingdom, and Northern Ireland (Liebman and Mahoney, 2017; Baumann, 2019). Note that we focus on the timing of OECD countries’ contributions to the World Bank accounts, not the World Bank’s subsequent disbursements of these funds that often occurs with significant delays.

This paper contributes to our understanding of year-end spending in four ways. First, we causally identify the effect of fiscal calendars on increased spending. This effect is non-trivial to identify as its annual regularity implies that it cannot be disentangled from other annually recurring events. Consider the case of the United States: There is observational equivalence between the end of the U.S. government’s fiscal year in September and the increased activity when federal staff returns from the summer break. We disentangle the seasonal from the fiscal year explanation by exploiting that the summer slow-down occurs in all Northern Hemisphere countries but that fiscal years end in December, March,

⁴The bulk of the data are publicly available at: <https://finances.worldbank.org/Trust-Funds-and-FIFs/Paid-in-Contributions-to-IBRD-IDA-IFC-Trust-Funds/ia5w-w33s> (last accessed on December 1, 2019). The public data do not include some of the details required for the analyses in this paper (e.g., the contribution date).

⁵The fiscal year at the World Bank runs from July 1 to June 30. All amounts are in constant 2013 USD.

or June elsewhere. Our novel identification strategy exploits the pre-determined cross-country variation in fiscal years to disentangle the effect of the governments' fiscal years from such alternative explanations. The cross-country differences in fiscal years date back decades and were adopted for reasons not related to the management practices in use in public bureaucracies today. We find that irregular subannual spending is caused by the end of the fiscal year. The year-end effect increases when we control for the calendar period. This suggests that the effect of the fiscal year might even be underestimated in a naive comparison of different months within a country. Our finding is corroborated by anecdotal evidence. Staff at bilateral aid agencies told the authors that contributions to World Bank funds are a way to spend expiring budgets. As one French aid official wrote in an e-mail: “[The fiscal year] is of course only one explanatory element for the use of trust funds. But a powerful one.”⁶

Our second contribution suggests administrative quality as a complementary reason for YESS. The principal-agent framework provides a useful way to think about year-end spending. There is a clear asymmetry of information between the principal and the agent about the reasons for year-end spending spikes. The budget holder responsible for the timing of the expenses in the public administration is the agent whereas her most direct principal is the upper-level management and the finance minister. Principal-agent theory proposes to reduce the asymmetry of information about the (in)actions of the agent that cause the budget remainders through monitoring, incentives, reputation, trust, and the culture in the administration. We think that many of the solutions proposed for principal-agent mechanisms are more likely to be present in a well-functioning or “good” administrations and argue that administrative quality is associated with lower YESS across countries. By testing for this explanation with our fine-grained data, we deepen the cross-country literature on institutional quality. At the macroeconomic level, the role of government bureaucracies' administrative capacity in fiscal and other outcomes is well established (in economics, e.g., Knack and Keefer, 1995; Keefer and Knack, 2007; Knack and Rahman, 2007; Van de Walle, 2006). At a more microeconomic level, a growing body of evidence finds that management and organizational practices (monitoring, targeting and incentives) explain an important share of productivity differences across firms and other management units (Bloom et al., 2014).⁷ We apply the arguments from these literatures to the subannual management of public funds. Our results show that countries with higher bureaucratic quality have lower spending spikes at the end of their respective fiscal year. This is in line with U.S. government reports on year-end spending which suggest improvements in aspects of administrative quality (Hyndman et al., 2005, p.8).

Our third contribution is to improve our understanding about the institutions that curb or promote YESS by opening the ‘black box’ of administrative quality. Administrative quality is a function of the frictionless interactions between high-quality institutions, well-trained staff, and an adequate technical infrastructure. Due to data constraints, we mainly focus on the ‘institutional channel’ through which administrative quality can re-

⁶E-mail exchange in October 2014, translated from French by the author.

⁷Around a quarter to a third of total factor productivity gaps between firms within and across countries can be accounted for by management. Variation in management practice (monitoring, targets and incentives) affects industry-specific organizational performance (as measured, e.g., by labor productivity or student scores) in firms but also in hospitals or schools (Bloom et al., 2014). In tax administrations, rigorous performance tracking is one of four drivers of performance tax administrations (Dohrmann and Pinshaw, 2009).

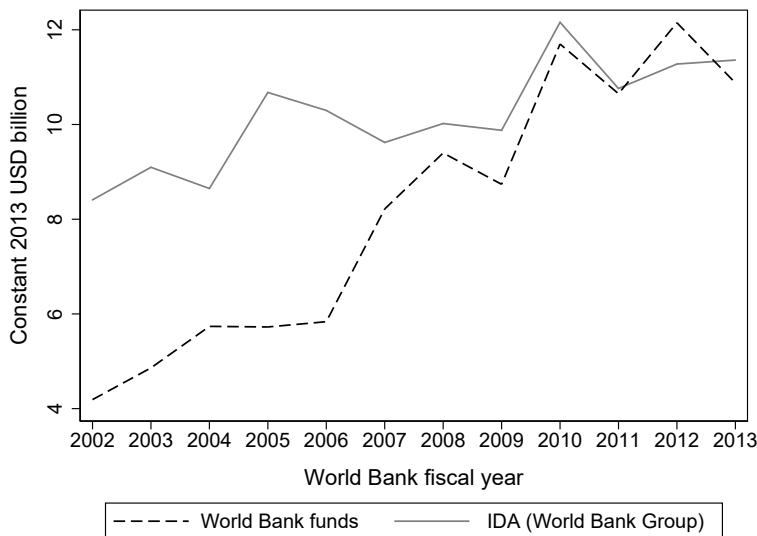
duce YESS. Using original hand-coded data as well as data from existing sources, we analyze the variation within and across countries in the institutional autonomy of the government agency, the introduction of multiannual budgetary frameworks, the transition from cash to accrual accounting, and the existence of fiscal and carry-forward rules. We also examine whether Baumann’s (2019) explanation of rationally procrastinating bureaucrats drives our findings of the YESS-reducing role of administrative quality.

Our fourth contribution is to revisit the complementary explanations for YESS proposed in the literature. Liebman and Mahoney (2017) propose precautionary savings and Baumann (2019) procrastinating bureaucrats to explain YESS. Their formal principal-agent models also form the basis for their contradictory policy recommendations. We provide the first evidence for their common assumption that random spending shocks reduce year-end spending. We further analyze the direction of the relationship between YESS and uncertainty about which the two papers make diverging predictions.

The discussion about the reasons and best remedies has only begun: The best way to mitigate YESS is poorly understood by practitioners (Hyndman et al., 2005) and the two existing contributions on YESS make contradicting policy recommendations.

The discretionary character of contributions to the World Bank ensures that we are really focusing on the discretionary spending rather than the scramble to pay all the bills before the end of the year.

Figure 1: Comparison of fund contributions and IDA disbursements



Notes: The discretionary contributions to World Bank funds analyzed in this paper increased in importance from 2002 to 2013 and, towards the end of the sample period, equaled annual disbursements by the International Development Association (IDA), the concessional lending arm of the World Bank Group.

We want to be upfront with the limits of this analysis. Our data only cover a narrow set of countries’ budget items and, as for every empirical analysis, the institutional setting is specific. However, the extent of end-of-year spending across countries is an issue that

warrants a thorough analysis. The high-quality of the data provides us with the unique opportunity to make this contribution to the literature. Data on subannual public expenditures even for individual governments have rarely been accessible to researchers. Even as such data become increasingly available, differences in countries' accounting regimes often impede a comparative analysis. Yet, the central registration of data by the World Bank provides the unique opportunity to analyzing subannual spending patterns across a wide range of countries.

This paper contributes to diverse sets of literature, most directly to the small but growing research on public spending at the end of the fiscal year (Liebman and Mahoney, 2017; Baumann, 2019). Because of its focus on the timing of public expenditures, this paper also relates to the political business cycle literature at the annual-level. This literature shows that debt and public expenditures, especially transfers, are systematically manipulated prior to elections (Eslava, 2011). Political business cycles depend on contextual factors such as institutional quality.⁸

As mentioned above, we draw from both the macro- and microeconomic literature on the importance of institutional quality and management practice on economic outcomes. More generally, our paper contributes to the research strands that examine the relationship between institutions and fiscal performance across (De Haan and Sturm, 1994; Von Hagen and Harden, 1995; Eslava, 2011; Hallerberg et al., 2009) and within countries (Andersen et al., 2012; Dietrichson and Ellegård, 2015; Dahan and Strawczynski, 2017; Coen-Pirani and Wooley, 2018). The paper also contributes to the foreign aid literature on multilateral delegation (Milner, 2006; Milner and Tingley, 2013; Schneider and Tobin, 2013) by adding disbursement pressure in aid agencies as a new explanation for donor countries' contributions to multilateral institutions.⁹ Regarding our data, the two most closely related papers are Reinsberg et al. (2017) and Eichenauer and Knack (2018) which respectively analyze the determinants of contributions to World Bank trust funds and their disbursements at the annual level. Finally, our question is also broadly related to research about the effects of firms' choice of their fiscal year.¹⁰

The remainder of the paper is organized as follows: Section 2 describes the institutional background and the data. Section 3 describes the identification strategy and Section 4 provides empirical results for the fiscal year effect. Section 5 describes the mechanism

⁸For instance, political business cycles are more likely or more pronounced in developing countries (Schuknecht, 2000; Shi and Svensson, 2006; Vergne, 2009) and in countries with limited checks and balances or access to free media (Alt and Lassen, 2006a,b; Akhmedov and Zhuravskaya, 2004; Klomp and de Haan, 2016). A literature survey is provided by De Haan and Klomp (2013).

⁹Our paper is among the few papers in the foreign aid literature which analyze subannual data. Michaelowa (2003) analyzes pledges to a multilateral debt relief campaign while Kersting and Kilby (2016) analyze foreign aid inflows around elections in developing countries.

¹⁰In the accounting literature, an ongoing stream of papers analyzes firms' discretionary choice of the fiscal year and, consequently, the timing of their disclosure. Smith and Pourciau (1988) are the first to document differences in the size and risk profile of December and non-December firms. Their work was extended in Huberman and Kandel (1989) and Sinha and Fried (2008). Kamp (2002) analyzes the international variation in the end of the fiscal year. The December fiscal year is more popular in continental Europe than in the United States, where it is still more popular than in the UK, New Zealand and Australia. Reporting or tax regulation at the national level explains most of these differences. A research strand pioneered by Oyer (1998) analyzes the effect of the fiscal year on sales. Lai (2008) exploits an exogenous change of the fiscal year in Germany to show that lower inventories at the end of the fiscal year are not due to the calendar year but due to sales incentives.

for YESS and provides the corresponding empirical evidence. Section 6 concludes and suggests avenues for future micro- and macroeconomic research on year-end spending.

2 Institutional Background

The effect of the budget year on subannual spending is examined using the original data obtained from the World Bank’s Trust Funds and Partnership Department and were first used in Reinsberg et al. (2017). The data contain information on the contribution date, the contributing country, and the receiving fund from 2002-2013. Note that we cannot combine this with information on World Bank’s subsequent disbursements to developing countries which often occur with significant delays.

The OECD counts the contributions to World Bank funds towards countries’ foreign aid expenditures. In addition to bilateral and multilateral aid, a third type of aid has grown in importance over the last two decades: ‘multi-bi’ or earmarked aid (Reinsberg et al., 2015). During the sample period, earmarked aid has come to constitute an important part of the budget of the World Bank and other international organizations. From the perspective of the donor country, this new type of aid is a hybrid between bilateral and multilateral aid. Just as with bilateral aid, the donor country maintains control over the allocation of the aid to recipient countries or issues. Just as with multilateral aid, earmarked aid will be implemented by a multilateral organization (OECD, 2010).¹¹ Earmarked aid differs from classical multilateral aid in several regards. Most relevant for our analysis, earmarked contributions are discretionary contributions by donor countries. As other discretionary spending, they are thus most likely to see end-of-year spending surges (see, e.g., Baumann, 2019). At the World Bank, earmarked aid is managed in trust funds. The World Bank manages these funds along-side its regular operations. A fund is established upon the request of one or several donor countries. The funder(s) and the World Bank negotiate a tailored contract.¹² The negotiated governance usually foresees that the donor country maintains some say about the selection of projects in developing countries. During the sample period, these discretionary contributions attain the same importance as disbursements by the IDA. The IDA is funded through regular donor conferences where donors pledge funds.

OECD countries, emerging and developing countries, private companies, multilateral and non-governmental organizations have contributed to these accounts during the sample period. In terms of financial volume, the 27 countries organized in the OECD’s Donor Assistance Committee (DAC) are by far the most important donor group (Figure A1 in the Appendix and Eichenauer, 2015).¹³ In line with the vast majority of the aid allocation literature, our analysis looks at the countries in the DAC.

¹¹Eichenauer and Hug (2018) model the trade-offs for donor countries when choosing between earmarked aid, traditional multilateral contributions, which is allocated to developing countries and issues through a joint decision of the member countries according to the organization’s governance rules, and bilateral aid for which the bilateral donor agency oversees the implementation.

¹²The Appendix D provides an overview of the different types of funds.

¹³OECD / DAC countries in our sample (in alphabetic order) are: Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Korea, Luxembourg, the Netherlands, New Zealand, Norway, Poland, Portugal, Spain, Slovak Republic, Sweden, Switzerland, the United Kingdom, and the United States.

