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Université Clermont Auvergne, CNRS, IRD, CERDI,
F-63000 Clermont-Ferrand, France

Evaluating the Impact and Effectiveness of Anti-illicit Financial Flows (IFFs) Policies on Economic Stability and Resources Mobilization in Developing Countries

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Par

Nibontenin YEO

Sous la direction de
Michaël GOUJON et Brou Emmanuel AKA

Membres du Jury

Delphine LAHET	Professeure, Université de Bordeaux	Rapporteure
Yao Séraphin PRAO	Maître de Conférences Agrégé, Université Alassane Ouattara	Rapporteur
Bernard SALOME	Economiste, Expert Finances Publiques, Union Européenne	Suffragant
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Michaël GOUJON	Professeur, Université Clermont Auvergne, CERDI	Directeur de Thèse
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A mes défunts père et mère partis trop tôt…

A mes frères et sœurs

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A mes adorables enfants

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Abstract

The 2030 Agenda for Sustainable Development, in its Target 16.4 call for significant curbing in illicit financial flows and arms flows, as well as the recovery of stolen assets and combating organized crime[1]. Over the years, developing countries have been suffering loss of a large amount of resources compromising their economic performance and the financing of key investments programs. Therefore, efforts have been made at both the global and domestic level to significantly reduce financial crime and better control their adverse effects in the developing world.

The thesis set out to scrutinize the effectiveness of anti-illicit financial flows (IFFs) policies in fostering economic stability and mobilizing resources in developing countries. Spanning several policy frameworks and tools, from international agreements to national regulations, the study aimed to unearth the multifaceted impacts these policies have on curbing IFFs.

Chapter 1 revisits the effectiveness of blacklisting as a policy tool for enhancing cooperation and compliance with anti-money laundering and counter-financing of terrorism (AML/CFT) standards. It examines the changes in illicit financial activities following blacklisting efforts. Tax evasion and money laundering have emerged as significant contributors to illicit financial flows (IFFs) in developing countries. Shell corporations often channel foreign capital flows, driven by harmful tax practices rather than genuine economic activities, resulting in revenue losses for these countries. Despite the implementation of coercive measures, such as the blacklisting of non-cooperative jurisdictions, illicit financial activities continue to erode the tax base in developing countries. This

[1] iff (unodc.org)

chapter applies a propensity score matching (PSM) strategy to a sample of 118 developing jurisdictions over the period from 2009 to 2017 to assess changes in illicit financial activities post-blacklisting. Contrary to expectations, financial restrictions have often resulted in an inverse effect, exacerbating financial crime activities—a phenomenon known as the boomerang effect. The illicit share in capital inflows has increased on average by six percentage points and by 0.7% of GDP following blacklisting. These findings are consistent across alternative matching methods and account for potential hidden biases. We discuss three main points: firstly, blacklists may inadvertently inform tax evaders and money launderers about the most favorable destinations for their activities; secondly, blacklisting can weaken jurisdictions lacking robust regulatory infrastructures, increasing their vulnerability to IFFs; finally, we recommend that the global financial community enhance cooperation with blacklisted countries by providing technical assistance in tax administration, resource mobilization, and technology updates to meet FATF's AML/CFT standards.

Chapter 2 assesses the effect of bilateral information exchange agreements on illicit financial outflows. Despite increased cooperation among jurisdictions to combat IFFs, these flows have intensified and become a major concern, particularly for developing countries experiencing significant outflows. Using a novel non-parametric Difference-in-Differences approach with multiple time periods and controlling for correlates of IFFs, we evaluate the causal effect of these agreements on illicit financial outflows in a sample of 88 developing countries from 2004 to 2013. Our findings indicate that cooperation effectively reduces illicit outflows, but this effect only materializes after at least three years of implementation.

Chapter 3 explores the dual effects of digitalization on financial crimes and resource mobilization in Africa. By analyzing data from 30 African countries over the period from 1995 to 2018,

this study provides valuable insights into how IFFs affect the dynamics of tax revenue mobilization, conditional on information and communication technology (ICT) development. Using a panel data methodology, we find that tax revenue is negatively impacted by IFFs. However, the integration of digital technology mitigates the adverse effects of financial crimes on tax revenue collection. For instance, in scenarios excluding digital technology, capital flight negatively impacts corporate income tax (CIT), which drops by -0.046. Conversely, with technological advancements, the combined effects of ICT and capital flight on CIT turn positive, reaching 0.224. We argue that high digital penetration could serve as a viable alternative to combat illicit capital outflows and thereby enhance tax revenue mobilization.

Chapter 4 revisits the role of capital controls and institutional quality in mitigating the impact of capital flight on key macroeconomic variables. We employ an interacted panel VAR methodology to address several technical issues, including endogeneity, and to capture the effects of shocks and varying stances of capital account policies and governance quality simultaneously. The results suggest that while capital controls have a limited ability to reduce the shocks of capital flight and promote macroeconomic stability, they yield better results when the institutional framework is strong. This highlights the catalytic role of governance in enhancing the effectiveness of capital controls. The implications of these results are twofold: first, they validate the use of capital controls as a stabilizer against the spillover effects of capital flight that undermine the domestic macroeconomic framework; second, they suggest that developing countries should combine capital controls with improved institutional quality to achieve more effective capital account policies.

Résumé

L'Agenda 2030 pour le développement durable, dans sa cible 16.4, appelle à une réduction significative des flux financiers illicites et des flux d'armes, ainsi qu'à la récupération des biens volés et à la lutte contre la criminalité organisée. Au fil des ans, les pays en développement ont subi la perte d'un volume important de ressources, ce qui a compromis leurs performances économiques et le financement de programmes d'investissement clés. C'est pourquoi des efforts ont été déployés au niveau mondial et national pour réduire de manière significative la criminalité financière et mieux contrôler ses effets néfastes dans les pays en développement.

Cette thèse a pour but d'examiner l'efficacité des politiques de lutte contre les flux financiers illicites (FFI) dans l'optique de garantir la stabilité économique et assurer une meilleure mobilisation des ressources dans les pays en développement. S'appuyant sur plusieurs cadres et outils politiques, des accords internationaux aux réglementations nationales, l'étude vise à mettre en lumière les impacts multiples de ces politiques sur la réduction des flux financiers illicites.

Le Chapitre 1 réinterroge l'efficacité de la liste noire comme outil politique pour améliorer la coopération et la conformité aux normes de lutte contre le blanchiment d'argent et le financement du terrorisme (LAB/CFT). Ce chapitre examine les changements dans les activités financières illicites à la suite de l'insertion sur liste noire de certaines juridictions jugées non coopérantes en matière de lutte contre les crimes financiers. L'évasion fiscale et le blanchiment d'argent se sont révélés être des contributeurs significatifs aux flux financiers illicites (FFI) dans les pays en développement. Les sociétés écrans canalisent souvent les flux de capitaux étrangers, motivés par des pratiques fiscales nuisibles plutôt que par des activités économiques réelles, entraînant des

pertes de revenus pour ces pays. Malgré la mise en œuvre de mesures coercitives, telles que la mise sur liste noire de juridictions non coopératives, les activités financières illicites continuent d'éroder la base fiscale dans les pays en développement. Ce chapitre applique une stratégie de jumelage par score de propension (PSM) à un échantillon de 118 pays en développement sur la période de 2009 à 2017 pour évaluer les changements dans les activités financières illicites après la mise sur liste noire. Contrairement aux attentes, les restrictions financières ont entraîné un effet inverse, exacerbant les activités criminelles financières—un phénomène connu sous le nom d'effet boomerang. La part illicite dans les entrées de capitaux a augmenté en moyenne de six points de pourcentage et de 0,7 % du PIB après la mise sur liste noire. Ces résultats sont stables aux méthodes alternatives du PSM et tiennent compte des biais potentiels cachés. Notre analyse permet de dégager trois idées majeures : premièrement, les listes noires peuvent involontairement informer les évadés fiscaux et les blanchisseurs d'argent sur les destinations les plus favorables pour leurs activités ; deuxièmement, la mise sur liste noire peut affaiblir les juridictions dépourvues d'infrastructures réglementaires robustes, augmentant leur dépendance aux flux financiers; enfin, nous recommandons que la communauté financière mondiale renforce la coopération avec les pays mis sur liste noire en fournissant une assistance technique en matière d'administration fiscale, de mobilisation des ressources et de mise à jour technologique pour répondre aux normes LAB/CFT du GAFI.

Le Chapitre 2 évalue l'effet des accords d'échange d'informations bilatéraux sur les sorties financières illicites. Malgré une coopération accrue entre les juridictions pour combattre les flux financiers illicites, ces flux se sont intensifiés et sont devenus une préoccupation majeure, en particulier pour les pays en développement qui connaissent des sorties importantes. En utilisant une approche non paramétrique et dynamique des

Différence de Différences et en contrôlant pour certains facteurs confondants, nous examinons l'effet causal de ces accords sur les sorties financières illicites dans un échantillon de 88 pays en développement de 2004 à 2013. Nos résultats indiquent que la coopération réduit efficacement les sorties illicites, mais cet effet ne se matérialise qu'après au moins trois ans de mise en œuvre.

Le Chapitre 3 explores les effets doubles de la digitalisation sur les crimes financiers et la mobilisation des ressources en Afrique. En analysant les données de 30 pays africains sur la période de 1995 à 2018, cette étude apporte des éclairages sur la manière dont les flux financiers illicites affectent la dynamique de mobilisation des recettes fiscales, dans un environnement marqué par le développement des technologies de l'information et de la communication (TIC). En utilisant une méthodologie de données de panel, nous trouvons que les recettes fiscales sont négativement impactées par les activités financières illicites. Cependant, l'intégration de la technologie numérique atténue les effets néfastes des crimes financiers sur la collecte des revenus de l'Etat. Par exemple, dans des scénarios excluant la technologie numérique, la fuite des capitaux impacte négativement l'impôt sur le revenu des sociétés (IRS), qui chute de -0,046 de points de pourcentage. Inversement, avec les avancées technologiques, les effets combinés des TIC et de la fuite des capitaux sur l'IRS deviennent positifs, atteignant 0,224. Nous soutenons qu'une forte pénétration numérique pourrait servir d'alternative viable pour combattre les sorties illicites de capitaux et permettre ainsi de renforcer la mobilisation des revenus fiscaux.

Le Chapitre 4 réévalue le rôle du contrôle des capitaux et de la qualité institutionnelle dans l'atténuation de l'impact de la fuite des capitaux sur les variables macroéconomiques clés. Nous employons une méthodologie en panel VAR intégrée (IPVAR) pour atténuer plusieurs problèmes techniques, y compris l'endogénéité, et pour bien capter les effets des chocs en tenant

compte des différentes orientations des politiques du compte de capital et de la qualité institutionnelle. Les résultats suggèrent une capacité existante mais limitée du contrôle strict des capitaux à réduire les chocs de la fuite des capitaux sur la stabilité macroéconomique. Toutefois, des résultats meilleurs sont obtenus lorsque le cadre institutionnel est amélioré. Cela souligne le rôle catalytique de la gouvernance dans l'amélioration de l'efficacité des contrôles strictes de capitaux en période forte turbulence économique causée par la fuite des capitaux. Les implications de ces résultats sont doubles : premièrement, ils valident l'utilisation des contrôles des capitaux comme stabilisateur contre les effets de débordement de la fuite des capitaux qui compromettent le cadre macroéconomique interne ; deuxièmement, ils suggèrent que les pays en développement devraient combiner les contrôles des capitaux avec une qualité institutionnelle améliorée pour obtenir des politiques plus efficaces parfois atténuées par les coûts de transaction de mise en œuvre.

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General Introduction

0.1 Context and motivations

The recent summit on the sustainable development goals (SDGs), held in New York in September 2023, highlighted that the lack of financial resources could jeopardize progress towards the SDGs[2].

Resources mobilization is a major challenge facing developing countries to enhance growth and alleviate poverty. According to the United Nations Conference on Trade and Development (UNCTAD 2023), developing countries actually face a staggering $4 trillion gap in sustainable development investments. Such investments are required to finance pro-poor investments in areas of education, wealth, roads and electricity etc. The UNCTAD 2021's World Investment Report underlined investments in digital and green infrastructures as major recovery priorities for developing countries. These investments are assumed to be aligned with SDGs and have high economic multiplier effects that are important for demand-side stimulus. However, the lower level of domestic resources along with the tight financing conditions on external markets are likely to reduce pro-poor investments.

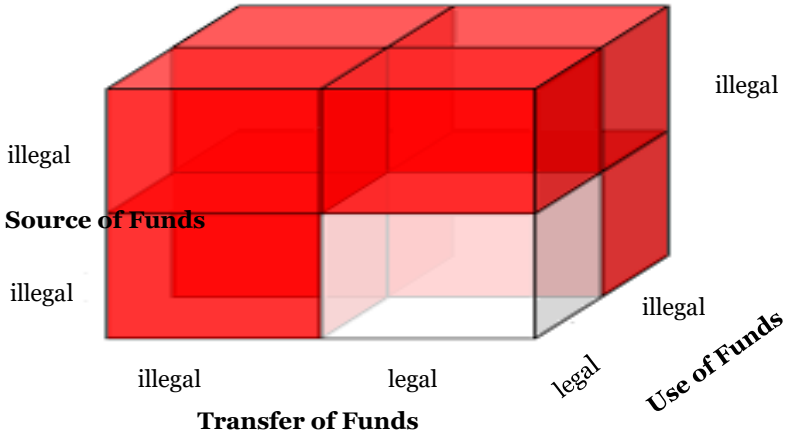
Greater mobilization of domestic resources could promote more investment, stimulate growth and accelerate economic development in these countries. However, the potential of domestic resources remains under-exploited in many emerging markets, as highlighted by the Millenium Challenge

[2] sdgs.un.org/sites/default/files/2023-09/FINAL GSDR 2023-Digital - 110923_1.pdf

Corporation[3] (MCC). According to the World Bank, tax revenues can meet the financing needs of developing countries given their largest share in total resources. The potential of tax revenue in developing countries could reach $5.5 trillion annually (World Bank, 2020). This important source of wealth is therefore crucial to reduce the reliance on external borrowing.

Unfortunately, illicit financial flows (IFFs) drain domestic resources from developing countries thereby compromising SDGs and poverty reduction. The Global Financial Integrity (GFI, 2024) stresses that developing countries loss hundreds of millions (US dollars) of tax revenues due to IFFs. These resources could support sustainable growth in poor countries. Illicit outflows pose a significant challenge for government intervention in the delivery of public goods and therefore dampen public policy effectiveness. These illicit outflows involve the movement of money across borders that is illegal in its source (e.g., corruption, smuggling), its transfer (e.g., tax evasion), or its use (e.g., terrorist financing). Scholars and practitioners generally refer broadly to IFFs as funds illegally transferred or concealed across borders, typically to evade taxes, launder money, or finance criminal activities. As underlined by Chowla & Falcao (2016), IFFs can be characterized across the three distinct dimensions as underlined above and presented in **Figure 1.** The typology of the flow depends on the combination of these dimensions which incorporate legal or illegal aspects. In fact, a cross-border financial flows is considered as licit when it is legal in all dimensions.

[3] Domestic Resource Mobilization (mcc.gov)



Source: Chowla & Falcao, 2016

Figure 1: Three-dimensional definition of IFFs

In fact, money earned illegally is illicit whatever the use (legal or illegal) or transfer. Indeed, funds transferred for illegal purposes such as terrorism financing, bribery or conflict financing are considered illicit (IFFs). However, investors can legally transfer capital abroad to avoid uncertainties like political conflicts or macroeconomic imbalances. Financial flows with illegal sources encompass money laundering, tax evasion, trade misinvoicing, drug trafficking etc. Funds from such criminal activities are illicit even if they are integrated into the real economy for legal use. Otherwise, money that is legal by its origin may be used in illegal activities and then considered as IFFs. This involve terrorism financing, bribery, smuggling, tax avoidance among others.

In practice, several cases of financial crime have arisen in recent decades and are linked to illicit outflows from developing countries. The Panama Papers scandal is a striking case of money laundering that occurred in 2016. This scandal involved

employees of a law firm accused of setting up shell corporates to acquire properties in Panama with money from corruption scheme[4] in Brazil. The Pandora papers[5] was another financial crime occurred in the Pandora island and involved tax evasion and money laundering scheme linked to about 14 offshore services firms from around the world. These offshore services firms set up shell companies and other offshore nooks for clients performing shadows financial activities. Many other cases of financial scandals have been disclosed over the past decades such as the Mauritius leaks, the Swiss leaks etc. However, despite the threats posed by illicit financial flows (IFFs), the lack of comprehensive data for deeper analysis remains concerning. As a result, researchers and practitioners continue to grapple with this issue to better understand and address IFFs worldwide.

The most widely recognized data on IFFs is provided by the Global Financial Integrity (GFI), a Washington, DC-based think tank specializing in financial crime, corruption, illicit trade, and money laundering. GFI's estimations of IFFs are primarily based on trade misinvoicing—a method for moving money illicitly across borders by deliberately falsifying the value, volume, or type of commodities in international commercial transactions. Figure 2 depicts GFI's estimations of IFFs in the developing world. According to these estimates, about US $ 835 billion of illicit financial flows have been recorded in the transactions between 134 developing countries and 36 advanced economies over the period 2009-2018. Similarly, the Tax Justice Network (TJN), an international NGO focused on financial justice also provides IFFs related data. TJN computes

[4] the so-called "car wash"

[5] Investigators worldwide continue to open 'Pandora's Box' to pursue criminals identified in Pandora Papers two years after ICIJ's landmark investigation - ICIJ

estimates of countries' vulnerability to illicit financial flows, which are available on their website. The UNODC and UNCTAD have jointly developed a statistical measurement framework and methodologies to estimate IFFs, focusing on selected illegal market activities. In contrast to the GFI data, these data have limited time coverage and country representation.

The diversity of data related to illicit financial flows underscores the challenge of a unified methodology for accurately estimating the impact of financial crime. Researchers have also explored various approaches to create estimation methodologies.

