Policy Research Working Paper 9150

Elite Capture of Foreign Aid

Evidence from Offshore Bank Accounts

Jørgen Juel Andersen
Niels Johannesen
Bob Rijkers

WORLD BANK GROUP
Development Economics
Development Research Group
February 2020

Policy Research Working Paper 9150

Abstract

Do elites capture foreign aid? This paper documents that aid disbursements to highly aid-dependent countries coincide with sharp increases in bank deposits in offshore financial centers known for bank secrecy and private wealth management, but not in other financial centers. The estimates are not confounded by contemporaneous shocks such as civil conflicts, natural disasters, and financial crises, and are robust to instrumenting with predetermined aid commitments. The implied leakage rate is around 7.5 percent at the sample mean and tends to increase with the ratio of aid to GDP. The findings are consistent with aid capture in the most aid-dependent countries.

This paper is a product of the Development Research Group, Development Economics. It is part of a larger effort by the World Bank to provide open access to its research and make a contribution to development policy discussions around the world. Policy Research Working Papers are also posted on the Web at http://www.worldbank.org/prwp. The authors may be contacted at niels.johannesen@econ.ku.dk, brijkers@worldbank.org, and jorgen.j.andersen@bi.no.

Elite Capture of Foreign Aid: Evidence from Offshore Bank Accounts*

Jørgen Juel Andersen (BI Norwegian Business School)
Niels Johannesen (University of Copenhagen and CEBI)
Bob Rijkers (The World Bank)

February 18, 2020

JEL: D73; F35, P16

*Jørgen Juel Andersen: jorgen.j.andersen@bi.no; Niels Johannesen: niels.johannesen@econ.ku.dk; Bob Rijkers: brijkers@worldbank.org. We thank Simeon Djankov, Shanta Devarajan, Eric Feyen, Caroline Freund, Francisco Ferreira, Penny Goldberg, Aart Kraay, Pablo Selaya, Stuti Khemani, Aaditya Mattoo, William Maloney, Steven Pennings, Finn Tarp, Emile Van Der Does De Willebois, and the World Bank's Chief Economist Council for excellent comments and Jarret Angbazo and Nicolas Gomez Parra for helpful research assistance. Research for this paper has been supported in part by the Knowledge for Change Program, the Multidonor Trust Fund for Trade and Development, and the Strategic Research Program of the World Bank. Andersen gratefully acknowledges support from the Research Council of Norway, Grant. No. 275387, and from Centre for Applied Macroeconomics and Commodity Prices, BI Norwegian Business School. Johannesen gratefully acknowledges financial support from the Danish Council for Independent Research and the Danish National Research Foundation. The findings, interpretations, and conclusions expressed in the paper are entirely those of the authors. They do not necessarily represent the views of the International Bank of Reconstruction and Development / World Bank and its affiliated organizations, or those of the Executive Directors of the World Bank or the countries they represent. All errors are our responsibility.

1 Introduction

The effectiveness of foreign aid remains controversial. A large literature studies how aid is spent (Werker et al., 2009); how it is absorbed in the domestic economy (Temple and van de Sijpe, 2017); and how much it ultimately stimulates growth (Dalgaard et al., 2004), improves human development outcomes (Boone, 1996), and reduces poverty (Collier and Dollar, 2002). In light of the evidence, some scholars assert that aid plays a pivotal role in promoting economic development in the poorest countries (Sachs, 2005) while others are highly skeptical (Easterly, 2006). Many studies emphasize that aid effectiveness depends crucially on the quality of institutions and policies in the receiving countries (Burnside and Dollar, 2000).

A concern often voiced by skeptics is that aid may be captured by economic and political elites. The fact that many of the countries that receive foreign aid have high levels of corruption (Alesina and Weder, 2002) invokes fears that aid flows end up in the pockets of the ruling politicians and their cronies. This would be consistent with economic theories of rent seeking in the presence of aid (Svensson, 2000) and resonate with colorful anecdotal evidence about failed development projects and self-interested elites (Klitgaard, 1990). Yet, there is little systematic evidence on diversion of aid.

In this paper, we study aid diversion by combining quarterly information on aid disbursements from the World Bank (WB) and foreign deposits from the Bank for International Settlements (BIS). The former dataset covers all disbursements made by the World Bank to finance development projects and provide general budget support in its client countries. The latter dataset covers foreign-owned deposits in all significant financial centers, both havens such as Switzerland, Luxembourg, Cayman Islands and Singapore whose legal framework emphasizes secrecy and asset protection and non-havens such as Germany, France and Sweden.

Equipped with this dataset, we study whether aid disbursements trigger money flows to foreign bank accounts. In our main sample comprising the 22 most aid-dependent countries in the world (in terms of WB aid), we document that disbursements of aid coincide, in the same quarter, with significant increases in the value of bank deposits in havens. Specifically, in a quarter where a country receives aid equivalent to 1% of GDP, its deposits in havens increase by 3.4% relative to a country receiving no aid; by contrast, there is no increase in deposits held in non-havens. While other interpretations are possible, these findings are suggestive of aid diversion to private accounts in havens.

One may be concerned that the results are confounded by factors affecting both aid inflows and capital outflows. We address this potential endogeneity in three ways. First, we augment

the baseline model with leads and lags of the aid variable. Reassuringly, we find no differential trends in deposits during the quarters prior to aid disbursements. Second, we instrument disbursements with pre-determined aid commitments, which are plausibly exogenous to contemporaneous shocks (Kraay, 2012, 2014). The IV estimates are qualitatively similar, but somewhat smaller than the OLS estimates. Third, we exclude observations where specific events such as wars, natural disasters and financial crises might cause both inflows of aid and outflows of domestic capital and introduce controls for potential confounders such as oil prices and exchange rates. We also estimate specifications with country-year fixed effects where identification comes exclusively from variation in the timing of disbursements within the year. The main results are robust to all these tests.

While our results document cleanly and robustly that aid disbursements are associated with wealth accumulation in offshore accounts, the macro nature of our deposit information represents an important limitation: since we do not observe *who* stores wealth in havens in periods with large aid disbursements, we cannot directly identify the economic mechanism underlying this correlation.

Despite this inherent limitation, it is almost certain that the beneficiaries of the money flowing to havens at the time of aid disbursements belong to economic elites. Recent research using micro-data from data leaks and tax amnesties documents that offshore bank accounts are overwhelmingly concentrated at the very top of the wealth distribution.[1] By contrast, the poorest segments in developing countries often do not even have a domestic bank account (World Bank, 2017) and it is entirely implausible that they should control the money flows to havens.

While it is more difficult to identify the precise mechanism by which aid inflows cause capital outflows to havens, aid capture by ruling politicians and bureaucrats is a salient and plausible one. First, it can explain why the trail leads to havens rather than non-havens: if the money derives from corruption and embezzlement, we should not be surprised to see it flowing to jurisdictions with legal institutions emphasizing secrecy.[2] Second, it can explain why we observe a sharp and immediate increase in deposits in the disbursement quarter with no increases in subsequent quarters: to the extent political elites divert aid to foreign accounts, either directly or through kickbacks from private sector cronies, aid inflows and capital outflows

[1] Alstadsæter et al. (2019) find that around 50% of the assets hidden in havens by Scandinavians belong to the 0.01% wealthiest households and 80% belong to the wealthiest 0.1%. Londono-Velez and Avila (2018) find similar results for Colombia.

[2] Anecdotally, havens are often associated with the laundering of proceeds from high-level corruption. For instance, a report by the Financial Action Task Force describes 32 cases of grand corruption of which 21 involved bank accounts in havens (FATF, 2011).

should occur almost simultaneously. Third, our analysis of heterogeneity is consistent with corruption mediating the effect of aid on wealth in havens: we find larger estimates in more corrupt countries although the difference is not statistically significant. In any case, since money is fungible we cannot distinguish between direct diversion of the funds disbursed by the donor and diversion of other public funds freed up by the aid disbursement.

Some alternative interpretations exist, but we find them harder to reconcile with all the patterns in the data. Most importantly, firms directly involved in aid-sponsored projects may receive payments in quarters with aid disbursements and deposit some of these funds with foreign banks. One set of results provides some support for this explanation: we find larger estimates in countries with less private credit suggesting that foreign banks serve as a substitute for inefficient domestic banks. However, this mechanism does not explain our finding that money only flows to places like Zurich, the global center for bank secrecy and private wealth management (Zucman, 2017), and not to other international banking centers like New York, London and Frankfurt. The dynamics in haven deposits, a permanent level shift at the time of aid disbursements, also seems more consistent with personal wealth accumulation than firm cash management.

There are other mechanisms that we can more confidently rule out. First, firms in developing countries have been shown to engage in aggressive tax avoidance by shifting profits to low-tax affiliates (Johannesen et al., 2016), but such profit shifting cannot explain our results because of the way the BIS statistics are constructed: deposits belonging to the Bermuda subsidiary of a Tanzanian company are assigned to Bermuda rather than Tanzania. Second, aid may increase income more broadly in the economy by stimulating aggregate demand and may therefore indirectly increase evasion of personal income taxes through havens; however, our model accounts for aggregate income shocks by conditioning on GDP growth and the sharp increase in haven deposits in the disbursement quarter does not mirror the typically protracted expansionary effect of economic stimulus (Kaplan and Violante, 2014). Finally, we can exclude that our results reflect portfolio adjustments by commercial or central banks as our deposit variables only include foreign deposits belonging to non-banks.

It is natural to express the estimates as a leakage rate: the dollar increase in haven deposits associated with a 100 dollar aid disbursement. Our model does not deliver this parameter directly and we therefore rely on the following transformation. Our key estimate suggests that aid corresponding to 1% of GDP increases deposits in havens by around 3.4%. While there is considerable variation over time and across the highly aid dependent countries in our main sample, the stock of deposits in havens stands at around 2.2% of GDP at the sample mean; hence

a 3.4% increase in haven deposits corresponds to around 0.075% of GDP (i.e. 2.2%*3.4%) and the implied average leakage rate is approximately 7.5% (i.e. 0.075%/1%). A simple simulation that weighs countries by their historical share of aid disbursements and accounts for cross-country differences in the ratio of haven deposits to GDP, implies a leakage rate of around 5% in aggregate disbursements. These modest leakage rates represent a lower bound in the sense that they only include aid diverted to foreign accounts and not money spent on real estate, luxury goods etcetera.

While the leakage estimates reported above are averages for those countries with annual aid from the World Bank above 2% of GDP, we show that leakage rates exhibit a strong gradient in aid-dependence, both within this sample and beyond. On the one hand, lowering the threshold to 1% of GDP (sample of 46 countries), we cannot reject the null hypothesis of no leakage. This suggests that the average leakage rate across all aid-receiving countries is much smaller than the estimates obtained from the main sample, which account for less than 10% of all World Bank aid. On the other hand, raising the threshold to 3% of GDP (sample of 7 countries), we find a higher leakage rate of around 15%. This pattern is consistent with existing findings that the countries attracting the most aid are not only among the least developed but also among the worst governed (Alesina and Weder, 2002) and that very high levels of aid might foster corruption and institutional erosion (Knack, 2000; Djankov et al., 2008).

While the comprehensive deposit dataset employed in the main analysis is restricted and subject to confidentiality requirements, we also study publicly available series recently released by the BIS. This allows us to study deposits in some individual havens: we find that bank accounts in Switzerland and Luxembourg contribute significantly to the correlation between aid disbursements and haven deposits whereas accounts in Belgium and Jersey do not. The public series also allow us to extend the sample period to more recent years where financial transparency has improved significantly. We find similar point estimates for the periods before and after 2009 suggesting that the relationship between aid and hidden wealth is unchanged. However, since our leakage estimates for short subperiods are imprecise, we cannot rule out that financial transparency has curbed diversion of aid.

The paper contributes to the understanding of aid effectiveness by empirically identifying and quantifying a mechanism that may render aid ineffective: elite capture. In doing so, we contribute to literatures on the distributional effects of aid (Bjørnskov, 2010); hidden wealth and its origins (Zucman, 2013); and capital flight (Johannesen and Pirttillä, 2016). Our results and empirical approach are most closely related to the finding that petroleum rents are partly

shifted to bank accounts in havens when political institutions are weak (Andersen et al., 2017). Last, our results contribute to the broader literature on political corruption (Olken and Pande, 2012).

The remainder of the paper is organized as follows. Section 2 describes our key variables. Section 3 explains our empirical strategy. Section 4 presents the results. A final section concludes.