Across government departments, a large share of spending is precommitted to programs, to pay for public servants' wages, or to serve debt. This also holds for the foreign aid budget. A large share of the aid budget is designated for multi-annual bilateral projects in developing countries and to cover mandatory membership contributions to multilateral organizations. Each year, only a small share of the foreign aid budget is discretionary. In the average country-year, earmarked aid to the World Bank amounts to 2.23% of a country's total Official Development Assistance (ODA) disbursements. This share ranges from 0.07% for the United States in 2013 to 12% for the United Kingdom in 2007.¹⁴

3 The Fiscal Year Effect: Identification

The existing literature unanimously assumes that spending spikes are due to the end of a fiscal year but has not been able to disentangle the reasons for these spending spikes. This is due to the observational equivalence between the annually recurring expenditures due to the budget year or any other annually recurring phenomenon such as the holiday seasons in the end of December. By looking at a single country, it is impossible to disentangle the fiscal year effect from alternative explanations for the subannual spending patterns. In this section, we exploit the facts that fiscal years are pre-determined and that fiscal years differ between countries. Our novel identification strategy and the cross-country panel data allow us to pin down the fiscal year explanation.

Specifically, we use variation in countries' fiscal years in a panel framework with high-dimensional fixed effects. The fiscal years of the 27 countries in the sample are shown in Table 1. A majority of countries uses the calendar year as their budget year. However, six major donor countries start their fiscal year in either April, July, or October. For example, the differences in fiscal years in a number of Anglo-Saxon countries emerged centuries ago. In these cases, the primary purpose was to increase parliamentary presence during the budget decision sitting (Arndt, 1990). It was argued that avoiding parliamentary sittings during hot summers, during crop or shearing season, and around Christmas would serve this purpose. In the United States for instance, the current fiscal year starting in the beginning of October has been in use since 1844. At the time, it was argued that the legislature should convene at the moment taxes are levied. The main tax income at that time was generated from property taxes which were collected at harvest time when people held cash (Arndt, 1990).

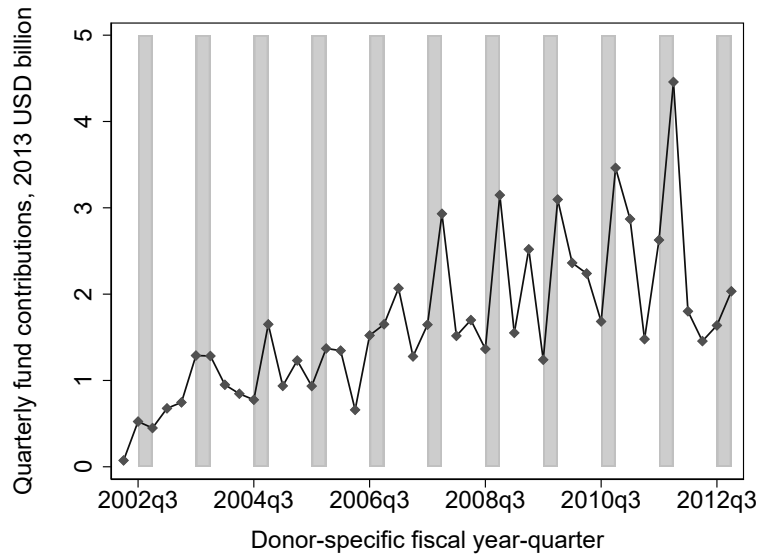
To the best of our knowledge, nobody has analyzed the implications of differences in governments' fiscal years across countries on the timing of public expenditures or any other outcomes. While there is an extensive literature looking at variation within the calendar year (i.e., seasonal effects), the limited research on fiscal years focuses on firms' discretionary choice of their firm-specific fiscal year for the inventory (see Footnote 10).

¹⁴Out of our sample, the smallest trust fund donor, the Slovak Republic, contributed less than USD 60,000 over the sample period, while the largest donor, the United States, provided USD 15.7 billion (constant 2013 USD).

Table 1: The fiscal years of the 27 OECD countries in the sample

Fiscal year	Countries
April 1 - March 31	Canada, Japan, United Kingdom
July 1 - June 31	Australia, New Zealand
October 1 - September 30	United States
January 1 - December 31	Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Korea, Luxembourg, Netherlands, Norway, Poland, Portugal, Slovak Republic, Spain, Sweden, Switzerland

Figure 2: Aggregate quarterly contributions by country-specific fiscal quarter



*Notes:*The grey shaded area highlights changes in contributions between the third and the last fiscal quarter.

We combine the information on countries' fiscal years with the World Bank data by assigning countries' contributions in a calendar quarter to the country-specific fiscal quarter.¹⁵ Around 30 percent of countries' annual contributions were made in countries' last fiscal quarter, while the baseline expectation would be 25 percent. Figure 2 gives a first glimpse of the irregularities in the spending pattern. The figure shows aggregate contributions to World Bank funds by fiscal quarter over the sample period. The grey shaded areas highlight the respective last fiscal quarter in each country. Contributions in the last fiscal quarter tend to be higher than in the rest of the fiscal year. Similar

¹⁵We assign contributions to calendar weeks by using the *PostingDate*, a variable that indicates the date of the financial transaction. We trust the variable because whenever a transfer was reimbursed to a donor government, say if funds were wired by mistake, in all but eleven cases funds were returned on the same day. In these eleven cases, reimbursements were made in a different quarter within a country's fiscal year except for two transactions. If the reimbursement was not completed on the same date, we drop the observation. Any remaining negative flows at the aggregate level are set to one before logarithms are taken. Results are robust to these decisions.

histograms at the monthly and quarterly level, Figures A2 and A3 in the Appendix, provide further evidence of overproportionally high contributions in the last period of a fiscal year.

We run ordinary least-square (OLS) regressions with stringent fixed effects to isolate the fiscal year effect and distinguish it from the alternative explanations. Our preferred regression specification takes the following form:

$$\begin{aligned} \text{Log}(\text{Quarterly amount})_{ickq_i f_i} &= \beta \text{Last fiscal quarter}_{iq_i} \\ &+ \eta_{if_i} + \delta_{ic} + \gamma_k + \epsilon_{ickq_i f_i} \end{aligned} \quad (1)$$

The country i -specific (logged) *quarterly amount* by fiscal quarter q_i in constant USD is regressed on a dummy for the country-specific *Last fiscal quarter* $_{iq_i}$ and country-fiscal year η_{if_i} , country-calendar year δ_{ic} and calendar quarter fixed effects γ_k .¹⁶ The index i refers to the country, q_i to the country-specific fiscal quarter, f_i to the country-specific fiscal year, c to the calendar year and k to the calendar quarter. The dummy *Last fiscal quarter* $_{iq_i}$ is one in the fourth country-specific fiscal quarter. A positive coefficient β would provide evidence for YESS independent of calendar-related seasonal effects common to all countries. Robust standard errors are clustered at the country level. The variable definitions and sources are in Table A1 and descriptive statistics in Table A2.

These fixed effects absorb many potential omitted variables such as different subannual spending patterns across countries. In Table 2 below, we add the different sets of fixed effects one-by-one. Column 1 shows the raw effect without any fixed effects. In specifications such as this without country-fiscal year-fixed effects, we also include the (logged) total *(Annual amount)* $_{if_i}$ spent by donors in a given fiscal year. In Column 2, the fiscal quarter dummy α_{f_i} absorbs the fiscal year-specific shocks and trends such as the general popularity of trust funds in a given fiscal year. These fixed effects can be thought of as group-fixed effects for countries with the same fiscal year. Column 3 adds country-specific fixed effects ξ_i to control for time-constant differences across countries such as time-invariant budgetary processes, the legal number of vacation days, or, for example, a bureaucratic ‘culture’ reflecting a highly competitive selection into public service such as in France. Column 4 includes the interactions between fiscal year- and country-fixed effects, η_{if_i} . These interactions control for factors such as the size of a country’s foreign aid budget in a given fiscal year. These fixed effects omit the annual contribution amount which had a positive and significant coefficient in the previous columns.

The calendar-year fixed effects π_c in Column 5 absorb any shocks that affect all countries at the same moment in time. Examples include the effect of the global financial crisis on the size of contributions or a regulatory change at the World Bank. The interaction between country- and calendar year-fixed effects δ_{ic} added in Column 6 will absorb subannual shocks that affect countries heterogeneously. Column 7 further adds calendar quarter-fixed effect γ_k to capture time-constant differences that are season-specific. For example, these fixed effects control for the number of public holidays around Christmas and New Year or the effect of a joint trust fund initiative triggering coordinated inflows from donor countries.¹⁷

¹⁶ $(\text{Annual amount})_{if_i}$ is omitted from the regression when country-fiscal year fixed effects δ_{if_i} are included. Its effect is fully captured by δ_{if_i} .

¹⁷These fixed effects do not control for country-year-quarter-specific variation in working days. The number of average quarterly working days vary due to the number of Sundays per calendar quarter and

In the main specifications, the unit of analysis is the country-specific fiscal quarter. We prefer to use quarterly data because the temporal aggregation mitigates the effect of outliers. Trust fund contributions are not made each and every day but transfers consist of substantial amounts whenever they occur. The next section provides the results and includes analyses at the monthly and weekly aggregation levels to explore the subannual spending pattern in more detail.

4 The Fiscal Year Effect: Empirical results

This section provides robust evidence that the uneven subannual spending patterns are caused by the historically determined fiscal year. Variations of (1) with high-dimensional fixed effects allow us to exclude alternative explanations for the above-average spending. Table 2 shows results. The coefficient on the last fiscal quarter dummy is statistically and economically significant at the one-percent level across columns with the increasingly stringent fixed effects discussed above. Regarding the quantitative effect, we estimate in Columns 1-4 that contributions almost double in the last country-specific fiscal quarter. When we control for the country-calendar year- and calendar quarter-fixed effects in Column 7, we estimate that spending increases more than five-fold in the last fiscal quarter.

Our estimate of the end-of-year spike obtained seems roughly in line with other estimates.¹⁸ Our estimates are probably at the upper-bound of what is expected, even for a highly discretionary spending item. This is most likely related to the identification of a pure supply side effect as there are no absorption constraints by the World Bank accounts.

The coefficient of interest is highest in Column 7 which includes calendar quarter-fixed effects. This implies that the calendar time of the year affects the amount of spending within a quarter. When this seasonality effect is controlled for, the size of YESS increases further. In other words, a descriptive analysis of the year-end effect would significantly underestimate the size of the spike due to the seasonality effect. This is the main finding of our analysis. This implies that the fiscal year effect would be even larger when the end of the fiscal year does not go hand-in-hand with productivity-reducing seasonal effects.

other public holidays that do not always fall in the same fiscal quarter such as Easter. Note that the number of working days (Monday-Friday) per quarter and annual holidays that take place in a fixed quarter are absorbed by the calendar quarter-fixed effects as these holidays are common to all OECD countries in the sample. However, there are also country-specific national public holidays and annually moving public holidays such as Easter. We tried to construct a proxy by looking at seasonally adjusted data. The seasonally adjusted data include calendar or work-day adjusted time series. However, this data is, first, not available for a substantial share of the sample countries based on the same decision (not even for EU countries). Second, there is no cross-country variable containing the number of national public holidays. However, we are convinced that the large effects we find, would not be entirely explained by differences in national public holidays.

¹⁸The Government Accounting Office (1980) reports that the US Department of Health, education, and Welfare spent 66 percent of total annual expenditures on consulting services in the last quarter while they find that in the 16 analyzed agencies 9 to 52 percent are spent during the last fiscal months. Baumann (2019) reports that Northern Irish capital expenditures in the final month are about three times as large as a balanced monthly spending schedule would suggest (current expenditures are about 40% larger). Generally, spending spikes are smaller at the more aggregate level as the extent of overspending tends to vary across sub-departmental units within a year. Liebman and Mahoney (2017) find that spending in the last week of the year is 4.9 times higher than in an average week during the rest of the year.

Table 2: The effect of the last fiscal quarter

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Last fiscal quarter	1.056*** (0.274)	1.078*** (0.294)	1.094*** (0.302)	1.079*** (0.346)	1.253*** (0.399)	1.238*** (0.416)	1.844*** (0.616)
Annual amount (ln)	1.027*** (0.066)	1.034*** (0.069)	0.438*** (0.053)				
Fiscal year FE	No	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	No	No	Yes	Yes	Yes	Yes	Yes
Country-fiscal year FE	No	No	No	Yes	Yes	Yes	Yes
Calendar year FE	No	No	No	No	Yes	Yes	Yes
Country-calendar year FE	No	No	No	No	No	Yes	Yes
Calendar quarter FE	No	No	No	No	No	No	Yes
No. of observations	1291	1291	1291	1291	1291	1291	1291
No. of countries	27	27	27	27	27	27	27

Notes: The dependent variable is (logged) quarterly contributions to World Bank funds during the World Bank's fiscal years 2002-2013. FE refers to fixed effects. Standard errors are robust and clustered by country. *: $p < 0.1$, **: $p < 0.05$, ***: $p < 0.01$.

For example, the lower number of working days in December due to the Christmas and New Year's holidays reduces the average number of working days in a government agency. Independent of the end of the budget year, this would imply less disbursement than in an average month. If disbursements are nevertheless higher than in a normal month, it must be the end of the fiscal year.

We also examine the seasonality effect and YESS at the monthly level (Table A3 in the Appendix). We confirm that seasonality leads to an underestimation of YESS. Column 8 in Table A3 controls for calendar month-fixed effects. Among other things, this accounts for differences in the number of days per month. According to Column 8 in Table A3, contributions due to the end of the fiscal year are about fourteen times larger than the average spendings during the other eleven months. The analysis at the monthly level confirms that the spike in contributions is associated with the end of the year, even when more stringent fixed effects were added.

The finding that seasonality biases YESS downward is further corroborated when we analyze the exact timing of year-end spending at the daily level (Table A4 in the Appendix). The coefficients on the weekly dummies in the eight weeks before and after the end of the fiscal year are highest in Column 5 in Table A4 which includes calendar month-fixed effects. Across columns with increasingly stringent fixed effects, we find positive coefficients in the eight weeks before the end of the fiscal year. The size of the coefficients significantly increases and are statistically significant across specifications in the weeks just before the end of the the fiscal year. These results suggest that spending peaks just before the end of the fiscal year.