For instance, Zoromé, (2007), Damgaard et al., (2019), Ndikumana & Boyce, (2001; 2010; 2012; 2018; 2021) have provided estimations and datasets related to IFFs. Ndikumana and Boyce estimate IFFs data based on the concept of capital flight defined as unrecorded capital flows between a country and the rest of the world. They assume that many unrecorded flows result from illicit transactions pursued for a variety of motives, including money laundering, tax evasion and tax avoidance. Capital flight data are widely used in the empirical literature to analyses issues related illicit financial flows. Damgaard et al., (2019) estimate of IFFs are based on the notion of "phantom investments" in the global FDI network. They disentangle real investment and phantom investment in cross-border investments. Phantom FDIs are investments made for the purpose of evading tax or washing dirty money. Their data are freely available and have large country coverage. Otherwise, Zoromé (2007) developed the concepts of offshore financial centers (OFCs) aiming to identify banking secrecy jurisdictions based on (i) primary orientation of business toward nonresidents (ii) the regulatory environment and (iii) the low- or zero-taxation schemes[6]. This methodology has played a

crucial role in identifying numerous tax havens that are siphoning resources away from developing countries. According to Brandt (2023), approximately 10% of the global GDP is held in these tax havens.

To gain deeper insights into the issue of illicit financial flows (IFFs), it is essential to better understand IFFs enabling factors and their related impact on emerging markets.

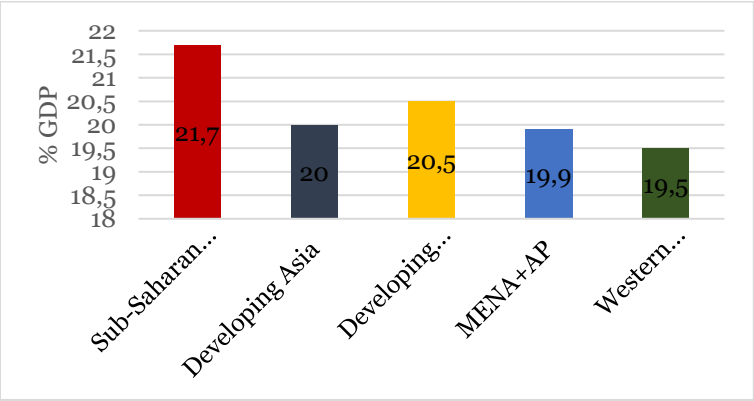


Figure 2: Trade-related illicit financial flows by region as % of total trade , data (2021 GFI report)

0.2 Divers of illicit financial flows

The literature related to financial crimes stressed some factors that are likely to promote finance-related crimes. These factors encompass several aspects at both host and source country level as documented by Abbott, (2000); Perez et al., (2012) and Damgaard et al., (2019) among others.

0.2.1 IFFs Drivers from Host countries (Tax havens)

Tax havens generally offer incentives involving banking secrecy, deregulated financial systems, low taxation, legal protection, and complex professional services industry.

A major feature of almost tax haven consists of providing *secrecy and opacity (lack of transparency)* in financial transactions making it easier for individuals and entities to hide illicit activities such as tax evasion, money laundering, and corruption. In addition to opacity, OFCs are also used to attract tax evaders by providing *low or zero taxation* on certain types of income or assets. As a results, these destinations attract individuals and corporates seeking to evade taxes from their origin countries by funneling money through offshore.

Additionally, multinational corporations often design very *complex corporate structures* to escape controls by tax authorities and evade tax. In fact, highly complex links or relationships between intra or extra-group companies are often used for profit shifting through complex transactions. In such complex structure, shell companies and trusts are often used to obscure the true ownership of assets and disguise the origins of illicit funds. Many companies belonging to this network are used to conceal criminal tax activities and have no productive activity. Damgaard et al., (2019) have argued that cross-border investments by these companies are sometimes phantom FDI, meaning that they do not correspond to any real economic activity. The empirical literature has provided some evidences of the closed link between complexity of Multinational Enterprises and harmful tax practices (Otusanya, 2011; Pacini & Wadlinger, 2018; Kovermann & Velte, 2019;Francois & Vicard, 2023).

Otherwise, the *international financial integration* of tax havens into the global financial system enable their connection to major financial centers and facilitates the movement of illicit funds across borders. As a results, it becomes harder for

authorities to track and recover stolen assets. Johannesen (2012) argues that economic integration makes it easier for multinational firms to circumvent taxes on interest payments to tax havens with conduit loans. Evidently, multinational corporates face strong incentives to shift profit from high corporates taxes countries to tax havens using the complex network in which they perform commercial transactions. Apart from these incentives, domestic countries' instability may also affect MNCs' behavior.

Politically stable states with legal protection frameworks provide a safe haven for individuals and entities engaged in illicit activities to park their assets without fear of seizure or confiscation. In fact, countries facing political disturbances are more likely to threaten businesses and private investment due to the absence of rule of law and effective bureaucracy. As a result, private capital may be subject to confiscation by political authorities. Dharmapala & Hines (2009) analyze factors that influence countries to become tax havens. They documented that better-governed countries are much more likely to become tax havens than others. Political stability is essential for a country's development and social unity. It enables long-term planning, investment, and prosperity, as businesses and citizens can rely on consistent governance and policies. Conversely, low stability increases the risks of abuses and expropriation of assets. In fact, investing in an unstable environment may lead to losses due to new regulations.

Finally, tax havens often have a thriving *professional services industry***,** including banks, law firms, and accounting firms, that specialize in facilitating offshore financial transactions. These professionals may turn a blind eye to the origins of funds or actively assist clients in hiding illicit activities. The described strategies are developed by OFCs jurisdictions to compensate

their economic disadvantages due to natural factors[7] (remoteness, lack of natural resources etc.) as stressed by Abbott (2000). Besides these tax havens attractive strategies, source countries experiencing illicit outflows present some features that also promote illicit financial activities.

[7] Abbott (2000) show that many tax havens and offshore financial centers are small islands economies facing several economic disavantages due to some natural factors such as smallness, remoteness, lack of natural resources etc. The authors also highlighted that there are over sixty jurisdictions worlwide that offer offshore financial services. These OFCs are dominated by SIEs incliding Belize, Vanuatu, Hong- Kong, Seychelles, Mauritus etc.

0.2.2 IFFs enablers in Source Countries

Tax havens attract dirty money from developing countries using some of the above strategies. However, some structural factors in source countries are enablers of financial crimes. The literature highlighted the openness to trade under weak regulation, natural resource dependence, poor governance and institutional quality, inadequate capital account regulation etc. From an empirical perspective, the link between illicit financial flows and the underlined factors is documented in the literature (Basaran-Brooks, 2022; Zallé, 2022; Hanif et al., 2023).

Trade misinvoicing is pointed out by GFI as the largest cause of illicit financial flows in developing countries (GFI, 2024). In such context, good regulation and strong institutional framework repressing such criminal practices are therefore necessary to curb IFFs. Weak regulatory framework and enforcement mechanisms in source countries allow illicit financial activities to flourish with little risk of detection or punishment. This lack of regulation makes it easier for criminals to move money across borders without scrutiny. For instance, Rashid, and al. (2022) empirically assess the role of governance and socioeconomic conditions in curbing tax evasion. Using panel data on developed and developing countries spanning from 2002 to 2015, they find that good governance reduce tax evasion. Therefore, a bad institutional quality can conversely promote tax evasion. So, the perception of tax evaders on the ability of tax authorities to uncover hidden wealth will determine the degree of criminal activities. This is documented by Nimer et al. (2022) who show that people's perception of public governance and institutional quality are core elements that influence tax evasion behavior.

Otherwise, financial crimes are often exacerbated in countries that possess abundant natural resources (Ndikumana & Sarr, 2019; Zallé, 2022). In a report issued in October 2022, the Basel

Institute of Governance (BIG) sheds light on environmental related IFFs in resources-rich developing countries. According to the BIG, the value of timber trafficking and wildlife trade have reached about USD 50–150 billion and USD 7–23 billion per year respectively. The report also shows that loss of resources from illegal unreported and unregulated (IUU) fishing is estimated at USD 10–23.5 billion. Moreover, profit shifting in international banks by public officials of about USD 350 million generated by deforestation over 20 years.

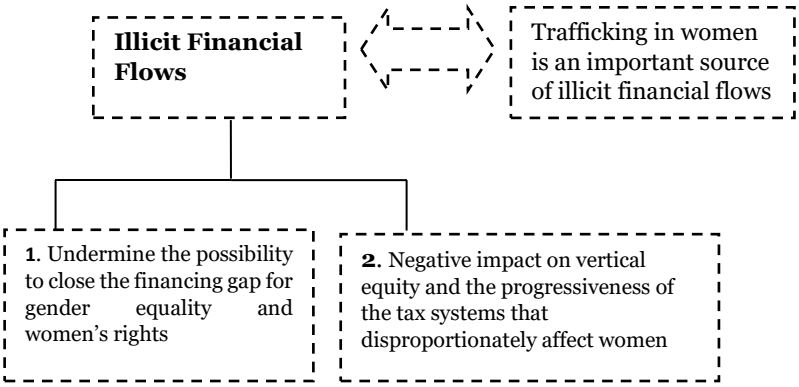
In addition to the aforementioned enabling factors, scholars have emphasized the role of weak and unregulated financial systems in facilitating illicit financial activities (Basaran-Brooks, 2022; Hanif et al., 2023; Cardao-Pito, 2023). The implementation of Anti-Money Laundering (AML) guidelines is intended to enhance the detection and prevention of money laundering and other financial crimes. Lupton (2023) underlines the role banks play in combatting money laundering. He argues that banks can strongly focus on compliance, prevent the use of the proceeds of IWT and identify broader trafficking networks. The banking sector is also well-equipped to develop appropriate platforms to facilitate the swift, easy and effective sharing of financial intelligence between banks at the local, regional and especially at an international level (Lupton, 2023). In general, financial crimes are enabled by several factors which may cause important damages in source countries both at micro and macro level.

0.3 Impact of illicit financial flows in developing countries

0.3.1 Micro-level impacts of IFFs

At the micro level, illicit financial flows (IFFs) disproportionately impact poor households by increasing their tax burden to finance public goods. Unlike the wealthy, poor citizens lack the opportunity to conceal their wealth abroad and evade taxes. Consequently, this situation tends to perpetuate poverty and keep the poorest individuals in more challenging conditions, burdened by the costs of funding public services[8]. Alstadsæter et al. (2019), show that offshore wealth is concentrated among the rich with 0.01% of the wealthiest households evading about 25% of tax and own approximatively 50% of wealth in tax havens. This situation is likely to exacerbate inequalities in developing countries, which are experiencing major capital outflows. According to the World Inequality Report (WIR), the poorest 50% of the population own just 2% of total net wealth, an average of PPP $4,100 per adult in 2021.

[8] Issue Brief A snapshot of illicit financial flows from eight developing countries (final).docx (live.com)

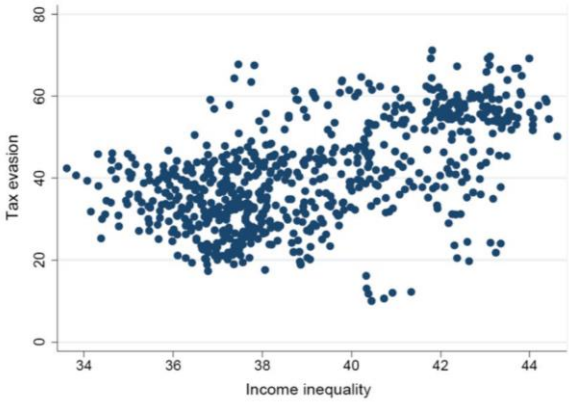


Source : Grondona et al, 2016

Figure 3: IFFs and Gender inequality

Argentiero et al. (2021) analyze the link between inequality and tax evasion in Italy and find a close link between tax evasion and income inequality as shown in figure 4. The authors argue that tax evasion and inequality are cointegrated phenomenon (long term co-movement). In fact, 90 billion euros per year from 2010 to 2014 were evaded while the share of taxpayers declaring an income above 200 hundred euros was only 0.25% of the total. Some of the causal links between tax evasion and inequality in African countries illustrate the harmful effects of financial crime, which undermines household well-being and exacerbates poverty. Relatively to developing countries, Djoyou (2023) provides an illustrative case of the clause link between IFFs and inequality. According to the author, South African's transformational Agenda in the aftermath of the apartheid has been dampened by financial crime. In fact, public resources were evaded in tax havens by corrupt political elites and private

corporates which gave place to massive poverty, unemployment and inequality.



Source: Argentiero et al. (2021)

Figure 4: Correlation between tax evasion and income inequality

The nexus IFFs-inequality is also documented by Oxfam based on the Mauritius leaks. Multinational tax evasion is entrenching poverty and weakening developing country economies, as warned by international agency Oxfam. Developing countries lose an estimated $100 billion to $160 billion annually due to corporate tax dodging[9]. These financial practices divert significant resources that could otherwise be invested in critical sectors such as education, agriculture, and healthcare, which are heavily relied upon by vulnerable populations. Similarly, Ngosa (2022) stresses a close link between IFFs and gender inequality. He argues that IFFs affect women through the lack of funding for public goods and services such as education and

[9] Tax evasion damaging poor country economies | Oxfam International

sexual and reproductive health services, which are mostly utilized by women. As noted, criminal financial activities exacerbated poverty and inequality thereby affecting households welfare. However, financial crimes also have macroeconomic effects.

0.3.2 Macro-level impact of IFFs

At macro level, IFFs undermine countries' economic stability by affecting key macroeconomic variables. According to the IMF, the global institution in charge of world's financial stability, illicit capital outflows have a significant impact on economic stability, not only for the victim country, but also for the global financial system. There is an array of macroeconomic imbalances factors that are caused by tax evasion and other forms of illicit outflows. For instances, the United Nations reported (Report 2022)[10] that IFFs drain foreign exchange reserves, affecting assets prices. Moreover, they distort competition and undermine the capacities of countries to maintain their economic and financial stability. According to Ozili (2020), tax evasion can have negative consequences for a country's financial stability. By reducing the tax revenue available to governments, it weakens their ability to manage the economy effectively and promote stability in financial systems. During the 2007-2008 financial crisis, numerous governments, including those in developed countries (such as the USA, UK, and France), as well as some developing nations during the COVID-19 pandemic, injected rescue funds to prevent economic and financial system collapse. In such context, the

[10] Report produced by Dr. Dan Ngabirano, Founder and Managing Partner of Development Law Group – Africa, and staff members of the UN Office of the Special Adviser on Africa (OSAA). The report is intitled "Tackling Illicit Financial Flows in Africa Arising from Taxation and Illegal Commercial Practices" and available at tackling iffs in tax reform and illegal commercial practices - nov 2022.pdf (un.org)

loss of resources drained by illicit financial activities would have reduced countries' fiscal buffers and undermined the role of governments to prevent financial instability.

Others evidences from empirical studies also highlight the negative effect of IFFs on economic performance. Morris-Cotterill (2001) argues that although the adverse effects of money laundering of economic development are difficult to establish, it is obviously admitted that dirty money damages the financial sector economy by diverting resources, encourages crime and corruption and distorts the trade indicators in the international sector. Similarly, Gulhan et al., (2018) show that in the Republic of Kosovo money laundering is associated with an annual reduction in growth.

0.4 Problem and objective of the thesis

During the 2000s, illicit financial flows become a subject of great interest among policymakers, scholars and several development institutions including NGOs (Johannesen & Zucman, 2014a). Furthermore, the subject has become central to many policy debate related to effective action plan against IFFs. In fact, the 2008's financial crisis rise concerns about the deregulation of the global financial system and the potential consequences of criminal financial activities on the world economy and specifically in poor countries. In the same context, developing countries were experiencing an increasing financing gap with regard to the Millenium Development Goals (MDGs). As a result, the international community firmly committed to crackdown illicit financial activities (Johannesen & Zucman, 2014b). Therefore, in April 2009, the G20 countries and Organization for Economic Cooperation and Development (OECD) set the fight against tax evasion as a political priority. Several institutions (OECD, UNCTAD, IMF, World Bank etc.)

and non-governmental organizations (Oxfam, TJN, FATF etc.) then designed specific agenda against illicit financial flows and their relative criminal activities. These initiatives aimed to shed light on the issue of IFFs and to effectively curb the phenomenon. However, after decades of fighting against financial crimes, many developing countries are still suffering huge outflows. In such context, it has become relevant to question the effectiveness of the different initiatives and policies adopted at both global and country level to tackle illicit financial activities. The purpose of this thesis is therefore to analyze with adapted tools some of the key policy adopted to tackle illicit financial flows in developing countries. Otherwise, this research aims at assessing whether existing policies adopted to combat illicit financial flows in developing countries have worked or not.

0.5 Value added and main findings

This thesis fills a significant gap in literature by examining the effectiveness of existing anti-illicit financial flows (IFFs) policies in curbing financial crimes and enhancing domestic resource mobilization (DRM) in developing countries. While previous research (Igbatayo, 2019; Ofoeda et al., 2022; Gerbrands et al., 2022) has explored the impact of various anti-IFFs initiatives, such as institutional capacities, transparency measures, and cooperation agreements, the effectiveness of these policies in the context of DRM remains understudied and controversial. By evaluating the outcomes of existing anti-IFFs measures on DRM, this research provides a nuanced understanding of the complex interactions between policy interventions and financial governance in developing countries.

The findings of this study have important implications for policymakers, international organizations, and development

practitioners seeking to strengthen anti-IFFs measures and promote sustainable development outcomes. By identifying the strengths and weaknesses of current policies, stakeholders can design more targeted interventions aimed at improving DRM and combating financial crimes effectively. Additionally, the recommendations arising from this research can inform the design and implementation of future anti-IFFs initiatives, including measures related to anti-money laundering (AML), countering the financing of terrorism (CFT), and international cooperation agreements.

Building on the insights gained from this study, future research should explore the specific mechanisms through which anti-IFFs policies influence DRM outcomes in different socio-economic contexts. Moreover, there is a need for comparative studies across multiple developing countries to assess the generalizability of our findings and identify best practices for policy implementation. Additionally, research focusing on the role of emerging technologies, such as blockchain and artificial intelligence, in enhancing anti-IFFs efforts could provide valuable insights into innovative approaches to combating financial crimes and promoting sustainable development.

It is important to acknowledge several limitations of this study, including the reliance on secondary data sources and the potential for measurement errors in assessing the effectiveness of anti-IFFs policies. Moreover, the scope of this research may not capture all dimensions of the complex relationship between anti-IFFs measures and DRM outcomes. Future studies employing mixed methods approaches and longitudinal data collection could provide a more comprehensive understanding of these dynamics.

In summary, this research contributes to the ongoing debate on effective policies to curb financial crimes, enhance DRM and promote economic stability in developing countries by

evaluating the contribution of existing anti-IFFs measures. By providing empirical evidence and actionable recommendations, this study aims to inform policy decisions and promote greater accountability and transparency in financial governance. Ultimately, the findings of this research have the potential to catalyze positive change and foster sustainable development outcomes in developing countries. The first part of the thesis is dedicated to the assessment of international initiatives against illicit financial flows while the second part focus on anti-IFFs measures at the domestic level.