2 Data

2.1 Cross-border bank deposits

We use data on foreign bank deposits from the Locational Banking Statistics of the Bank for International Settlements (BIS). This quarterly dataset has information on the value of bank deposits in 43 financial centers owned by residents of around 200 countries. The deposit information is at the bilateral level, e.g. the value of deposits in Swiss banks owned by residents of Tanzania, and builds on confidential reports from individual banks on their foreign positions. Importantly, deposits are assigned to countries based on immediate ownership rather than beneficial ownership; hence, if a Tanzanian firm has a subsidiary in Bermuda, which holds a Swiss bank account, the account is assigned to Bermuda in the BIS statistics.

The dataset covers the vast majority of the world's cross-border bank deposits: all significant banking centers contribute to the dataset and within each banking center coverage is rarely below 90% (BIS, 2011). This is one of the most reliable sources for information about foreign assets and is therefore frequently used by central banks to construct capital accounts; by macroeconomists to gauge net wealth positions (Lane and Milesi-Ferretti, 2007; Zucman, 2013); and by public finance economists to study offshore tax evasion (Johannesen, 2014; Johannesen and Zucman, 2014).

While the BIS generally makes deposit information publicly available at the country level (e.g. deposits held by Tanzanians in all foreign banking centers combined and deposits held in Cayman banks by all foreigners combined), it has traditionally restricted access to deposit information at the bilateral level (e.g. deposits held by Tanzanians in Cayman banks) to central bank staff and external researchers working under a confidentiality agreement with the BIS. In the main analysis, we use a dataset with restricted information at the bilateral level up until 2010, which allows us to break down each country's total foreign deposits into deposits in havens and deposits in non-havens. In an auxiliary analysis, we exploit recently released information at

the bilateral level for selected banking centers. While the public dataset is not as comprehensive as the restricted one, it allows us to extend the sample period beyond 2010 and to show results for individual havens, which is prohibited under the confidentiality agreement governing the restricted data.

Among the 43 financial centers contributing to the Locational Banking Statistics, we classify 17 as havens and the remaining 26 as non-havens.[3] Havens generally have institutional characteristics that make them attractive places to hide funds: bank secrecy rules that ensure strict confidentiality and legal arrangements that facilitate asset protection by enabling investors to nominally transfer asset ownership to a third party while retaining full control (e.g. trusts or de facto anonymous shell corporations). Important havens in our dataset include Switzerland, Luxembourg, Cayman Islands, Bahamas, Hong Kong and Singapore.[4]

We define $Haven_{it}$ as deposits owned by country i in the 17 havens in quarter t, and similarly $Nonhaven_{it}$ as deposits owned in one of the other financial centers. We exploit the sectoral breakdown in the BIS statistics to exclude interbank deposits from these measures.[5] The BIS statistics do not look through chains of ownership to the ultimate owners of deposits; our analysis does therefore not include accounts held through foreign shell corporations (Omartian, 2017), which is likely to reduce the estimated leakage. The dataset at our disposal spans the period 1977-2010, but we discard observations before 1990 because of a major data break in 1989.[6]

Table 1 presents summary statistics on the deposit measures. Average haven deposits range from $4 million in Sao Tome and Principe to almost $200 million in Madagascar and generally constitute around one third of all foreign deposits. Quarterly growth rates in haven deposits, our main outcome variable, average 2.0%, which is significantly higher than the quarterly growth rate in non-haven deposits and GDP. The distribution of growth rates in haven deposits is displayed in Figure A1 in the Online Appendix.

[3]Our classification of financial centers as havens and non-havens follows Andersen et al. (2017): to the set of financial centers identified by the OECD in 2008 as not providing bank information to foreign governments on request, they add Macao, SAR, China, and Hong Kong, SAR, China. Table A1 in the Online Appendix provides a list of havens ranked by the total value of foreign-owned deposits in their banks.

[4]In response to strong international pressure, legal institutions in havens have changed considerably in the past decade. Starting around 2009, all havens committed to some measure of information exchange with other countries for tax enforcement purposes (Johannesen and Zucman, 2014).

[5]This also excludes foreign deposits held by central banks, which is important to avoid confounding effects through placement of foreign reserves.

[6]Until 1989, the Locational Banking Statistics did not include fiduciary deposits in Swiss banks, the lion's share of foreign-owned deposits in Switzerland, as they were considered off-balance sheet items by the BIS.

2.2 Foreign aid

We first construct a project-level database of aid disbursements from the World Bank through its two principal institutions, the International Development Association (IDA) and the International Bank for Reconstruction and Development (IBRD). From the World Bank Project Database (so-called API data), we obtain information on approval date, commitment amount, sector and instrument type for each project. We combine this dataset with monthly project-level information on disbursements from Kersting and Kilby (2016).[7]

Next, we draw on this database to construct our main aid variable, Aid_{it}, which aggregates disbursements from the World Bank across all projects in a given country i in a given quarter t. By construction, this variable does not include aid from other sources such as humanitarian assistance and development aid from individual countries. It also excludes debt relief. The main reason to focus on aid from the World Bank is that we observe the timing of disbursements within the year, which is important for empirical identification because the main effect shows up at quarterly frequency. Data on other sources of aid, including the leading aggregate measure of development aid Official Development Assistance (ODA), is typically available only at the annual frequency. Further, the fact that Word Bank disbursement data is available at the level of individual projects allows us to implement an instrumental variables strategy (see below).

Our main sample consists of the 22 countries that, on average over the sample period 1990-2010, receive annual disbursements from the World Bank equivalent to at least 2% of GDP.[8] As shown in Table 1, annual aid disbursements from the World Bank are almost 3% of GDP on average whereas development aid from all sources exceeds 10% of GDP on average. Foreign aid is thus a major source of income within this sample. The distribution of our main explanatory variable, the ratio of quarterly aid disbursements from the World Bank to annual GDP, is displayed in Figure A2 in the Online Appendix: aid disbursements exceed 1% of GDP in around 25% of the quarters and exceed 2% of GDP in around 5% of the quarters.

Aid disbursements are potentially endogenous to contemporaneous economic shocks and, building on Kraay (2012, 2014), we therefore construct an instrument that exploits the time lag between commitments and disbursements of aid.[9] After a World Bank project is approved, dis-

[7] While the World Bank Project Database contains information on disbursements, it does not allow for bulk download. Kersting and Kilby (2016) retrieve the disbursement information from the database using an automated script.

[8] In extensions, we also study a broader set of countries with annual disbursements above 1% of GDP.

[9] Existing studies have used other instruments for aid. Werker et al. (2009) use oil price variation to instrument aid provided by OPEC members. Galliani et al. (2017) exploit the crossing of the IDA eligibility threshold to assess the impact of aid on growth.

bursements are usually spread out over many quarters at different stages of the project. Actual disbursements may deviate substantially from the originally planned disbursement schedule; for instance, disbursements may be accelerated in response to natural disasters or delayed in the face of civil conflict. However, the amount of aid disbursed in a given quarter is largely the result of project approvals made in previous quarters, which creates variation in disbursements that is arguably exogenous to contemporaneous shocks.

Following Kraay (2012, 2014), we build an instrument by predicting quarterly disbursements for each project based on the initial commitment and the average disbursement schedule across all other projects implemented in the same sector and the same geographical region. Summing over predicted disbursement at the project-level, we predict aggregate disbursements for each country and quarter.[10] We never use predicted disbursements for the commitment quarter as an instrument since it suffers from the same potential endogeneity as the actual disbursements. In the most rigorous tests, we only use predicted disbursements related to projects approved at least 3 quarters before as an instrument to strengthen the case for exogeneity.

2.3 Other variables

We collect information about events that may be associated with simultaneous changes in aid disbursements and cross-border capital flows: Wars from the PRIO Armed Conflict Dataset; Coups from Powell and Thyne (2011); Natural disasters from the International Disaster Database; Financial crisis from Laeven and Valencia (2012); Petroleum rents and financial sector development from World Development Indicators (WDI). We also collect information on country characteristics that may mediate the effect of aid disbursements on haven deposits: Corruption from Worldwide Governance Indicators (WGI); Disclosure requirements for members of parliament from Djankov et al. (2010); Capital account openness from Chinn and Ito (2006); Political regime characteristics from the Polity IV Project. We document these variables in more detail and provide summary statistics in Table A2 in the Online Appendix.

3 Empirical strategy

To assess whether disbursements of aid are accompanied by money flows to havens, we estimate the following baseline model:

$$\Delta \log(Haven_{it}) = \beta Aid_{it} + \gamma X_{it} + \mu_t + \tau_i + \epsilon_{it}$$

[10] The analysis is limited to projects that were approved after 1984.

where $\Delta \log(Haven_{it})$ measures the growth rate in haven deposits owned by country i in quarter t, Aid_{it} measures aid disbursements to country i in quarter t as a share of GDP, X_{it} is a vector of control variables (including notably GDP growth) and μ_i and τ_t represent country and time fixed effects respectively.[11] Conceptually, the equation thus relates two flows of money: flows from the World Bank on the right-hand side and (net) flows to foreign bank accounts on the left-hand side.

The main parameter of interest, β, expresses the percentage change in haven deposits associated with an aid disbursement equivalent to one percent of GDP. It is measured relative to the counterfactual change in haven deposits given by the other variables in the model: the country's long-run average growth rate in haven deposits (captured by country fixed effects), global shocks to haven deposits (captured by the time fixed effects) and local shocks to income (captured by the control for GDP growth). The presence of country fixed effects implies that β is identified exclusively from within-country variation. We are effectively asking whether haven deposits grow more than the country average in quarters where aid exceeds the country average while absorbing the global trend in cross-border capital flows and the effect of the local business cycle.

To distinguish between cross-border money flows motivated by secrecy and asset protection and those motivated by other concerns, we also estimate the baseline model using the growth rate in deposits in non-havens, $\Delta \log(Nonhaven)$, as dependent variable. We compare the estimated coefficients on Aid in the two regressions and, as a more formal test for differential growth rates in haven and non-haven deposits induced by aid disbursements, additionally estimate the baseline model using the differential growth rate, $\Delta \log(Haven) - \Delta \log(Nonhaven)$, directly as dependent variable. This specification identifies the impact of aid on haven deposits while absorbing any shocks to cross-border flows that are shared between haven and non-haven accounts.This is a very conservative test for potential diversion, since it assumes aid capture would only result in flows to havens; potential diversion to nonhavens would result in a downward bias.

The main threat to identification in the baseline model is the potential endogeneity of aid. There could be macroeconomic shocks, such as financial crises or famine, that simultaneously cause capital flight and a surge in foreign aid, leading to a spurious positive correlation between aid disbursements and foreign deposits. Alternatively, opportunistic behavior by politicians could result in capital flight and induce foreign donors to cut back on aid suggesting that the correlation between aid and haven deposits might be spuriously negative.

[11] In the main specification, deposit and aid variables are winsorized at the 1%/99% level to reduce the impact of extreme values. We obtain similar results using non-winsorized variables as is shown in column 11 of Table 3.

We address this potential endogeneity problem in three ways. First, we exploit the high-frequency nature of our data and test for pre-existing differential trends in haven deposits by adding leading values of aid disbursements to the estimating equation. Non-zero coefficients on the leading disbursements are suggestive of endogeneity. Second, we instrument aid disbursements with their predetermined component as described in the previous section (Kraay, 2012, 2014). The exclusion restriction requires the predetermined component of aid flows, following from aid commitments at least three quarters earlier, to be uncorrelated with contemporaneous shocks to haven deposits (conditional on controls). Third, we exclude observations where specific events such as wars, natural disasters and financial crises might confound the inference; introduce controls for potential confounders such as oil prices and exchange rates; and augment the model with country-year fixed effects that restrict the identifying variation to changes in disbursements within the year.

An important feature of all of our empirical specifications is the log-transformation of foreign deposits, which captures the statistical assumption that foreign deposits change exponentially. This assumption has strong economic foundations. First, absent withdrawals and new deposits, compound interest mechanically makes account balances grow exponentially. Second, many theoretical models will predict that changes in deposits in response to changes in the economic environment, e.g. business cycles and policy interventions, are proportional to the stock of deposits. Such considerations have led almost three decades' of literature on foreign deposits to estimate models in log-levels (Alworth and Andresen, 1992; Huizinga and Nicodeme, 2004; Johannesen, 2014; Johannesen and Zucman, 2014; Menkhoff and Miethe, 2019; OECD, 2019) or log-differences (Andersen et al., 2017).

