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## The effect of financial transparency on aid diversion

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OF ECONOMIC STUDIES  
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# THE EFFECT OF FINANCIAL TRANSPARENCY ON AID DIVERSION

*Jan Žalman*

IES Working Paper 29/2024

$$\frac{1!}{(m-1)!} p^{m-1} (1-p)^{n-m} = p \sum_{\ell=0}^{n-1} \frac{\ell+1}{n} \frac{(n-1)!}{(n-1-\ell)! \ell!} p^{\ell} (1-p)^{n-1-\ell} = p \frac{n-1}{n} \sum_{\ell=0}^{n-1} \left[ \frac{\ell}{n-1} + \frac{1}{n-1} \right] \frac{(n-1)!}{(n-1-\ell)! \ell!} p^{\ell} (1-p)^{n-1-\ell} = p^2 \frac{n-1}{n} +$$

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# The Effect of Financial Transparency on Aid Diversion

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**Abstract:**

Aid diversion poses a significant challenge to aid-recipient countries by depleting vital resources and hindering sustainable development. In many developing nations, high levels of corruption raise concerns about whether aid funds reach their intended destination. This paper studies the impact of financial transparency on aid diversion by focusing on global efforts to reduce secrecy in tax havens since 2009. We explore how the global push to end bank secrecy has affected aid capture, finding a significant reduction in aid diversion, particularly after 2008. This reduction aligns with the initial release of customer information from tax havens, highlighting the effectiveness of the transparency measures. Our results have important implications for foreign aid allocation strategies, especially in countries involved in offshore leaks and with high corruption levels, highlighting the need for continued efforts to enhance financial transparency.

**JEL:** F35, O19

**Keywords:** aid capture, offshore bank deposits, foreign aid, financial transparency, tax

# 1 Introduction

Illicit financial flows, including the capture of foreign aid, continue to pose significant challenges for developing countries by draining their economies of vital resources and impeding sustainable development (IMF, 2018; Johannesen, Langetieg et al., 2020). The prevalence of high corruption levels in many aid-receiving countries raises concerns that aid does not reach its intended destinations but is instead captured by ruling politicians (Andersen, Johannesen and Rijkers, 2022). This misappropriation undermines the effectiveness of foreign aid, which is intended to support development and alleviate poverty in these nations.

The effectiveness of foreign aid remains contentious. A considerable body of literature examines how aid is spent (Werker et al., 2009), its absorption into domestic economies (Temple and Sijpe, 2017), and its impact on growth (Dalgaard et al., 2004), human development outcomes (Boone, 1996), and poverty reduction (Collier and Dollar, 2002). While some scholars argue that aid is crucial for promoting economic development in the poorest countries (Sachs, 2005), others remain skeptical (Easterly and Sachs, 2006).

A common concern is that aid may be captured by economic and political elites. Andersen, Johannesen and Rijkers (2022) show that a 1% GDP aid disbursement leads to a 5% differential increase in haven deposits in secret accounts. The high levels of corruption in many aid-receiving countries (Alesina and Weder, 2002) lead to fears that aid flows enrich ruling politicians and their associates, consistent with theories of rent-seeking (Svensson, 2000) and anecdotal evidence of failed development projects and self-serving elites (Klitgaard, 1990). Despite these concerns, systematic evidence on aid capture has been limited.

In this paper, we study the effect of enhanced financial transparency on aid diversion, focusing on changes in foreign bank deposits linked to aid disbursements in aid-dependent countries during the 1990-2018 period. The results indicate that the global initiatives to end bank secrecy have significantly reduced aid capture, especially after 2008, which aligns with the release of customer information from tax havens (Johannesen and Stolper, 2021). Furthermore, the findings reveal that aid capture was more prevalent in aid-dependent countries with weak governance and high levels of corruption (Alesina and Weder, 2002).

Our findings show that an aid disbursement in a given quarter leads to a significant increase of approximately 2.3% in deposits within tax havens. Conversely, deposits in non-

haven jurisdictions show a insignificant decrease of about 1.5%. Combining these outcomes, we deduce that aid disbursements result in a net differential increase of roughly 3% in tax haven deposits compared to non-haven deposits. This suggests that aid funds are disproportionately diverted to offshore accounts.

The effect is evident throughout the 1990-2018 period but becomes particularly pronounced around 2008. During this time, international initiatives, such as those by the Organisation for Economic Co-operation and Development (OECD) and individual countries like the United States, advocated for enhanced financial transparency in tax havens. This push led to significant regulatory changes aimed at reducing bank secrecy. By improving financial transparency and reducing opportunities for illicit financial flows, these initiatives have helped ensure that aid reaches its intended recipients.

Moreover, 2008 marked the publication of the first major leak exposing tax evasion, which significantly altered the landscape of offshore banking. Prior to this leak, offshore tax evasion had not been publicly exposed, and offshore account owners and bankers likely did not consider the risk of exposure (Johannesen and Stolper, 2021). Bank accounts in tax havens, while not illegal per se, are frequently utilized for tax evasion, exposing account holders and, at times, bankers to potential criminal prosecution. Recent data leaks in the wealth management industry, such as the Panama Papers, have increased the exposure risk for prominent figures with undeclared money on foreign accounts. The leak and subsequent regulatory changes heightened the risk of exposure, thereby deterring the diversion of aid to offshore accounts.

Given the significant role of corruption in explaining our baseline results, we further analyze how the main findings relate to corruption levels in the sampled countries. By generating predicted values using our baseline model and comparing them with Control of Corruption estimate for each sample country, we find a robust association between higher levels of corruption and increased aid capture before 2008. Specifically, countries with higher perceived corruption exhibited more significant diversion of aid funds to tax havens. However, after 2008, this relationship diminishes, suggesting that the global push for financial transparency and regulatory changes have weakened the influence of corruption on aid capture.

While our research demonstrates the positive impact of enhanced financial transparency

on reducing aid capture, we acknowledge certain limitations. Specifically, we cannot directly identify who stores wealth in tax havens during aid disbursements. The macro nature of bank deposit data limits our ability to infer the precise economic mechanisms at play. However, evidence strongly suggests that the beneficiaries of these funds are economic elites. Recent studies using microdata from leaks and administrative sources show that offshore accounts are overwhelmingly held by the wealthiest individuals (Alstadsæter et al., 2018; Londoño-Vélez and Ávila-Mahecha, 2021). In contrast, the poorest in developing countries often lack domestic bank accounts (Demirgüç-Kunt et al., 2018), making it highly implausible that they control these offshore funds.