Some of the weekly dummies at the beginning of the new fiscal year are also statistically significant although the coefficients are substantially smaller than those in the weeks before the end of the fiscal year. This hints at the presence of a year-start spending spike.¹⁹ How

¹⁹There are several reasons that may explain above-average spending at the start of the fiscal year. According to OECD (2003, p.109), it is common practice that disbursements scheduled in a fiscal year but undertaken up to sixty days (i.e., up to 7 weeks) after its end are still counted as expenditures of

does this affect the interpretation of the previous findings for YESS? Any spending above the weekly, monthly or quarterly average at the start of the fiscal year would bias our previous estimates for YESS downward. This downward bias results from the fact that the first fiscal quarter is part of the comparison group in the baseline regression (Equation 1). Our previous estimates are thus lower bounds if there is a systematic year-start spending spike. In Table A5 in the Appendix, we include a dummy for the first fiscal quarter. We find evidence of a year-start spike although the magnitude of this year-start effect is substantially smaller than the year-end effect. We estimate that expenditures in the first fiscal quarter are about ten percent higher than in the second or third fiscal quarters, the baseline categories. Once we control for seasonality with calendar-quarter fixed effects in the last Column 8 of Table A5, the first fiscal quarter effect becomes insignificant.

These results hold when we focus on relevant time subsamples in Table A6. For comparison, Column 1 shows our baseline result before we start changing the sample period. Columns 2 and 3 show results for the first (the World Bank’s fiscal years 2002-2007) and the second half (2008-2013) of the sample period, respectively. As expected, the year-end effect is more pronounced between 2008 and 2013, when trust funds became increasingly popular (Figure 1). In Column 4 of Table A6, the five smallest contributors are dropped.²⁰ Alternatively, we drop any of the 27 sample countries (Table A7–Table A11).²¹ The result for the last fiscal quarter remains highly significant in all these regressions. In particular, the result holds when omitting the United States, whose (aid) budgets are often delayed and more micro-managed by the legislature than those of most other aid agencies. Finally, Table A6 addresses concerns that the demand side, the World Bank or the trust fund managers, influence the timing of countries’ contributions. In particular, the end of the World Bank’s own fiscal year in June might increase such contribution demands. We address this in Column 5 by omitting Australia and New Zealand which share their fiscal year with the World Bank. The result is robust to these changes in the sample.

The results at three levels of temporal aggregation provide causal evidence for a year-end spending spike due to the fiscal year. Our identification strategy makes use of the fact that country’s fiscal year is exogenous to today’s bureaucratic system. We thereby show that year-end spending can be causally attributed to the end of the fiscal year rather than to seasonality. Our finding is robust to using various subsamples. We find that the size of the year-end spending surge is underestimated when other annually recurring seasonal influences are not accounted for. This means that the typical single-country study underestimates the size of YESS. The remainder of the paper examines three explanations for the variation in YESS over time and across countries. The three theories differ with respect to the importance they attribute to institutions and processes, the behavior of bureaucrats, and uncertainty. This leads to different conclusions about adequate policy measures to curb YESS.

the elapsed fiscal year. Also, countries’ transfers may be made later than intended due to bureaucratic delays in the ministry or at the World Bank. All these explanations would suggest that the size of the estimated coefficients and their significance levels decrease as the elapsed fiscal year moves further away. That is indeed what we find.

²⁰The Slovak Republic, Poland, Iceland, the Czech Republic and Greece each provide less than US\$ 40 million over the sample period. The next largest country, Portugal, provides almost three times as much as Greece, the most important contributor among the excluded countries.

²¹We also run regressions excluding any of the sample countries. The results remain qualitatively and quantitatively similar.

5 The Causes of Year-End Spending Spikes

We find it helpful to think about the reasons for YESS in a classical principal-agent framework. For our research question, the key issue is the asymmetry of information between the principal and the agent about the reasons for unspent funds at the end of the fiscal year. We think about the agent as the budget holder responsible for disbursements, while its immediate principal is the upper-level management in the government agency as well as the finance minister. For the total budget outcome, the relevant principal is the parliament, which represents the interests of voters and taxpayers. The principal-agent theory proposes some solutions to the problem of information asymmetries: increased bureaucratic control and monitoring, changing the agent’s incentives to better align the agent’s interest with those of the principal, and to promote a culture of high-quality work where trust and reputation pay off. Most of these policies are both difficult to implement and to measure individually. However, we think that they can be summarized under the concept of administrative quality.

We hypothesize that administrative quality mitigates YESS. Many of the solutions proposed to mitigate the information asymmetry between the principal and the agent are more likely to be present or implemented in well-functioning or “good” administrations. We first test for the effect of administrative quality on YESS and then attempt to unpack the concept by focusing on specific institutions and fiscal rules.

5.1 Administrative Quality and YESS

We argue that administrative quality reduces year-end spending. There are a number of channels through which administrative quality could plausibly and substantially affect the size of YESS. These channels can usefully be categorized along three dimensions: ‘policy and structures,’ ‘systems,’ and ‘human resources’ (World Bank, 2006).

For the ‘policy and structures’ cluster for example, there is anecdotal evidence that some flexibility in reshuffling of resources between issue areas or budget periods reduces YESS. In many bureaucracies however, the budgets are tightly earmarked. Even when reallocation is possible, it is often associated with much additional paperwork (Douglas and Franklin, 2006). Moreover, a precondition for such a reallocation of money is information about disbursement progress on various spending areas. The availability of such accurate information is part of the ‘systems’ dimension. Adequate technological infrastructure also improves the precision of cost estimates for planned projects. This allows us to forecast expenditure demands based on past experiences and helps us to determine the optimal size of precautionary savings (Government Accountability Office, 1980).²² The third dimension of administrative quality is ‘human resources,’ i.e. the recruitment and management of qualified staff. Reasonable levels of monitoring, accountability, meritocratic career advancement, adequate pay, and other incentive schemes contribute to maintain and increase worker productivity. Dietrichson and Ellegård (2015) find managerial accountability for budget balances to be effective in improving fiscal performance. In

²²Inadequate expenditure planning can lead to underspending or to overprogramming. The former leads to excessive precautionary savings, while the latter will inadvertently be followed by the disruption of some projects at the end of the year (Hurley et al., 2014).

contrast, Baumann (2019) finds that infrequent monitoring leads to procrastination by bureaucrats.

We test our argument by adding the interaction between the last fiscal quarter dummy and different measures of administrative quality to equation (1). A negative interaction coefficient would provide evidence for a YESS-reducing effect. As we are interested in the differential effect of bureaucratic quality on YESS, we focus on the interaction coefficient which can be interpreted as causal under fairly weak assumptions which we believe to be fulfilled.²³

Our empirical analysis adds to the existing research strands that stress the importance of institutions and management (Knack and Keefer, 1995; Bloom et al., 2016) by relating administrative quality to a specific performance variable – the regularity of subannual spending patterns. We are able to identify the total or net effect of administrative quality on YESS. It is an important to acknowledge that administrative quality is associated with lower spending sprees. But our investigation does not end here as any findings about the importance of administrative quality would still remain a ‘black box.’ Such findings lack the specificity required to provide concrete advice about institutional reforms that could reduce (wasteful) YESS. Our attempt to unbundle administrative quality is faced with numerous theoretical and empirical challenges as we discuss in the next section.

5.2 Unbundling Administrative Quality

The three dimensions of administrative quality – ‘policy and structures,’ ‘systems,’ and ‘human resources’ – most probably interact in complex non-linear ways. This makes it difficult to examine their respective importance, which is exacerbated by the limited data available on these dimensions. Not least for data reasons, we focus on the ‘policy and structures’ dimension. We also shed light on the main behavioral assumption that Baumann (2019) makes – procrastination by bureaucrats.

The literature is full of proposals for institutional reforms (e.g., Liebman and Mahoney, 2017; Baumann, 2019). U.S. government reports suggest improvements to various aspects of administrative quality: introducing institutions that allow (some) flexibility in the timing of spending, using more systematic procurement processes, improving approaches to plan and schedule spending, and apply inadequate pay and promotion policies (summarized in Hyndman et al., 2005, p.8). To the best of our knowledge, rigorous empirical evaluations of the YESS-reducing effect of budgetary institutions are still lacking.²⁴ The evidence about roll-over or carry-forward rules, a popular recipe to reduce YESS, did not have the intended effect in the UK after a decade-long trial period (Crawford et al., 2009; Baumann, 2019).

Given the ongoing discussions about institutional remedies, we gathered and hand-coded data on some of the most pertinent factors: the institutional autonomy of the

²³The interaction effect is consistent under two assumptions. First, a country’s fiscal year is exogenous. Second, the “degree of endogeneity” (the direction and extent of the omitted variable bias) of the endogenous variable does not depend on the exogenous variable. In other words, any bias that arises from the possible endogeneity of bureaucratic quality is the same for countries with different fiscal years (Nizalova and Murtazashvili, 2016; Bun and Harrison, 2019). This is a relatively weak condition, present in various data-generating processes.

²⁴Liebman and Mahoney (2017) and Baumann (2019) provide calibration evidence supporting their respective recommendation.

spending government agency, the existence and type of a multiyear budgetary framework, the existence of carry-forward and fiscal rules, and the accounting regime applied in the donating country.

The institutional autonomy of the government agency is an important aspect of the ‘policy and structure’ dimension of administrative quality. We expect that the timing of actual disbursements will be more aligned with the original spending plan if the agency is shielded from extra-institutional interference and their demands. We thus expect institutional autonomy to reduce the size of YESS. The literature on foreign aid has analyzed the autonomy of the foreign aid department from the more short-term political interests of the foreign policy ministry (Bertoli et al., 2008; Fuchs et al., 2014; Fuchs and Richert, 2018). Insulation from political pressures is also part of the definition of our main variable for administrative quality which we introduce below. This shows the importance of institutional autonomy for policy making and implementation.

As a second important dimension, we consider the time horizon of budget plans. During our sample period, many OECD countries have transitioned to using Medium-Term Frameworks (MTFs). MTFs are designed to overcome dynamic fiscal inefficiencies and to contain expenditure overruns. Vlaicu et al. (2014a) show that MTFs were effective in improving budget balance in implementing countries. Regarding year-end spending, we expect the relationship between MTFs and YESS to be positive whenever both the budget and the planning framework is made and approved for multiple years. This would allow bureaucrats to use remaining funds of a given fiscal year to start new projects and continue implementing these projects based on the spending priorities for the next year(s) as specified in the MTF. However, no OECD country has yet approved a general budget for multiple years so that we cannot test a hypothesis about the joint presence of multi-annual budgets and planning frameworks. When planning and budget horizons diverge, we expect MTFs to increase rather than reduce YESS.

If YESS are at least partly due to information asymmetries between the agent and the principal and there is slack in the bureaucracy, budgetary rules could reduce YESS. We will analyze the role of budgetary rules at the national level and carry-forward rules. As previously mentioned, the UK experience suggests no effect of carry-forward rules on year-end spending spikes (Baumann, 2019). Nevertheless, Liebman and Mahoney (2017) suggest a carry-forward rule to reduce year-end spending spikes.

Our sample period coincides with another major trend in public financial management. Many OECD countries transitioned from cash to accrual accounting. Cash accounting records a transaction when the monetary transfer occurs, while accrual accounting registers the activity whenever the product or service is consumed or produced. Any differences between the accounting systems accrue primarily because of expenditures for physical investments due to depreciation. For most types of government expenditures, including foreign aid, no physical investments enter the books. According to this argument, changes in the accounting system do not affect YESS in the foreign aid budget. Furthermore, we note that changes in country’s accounting regime cannot bias the reporting time of the contributions to World bank accounts because our data are recorded by the World Bank’s accounting office rather than the donor country. Another argument is that accrual accounting increases the budget holder’s flexibility and thus the possibilities for accrual accounting. According to this argument, the transition to accrual accounting would most likely decrease YESS as budget holders try to shift funds to the next year. We test these

arguments about the role of the accounting system using original data.

These analyses of the institutional aspects of budget implementation shed light on the ‘policy and structures’ dimension of administrative quality. Some of these institutions are proposed by principal-agent theory to mitigate information asymmetries. The ‘human resource’ dimension of administrative quality takes into account the behavior of agents. Given the burgeoning literature on behavioral ‘biases,’ it is impossible to assume that bureaucrats are not also subject to biases and heuristics. The multidimensional concept of administrative quality includes the behavior of bureaucrats as one explanatory factor.

Baumann’s (2019) explanation for YESS puts people at the center. He assumes effort-averse and time-discounting bureaucrats whose spending performance is monitored by the principal only at the end of the period. Bureaucrats’ rational response is then to procrastinate spending that requires effort until right before the principal’s performance evaluation. Bureaucrats’ discounting behavior and the lack of regular monitoring thus creates YESS. In the empirical analysis below, we attempt to disentangle the rational procrastination explanation from our more general argument about administrative quality wherein individuals (and their biases) play an important role.

5.3 Administrative Quality and YESS: Empirical Evidence

This section discusses the empirical evidence for the administrative quality explanation of YESS. Our main proxy variable for administrative quality is the variable *Bureaucratic Quality* from the International Country Risk Group (ICEBERG) (Howell, 2011), a commercial service that provides information on political risks. The variable is based on experts’ views about the presence of regular, meritocratic recruitment and advancement processes, insulation from political pressure, and the ability to continue service provision during government changes (Howell, 2011). Among the available governance measures, *Bureaucratic Quality* corresponds most closely to the theoretical mechanisms underlying our argument and, moreover, is available at monthly frequency.

In Table 3, we test for the effect of administrative quality on YESS by adding an interaction between the last fiscal quarter and the ICRG bureaucratic quality variable, as well as the main effect of bureaucratic quality to absorb linear effects, to (1). The lagged quarterly average of the ICRG bureaucratic quality is constructed as the average value of the variable in the three months prior to a given fiscal quarter.