The main disadvantage of the log-transformation is that the resulting model does not deliver the structural parameter of interest, the leakage rate, directly. It is therefore natural to consider alternatives, for instance to scale deposits by GDP. However, scaling does not preserve the appealing features of the logarithmic transformation when countries are structurally different. For instance, in case two countries exhibit a ratio of haven deposits to GDP of 2% and 10% respectively, compound interest at the rate of 5% increases the ratio of haven deposits to GDP by 0.1% in one country and by 0.5% in the other. Moreover, scaling both deposits (the dependent variable) and aid (the explanatory variable) with GDP may create a mechanical positive correlation. In light of these difficulties, we first estimate the model in log-differences and later retrieve the leakage rate with a simple transformation.

4 Results

4.1 Main Findings

We present the results from our baseline model in Table 2. Controlling for GDP growth, country fixed effects and time fixed effects, we find that aid disbursements are strongly associated with increases in haven deposits, but do not vary systematically with non-haven deposits. Specifically, as shown in Column (1), an aid disbursement equivalent to one percent of GDP in a given quarter induces a statistically significant increase in haven deposits of around 3.4%. By contrast, as shown in Column (2), the analogous effect on non-haven deposits is a statistically insignificant decrease of around 1.5%. The final specification highlights the difference: an aid disbursement equivalent to one percent of GDP is associated with a statistically significant increase in haven deposits, measured over and above the increase in non-haven deposits, of around 5%, as shown in Column (3).

The results are consistent with aid capture by ruling elites: diversion to secret accounts, either directly or through kickbacks from private sector cronies, can explain the sharp increase in money held in foreign banking centers specializing in concealment and laundering. If the transfers to havens were caused by confounding shocks correlating with aid disbursements, we should expect to see similar transfers to other foreign banking centers; however, there is no evidence of such responses.

4.2 Robustness

As a first robustness check of the baseline results, we re-estimate the model while replacing the continuous aid measure with a discrete variable indicating quarters with particularly large aid inflows: disbursements from the World Bank in excess of 2% of GDP. Disbursements of this magnitude occur in approximately 5% of the country-quarters in our sample (see Figure A2 in the Online Appendix). The results are qualitatively similar to those obtained with the continuous aid measure. Haven deposits increase by around 12% in quarters with a large disbursement relative to the counterfactual with no large disbursement (Column 4). By comparison, non-haven deposits decrease by around 3% (Column 5). Consequently, the growth rate in haven deposits over and above the growth rate in non-haven deposits is around 15% (Column 6), which is highly statistically significant.[12]

[12]Table A3 in the Online Appendix shows how the results vary with the threshold defining large disbursements. With a threshold of 1.5%, large disbursements increase haven deposits by 6% and increase haven deposits relative to non-haven deposits by 10%; with a threshold of 2.5%, the increase in both outcomes is 15%.

Our first attempt to address the potential endogeneity of aid is to estimate quarterly changes in foreign deposits in a two-year window around aid disbursements. Specifically, starting from the model presented in Columns (1)-(3) of Table 2, we add four leads and four lags of the aid variable. Figures 1-3 plot the estimated coefficients and their 95% confidence bounds. As shown in Figure 1, aid is associated with a sharp increase in haven deposits precisely in the quarter of the disbursement with a point estimate close to the baseline estimate of 3.4%; however, the analogous effects in the four quarters before and after the disbursement are all economically small and statistically indistinguishable from zero. As shown in Figures 2-3, aid is not associated with significant changes in non-haven deposits, neither in the disbursement quarter nor in the four quarters before and after, and the increase in haven deposits over and above the increase in non-haven deposits is significant precisely in the disbursement quarter. We find similar patterns when we use the dummy measure of large aid disbursements as shown in Figure A3 in the Online Appendix.

These results have several important implications. First, the finding that aid disbursements are not preceded by changes in haven deposits attenuates the concerns about endogeneity. If haven deposits were increasing already before the disbursement quarter, one may have worried that the same factors causing this increase were also causing the increase in the disbursement quarter. The observed pattern supports a causal interpretation of the results. Second, the finding that haven deposits increase precisely in the disbursement quarter and not in the following quarters is suggestive that diversion is a key mechanism. If the correlation between aid and money flows to foreign accounts reflected that aid raises incomes by stimulating aggregate demand, we would have expected a protracted response mirroring the slower dynamics of a typical business cycle.

To further address concerns about endogeneity, we estimate the baseline model (Table 2, Column 1) while instrumenting actual disbursements with predicted disbursements as discussed in the previous section. We employ two different specifications: one discarding disbursements made in the same quarter as the commitment and another further discarding disbursements made in the two quarters following the commitment. In the latter specification, the effect of aid disbursements is identified only from predicted disbursements related to projects approved at least 3 quarters before. In both cases, the first stage of the IV is very strong with a Kleibergen-Paap Wald F-statistic for weak instruments of almost 100.[13]

Table 3 first reiterates the baseline OLS specification for ease of comparison (Column 1)

[13]The first stage regressions are documented in Table A4 and Figure A4 in the Online Appendix.

and then shows results for the IV specification excluding one quarter (Column 2) and three quarters (Column 3) of post-commitment disbursements respectively. Both specifications yield an estimate of the effect of aid on haven deposits that is statistically significant (in the latter specification only at the 10% level) but somewhat smaller than the OLS baseline: an (instrumented) disbursement equivalent to one percent of GDP induces an increase in haven deposits of around 2.5-3%.

We conduct a number of additional robustness tests of the relationship between aid disbursements and haven deposits. First, we show how the estimates change when we exclude country-quarters characterized by wars (Column 4), coups (Column 5), natural disasters (Column 6), and financial crises (Column 7). Each of these restrictions reduces the sample size considerably, reflecting that the countries in our sample frequently suffer severe shocks. However, the coefficient on aid disbursements barely changes (except in the case of wars where it drops to around 2.75) and remains statistically significant in all cases. Second, we show results from the baseline model augmented with country-year fixed effects (Column 8). The estimated effect of aid on haven deposits remains almost unchanged when identified exclusively from variation in disbursements within the year although the precision of the estimate decreases. Third, we show that the baseline result is robust to controls for exchange rate movements[14] (Column 9) and resource rents[15] (Column 10). Finally, we show that the baseline result does not depend on the winsorization procedure employed to limit the effect of extreme observations: the coefficient on aid increases marginally when growth rates in haven deposits are not winsorized (Column 11).

4.3 Implied leakage rates

We restate the baseline estimates so they express the leakage rate: the dollar increase in haven deposits associated with a 1 dollar aid disbursement. This step helps assess the likely scale of elite capture through offshore accounts. Since our empirical model does not deliver the leakage rate directly, we need to rely on simple transformations to obtain it.

[14]Changes in exchange rates can cause changes in our deposit measures because they aggregate different currencies into USD equivalents using contemporaneous exchange rates. The model in Column (9) controls for exchange rate movements by including a variable that expresses the mechanical change in deposits following from exchange rate changes. We construct this variable as the average percentage change in exchange rates (relative to USD) weighted by country-specific currency shares in deposits (obtained from the BIS Locational Banking Statistics).

[15]Andersen et al. (2017) show that rents from petroleum production are associated with money flows to havens in countries with poor democratic governance. We control for resource rents by including the interaction between the time dummies and an indicator for petroleum producing countries.

We first provide an estimate of the leakage rate for the *average country* by evaluating at the sample mean. The key estimate implies that disbursements corresponding to 1% of GDP are associated with an increase in haven deposits of around 3.4%. At the sample mean, the stock of deposits in havens is around 2.2% of GDP; hence, a 3.4% increase in haven deposits corresponds to around 0.075% of GDP (i.e. 2.2%*3.4%) and the implied leakage is around 7.5% (i.e. 0.0075%/1%).

From the perspective of a multilateral development bank, such as the World Bank, a more relevant metric is leakage as a share of *aggregate aid disbursements*. To provide such a metric, we assume that the key parameter estimated in the model applies uniformly to all countries in the sample, but account for the fact that countries receive different shares of aggregate aid and have different ratios of haven deposits to GDP. When weighted by the fraction of aid received, the average stock of deposits in havens is around 1.4% of GDP; hence, for the average dollar disbursed, a 3.4% increase in haven deposits corresponds to around 0.05% of GDP (i.e. 1.4%*3.4%) and the implied leakage rate for highly aid-dependent countries is around 5% (i.e. 0.05%/1%). Intuitively, the leakage rate in aggregate aid disbursements is slightly lower than the leakage rate for the average country because countries that receive a larger share of the aid disbursements tend to have slightly lower ratios of haven deposits to GDP (such that a given percentage increase in haven deposits correspond to a smaller share of GDP).

These computations suggest that elite capture may contribute to the low effectiveness of aid found in some studies, but also that the vast majority of aid is not diverted to foreign bank accounts. The estimated leakage rate is directly comparable to Andersen et al. (2017) who use a similar strategy to convert parameter estimates from a model in log-differences to leakage rates. They find that 15% of petroleum rents in countries with poor governance are diverted to bank accounts in havens; a leakage rate that is 2-3 times larger than the one we estimate in the context of aid disbursements. The difference may be due to the fact that foreign aid is generally subject to monitoring and control by the donors whereas there are no external constraints on the use of petroleum rents.

The back-of-the-envelope computations are a useful way to assess the quantitative importance of aid leakage through elite capture, but also have several limitations. First, we clearly underestimate the total leakage rate by only including funds flowing into foreign bank accounts in the numerator (and not money spent on real estate, luxury goods etcetera) and may potentially overestimate it by only including World Bank aid in the denominator (since aid from

multilateral agencies may crowd in bilateral aid).[16] Second, the computations all rely on the assumption that the parameter estimated in the model applies uniformly to all countries in the sample. If the true effect is in fact larger (smaller) for countries with relatively low ratios of haven deposits to GDP, the procedure will underestimate (overestimate) the average leakage rate. Finally, the point estimate of 3.4% underlying the estimate of the leakage rate is associated with statistical uncertainty: the lower bound of the 95% confidence interval implies an average leakage rate of around 2.5%.

4.4 Heterogeneity

This section studies heterogeneity in the effect of aid inflows on money flows to havens with the aim of learning more about the underlying mechanism. Our general approach is to, first, construct indicators for being above and below the sample median in some dimension of heterogeneity and, then, re-estimate the baseline model while interacting the aid variable with both of the two indicators.

As corruption features prominently among the possible mechanisms underlying our baseline result, we first allow the effect of aid to vary across countries with more and less *control over corruption*. Column (1) of Table 4 shows that a given aid disbursement is associated with smaller increases in haven deposits when countries have more control over corruption. While the baseline results suggested that receiving aid equivalent to 1% of GDP caused an increase in haven deposits of 3.4%, these results suggest that the increase is 2.2% and 4.5% respectively for countries with more and less control over corruption than the median. These results are suggestive that corruption is an important mechanism through which aid increases wealth in havens. However, like the rest of our heterogeneity analysis, the result has important limitations. While the point estimates are consistently higher in countries with less control over corruption, we cannot reject that they are identical at conventional confidence levels (p-value of 0.25 reported at the bottom of the table). Moreover, although the effect of aid disbursements correlates with corruption, we cannot exclude that this heterogeneity derives from other country characteristics correlating with corruption.

We split the sample in other dimensions to further probe the corruption mechanism and test alternative explanations. Column (2) shows that the effect of aid on haven deposits is larger in

[16] A simple exercise, reported in Table A5 in the Online Appendix, suggests that there is no crowding-in: regressing non-WB aid on WB aid (including country and time fixed effects) yields a point estimate on WB aid very close to zero (with large standard errors). However, we cannot exclude that this annual-level regression conceals a stronger within-year correlation.

the presence of *disclosure rules* for politicians. This result may reflect that disclosure rules create stronger incentives for politicians to hide diverted funds on bank accounts in havens rather than keeping them in the domestic financial system where they are disclosed. Column (3) shows that the effect of aid on haven deposits is larger when the country's *capital account* is more open. This finding is suggestive that regulatory restrictions on cross-border capital flows may deter diversion of aid through foreign bank accounts. Column (4) shows that the effect varies with *institutional quality*: it is somewhat larger in autocracies than in countries with more democratic institutions. This is consistent with Andersen et al (2017) who find that the checks-and-balances embedded in democratic institutions are mediating the transformation of petroleum rents to political rents. Finally, Column (5) shows that the effect of aid on haven deposits decreases with domestic *financial sector development*. This suggests an alternative mechanism whereby firms involved in aid-sponsored projects receive payments in the disbursement quarter and rely on foreign banks for cash deposits when domestic banks are underdeveloped; however, this mechanism is difficult to reconcile with the finding that money only flows to havens around disbursements and not to banking centers without financial secrecy.