The primary challenge to identifying causality between changes in haven bank deposits and received aid is the risk of endogeneity concerning foreign aid. For example, macroeconomic shocks such as financial crises may cause significant capital flight and a surge in foreign aid, resulting in a false positive correlation between aid disbursements and foreign deposits. Subsequently, politicians engaging in opportunistic behavior could result in capital transfers and a reduction in foreign aid, giving the impression of a false negative correlation between aid and haven deposits.

Addressing endogeneity concerns related to foreign aid, such as the potential impact of macroeconomic shocks, we conduct heterogeneity analysis and sensitivity tests on classified tax havens. Switzerland emerges as the most significant among offshore financial centers. Furthermore, we perform tests excluding observations affected by certain macroeconomic shocks and events that may influence our estimates.

This paper contributes valuable empirical hypotheses to the understanding of aid effectiveness, demonstrating the impact of enhanced financial transparency on aid capture. Our findings have significant implications for the efficient allocation of foreign aid, especially in aid-dependent countries with a high degree of corruption. Additionally, our contribution extends to literature exploring the distributional effects of aid (Bjørnskov, 2010), hidden wealth and its origins (Zucman, 2013), offshore leaks Johannesen and Stolper (2021), capital flight (Cobham and Jansky, 2020), and broader research on political corruption (Olken and Pande, 2012).

The remainder of this paper is structured as follows. Section 2 describes the data. Section

3 introduces the empirical methodology. Section 4 presents the results and heterogeneity analysis. Section 5 concludes.

## 2 Data

### 2.1 Cross-Border Bank Deposits

We use publicly available data on foreign bank deposits from the Bank for International Settlements (BIS). This data set contains quarterly information on the value of bank deposits in all significant financial centers (including key tax havens) at the bilateral level – for example, the value of bank deposits held in Belgian banks owned by residents of Burundi. Covering 49 financial centers and approximately 200 countries, the BIS data set is a well-established database frequently used by central banks and macro economists to measure net wealth positions. It has also been used in previous studies to investigate offshore tax evasion, making it a suitable choice for our research question (Johannesen, 2014; Johannesen and Zucman, 2014; Menkhoff and Miethe, 2019).

BIS assigns deposits to countries on the basis of immediate ownership rather than beneficial ownership. Hence, if a Burundian firm has a subsidiary in Bermuda, which holds a Luxembourgian bank account, the account is assigned to Bermuda in the BIS statistics.

To identify tax havens, we adhere the classification introduced by Andersen, Johannesen, Lassen et al. (2017), relying on institutional characteristics that make financial centers attractive destinations for illicit funds, such as bank secrecy rules and legal provisions enabling investors to protect their assets by nominally transferring ownership to a third party while retaining ultimate control. Using publicly available data, we classify 7 financial centers as tax havens and the remaining 11 as non-havens.

The variable  $Haven_{it}$  represents deposits owned by country  $i$  in the 7 tax havens in quarter  $t$ , while  $Nonhaven_{it}$  represents deposits in other financial centers considered as nonhavens. The BIS sectoral breakdown is used to exclude interbank deposits and those held by central banks. Due to the lack of information on the ultimate owner of deposits in BIS statistics, offshore intermediary accounts are excluded to maintain accuracy.

Descriptive statistics for haven and non-haven bank deposits in the main sample are



presented in Table 1. The value of cross-border bank deposits held by countries in the main sample from 1990 to 2018 is illustrated in Figure 1.

## 2.2 Foreign Aid

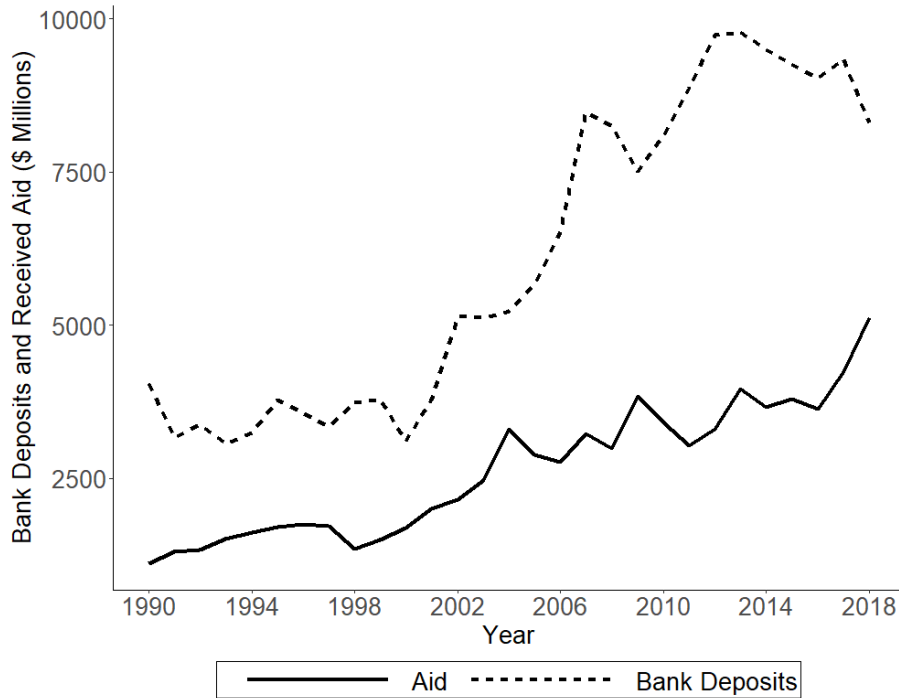
We obtain data on foreign aid and aid disbursements from the World Bank through its two foremost institutions, IDA and IBRD. The World Bank Project Database provides details on the approval date, commitment amount, sector, and instrument type for each project.

The datasets from IDA and IBRD encompass information on aid disbursements. Ultimately, the data from the World Bank Project Database aggregate aid disbursements based on development program characteristics, including evaluation outcome, sectors, instrument types, and themes of the aid flow. This data allows for creating variables to test whether the link between aid disbursements and money flows to tax havens differs systematically based on the development program characteristics. Figure 1 presents the aid disbursed to recipient countries included in the main sample for the 1990-2018 time period.

In the main sample, we include 22 countries that, on average, received annual disbursements from the World Bank equivalent to at least 2% of GDP between 1990 and 2010. For consistency, we use the identical sample as Andersen, Johannesen and Rijkers (2022), as the methodology-based country selection in their study yields significantly different results. If we apply the same criterion, specifically that countries received disbursed aid amounting to at least a 2% fraction of their GDP, only four countries would be included in the sample. Descriptive statistics on received aid from 1990 to 2018 are provided in Table 1.