Chapter 1 evaluates the impact of international tax treaties on cross-border illicit financial activities. Tax Information Exchange Agreements (TIEAs) are signed by two countries that agree to co-operate in tax matters by exchanging information to enforce domestic tax laws. After the crackdown initiative set by the international community against tax evasion and other forms of illicit financial flows, many developing countries have signed TIEAs. The chapter assesses the impact of these information sharing agreements on IFFs using a quasi-experimental design. Specifically, we use a recent form of the difference-in-difference (DID) with multiple time periods developed by (Callaway & Sant'Anna, 2021). This methodology is adapted to policy intervention where individuals are heterogeneous in time of adoption of the treatment (policy). It computes the treatment effect for each homogenous group according to their period of adoption. Moreover, this DID provide the dynamic effect of the policy intervention meaning how the treatment effect varies over time. The assessment is based on a sample of 88 developing countries over the period 2004-2013. Our results show that adoption of TIEAs by developing countries reduce illicit financial activities after a third year of cooperation.

Chapter 2 focuses on the effectiveness of the blacklisting mechanism set by some international organizations in order to blame non-cooperative jurisdictions with regard to Anti-IFFs measures. This study employs an impact evaluation methodology and is based on a large sample of 118 developing encompassing backlisted and non-blacklisted jurisdiction over the period 2009-2017. The findings reveals that criminal financial activities explode in blacklisted jurisdictions following their inscription on the blacklist resulting in a boomerang effect.

Chapter 3 is dedicated to a controversial subject related to the capital account policy orientation in time of uncertainty induced by huge capital flight shock. We use an interacted panel var (IPVAR) approach to assess the macroeconomic impact of illicit capital outflows and analyze the difference in the reaction of some macroeconomic variables under different degrees of capital controls. The results show that capital controls can effectively prevent the negative effects of capital flight. Moreover, tight capital controls are more effective when institutional quality is improved.

Finally, Chapter 4 assesses the effect of information and communication technology (ICT) on illicit financial flows and domestic resources mobilization (DRM). We use the Generalized Method of Moments (GMM) to account for the endogeneity issue in order to compute an unbiased estimation of ICT impact on IFFs and DRM. We conclude that digital development in developing countries has a double positive effect. First, digitalization can be helpful in reducing financial crime and second it contributes to enhancing government revenue through domestic resources mobilization.

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PART I:
EFFECTIVENESS OF INTERNATIONAL EFFORTS TO CURB FINANCIAL CRIMES

CHAPTER[11] 1

DOES BLACKLISTING CAUSE A BOOMERANG EFFECT IN COMBATTING ILLICIT FINANCIAL FLOWS? EVIDENCE FROM DEVELOPING COUNTRIES

[11] This chapter is published in "Journal of Financial Crime" ; Does blacklisting cause a boomerang effect in combating illicit financial flows? Evidence from developing countries | Emerald Insight

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Abstract

Tax evasion and money laundering have become important sources of illicit financial flows (IFFs) in developing countries. Foreign capital flows used by Shell Corporates are generally with no real economic activities but motivated by harmful tax practices thereby inducing loss of revenue for developing countries. Despite coercive actions such as backlisting of non-cooperative jurisdictions to AML/CFT standards, illicit financial activities are still eroding tax base in developing countries. This paper applies a propensity score matching (PSM) strategy on a sample of 118 developing jurisdictions over the period 2009-2017 to evaluate change in illicit financial activities following the blacklisting. The results show that rather than altering illicit inflows in blacklisted countries, financial restrictions have produced the inverse thereby causing a boomerang effect on financial crime activities. The illicit share in capital inflows increases in average by 6 percentages points and 0.7 percent of GDP following the blacklisting. These results are robust to alternative matching methods and to the hidden bias problem. First, we argue that the list can serve as source of information for tax evaders and money launderers about the most favorable destinations for their illicit financial activities. Second, blacklisting can fragilize jurisdictions that do not have strong regulatory infrastructures or resources to enact the FATF's AML/CFT standards thereby increasing their vulnerability to IFFs. Finally we recommend the global financial community reinforce cooperation with blacklisted countries by providing them with more technical assistance in tax administration, domestic resources mobilization and updating their technological resources to enact the FATF's AML/CFT standards.

***Keywords**: tax evasion, illicit financial flows, FDI, blacklisting, developing countries.*
JEL Classification: C33, F21, H26, K34

1.1 Introduction

The Addis-Ababa Agenda and the 2030 Agenda for sustainable development have stressed the need for a global commitment to alleviate poverty around the world and specially in developing countries. However, there is still a gap between the available resources to achieve the Sustainable Development Goals (SDGs) and the actual financing needs. According to Gaspar et al., (2019), the overall financing gap for the 2030 SDGs is around USD 2.5 trillion and represents 15% and 4% of GDP additional spending per year respectively for low-income countries and other developing countries[12]. The Organization for Economic Cooperation and Development (OECD) emphasized that this gap was expected to increase in 2020 from USD 2.5 trillion to USD 4.2 trillion due to an initial USD 700 billion drop in external private finance[13] and an emergency public spending gap of USD 1 trillion in developing countries. In 2021, the SDGs financing gap in developing countries increased by 50% (USD 1.2 trillion) (OECD). Hence, the international community and the G20 committed to address the challenge of the SDGs financing needs in developing countries. In 2017, a set of performance indicators were developed by the UN to monitor the progression of SDGs towards the targets. According to the UN Conference on Trade and Development (UN-CTD), the financing gap of SDGs is exacerbated by the issue of capital flight from developing countries. Capital flight erodes domestic resources from developing countries thereby increasing reliance on external funds.

The UN-CTD emphasized that stopping clandestine capital flight could almost fill the financing gap in Africa because around USD 88.6 billion of illicit money and assets leave the African continent every year. These important amounts of illicit flows can equalize both the total official development aid and the annual international investment inflows in Africa. These external funds are estimated at around USD 54 billion between 2013 and 2015 (UNCTAD). Therefore, tackling capital flight represents a huge

[12] The financing needs are estimated at around US$ 500 billion for low-income countries and US$ 2 trillion for other developing countries (Gaspar et al., 2019).
[13] Remittances, FDI, portfolios flow, etc.

potential for much-needed investment in areas such as infrastructure, education, health and productive capacity. Given that developing countries have experienced debt distress and reduced fiscal buffers due to the COVID-19 pandemic, the drawbacks of capital flight have become recently more accurate (Gaspar et al., 2019). For instance, the recent fall of major domestic tax resources like corporate tax income while public expenditures increase resulted in growth in the fiscal deficits leading to upward borrowing costs and financing constraints on financial markets.
In such context, effective tax reforms can fill the resources gap and break the reliance on external borrowing. However, illicit financial flows (IFFs) pose serious threats to domestic resources mobilization in many developing countries (Combes et al., 2021), inducing lags on the achievement of the Addis Ababa development 2030 agenda.
IFFs represent a significant loss of revenue due to their multi-dimensional features and stem from several channels including illicit and licit activities being used in an illicit way. . For instance, concealing assets, income or information to dodge liability typically constitute tax evasion. These aggressive tax plans aimed at exploiting mismatches and loopholes in the domestic and international tax framework to reduce the overall tax burden. According to the UN agencies, IFFs are illicit flows in origin, transfer or use and reflect a cross border exchange of value. Thus, IFFs are not pure financial transactions, rather they are characterized by an exchange of value.

The main issues when analyzing illicit financial flows are related to their definition and measurement. The measurement and definition of illicit financial flows remain an unconclusive debate among academics and policy makers. However, there is a general concensus about the main characteristics of IFFs regarding their origin, destination and use. Generally, illicit financial flows are defined as cross-border mouvement of money and assets which are illegal in their origin, transfer or use. Many FDI tend to be illegal in their origin because immediates or ultimates investors evade tax in origin countries or have earned funds from illegal activities. In 2017, the Statistical Task Force set up by UNDOC and

UNCTAD for proposing a methodology to measure IFFs identifies four main types of IFFs based on the system of national accounts (SNA) and the balance of payments. Tax evasion and avoidance, corruption related IFFs such as bribery, money laundering and terrorism financing are among the main types of illicit financial flows. Besides, some scholars proposed different approaches of illicit financial flows. For instance, Ndikumana and Boyce (2012) estimated capital flight using the "residual difference" approach. In this approach capital flight is computed as the difference between two factors that are positive (external debt, net FDI and trade misinvoicing) and negatively (current account deficit and the change in international reserves) related to capital flight. Johansen used the concept of phantom FDI which cross-border investments that have no link with real economic activities but used for the purpose to evade tax. The Global Financial Integrity estimated IFFs using trade misinvoicing which is also close to the residual approach. Illegal

The complexity of IFFs due to their pervasiveness dampens appropriate actions against them. Therefore, IFFs remain a challenge causing serious threats to economic progress in developing countries.

Yet, the UN and the global community have committed to significantly reducing illicit financial flows (IFFs) (target 16.4. of SGDs) by 2030. Global standards have been identified to prevent cases of money laundering, tax evasion and all forms of illicit financial flows[14]. The Financial Actions Tasks Force (FATF) has set anti-IFFs standards to promote effective implementation of legal, regulatory and operational measures for combating money laundering, tax evasion and terrorist financing and other related threats to the integrity of the international financial system. Since 2000, FATF has been issued the list of non-cooperative countries or territories (NCCTs). According to the intergovernmental institution, NCCTs pose serious threats to the global financial community by violating international standards and laws. As a result, by blacklisting non-cooperative jurisdictions, the FATF expect to pressure the governments of

[14] Several international organizations and NGOs such as the World Bank, the OECD, the Financial Action Task Force (FATF), Tax justice Network (TJN) Oxfam, the GFI are engaged to combat IFFs for se.

listed countries to introduce regulations that are compliant with the FATF's anti-money laundering and countering terrorism financing standards (AML/CFT) (FATF, 2022). Since then, a blacklist of non-cooperative jurisdictions is periodically issued with countries being added or dropped from the list. Notwithstanding this coercive regulatory policy, illicit financial are still causing damages in developing countries by generating important loss of government revenue. In addition, blacklisted countries continue to promote harmful tax and financial activities despite the potential risk of sanctions that they may support. This paper aims to assess the blacklisting effectiveness as a coercive policy against illicit financial activities. The reminder of the paper is as follows. The next section gives a review of the literature on illicit financial flows and situates the debate on the strategies adopted to counter IFFs. Section 2 presents the data and some stylized facts. Section 3 gives the methodology used to assess the blacklisting effectiveness. The results are analyzed in section 4. In section 5, we conclude with some policy recommendations.

1.2 Literature Review

This section highlights the economic debate on the issue of illicit financial flows and the international actions aiming to combat IFFs. It focuses on IFFs related to capital account where FDI and other international financial flows are used illegally for tax evasion and money laundering.

1.2.1 FDI and illicit financial flows

The role of FDI in facilitating tax evasion and capital flight has been widely documented in economic literature (Perez et al., 2012; Jones and Temouri, 2016; Edoun et al., 2016; Atems and Mullen, 2016; Merz et al., 2017; Owens et al., 2018; Damgaard et al., 2019; Siranova et al., 2021). Perez and al. (2012) examine the role of FDI in facilitating money laundering and illicit financial flows in transition economies and find that up to 10% of total FDI outflows and 20% of FDI to tax havens are connected with illicit money flows. They estimate a bilateral FDI model from transition economies to host countries around the world and argue that outflows from transition economies are fueled by tax evasion and money laundering behavior. Jones and Temouri (2016) agree that FDI in tax havens is motivated by tax evasion however they do not share the argument that firm tax strategy is reactive as argued by Oxelheim et al. (2001). Rather, they believe that these tax strategies can be used to exploit differences in tax treatment and avoid double taxation of the corporate income.
Siranova et al. (2021) used FDI and capital flows of the public sector (external debt) to estimate illcit financial flows in Europe using a Net Errors Omissions (NEO) model. For instance, Edoun et al. (2016) explain that most FDI inflows in Africa are a modus operandi behind tax evasion. Similary, Merz et al.(2017) find that host country regulation policy and the corporate taxation affect negatively the investment destinantion of financial sector FDI. Looking for competive tax destinations is not bad per se in terms of international investments. Indeed, low taxation is profitable for firms since it reduces production costs (Jones and Temouri, 2016). However, when tax optimization become the center piece of the corporate

strategy it may lead harmful tax practices. As a results, FDI have become a priveleged channel of illicit financial flows. Many foreign corporates use empty shell subsidiaries with no physical presence to evade tax. Damgaard et al. (2019) find that phantom investment into corporate shells with no substance and no real links to the local economy may account for almost 40% of global FDI. The authors disentagle FDI into two types namely phantom FDI and real FDI. Phantom FDI are closelly related to illelegal financial activities such as tax evasion or money laundering. In this paper, we adopts the concept of phantom FDI as IFFs which are detrimental for both origin and destination countries (Damgaard et al.,2019).

1.2.2 Combatting illicit financial flows with coercive policy: The blacklisting effectiveness

The effectiveness of economic sanctions or coercive measures led by international organizations has been explored in both political science and economic literature (Peksen, 2019; Choi and Luo, 2013; O'Driscoll, 2017 ; Masciandaro, 2005; Kudrle, 2009; Balakina et al., 2017). Many studies have focused on sanctions' effects on democracy, human rights restoration and fighting terrorism. The majority of these works conclude that economic sanctions have failed to address the problems justifying their imposition. For example, Neuenkirch and Neumeier, (2016) and O'Driscoll (2017) show that US economic santions adversely affect the poor of targeted countries rather than curbing terrorism, restoring democracy or briging regime change. However, Peksen, (2019) assumes that these conclusions may be biased by omiting variable and methodological issues. Peksen argues that such problems could lead to a partial understanding of the specific role of sanctions in shaping the outcome of foreign policy initiatives.

Coercive measures are imposed as foreign policy tools by major powers or international organizations in order to force a targeted jurisdiction to comply with international norms and laws by adopting sectoral reforms (economic reforms, financial transparency etc.). Such measures may vary

accordingly with threats posed by the target on the sender or on the global community. In the financial sector, the AML/CFT standards were set by the global financial community and led by the Financial Action Task Force to combat money laundering, tax evasion and other illegal financial activities connected with terorism. Notwithstanding the relavant contribution of FATF regulatory standards in increasing transparency in the financial sytem (Ofoeda et al., 2022), its blacklisting policy is still questioned (Masciandaro, 2005; 2008; Kudrle, 2009; Balakina et al., 2017).

Since 2000, the FATF has proceeded to the blacklisting of non-cooperative jurisdictions that do not contribute to the gblobal effort against money laudering and tax evasion. The idea behind this policy is to coerce blacklisted countries with an intense international financial pressure to conform to AML/CFT standards. In fact, these stricter financial regulations imposed on the blacklisted jurisdictions aim to induce shift in resources and services thereby accelerating the countries compliance. Masciandaro (2005) assumes that blacklisting is more likely to work when it induces a *stigma or shame effect* that will force the blacklisted country to comply. However, this stigma effect may not work if the induced costs for the blacklisted country are lower than the costs of compliance (Balakina et al., 2017). For instance, Weisberg (2006) and Peksen (2019) have pointed out that in a dictatorship regime the stigma effect will not work because in such contex it will be easier for the dictator to put the blame on external enemies for country's suffering sanctions. Peksen (2019) assumes that a single party or a military regime is unlikely to capitulate under sanctions because the costs of stigma effects are lower. Moreover, Balakina et al., (2017) argue that blacklisting may not work if lax financial regulations are policy choice of non-compliant jurisdictions and provides more advantages (see also, Unger & Rawlings, 2008; Gnutzmann et al., 2010). For example, in the case of small islands (SIEs), Hampton & Christensen (2002) analyse why many SIEs become offshore finance centers (OFC). The authors argue that these states are offshore financial center because of barriers to diversification arising from their smallness and remoteness. Therefore, these natural constraints have pushed many SIEs to attract international capital flows

with banking secrecy therby neglecting international financial standards and laws. In such conditions the stigma effect become obviously ineffective and blacklisting cannot exhert the expected effect of coercion-to-compliance. However, the arguments that blacklisting does not work is not unanimously shared by all scholars in economic literature. Masciandaro (2013) analyses the international financial flows in Latin America in oder to assess the direction and the existance of the so called stigma effect. Conversely to previous studies, the author find that blacklisting affected both capital inflows and outflows. Besides, Collin (2020) find a mixed results about the potential effect of blacklisting on adopting tax governance reforms.

Previous studies have focused only on the stigma effect and do not take into account that international financial standards and laws aim to tackle specifically illicit financial activities. In fact, AML/CFT standards aim to curtail illicit financial transactions by promoting more transparency in the financial sector. This paper will fill this literature gap by analysing the capacity of blacklisting to stop inflows of illicit funds towards a blacklisted jurisdiction. Mainly we analyse the ability the FATF's corecive policy to break the illicit financial inflows. As such, the stigma effect is not the goal per se of the blacklisting.

1.3 Data

This section describes the different variables and data sources used in the current chapter.

1.3.1 Variables and data source

This empirical analysis is conducted on a large sample of 117 developing and emerging countries over the period 2009-2017. The sample was constructed based on phantom FDI and FAFT's blacklist data availability which are respectively the dependent and interest variables. Among the selected countries 29 have been blacklisted by the FATF at least once and 88 jurisdictions have never been blacklisted. The first blacklist of non-cooperative jurisdictions was issued by the FATF in 2000. Since then, the list is periodically revised by adding new non-compliant jurisdictions and dropping jurisdictions that become compliant with AML/CFT standards after regular assessments.

We use data on such FDI from Damgaard and al., 2019 who called these type of cross-border investment phantom FDI. Generally, shell corporates are characterized by few or no employees, little and no production in the host economy, little or no physical presence, with assets and liabilities which are generally vis-à-vis non-residents and which core activities is for group financing or holding activities (OECD, 2008).

Phantom FDI were estimated based on several sources of FDI data namely the IMF' coordinated direct investment survey (CDIS), the OECD *FDI statistics* and the global firm database Orbis which includes accounting and ownership information for millions of corporates entities at the unconsolidated level. The methodology of Damgaard and al., 2019 consisted of decomposing the total inwards of FDI into real and phantom components. If such decomposition already exists for some countries it is used as *de facto* if not it is computed based on the methodology adopted. In fact, the authors established a linear relation between the share of phantom FDI in the total FDI and the share of FDI to the GDP. Based on

information from data the authors argue that countries with a high share of FDI to GDP have a low share of real FDI in the total FDI and vis versa.