Moreover, we exploit the detailed information in the World Bank Project Database to explore differences between two types of aid: Development Policy Financing (DPF) supporting policy programs and Investment Project Financing (IPF) supporting investment projects (World Bank, 2017). One may hypothesize that the latter type of aid, tied to specific expenditure and disbursed over a long time horizon, is more difficult to divert than the former, subject to fewer constraints and disbursed more quickly. However, if anything, aid supporting investment projects correlates more strongly with money flows to havens. As shown in Columns (1)-(3) of Table 5, an aid disbursement of 1% of GDP is associated with an increase in haven deposits of around 2.8% when the aid takes the form of DPF and 5.3% when it takes the form of IPF, but the difference between the coefficients is not statistically significant. The difference between the two forms of aid is much less pronounced when the increase in haven deposits is measured relative to the increase in non-haven deposits as shown in Columns (7)-(9).

Last, we investigate whether there are systematic differences in the correlation between aid disbursements and haven deposits across countries that differ in aid-dependence.[17] While the baseline analysis focused exclusively on the sample of 22 countries with average annual aid disbursements from the World Bank above 2% of GDP, we now re-estimate the baseline model

[17]Table A6 in the Online Appendix reports descriptive statistics similar to Table 1 for the 24 countries that are not part of the baseline analysis (because their ratio of annual aid from the World Bank to GDP is below 2%) but enter this analysis (because their ratio of annual aid from the World Bank to GDP is above 1%)

while varying this threshold. The point estimates on aid disbursements, illustrated by the blue bars in Figure 4, suggest a strong positive correlation between aid-dependence and aid diversion. One the one hand, when we lower the threshold to 1% (sample of 46 countries), the estimate falls to around 1.8%, which is not significantly different from zero. On the other hand, raising the threshold to 3% (sample of 7 countries), the estimate increases to a highly significant 6%. The implied leakage rates, illustrated by the red line in Figure 4, exhibit an even stronger gradient: from a leakage rate of around 4% with a threshold of 1% to more than 15% with a threshold of 3%.[18]

The steep gradient in leakage rates has several important implications. First, it suggests that our estimate of leakage out of aid disbursements to the main sample of highly aid-dependent countries is a poor estimate of leakage out of aid disbursements more generally. The 22 highly aid-dependent countries in our main sample account for around 10% of the aid disbursed by the World Bank and the results in Figure 4 suggest that leakage rates are much lower (if not zero) for less aid-dependent countries. Second, it constitutes novel evidence that aid capture may be more salient in underdeveloped and poorly governed countries, which are also most in need of development assistance (Alesina and Weder, 2002). While this association may simply reflect that the combination of poor development and bad governance stimulates foreign aid, it is also consistent with the view that very high levels of aid may foster corruption and institutional erosion (Knack, 2000; Djankov et al., 2008).

4.5 Publicly available data

Up to this point, we have conducted the analysis with a restricted dataset from the BIS that allows us to break down each country's total foreign deposits, which is public information, into deposits in havens and deposits in non-havens, which is not publicly available. To enhance transparency and to facilitate work by other researchers on aid and foreign deposits, we show that results similar to our main results can be obtained with a publicly available dataset from the BIS. This recently released data includes quarterly data on cross-border deposits at the bilateral level for a selected group of banking centers.

Table 6 summarizes the publicly available information. In our main sample of 22 highly aid-dependent countries (Column 1), the average of total foreign deposits taken across all quarters in the sample period 1999-2010 stands at $199 million (corresponding to the sum of Columns 2 and 3 in Table 1). With the public dataset, 29% of these deposits can be assigned to six

[18]Not only does the point estimate on aid increase as we raise the threshold, the ratio of haven deposits to GDP also increases, which implies a higher leakage rate for a given point estimate.

havens (Switzerland, Luxembourg, Belgium, Jersey, Guernsey and the Isle of Man) and 55% can be assigned to 11 non-havens. Among the havens, for which bilateral deposit information is publicly available, Switzerland is by far the most important. Around 16% of the total foreign deposits cannot be assigned to individual banking centers. Even if all these unallocated deposits are held in havens like Cayman Islands, Singapore and the Bahamas where public data is not available at the bilateral level, the public series still allocate almost two thirds of all haven deposits to individual havens for this particular sample.[19]

We first re-estimate the baseline model with the (incomplete) measures of haven and non-haven deposits based on publicly available information while using the same sample period as in the baseline analysis, 1990-2010. As shown in Column (1) of Table 7, an aid disbursement equivalent to one percent of GDP in a given quarter induces a statistically significant increase in haven deposits of around 2.5% and, as shown in Column (2), an insignificant decrease in non-haven deposits of around 2%. The increase in haven deposits, measured over and above the increase in non-haven deposits, is around 4.1%, as shown in Column (3). These estimates are similar to the baseline estimates based on restricted deposit information (Columns 1-3 in Table 2), but somewhat smaller. A possible interpretation is that the havens not allowing for public release of bilateral deposit data are also the havens where deposit responses to aid disbursements are largest. Extending the sample period to include the most recent observations in the public data yields almost identical results, as shown in Columns (4)-(6).

Next, we show results by individual banking centers; an exercise we are not allowed to conduct with the restricted dataset due to confidentiality requirements.[20] As shown in Columns (7)-(10), the overall increase in haven deposits around aid disbursements is driven by accounts in Switzerland and Luxembourg while the responses in Belgium and Jersey (combined with Guernsey and Isle of Man) exhibit statistically insignificant changes. This is consistent with the notion that the increase in haven deposits around aid disbursements reflect diversion to secret private accounts. Throughout the period 1990-2010, Switzerland was a leading haven with some of the strictest bank secrecy rules in the world and a share of the global market for private wealth management of around 40% (Zucman, 2013; Zucman, 2017). There is evidence that as much as 90-95% of the wealth managed in Switzerland is hidden from the authorities in the owners' home country (Alstadsæter et al., 2019).

[19]For the rest of the world (Column 2), the coverage of the publicly available deposit information is lower with 35% that cannot be allocated to individual banking centers.

[20]A limitation of this analysis is that the total deposits owned by small and relatively poor countries in small and relatively unimportant banking centers are not rarely zero, which translates into missing observations with our log-transformation of the dependent variable.

Finally, we exploit the public dataset to examine whether the correlation between aid and haven deposits has diminished in the most recent years (not covered by the restricted dataset). Since around 2009, all havens have enhanced financial transparency in response to pressure by international organizations like the OECD (Johannesen and Zucman, 2014) and individual countries like the United States (Johannesen et al., 2018). In the same period, a number of data leaks by whistleblowers in the wealth management industry, e.g. *Swiss Leaks* and *Panama Papers*, have increased the risk of exposure for public figures with undeclared money on foreign accounts (Johannesen and Stolper, 2017). As shown in Column (11), there are no clear signs that aid disbursements are associated with smaller increases in haven deposits in the period with more financial transparency: the coefficient on the aid variable is almost identical in the periods 1990-2008 and 2009-2018. However, the standard errors are large and we also cannot reject the null hypothesis of a zero correlation in the post-2009 period. In principle, it is possible to conduct more high-powered tests that exploit country-level variation in transparency and information exchange, but we leave that for future research.

5 Concluding remarks

We document that aid disbursements to the most aid-dependent countries coincide with significant increases in deposits held in offshore financial centers known for bank secrecy and private wealth management. Aid capture by ruling politicians, bureaucrats and their cronies is consistent with the totality of observed patterns: it can explain why aid does not trigger flows to non-havens, why the capital outflows occur precisely in the same quarter as the aid inflows and why the estimated effects are larger for more corrupt countries. Other explanations are possible but we find them harder to reconcile with all the patterns in the data. We cannot exclude that firms benefiting from aid-sponsored spending receive payments in quarters with aid disbursements and deposit the funds with foreign banks; however, this mechanism cannot explain why the money only flows to havens. It seems even less likely that the results reflect profit shifting by multinational firms, the effect of aid on income through aggregate demand and portfolio adjustments by commercial and central banks. Our estimates suggest a leakage rate of around 7.5% for the average highly aid-dependent country.

References

[1] Alesina, Alberto and Beatrice Weder. 2002. "Do Corrupt Governments Receive Less Foreign Aid?". *American Economic Review* 92(4), 1126 – 1137.

[2] Alstadsæter, Annette, Niels Johannesen, and Gabriel Zucman. 2017. "Tax Evasion and Inequality". *American Economic Review* 109(6), p. 2073-2103.

[3] Alworth, Julian and Andresen, S., 1992. "The determinants of cross-border non-bank deposits and the competitiveness of financial market centers ". *Money Affairs* July-December, p. 105-133.

[4] Andersen, Jørgen J., Niels Johannesen, David D. Lassen, and Elena Paltseva. 2017. "Petro Rents, Political Institutions, and Hidden Wealth: Evidence from Offshore Bank Accounts". *Journal of the European Economic Association* 15(4), 818 – 860.

[5] Boone, Peter. 1996. "Politics and the Effectiveness of Foreign Aid". *European Economic Review* 40, 289 – 329.

[6] Burnside, Craig and David Dollar. 2000. "Aid, Policies, and Growth". *American Economic Review* 90(4), 847 – 868.

[7] Bjørnskov, Christian. 2010. "Do elites benefit from democracy and foreign aid in developing countries?" *Journal of Development Economics* 92(2), 115-124

[8] Chinn, Menzie D. and Hiro Ito (2006). "What Matters for Financial Development? Capital Controls, Institutions, and Interactions". *Journal of Development Economics* 81(1), 163-192.

[9] Collier, Paul and David Dollar. 2002. "Aid Allocation and Poverty Reduction". *European Economic Review* 46, 1475 – 1500.

[10] Dalgaard, Carl-Johan, Henrik Hansen and Finn Tarp, 2004. "On The Empirics of Foreign Aid and Growth". *Economic Journal* 114, 191-216.

[11] Djankov, S., Montalvo, J.G. and Reynal-Querol, M., 2008. "The curse of aid.". *Journal of economic growth* 13(3), p. 169-194.

[12] Djankov, Simeon, Rafael La Porta, Florencio Lopez-de-Silanes and Andrei Shleifer, 2010. "Disclosure by Politicians". *American Economic Journal: Applied Economics* 2(2), 179-209.

[13] Easterly, William. 2006. "The Big Push Déjà Vu: A Review of Jeffrey Sachs's The End of Poverty: Economic Possibilities for Our Time". *Journal of Economic Literature* XLIV, 96 – 105.

[14] FATF. 2011. "Laundering the Proceeds of Corruption". Financial Action Task Force, OECD, Paris.

[15] Galiani, Sebastian, Stephen Knack, Lixin Colin Xu, and Ben Zou. 2017. "The Effect of Aid on Growth". *Journal of Economic Growth* 22(1), 1 – 33.

[16] Guardian. 2009. "G20 Declares Door Shut on Tax Havens."2 April. http://www.guardian.co.uk/world/2009/apr/02/g20-summit-tax-havens. Accessed on 17 February, 2020.

[17] Huizinga, Harry and Gaetan Nicodeme, 2004. "Are international deposits tax-driven". *Journal of Public Economics* 88, p. 1093-1118.

[18] Johannesen, Niels. 2014. "Tax Evasion and Swiss Bank Deposits". *Journal of Public Economics* 111, p. 46-62.

[19] Johannesen, Niels and Gabrial Zucman. 2014. "The End of Bank Secrecy? An Evaluation of the G20 Tax Haven Crackdown". *American Economic Journal: Economic Policy* 6(1), 65 – 91.

[20] Johannesen, Niels and Jukka Pirtillä. 2016. "Capital Flight and Development: An Overview of Concepts, Methods, and Data Sources". WIDER Working Paper, No. 2016/95.

[21] Johannesen, Niels, Thomas Tørsløv, and Ludvig Wier. 2018. "Are Less Developed Countries More Exposed to Multinational Tax Avoidance? Method and Evidence from Micro-Data". WIDER Working Paper, No. 2016/10. (*World Bank Economic Review*, forthcoming).

[22] Johannesen, N. and Stolper, T., 2017. "The deterrence effect of whistleblowing–an event study of leaked customer information from banks in tax havens. "Working Paper

[23] Johannesen, N., Langetieg, P., Reck, D., Risch, M. and Slemrod, J., 2018. "Taxing hidden wealth: The consequences of US enforcement initiatives on evasive foreign accounts. "NBER Working Paper, No. 24366.

[24] Kersting, Erasmus K. and Christopher Kilby. 2016. "With a Little Help from My Friends: Global Electioneering and World Bank Lending". *Journal of Development Economics* 121, 153 – 165.

[25] Klitgaard, Robert. 1990. "Tropical Gangsters". New York: Basic Books.

[26] Knack, S., 2000. "Aid dependence and the quality of governance: a cross-country empirical analysis."The World Bank.