We recognize the potential endogeneity of aid disbursements to current economic shocks. To address this concern, we adopt the approach used by Kraay (2012, 2014) and develop an instrument that uses the lag between aid commitments and disbursements. Typically, after World Bank project approval, aid disbursements are distributed over multiple quarters at various project stages. Despite some variability in the actual disbursement schedule, the amount of disbursed aid in a given quarter is predominantly influenced by project approvals in preceding quarters, creating exogenous variation in disbursements. Additionally, external factors such as natural disasters, wars, and civil conflicts could impact the actual disbursement amounts, introducing another potential source of endogeneity.

Figure 1: Cross-Border Bank Deposits And Received Aid (\$ in Millions).



### 2.3 Offshore Corporations

Following the methodology of Andersen, Johannesen and Rijkers (2022), we incorporate data on offshore corporations obtained from publicly leaked files by the ICIJ into the dataset. These leaks include information from the Panama Papers, Offshore Leaks, the Paradise Papers, and the Bahamas Leaks, offering details on offshore corporations headquartered in Panama, the British Virgin Islands, and Bermuda. Simultaneously, the data includes records from corporate registries in Aruba, Barbados, the Bahamas, Nevis, Malta, the Cook Islands, and Samoa. Despite variation across the leaked files, they provide general information about the corporations (e.g., name, date of closure, date of incorporation) and about shareholders, director, and beneficiaries.

Utilizing this data, we construct the variable  $Corporations_{it}$ , capturing the number of active offshore corporations with links - officers in the respective state - to country  $i$  in quarter  $t$ . Officers refer to various staff roles across corporations, such as directors or shareholders. Given that a corporation may have multiple officers, we allow corporations to have links to multiple countries. When constructing  $Corporations_{it}$ , we accumulate the number of corporations as far back as the leaked records go. The number of active offshore

corporations with links to the main sample countries is reported in Table 1.

The significance of offshore corporations is particularly important in the context of low-income countries. In these nations, the use of offshore corporations may contribute to the outflow of financial resources that could otherwise be utilized for development purposes. This outflow can occur through illicit financial flows, where resources are moved out of the country and hidden in offshore corporations, resulting in lost revenue. Additionally, the use of offshore corporations can create a perception of corruption and erode public trust in institutions, further impeding development efforts. Understanding the relationship between foreign aid and offshore corporations can help policymakers in low-income countries in designing effective strategies to prevent resource outflow and promote sustainable development.

However, offshore corporations' data faces limitations. Firstly, the leaks cover only for a small subset of offshore corporate service providers and corporate registers in the worldwide, providing only a partial representative picture of the offshore world. Secondly, since the leaked files lack information about the assets and activities of offshore corporations, cross-country differences must be interpreted cautiously. Despite some leaks being tied to illicit financial flows, it does not imply universality, and one country's offshore corporation may be more represented than another's.

The number of offshore corporations revealed in the leaks varies significantly across the countries in the main sample. As shown in Table 1, there is a considerable variation in the number of offshore corporations by country, ranging from non-participating countries like Eritrea, Guinea Bissau, and Sao Tome and Principe, to a high of 348 in Ghana. Intuitively, countries with the largest number of offshore corporations tend to be the most populous.

It is important to note that the number of offshore corporations in the leaks is not necessarily an indicator of illicit activity or corruption but rather reflects the extent to which a country's citizens and companies have used offshore financial centers for wealth management (OECD, 2017). Nevertheless, the significant variation underscores the need for greater transparency and accountability in global financial systems, particularly with respect to the role of tax havens in facilitating elite capture of foreign aid.

## 2.4 Corruption

We obtain corruption data from the Worldwide Governance Indicators (WGI), a World Bank research project designed to offer objective measures of governance quality globally. The WGI relies on perceptions from experts, academics, and public sector officials. One key indicator is the Control of Corruption Estimate (CCE), measuring how effectively corruption is managed within a country. It assesses the frequency and the extent of corruption in the public sector, as well as the efficacy of anti-corruption efforts and institutions.

The CCE estimate operates on a scale from -2.5 to 2.5, with higher scores indicating better corruption control. Countries with high scores are associated with a strong rule of law, effective public institutions, and a culture of transparency and accountability. Conversely, low scores suggest weak institutions, a lack of transparency, and a high degree of corruption. Descriptive statistics of CCE for the main sample are presented in Table 1.

While acknowledging certain limitations and criticisms of WGI data and the CCE measure, such as arguments from Rose-Ackerman (1999), Kaufmann and Vicente (2011), and Kaufmann (2005) about the reliance on subjective perceptions, we recognize that the data is based on expert assessments and survey responses, which may not be fully representative of the entire population.

Despite these concerns, the WGI data and CCE remain widely used and respected sources of information on corruption and governance quality. The subjective nature of the data might not always precisely reflect the true level of corruption in a given country. However, it offers a consistent and comprehensive measure of corruption across numerous countries, enabling meaningful cross-country comparisons over time.

## 2.5 Other Variables

We collect data on events that could simultaneously impact aid disbursements and cross-border capital flows from multiple sources. Firstly, data on wars is obtained from the Peace Research Institute Oslo (PRIO) Armed Conflict Dataset, a widely used and comprehensive dataset covering armed conflicts and political violence globally from 1946 to the present. It includes details on conflict-related deaths, location, parties involved, and duration.

Secondly, information on coups is sourced from Powell and Thyne (2011), who present a

Table 1: Descriptive Statistics (1990-2018).

	Haven Deposits (\$ in Millions)	Non Haven Deposits (\$ in Millions)	Received Aid (\$ in Millions)	Offshore Corpora- tions (2018)	Portfolio Investment in Havens (\$ in Millions)	CCE (Aver- aged)	GDP Growth rate %(Aver- aged)
Afghanistan	2,285	4,889	3,098	6	290	-1.53	10.9
Armenia	6,515	2,230	2,153	186	10,465	-0.56	10.1
Burkina Faso	5,352	10,993	3,979	17	144	-0.24	6.5
Burundi	11,278	1,871	1,586	1	4,255	-1.17	4.1
Eritrea	1,332	962	509	0	5	-0.47	10.4
Ethiopia	11,728	12,847	15,585	7	6,693	-0.62	8.2
Ghana	14,102	73,803	8,112	348	62,963	-0.12	11
Guinea-Bissau	2,504	911	404	0	2	-1.21	7.6
Guyana	2,544	11,257	361	14	271	-0.51	9
Kyrgyz Republic	1,776	1,156	1,247	53	3,183	-1.01	6.6
Madagascar	21,446	29,422	3,854	59	29	-0.40	6.6
Malawi	5,119	8,507	3,557	51	242	-0.58	7.9
Mali	4,470	16,350	3,031	20	434	-0.59	7.5
Mauritania	4,044	28,613	1,040	122	1,345	-0.52	5.6
Mozambique	6,648	16,154	5,868	63	2,448	-0.58	7.6
Niger	2,751	7,994	2,624	30	259	-0.75	5.5
Rwanda	15,174	4,252	3,270	2	2,268	-0.07	8.6
Sao Tome and Principe	482	183	132	0	38	-0.05	10.9
Sierra Leone	4,389	8,648	1,197	19	170	-0.83	8
Tanzania	22,475	42,111	10,074	118	5,495	-0.64	10.4
Uganda	9,356	18,479	6,886	53	3,801	-0.92	7.7
Zambia	20,140	34,146	3,489	53	16,362	-0.62	9
<b>Sample Mean</b>	<b>7,995</b>	<b>15,263</b>	<b>3,730</b>	<b>58</b>	<b>5,507</b>	<b>-0.64</b>	<b>8.2</b>