As expected, the interaction effect of bureaucratic quality and the last fiscal quarter dummy is negative and remains statistically significant when we add the increasingly stringent fixed effects. The coefficient estimate suggests that a one-standard-deviation increase in bureaucratic quality reduces year-end spending in the last quarter by about one third. For the average country in the sample, this would translate into a reduction of about 32 million US\$ in the last fiscal quarter.

Institutional quality is notoriously hard to measure (Langbein and Knack, 2010) and there are number of common concerns about such measures. We are confident about the quality of the ICRG variable in general. Reassuringly, we find very similar results with alternative measures of institutional quality (Table A12 in the Appendix).²⁵ There are

²⁵We analyzed three alternative measures of institutional quality that vary at the annual level rather than the quarterly level as the ICRG variable. All three variables come from the the World Governance Indicators (WGI). The WGI *Government Effectiveness* indicator aims to capture “the capacity of the

Table 3: ICRG *Bureaucratic Quality* and the last fiscal quarter effect

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Last fiscal quarter	5.952** (2.304)	6.084** (2.351)	6.468** (2.444)	6.361** (2.899)	5.910* (2.945)	6.026* (3.038)	6.759** (3.105)
Last fiscal quarter x Bureaucratic quality	-1.338** (0.583)	-1.365** (0.591)	-1.470** (0.617)	-1.444* (0.732)	-1.290* (0.755)	-1.330* (0.777)	-1.320* (0.767)
Bureaucratic quality	2.185* (1.104)	2.180* (1.100)	-0.297 (0.289)	0.222 (0.747)	0.220 (0.746)	0.220 (0.773)	0.077 (0.865)
Annual amount (ln)	0.942*** (0.095)	0.948*** (0.095)	0.435*** (0.053)				
Fiscal year FE	No	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	No	No	Yes	Yes	Yes	Yes	Yes
Country-fiscal year FE	No	No	No	Yes	Yes	Yes	Yes
Calendar year FE	No	No	No	No	Yes	Yes	Yes
Country-calendar year FE	No	No	No	No	No	Yes	Yes
Calendar quarter FE	No	No	No	No	No	No	Yes
No. of observations	1291	1291	1291	1291	1291	1291	1291
No. of countries	27	27	27	27	27	27	27

Notes: The dependent variable is (logged) quarterly contributions to World Bank funds during the World Bank’s fiscal years 2002-2013. FE refers to fixed effects. Standard errors are robust and clustered by country. *: $p < 0.1$, **: $p < 0.05$, ***: $p < 0.01$.

general concerns about the use of survey measures because of potential reverse causality. For example, surveyed experts might observe inefficient projects that are due to YESS and, as a consequence, give lower scores for the questions related to administrative quality. However, surveyed experts are told not to base their evaluation on fiscal performance but advised to rate the previously noted aspects, such as insulation from political pressure. Lastly, we use the one-quarter lag of *Bureaucratic Quality* to further mitigate these concerns. We are thus confident about our results with the ICRG measure. Our conviction is reinforced by the fact that the YESS-reducing effect of administrative capacity also holds at the monthly level (Table A14 in the Appendix).

5.4 Unbundling Administrative Quality: Empirical Evidence

Our preferred measure of administrative quality as well as other variables of institutional quality aim to capture relatively encompassing concepts. While these empirical results provide important new evidence, they are difficult to act upon. We thus go one step further and provide evidence on budgetary institutions that could reduce (wasteful) year-end spending: institutional autonomy, the existence of a multiyear budgetary framework,

governments to effectively formulate and implement sound policies” (Kaufmann et al., 2011) The government effectiveness variable includes the ICRG bureaucratic quality variable as one of its sources. The definition illustrates a more outcome-focused perspective rather than the input-oriented one we are interested in measuring. The WGI *Regulatory Quality* variable measures the “perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development” (Kaufmann et al., 2011). This definition shows a private sector perspective rather than public sector one we are interested in. Finally, we use the average value of all six WGI indicators. Table A13 in the Appendix shows that the correlation of these measures with ICRG bureaucratic quality hovers around 0.8.

carry-forward and fiscal rules, and the accounting regime. This analysis of institutions reinforces our focus on the ‘policy and structures’ dimension of administrative quality.

Table 4: Institutional characteristics and bureaucratic quality

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Last fiscal quarter	6.759** (3.105)	3.853** (1.630)	3.782 (3.289)	6.976** (3.098)	5.996* (3.351)	6.790** (3.140)	8.522** (3.700)
Last fiscal quarter x Bureaucratic quality	-1.320* (0.767)	-0.284 (0.297)	-1.340 (0.816)	-1.250* (0.690)	-1.296 (0.766)	-1.428* (0.828)	-1.825* (0.918)
Bureaucratic quality	0.077 (0.865)	-0.931*** (0.207)	0.132 (0.916)	-0.055 (0.940)	0.111 (0.873)	0.256 (0.942)	6.417* (3.455)
Last fiscal quarter x Agency model		-0.613** (0.267)					
Last fiscal quarter x MTF, extended			3.098*** (0.688)				
Last fiscal quarter x Carry-over rule				-0.093 (0.094)			
Last fiscal quarter x Fiscal rule					0.785 (1.294)		
Last fiscal quarter x Accrual accounting						0.660 (0.717)	
Last fiscal quarter x risk aversion							1.783 (1.527)
Country-fiscal year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-calendar year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Calendar quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.71	0.57	0.71	0.71	0.71	0.71	0.69
No. of observations	1291	1051	1291	1291	1291	1291	811
No. of countries	27	22	27	27	27	27	17

Notes: The dependent variable is (logged) quarterly contributions to World Bank funds during the World Bank’s fiscal years 2002-2013. All regressions include country- and fiscal year- fixed effects. FE refers to fixed effects. Standard errors are robust and clustered by country. * : $p < 0.1$, ** : $p < 0.05$, *** : $p < 0.01$.

In Table 4, we first examine the relationship between YESS and the institutional autonomy of the foreign aid department. Data availability limits the analysis to only a subset of OECD countries.²⁶ Column 2 includes both the interaction of the last fiscal quarter and the institutional autonomy variable, which we compare to our baseline results in Column 1. The institutional autonomy goes from 1 to 4 with higher values representing more institutional autonomy. The ICRG and other measures of bureaucratic quality are ordinal variables but the existing literature has used them as cardinal values (e.g., Knack and Rahman, 2007) as no cardinal values of institutional quality exist.²⁷ The variable is cross-sectional, based on the classification of aid management practice into four models in 2008. The first organizational model is that development co-operation is an integral part of the ministry of foreign affairs, which is responsible for policy and implementation. In the second model, a Development Co-operation Directorate within the ministry of

²⁶No information for the Czech Republic, Island, Poland, and the Slovak Republic is available.

²⁷In robustness checks (not reported), we dichotomize *Bureaucratic Quality* at the sample mean and confirm the main findings.

foreign affairs has the lead role and is responsible for policy and implementation. In model three, one ministry has overall responsibility for policy while a separate executive agency is responsible for implementation. Lastly, in model four, a ministry or agency, which is not (a part of) the ministry of foreign affairs, is responsible for both policy and implementation.²⁸ The interaction coefficient on administrative quality is substantially reduced which provides the expected evidence that institutional autonomy is an important aspect of administrative quality. The result is thus in line with the previously noted fact that the definition of ICRG’s *Bureaucratic Quality* mentions “insulation from political pressures” as one of its dimensions.

Second, many OECD countries introduced multiyear budget frameworks during our sample period.²⁹ Column 3 of Table 4 shows that the existence of a medium-term framework (MTF) correlates positively with YESS. The coefficient on the last fiscal quarter is smaller but still economically important and loses statistical significance at conventional levels. The coefficient on the bureaucratic quality interaction is also statistically insignificant, while the point estimate is very similar to the baseline result in Column 1. Taking together, these estimates can be interpreted as evidence that MTFs are of similar importance for year-end spending spikes as the end of the fiscal year. However, MTFs do not seem to be captured by our bureaucratic quality measure. This should not be surprising as MTFs are endogenous to problems in the budgeting processes which include year-end spending spikes. It remains speculative whether the positive MTF effect would be reversed if multiannual planning were to be approved together with a multiannual budget.

Budgetary rules gained in popularity during our sample period and we analyze two budgetary institutions at the execution stage. First, we use an indicator for the existence of any numerical fiscal rule (Lledó et al., 2017) which is one if any fiscal rule related to the budget, revenue, expenditure or debt is in place at the national level. A commonly proposed remedy for YESS are carry-forward rules. The most detailed cross-country information about these rules are available from OECD surveys on budgetary processes. These surveys were answered by the central budget authority in several dozen countries in 2003, 2007, and 2016 (OECD, 2003, 2007, 2016a). As the questions and possible answers in these surveys vary slightly over time (Dahan and Strawczynski, 2017), we code the information into a binary variable that is one if any form of carry-forward of remaining funds is allowed and intra- and extrapolate these values.³⁰ Columns 4 and 5 of Table 4 show that interactions between the last fiscal quarter and the dummy for a fiscal or a carry-forward rule are statistically insignificant. These interactions remain insignificant when bureaucratic quality and its interaction with the last fiscal quarter are excluded. It thus seems that budgetary rules per se are insufficient to curb YESS. This is in line with the UK’s experience (Baumann, 2019), but contradicts Liebman and Mahoney’s (2017) policy proposal and calibration evidence.

Fourth, we analyze the role of cash versus accrual accounting. During the sample period, seven OECD governments transitioned from cash to accrual accounting. Column 6 of Table 4 shows that the interaction between the last fiscal quarter and the dummy

²⁸Definition from Fuchs et al. (2014); Classification by OECD (2009).

²⁹Vlaicu et al.’s (2014b) data end in 2011 but all OECD countries had already implemented a multiyear budget framework by then so that extrapolation is straightforward.

³⁰Variables were coded from OECD surveys and standardized by Dahan and Strawczynski (2017).

for accrual accounting is statistically insignificant.³¹ As expected, the accounting regime does not affect YESS in the case of foreign aid.

Lastly, we aim to test whether Baumann’s (2019) rational procrastination theory drives our bureaucratic quality results. In other words, we seek to disentangle this explanation on the timing of performance evaluations from other dimensions of administrative quality. The empirical challenge is to measure bureaucrats’ discounting parameters or present bias across countries and cultures. Recent research suggests that some behavioral ‘anomalies’ are not empirically distinguishable once experimental measurement error is accounted for. Importantly, Dean and Ortoleva (2015) find that risk aversion (as measured by the certainty equivalence of a risky lottery) is related to discounting and present bias. We thus operationalize the cross-cultural tendency to procrastinate using the experimentally validated, individual risk aversion measures from Falk et al. (2018). The data are subnationally representative which allows us to go beyond using national averages. We calculate the average risk aversion of individuals living in the subnational region in which a country’s capital is located. Bureaucrats generally come from the capital province, self-select into the capital province, or their initial level of risk aversion may adapt to the risk aversion of their social environment in the province. The interactions of interest are statistically insignificant (Column 7 in Table 4), suggesting no supporting evidence for the procrastination theory.³²

In sum, we find strong evidence that administrative quality reduces the size of YESS. Year-end spending is also lower in foreign aid agencies which are more isolated from political inference, while the accounting regime and fiscal or carry-forward rules do not seem to affect YESS at the disaggregated level we analyze. In contrast, multiterm frameworks do seem to increase YESS, plausibly because they have been implemented without an accompanying multiannual budget. While we do not find systematic evidence for the procrastination explanation proposed by Baumann (2019), we will examine further hypotheses proposed in the literature that are related to uncertainty.

5.5 Uncertainty and YESS

The economic literature on YESS so far consists of two well-developed theories that explain the existence and size of YESS. There are two main testable hypotheses emerging from this literature. These hypotheses have not yet been econometrically tested. First, both theories assume that unexpected positive demand shocks increase year-end spending. Second, these theories make opposing predictions about the relationship between uncertainty and YESS.³³ In the following analysis, we consider the precautionary sav-

³¹The interaction remains negative and statistically insignificant when bureaucratic quality is excluded.

³²Alternatively, we use the average risk aversion of all individuals in the country. Bureaucrats originate from across the country and their risk aversion might be a persistent feature due to genetics or socialization in childhood and youth. The interaction between the average national risk aversion and the last fiscal quarter is also statistically insignificant.

³³Both papers seem to use the term ‘uncertainty’ to refer to Knightian risk rather than Knightian uncertainty (Knight, 1921). Knightian risk is measurable and, within one confidence interval, forecastable. In contrast, Knightian uncertainty is the “conditional volatility of a disturbance that is unforecastable from the perspective of economic agents” (Jurado et al., 2015, 1177). Regarding the interpretation of uncertainty in Liebman and Mahoney (2017), Baumann (2019, 18) writes that “[i]t should be noted that variation in the effectiveness of government spending is not precisely what is needed for precautionary savings - what is needed is unpredictability. [...] This interpretation allows the distribution of the shock

ings (Liebman and Mahoney, 2017) and the procrastination theory (Baumann, 2019) as complementary but separate explanations from our administrative quality explanation. Future research could examine how uncertainty interacts with administrative quality.