[27] Kraay, Aart. 2012. "How Large is the Government Spending Multiplier?". *Quarterly Journal of Economics* 127(2), 829 – 887.

[28] Kraay, Aart. 2014. "Government Spending Multipliers in Developing Countries: Evidence from Lending by Official Creditors". *American Economic Journal: Macroeconomics* 6(4), 170 – 208.

[29] Laeven, Luc and Fabián Valencia. 2012. "Systemic Banking Crises Database: An Update". IMF Working Paper WP/12/163, International Monetary Fund.

[30] Lane, Philip R. and Gian Maria Milesi-Ferretti. 2007. "The External Wealth of Nations Mark II: Revised and Extended Estimates of Foreign Assets and Liabilities, 1970–2004". *Journal of International Economics* 73, 223 – 250.

[31] Londoño-Vélez, Juliana and Javier Ávila-Mahecha. 2018. "Can Wealth Taxation Work in Developing Countries? Quasi-Experimental Evidence from Colombia". Job Market Paper at the Department of Economics, University of California, Berkeley.

[32] Menkhoff, Lukas and Jakob Miethe, 2019. "Tax evasion in new disguise? Examining tax havens' international bank deposits." *Journal of Public Economics* forthcoming.

[33] OECD, 2019. "Using bank deposit data to assess the impact of exchange of information."

[34] Olken, Benjamin A. and Rohini Pande. 2012. "Corruption in Developing Countries". *Annual Review of Economics* (4), 479 – 509.

[35] Omartian, James D.. 2017. "Do Banks Aid and Abet Asset Concealment: Evidence from the Panama Papers". Available at SSRN: https://ssrn.com/abstract=2836635 or http://dx.doi.org/10.2139/ssrn.2836635

[36] Powell, Jonathan M. and Clayton L. Thyne. 2011. "Global Instances of Coups from 1950 to 2010: A New Dataset". *Journal of Peace Research* 48(2), 249 – 259.

[37] Sachs, Jeffrey. 2005. "The End of Poverty: Economic Possibilities for Our Time". New York: Penguin Press.

[38] Svensson, Jakob. 2000. "Foreign Aid and Rent-Seeking". *Journal of International Economics* 51, 437 – 461.

[39] Temple, Jonathan and Nicolas Van de Sijpe. 2017. "Foreign Aid and Domestic Absorption". *Journal of International Economics* 108, 431 – 443.

[40] Werker, Erik, Faizal Z. Ahmed, and Charles Cohen. 2009. "How Is Foreign Aid Spent? Evidence From a Natural Experiment". *American Economic Journal: Macroeconomics* 1(2), 225 – 244.

[41] World Bank. 2017. "The 2017 Global Findex database".

[42] Zucman, Gabriel. 2013. "The Missing Wealth of Nations". *Quarterly Journal of Economics* 128(3), 1321 – 1364.

[43] Zucman, Gabriel. 2017. "The Hidden Wealth of Nations". University of Chicago Press, Second edition.

Table 1: Descriptive statistics. The table shows the 22 countries in our main sample and presents summary statistics for the main variables in our analysis. The sample includes all countries for which annual disbursements from the World Bank are equivalent to at least 2 percent of annual GDP on average. *Sample mean* is the average of the 22 countries in the sample. *Annual WB aid (% of GDP)* is annual disbursements from the World Bank as a fraction of annual GDP. *Annual ODA aid (% of GDP)* is annual Official Development Assistance (ODA) from all sources as a fraction of annual GDP. *Haven deposits* is foreign deposits held in the 17 countries classified as havens. *Non-haven deposits* is foreign deposits held in the countries not classified as havens. *Haven deposits (quarterly growth in %)* is the quarterly percentage change in deposits held in the 17 countries classified as havens (measured as the change in quarterly log-levels).*Non-haven deposits (growth in %)* is the quarterly percentage change in deposits held in countries not classified as havens (measured as the change in quarterly log-levels). *GDP (growth in %)* is the quarterly percentage change in GDP (measured as the difference in quarterly log-levels of GDP)

	Annual WB aid flows (%GDP)	Annual ODA aid flows (%GDP)	Haven deposits (million USD)	Non-haven deposits (million USD)	Haven deposits (quarterly growth rate)	Non-haven deposits (quarterly growth rate)	GDP (quarterly growth rate)
Afghanistan	2.5%	33.5%	34	71	3.27%	-0.2%	4.3%
Armenia	2.3%	4.3%	38	17	6.87%	5.5%	2.8%
Burkina Faso	2.3%	8.1%	32	88	1.51%	1.9%	1.5%
Burundi	3.8%	11.8%	103	19	0.48%	1.7%	0.7%
Eritrea	3.2%	12.7%	8	11	2.29%	4.0%	2.2%
Ethiopia	2.2%	6.1%	64	155	1.61%	0.3%	1.1%
Ghana	2.7%	5.3%	76	446	2.12%	1.0%	2.2%
Guinea-Bissau	3.2%	18.5%	8	16	3.14%	1.8%	1.6%
Guyana	2.5%	6.5%	33	103	3.60%	0.9%	2.1%
Kyrgyz Republic	2.1%	4.8%	11	12	4.11%	2.5%	1.2%
Madagascar	2.7%	6.6%	193	232	0.32%	1.7%	1.5%
Malawi	3.9%	10.6%	31	82	3.97%	0.7%	1.8%
Mali	2.1%	7.9%	27	133	0.78%	1.6%	1.9%
Mauritania	2.1%	6.8%	32	150	2.14%	2.7%	1.8%
Mozambique	3.3%	19.0%	40	161	3.19%	1.8%	1.8%
Niger	2.0%	8.5%	29	79	-0.25%	1.8%	1.1%
Rwanda	2.7%	13.7%	149	41	0.06%	-1.0%	1.0%
Sao Tome and Principe	2.3%	18.4%	4	8	-1.11%	3.9%	2.7%
Sierra Leone	3.2%	10.3%	32	82	-0.37%	-0.1%	1.2%
Tanzania	2.4%	8.8%	145	437	2.46%	1.0%	2.4%
Uganda	3.3%	7.6%	73	188	2.36%	0.6%	1.6%
Zambia	2.9%	10.2%	117	306	2.67%	0.5%	1.9%
Sample mean	2.7%	10.1%	61	136	2.02%	1.5%	1.7%

Table 2: Main results. The table shows our main results: OLS The sample comprises 22 countries with average annual disbursements from the World Bank exceeding 2% of GDP. The sample period is 1990-2010 and the frequency is quarterly. In columns 1 and 4 the dependent variable is the percentage change in haven deposits; in columns 2 and 5 it is the percentage change in non-haven deposits; while in columns 2 and 6 is the difference between the percentage change in haven and non-haven deposits. The explanatory variables are: *Aid (%GDP)* is quarterly disbursements from the World Bank as a fraction of annual GDP. *High aid disbursement* is an indicator for quarterly disbursements from the World Bank exceeding 2% of annual GDP. *GDP (% growth)* is the quarterly percentage change in GDP (measured as one quarter of the annual percentage change). *Country FE* is a vector of country fixed effects. *Time FE* is a vector of time fixed effects. All percentage changes are approximated with the difference in log-levels. The deposit and aid variables are winsorized at the 1st and 99th percentile. Standard errors clustered at the country-level are presented in parentheses (*** p<0.01, ** p<0.05, * p<0.1)

	(1)	(2)	(3)	(4)	(5)	(6)
	haven	**non-haven**	**ratio**	**haven**	**non-haven**	**ratio**
Aid (%GDP)	3.3913***	-1.5112	4.9732***			
	(1.1541)	(1.0354)	(1.7153)			
High aid disbursement				0.1008***	-0.0283	0.1380***
(Aid >2% GDP)				(0.0322)	(0.0294)	(0.0432)
GDP (%growth)	0.1221	0.1475**	-0.0013	0.1068	0.1555**	-0.0239
	(0.1406)	(0.0633)	(0.1498)	(0.1416)	(0.0637)	(0.1495)
Observations	1,648	1,652	1,645	1,648	1,652	1,645
R-squared	0.1006	0.0918	0.0760	0.1013	0.0908	0.0759
country FE	YES	YES	YES	YES	YES	YES
time FE	YES	YES	YES	YES	YES	YES

Table 3: Robustness. The table shows results from regressions with varying samples and specifications. Across all regressions, the dependent variable is the quarterly percentage change in haven deposits and the explanatory variable of interest is quarterly disbursements from the World Bank as a fraction of annual GDP. All regressions control for the quarterly percentage change in GDP (not reported) and include country and time fixed effects. Percentage changes are approximated with the difference in log-levels. Unless stated otherwise, the deposit and aid variables are winsorized at the 1st and 99th percentile. Column 1 shows the baseline regression (equivalent to Table 2, Column 1); Columns 2 and 3 present the results of IV regressions in which aid is instrumented using predicted aid which is calculated based on project-level aid commitments and the average sector and region specific temporal disbursement patterns as described in the main text. In column 2 the predicted aid measure excludes approval quarters for; in column 3 it also excludes the first and second quarter after the approval quarter to strengthen the case for exogeneity. Columns 4-7 exclude country-quarters with wars, coups, natural disasters and financial crises respectively. Column 8 includes country-year fixed effects; Column 9 includes a variable that expresses the mechanical increase in haven deposits following from exchange rate movements given the currency composition of the deposits (not reported); Column 10 includes an interaction between the time trend and an indicator for being an oil producing country; Column 10 shows results using as dependent variable the non-winsorized percentage change in haven deposits. Standard errors clustered at the country-level are in parentheses (*** p<0.01, ** p<0.05, * p<0.1)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
		Instrument aid		**Omit periods with other shocks**				**Other specifications**			
	Baseline	exclude 1 quart	exclude 3 quart	NoWar	NoCoup	NoDisaster	NoFinCrisis	country-year FE	Forex	Oil*timeFE	No winsor
Aid (%GDP)	3.3913***	2.5947***	2.8483*	2.7544**	3.4464***	3.6013***	3.5594***	3.2902*	3.3095***	3.5351**	3.5905**
	(1.1541)	(1.0035)	(1.5639)	(1.2959)	(1.1601)	(1.2369)	(1.1904)	(1.8955)	(1.1264)	(1.2960)	(1.5000)
Observations	1,648	1,648	1,648	1,386	1,618	1,586	1,511	1,648	1,648	1,648	1,648
R-squared	0.1006	0.0051	0.0051	0.1068	0.0996	0.1043	0.1024	0.2419	0.1029	0.1415	0.0999
country FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
time FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Table 4: Heterogeneity. The table shows how the results vary across countries with different characteristics. Across all regressions, the dependent variable is the quarterly percentage change in haven deposits. In each column we interact quarterly aid dipbursements from the World Bank expressed as a share of GDP with indicators for being above and below the sample median in some dimension of heterogeneity. At the bottom of the table we show case the difference in coefficient estimates across countries that are above versus below the median, as well as the associated p-value. Column 1 distinguishes between countries based on whether they have high focus on control of corruption from the World Governance Indicators (with higher control of corruption implying less corruption). Column 2 divided countries based on the presence of *disclosure requirements* as measured by Djankov et al. (2010). Column 3 divides countries based on their contemporaneous value of *capital account openness* as reported by Chinn and Ito (2006). Column 4 examines heterogeneity associated with democratic institutions as captured by the variable polity2 from the Polity IV Project. Column 5 divided countries on the basis of *domestic credit* from the financial sector relative to GDP as reported in the World Development Indicators. All regressions control for the quarterly percentage change in GDP (not reported) and include country and time fixed effects. Percentage changes are approximated with the difference in log-levels. The deposit and aid variables are winsorized at the 1st and 99th percentile. Standard errors clustered at the country-level are in parentheses (*** p<0.01, ** p<0.05, * p<0.1)

	control over corruption	**disclosure rules**	**capital account**	**democratic institutions**	**credit markets**
	(1)	(2)	(3)	(4)	(5)
Aid*(Control of corruption=low)	4.4482**				
	(1.7478)				
Aid*(Control of corruption=high)	2.1635*				
	(1.0512)				
Aid*(Disclosure required=0)		2.7571**			
		(1.0606)			
Aid*(Disclosure required=1)		4.4350*			
		(2.3600)			
Aid*(Capital account openness=low)			1.7202		
			(1.0980)		
Aid*(Capital account opennes=high)			4.4568*		
			(2.4139)		
Aid*(Polity low)				3.3812**	
				(1.4936)	
Aid*(Polity high)				1.8541	
				(1.8224)	
Aid*(Credit=low)					3.7033*
					(2.0589)
Aid*(Credit=high)					2.0798*
					(1.1430)
Observations	1,648	1,648	1,606	1,582	1,435
R-squared	0.1013	0.1009	0.1091	0.1131	0.0963
country FE	YES	YES	YES	YES	YES
time FE	YES	YES	YES	YES	YES
Aid disbur*(high-low)	-2.285	1.678	2.737	-1.527	-1.624
p-value	.247	.497	.288	0.554	.477