The control variables are potential determinants of a country's blacklisting status vis-à-vis the FATF standards and also determinants of the harmful tax practices. Following the literature, we assume that the common characteristics of non-cooperative countries related to international tax and financial standards are factors like the level of financial development, the tax administration performance, the macroeconomic framework and the governance. These factor also influences the degree of illicit financial flows related to each jurisdiction.

In term of financial development we use financial market index (FM) from (Svirydzenka, 2016). The financial market index is a composite index that takes several dimensions of financial development such the depth, access, and efficiency. This index better assess the level of financial market development than the single dimensional index of credit to GDP index. This later proxy of financial development based on credit provided by banks or the financial sector to the private sector tend to capture only access to the financial sector and omitting other aspects.

In term of tax administration performance we use indicators such the government revenue from corporate tax, income tax and the overall tax revenue extracted from *the World Development Indicators* database (World Bank). These indicators reflect be ability of a jurisdiction to collect tax and reduce tax evasion, tax avoidance and corruption. The higher the tax revenue collected on corporates or individuals' income the better is the tax administration in the fight against illicit financial flows. As a results the level of tax revenue is expected to be negatively correlated with tax evasion in a performant tax administration framework. Generally the level of corporate and individual income tax is weak in Tax haven of offshore international financial centers (OFC). Moreover, a tax havens or an OFC jurisdiction is more likely to be blacklisted by the FATF. Income tax reflect taxes on income, profits, and capital gains that are levied on the actual or presumptive net income of individuals, on the profits of corporations and enterprises, and on capital gains (WB, 2022). While corporate tax corresponds to tax paid by a Corporation on its profits. These taxes are

levied on the corporate's taxable income which includes revenue deducted from operating costs.

The macroeconomic variables used in this paper include the GDP and the debt to GDP ratios. For GDP, we use the growth rate which expresses the increase in country's wealth. Wealth accumulation in a country could make such a country more attractive to external capital flows thereby increasing the risk of illicit financial practices. As a result, GDP growth may be positively correlated to practices such as money laundering, tax evasion and terrorism financing. However, this may not be a general truth. In fact, wealth accumulation could also mean that a jurisdiction is enhancing its technological progress which can allow a better administration of tax and increase its ability to counter illicit financial flows. In that case, GDP growth can be negatively correlated with illicit financial flows and the probability of being blacklisted. We used nominal GDP to normalize our phantom FDI data. This normalization was made in order to correct the heterogeneity related to the size of the jurisdictions. In fact, the econometric technic applied in this paper requires comparability among individuals. Therefore, by dividing FDI inflows by GDP correct for this heterogeneity such that our results will not depend on the performance of big size entities. In addition, we also use control for the public debt size .

Finally, we control the quality of governance by using several indicators from the 2021 updated *Worldwide Governance Indicator* database. The relation between governance, tax evasion and illicit financial activities is well documented in economic literature. In fact, low quality of governance fuel tax evasion and illicit financial flows. As a result, countries with worse governance level are likely to authorize harmful tax practices and so be backlisted for non-compliance to the AML/CFT. The governance indicators used here are corruption, rule of law, voice and accountability, regulatory quality, government effectiveness and political stability,. These variables are interchanged for a search of sensitivity analysis. Governance indicators range between -2.5 (weak performance) and 2.5 (good performance). The quality of governance is expected to be negatively correlated with the blaclisting. Indeed, jurisdiction with good governance quality will have a low probability of being blacklisted.

1.3.2 Some stylized Fact

The statistical analysis performed on data highlighted important information about the dynamic of tax related FDI inflows over the overall period of study and among jurisdictions (blacklisted and non-blacklisted). Figure 1.1 shows evolution of the average share of phantom FDI inwards in the total inflows of FDI. From 2009 to 2017 developing countries experienced an upward trend in phantom FDI inflows. The higher value of phantom FDI for the sample is 91.7% of the total inflows of FDI experienced by Mauritania in 2016. This level of phantom FDI seems surprisingly high giving the historical low level of foreign investment to Mauritania (UNCTAD).

In 2016, FDI inflows in Mauritania was around 4.23% of GDP. These statistics confirm the arguments of Damgaard and al., 2019 that phantom FDI is higher for jurisdictions where the ratio of FDI to GDP is weak. According to the UNCTD most investments in Mauritania are directed to telecommunication, oil exploration and exploitation, mineral mining of gold and iron which generally show high risk of tax harmful practices.

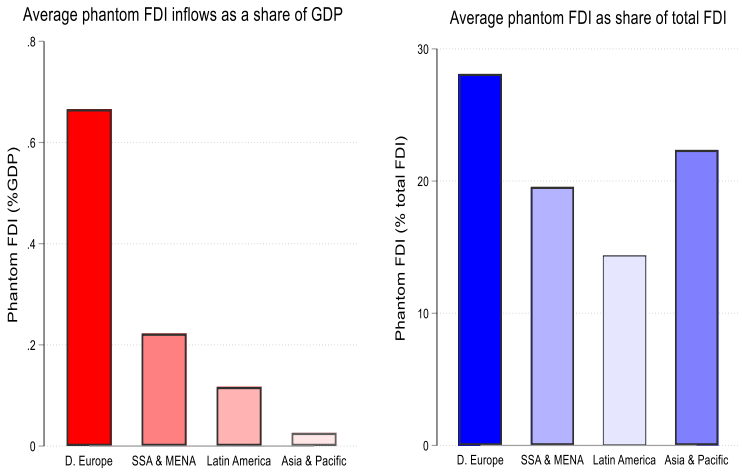

Figure 1.1: Share of phantom foreign direct investment by world region

As highlighted by Figure 1.1 show that on average, developing Europe is the most affected region by phantom FDI both in terms of FDI share (29%) or GDP (0.7%). Sub-Saharan Africa and the MENA region follow with more than 0.2% of GDP on average and about 20% of FDI inflows. The Asia & Pacific region rank last in term of phantom FDI as a share of GDP but has the second higher ratio in term of total FDI inflows. This situation may stress the size effect of some jurisdictions in this region. For instance, China and India are two large countries with important gross domestic product. However, these data reveal that countries in this world region are also highly affected by tax motive international capitals. The share of phantom FDI inflows in China for the period 2009-2017 range in [44.42%; 52.17%]. For India, phantom FDI between [35.68%; 41.67%][15]. Figure 1.2 compares phantom FDI inflows between blacklisted and non-blacklisted jurisdictions

[15] The value of phantom FDI inflows is 9.77 % in 2009. Here we just give the value from 2010 to 2017 because the value in 2009 is an outlier.

before and after the blacklisting. Panel (a) shows that phantom FDI in total FDI inflows is most important in blacklisted than in non-blacklisted jurisdictions. Most backlisted countries have value of phantom FDI inflows between [9%; 38%] while in non-blacklisted the range is [7% ; 25%]. These figures show that blacklisted jurisdictions are among preferential destination of illicit financial flows and explain why they are more likely to appear on FATF's blacklist. Panel (b) compares the blacklisted jurisdictions before and after the blacklisting. The box plots highlights that the median value of phantom FDI is about 10% before the blacklisting but it reached more than 20% after the blacklisting. After the blacklisting, most of the jurisdiction experienced phantom FDI ranging between [10%; 38%] of total FDI inflows. Yet, before the blacklisting the distribution of phantom FDI inwards lied between [5%; 24%] of FDI inflows.

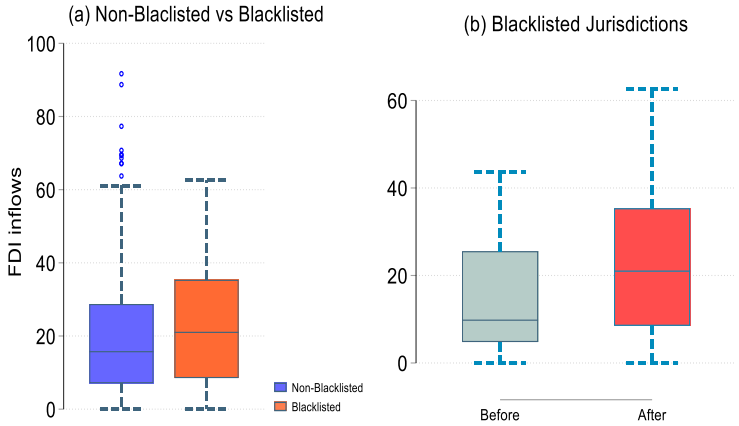

Figure 1.2: Distribution of phantom FDI for blacklisted and non-blacklisted

The statistical analysis shows that phantom FDI inflows is higher in blacklisted jurisdictions than non-blacklisted ones. Moreover, phantom foreign investments tend to increase in jurisdictions following the

blacklisting. This assumes that blacklisting may induce an upward effect on illicit financial activities. Therefore, these insights need to be tested econometrically with rigorous methodology

1.4 Methodology

This section describes the model used to assess the causal effect of blacklisting on IFFs related FDI. We consider the blacklisting by the FATF as the "treatment". Our parameter of interest is the average treatment effect on the treated (ATT) which is most popular in the evaluation literature (Caliendo and Kopeinig, 2008). ATT is defined as the difference between the mean of the outcome for the treated group and the mean of outcome for the same group without the treatment. It gives the following equation:

$$ATT = E[Y_{it}(1) - Y_{it}(0)] = E[Y_{it}(1)|D = 1] - E[Y_{it}(0)|D = 1] \quad (1)$$

D=BLACKLIST: represents the treatment variable namely the blacklisting taking 1 for the treated group and 0 for the control group;

$Y_{it}(1)$ is the Phantom FDI (PFDI) after the treatment ; $Y_{it}(0)$ is Phantom FDI (PFDI) before the treatment for country i at time t. For ta sake of simplicity we will use the undefined terms in the following equations.

$E[Y_{it}(1)|D = 1]$ is the mean outcome for the treated group after the treatment and $E[Y_{it}(0)|D = 1]$ is the outcome mean for the control group after the treatment.

The problem is that this second term is not observed because the control group must be identical to the treated group had it not been treated. In fact, $Y_{it}(0)|D = 1$ is the level of phantom FDI for the blacklisted group had it not been blacklisted. As a result, a solution is to use a proxy which may be the outcome for a never blacklisted group. This is given by:

$E[Y_{it}(0)|D = 0]$ (2)

By using (2) in (1) we get:

$$E[Y_{it}(1)|D = 1] - E[Y_{it}(0)|D = 0] = ATT + E[Y_{it}(0)|D = 1] - E[Y_{it}(0)|D = 0] \quad (3)$$

We obtain a bias estimate of treatment effect with $E[Y_{it}(0)|D = 1] - E[Y_{it}(0)|D = 0]$ as the bias. Taking a control group which is not strictly identic the treated group lead to the selection bias problem.
The challenge is to construct $Y_{it}(0)|D = 1$ based on two strong assumptions.

The first is the *conditional independence* or the selection on observable assumption (CIA) and the second is the overlap assumption. The CIA assume that given a set of observables (X) uncorrelated to the treatment, the potential outcome is independent to treatment. In addition, the assumption implies that systematic differences in outcomes between treated and comparison groups that have the same values of covariates are attributable to treatment. The *conditional independence* assumption is given by: $Y_{it}(1),\ Y_{it}(0) \perp\!\!\!\perp D|X,\ \forall X$ (4)
It implies that the FATF puts jurisdictions in the blacklist only based on observables characteristics and there is any unobservable variable that influence the blacklisting process. However, conditioning the blacklisting on a large set of variables may cause a dimensionality problem. Rosenbaum and Rubin (1998) suggest matching individuals based on their propensity score which are the probability to participate in a treatment conditional to observed characteristics. So in equation (4) we replace the conditional term ($D|X_{it}$) by $D|P(X_{it})$.

The second assumption is the *overlapping assumption (OA*) which assumes that there are individuals both in the treated group and the control group that are comparable. In this case, we assume that in our sample, backlisted countries are comparable to some non-blacklisted ones.

$$0<P(D = 1|P(X_{it})<1 \qquad (5)$$

The OA implies the any individual with observable characteristics X can be selected for the treatment. The use of these assumptions aims to mimic the blacklisting as a random procedure.
Under this two strong assumptions, ATT can be written as follow:

$$ATT = E[Y_{it}(1)|D = 1, P(X_{it})] - E[Y_{it}(0)|D = 1, P(X_{it})] \qquad (6).$$

We rewrite ATT with our treatment and outcome variables which gives the following:

$$\mathbf{ATT} = \mathbf{E}[\mathbf{PFDI}_{it}(\mathbf{1})|\mathbf{BLACKLIST}_{it} = \mathbf{1}, P(X_{it})] - \mathbf{E}[\mathbf{PFDI}_{it}(\mathbf{0})|\mathbf{BLACKLIST}_{it} = \mathbf{1}, P(X_{it})] \quad (7)$$

The matching of entities in the treated group and the control group can be done using several approaches including

1.5 Results

This section provides the estimates of average treatment effects of blacklisting on phantom FDI inflows, defined as the share of FDI inflows motivated by financial or tax abuse. The following provides baseline results and robustness analyses used to support the validity of the findings.

1.5.1 Baseline results

This subsection gives the estimations of the propensity scores and the results from the matching.

a-Estimation of the propensity scores

We estimate the propensity scores of being blacklisted with a Probit model on panel data. The choice of the variables in the model is based on five classes of variables that affect the FATF listing policy. These groups of variables are related to financial development, the country's tax and fiscal policy, the macroeconomic environment, the natural resources endowment and the quality of governance.

Table 1.1. Probit estimates of the propensity score of being blacklisted

Treatment: Blacklisted	**[1]**	**[2]**	**[3]**	**[4]**	**[5]**	**[6]**
Financial Dev.	2.635***	1.535***	1.726***	1.860***	2.412***	2.257***
	(0.504)	(0.476)	(0.455)	(0.456)	(0.475)	(0.458)
Lresource_rents	-0.102*	-0.027	-0.043	-0.080	-0.095	-0.074
	(0.060)	(0.055)	(0.055)	(0.055)	(0.059)	(0.059)
Lgdpth	-0.194**	-0.211**	-0.226**	-0.202**	-0.208**	-0.213**
	(0.098)	(0.098)	(0.096)	(0.099)	(0.098)	(0.097)
Lincome_tax	0.962***	0.787***	0.888***	1.010***	0.965***	0.861***
	(0.230)	(0.215)	(0.222)	(0.233)	(0.232)	(0.221)
Lagricult_gdp	0.288*	0.290*	0.326**	0.217	0.321**	0.342**
	(0.149)	(0.150)	(0.146)	(0.153)	(0.149)	(0.146)
Corporate_tax	-0.201***	-0.214***	-0.234***	-0.229***	-0.240***	-0.223***
	(0.074)	(0.074)	(0.073)	(0.076)	(0.075)	(0.071)
Ldebt/gdp	-0.008	0.021	0.012	0.183	0.175	-0.098
	(0.169)	(0.167)	(0.165)	(0.182)	(0.183)	(0.164)
gov. effectiveness	-0.774***					
	(0.229)					
political stability		-0.327***				
		(0.121)				
voice and account.			-0.320***			
			(0.124)			
corruption				-0.824***		
				(0.199)		
rule of law					-0.746***	
					(0.205)	
regulatory quality						-0.490***
						(0.183)
_cons	-2.918***	-2.451***	-2.597***	-3.463***	-3.603***	-2.305***
	(0.770)	(0.729)	(0.726)	(0.814)	(0.856)	(0.731)
N	481	481	481	481	481	481
Pseudo R2	0.112	0.101	0.099	0.132	0.117	0.101

Note: Standard errors in parentheses. *p<0.10, **p<0.05, ***p<0.01.

Table 1.1 gives the estimates of each variable on the probability of being blacklisted. Most of the variables are statistically significant with the expected signs. For instance, the financial sector development increases the probability of being on the FATF's list. In fact, this findings confirm the reality of many jurisdictions, especially small islands that create offshore financial centers by providing money launderers and tax evaders with competitive banking secrecy. Indeed, most of the jurisdictions identified as tax havens experienced a rapid development of their financial sector by attracting cross-border capital flows. The estimated coefficient for total natural resource rents is negative.

This highlights that transparency in the extractive sector is a good signal for a jurisdiction in making efforts to comply with international standards and laws thereby decreasing its probability of being blacklisted. Surprisingly, the coefficient for income taxation is positively related to blacklisting while, corporate taxation is negatively associated with the presence in the blacklist. The results show that GDP growth and the government debt affect differently the probability of being blacklisted. While economic growth tends to decrease the likelihood of being blacklisted, public debt overhang increases it. In fact, it is widely documented that external debt flows foster corruption and illicit financial flows. Therefore, the more external debt flows increase, the more likely the country is to be corrupt and blacklisted. The relation between governance and blacklisting seems intuitive. For instance, less corrupt jurisdictions will face lower costs of compliance than more corrupt ones for which the costs of compliance may be too high. As a results, corruption will tend to decrease the level of compliance to AML/CFT standards. This adverse effects of corruption on the degree of compliance also applies for rule of law or political stability etc. Basu & Li (1996) illustrated how bad governance can undermine tax reform using a case study of Chinese reform.

Our results confirm these presumptions that governance is negatively related to blacklisting[16]. Therefore, jurisdictions experiencing bad quality of governance are more likely to be backlisted. The pseudo R^2 computed from the regression is around 10% indicating that our regressors explain well the probability of being blacklisted.

1.5.2 Results from the matching

To ensure that the matching results are accurate, we analyze some conditions of validity of the match. Indeed, given that the participation to the treatment is not random, we have to mimic a random experiment by matching the treated group with the control group conditional on some observables. The validity of the matching is ensured by the existence of a common support between the treatment and control groups. This requirement ensures the comparability between the treatment group and the control group. Following Heckman et al. (1998), figure 1.3 provides evidence of a common support between the two groups. Graphically, the common support is the area of intersection between the treated and control group. As emphasized by Caliendo & Kopeinig (2008), the common support region can be identified based on two approaches. First by the minima and maxima comparison and second by the trimming approach.

We consider the second approach since it is recognized as providing more flexibility in the determination of common support. The minima and maxima reject all the observation close to the minimum and maximum band of the overlapping region and if the density in the tails of distribution is very thin. However, the trimming considers these observations that are normally in the common support region. Testing the quality of our matching, we use bootstrapping options to estimate the variance of the treatment effect. We also tested the sensitivity of the ATTs to the hidden bias problem.

[16] Indeed, all the governance variables used in this paper negatively affect the probability on being on the FATF list.