Liebman and Mahoney (2017) and Baumann (2019) propose formal principal-agent models for their mechanism. Liebman and Mahoney’s (2017) main idea is that high uncertainty about unexpected spending demands towards the end of the fiscal year leads bureaucrats to keep more funds for a rainy day to meet these spending demands. As a consequence, their principal-agent model with stochastic demand shocks predicts a *positive* relationship between YESS and uncertainty. As a remedy, they propose to allow for the rollover of funds to the next budget period. Baumann (2019) raises doubt about the empirical persuasiveness of Liebman and Mahoney’s (2017) model. He notes that the level of uncertainty assumed in Liebman and Mahoney (2017) is unrealistically high. Furthermore, the UK experience with rolling-over budget remainders is at odds with the remedy suggested in Liebman and Mahoney (2017), where the introduction of rollover policies in their model reduces YESS. From 1998-2010, the UK central government allowed all departments to completely rollover budgets. This led to the accumulation of “savings.” However, the incoming government reformed the system in 2010. It first decided that all “savings” were lost and then introduced a more restrictive rollover policy, which limited the percentage of the budget that could be rolled over. The percentage also depends on the size of the government department. The reformed system also allows funds to be rolled over only once (Baumann, 2019). This reform experience contradicts the policy recommendation of Liebman and Mahoney (2017) and raises doubts about the importance of uncertainty relative to other factors.

Given these considerations, Baumann (2019) takes the perspective that procrastination is an important reason for YESS in the typical year. He argues that the time-inconsistency between the continuous effort that needs to be expended by the agent, the public servants, to identify and disburse to projects of good quality and the discontinuous performance evaluation by the principal, the “media and politicians,” at the end of the fiscal year leads to procrastination and thus YESS.³⁴ The underlying problem is the information asymmetry between the agent and the principal during the fiscal year about the effort expended by the agent. Baumann (2019) focuses on a specific mechanism for YESS which is encompassed by our administrative quality explanation. Empirically, we test for Baumann’s (2019) explanation below. Formally, Baumann (2019) proposes a principal-agent model with time-discounting and effort-averse bureaucrats. In an extension of his model, he allows for uncertainty and predicts a *negative* relationship between YESS and uncertainty. The intuition is that bureaucrats use stochastic shocks during the fiscal year as low-effort spending opportunities. Using monthly data on spending by Northern Irish departments, he finds the data to be more consistent with his procrastination theory than with Liebman and Mahoney’s (2017) hypothesis. To curb YESS, he suggests budgetary ‘taxes’ that increase towards the end of the fiscal year.

We are the first to econometrically test two main hypotheses from Liebman and Mahoney (2017) and Baumann (2019). We start with the econometric test of an exogenous demand shocks on YESS. Although Liebman and Mahoney (2017) and Baumann (2019)

to be checked against real world measures of governmental uncertainty.”

³⁴See arguments in Hyndman et al. (2005) and Government Accountability Office (1980). The mechanism is similar to the argument about effort and nonlinear performance contracts in Oyer (1998).

assume that unexpected positive demand shocks during the fiscal year reduce YESS, neither paper names only relevant positive demand shocks or conducts econometric tests. Having established that an unexpected demand shock increases YESS, we examine the relationship between uncertainty and YESS. The authors provide calibration evidence from US federal government procurement (Liebman and Mahoney, 2017) and departments in Northern England (Baumann, 2019) which both support their contradicting predictions. Our cross-country regressions will complement and extend this single-country evidence.

5.6 Empirical Evidence on Uncertainty and YESS

An important assumption in Liebman and Mahoney’s (2017) and Baumann’s (2019) models is that unexpected demand shocks in the beginning of the fiscal year reduce YESS. To test this, we need to analyze the effects of surprising events on the timing of spending. These events need to be exogenous to the timing of the fiscal year and of national budget plans. For the foreign aid budget, the most exogenous international demand shocks are natural disasters in developing countries. Fuchs and Klann (2013) describe that OECD governments provide disaster aid within days. Data on the occurrence of natural disasters is available at the daily level and includes information about the severity of such disasters. Our preferred results focus on rapid onset disasters. These disasters are more exogenous, arriving without anticipation or warning signals. Thus, expenditure planning by aid agencies can only be based on experiences from past years.³⁵ Figures A4– A6 show that the number of people affected by (fast onset) disasters do not cluster in specific months of the calendar year and show considerable variation across years.

We calculate the (logged) number of people affected by natural disasters in developing countries in the first three OECD country-specific fiscal quarters. When we interact our measure of demand shocks with the last fiscal quarter dummy, we find a negative interaction effect (Table 5). The interaction is economically and statistically significant across columns. As expected, the interaction coefficient for rapid onset disasters is more negative than for all disasters, which also includes humanitarian crises that were easier to anticipate. The main finding is robust to the exclusion of the bureaucratic quality interaction.

We found evidence that exogenous increases in the humanitarian needs of developing countries reduces year-end spending spikes. This provides support for the assumption in the YESS literature that unexpected demand shocks reduce YESS. We now turn to the question whether uncertainty about such events increases or decreases YESS.

Testing this second hypothesis is more difficult. Uncertainty may arise from country-, time-, as well as country-time-specific factors. It is well-known that the measurement of uncertainty is challenging (Jurado et al., 2015; Ashill and Jobber, 2010). Liebman and Mahoney (2017) and Baumann (2019) do not propose any variables to approximate the subannual uncertainty faced by the government bureaucracy but provide calibration evidence supporting their respective prediction about the relationship between uncertainty and YESS. We think that changes in government and macroeconomic conditions affect

³⁵In our coding, rapid onset disasters are all natural disasters except droughts (Guha-Sapir et al., 2015). While the results are robust to using all natural disasters, we only use observations with information about the start month of the disaster.

Table 5: YESS, rapid onset and all disasters in developing countries

	(1)	(2)	(3)	(4)	(5)	(6)
Last fiscal quarter	6.756** (3.081)	35.271*** (11.329)	29.952*** (10.719)	1.844*** (0.616)	28.493*** (9.772)	24.355** (9.165)
Last fiscal quarter x Bureaucratic quality	-1.319* (0.761)	-1.402* (0.774)	-1.354* (0.773)			
Bureaucratic quality		0.610 (1.367)	0.609 (1.334)			
Last fiscal quarter x Affected, FQ1-3, ln		-1.527*** (0.529)			-1.443*** (0.516)	
Last fiscal quarter x Affected, all disasters, FQ1-3, ln			-1.230** (0.486)			-1.201** (0.488)
Country-fiscal year FE	Yes	Yes	Yes	Yes	Yes	Yes
Country-calendar year FE	Yes	Yes	Yes	Yes	Yes	Yes
Calendar quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.71	0.71	0.71	0.71	0.71	0.71
No. of observations	1291	1290	1290	1291	1290	1290
No. of countries	27	27	27	27	27	27

Notes: The dependent variable is (logged) quarterly contributions to World Bank funds during the World Bank's fiscal years 2002-2013. The quarterly mean of the ICRG bureaucratic quality is lagged by one quarter. FQ1 (FQ3) refers to the first (third) fiscal quarter. FE refers to fixed effects. Standard errors are robust and clustered at the donor country level. Standard errors are robust and clustered by country. * : $p < 0.1$, ** : $p < 0.05$, *** : $p < 0.01$.

the probability of unexpected demand shocks for budget holders at the execution stage of the budget.

We propose to test for the role of the political environment by creating interactions between the last fiscal quarter dummy and a dummy for late approval of the budget by parliament, a dummy for the quarter of government elections or a government change, and a dummy for the quarter of the aid minister change (Columns 2-5 in Table 6). Table 7 aims to capture the influence of the economic circumstances on uncertainty and thus the timing of spending. We thus interact the last fiscal quarter with a dummy for economic crisis, the deviation from government projected lending (in percent of GDP), net government lending (in percent of GDP), and the primary balance (in percent of GDP). These political and economic factors are all potentially major factors that increase the unpredictability of spending demands faced by the agencies.

Table 6 shows results analyzing the relationship between political uncertainty and year-end spending. Among all of the variables analyzed, we find a statistically significant interaction only for a changing aid minister. The obtained negative relationship is in line with Baumann's (2019) prediction that a change in the aid minister can be interpreted as a positive demand shock. The exiting aid minister may spend overproportionally before leaving office as she might not care about how to meet any unexpected demands at the end of a fiscal year when she would no longer be in office. In such a scenario, the incoming aid minister would be left with less budget and thus less potential for YESS.

Table 6: Uncertainty and political factors

	(1)	(2)	(3)	(4)	(5)
Last fiscal quarter	6.759** (3.105)	7.098** (3.142)	6.677** (3.002)	6.681** (2.877)	6.759** (3.105)
Last fiscal quarter x Bureaucratic quality	-1.320* (0.767)	-1.365* (0.766)	-1.308* (0.743)	-1.320* (0.718)	-1.320* (0.767)
Bureaucratic quality	0.077 (0.865)	0.194 (0.852)	0.031 (0.824)	-0.006 (0.787)	0.077 (0.865)
Last fiscal quarter x Late budget		-0.255 (0.161)			
Last fiscal quarter x Election quarter			0.936 (2.019)		
Last fiscal quarter x Quarter between governments				2.617 (1.882)	
Last fiscal quarter x Quarter of aid minister change					-5.825* (3.222)
Country-fiscal year FE	Yes	Yes	Yes	Yes	Yes
Country-calendar year FE	Yes	Yes	Yes	Yes	Yes
Calendar quarter FE	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.71	0.71	0.71	0.71	0.71
No. of observations	1291	1291	1291	1291	1291
No. of countries	27	27	27	27	27

Notes: The dependent variable is (logged) quarterly contributions to World Bank funds during the World Bank’s fiscal years 2002-2013. All regressions include country- and fiscal year-fixed effects. FE refers to fixed effects. Standard errors are robust and clustered by country. * : $p < 0.1$, ** : $p < 0.05$, *** : $p < 0.01$.

Table 7 shows the results for uncertainty related to economic factors. Using our high-dimensional fixed effects, we do not find that any of the considered economic factors affect year-end spending.³⁶

In sum, the empirical evidence does not provide robust support for a systematic relationship between uncertainty and YESS. We do not draw strong conclusions because of the difficulty of operationalizing the uncertainty relevant for the budget holder. There are also two theoretical reasons for a lack of relationship between uncertainty and YESS. First, both procrastinating and saving bureaucrats may be employed in a government agency. Their behavioral reactions to uncertainty could offset each other, resulting in a net effect of null. Second, the level of precautionary savings made by bureaucrats may not be optimal for the “objective” level of uncertainty. “Forecasting” errors about the expected value of the demand shocks would make it impossible to detect any relationship.

In this section, we provided support for the first hypothesis about a YESS-decreasing effect of unexpected demand shock in the first quarters of the fiscal year. The assumption made in Liebman and Mahoney’s (2017) and Baumann’s (2019) model is thus reasonable. Regarding the second hypothesis, we suggest that the lack of robust empirical evidence about the uncertainty-YESS nexus could be due to measurement challenges and to theoretical reasons. If possible, future research should examine the role of uncertainty in environments where the sources and variation in uncertainty can be better observed or

³⁶Interactions with the and the cyclically adjusted primary balance, gross debt, revenue, and expenditure are also statistically insignificant.

Table 7: Uncertainty and economic factors

	(1)	(2)	(3)	(4)	(5)
Last fiscal quarter	6.759** (3.105)	6.825** (3.023)	5.979* (3.026)	7.613** (3.437)	7.204** (3.274)
Last fiscal quarter x Bureaucratic quality	-1.320* (0.767)	-1.312* (0.740)	-1.113 (0.747)	-1.517* (0.835)	-1.430* (0.805)
Bureaucratic quality	0.077 (0.865)	0.164 (0.874)	0.032 (0.859)	0.219 (0.901)	0.216 (0.912)
Last fiscal quarter x Economic crisis		-1.819 (1.173)			
Last fiscal quarter x Deviation from projected lending			0.055 (0.110)		
Last fiscal quarter x Net lending				0.056 (0.069)	
Last fiscal quarter x Primary balance					0.052 (0.080)
Country-fiscal year FE	Yes	Yes	Yes	Yes	Yes
Country-calendar year FE	Yes	Yes	Yes	Yes	Yes
Calendar quarter FE	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.71	0.71	0.69	0.71	0.71
No. of observations	1291	1291	1193	1291	1291
No. of countries	27	27	27	27	27

Notes: The dependent variable is (logged) quarterly contributions to World Bank funds during the World Bank's fiscal years 2002-2013. All regressions include country- and fiscal year-fixed effects. FE refers to fixed effects. Standard errors are robust and clustered by country. * : $p < 0.1$, ** : $p < 0.05$, *** : $p < 0.01$

even controlled.

6 Concluding Remarks

Recent evidence suggests that public spending at the end of the budget is less effective than spending in the rest of the fiscal year (Liebman and Mahoney, 2017). However, there is little academic research on the existence, causes, and remedies for YESS. The suggested remedies for this dynamic fiscal inefficiency are still debated and have either not yet been systematically evaluated or remained entirely theoretical. One reason for the lack of research on YESS is a lack of access to subannually disaggregated and, more specifically, internationally comparable public expenditure data.

We provide the first evidence that subannual spending patterns are indeed causally related to the fiscal year rather than being a seasonal phenomenon. We analyze internationally comparable accounting data from the World Bank and identify the effect of interest by using historic variation in countries' fiscal years in a panel framework with high-dimensional fixed effects.

Understanding the causes for the size of year-end spending is required to choose the remedies for inefficient YESS. The literature is far from reaching a consensus. For example, Liebman and Mahoney (2017) and Baumann (2019) provide contradictory advice regarding carry-forward rules, an often proposed institutional remedy for YESS. The year-end spending surges are often discussed in a principal-agent framework with information asymmetries, and principal-agent theories have proposed various measures to improve the alignment of the agent with the principal. We propose that these suggested incentive, monitoring, pay and other policies tend to be present in government agencies with good administrative quality. We find that administrative quality is associated with lower YESS, in line with recent findings on the importance of management practices for performance. We then examine a number of budgetary institutions to open the 'black box' of administrative quality.

We also examine the two hypotheses from the literature (Liebman and Mahoney, 2017; Baumann, 2019). We provide robust empirical support that unexpected demand shocks do reduce year-end spending; however, where the prediction by the theories differ, we do not find that uncertainty is systematically related to YESS.