Note: This table provides summary statistics of 22 countries included in the main sample. Columns 1 and 2 show cross-border bank deposits held both in havens and non havens, respectively. Column 3 shows the total amount of received aid from the World Bank in 1990-2018. Column 4 shows the amount of involvement of the main sample countries in leaked files in 2018. Column 5 shows the total amount of portfolio investment from the main sample countries into classified tax havens. Column 6 shows the average CCE of main sample countries in 1990-2018. Column 7 shows annual growth rates in GDP.

new dataset on coups from 1950 to 2010. Despite the occurrence of numerous coups, their paper highlights the lack of a comprehensive dataset, offering theoretical definitions and coding procedures.

Thirdly, data on natural disasters is collected from the International Disaster Database, known as EM-DAT, managed by the Centre for Research on the Epidemiology of Disasters (CRED). Covering natural, technological, and conflict-related disasters from 1900 to the present, this database is considered the most comprehensive globally, with over 24,000 documented events. Information includes the type of disaster, location, date, casualties, injuries, and economic damages.

Lastly, data on financial crises is obtained from Laeven and Valencia (2020), presenting a comprehensive database of systemic banking crises during 1970-2011. The database dates banking crises based on policy indices, providing insights into costs and policy responses associated with these crises. It also includes dates for sovereign debt and currency crises during the same period. This dataset assists in constructing variables to address endogeneity and facilitates robustness checks (Section 4.4). Descriptive statistics for these variables are presented in Table 1.

### 3 Empirical Strategy

To quantify the extent of foreign aid shifted to tax havens in the interest of ruling elites, we employ a high-powered test examining changes in cross-border bank deposits associated with aid disbursement. the analysis adopts the baseline model developed by Andersen, Johannesen and Rijkers (2022):

$$\Delta \log(Haven_{it}) = \beta Aid + \gamma X_{it} + \mu_i + \tau_t + \epsilon, \quad (1)$$

where  $\Delta \log(Haven_{it})$  expresses the growth rate of bank deposits in havens owned by country  $i$  in quarter  $t$ ,  $Aid_{it}$  measures disbursed aid to country  $i$  in quarter  $t$  as a share of GDP,  $X_{it}$  represents vector of control variables (such as GDP growth), and  $\mu_i$  and  $\tau_t$  denote country and time fixed effects. This empirical method allows us to estimate the relationship between inflows of aid to recipient countries (right-hand side) and change in bank deposits

in tax havens (left-hand side).

The main parameter of interest,  $\beta$ , expresses the percentage change in cross-border bank deposits held in tax havens associated with aid disbursements received by countries in the main sample.  $\beta$  is measured relative to the counterfactual change in foreign deposits held in havens predicted by the other variables that are included in the model: country's long-run average growth rate in foreign deposits held in havens (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). With country fixed effects,  $\beta$  is identified exclusively from within-country variation. The inclusion of GDP growth as a control variable is essential to account for potential confounding factors impacting the relationship between aid and tax haven deposits. By including this control variable, we isolate the effect of aid on tax haven deposits.

To differentiate between cross-border capital movements driven by secrecy and asset protection versus those motivated by other factors, we employ model using the growth rate of deposits in non-tax-haven jurisdictions, referred to as  $\Delta\log(\textit{Nonhaven})$ , as the dependent variable. Comparing the estimated coefficients on aid in the two regressions allows us to formally test for differences in growth rates induced by aid disbursements in tax havens and non-havens. Further, we use the differential growth rate,  $\Delta\log(\textit{Haven}) - \Delta\log(\textit{Nonhaven})$ , directly as the dependent variable to identify the impact of aid on tax haven deposits while controlling for any shocks to cross-border flows that are shared between tax haven and non haven accounts.

A significant feature of the baseline model is the log transformation applied to foreign deposits, accounting for the statistical assumption that disturbances to foreign deposits are proportional to the stock of deposits. This assumption is grounded in sound economic principles. First, in the absence of withdrawals and new deposits, compound interest, accruing at a uniform rate, mechanically generates exponential growth of account balances. Second, numerous theoretical models suggest that deposits variation in response to fluctuations in the economic environment, such as business cycles and policy interventions, are proportional to the stock of deposits. An identical approach of estimating the change in foreign deposits in log levels was applied by Alworth (1992), Huizinga and Nicodème (2004), Johannesen and

Zucman (2014), Johannesen (2014), and Menkhoff and Miethe (2019).

To further explore the effect of enhanced financial transparency on aid capture, we consider leaked files by ICIJ with information on offshore corporations. The initial release of customer information from tax havens in 2008 revealed details about the outflow of foreign bank deposits and the market value of banks involved in facilitating tax evasion activities (Johannesen and Stolper, 2021). Additionally, we adjust the baseline model to include  $\log(\text{Corporations}_{it})$  as a dependent variable, examining the correlation between received aid and involvement in offshore leaks.

Being aware that the use of offshore corporations may not necessarily imply illicit activity, we focus on the relationship between received aid and offshore leaks, recognizing that many countries use offshore financial centers for legitimate purposes. This approach allows us to better understand how enhanced financial transparency may influence the actions of aid recipients in utilizing offshore financial instruments.

## 4 Results

### 4.1 Main Results

We present the main results from the baseline model in Table 2. In columns 1, 2, and 3, we show estimates obtained by replication of Andersen et al. (2022). We find that an aid disbursement induces a statistically significant increase of around 2.3% in haven deposits and a statistically insignificant decrease of approximately 1.5% in non-haven deposits. The overall outcome can be deduced intuitively: an aid disbursement leads to a differential rise of approximately 3% in haven deposits, in addition to the increase in non haven deposits indicated in column 3. The results are comparable to those reported in the original paper, albeit less significant in magnitude. Extending the sample period to 1990-2018, columns 4 and 6 show that the effect persists for haven deposits.

In Table 3, we delve deeper into the correlation between alterations in foreign bank deposits and aid disbursement. We find that the overall effect is strongly affected by the year 2008. Column 1 presents a significant and robust estimate for the change in haven deposits associated with an aid disbursement in 2008-2018. However, Column 4 shows that



Table 2: Main Results.