Table 5: Heterogeneity by type of aid. The table documents how the results from the baseline specification varies by the type of aid. The dependent variable is the percentage change in haven deposits (in Columns 1-3); the percentage change in non-haven deposits (in Columns 4-6); and the difference between the percentage change in haven and non-haven deposits (in Columns 7-9). *IPF Aid disbursement (%GDP)* is quarterly disbursements of Investment Project Financing from the World Bank as a fraction of annual GDP. *DPF Aid disbursement (%GDP)* is quarterly disbursements of Development Policy Financing from the World Bank as a fraction of annual GDP. All regressions control for the quarterly percentage change in GDP and include country and time fixed effects. Percentage changes are approximated with the difference in log-levels. The deposit and aid variables are winsorized at the 1st and 99th percentile. Standard errors clustered at the country-level are in parentheses (*** p<0.01, ** p<0.05, * p<0.1)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		haven			**non-haven**			**ratio**	
IPF Aid (% of GDP)	5.3149***		5.1225***	-0.5744		-0.4345	6.1377**		5.7869**
	(1.6668)		(1.7077)	(1.5390)		(1.5635)	(2.2126)		(2.2563)
DPF Aid (% of GDP)		2.7929*	2.6971*		-1.9810	-1.9729		4.8174**	4.7044**
		(1.3731)	(1.3483)		(1.3159)	(1.3227)		(2.0509)	(2.0598)
Observations	1,648	1,648	1,648	1,652	1,652	1,652	1,645	1,645	1,645
R-squared	0.0977	0.0978	0.1002	0.0900	0.0922	0.0923	0.0708	0.0737	0.0756
country FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
time FE	YES	YES	YES	YES	YES	YES	YES	YES	YES

Table 6: Coverage of public deposit data. The table shows how the extent to which total foreign deposits can be allocated to individual banking centers based on publicly available data from the BIS Locational Banking Statistics. The first column shows our main sample of 22 highly aid-dependent countries while the second column shows all other countries in the world for which relevant data are available. The first line shows the publicly available statistics on total deposits by counterpart country. The next lines show the fraction of this total can be allocated to specific banking centers. The category "Jersey" includes Jersey, Guernsey and the Isle of Man. The category "Other non-havens" includes Australia, Brazil, Denmark, Finland, Ireland, Japan, Netherlands, Sweden and the U.S. The category "Unallocated" is the difference between 100% and the sum of the percentages above. Source: Bank for International Settlements, Locational Banking Statistics.

	High Aid	**Other**
Foreign deposits	200	17,097
Haven deposits	29%	22%
- Switzerland	14%	9%
- Luxembourg	3%	5%
- Belgium	8%	5%
- Jersey etc.	5%	3%
Non-haven deposits	56%	42%
Unallocated	15%	36%

Table 7: Results with public deposit data. The table shows results obtained with publicly available deposit data. The dependent variable is the quarterly percentage change in deposits in all havens with publicly available data (Column 1); in all non-havens with publicly available data (Column 2), in all havens with publicly available data over and above the change in all non-havens with publicly available data (Column 3); in individual banking centers with publicly available data (Columns 4-10). Across all the regressions, the explanatory variable of interest is quarterly disbursements from the World Bank as a fraction of annual GDP. All regressions control for the quarterly percentage change in GDP (not reported) and include country and time fixed effects. Percentage changes are approximated with the difference in log-levels. The deposit and aid variables are winsorized at the 1st and 99th percentile (*** p<0.01, ** p<0.05, * p<0.1)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	Validation (1990-2010)			**Longer time period (1990-2018)**			**Heterogeneity by haven and period**				
	haven	non-haven	ratio	haven	non-haven	ratio	Swiss	Lux	Belgium	Jersey etc	All haven
Aid (%GDP)	2.4599*	-2.0686	4.0755**	2.3821*	-2.4209	4.6067**	2.8725*	2.7165**	-1.0347	-2.0679	
	(1.3198)	(1.2631)	(1.5999)	(1.3295)	(1.4551)	(1.7131)	(1.5627)	(1.1969)	(0.7264)	(2.0260)	
Aid (%GDP) × l(pre-2010)											2.4143*
											(1.3702)
Aid (%GDP) × l(post-2010)											2.2195
											(2.0202)
Observations	1,669	1,645	1,641	2,345	2,319	2,315	2,334	1,796	2,075	1,304	2,345
R-squared	0.1138	0.0855	0.0746	0.1021	0.0841	0.0743	0.0812	0.0873	0.0828	0.0808	0.1021
country FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
time FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Figure 1: Haven deposits - dynamic results. The figure shows the results from the baseline specification (equivalent to Table 2, Columns 1) augmented with four leads and four lags of the disbursement variable. The dependent variable is the percentage change in haven deposits and the explanatory variable of interest is quarterly disbursements from the World Bank as a fraction of annual GDP. The regression controls for the quarterly percentage change in GDP and include country and time fixed effects. Percentage changes are approximated with the difference in log-levels. The deposit and aid variables are winsorized at the 1st and 99th percentile. The dark blue dots indicate the point estimates on the aid disbursement variables and the light blue lines indicate 95%-level confidence intervals (clustering at the country-level)

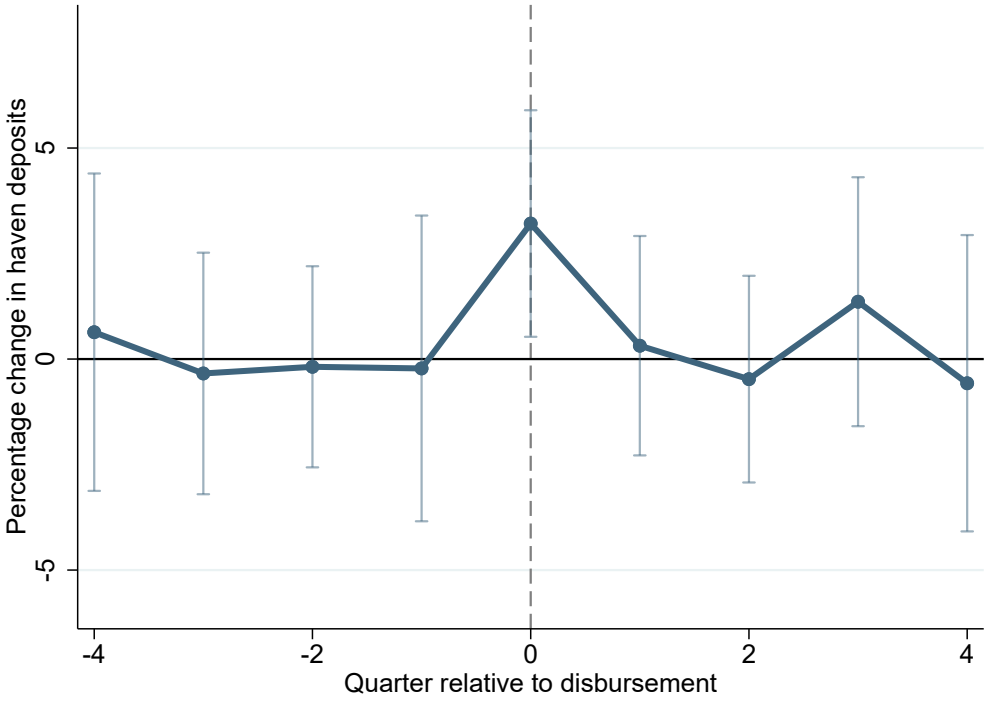


Figure 2: Non-haven deposits - dynamic results. The figure shows the results from the baseline specification (equivalent to Table 2, Columns 2) augmented with four leads and four lags of the disbursement variable. The dependent variable is the percentage change in non-haven deposits and the explanatory variable of interest is quarterly disbursements from the World Bank as a fraction of annual GDP. The regression controls for the quarterly percentage change in GDP and include country and time fixed effects. Percentage changes are approximated with the difference in log-levels. The deposit and aid variables are winsorized at the 1st and 99th percentile. The dark blue dots indicate the point estimates on the aid disbursement variables and the light blue lines indicate 95%-level confidence intervals (clustering at the country-level)

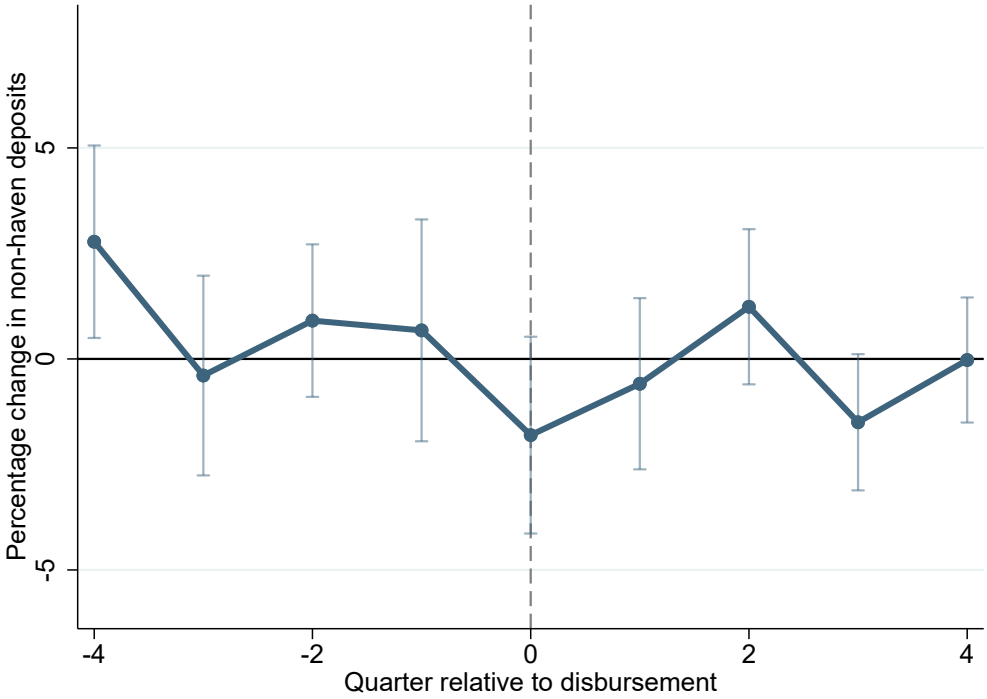


Figure 3: Haven deposits relative to non-haven deposits - dynamic results. The figure shows the results from the baseline specification (equivalent to Table 2, Columns 3) augmented with four leads and four lags of the disbursement variable. The dependent variable is the percentage change in haven deposits over and above the percentage change in non-haven deposits and the explanatory variable of interest is quarterly disbursements from the World Bank as a fraction of annual GDP. The regression controls for the quarterly percentage change in GDP and include country and time fixed effects. Percentage changes are approximated with the difference in log-levels. The deposit and aid variables are winsorized at the 1st and 99th percentile. The dark blue dots indicate the point estimates on the aid disbursement variables and the light blue lines indicate 95%-level confidence intervals (clustering at the country-level)