The Rosenbaum sensitivity test gives the values of coefficients ranging between [1; 1.3] which allow us to confirm the robustness of the estimates to hidden variables bias. In addition, high *p-values* of the standardized bias suggest statistical equality between the means of the large number of observed variables among countries from the treated and the control group. Given that the matching quality is now confirmed, we estimated the ATT with observations inside the common support[17]. We compute the treatment effects (ATTs) of blacklisting using several matching methods. Column 2 to 4 in Table 1.2 give the estimates of ATT of the n-nearest neighbors matching with n=1; 2 and 3. The next three columns (4 to 6) report the Raduis matching results with r ranging from 0.008 to 0.05. In the last two columns, we reported results of kernel and local linear matching. All these methods give positive coefficients of ATT. This suggests that the blacklisting increase phantom international investments in jurisdictions listed by the FATF as non-cooperatives.

The average treatment effect on the treated (ATT) estimates range in [0.6% to 0.7%] of GDP and in [5% to 7%] of total FDI inflows. These results are robust when controlling for the quality of governance with different governance variables (see lines [2] to [6] in tables 1.2). The first line of tables 1.2 gives the baseline estimates of ATT of blacklisting on phantom FDI inflows. The highest values of ATT (0.68% of GDP and 7.67% of FDI inflows) are obtained with the n-nearest neighbors matching for n=2. The results are statistically significant at 1% level. Moreover, the estimates of ATT with other methods give also statistically significant coefficients of at least 10% level of significance.

[17] Table 2 & 3 show that ATT estimates are based 66 and 329 observations respectively in the control and treated group when consider phantom FDI as a share of GDP. With phantom FDI as a share FDI inflows estimates are based on 46 and 378 observations in the control and treated group.

Table 1.2. Matching estimates of blacklisting effect on phantom FDI inflows

Treatment: Blacklisted by FATF	**Dependent variable: phantom FDI inflows (% GDP)**							
	n-Nearest neighbors matching			r-Raduis matching			Kernel matching	Local linear matching
	n=1	n=2	n=3	r=0.008	r=0.01	r=0.05		
[1] ATT using Gov. Effectiveness	0.670**	0.679***	0.677**	0.528**	0.527**	0.481*	0.668***	0.670***
	(0.266)	(0.261)	(0.267)	(0.242)	(0.260)	(0.258)	(0.255)	(0.252)
N. Total Obs.	395	395	395	395	395	395	395	395
N. Treated/Controls Obs.	66/329	66/329	66/329	66/329	66/329	66/329	66/329	66/329
Pseudo R2	**0.052**	**0.027**	**0.017**	**0.010**	**0.007**	**0.006**	**0.009**	**0.052**
Standardized bias (p-value)	**0.304**	**0.757**	**0.931**	**0.991**	**0.997**	**0.998**	**0.991**	**0.304**
Rosenbaum sensitivity	**1.0**	**1.0**	**1.0**	**1.3**	**1.2**	**1.0**	**1.0**	**1.0**
Robustness Check								
[2] ATT using Pol. Stability	0.697***	0.700***	0.704***	0.725***	0.714***	0.716***	0.716***	0.720***
	(0.247)	(0.252)	(0.234)	(0.245)	(0.270)	(0.234)	(0.276)	(0.235)
[3] ATT using Voice and Account.	0.679***	0.683**	0.666***	0.691***	0.694***	0.680**	0.679**	0.683***
	(0.234)	(0.267)	(0.253)	(0.259)	(0.252)	(0.266)	(0.271)	(0.240)
[4] ATT using Corruption	0.665***	0.666***	0.668***	0.530**	0.537*	0.663**	0.665**	0.663***
	(0.248)	(0.254)	(0.244)	(0.252)	(0.275)	(0.329)	(0.259)	(0.237)
[5] ATT using Rule of Law	0.707***	0.692***	0.690**	0.729***	0.705***	0.680**	0.682**	0.681**
	(0.232)	(0.255)	(0.272)	(0.239)	(0.231)	(0.278)	(0.279)	(0.279)
[6] ATT using Regulatory Qual.	0.692***	0.688**	0.683***	0.507*	0.689***	0.669***	0.669***	0.671***
	(0.265)	(0.275)	(0.229)	(0.269)	(0.223)	(0.235)	(0.249)	(0.258)

Note: Standard errors in parentheses *p<0.10, **p<0.05, ***p<0.01.

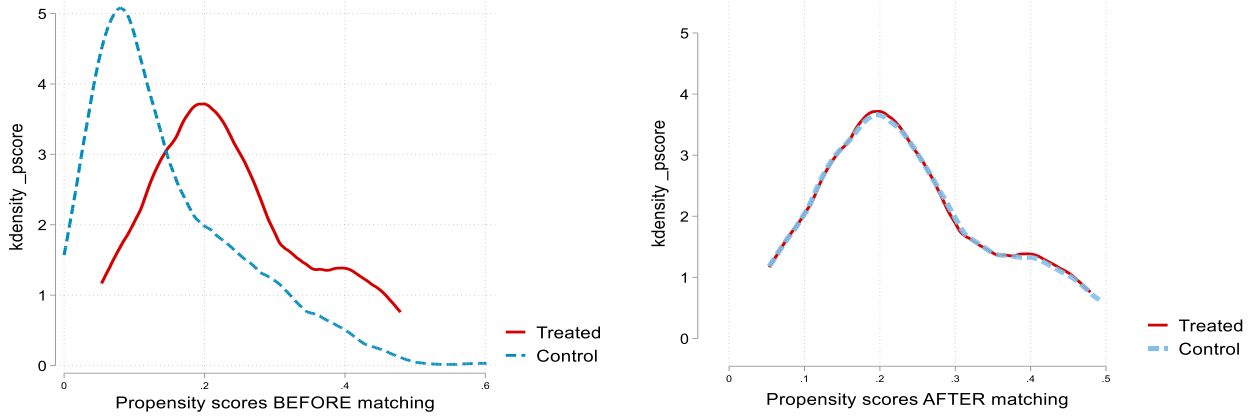

Figure 1.3: Propensity scores distribution of treated and control group

1.6 Robustness Checks

In this section, we analyze the robustness to alternative specifications of the blacklisting effect on tax motive FDI inflows called phantom FDI. We apply two different approaches namely adoption of alternative matching methods and the use of different samples in estimating the treatment effect. Table 1.3 gives the results of ATTs of FATF list on phantom FDI with the alternative methods. Following, Abadie & Imbens (2011), we use the bias-corrected n-nearest neighbor matching estimator to account for potential bias introduced by the simple n-nearest neighbor estimator. In fact, when estimating the treatment effect based on the n-nearest neighbor, the researcher includes a conditional bias that is supposed to converge towards zero at a rate that may be slower than $N^{1/2}$. As a results, the simple n-nearest neighbor estimator are not often $N^{1/2}$ -consistent (Abadie & Imbens, 2011).

The other alternatives matching technics used here are the inverse probability weighted (IPTW) and augmented inverse probability weighted (AIPTW) matchings. As the previous alternative matching approach, these latter aim to reduce the estimation bias of ATTs. The IPTW matching gives unbiased estimates by reweighting each subject with its inverse probability to be assigned to the treatment. This approach creates a synthetic sample in which treatment assignment is independent of measured baseline covariates (Austin & Stuart, 2015). Moreover, the AIPTW complete the inverse probability weighting by addressing and additional source of bias due to missing data. This advanced matching method combine propensity score function and a regression model (see Qin et al., 2017).

We find that the previous results are robust to these alternative approaches of matching. More specifically, the signs of the estimated effects (ATTs) are positive and statistically significant at 1% for all the specifications and for the two measures of

phantom FDI. Therefore, it confirms the finding that inscription in the FATF blacklist increases illicit financial flows towards blacklisted jurisdictions at around 0.4 to 0.6% of GDP and 3 to 7% of total FDI inflows.

In addition, we tested the sensitivity of the results to sample changes by removing some jurisdictions from the full sample. Table 5 provides the results of the treatment effect with different samples. First, the ATT of the blacklisting is estimated with the full sample, Second, we drop small islands developing states (SIDS) from the sample and finally, only the blacklisted SIDS are dropped from the sample.

We focus on SIDS because many of these jurisdictions present some specificities regarding their economic development strategy. In fact, small islands are subject of many natural disadvantages such as small size, and geographical remoteness. Therefore, these jurisdictions have developed offshore financial centers with high dependance upon offshore finance. Hampton & Christensen (2002) argued that 90% of government revenues in some small islands are derived from the financial sector activities. In order to be attractive financial destinations, some small islands offer a competitive tax and financial system for money laundering and harmful tax practices, thus violating financial regulations and the international initiative to combat IFFs. As a result, the high dependance on offshore finance, lax financial regulation has become a policy choice of many small islands. Therefore, the argument of Balakina et al., (2017); Unger & Rawlings, 2008 and Gnutzmann et al., 2010 that blacklisting may not work if lax financial regulations are policy choice of non-compliant jurisdictions may apply in the current study. Hence, we drop from the sample all small islands and then only blacklisted ones to ensure that our results are not sensitive to these special jurisdictions.

Table 5 gives the estimates of ATT from sensitivity analysis. The sign of the coefficients is robust to changes in samples.

Moreover, for all the matching approaches, the estimates of ATT are statistically significant at 1% level. Once again, the results confirm that blacklisting does not reduce illicit financial flows, rather it increases harmful financial activities. Phantom FDI inflows increase after blacklisting by around 0.7% of GDP for the two alternative samples.

The sensitivity analyses performed have confirmed that the positive impact of blacklisting on tax motive FDI inflows are robust to different specifications and to sample changes. When small islands are dropped from the sample, the size of the estimated effects increase slightly however the difference is not economically important. This suggest that large countries in the FATF's list are also likely to become preferential destinations for money launderers and tax evaders.

We argue that rather than being a coercive policy that forces compliance, the FATF list has become a source of information for foreign residents or multinational companies that want to move their income to jurisdictions that offer more favorable conditions for tax evasion, money laundering

Table 1.3. Estimates of the blacklisting effects on phantom FDI inflows (alternative matching methods)

Treatment: FATF Blacklist	**Dep. variable: Phantom FDI inflows (% GDP)**				
	Bias corrected N-neighbor matching			Inverse probability	Augmented inverse probability
	n=1	n=2	n=3	weight. match.	weight. match.
[1] ATT using Gov. Effectiveness	0.357***	0.376***	0.446***	0.209	0.609**
	(0.0918)	(0.0873)	(0.0954)	(0.128)	(0.256)
N. Total Obs.	**395**	**395**	**395**	**395**	**455**
[2] ATT using pol. stability	0.600***	0.506***	0.512***	0.384***	0.723***
	(0.115)	(0.105)	(0.103)	(0.140)	(0.273)
[3] ATT using voice and account.	0.486***	0.519***	0.531***	0.319***	0.646**
	(0.117)	(0.120)	(0.115)	(0.122)	(0.271)
[4] ATT using corruption	0.471***	0.406***	0.392***	0.658**	0.530**
	(0.116)	(0.101)	(0.103)	(0.271)	(0.254)
[5] ATT using rule of law	0.481***	0.418***	0.468***	0.670**	0.640**
	(0.116)	(0.0999)	(0.113)	(0.271)	(0.258)
[6] ATT using regulatory quality	0.481***	0.418***	0.468***	0.670**	0.640**
	(0.116)	(0.0999)	(0.113)	(0.271)	(0.258)

Note: Standard errors in parentheses. *p<0.10, **p<0.05, ***p<0.01

1.7 Conclusion

Illicit financial flows remain one of the main cause of revenue loss in developing countries. The flourishing of international initiatives to combat illicit financial activities has increased the compliance of many jurisdictions to international anti-IFF standards and laws. However, some countries remain with an historic non-cooperative tradition and moreover new centers of tax evasion and money laundering have emerged around the world. Since 2000, the FATF has periodically issued a list called the "blacklist" of non-cooperative jurisdictions. This list aims to blame listed countries and crack down their unfair financial practices which are harmful for the global community. The purpose of this paper is to assess the outcome of such an initiative.

We compare backlisted to non-backlisted countries based on common characteristics. The results reveal that blacklisting does not cut down illicit financial flows toward a blacklisted jurisdiction. Moreover, we find that illicit financial flows increase following the issuance of the FATF's list. The share of illicit inflows in the total FDI has increased on average by 6 percentages points after the blacklisting representing 0.5 and 0.7 percent of GDP. These results are robust to alternative matching methods and to the hidden bias problem. Overall, the paper stressed that blacklisting is not a solution per see against illicit financial flows. The deep analysis performed reveal some heterogeneities in blacklisting effect among countries. In small island states, illicit financial flows increase more than in large size countries. We argue that this difference can be explained by the high dependency of many small states on the financial sector which are more likely to overcome sanctions and continue to use aggressive practices to attract external flows. Finally, we recommend the global financial community to increase assistance to non-compliance jurisdictions by providing them

with capacities to foster their AML/CFT system. They should also create global incentives for cooperation against IFFs rather than systematically use coercive actions against non-compliant jurisdictions.

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Appendix

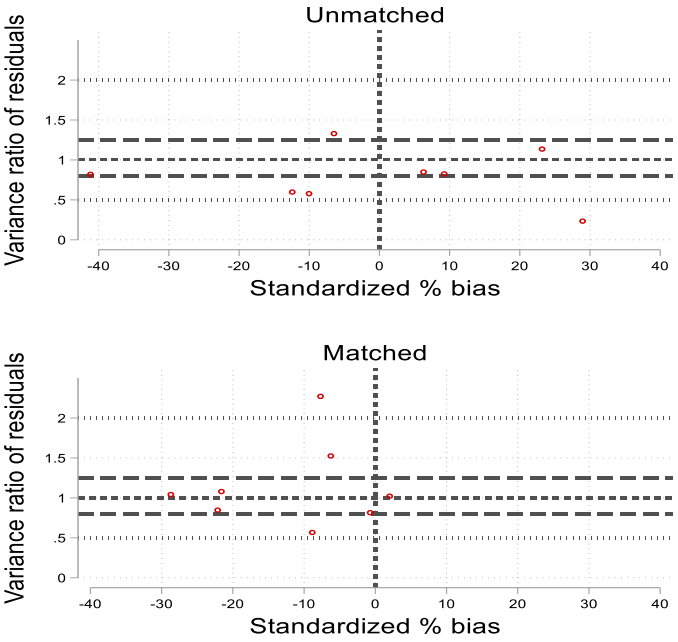
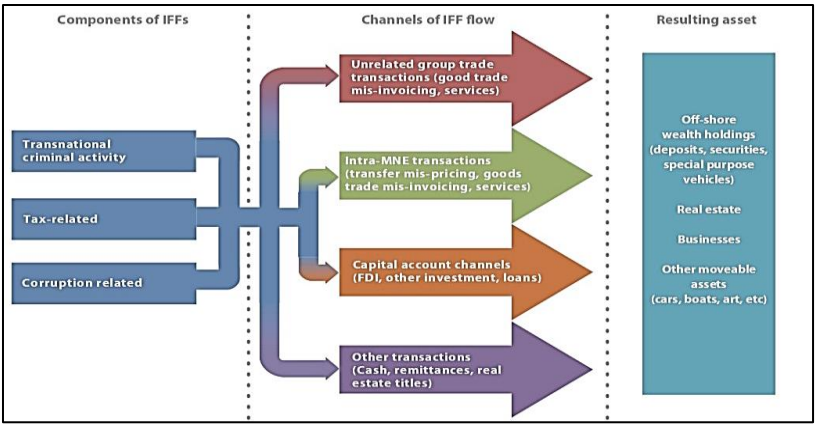


Figure A.1: Variance ratio of residuals



Source: Inter-agency Task Force on Financing for Development

Figure A2: Conceptual framework and typology of IFFs

Table A1: Heterogeneity to CIT of the blacklisting effect on the Phantom share of FDI (% total FDI

Phantom share of FDI inflows	[1]	[2]	[3]	[4]	[5]
Corporate_tax	2.376***	2.703***	2.678***	2.708***	2.767***
	(0.665)	(0.650)	(0.650)	(0.656)	(0.652)
FATF blacklist	13.101***	10.655***	9.952***	9.867***	9.975***
	(3.258)	(3.213)	(3.242)	(3.255)	(3.236)
FATF blacklist*corporate_tax	-2.827**	-2.413**	-2.208*	-2.167*	-1.987
	(1.229)	(1.199)	(1.205)	(1.212)	(1.207)
_pscore	-2.472	-7.697	-8.170	-6.779	-0.852
	(6.427)	(6.352)	(6.349)	(7.509)	(7.874)
Lresrentgdp		-4.646***	-4.344***	-4.292***	-3.705***
		(0.983)	(1.003)	(1.015)	(1.039)
Debt/GDP			0.071	0.070	0.060
			(0.048)	(0.048)	(0.048)
Financial Dev.				-4.259	-9.878
				(12.242)	(12.399)
Corruption					6.657**
					(2.817)
_cons	13.927***	16.675***	13.282***	13.593***	15.064***
	(2.180)	(2.200)	(3.166)	(3.293)	(3.332)
N	453	453	453	453	453
Pseudo R2					

Note: Standard errors in parentheses. *p<0.10, **p<0.05, ***p<0.01

Table A2: Descriptive Statistics

N°	VARIABLES	N. observations	Mean	Stand. Dev	Min.	Max.
1	Blacklisted	1 053	0.202	0.402	0	1
2	Portfolio Investment	1 044	26 426	93 385	-43.86	1.149e+06
3	Phantom_FDI	931	20.05	15.53	0	91.71
4	Financial Development	1 053	0.247	0.141	0.0422	0.668
5	Finnacial Market	1 053	0.125	0.173	0	0.711
6	Credit_to_GDP	969	41.93	29.61	2.660	156.2
7	KA_OPEN	1 045	0.426	0.352	0	1
8	Nominal_FDI inflows	1 053	5 463	23 216	-20 77	290 928
9	Agricultural	1 034	14.03	11.91	0.262	60.61
10	Rent Natural Resources	1 041	7.836	9.656	0	58.98
11	Tax Revenu	935	18.19	8.720	0.607	59.98
12	Income Tax	773	5.278	2.748	0	17.50
13	Corporate Tax	604	2.611	1.440	0	10.33
14	Public Debt Service	870	4.094	5.223	0.00104	45.12
15	GDP growth	1 036	3.512	4.104	-36.39	20.72
16	GDP cp	1 041	6 24	7 258	212.1	51 979
17	GDP cp growth	1 036	1.802	4.116	-36.56	18.05
18	Debt to GDP	1 028	46.43	26.57	1.583	173.9
19	Public Investment	1 01	25.23	9.812	2.326	72.46
20	Inflation rate	1 046	6.162	12.21	-6.357	210.0
21	Voice Accountability	1 053	-0.333	0.814	-2.173	1.213
22	Gouvernement Effectiveness	1 053	-0.350	0.681	-2.078	1.509
23	rqe	1 053	-0.309	0.651	-2.244	1.539
24	Rule of Law	1 053	-0.397	0.655	-2.241	1.433
25	Corruption	1 053	-0.369	0.712	-1.816	1.725
26	Population	1 053	48.33	174.7	0.0509	1 41