	1990-2010			1990-2018		
	Haven (1)	Nonhaven (2)	Difference (3)	Haven (4)	Nonhaven (5)	Difference (6)
Aid Disbursement (% GDP)	2.274* (0.925)	-1.413 (1.047)	2.970* (1.403)	2.332** (1.024)	-1.800 (1.199)	3.529* (1.456)
GDP Growth (%)	$1.930e-12$ ( $2.628e-11$ )	$1.848e-11$ ( $2.945e-11$ )	$-1.369e-11$ ( $3.942e-11$ )	$5.423e-13$ ( $1.317e-11$ )	$1.012e-11$ ( $1.864e-11$ )	$-8.854e-12$ ( $2.262e-11$ )
Observations	1,669	1,645	1,641	2,345	2,319	2,315
$R^2$	.053	.017	.001	.48	.019	.012
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes

Note: This table shows the main results for the main sample in 1990-2010 and 1990-2018, respectively. In columns 1 and 4, the dependent variable is the percentage change in foreign deposits held in havens. In columns 2 and 5, the percentage change in non-havens. In columns 3 and 6, it is the percentage change difference between haven and non-haven deposits. "Aid Disbursement" is quarterly disbursement from the World Bank. GDP is the quarterly percentage change in GDP. Standard errors are shown in parentheses.

the observed effect loses statistical significance upon the exclusion of the year 2008 from the regression.

Table 3: Main Results: Cont'd.

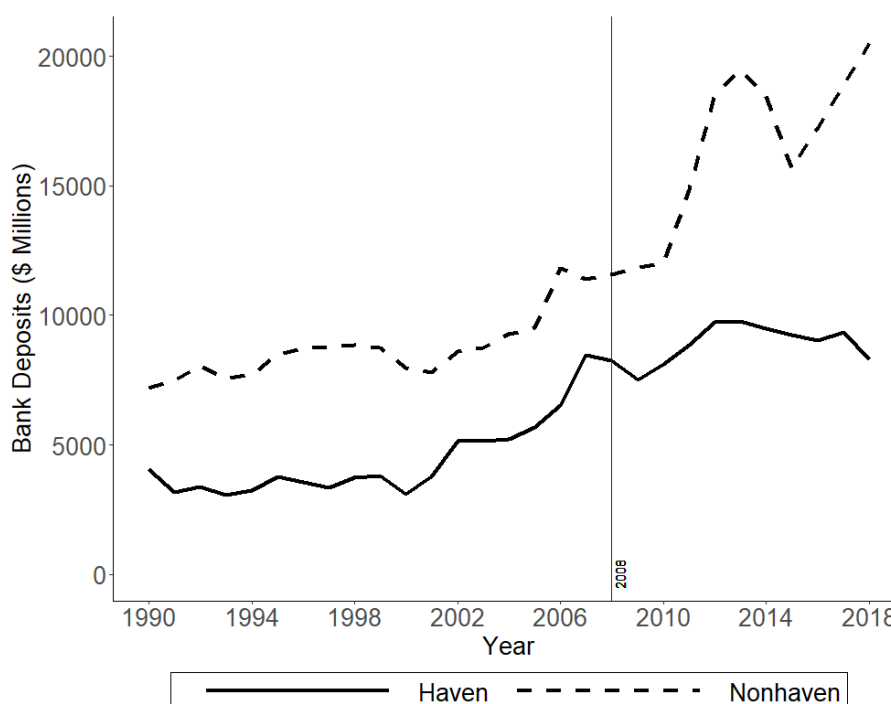
	2008-2018			2009-2018		
	Haven (1)	Nonhaven (2)	Difference (3)	Haven (4)	Nonhaven (5)	Difference (6)
Aid Disbursement (% GDP)	6.923** (2.171)	0.999 (0.204)	3.158 (1.513)	2.703 (2.280)	2.216 (5.102)	1.567 (5.502)
GDP Growth (%)	$-1.035e-12$ ( $1.408e-11$ )	$5.699e-12$ ( $2.866e-11$ )	$-6.410e-12$ ( $3.119e-11$ )	$-2.670e-12$ ( $1.364e-11$ )	$4.616e-12$ ( $3.002e-11$ )	$-6.845e-12$ ( $3.238e-11$ )
Observations	940	933	933	852	847	847
$R^2$	.007	.017	.004	.010	.016	.016
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes

Note: This table shows the main results for the main sample in 2008-2018 and 2009-2018, respectively. In columns 1 and 4, the dependent variable is the percentage change in foreign deposits held in havens. In columns 2 and 5, the percentage change in non-havens. In columns 3 and 6, it is the percentage change difference between haven and non-haven deposits. "Aid Disbursement" is quarterly disbursement from the World Bank. "GDP" is the quarterly percentage change in GDP. Standard errors shown are in parentheses.

We introduce two hypotheses to explain the disappearance of the estimated effect of aid capture after 2008. First, during this time frame, global tax havens faced pressure from various international organizations, including the OECD, and individual countries like the United States (Alstadsæter et al., 2018), to increase their financial transparency. The G20 nations compelled tax havens to enter into bilateral agreements mandating the exchange of banking information, with more than 300 treaties signed by the end of 2009 (Johannesen and Zucman, 2014). Figure 2 presents the impact of the agreements on the countries in the main sample.

Once the effort to curb the use of the offshore account to end bank secrecy was introduced, the amount of cross-border bank deposits assigned to non havens gradually increased. To

Figure 2: Haven and Non Haven Bank Deposits (\$ in Millions).



the contrary, the flows of bank deposits to havens remained stable and eventually started to decline towards the end of the sample period. To present a complete picture, it is necessary to emphasize that this process occurred in the context of escalating levels of development aid (as shown in Figure 1).

Second, a significant change in the trend of cross-border bank deposits assigned to havens and non-havens occurred after the 2008 leak exposing tax evasion. Figure 2 illustrates this trend, consistent with estimates in Table 2 and Table 3. Prior to the leak, offshore tax evasion had not been exposed in leaks, and offshore account owners and bankers may not have considered the risk of exposure (Johannesen and Stolper, 2021). Specifically, authors find that data leaks in tax havens result in a decrease in customer bank deposits by approximately 4.6%.

The 2008 release of customer information from tax havens led to a sudden outflow of deposits and a substantial decline in the market value of banks to be known for facilitating tax evasion. This event heightened regulatory scrutiny, prompting individuals and corporations to avoid potential legal consequences by moving their funds out of offshore accounts. The sharp decrease in market value reflected a loss of investor confidence and financial instability

in implicated institutions. Simultaneously, the release increased public awareness of the risks associated with offshore bank accounts, potentially deterring their use for tax evasion and illicit activities.