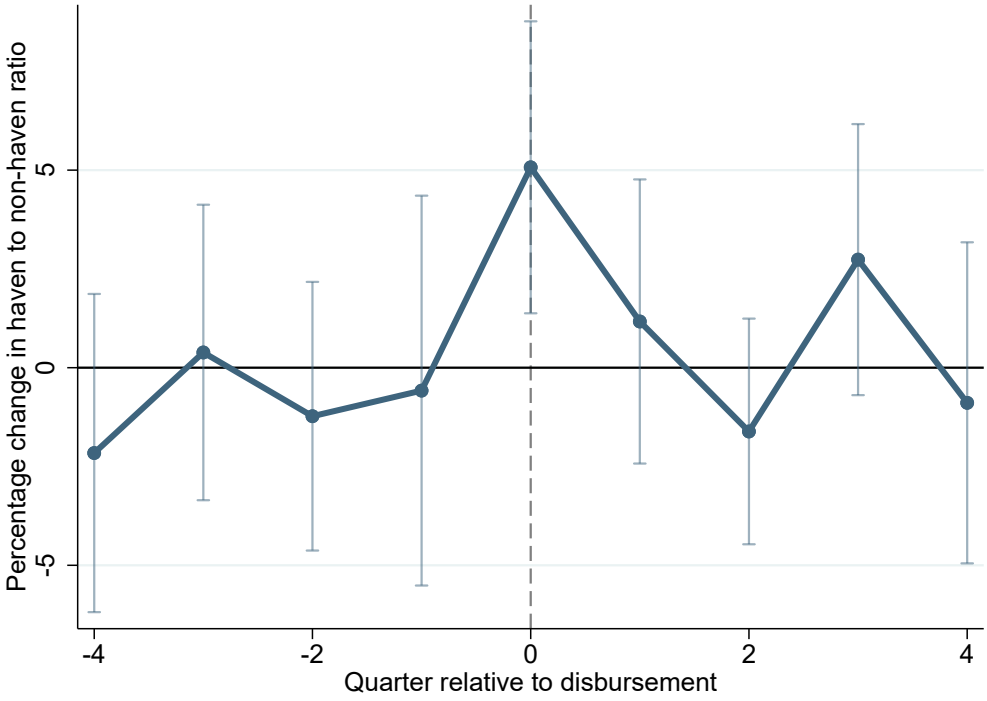
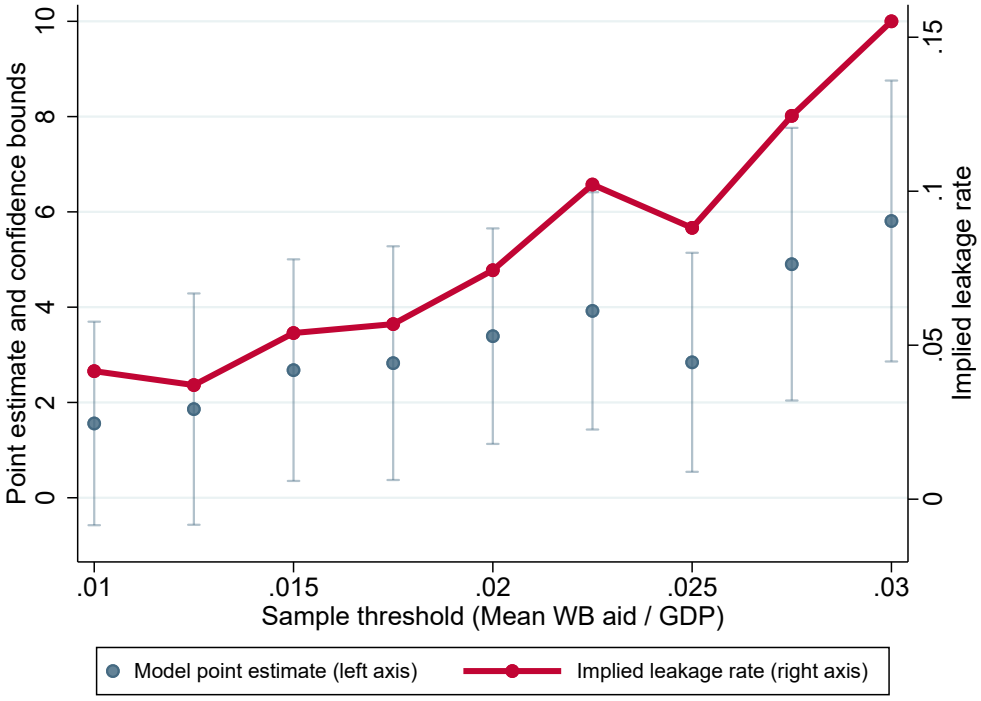


Figure 4: Heterogeneity by aid dependence. The figure shows how our main results vary with aid dependence proxied by the ratio of average annual aid over GDP as we increase the treshold for inclusion in the sample from from 1% of GDP, to 1.25% of GDP, to 1.50% of GDP and so on. The blue dots reflect the coefficient estimate associated with aid (% GDP) and the blue bars indicate the 95%-level confidence intervals (clustering at the country-level). The red line depicts the implied leakage rate for each of the coefficient estimates, calculated by multiplying the coefficient estimate on aid with the average ratio of haven deposits to GDP over the sample period. The regressions controls for the quarterly percentage change in GDP and include country and time fixed effects. Percentage changes are approximated with the difference in log-levels. The deposit and aid variables are winsorized at the 1st and 99th percentile.



ONLINE APPENDIX

Table A1: Cross-border deposits by haven. The table lists the jurisdictions that we classify as havens following the classification of Andersen et al. (2017). For each haven, we report the value of deposits owned by foreign non-banks in banks located on its territory (in $ billion). The reported numbers are averages taken over the four quarters of 2010. Source: Bank for International Settlements, Locational Banking Statistics.

Country	Deposits ($millions)
Cayman Islands	872,806
Switzerland	455,553
Belgium	295,765
Singapore	224,886
Hong Kong	178,285
Bahamas	145,693
Luxembourg	142,579
Jersey	89,602
Bahrain	62,906
Austria	61,471
Guernsey	57,404
Isle Of Man	42,717
Panama	15,969
Macao	9,280
Netherlands Antilles	7,783
Bermuda	1,873

Table A2: Descriptive statistics of events. The table shows descriptive statistics for a number of event variables that may confound our analysis for the 19 highly aid-dependent countries in our main sample. *War* indicates whether at least one war between the government of a state and at least one other party has resulted in least 1000 battle-related deaths within a calendar year (source: PRIO Armed Conflict Dataset). *Coup* indicates whether at least one coup attempt (either failed or successful) has taken place in a given quarter (source: Powell and Thyne, 2011). *Disaster* indicates whether a natural disaster with total damages exceeding 1% of GDP has taken place within the calendar year (source: EM-DAT). *Crisis* indicates whether one of the following types of financial crises have taken place within the calendar year: systemic banking crisis, currency crisis, sovereign debt crisis and sovereign debt restructuring (source: Laeven and Valencia, 2012). *Oil* indicates whether the country is producing oil in the sense that oil rents are positive in any year in the sample period (source: World Development Indicators). *Control over corruption* comes from the World Governance Indicators. *Disclosure Rules* is a binary indicator as to whether politicians are required to disclose their assets (from Djankov et al., 2010). *Capital account openness* comes from Chin and Ito (2006). *Financial Sector Development* is measured as domestic credit over GDP from the World Development Indicators. *Polity* is a measure of democracy taken from the Polity IV project.

	War	Coup	Disaster	Financial Crisis	Oil Producer	Control over Corruption	Disclosure rules	Capital account openness	Financial sector development	Polity
Afghanistan	100.0%	0.0%	100.0%	0.0%	1	-1.55	0	.	2.05	.
Armenia	0.0%	0.0%	0.0%	0.0%	0	-0.58	1	2.11	16.15	4.05
Burkina Faso	0.0%	0.0%	0.0%	0.0%	0	-0.27	0	-0.90	12.61	-2.48
Burundi	57.1%	6.0%	57.1%	6.0%	0	-1.12	0	-1.40	22.43	0.76
Eritrea	11.6%	0.0%	11.6%	0.0%	0	-0.28	0	-1.26	116.37	-6.58
Ethiopia	38.1%	0.0%	38.1%	0.0%	0	-0.66	0	-1.27	41.13	-0.67
Ghana	0.0%	0.0%	0.0%	0.0%	1	-0.12	1	-1.27	26.70	3.29
Guinea-Bissau	4.8%	7.1%	4.8%	7.1%	0	-1.13	0	-1.28	7.80	2.19
Guyana	0.0%	0.0%	0.0%	0.0%	0	-0.55	1	1.24	111.69	4.76
Kyrgyz Republic	0.0%	0.0%	0.0%	0.0%	1	-1.01	1	1.37	14.13	-1.03
Madagascar	0.0%	3.6%	0.0%	3.6%	1	-0.25	1	-0.52	16.47	6.00
Malawi	0.0%	0.0%	0.0%	0.0%	0	-0.54	0	-1.32	16.37	2.95
Mali	9.5%	2.4%	9.5%	2.4%	0	-0.57	0	-0.90	13.76	5.76
Mauritania	0.0%	3.6%	0.0%	3.6%	1	-0.46	0	-1.19	40.37	-4.95
Mozambique	14.3%	0.0%	14.3%	0.0%	1	-0.52	0	-1.30	8.14	2.86
Niger	0.0%	3.6%	0.0%	3.6%	1	-0.79	0	-0.84	10.47	3.00
Rwanda	42.9%	1.2%	42.9%	1.2%	0	-0.05	1	-1.09	12.06	-4.81
Sao Tome and Principe	0.0%	2.5%	0.0%	2.5%	0	-0.40	1	0.76	0.02	.
Sierra Leone	42.9%	6.0%	42.9%	6.0%	0	-0.89	0	-1.26	34.06	0.86
Tanzania	0.0%	0.0%	0.0%	0.0%	0	-0.68	1	-1.16	13.64	-2.05
Uganda	57.1%	0.0%	57.1%	0.0%	0	-0.88	1	1.08	9.57	-3.57
Zambia	0.0%	2.4%	0.0%	2.4%	0	-0.63	0	1.02	36.66	3.90
Sample mean	15.6%	1.8%	15.6%	1.8%	0.31	-0.61	0.40	-0.53	26.83	0.77

Table A3: Alternative high aid disbursement measures. The table shows how our main results when using dummy measures for high aid disbursements (presented in columns 4-6 in Table 2) change when using alternative treshholds to measure high aid disbursements. The sample comprises 22 countries with average annual disbursements from the World Bank exceeding 2% of GDP. The sample period is 1990-2010 and the frequency is quarterly. In columns 1-4 the dependent variable is the percentage change in haven deposits, winsorized at the 1st and 99th percentile;in columns 5-8 it is the difference between the percentage change in haven and non-haven deposits, winsorized at the 1st and 99th percentile. All regressions control for quarterly GDP growth (not included in the table). *Country FE* is a vector of country fixed effects. *Time FE* is a vector of time fixed effects. All percentage changes are approximated with the difference in log-levels. Standard errors clustered at the country-level are presented in parentheses (*** p<0.01, ** p<0.05, * p<0.1)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	havens				**ratio**			
Aid disb >1% of GDP	0.0183				0.0532**			
	(0.0159)				(0.0198)			
Aid disb >1.5% of GDP		0.0584**				0.1034***		
		(0.0233)				(0.0348)		
Aid disb >2.0% of GDP			0.1008***				0.1380***	
			(0.0322)				(0.0432)	
Aid disb >2.5% of GDP				0.1550**				0.1555*
				(0.0549)				(0.0757)
Observations	1,648	1,648	1,648	1,648	1,645	1,645	1,645	1,645
R-squared	0.0958	0.0991	0.1013	0.1025	0.0722	0.0765	0.0759	0.0733
Kleibergen-Paap rk Wald-F	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
country FE	YES	YES	YES	YES	YES	YES	YES	YES
time FE	YES	YES	YES	YES	YES	YES	YES	YES
# events	751	354	178	97	751	354	178	97

Table A4: First stage regressions. The table documents the first stage regressions for the instrumental variable regressions presented in columns 2 and 3 of Table 3. The dependent variable is quarterly aid disbursements from the World Bank as a share of GDP, winsorized at the 1% level. The main explanatory variable is predicted aid which is calculated based on project-level aid commitments and the average sector and region specific temporal disbursement patterns as described in the main text. In column 1 (the first stage for the specification presented in column 2 of Table 3) the predicted aid measure excludes approval quarters for; in column 2 (the first stage for the specification presented in column 3 of Table 3) it also excludes the first and second quarter after the approval quarter to strengthen the case for exogeneity. All regressions control for the annual percentage change in GDP and include country and time fixed effects. The sample includes all countries with annual disbursements from the World Bank exceeding 2% in Column 1 and exceeding 1% in Column 2. Standard errors clustered at the country-level are in parentheses (*** p<0.01, ** p<0.05, * p<0.1)

	(1) 1st stage Aid (% GDP)	(2) 1st stage Aid (% GDP)
Predicted aid (% GDP)	0.8668***	
(excluding approval quarter)	(0.0801)	
Predicted aid (% GDP)		0.7674***
(excluding approval quarter, q1 and q2)		(0.0865)
Observations	1,648	1,648
R-squared	0.2898	0.2319
country FE	YES	YES
time FE	YES	YES

Table A5: Crowding-in of non-WB foreign aid. The table documents how aid disbursements from the World Bank correlates with aid from other sources. The results are the estimated coefficients from a panel regression for the sample period 1990-2010 at the annual frequency. The main explanatory variable is annual disbursements from the World Bank (measured as the sum of the quarterly disbursements that enter our main regressions). The dependent variable is aid from other sources than the World Bank (measured as Official Development Assistance net of disbursements from the World Bank) as a fraction of GDP. Both aid variables are winsorized at the 1st and 99th percentile. Both regressions control for the annual percentage change in GDP and include country and time fixed effects. The sample includes all countries with annual disbursements from the World Bank exceeding 2% in Column 1 and exceeding 1% in Column 2. Standard errors clustered at the country-level are in parentheses (*** p<0.01, ** p<0.05, * p<0.1)