Table A3: List of Blacklisted countries

N°	Country	Blacklist	N°	Country	Blacklist	N°	Country	Year of Blacklist
1	Angola	2009	11	Indonesia	2009	21	Kenya	2011
2	Bahamas	2009	12	Cambodia	2015	22	Russia	2009
3	Dominica	2009	13	St. Kitts Nevis.	2009	23	São Tomé P.	2009
4	Algeria	2013	14	Lebanon	2009	24	Syria	2011
5	Ecuador	2013	15	Myanmar	2009	25	Turkey	2011
6	Egypt	2009	16	Namibia	2015	26	Tanzania	2012
7	Ethiopia	2011	17	Nigeria	2009	27	Ukraine	2009
8	Grenada	2009	18	Nicaragua	2015	28	St. V. Grenadines.	2009
9	Guatemala	2009	19	Panama	2009	29	Vietnam	2013
10	Hungary	2009	20	Iran	2012			

Table A4: List on non-Blacklisted countries

N°	Country	N°	Country	N°	Country	N°	Country	N°	Country	N°	Country
1	Albania	31	Dominican Republic	61	Mauritius	16	Bolivia	46	Cambodia	76	Sierra Leone
2	United Arab Emirates	32	Fiji	62	Malawi	17	Brazil	47	Kuwait	77	El Salvador
3	Argentina	33	Gabon	63	Malaysia	18	Barbados	48	Lao P.D.R.	78	Suriname
4	Armenia	34	Georgia	64	Niger	19	Bhutan	49	Liberia	79	Seychelles
5	Antigua and Barbuda	35	Ghana	65	Nepal	20	Botswana	50	St. Lucia	80	Chad
6	Azerbaijan	36	Guinea	66	Oman	21	Central African Republic	51	Sri Lanka	81	Togo
7	Burundi	37	The Gambia	67	Pakistan	22	Chile	52	Lesotho	82	Trinidad and Tobago
8	Benin	38	Guinea-Bissau	68	Peru	23	China	53	Morocco	83	Tunisia
9	Burkina Faso	39	Equatorial Guinea	69	Philippines	24	Côte d'Ivoire	54	Moldova	84	Uganda
10	Bangladesh	40	Honduras	70	Poland	25	Cameroon	55	Madagascar	85	Uruguay
11	Bulgaria	41	Croatia	71	Paraguay	26	Colombia	56	Maldives	86	Uzbekistan
12	Bahrain	42	Haiti	72	Rwanda	27	Comoros	57	Mali	87	Venezuela
13	Bosnia and Herzegovina	43	India	73	Saudi Arabia	28	Cabo Verde	58	Mongolia	88	Yemen
14	Belarus	44	Jordan	74	Sudan	29	Costa Rica	59	Mozambique	89	South Africa
15	Belize	45	Kazakhstan	75	Senegal	30	Djibouti	60	Mauritania		

Table A5: Data sources and definitions

Group	VARIABLES	Variable Labels	Data sources
AML/CFT	Blacklist	Blacklisted by the FAFT	Financial Action Task Force
Capital Flows/IFFs	Phantom_FDI (% FDI)	Phantom share of FDI inflows	Damgaard and al., 2019
	FDI inflows	Inward Direct Investment Positions (Total, Equity, and Debt Instruments) by End-Year	IMF data, coordinated direct investment survey (CDIS)
Financial Development	Financial Development	Financial Development Index	World Bank indicators
	Finnacial Market	Finnacial Market Index	
	Credit to GDP	Domestic credit to private sector (% of GDP)	
	KA_OPEN	Chinn-Ito index, normalized	
Tax and fiscal policy	Tax Revenu	Taxes including social contributions	World Bank Indicators
	Income Tax	Taxes on income, profits, and capital gains	
	Corporate Tax	Corporations and other enterprises tax	
	Public Debt Service	Total debt service (% of GNI)	
	Debt to GDP	General government gross debt, gross debt consists of all liabilities that requi	
	Public Investment	Total investment,Investment or gross capital formation is measured by the total	
Natural resources	Agricaltural	Agriculture, forestry, and fishing, value added (% of GDP)	World Bank indicators
	Rent Natural Resources	Total natural resources rents (% of GDP) f	
Macroeconomic framework	GDP growth	GDP growth (annual %)	World Bank indicators
	GDP cp	GDP per capita (current US$)	
	GDP cp growth	GDP per capita growth (annual %)	
	Inflation rate	Inflation(end of period consumer prices)in percentage change	
Governance	Voice Acountability	Voice and Accountability, Estimate	Worldwide Governance Indicators, 2021 Update
	Government Effectiveness	Government Effectiveness, Estimate	
	Regulatory quality	Regulatory Quality, Estimate	
	Rule of Law	Rule of Law, Estimate	
	Corruption	Control of Corruption, Estimate	

Table A6: List small islands developing states (SIDS)

1. Antigua and Barbuda	14. Guyana	27. Singapore
2. Bahamas	15. Haiti*	28. St. Kitts and Nevis
3. Bahrain	16. Jamaica	29. St. Lucia
4. Barbados	17. Kiribati*	30. St. Vincent and the Grenadines
5. Belize	18. Maldives	31. Seychelles
6. Cabo Verde	19. Marshall Islands	32. Solomon Islands*
7. Comoros*	20. Federated States of Micronesia	33. Suriname
8. Cuba	21. Mauritius	34. Timor-Leste*
9. Dominica	22. Nauru	35. Tonga
10. Dominican Republic	23. Palau	36. Trinidad and Tobago
11. Fiji	24. Papua New Guinea	37. Tuvalu*
12. Grenada	25. Samoa	38 Vanuatu
13. Guinea-Bissau*	26. São Tomé and Príncipe*	

CHAPTER 2

TIMING IN INTERNATIONAL TREATIES TO FIGHT ILLICIT FINANCIAL OUTFLOWS: EVIDENCE USING A DID WITH MULTIPLE TIME PERIODS

Abstract

Although numerous jurisdictions cooperate to fight illicit financial flows, they have gained ground and become a real concern, particularly for developing countries suffering from outflows. In this paper, the causal effect of bilateral information exchange agreements on illicit financial outflows is explored on a sample of 88 developing countries over the period 2004-2013 using a new non-parametric method of Difference-in-Differences with multiple time periods, controlling for correlates of IFFs. We found that increasing cooperation is effective against illicit financial outflows, but only after at least three years under cooperation.

Keywords: Illicit Financial Flows, Information exchange agreements, Cooperation, Difference-in-Differences, Group time effect, Dynamic effect.

2.1 Introduction

According to the Global Financial Integrity, illicit financial outflows represent a cost of about US $1.26 trillion per year for emerging countries. They have significantly hindered domestic resources mobilization in developing countries for several decades (Kar and Spanjers, 2015), with detrimental consequences on macroeconomic stability and development outcomes. More broadly, corruption, smuggling, tax evasion, money laundering and terrorism financing are becoming a global concern (IMF, 2020). Over the past decades, many jurisdictions have joined efforts, and several regional and international institutions have been established under separate agreements to combat and eradicate illicit financial flows (IFFs). The Global Forum on Transparency and Exchange of Information (GFT) is an international institution gathering 158 countries aiming to implement a transparency mechanism on tax and information exchange. With the same focus, the Financial Transparency Coalition (FTC) works for transparency, accountability, and a sustainable financial system, through country reports, automatic exchange of information, and data sharing. FTC argued that IFFs decrease the global economy by 4% each year, and the Sub-Saharan economy by 7.2% per year. The Centre for Budget and Governance Accountability (CBGA) analyses government policies towards transparency and accountability. Besides, the Financial Action Task Force (FATF), an inter-governmental body gathering more than 200 countries and territories worldwide, aims to prevent illegal financial activities. The FATF's actions are based on standards and recommendations to ensure a well-defined national legislature and set up a robust regulatory system to counter illicit financial activities in member countries. The European Union (EU) similarly developed an Anti-money laundering framework to promote cooperation against IFFs.

Last but not least, NGOs and other entities have engaged in advocacy against IFFs for poverty alleviation. For instance,

Oxfam calls for strengthening trade regulation, correcting inconsistent tax policy, challenging collusion, and corporate greed. The Tax Justice Network, focusing on the role of tax havens, estimates global loss related to tax havens at $189 billion a year.

Bilateral cooperation to fight against international IFFs relies mostly on bilateral information exchange agreements, as part of the national anti-evasion policies. Bilateral information exchange agreements may take the forms of information-on-request, or information shared automatically that have been installed later. Information-on-request agreements allow countries to request information related to IFFs from partner countries. Although numerous jurisdictions cooperate to fight illicit financial flows, they have gained ground and become a real concern, particularly for developing countries suffering from outflows.

IFFs channels are mutating on multiple forms, and the number of destination countries is increasing. Many small economies developed financial mechanisms such tax facilities and banking opacity to attract tax evaders. Tax havens or offshore financial centers have arisen during the last decades, in a highly competitive financial business operating under weak global financial supervision. The recent development of digital technologies facilitate IFFs through money transfers online, mobile banking, cryptocurrency, e-commerce, etc.

The seemingly uncontrolled upward trend in IFFs, the development of tax havens and the increasing number of financial scandals raise the debate on the effectiveness of global and bilateral cooperation and actions to eradicate IFFs.

Previous studies on the effect of international cooperation on IFFs are usually based on simple regression techniques that would highlight correlations more than causation. To the best of our knowledge only one study (Casi, Spengel and Stage, 2020)

employed a proper methodology by using event studies and difference-in-differences analysis. Moreover, usual approaches are typically static. Even if they stated that information exchange agreements are effective against IFFs, they do not reveal at which time horizon treaties become effective. Yet, the dynamic effect may depend on the length of cooperation but also be time and group specific.

In this paper, we attempt to measure the dynamics in cooperation effect over time for a selected panel of emerging economies, by focusing on the length of exposure to cooperation and taking into account the time and group heterogeneity. We use a new non-parametric method of Difference-in-Differences with multiple time periods recently developed by Callaway and Sant'Anna (2020). The causal effect of bilateral information exchange agreements on IFFs is explored on a sample of 88 developing countries over the period 2004-2013.

The rest of the paper is divided as follows: section 2 reviews previous studies on IFFs and introduce how we attempt to fill some gaps. Section 3 presents the framework that connects international cooperation and illicit financial flows. Section 4 and 5 presents the data and results of the tests of the model. Section 6 concludes with some recommendations.

2.2 Literature review

2.2.1 Defining and estimating IFFs

Over the past few decades characterized by financial crises, the academic literature on illicit financial activities has grown. Different definitions, concepts and methodologies are used to define and measure illicit funds (Aziani, 2018; OECD, 2014). This variety of approaches is firstly caused by the illegality and the multiple ways taken by fraud connected with financial activities (corruption, tax evasion, trade misinvoicing, money laundering,

etc.). Kirchler and al. (2003) define tax evasion as individual and corporate illegal behavior related to income underreporting to minimize income tax. Such activities should be differentiated from tax avoidance, which is not always illegal. Strumpf (2017) illustrates tax optimization or tax avoidance practices by a case study on strategic plane owners. Cobham (2005) highlights domestic tax evasion from the shadow economy that is beyond the control of the tax administration. The author argues that the total cost of these leakages is around US$385 billion annually for developing countries. Moreover, IFFs related to tax evasion undermine development outcomes (Fuest and Riedel, 2010; Cerqueti and Coppier, 2011). In many developing countries, officials perceive bribery to deduce taxable income with important development damages (D'Souza, 2012). According to Huang and Li (2015) bribery leads to inefficiencies in government spending allocation because it may reduce investment dedicated to public infrastructures. Following the same ideas, Keefer and Khemani (2002) argue that corruption reduces the efficiency of government spending for economic development. Buchanan (2004) focuses on money laundering, i.e. making criminal profits legal through complex types of cross border transactions and numerous financial institutions. Schooner (2010) argues that money is laundered through three stages that consist of (i) placing criminal money in financial institutions, (ii) moving money in another country or financial institutions to hide its illicit origin, (iii) reinvesting money in other economic activities.

Originally, IFFs referred to capital flight, which embraces all financial flows leaving a territory for political matters or tax optimization purposes (World Bank, 2017). However, this definition of IFFs would be misleading because money may fly following legal decisions and actions, such as pursuing higher investment returns or hedging currency risk (Tax Justice Network, 2020). Other attempts to define IFFs were

consequently developed. For instance, the OECD (2014) considers IFFs as financial flows generated by methods, practices, and crimes used to transfer money abroad by breaking national and international laws. This last definition covers various IFFs such as money laundering, international bribery, and tax evasion.

Given the multiplicity of practices and the nature of illegality, measuring IFFs presents several challenges for researchers and policymakers. Collin (2019) assesses different conceptual frameworks and identified eight methods used in the empirical literature for measuring IFFs. First, the balance-of-payment method or hot-money-narrow method is based on detecting abuse, fraud, or errors related to cross-border capital movements (Johannesen and Pirttilä, 2016; Kar and Spanjers, 2015; Henry, 2012). The trade gap analysis approach, mostly used by the Global Financial Integrity (GFI), estimates the gap in mirror statistics on the declared price and the quantity of goods between origin countries and destination countries (Nicolaou-Manias, 2016). This method is simple and easy to implement but gaps may also come from errors in recording prices and quantities or differences in tax administration systems (Nitsch, 2016; Collin, 2019).

Researchers also approximate IFFs with international portfolio and deposit data, using assets transferred in foreign countries that are not declared to tax authorities in the jurisdiction of origin. For example, Zucman (2013) computed the gap between portfolio liabilities and assets as an estimation of hidden assets located in tax havens that is considered as illicit. However, this method can also produce confounding estimates when gaps rely mostly on measurement errors. The gravity model that is widely used in empirical studies to estimate spatial relationships (Anderson, 2011), can be applied to estimate IFFs resulting in cross-border financial flows (see eg., Perez and al., 2012). Last,

other methods are based on estimating criminal activities that are assumed to be correlated with money laundering.

2.2.2 Information sharing cooperation (agreements) and IFFs

Outward-oriented or free-trade based development strategies necessitate international cooperation. Cooperation is defined as a joint action to achieve common objectives (Paulo, 2014). Either it delivers aid or builds an environment that favors exchange and shares knowledge between nations, through treaties and conventions, and even policy structures – international organizations - that goes beyond nations. Cooperation can help to avoid conflict and combat all kinds of unfair economic strategies.

Studies have flourished to question the effects of international cooperation on IFFs. Numerous methods are employed to measure and evaluate the effectiveness of this cooperation. The majority of the studies test whether cooperation through treaties influences the IFFs when countries join a regional or international group and further at which scale treaties may decrease IFFs.

Many scholars have highlighted that information sharing cooperation fail to reduce IFFs or that it may only generate relocation into banks located in non-cooperative jurisdictions instead of reducing tax evasion overall. Huizinga and Nicode'me (2004) show a little impact on international tax evasion, explained by the incomplete coverage of anti-evasion policies. The same argument is provided by Johannesen and Zucman (2014) in evaluating the G20 tax haven crackdown, using data on cross-border bank deposits and tax treaties. They found a relocation effect of international deposits in jurisdictions that were least compliant with OECD information exchange standards. Kemme and Steigner (2017) find a weak effectiveness

of information sharing cooperation to counter OECD resident tax evasion. Using a fixed effects estimator on panel data, the authors stated that higher tax rate positively influences tax evasion that cannot be stopped only with information exchange agreements. With the same perspective, Menkhoff and Miethe (2019) examine the impact of information exchange cooperation in curbing tax evasion. Based on bilateral bank deposit data, the authors argue that cooperation failed to curtail tax evasion in the long-run for two types of agreements (on-request and automatic exchange of information). In addition, their study suggests that tax evaders use new disguises to hide their fraudulent financial transactions in tax havens; revealing a new form of adaptation of criminal financial activities.

Oppositely, some researchers have brought evidence that information exchange is efficient to fight against IFFs. Kudrle (2016) analyzes different international tax regimes such as double taxation conventions and cooperation through information exchange aimed to combat harmful tax practices. He argues that the efforts of the OECD and the G-20 to curb tax evasion would be significantly effective. Heckemeyer and Hemmerich (2018) share the same view. Using an OLS regression and a Poisson fixed effect model, the authors find that portfolio investments from tax haven decline after information exchange treaties. Beer and al., (2019) test the impact of automatic exchange of information on cross-border tax evasion using a finite mixture model. Based on bilateral deposit data their result confirm that automatic exchange of information significantly reduces deposits in offshore jurisdictions.

Similarly, Casi, Spengel and Stage (2020) state that automatic exchange of information reduces cross-border deposits in offshore financial centers by 11.5%. Contrary to many previous studies on the subject, they used causal analysis to test information exchange effect on cross border tax evasion, through

event studies and difference-in-differences analysis. Their approach seem more accurate for impact evaluation of treaties than regression analysis that would highlight correlation rather than causation.

However, the above-mentioned studies did not consider the relative heterogeneity of the effect of international cooperation on IFFs and time effects. Their approaches are relatively statics while it would seem relevant to consider the dynamic effect of such cooperation and understand at which time horizon treaties become effective.

Here we take into account the timing of the arrangement and the length of the cooperation, but also group-specific heterogeneity. We assume that the period at which a country signed an agreement is important because domestic or international environment, that change over time, may influence cooperation outcome (Strachan, 2018). For instance, the effectiveness of actions against illicit traffic at a given time period may depend on the political context. Furthermore, during the 2008's financial crisis, the international environment changed considerably with the reactions of the Organization for Economic Cooperation and Development (OECD) and of the G20 that compelled tax havens to increase transparency (Johannesen and Zucman, 2014).