The ICIJ leaks provided unprecedented access to previously confidential information on offshore accounts, exposing practices of tax evasion and money laundering. The revelations started media sensation and attracted the attention of politicians, regulatory authorities, and the general public, increasing the pressure to crack down on offshore tax evasion and other forms of financial crime.

As a result of this increased scrutiny, offshore account holders and bankers may have become more aware of the risks associated with such activities, and the likelihood of getting caught. This could lead to a reduction in the use of offshore accounts for tax evasion and other illicit activities, as individuals and corporations sought to avoid the risks of exposure and legal consequences.

To validate the findings, we use an alternative specification of the baseline model and run the regression with  $\log(\text{Corporations}_{it})$  as a dependent variable, presented in Table 4. The results suggest a positive and statistically significant relationship between aid disbursement and offshore corporations in 1990-2010. However, the estimate for 2009-2019 indicates no statistically significant effect, emphasizing that the use of offshore corporations is not necessarily an indicator of illicit activity or corruption.

Table 4: Offshore Corporations.

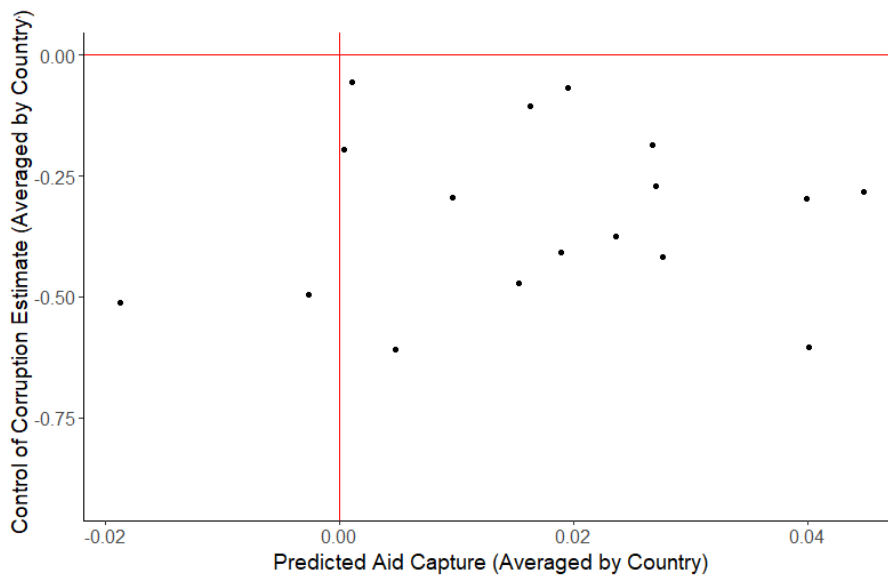
	1990-2010 (1)	2009-2019 (2)	1990-2018 (3)
Aid Disbursement	5.698** (2.104)	5.988 (3.993)	7.853*** (2.085)
GDP Growth (%)	1.768e-13 (6.896e-13)	7.285e-12 (5.267e-12)	6.290e-13 (7.157e-13)
Observations	1,096	707	1,648
$R^2$	0.890	0.951	0.891
Country fixed effects	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes

Note: This table shows results when we use  $\log(\text{Corporations}_{it})$  as a dependent variable in the baseline model. Columns 1 and 2 show the estimates of the regression for 1990-2010 and 2009-2018, respectively. “GDP” is the quarterly percentage change in GDP. Standard errors are shown in parentheses.

## 4.2 Role of Corruption

Given that corruption is a significant factor among the potential mechanism that explains the baseline results, we provide a further analysis that is consistent with the obtained estimates. To explore how the main findings relate to corruption levels in the countries included in the sample, we generate predicted values using the baseline model and compare them with CCE for each country. Averaging predicted values and CCE per country, Figure 3 illustrates the correlation between predicted aid capture and CCE in 1990-2010.

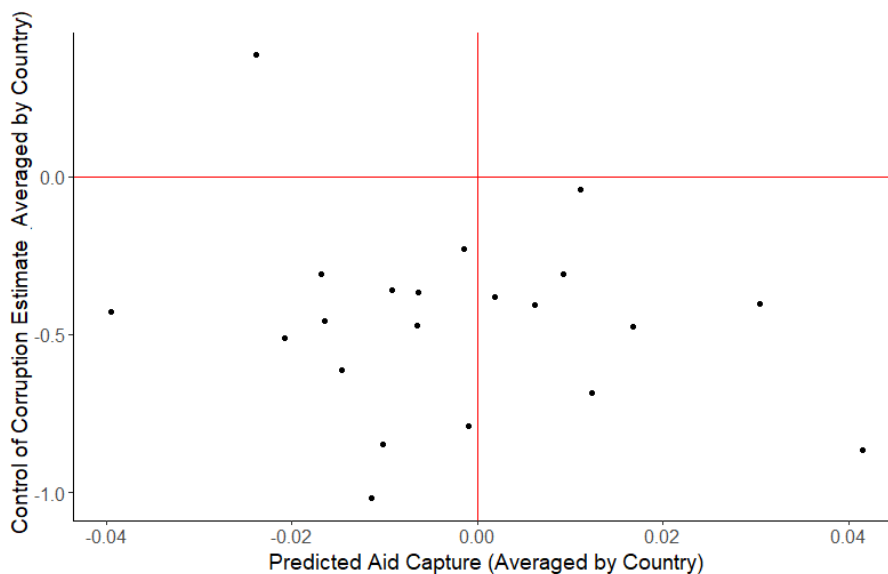
Figure 3: Predicted Aid Capture and CCE (averaged by country) in 1990-2010.



Predicted values of aid capture averaged by country in the 1990-2010 period show a predominantly positive trend, contrasting with all observed countries reporting negative CCE, indicating perceived corruption. However, in the 2009-2018 period (Figure 4), the averaged predicted values distribute more evenly around zero, suggesting a weakened correlation between aid and corruption.

These results within the country sample suggest that aid capture may be associated with countries exhibiting negative CCE and relatively high corruption levels, particularly prevalent before 2008. However, this link diminishes after 2008 when the impact of aid capture decreases. This implies that aid capture might have been more widespread in developing countries characterized by weak governance, despite their heightened need for development aid (Alesina and Weder, 2002). The association suggests that while aid is essential for un-

Figure 4: Predicted Aid Capture and CCE (averaged by country) in 2009-2018.



derdeveloped nations, excessively high aid levels may inadvertently foster corruption and undermine institutions (Djankov et al., 2008; Knack, 2001).