It is fair to say that the debate on the most cost-effective policy to curb YESS has only begun. Consequently, there is much room for future research. Further research should focus on the effects of exogenous changes in (fiscal) institutions and budget rules on subannual spending patterns. To improve our understanding of the factors generating uncertainty for budget holders, researchers could analyze differences in the uncertainty faced by departments within a government (e.g., using the U.S. data analyzed in Liebman and Mahoney, 2017). As the introduction of new budgetary rules is often associated with considerable administrative cost, the costs and benefits of curbing YESS must be carefully evaluated for each of the proposed measures in order to improve public performance overall.

On the macroeconomic level, research could analyze the macroeconomic consequences of YESS. The fiscal year ends at the same day in all public sector agencies (frequently also in private sector firms) of a country. As the public sector accounts for a large share of GDP in most OECD countries, YESS may actually explain some of the seasonality observed in macroeconomic time series.

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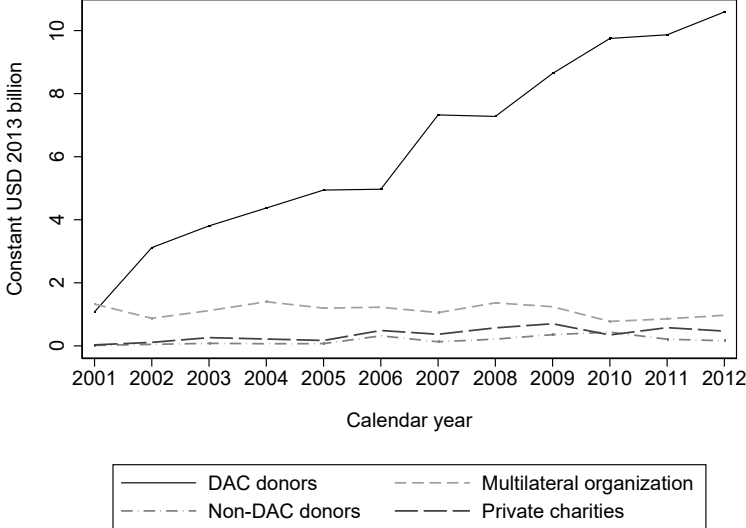
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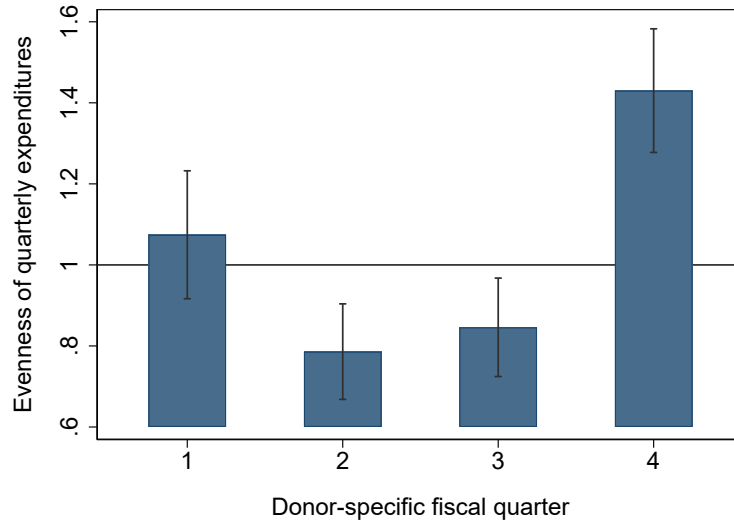
Appendix Figures

Figure A1: Different types of countries



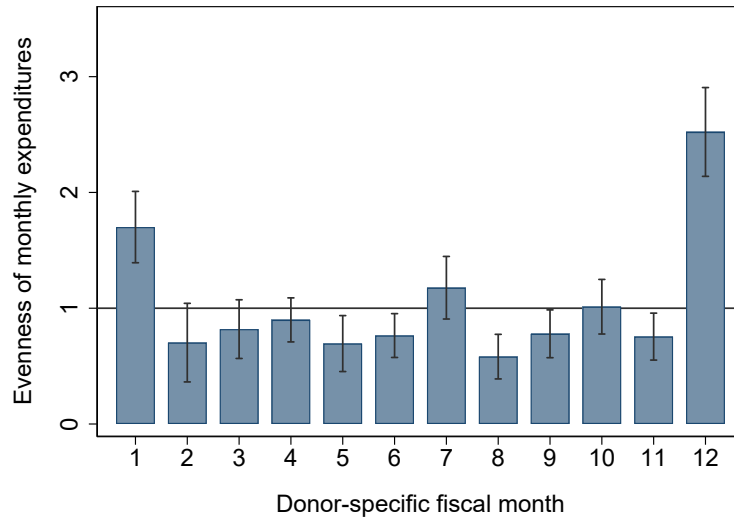
Notes: Donors of the OECD’s Donor Assistance Committee (DAC) are the major contributors to World Bank funds over the sample period.

Figure A2: Contributions by country-specific fiscal quarter



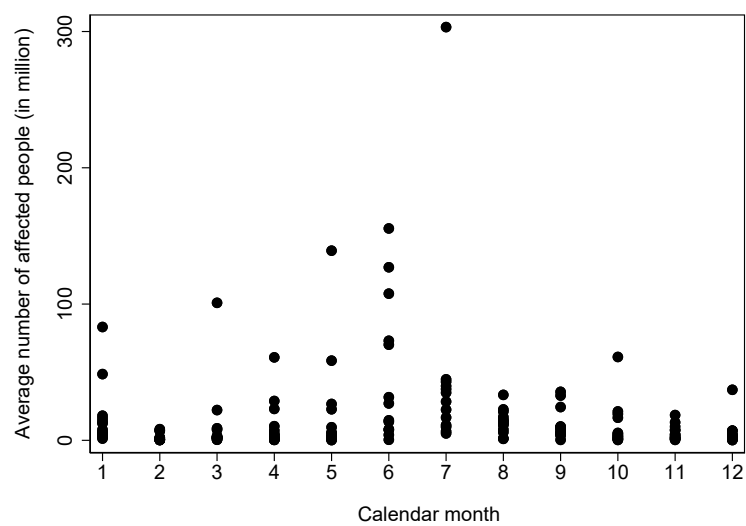
Notes: The y-scale shows the evenness of spending within the fiscal year and is defined as the actual quarterly trust fund contributions divided by the average quarterly contributions (i.e. annual trust fund contributions divided by 4). The vertical line at one marks balanced spending in each quarter.

Figure A3: Contributions by country-specific fiscal month



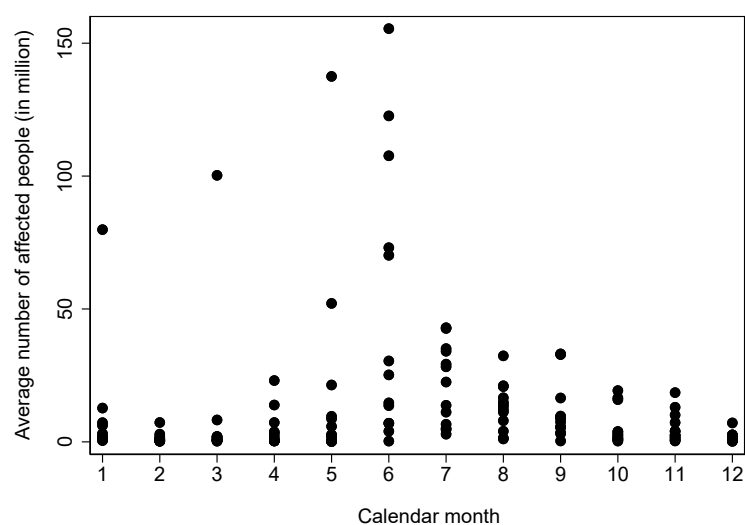
Notes: The y-scale shows shows the evenness of spending within the fiscal year and is defined as the actual monthly contributions divided by the average monthly contributions (i.e. annual fund contributions divided by 12). The vertical line at one marks balanced spending in each month.

Figure A4: Monthly number of people affected by natural disasters



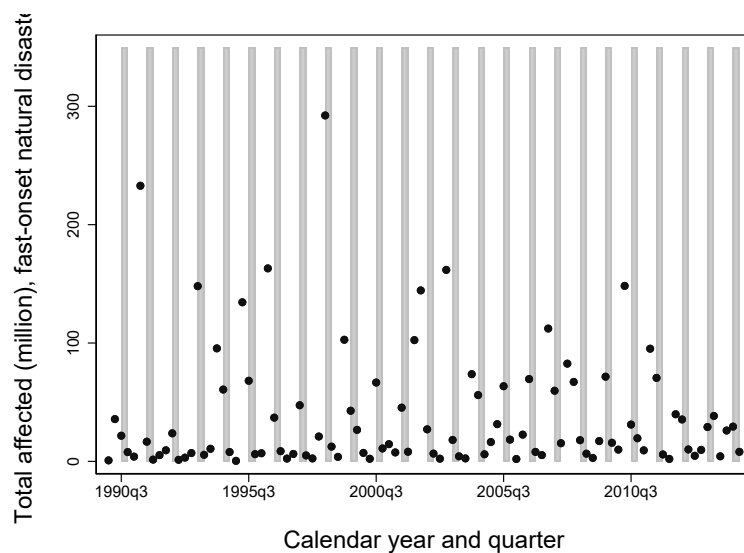
Notes: The figure shows the number of people (in million) affected by any type of natural disaster in developing countries in each month of the years 2001-2013. See also Table A15.

Figure A5: Monthly number of people affected by rapid onset natural disaster



Notes: The figure shows the number of people (in million) affected by rapid onset natural disaster in developing countries per month for the years 2001-2013. Rapid onset disasters include all disaster types except droughts. This means that all disaster types in the database by (Guha-Sapir et al., 2015) are included: animal accident (1 observation), earthquake, epidemic, extreme temperature, flood, impact (1 observation), insect infestation, landslide, mass movement (dry), storm, volcanic activity, wildfire. See also Table A15.

Figure A6: Quarterly number of people affected by rapid onset natural disasters in developing countries (1987-2014)



Notes: The figure shows the number of people (in million) affected by rapid onset natural disaster in developing countries in a given quarter during the period 2001-2013. For the definition, see Table A15 and Figure A5.

Appendix Tables

Table A1: Sources and definitions

Variable	Definition	Original Source
Dependent Variables		
Quarterly fund contributions (ln)*	Sum of country-specific quarterly transfers from a donor country to World Bank funds, in logs. Identified via <i>PostingDate</i> .	World Bank (2013).
Monthly TF contributions (ln)*	Sum of country-specific monthly transfers from a donor country to World Bank funds, in logs.	World Bank (2013).
Number of first contributions (ln)	Number of donor-specific first use of a specific fund in a fiscal quarter-year. Identified via <i>TrusteeFundName</i> .	World Bank (2013).
Independent variables		
<i>Main variables</i>		
Last fiscal quarter (month / weeks)	Indicator for the (month / weeks) in the fiscal year of the country.	See Table 1: own coding based on internet research.
Bureaucratic quality	Monthly score of Bureaucracy Quality, lagged by one month. Regressions at the quarter level include the 3-month average, lagged by one quarter. Definition "[...] [H]igh points are given to countries where the bureaucracy has the strength and expertise to govern without drastic changes in policy or interruptions in government services. In these low-risk countries, the bureaucracy tends to be somewhat autonomous from political pressure and to have an established mechanism for recruitment and training."	International Country Risk Indicators (Howell, 2011).
<i>Variables at the quarterly level</i>		

Table A1: (continues on next page)

Table A1: (continued)

Variable	Definition	Original Source
Late budget	Number of months the annual budget is appropriated late. Early and on-schedule budget approvals are coded as zero.	Own coding based on internet research (sources available on request).
Election quarter	Indicator equals 1 in the election quarter. Legislative elections are used for parliamentary and presidential systems because budget authority is always held by parliaments. In the U.S. case, legislative elections to the House of Representatives take place biannually.	Beck et al. (2001), own update for 2013.
Government change	Indicator is 1 in all quarters which include at least one month of the time period between the lost election (but excluding the election month) up to and including the month of the inauguration of the new government. An election is considered lost if the party of the Chief Executive changes as a consequence of the election. All legislative elections are considered.	Beck et al. (2001), own update for 2013. Own coding of the inauguration date based on internet research (sources available on request).
Aid minister change	Indicator equals 1 in the quarter a new minister responsible for the aid budget takes office (based on monthly available data).	Fuchs and Richert (2018).
<i>Annual variables</i>		
Annual amount (ln)*	Sum of country-specific transfers within a donor’s fiscal year, in logs.	World Bank (2013).
Government effectiveness	Governance indicator measuring “the capacity of the governments to effectively formulate and implement sound policies.”, one quarter lag	World Governance Indicators (Kaufmann et al., 2011).
Regulatory quality	Governance indicator measuring “perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.”	World Governance Indicators (Kaufmann et al., 2011).

Table A1: (continues on next page)

Table A1: (continued)

Variable	Definition	Original Source
Average WGI score	Average of the six World Governance Indicators (Control of Corruption; Government Effectiveness; Law and Order; Political Stability; Regulatory Quality; Voice and Accountability).	World Governance Indicators (Kaufmann et al., 2011).
Aid agency model	Variable based on the classification of the four organizational models of bilateral aid provision; Model 1: Development co-operation is an integral part of the ministry of foreign affairs, which is responsible for policy and implementation. Model 2: A Development Co-operation Directorate has the lead role within the ministry of foreign affairs and is responsible for policy and implementation. Model 3: A ministry has overall responsibility for policy and a separate executing agency is responsible for implementation. Model 4: A ministry or agency, which is not the ministry of foreign affairs, is responsible for both policy and implementation.	Definition from Fuchs et al. (2014), 2018 data update; Classification from OECD (2009).
MTF	Indicator equals 1 if a Medium-Term Framework (MTF) is in place.	Vlaicu et al. (2014a).
Fiscal rule	Indicator equals one if a numerical fiscal rule exists, values are extrapolated between survey years at the country-calendar year level. The indicator is one if at least one of the following rules is in place: balanced budget rule, expenditure rule, revenue rule, or debt rule	Lledó et al. (2017).
Carry-over rule	Indicator is one if any form of carry-forward is allowed, values are extrapolated between survey years at the country-calendar year level.	From Dahan and Strawczynski (2017) based on OECD (2003, 2007, 2016a).
Risk aversion (capital province)	Average risk aversion of individuals living in the subnational region in which the country's capital is located.	Falk et al. (2018).