2.3 Empirical framework

We use a strategy that aims to capture how cooperation through bilateral agreements on information exchange affects IFFs dynamically, depending on variation in timing, the length of the cooperation, and group-specific heterogeneity. Using a non-linear function, we model that the outcome variable is influenced by the policy intervention and the time at which the policy is implemented, and other control variables (Callaway et al., 2020; Callaway and Sant'Anna, 2019; Goodman-bacon et al., 2018; Abraham and Sun, 2018; Gibbons and al., 2018).

$$Z_{it} = \varphi(X_{it}, T_i, W_{it}) \quad (1)$$

Z denotes the outcome value (IFFs outflows), with i is the group specific (countries) index and t is the time index. φ is a non-linear function. X represents the treatment variable, a binary variable taking one if a group is treated (under information exchange agreement) and zero otherwise. T denotes the period of the first treatment (signature of the information exchange agreement). W is a set of control variables.

We use Difference-in-Difference (DID) with multiple time periods to estimate the causal effect of information exchange agreement on IFFs. This estimation strategy presents some advantages over traditional DID, such as Smith and Todd (2005), Heckman and al., (1998) that use two times periods (before and after treatment) and two groups (control and treatment group), which does not account for the dynamic of treatment effect across time and heterogeneity within both groups. Although the DID with multiple time periods has advantages in estimating the causal effect for specific groups and across time, the accuracy of this estimation technic relies on the "parallel trends" assumption. Here, we consider the conditional parallel trend assumption. This assumption states that the path of outcomes that units in group i would have experienced if they had not participated in

the treatment is the same as the path of outcomes shown by units in the untreated group, *after conditioning on observed covariates* (Callaway et al., 2020). Wald pre-test allows the rejection or acceptance of the null hypothesis of the parallel trends.

Here we consider heterogeneous groups among the treated at different time periods. The group-time average treatment effects measure the causal effect of the policy intervention for each group at different periods, as follows:

$$ATT(i,t) = \mathrm{E}[Z_t(1)\text{-}Z_t(0) \mid G_i{=}1] \quad (2)$$

Equation (2) expresses the gap between the expected values of the treated group(s) compared to the control group(s).

ATT is then the group-time average treatment effect representing the average treatment effect for a cluster of countries i at period t ; i is the cluster index of countries; t denotes the time at which the treatment effect is assessed.

Z_t (1) is the value of the outcome for the treated group(s) at period t

$Z_t(0)$ is the value of the outcome for the control group(s) at period t

G represents a binary variable that equals one if the country belongs to cluster i, being a group of countries that is treated for the first time at the same year

$G_i{=}1$ indicates conditions under which country belongs to a given cluster.

Then, we consider the group-time effects as the effect of the policy intervention on the outcome variable for each specific group at a given time. The aggregation of the different group-time average treatment effects for clusters and periods generates

the average or overall treatment effect of treated (ATT). The aggregation is firstly done for all groups treated at a specific time t, and second, across all different periods considered. Among several computational methods of ATT, this study applies dynamic effects (Callaway and Sant'Anna, 2018; Abraham and Sun, 2018). The dynamic effects method highlights variations of the average treatment effects with length of exposure to the treatment. We assume that the wider the length of exposure (countries remaining under bilateral agreements of information exchange) the more IFFs will decrease. So, the method mentioned above is used to test this hypothesis.

$$ATT\ (\omega) = \sum_{t}^{T} \sum_{i}^{M} \psi_i [ATT(i,t)] \qquad (3)$$

Where, $\omega = t - i + 1$ (4)

$ATT\ (\omega)$ is the average treatment effect of treated at exactly ω exposure length.

ψ denotes the weight of each group cluster over a specific period of time.

M and T are the total numbers of clusters and periods respectively.

The overall treatment effect using the dynamic effect approach is then the aggregation of all $ATT\ (\omega)$:

$$ATT = \frac{1}{T-1} \sum_{\omega=1}^{T-1} ATT\ (\omega) \qquad (5)$$

2.4 Data and Sample

2.4.1 Illicit financial flows (IFFs)

Researches on the impact of international cooperation against IFFs mostly use specific kinds of financial assets, such as bank deposits in a tax haven and foreign portfolio investment (see e.g., Casi et al., 2020; Menkhoff and Miethe, 2019; Johannesen and Zucman, 2014; Kudrle, 2016; Heckemeyer and Hemmerich, 2018). These measurements may be biased because all deposits in banks located in tax havens are not illicit, as Abbott (2000) argues.

We collected IFFs data from the Global Financial Integrity (GFI) periodical reports. GFI estimates illicit financial outflows as deliberate misinvoicing in merchandise trade and leakage in the balance of payments using data from the International Monetary Fund (IMF). GFI estimates of IFFs cover various activities related to financial fraud (hidings the proceeds of crime, evading tariffs, taxes trough misreporting of transaction etc.). This large coverage makes such data suitable to study the effectiveness of cross-border information sharing. Forstater (2018a) argued that wider definitions of IFFs focus on not strictly illegal action like tax avoidance or strategic transfer pricing. Deliberate trade misinvoicing is a major channel of tax evasion and profit shifting (Cobham and Janský, 2017). The usage of GFI data has flourished in the recent academic literature (Forstater, 2018a , 2018b; Combes et al., 2019; Sow and Madden, 2020). This dataset, however, cover the period 2004-2013.

GFI's data on illegal financial outflows from developing countries show that Asia is the first region of origin with 38.8% of total IFFs from developing countries, followed by developing Europe at 25.5% (Kar and Spanjers, 2015). Five of the top ten countries of origin of the IFFs are located in Asia (China, India, Thailand, Indonesia, Malaysia). From 2004 to 2013, about 1.4 billion of dollars US flighted out from China. In developing Europe, Russia

experienced the highest capital flight with at least 1 billion dollars US. In the Western Hemisphere, Mexico heads with about 52.8 million dollars US. South-Africa is the top Sub-Sahara African country with about 20 million dollars US.

However, in percentage of GDP, Sub-Saharan Africa and the Developing Europe are the most affected with respectively an equivalent of 6.1% and 5.9% of GDP from 2004 to 2013 (Figure 2.1).

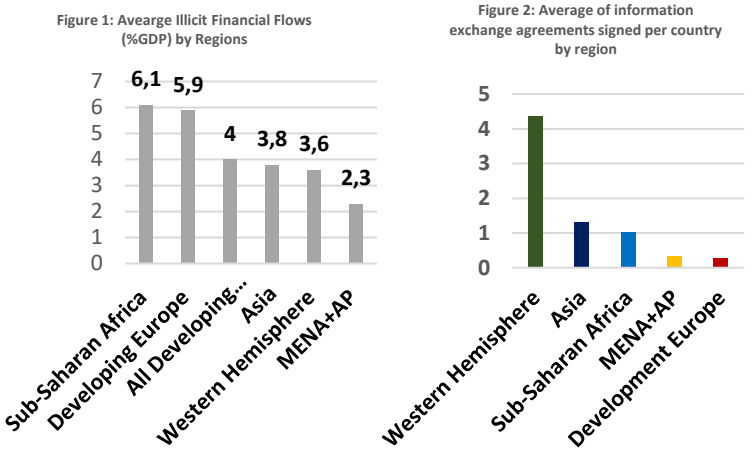


Figure 2.1 : Average Illicit Financial Flows (%GDP) and Average of information exchange agreements by Regions

2.4.2 Information exchange agreements (IEAs)

International cooperation between selected countries is proxied by bilateral information exchange agreements collected from the Organization for Economic Cooperation and Development (OECD) database.

The OECD data on bilateral information exchange agreements covers information-on-request or information shared automatically. Here, the data used corresponds to the exchange of information on request (IEA). These agreements allow countries to request information related to IFFs from partner countries. IEA is a dummy variable equal to one if a selected country signed a bilateral treaty and zero if not. We choose IEA rather than automatic exchange of information because most of the countries of our sample are not committed to automatic sharing of information, and this tool was initiated only in 2017.

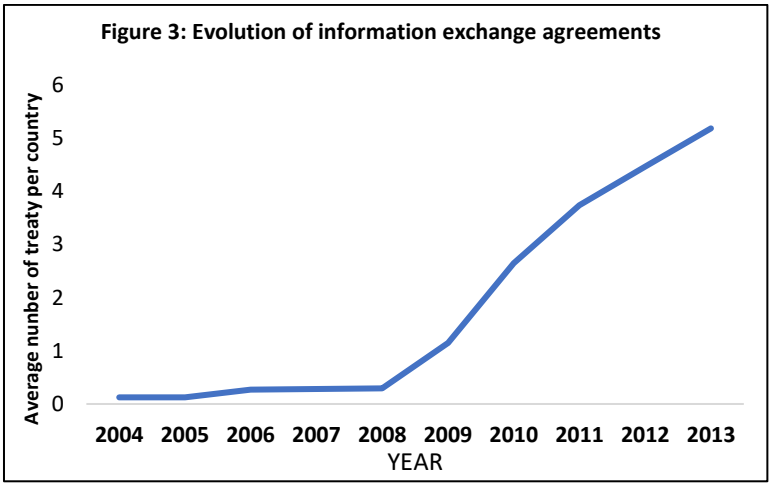


Figure 2.2: Dynamic of information exchange agreements (OECD data)

Figure 2.2 above presents the evolution of information sharing agreements for 88 developing countries, measured as the average number of treaties per country, over the period 2004-2013. Information exchange cooperation increased insignificantly from 2004 to 2008. However, data show an important upward trend in cooperation from 2008 to 2013. Policymakers and researchers related this increased number of agreements to the international agenda against illicit financial activities after the 2008 financial

crisis. In fact, more transparency was advocated as a panacea to curtail tax evasion and other illicit transactions. For instance, the OECD urge its country members to sign at least 12 treaties with other jurisdictions. Furthermore, non-comparative jurisdictions were systematically blacklisted. This initiative of the OECD aimed to put an end to illicit financial flows towards offshore financial center.

Figures 2.1 indicates that countries with few treaties experienced high IFFs in share of GDP. More precisely, the Western Hemisphere has the highest average of treaty per country (4.3 treaties) followed by Asia (1.3 treaties) and Sub-Saharan Africa (1.02 treaties). In average, countries in Developing Europe and MENA+P have signed less than 1 treaty. Of the six regions, Sub-Saharan Africa and Developing Europe respectively rank 1st and 2nd regarding the amount of IFFs in percent of GDP and present the smallest number of treaties (ranking respectively 4th and 6th).

2.4.3 Additional control variables

Other covariates of IFFs, or control variables, are used as conditions for the parallel trends assumption to hold. GDP growth (GDPGTH) in the country of origin is likely to prevent capital flight and decrease IFFs. IFFs may be generated by rent from natural resources (RESSRENTE) as suggested by the works on capital flight from Tanaka (2020), Muhanji and al., (2019), Ndikumana and Sarr (2019), Sovacool (2016). Following Hermes and Lensink (2001) and Lensink and al., (2000), inflation (INFL) is used as an indicator of macroeconomic stability and price distortions that may cause IFFs. Foreign direct investment inflows (FDI) can proxy the attractiveness of a country business environment and may appear to be a significant determinant for IFFs. Perez et al. (2012) find that FDI has a facilitating role in money laundering and illegal capital flight in transition

economies. GDPGTH, RESSRENTE, INFL and FDI data are from the World Development Indicators database (WDI).

Besides information exchange, the degree of freedom or restrictions on the cross-border movements of capital can impact IFFs. We use an updated version of the Chinn-Ito index of financial openness or of country degree of capital account openness (KAOPEN) (Chinn and Ito, 2006).

The quality of the governance, institutions and policies in the country of origin may also influence IFFs outflows. The World Bank Institute published the Worldwide Governance indicators (WGI), six well-known indicators to measure governance. We select the indicators of political stability (PVE) and control of corruption (CCE). PVE measures the perceptions of the likelihood of political instability and politically motivated violence, including terrorism. While CCE captures perceptions of the extent to which public power is exercised for private gain. These indicators range from -2.5 (worst governance) to 2.5 (best governance).

2.4.4 Sample

Data covers 88 developing countries from Africa, Asia, Europe, and Latin America over 2004-2013. These countries are selected based on data availability of the main variables IFFs and IEAs. The sample is first divided into two groups, the treated group and the control group. The control group sample comprises 45 countries that have never been involved in cooperation through IEAs. The treated group of 43 countries have signed agreements with other jurisdictions at different years. We define three cluster periods: 13 countries signed their first IEAs over 2004-2007, 16 countries over 2009-2010 and 14 over 2011-2013 (Figure 2.3).

The cluster periods are designed in order to get a minimum of observations in the treated groups to compute the treatment effect using DID with multiple time periods. For instance, only

Argentina signed its first treaty in 2004, and Brazil, Costa Rica, Guatemala, and El Salvador signed in 2006. They are grouped into the cluster 2004-2007. Countries that signed their first treaty before 2004 such as Aruba, Antigua, and Barbuda or Columbia, also join the 2004-2007 treated group. On the other side, countries that have signed their first treaty after 2014 (for instance the United Arab Emirates and Bulgaria that signed their first treaty in 2015) are part of the "control group" because they have not signed any treaty for the entire study period. Cluster 1 is a group of countries with first treaty between 2004-2007, cluster 2 is group of countries with first treaty between 2009-2011 and cluster 3 is group of countries with first treaty between 2011-2013.

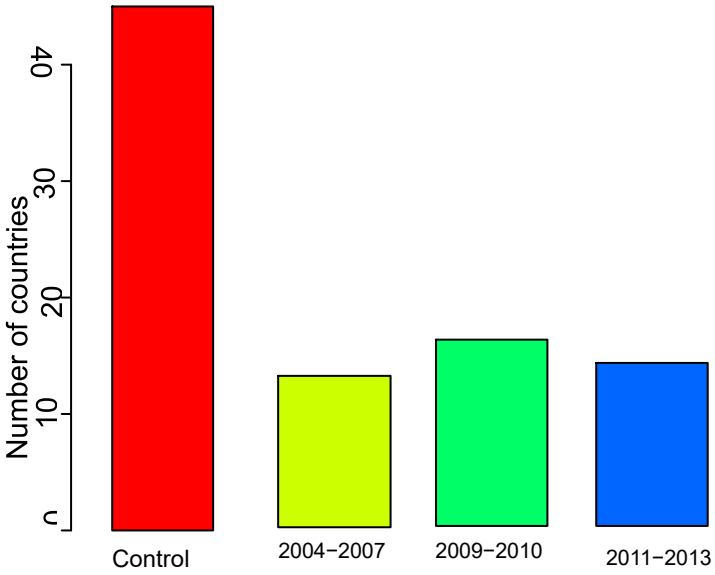
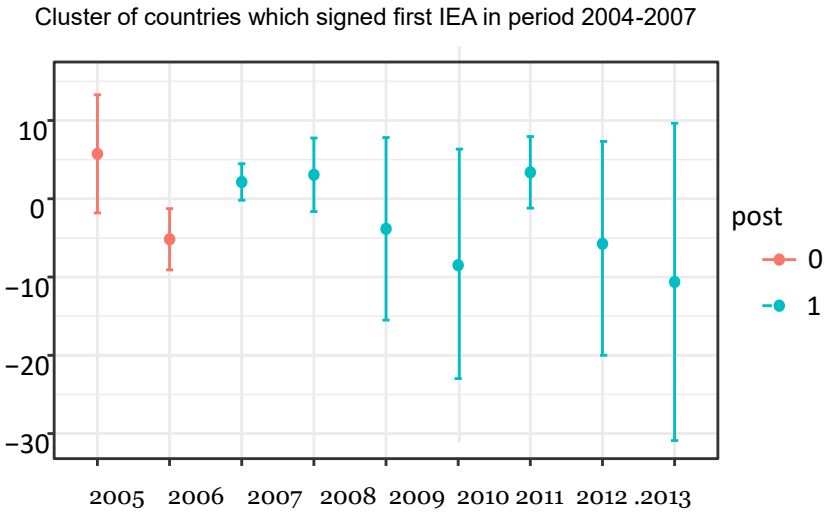


Figure 2.3: Sample size for each group according to year of signature of the first treaty

2.5 Results

The result of the Wald pre-test of the parallel trends assumption provides a p-value of 0.66, meaning that we fail to reject the hypothesis that the trend of IFFs for treated group and control group would have been the same if the treated had not signed any agreement. This also confirms that the chosen estimation method is relevant.

Figure 2.4 displays the estimates of the yearly Average Treatment Effect of the Treated (ATT) for the three clusters (2004-2007; 2008-2009; 2011-2013), under the parallel trend assumption, i.e. when controlling for different covariates which are assumed to influence IFFs. Red and blue lines report estimates of pre-treatment and of treatment within a 95% confident band.



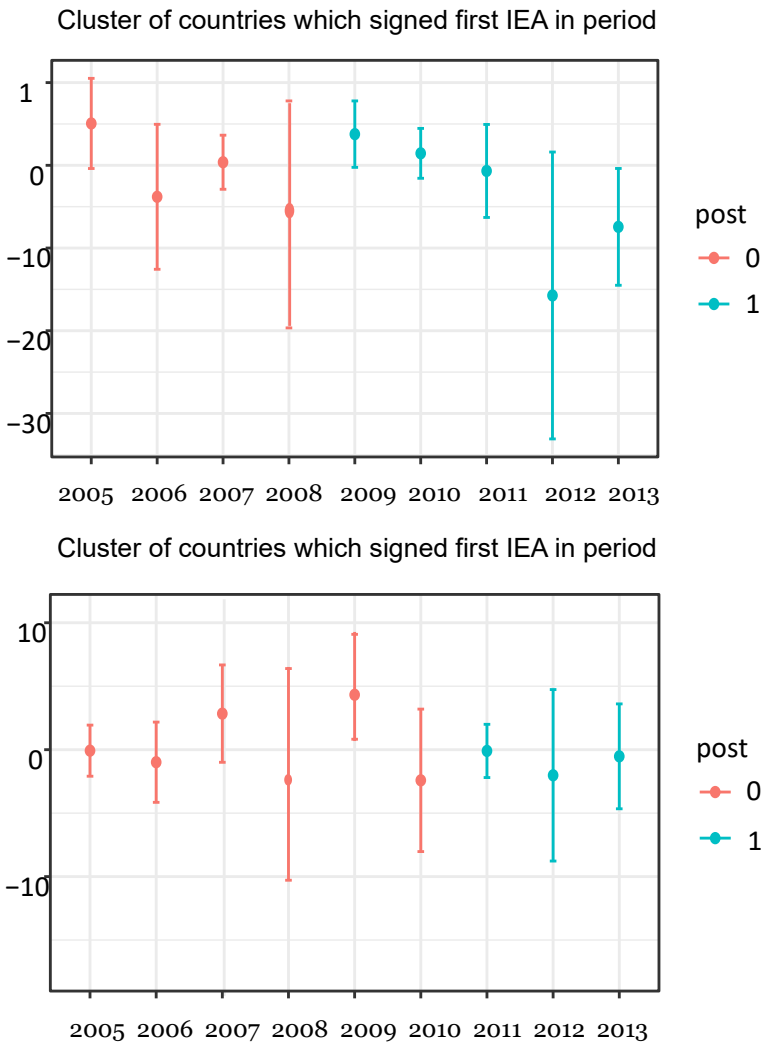


Figure 2.4: Group-Time Average Treatment Effects of IEAs on IFFs

For the clusters 2004-2007 and 2009-2011, the effect of IEAs on IFFs show a similar pattern over time with a negative impact at

the fourth year after but are poorly significant on the whole period. For the cluster 2011-2013, the impact of IEAs is not significant during the first three years.