### 4.3 Endogeneity Issues

To address potential endogeneity concerns related to aid, we employ a strategy analyzing quarterly changes in foreign deposits within a 2-year time frame surrounding aid disbursements by adding four leads and four lags of the aid variable (Andersen, Johannesen and Rijkers, 2022). Results from the regressions on the 1990-2018 sample period are presented in Table 5. The findings, however, are inconclusive, revealing an association between aid disbursements and increased haven deposits not only during the disbursement quarter but also three quarters afterward. This suggests a notably large net flow to tax havens during the disbursement quarter, possibly linked to aid disbursement three quarters later. The results raise concerns about establishing a causal relationship between aid disbursements and haven deposits if the latter continues to increase after the disbursement quarter.

As shown in Table 6, there are no significant changes in non-haven deposits associated with aid, neither during the disbursement quarter nor in the four quarters preceding or following. This pattern aligns with the intuitive observation inferred from the regression (Table 2 columns 4, 5, and 6), highlighting a substantial surge in haven deposits compared

Table 5: Lags and Leads: Havens.

	Estimate	Std. Error	t-statistic	p-value
Aid Disbursement (lag 4)	0.742	0.950	0.780	0.435
Aid Disbursement (lag 3)	-0.510	0.957	-0.532	0.595
Aid Disbursement (lag 2)	0.976	0.958	1.019	0.309
Aid Disbursement (lag 1)	0.124	0.969	1.277	0.202
Aid Disbursement	1.726	0.981	1.759	0.079
Aid Disbursement (lead 1)	-0.596	0.976	-0.611	0.541
Aid Disbursement (lead 2)	-0.383	0.963	-0.397	0.691
Aid Disbursement (lead 3)	2.069*	0.966	2.142	0.032
Aid Disbursement (lead 4)	0.330	0.966	0.342	0.733
GDP (% growth)	1.623e-12	2.684e-11	0.060	0.952
Observations	1,661			
R <sup>2</sup>	.054			
Country fixed effects	Yes			
Time fixed effects	Yes			

Note: This table shows the results of the augmented baseline model with four leads and lags of the disbursement of the aid variable. The dependent variable is the percentage change in foreign deposits held in havens. "Aid Disbursement" is quarterly disbursement from the World Bank. "GDP" is the quarterly percentage change in GDP.

to non-haven deposits. The dynamic results for the differences between haven and non-haven deposits further support these findings, as shown in Table 8. Once again, the estimates align with the main regression analysis, providing consistency in the observed patterns.

## 4.4 Heterogeneity Analysis

### 4.4.1 Tax Havens Sensitivity Analysis

To ensure robustness and avoid excessive reliance on a singular assumption - such as the use of a particular tax haven - we conduct a comprehensive sensitivity analysis encompassing the various havens within our study. Such tests are typically employed in papers that address money transfers to tax havens (Dharmapala, 2014; Johannesen and Zucman, 2014).

In the main sample of 22 aid-dependent countries, totaling approximately \$15,550 million in foreign deposits, seven tax havens (Switzerland, Liechtenstein, Luxembourg, Belgium, Jersey, Guernsey, and the Isle of Man) were identified, with around 60% attributed to 11 non-haven financial centers. Switzerland emerged prominently, holding an average of \$2,630 million in deposits. Figure 5 illustrates the predominant utilization of tax havens by the

Table 6: Lags and Leads: Nonhavens.

	Estimate	Std. Error	t-statistic	p-value
Aid Disbursement (lag 4)	-0.656	1.064	-0.617	0.538
Aid Disbursement (lag 3)	-1.669	1.062	-1.571	0.116
Aid Disbursement (lag 2)	1.410	1.064	1.325	0.186
Aid Disbursement (lag 1)	-0.518	1.088	-0.477	0.634
Aid Disbursement	-1.346	1.103	-1.220	0.223
Aid Disbursement (lead 1)	0.706	1.089	0.648	0.517
Aid Disbursement (lead 2)	0.505	1.077	0.469	0.639
Aid Disbursement (lead 3)	0.032	1.076	0.030	0.976
Aid Disbursement (lead 4)	1.570	1.083	1.449	0.147
GDP (% growth)	1.336e-11	2.771e-11	0.482	0.630
Observations	1,637			
R <sup>2</sup>	.023			
Country fixed effects	Yes			
Time fixed effects	Yes			

Note: This table shows the results of the augmented baseline model with four leads and lags of the disbursement of the aid variable. The dependent variable is the percentage change in foreign deposits held in non havens. "Aid Disbursement" is quarterly disbursement from the World Bank. "GDP" is the quarterly percentage change in GDP.

Table 7: Lags and Leads: Difference.

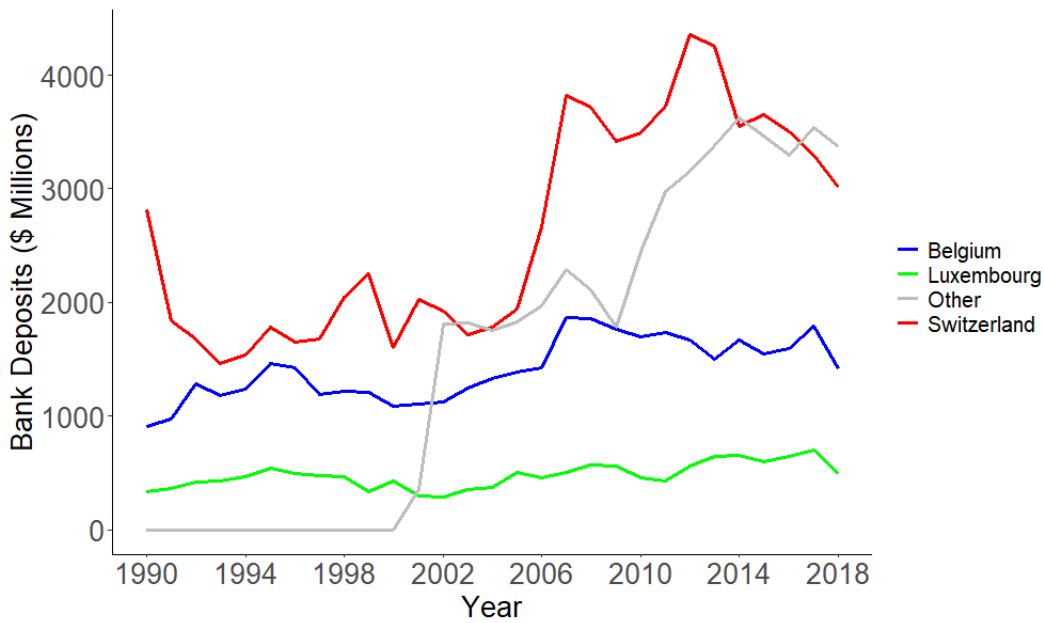
	Estimate	Std. Error	t-statistic	p-value
Aid Disbursement (lag 4)	1.081	1.425	0.758	0.448
Aid Disbursement (lag 3)	0.821	1.424	0.576	0.565
Aid Disbursement (lag 2)	-0.627	1.427	-0.440	0.660
Aid Disbursement (lag 1)	1.259	1.459	0.863	0.388
Aid Disbursement	2.250	1.478	1.522	0.128
Aid Disbursement (lead 1)	-0.798	1.459	-0.547	0.585
Aid Disbursement (lead 2)	-0.874	1.444	-0.605	0.545
Aid Disbursement (lead 3)	2.160	1.453	1.487	0.137
Aid Disbursement (lead 4)	-0.939	1.452	-0.647	0.518
GDP (% growth)	2.557e-12	3.712e-11	0.069	0.945
Observations	1,633			
R <sup>2</sup>	.013			
Country fixed effects	Yes			
Time fixed effects	Yes			