	(1)	(2)
Sample	WB aid > 2% Annual non WB aid (% of GDP)	WB aid > 1% Annual non WB aid (% of GDP)
Annual WB aid (% of GDP)	-0.0538	-0.1278
	(0.3850)	(0.2610)
Annual GDP (% growth)	-0.0476*	-0.0236
	(0.0235)	(0.0191)
Observations	425	910
R-squared	0.6081	0.5414
country FE	YES	YES
time FE	YES	YES

Table A6: Sample of modestly aid-dependent countries. The table shows the 24 countries for which annual disbursements from the World Bank are between 1% and 2% of annual GDP on average. is the average of the 24 countries in the sample. *Annual WB aid (% of GDP)* is annual disbursements from the World Bank as a fraction of annual GDP. *Sample mean* is the average of the 22 countries in the sample. *WB aid disbursements* is annual disbursements from the World Bank as a fraction of annual GDP. *Annual ODA aid (% of GDP)* is annual Official Development Assistance (ODA) from all sources as a fraction of annual GDP. *Haven deposits* is foreign deposits held in the 17 countries classified as havens. *Non-haven deposits* is foreign deposits held in the countries not classified as havens. *Haven deposits (quarterly growth in %)* is the quarterly percentage change in deposits held in the 17 countries classified as havens (measured as the change in quarterly log-levels). *Non-haven deposits (growth in %)* is the quarterly percentage change in deposits held in countries not classified as havens (measured as the change in quarterly log-levels). *GDP (growth in %)* is the quarterly percentage change in GDP (measured as the difference in quarterly log-levels of GDP)

	Annual WB aid (%GDP)	Annual ODA aid (%GDP)	Haven deposits (million USD)	Non-haven deposits (million USD)	Haven deposits (quarterly growth rate)	Non-haven deposits (quarterly growth rate)	GDP (quarterly growth rate)
Albania	1.0%	6.0%	15	33	3.5%	4.2%	2.0%
Benin	1.3%	6.0%	42	96	1.4%	1.9%	1.8%
Bosnia and Herze	1.0%	9.7%	115	161	2.6%	6.7%	4.1%
Cape Verde	1.8%	14.1%	14	20	3.1%	3.3%	2.2%
Central African	1.4%	6.6%	18	53	-0.2%	0.6%	0.7%
Chad	2.0%	5.3%	11	91	2.2%	2.7%	2.4%
Comoros	1.0%	4.0%	7	27	-0.2%	1.2%	1.2%
Congo, Dem. Rep.	1.1%	6.8%	910	93	-0.3%	-0.1%	1.0%
Cote d'Ivoire	1.2%	3.6%	386	787	-0.8%	0.4%	1.1%
Gambia, The	1.6%	4.2%	24	82	2.5%	0.2%	1.4%
Georgia	1.4%	3.4%	69	61	3.5%	5.4%	1.9%
Guinea	1.5%	4.1%	54	114	1.1%	1.9%	1.2%
Honduras	1.2%	3.9%	179	204	3.6%	2.7%	1.3%
Jordan	1.1%	4.8%	2042	1091	1.4%	0.1%	2.2%
Kenya	1.1%	3.7%	1277	1784	2.0%	0.4%	1.9%
Lao PDR	1.9%	7.9%	9	33	2.8%	3.7%	2.7%
Lesotho	1.7%	5.0%	11	28	1.1%	2.5%	1.9%
Moldova	1.6%	3.0%	37	27	3.9%	7.3%	2.3%
Mongolia	1.1%	7.8%	5	8	3.2%	4.2%	0.8%
Nepal	1.2%	5.0%	65	56	3.0%	1.6%	1.8%
Nicaragua	1.5%	12.6%	174	109	3.2%	4.5%	2.6%
Senegal	1.2%	5.1%	253	487	0.7%	1.1%	1.1%
Tajikistan	1.5%	3.7%	11	1	2.5%	11.0%	1.5%
Togo	1.4%	5.2%	82	146	-0.1%	0.8%	1.1%
Sample Mean	1.4%	5.9%	247	237	1.8%	2.5%	1.7%

Figure A1: Distribution of haven deposit growth rates. The figure shows the distribution of percentage changes in haven deposits (approximated with the difference in log-levels). The variable is winsorized at the 1st and 99th percentile.

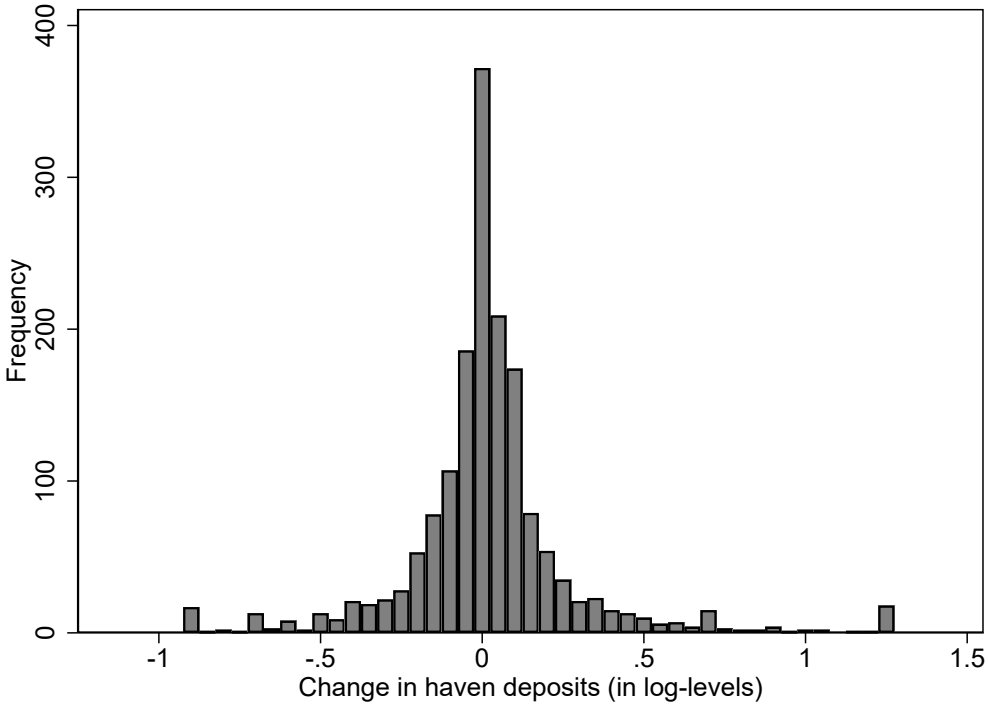


Figure A2: Distribution of aid disbursements. The figure shows the distribution of quarterly aid disbursements measured relative to annual GDP. The variable is winsorized at the 1st and 99th percentile.

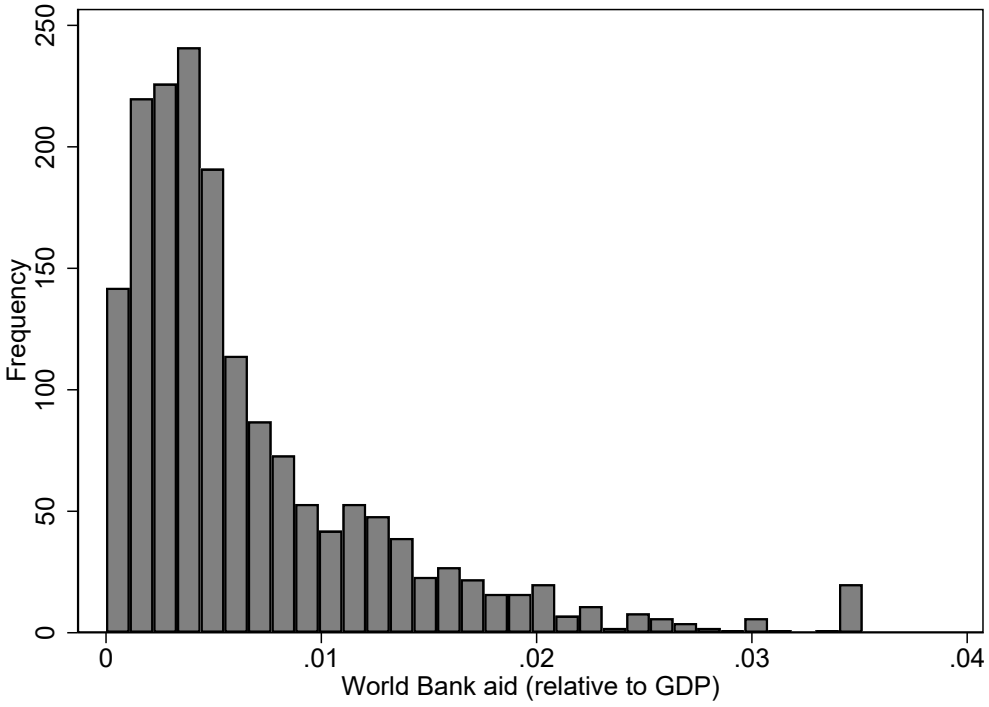


Figure A3: Dynamic results with alternative disbursement measure. The figure shows the results from the baseline specification where the disbursement variable is an indicator of quarterly disbursements exceeding 2% of annual GDP. (equivalent to Table 2, Columns 4-6) augmented with four leads and four lags of the disbursement variable. The dependent variable is the percentage change in haven deposits (Panel A) the percentage change in non-haven deposits (Panel B) the percentage change in haven deposits over and above the percentage change in non-haven deposits (Panel C). The regression controls for the quarterly percentage change in GDP and include country and time fixed effects. Percentage changes are approximated with the difference in log-levels. The deposit and aid variables are winsorized at the 1st and 99th percentile. The dark blue dots indicate the point estimates on the aid disbursement variables and the light blue lines indicate 95%-level confidence intervals (clustering at the country-level)

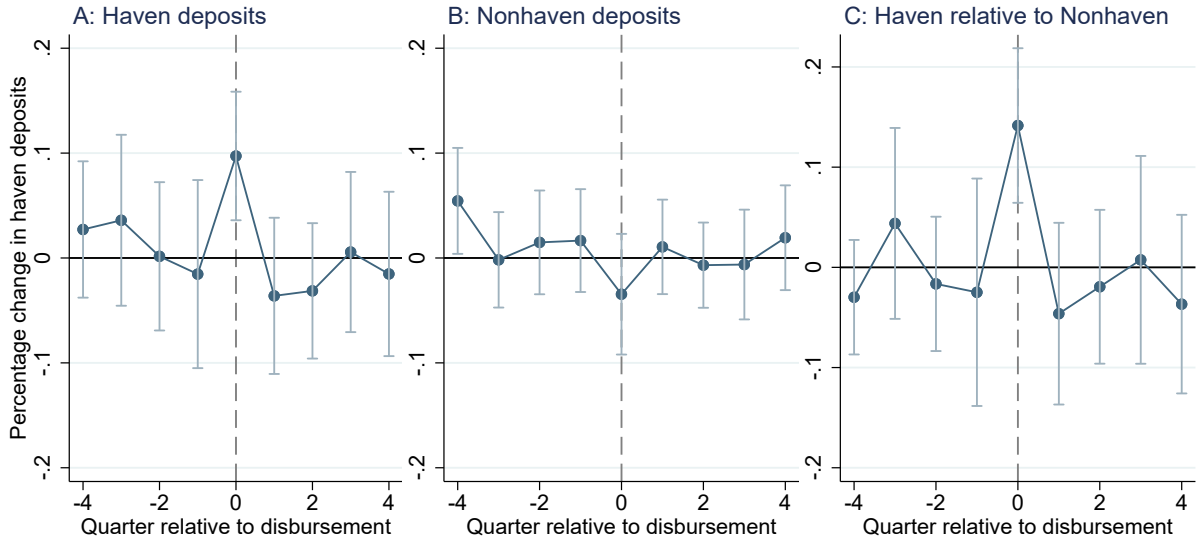


Figure A4: First stage of the IV estimation. The figure shows an added-variable plot corresponding to the first stage of the IV estimations presented in columns 2 and 3 in Table 3. It plots the residual of the instrument predicted aid disbursements as a share of GDP excluding respectively, the approval quarter and an additional two quarters, regressed on the set of exogenous variables (i.e. GDP growth, country and time fixed effects) plotted against the residual of aid disbursements from the World Bank regressed on the same set of variables