Table A1: (continues on next page)

Table A1: (continued)

Variable	Definition	Original Source
Average risk aversion	Average risk aversion of all individuals in the country.	Falk et al. (2018).
Accrual accounting	Indicator equals 1 if the federal government uses accrual accounting systems and 0 if a cash accounting system is used or when countries transitioned from cash to accrual (there are no transitions in the other direction).	Own coding based on OECD(2003; 2004; 2005; 2013); confirmed through correspondence with accounting experts in different countries.
Disaster affected, rapid onset disasters, FQ1-FQ3 (ln)	Total number of people affected by rapid onset natural disasters occurring in the first country-specific fiscal quarters, in logs. Rapid onset disasters are all disasters in the data except droughts, which clearly are disasters that do not start suddenly. Accordingly, rapid onset disasters are all reported earthquakes, volcanic activity, storms, landslides, dry mass movements, and wildfires.	EM-DAT: The OFDA/CRED International Disaster Database (Guha-Sapir et al., 2015)
Disaster affected, all disasters, FQ1-FQ3 (ln)	Total number of people affected by all natural disasters occurring in the first country-specific fiscal quarters, in logs.	EM-DAT: The OFDA/CRED International Disaster Database (Guha-Sapir et al., 2015).
Total aid growth (%)	Percentage change in total aid disbursements with aid referring to Official Development Assistance (ODA).	(OECD, 2016b).
Total aid change (ln)	Difference between total aid (ODA) disbursements in the current fiscal year and total aid disbursements in the previous fiscal year.	(OECD, 2016b).
Economic crisis	Indicator equals 1 in years in which the country is affected by a banking, sovereign or currency crisis.	Valencia and Laeven (2012).

Table A1: (continues on next page)

Table A1: (continued)

Variable	Definition	Original Source
Δ of projected government net lending	Difference between the projected government net lending as a percentage of GDP [NLGQ] (as available at least two full months before the beginning of the donor country's fiscal year) and realized values as reported in November 2014.	OECD (2016c).
Net lending	Net lending/borrowing (also referred as overall balance) (% of GDP) (Variable name: <i>GGXCNL_G01_GDP_PT</i>).	IMF (2016).
Primary balance (% of GDP)	Primary net lending/borrowing (% of GDP) (Variable name: <i>GGXONLB_G01_GDP_PT</i>).	IMF (2016).
Cyclically adj. primary balance (% of GDP)	Cyclically adjusted primary balance (% of potential GDP) (Variable name: <i>GGCBP_G01_PGDP_PT</i>)	IMF (2016).

Table A2: Descriptive statistics

	No.	Mean	SD	Min.	Max.
Quarterly fund contributions *	1291	60.164	124.779	0.000	1479.981
Mean contributions in the last fiscal quarter *	323	86.513	150.151	0.000	1163.747
Last fiscal quarter	1291	0.250	0.433	0.000	1.000
Bureaucratic quality	1291	3.656	0.504	2.500	4.000
Government effectiveness	1237	1.502	0.500	0.214	2.357
Regulatory quality	1237	1.393	0.351	0.484	1.971
Avg. WGI score	1237	1.338	0.424	0.232	1.985
Aid agency organization, continuous	1051	2.632	0.827	1.000	4.000
Aid agency model 1	1051	0.091	0.288	0.000	1.000
Aid agency model 2	1051	0.320	0.467	0.000	1.000
Aid agency model 3	1051	0.455	0.498	0.000	1.000
Aid agency model 4	1051	0.134	0.341	0.000	1.000
Disaster-affected in calendar quarters 1-3, million	1290	170.182	146.950	23.093	650.941
Medium-Term Framework (MTF)	809	0.975	0.155	0.000	1.000
Fiscal rule	1243	0.907	0.290	0.000	1.000
Carry-over rule	1291	5.403	0.035	5.362	5.463
Risk aversion in the capital region	811	-0.062	0.232	-0.739	0.256
Accrual accounting	1291	0.452	0.498	0.000	1.000
Late budget	1291	0.488	1.733	0.000	14.000
Government change	1291	0.043	0.204	0.000	1.000
Aid minister change	1291	0.017	0.129	0.000	1.000
Economic crisis	1291	0.056	0.230	0.000	1.000
Net lending	1291	-2.093	5.126	-32.178	18.458
Deviation from projected lending	1193	-0.846	3.447	-25.384	6.853
primary balance (% of GDP)	1291	-0.584	4.418	-29.730	15.888

* 2013 constant USD million

Table A3: The effect of the last fiscal month

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Last fiscal month	2.658*** (0.469)	2.658*** (0.470)	2.381*** (0.483)	2.658*** (0.490)	2.634*** (0.486)	2.567*** (0.481)	2.336*** (0.491)	2.739*** (0.679)
Annual amount (ln)	0.744*** (0.043)	0.794*** (0.077)	0.285*** (0.053)					
Country FE	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Fiscal year FE	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-fiscal year FE	No	No	No	Yes	Yes	Yes	Yes	Yes
Calendar year FE	No	No	No	No	Yes	Yes	Yes	Yes
Country-calendar year FE	No	No	No	No	No	Yes	Yes	Yes
Calendar quarter FE	No	No	No	No	No	No	Yes	Yes
Calendar month FE	No	No	No	No	No	No	No	Yes
No. of observations	4464	4464	4464	4464	4464	4464	4464	4464
No. of countries	27	27	27	27	27	27	27	27

Notes: The dependent variable is (logged) monthly contributions to World Bank funds during the World Bank's fiscal years 2002-2013. FE refers to fixed effects. Standard errors are robust and clustered by country. * : $p < 0.1$, ** : $p < 0.05$, *** : $p < 0.01$.

Table A4: The weeks around the change of the fiscal year

	(1)	(2)	(3)	(4)	(5)
Before: week 8	0.098* (0.056)	0.071 (0.060)	0.083 (0.056)	0.092* (0.050)	0.099* (0.048)
Before: week 7	0.046 (0.050)	0.019 (0.064)	0.031 (0.055)	0.040 (0.050)	0.047 (0.053)
Before: week 6	0.160* (0.084)	0.133 (0.083)	0.145* (0.084)	0.154* (0.088)	0.160 (0.098)
Before: week 5	0.135*** (0.042)	0.108*** (0.036)	0.120*** (0.036)	0.129*** (0.044)	0.172*** (0.058)
Before: week 4	0.186*** (0.060)	0.159** (0.063)	0.171*** (0.060)	0.180*** (0.055)	0.272*** (0.095)
Before: week 3	0.353*** (0.113)	0.326*** (0.105)	0.338*** (0.108)	0.347*** (0.116)	0.438*** (0.154)
Before: week 2	0.369*** (0.105)	0.342*** (0.100)	0.355*** (0.101)	0.364*** (0.109)	0.455*** (0.137)
Before: week 1	0.458** (0.176)	0.431** (0.163)	0.443** (0.170)	0.452** (0.180)	0.543** (0.207)
After: week 1	0.096 (0.095)	0.112 (0.103)	0.100 (0.098)	0.129 (0.094)	0.227 (0.137)
After: week 2	0.185** (0.085)	0.201** (0.087)	0.189** (0.088)	0.218** (0.097)	0.317** (0.128)
After: week 3	0.128* (0.070)	0.143* (0.080)	0.131* (0.075)	0.160* (0.081)	0.259* (0.130)
After: week 4	0.117** (0.054)	0.133** (0.062)	0.121** (0.057)	0.149** (0.061)	0.248** (0.107)
After: week 5	0.094* (0.051)	0.109** (0.052)	0.097* (0.052)	0.126* (0.063)	0.199** (0.085)
After: week 6	0.112** (0.045)	0.128** (0.049)	0.116** (0.047)	0.145** (0.055)	0.198** (0.073)
After: week 7	0.092 (0.064)	0.108 (0.073)	0.096 (0.067)	0.124* (0.067)	0.178* (0.104)
After: week 8	0.112* (0.059)	0.127* (0.067)	0.115* (0.061)	0.144** (0.055)	0.197** (0.082)
Aggregation level	Daily	Daily	Daily	Daily	Daily
Calendar year FE	No	Yes	Yes	Yes	Yes
Fiscal year FE	No	Yes	Yes	Yes	Yes
Country-fiscal year FE	No	No	Yes	Yes	Yes
Calendar quarter FE	No	No	No	Yes	Yes
Calendar month FE	No	No	No	No	Yes
No. of observations	118341	118341	118341	118341	118341
No. of countries	27	27	27	27	27

Notes: The dependent variable is (logged) daily contributions to World Bank funds during the World Bank's fiscal years 2002-2013. FE refers to fixed effects. Standard errors are robust and clustered by country. * : $p < 0.1$, ** : $p < 0.05$, *** : $p < 0.01$.

Table A5: The effect of the first and the last fiscal quarter

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Last fiscal quarter	1.384*** (0.336)	1.402*** (0.349)	1.391*** (0.348)	1.408*** (0.355)	1.395*** (0.407)	1.501*** (0.443)	1.514*** (0.467)	1.165* (0.599)
First fiscal quarter	0.993** (0.419)	1.002** (0.425)	0.988** (0.423)	0.993** (0.428)	1.005* (0.495)	0.952* (0.503)	0.973* (0.534)	0.965 (0.612)
Annual amount (ln)	1.027*** (0.066)	0.464*** (0.055)	1.034*** (0.069)	0.438*** (0.053)				
Fiscal year FE	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	No	Yes	No	No	Yes	Yes	Yes	Yes
Country-fiscal year FE	No	No	No	No	Yes	Yes	Yes	Yes
Country-calendar year FE	No	No	No	No	No	No	Yes	Yes
Calendar year FE	No	No	No	No	No	Yes	Yes	Yes
Calendar quarter FE	No	No	No	No	No	No	No	Yes
No. of observations	1291	1291	1291	1291	1291	1291	1291	1291
No. of countries	27	27	27	27	27	27	27	27

Notes: The dependent variable is (logged) quarterly contributions to World Bank funds during the World Bank's fiscal years 2002-2013. FE refers to fixed effects. Standard errors are robust and clustered by country. * : $p < 0.1$, ** : $p < 0.05$, *** : $p < 0.01$.

Table A6: The effect of the last fiscal quarter: sensitivity analysis

	(1)	(2)	(3)	(4)	(5)
Last fiscal quarter	1.844*** (0.616)	1.320** (0.602)	2.532*** (0.767)	1.323** (0.488)	1.362*** (0.486)
Notes		≤ 2007	> 2007	5 minor	WB year
Country-fiscal year FE	Yes	Yes	Yes	Yes	Yes
Country-calendar year FE	Yes	Yes	Yes	Yes	Yes
Calendar quarter FE	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.71	0.69	0.73	0.40	0.72
No. of observations	1291	711	580	1051	1196
No. of countries	27	27	27	22	25

Notes: The dependent variable is (logged) quarterly contributions to World Bank funds during the World Bank's fiscal years 2002-2013. The column notes describe the type of sensitivity analysis: Column 1 shows the baseline result, Columns 2 and 3 are, respectively, based on the first and the second part of the 2002-2013 sample period, Column 4 drops the five smallest donor countries from the sample, and Column 5 omits the two countries that share the fiscal year with the World Bank, namely Australia and New Zealand. FE refers to fixed effects. Standard errors are robust and clustered by country. * : $p < 0.1$, ** : $p < 0.05$, *** : $p < 0.01$.

Table A7: The effect of the fiscal quarter: excluding one country, I

	(1)	(2)	(3)	(4)	(5)	(6)
Last fiscal quarter	1.866** (0.686)	1.884*** (0.638)	1.835*** (0.625)	1.836*** (0.656)	1.886*** (0.633)	1.659*** (0.580)
Excluded donor	AUS	AUT	BEL	CAN	CHE	CZE
Fiscal year FE	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
No. of observations	1244	1243	1243	1244	1243	1243
No. of countries	26	26	26	26	26	26

Notes: The dependent variable is (logged) quarterly contributions to World Bank funds during the World Bank's fiscal years 2002-2013. The country code in the column notes indicates the country that is temporarily dropped from the sample. FE refers to fixed effects. Standard errors are robust and clustered by country. * : $p < 0.1$, ** : $p < 0.05$, *** : $p < 0.01$.

Table A8: The effect of the fiscal quarter: excluding one country, II

	(1)	(2)	(3)	(4)	(5)	(6)
Last fiscal quarter	1.916*** (0.632)	1.858*** (0.635)	1.859*** (0.630)	1.871*** (0.633)	1.881*** (0.637)	1.931*** (0.638)
Excluded donor	DEU	DNK	ESP	FIN	FRA	GBR
Fiscal year FE	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
No. of observations	1243	1243	1243	1243	1243	1244
No. of countries	26	26	26	26	26	26

Notes: The dependent variable is (logged) quarterly contributions to World Bank funds during the World Bank's fiscal years 2002-2013. The country code in the column notes indicates the country that is temporarily dropped from the sample. FE refers to fixed effects. Standard errors are robust and clustered by country. * : $p < 0.1$, ** : $p < 0.05$, *** : $p < 0.01$.