Note: This table shows the results of the augmented baseline model with four leads and lags of the disbursement of the aid variable. The dependent variable is the percentage change difference between haven and non haven deposits. "Aid Disbursement" is quarterly disbursement from the World Bank. "GDP" is the quarterly percentage change in GDP.

sample countries.

Table 8 presents the significance of individual banking centers in the regression. Results show that the overall increase in tax havens linked to aid disbursements is primarily driven by Swiss accounts, as shown in column 1. Conversely, responses in Luxembourg, Belgium, and Jersey (combined with Guernsey and the Isle of Man) show statistically insignificant changes, as shown in columns 2, 3, and 4. These findings are consistent with the hypothesis that the surge in tax haven deposits following aid disbursements reflects a diversion towards concealed private accounts. Over 1990-2018, Switzerland stood out globally as one of the largest tax havens, boasting stringent bank secrecy and commanding a share of about 40% of the private wealth management market (Zucman, 2013).

Figure 5: Cross-Border Bank Deposits in Individual Havens (\$ in Millions).



#### 4.4.2 Macroeconomic Shocks

We carried out various tests to ensure the reliability of the relationship between aid disbursements and haven deposits. We systematically excluded observations influenced by significant events such as wars, coups, natural disasters, and financial crises, with corresponding outcomes detailed in Table 9.

Despite substantial sample size reductions resulting from these exclusions due to the



Table 8: Individual Havens.

	Switzerland (1)	Belgium (2)	Luxembourg (3)	Others (4)
Aid Disbursement	2.446* (1.037)	-1.277 (1.293)	3.067 (2.440)	-2.247 (2.376)
GDP Growth (%)	-8.617e-13 (1.619e-11)	-6.117e-12 (1.631e-11)	-9.267e-13 (2.740e-11)	-5.440e-12 (2.137e-11)
Observations	1,630	1,371	1,092	600
R <sup>2</sup>	.025	0.012	.006	.003
Country fixed effects	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes

Note: This table shows the results of the sensitivity analysis of each haven. This specification is equivalent to Table 2 with each column showing the estimates if only one of the havens is included in the regression. “GDP” is the quarterly percentage change in GDP. Standard errors are shown in parentheses.

Table 9: Macroeconomic Shocks

	No War (1)	No Coup (2)	No Disaster (3)	No Financial Crisis (4)
Aid Disbursement	7.239* (3.210)	2.375** (0.932)	-2.835 (6.374)	-2.222 (5.030)
GDP Growth (%)	3.988e-11 (6.849e-11)	-1.184e-12 (1.321e-11)	-3.200e-10 (2.740e-11)	-2.689e-11 (9.146e-11)
Observations	1,761	1,672	1,810	1,811
R <sup>2</sup>	.123	.049	.321	-.171
Country fixed effects	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes

Note: This table shows the results of robustness checks. Each column shows the estimates of the regression equivalent to Table 3 with each column showing the results if the macroeconomic shock does not occur. The dependent variable is the percentage change in foreign deposits held in non havens. “Aid Disbursement” is quarterly disbursement from the World Bank. “GDP” is the quarterly percentage change in GDP. Standard errors are shown in parentheses.

\*  $p < 0.05$ ,

\*\*  $p < 0.01$

frequent impact of such shocks on the main sample countries, the statistical significance of the aid disbursement coefficient perseveres in the absence of wars or coups in recipient countries. Conversely, during periods marked by financial crises or natural disasters, the statistical significance diminishes.

Variables derived from public data exhibit partial robustness compared to confidential data employed by (Andersen, Johannesen and Rijkers, 2022). This discrepancy could stem from the confidential data’s broader coverage of cross-border bank deposits, offering a more

intricate analysis of the aid disbursement and deposit relationship. Moreover, the confidential data may boast superior quality due to rigorous control and cleaning procedures, enhancing reliability.

## 5 Conclusion

Illicit financial flows, encompassing the diversion of foreign aid, present a pressing challenge for developing nations, hindering sustainable development by depriving economies of essential resources (IMF, 2018; Johannesen, Tørsløv et al., 2020). This paper examines the impact of heightened financial transparency on aid diversion, focusing on the alteration in foreign bank deposits linked to aid disbursements in aid-dependent countries from 1990 to 2018. International initiatives, including those by the OECD and the United States, advocating for transparency in tax havens since 2009, have influenced the reduction in bank secrecy. The results reveal the positive effect of global efforts to end bank secrecy, particularly after 2008. Aid diversion is more prevalent in aid-dependent countries with weak governance, emphasizing the correlation with corruption levels (Alesina and Weder, 2002).

The primary challenge lies in identifying causality between changes in haven bank deposits and received aid, entailing the risk of endogeneity regarding foreign aid. Macro shocks, like financial crises, can confound the correlation between aid disbursements and foreign deposits, creating false positives or negatives. To address endogeneity concerns, we conduct heterogeneity analysis and sensitivity tests on classified tax havens, with Switzerland emerging as a significant offshore financial center.

While our research underscores the positive impact of enhanced financial transparency on the correlation between aid disbursements and offshore wealth accumulation, the macro nature of bank deposit data limits precise inference into the driving economic mechanisms. Nevertheless, findings consistently highlight offshore bank account concentration among the economic elite, indicating their role in directing funds to tax havens. The decrease in captured aid, as evidenced by the research, is attributed to offshore leaks since 2008, increasing the exposure risk for figures with undeclared wealth.

Contributing valuable empirical hypotheses to aid effectiveness understanding, the findings have implications for foreign aid allocation, especially in corruption-prone aid-dependent

countries. Additionally, the contribution extends to literature on aid distribution, hidden wealth, offshore leaks, capital flight, and broader research on political corruption.

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