Table A9: The effect of the fiscal quarter: excluding one country, III

	(1)	(2)	(3)	(4)	(5)	(6)
Last fiscal quarter	1.874*** (0.646)	1.931*** (0.629)	1.731*** (0.600)	1.808*** (0.634)	1.876*** (0.649)	1.758*** (0.616)
Excluded donor	GRC	IRL	ISL	ITA	JPN	KOR
Fiscal year FE	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
No. of observations	1243	1243	1243	1243	1244	1243
No. of countries	26	26	26	26	26	26

Notes: The dependent variable is (logged) quarterly contributions to World Bank funds during the World Bank's fiscal years 2002-2013. The country code in the column notes indicates the country that is temporarily dropped from the sample. FE refers to fixed effects. Standard errors are robust and clustered by country. * : $p < 0.1$, ** : $p < 0.05$, *** : $p < 0.01$.

Table A10: The effect of the fiscal quarter: excluding one country, IV

	(1)	(2)	(3)	(4)	(5)	(6)
Last fiscal quarter	1.945*** (0.627)	1.871*** (0.635)	1.859*** (0.634)	1.473*** (0.485)	1.632*** (0.564)	1.870*** (0.640)
Excluded donor	LUX	NLD	NOR	NZL	POL	PRT
Fiscal year FE	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
No. of observations	1243	1243	1243	1243	1243	1244
No. of countries	26	26	26	26	26	26

Notes: The dependent variable is (logged) quarterly contributions to World Bank funds during the World Bank's fiscal years 2002-2013. The country code in the column notes indicates the country that is temporarily dropped from the sample. FE refers to fixed effects. Standard errors are robust and clustered by country. * : $p < 0.1$, ** : $p < 0.05$, *** : $p < 0.01$.

Table A11: The effect of the fiscal quarter: excluding one country, V

	(1)	(2)	(3)
Last fiscal quarter	1.904*** (0.631)	1.872*** (0.635)	2.065*** (0.641)
Excluded donor	SVK	SWE	USA
Fiscal year FE	Yes	Yes	Yes
Country FE	Yes	Yes	Yes
No. of observations	1243	1243	1243
No. of countries	26	26	26

Notes: The dependent variable is (logged) quarterly contributions to World Bank funds during the World Bank's fiscal years 2002-2013. The country code in the column notes indicates the country that is temporarily dropped from the sample. FE refers to fixed effects. Standard errors are robust and clustered by country. * : $p < 0.1$, ** : $p < 0.05$, *** : $p < 0.01$.

Table A12: Alternative measures of administrative quality

	(1)	(2)	(3)	(4)
Last fiscal quarter	6.759** (3.105)	3.517** (1.455)	4.150** (1.961)	3.671** (1.571)
Last fiscal quarter x Bureaucratic quality	-1.320* (0.767)			
Bureaucratic quality	0.077 (0.865)			
Last fiscal quarter x Government effectiveness		-1.168 (0.753)		
Government effectiveness		1.079 (2.537)		
Last fiscal quarter x Regulatory quality			-1.669 (1.217)	
Regulatory quality			0.245 (3.187)	
Last fiscal quarter x Average WGI score				-1.415 (0.932)
Average WGI score				-0.373 (4.954)
Country-fiscal year FE	Yes	Yes	Yes	Yes
Country-calendar year FE	Yes	Yes	Yes	Yes
Calendar quarter FE	Yes	Yes	Yes	Yes
Adjusted R-squared	0.71	0.71	0.71	0.71
No. of observations	1291	1210	1210	1210
No. of countries	27	27	27	27

Notes: The dependent variable is (logged) quarterly contributions to World Bank funds during the World Bank's fiscal years 2002-2013. Column 1 shows the baseline results for the quarterly *Bureaucratic Quality* variable from ICRG. Columns 2-4 include interactions with alternative measures of institutional quality, which are available at annual frequency. FE refers to fixed effects. Standard errors are robust and clustered by country. * : $p < 0.1$, ** : $p < 0.05$, *** : $p < 0.01$.

Table A13: Correlation matrix for governance measures

	(1)	(2)	(3)	(4)
(1) Bureaucratic quality, ICRG	1.000			
(2) Government effectiveness, WGI	0.851***	1.000		
(3) Regulatory quality, WGI	0.786***	0.832***	1.000	
(4) Avg. WGI score	0.866***	0.948***	0.898***	1.000

Notes: The table shows the binary correlation of the four governance measures.

Table A14: ICRG *Bureaucratic Quality* and the last fiscal month

	(1)	(2)	(3)	(4)	(5)	(6)
Last fiscal month	7.491*** (2.559)	7.600*** (2.550)	7.732*** (2.553)	7.959*** (2.643)	7.350*** (2.639)	8.051*** (2.895)
Last fiscal month x Bureaucratic quality	-1.318* (0.744)	-1.349* (0.743)	-1.398* (0.741)	-1.480* (0.763)	-1.369* (0.764)	-1.396* (0.787)
Bureaucratic quality	2.833*** (0.942)	2.850** (1.068)	-2.567** (0.966)	-2.734 (4.292)	-2.868 (4.252)	-2.893 (4.303)
Annual amount (ln)	0.683*** (0.061)	0.673*** (0.098)	0.270*** (0.052)			
Fiscal year FE	No	Yes	Yes	Yes	Yes	Yes
Country FE	No	No	Yes	Yes	Yes	Yes
Calendar year FE	No	No	No	Yes	Yes	Yes
Country-fiscal year FE	No	No	No	Yes	Yes	Yes
Country-calendar year FE	No	No	No	Yes	Yes	Yes
Calendar quarter FE	No	No	No	No	Yes	Yes
Calendar month FE	No	No	No	No	No	Yes
No. of observations	4443	4443	4443	4443	4443	4443
No. of countries	27	27	27	27	27	27

Notes: The dependent variable is the (logged) contribution amount in the country-specific fiscal monthly. FE refers to fixed effects. Standard errors are robust and clustered by country. * : $p < 0.1$, ** : $p < 0.05$, *** : $p < 0.01$.

Table A15: People affected by natural disasters, average by calendar month

Calendar month	Affected people (in million), average	
Disaster type	Fast-onset disasters	All disasters
January	9.1	17.1
February	1.4	2.4
March	9.2	12.0
April	4.3	11.3
May	18.7	21.3
June	48.6	49.3
July	21.5	46.4
August	13.1	13.6
September	11.16	12.2
October	5.5	10.9
November	5.2	5.7
December	1.9	5.4

Notes: Rapid onset disasters include all disaster types except droughts. This means that all disaster types in the database by (Guha-Sapir et al., 2015) are included: animal accident (1 observation), earthquake, epidemic, extreme temperature, flood, impact (1 observation), insect infestation, landslide, mass movement (dry), storm, volcanic activity, wildfire. See also Figure A5 and Figure A4.

The end of the Fiscal Year and Choice of Funds

Although hard evidence is scarce, year-end spending is generally considered less efficient than money spent in the remainder of the fiscal year. End of year spending is undertaken in a rush or supports low-priority and low-impact projects.³⁷ Liebman and Mahoney (2017) show that IT projects contracted in the last weeks of the financial year receive lower performance evaluations on average. The effectiveness of trust fund aid provided at different times of the fiscal year cannot be evaluated. Using the same data as above, we provide indirect evidence about subannual differences in contributions. At the end of the year, countries might prefer certain issues or choose to contribute to single-donor funds about which they have more control. If trust funds differ systematically in the quality of their projects, this influences the effectiveness. However, no systematic information on the quality of projects supported by trust fund aid is known.³⁸ First, we consider trust funds that are used only once or twice at all. Such contributions might be less efficient because these types of funds tend to be small while set-up costs are largely fixed.³⁹ Table A16

³⁷Fichtner and Greene (2014) review the little evidence available.

³⁸General discussions of the transaction costs and the efficiency of trust funds are made by IEG (2011), Reinsberg et al. (2015), and Reinsberg (2016).

³⁹Smaller trust funds are likely to be less efficient because transaction costs are high in relative terms as reflected by management fees. Recent World Bank reforms have increased the minimum size of trust funds and have sought to dissolve small trust funds (no threshold until the World Bank fiscal year (WBFY) 2007; US\$ 1 million threshold effective from WBFY 2008 to 2013; US\$ 2 million threshold since WBFY

shows that of the 445 trust funds that received only one contribution in the sample period, more than 40 percent were used in countries' last FQ (Row 1). Row 2 shows that contributions to trust funds that were used twice in the sample period were most frequently made in the last quarter, although the percentage share is lower than in Row 1. Rows 3 and 4 allow for the possibility that newer trust funds might not yet have received additional trust funds but will soon by excluding the last three years of the sample. The percentage shares in Rows 3 and 4 correspond to Rows 1 and 2, respectively. Row 5 shows that countries made unique contributions to any given trust fund in every quarter but that single usage peaks in the last FQ. This shows differences in the subannual usage of trust funds. However, conclusions about the efficiency of these differential trust funds are difficult to draw. First, year-end trust fund contributions could be more efficient than any alternatives within the aid budget. In the unlikely case that the lapsing funds would be returned to the general treasury instead, the efficiency of trust fund aid and other aid would need to be compared to that of public resources used in other sectors in the next fiscal year. This is a daunting if not impossible task. Further research is needed to answer the efficiency question.

At the end of the year, countries might prefer to contribute to use particular types of trust funds. Eichenauer and Reinsberg (2017) argue that single-donor trust funds allow contributing donors to maintain more control over the future allocation of funds. Single-donor trust funds could thus be more popular for the purpose of de-annualizing funds than multi-donor trust funds. Table A17 shows that contributions to single-donor trust funds more than double in the last FQ.

There is some tentative evidence that trust funds are used differently in the last quarter but it cannot be determined whether year-end contributions are less efficient than trust fund aid provided in other quarters, other types of foreign aid or public funds spent elsewhere.

Table A16: Descriptive evidence: Differential use of World Bank funds at the end of fiscal years

		1 st quarter		2 nd quarter		3 rd quarter		4 th quarter		Total
(1)	N° of funds used once	126	28%	65	15%	66	15%	188	42%	445
(2)	N° of funds used twice	149	27%	85	15%	102	18%	216	37%	552
(3)	N° of funds used once by any donor (< 2010)	100	30%	54	16%	44	13%	140	43%	338
(4)	N° of funds used twice by any donor (< 2010)	120	30%	66	16%	72	18%	147	37%	405
(5)	N° of funds used once by a given donor	293	30%	140	14%	135	14%	407	43%	975

Notes: Descriptive analysis of the frequency of contributions to the same World Bank fund according to the fiscal quarter.

2013).

Table A17: End of year contributions by type of funds

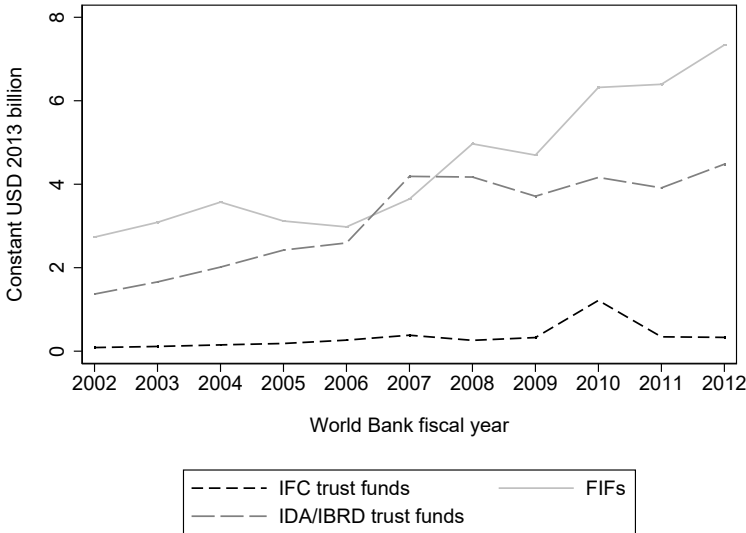
	(1)
Last fiscal quarter	1.271** (0.562)
Annual amount (ln)	-0.573 (0.584)
Last fiscal quarter x single-donor fund	2.406* (1.378)
Amount to single-donor funds (ln)	-1.929*** (0.583)
Fiscal year FE	Yes
Country FE	Yes
Country-fiscal year FE	Yes
Calendar year FE	Yes
Country-calendar year FE	Yes
Calendar quarter FE	Yes
No. of observations	1296
No. of countries	27

Notes: The dependent variable is the (logged) contribution amount to all World Bank funds or the single-donor trust funds in the country-specific fiscal quarter. FE refers to fixed effects. Standard errors are robust and clustered by country. * : $p < 0.1$, ** : $p < 0.05$, *** : $p < 0.01$.

Details on the Types of Trust Funds

The World Bank categorizes funds according to their topic and the services it provided. These funds may support the projects of or be implemented by the International Bank for Reconstruction and Development (IBRD) and the IDA, or by the International Finance Corporation (IFC). Alternatively, contributions are made to Financial Intermediary Funds (FIFs), which may use organizations other than the World Bank for implementation. They are institutionally less dependent from the World Bank than trust funds, relying mainly on its financial management service. Figure A7 shows the importance of the different types of funds over the sample period. Because contributions to one or the other type are likely to be substitutes when donor agencies spend ‘left-over’ funds at the end of the fiscal year (FY), all fund types are included in the analysis. There are other spending categories within the foreign aid budgets that are imperfect substitutes for trust fund contributions. However, no subannual data on these spending categories are available.

Figure A7: Different types of funds



Notes: The OECD countries may choose to contribute to different World Bank funds. These funds may be implemented by the International Bank for Reconstruction and Development (IBRD) and the IDA, or by the International Finance Corporation (IFC). Alternatively, contributions are made to Financial Intermediary Funds (FIFs), which can use organizations other than the World Bank for implementation. FIFs are the most popular type of funds. The sample include contributions to any type of fund.