Table 2.1 and Figure 2.5 reports the 3-cluster average effects of IEAs against IFFs depending on the number of years after the first agreement. More precisely, considering the length of exposure, the fourth, fifth and seventh years show negative ATT that are significant at 5% or 10% level. The estimated effects indicate that one or two years after the signature of an agreement, the amount of IFFs does not decrease. The negative impact of IEAs of IFFs appears only after the third year following the first agreement ($w = 3$). Nevertheless, this effect is not yet significant. Following the third year, the effect remains negative but become more significant. For instance, the IFFs decrease by 12 percentage points four years after the first agreement ($w = 4$). This effect is significant at 5% level. This suggest that treaties are effective when a country spends at least three years under cooperation.

Table 2.1: Average treatment effect by length of exposure

Dynamic Treatment Effects		
Length of treatment exposure (w)	***ATT (w)***	***SE***
1	**2.0192316**	**0.9120863****
2	0.8087342	1.844171
3	-1.586004	2.2152922
4	**-12.4866275**	**8.102213****
5	**-2.5916562**	**2.5497348***
6	-5.7497632	10.7427945
7	**-10.6267239**	**10.0838173***

***** 5% , * 10% significant level***

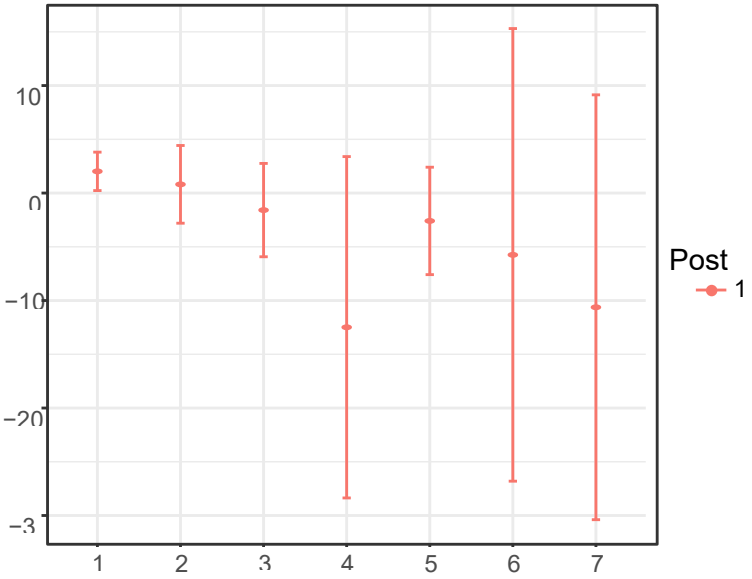


Figure 2.5: Average treatment effect by length of exposure to cooperation

The aggregated effect of IEAs on IFFs is estimated with the overall treatment effect (table 2.2), recalling that out of the 88 selected countries, 43 are treated countries and 45 non-treated countries (never been involved in cooperation through IEAs over the period). The overall ATT indicate that IEAs significantly decrease IFFs by about 4 percentage points. The algorithm used to compute these effects provides simultaneously the results for other aggregation procedures available in the DID with multiple time periods package (simple, selective and calendar)[18]. As stated above, this paper use the dynamic procedure.

[18] Details about these procedures are available at Callaway and Sant'Anna (2020), Getting Start with the DID Package, July 04, 2020: https://bcallaway11.github.io/did/articles/multi-period-did.html

Table 2.2: Overall Treatment Effects

Overall Summary Measures of ATT	***ATT***	***SE***
Simple	-2.801691	3.242502
Selective	-2.54296	3.242502
Dynamic	**-4.316116***	**3.910179**
Calendar	-1.586031	2.489882

The results support a stability of the negative sign of the impact of IEAs on IFFs whatever the aggregation procedure. However, this global effect is significant only when we use the dynamic aggregation method. This implies that the heterogenous effects of IEAs on IFFs depend on the length of exposure to cooperation.

2.6 Conclusion

International organizations and NGOs advocate more global transparency to combat illicit financial activities and many developed and developing countries have formed regional blocs or joined international cooperation for fighting IFFs. However, illicit funds channels are continuously spreading across the globe. Therefore, this raises questions about international cooperation's effectiveness.

This study applied a specific Difference-in-Differences (DID) estimation strategy to measure the causal effect of information exchange agreements (IEAs) on IFFs. The DID with multiple time periods allows us to estimate the dynamic effect regarding the number of years a country cooperate against IFFs and taking account of country heterogeneity. Tests are led on a sample of 88 developing countries over 2004-2013, that are gathered into

three groups regarding the period of the settlement year of the first IEA (2004-2007, 2009-2010 and 2011-2013). Countries that had not signed any IEA (before and) over the whole period are the control, non-treated, group.

We found that IEAs are effective against IFFs. Signing an IEA allows a country to fight against IFFs outflows, but only after three years under the agreement and that the effectiveness increases with time.

Overall, for the set of treated countries, over the 2004-2013 period, cooperation through bilateral information exchange has decreased IFFs outflows by about 4%. This would indicate that countries should sign IEA to fight against IFFs but also that they should reduce the gap between treaties settlement and effective enforcement.

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Appendix.

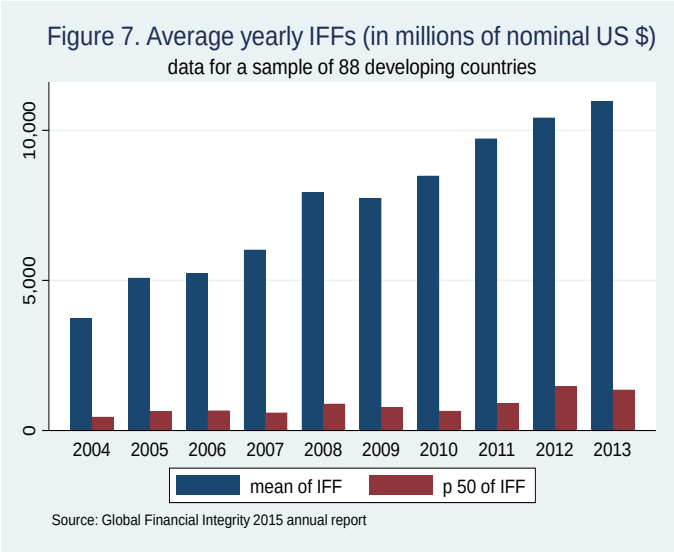
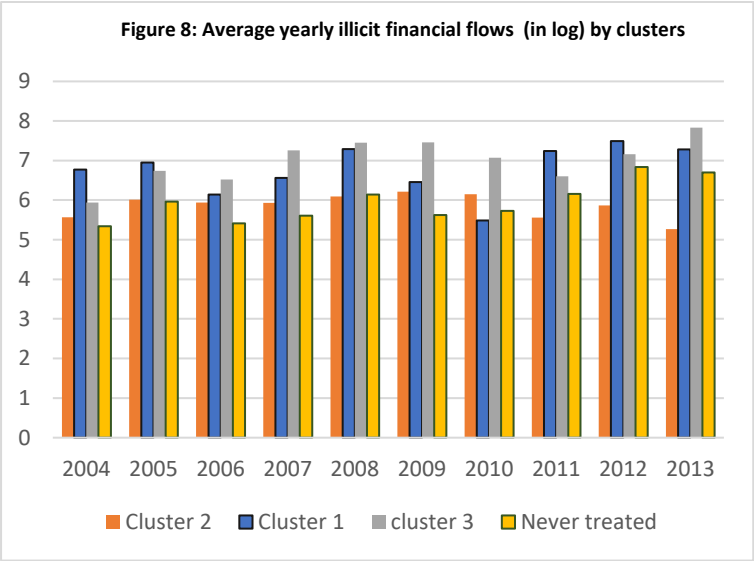


Figure 7. Average yearly IFFs (in millions of nominal US $)
data for a sample of 88 developing countries
10,000
5,000
0
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
mean of IFF
p 50 of IFF
Source: Global Financial Integrity 2015 annual report



Source: Global Financial Integrity 2015 annual report

Table B1 : Group time average treatment effect of IEAs on IFFs

Group of Treatment	***Time***	ATT_{it}	***SE***
2007	2005	5.7368671	4.016787
2007	2006	-5.1683907	2.072077
2007	2007	2.1474492	1.173134
2007	2008	3.0665782	2.389619
2007	2009	-3.8400888	5.934448
2007	2010	-8.4854062	10.974779
2007	2011	3.3764234	2.510293
2007	2012	-5.7497632	9.705153
2007	2013	-10.6267239	10.012834
2009	2005	5.0621344	3.137735
2009	2006	-3.8069322	4.300961
2009	2007	0.3736596	1.7791
2009	2008	-7.9387704	6.477167
2009	2009	3.7681284	1.909418
2009	2010	1.4489259	2.056814
2009	2011	-0.6822124	3.036721
2009	2012	-15.7376198	9.568868
2009	2013	-7.4407208	4.51219
2011	2005	-0.077575	1.106189
2011	2006	-0.9875846	1.656649
2011	2007	2.8413247	1.966725
2011	2008	-9.1935032	4.164218
2011	2009	6.510612	2.137682
2011	2010	-2.4161398	3.148419
2011	2011	-0.0985668	1.290463
2011	2012	-2.019483	3.93513
2011	2013	-0.5258298	2.469877

Table B2: Countries of the final sample

N°	Country	N°	Country	N°	Country	N°	Country
1	Aruba	23	Cape Verde	45	Kuwait	67	Poland
2	Albania	24	Costa Rica	46	Lebanon	68	Paraguay
3	United Arab Emirates	25	Djibouti	47	Liberia	69	Qatar
4	Argentina	26	Dominica	48	St. Lucia	70	Russian Federation
5	Armenia, Republic of	27	Dominican Republic	49	Lesotho	71	Rwanda
6	Antigua and Barbuda	28	Ecuador	50	Morocco	72	Saudi Arabia
7	Azerbaijan, Republic of	29	Egypt	51	Moldova	73	Senegal
8	Benin	30	Gabon	52	Madagascar	74	El Salvador
9	Burkina Faso	31	Georgia	53	Maldives	75	Seychelles
10	Bulgaria	32	Ghana	54	Mexico	76	Chad
11	Bahrain, Kingdom of	33	Grenada	55	Macedonia, FYR	77	Togo
12	Bahamas, The	34	Guatemala	56	Mongolia	78	Thailand
13	Bosnia and Herzegovina	35	Guyana	57	Mauritius	79	Trinidad and Tobago
14	Belize	36	Croatia	58	Malaysia	80	Tunisia
15	Brazil	37	Hungary	59	Niger	81	Turkey
16	Barbados	38	Indonesia	60	Nigeria	82	Tanzania
17	Botswana	39	India	61	Oman	83	Uganda
18	Chile	40	Jamaica	62	Pakistan	84	Ukraine
19	China, Mainland	41	Kazakhstan	63	Panama	85	Uruguay
20	Cote d'Ivoire	42	Kenya	64	Peru	86	St. Vincent and the Grenadines
21	Cameroon	43	Cambodia	65	Philippines	87	Samoa
22	Colombia	44	St. Kitts and Nevis	66	Papua New Guinea	88	South Africa

Table B3: Illicit Financial Outflows from the Top Ten Source Economies, 2004-2013 (Millions of nominal US dollars or in percent)

Rank	Country	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Cumulative	Average
1	China, Mainland	81,517	82,537	88,381	107,435	104,980	138,864	172,367	133,788	223,767	258,640	1,392,276	139,228
2	Russian Federation	46,064	53,322	66,333	81,237	107,756	125,062	136,622	183,501	129,545	120,331	1,049,772	104,977
3	Mexico	34,239	35,352	40,421	46,443	51,505	38,438	67,450	63,299	73,709	77,583	528,439	52,844
4	India	19,447	20,253	27,791	34,513	47,221	29,247	70,337	85,584	92,879	83,014	510,286	51,029
5	Malaysia	26,591	35,255	36,554	36,525	40,779	34,416	62,154	50,211	47,804	48,251	418,542	41,854
6	Brazil	15,741	17,171	10,599	16,430	21,926	22,061	30,770	31,057	32,727	28,185	226,667	22,667
7	South Africa	12,137	13,599	12,864	27,292	22,539	29,589	24,613	23,028	26,138	17,421	209,219	20,922
8	Thailand	7,113	11,920	11,429	10,348	20,486	14,687	24,100	27,442	31,271	32,971	191,768	19,177
9	Indonesia	18,466	13,290	15,995	18,354	27,237	20,547	14,646	18,292	19,248	14,633	180,710	18,071
10	Nigeria	1,680	17,867	19,160	19,335	24,192	26,377	19,376	18,321	4,998	26,735	178,040	17,804
Total of Top 10		262,994	300,565	329,526	397,912	468,623	479,289	622,435	634,524	682,086	707,765	4,885,718	488,572
Top 10 as Percent of Total		56.50%	57.30%	60.60%	56.90%	56.60%	64.20%	68.70%	63.00%	65.80%	64.90%	62.30%	
Developing World Total		465,269	524,588	543,524	699,145	827,959	747,026	906,631	1,007,744	1,035,904	1,090,130	7,847,921	784,792

Source: GFI, 2015 " Illicit financial flows from developing countries 2004-2013"

PART II

CURBING FINANCIAL CRIMES AND PROMOTE ECONOMIC STABILITY AND RESOURCES MOBILIZATION IN DEVELOPING COUNTRIES

CHAPTER 3

COUNTERING ILLICIT FINANCIAL FLOWS: A TECHNOLOGICAL APPROACH FOR BOOSTING TAX REVENUES IN AFRICA

Abstract

Drawing from a comprehensive analysis of data from 30 African countries over the period 1995-2018, our study provides valuables insights into how illicit financial flows (IFFs) affect the dynamic of tax revenue mobilization conditional to information and communication technology (ICT) development. Using panel data methodology, our results are twofold. First, the paper indicates that the level of tax revenue is negatively impacted by IFFs. Second, we find that the usage of digital technology counter the damaging effects of financial crime on tax revenue collection in developing countries. For instance, we find that ignoring digital technology, capital flight has a negative impact on corporate income tax (CIT) which drops by -0.046. However, in the presence of technological development, the combined effect of ICT and capital flight on CIT become positive and equal to 0.224. We argue that high digital penetration could be an alternative to curb illicit capital outflows and thereby improve tax revenue mobilization.

JEL Classification: H20, H26,
Keywords: Developing countries, Illicit financial flows, ICT, Tax revenue

3.1 Introduction

Tax evasion has significant consequences on the financing needs of many countries, including those in the African region. The United Nations Conference on Trade and Development (UNCTAD) in 2020 estimates that tax evasion losses in Africa amount to an average of $89 billion per year, which exceeds the GDP of countries such as Luxembourg, Bulgaria, Croatia, and Serbia. While Africa's infrastructure financing needs are estimated at between $67.6 and $107.5 billion, it is clear that these needs could be met if tax evasion losses were reduced. This could be achieved by dispelling the myth of capital flight and increasing revenue from taxes. Over the past two decades, there has been a significant decrease in the share of tax revenues in the world's total GDP. According to data from the World Bank, between 2005 and 2020, the tax revenue share to world GDP fell by approximately 0.5% (World Bank , 2022). Aslam et al., (2022) found that tax revenues were only 15% of African GDP in 2019, which is considerably lower than the mobilization capacity of developed economies (around 40% of GDP) and emerging economies (around 30%).

Ajahi and Léonce (2014) have identified two dimensions of capital flight in Africa, namely economics and institutions. The economic dimension pertains to the flow of funds, monetary policy, financial liberalization, and the financial system, while the institutional dimension covers natural resources, governance, tax evasion, safe havens, secrecy jurisdiction, and stolen assets. These factors contribute to the increasing incidence of capital flight in the African region. Ndikumana (2016) found that external borrowing and trade misinvoicing were significant channels of capital flight, in resource-rich countries. Although robust policies have been put in place to curb capital flight in Africa, significant financial losses persist.

The purpose of this study is to investigate how capital flight affects tax revenue mobilization (TRM) in Africa, and whether information and communication technology can influence the capital flight-TRM nexus. The potential impact of technological infrastructures on the decrease of capital flight in developing countries that may lead to increased tax revenues in developed countries is explored. Given the well-documented technological

gap between developed and developing countries, this paper evaluates the effects of ICT on tax revenues and capital flight. We anticipate that technological tools will interact positively to reduce capital flight, resulting in an increase in tax revenues from selected countries. The paper employs a mixed-method approach. Firstly, a theoretical framework is developed that considers the role of ICT in linking capital flight and tax revenues in two groups of countries - developed and developing countries. Secondly, an empirical method is used to estimate the effects of variables used in the paper. In this regard, the Generalized Method of Moments (GMM) is employed to quantify the effect of capital flight under ICT reform and its impacts on tax revenue. The empirical analysis considers the endogeneity of the tax revenue variable, and the panel data described herein. The outcomes of this study will assist policymakers in African countries to take appropriate measures to control and reduce capital flight from their respective countries. The study covers 35 countries from Africa, spanning the period 1970-2021, and data are sourced from various reliable sources such as the World Bank Indicator (WDI), (L. Ndikumana & Boyce (2021), and Adegboye et al. (2022a). These newly available data were obtained through the new approach developed by the pioneers in the field of good governance, including new countries to the previous database.

This paper aims to address the gap in the existing literature regarding the relationship between capital flight, tax revenue, and ICT reforms. While previous research has focused on governance to combat capital flight, we believe that adding an ICT reform component to the equation may alter the trend of capital flight over time. By examining the role of ICT in mitigating capital flight, we hope to contribute to a more comprehensive understanding of the complex issue of curbing capital flight. In addition, this study focuses specifically on African countries, which have been historically understudied in the context of capital flight. These countries are working under various agreements to address capital flight and improve public finance, making our findings particularly relevant for policymakers in these regions. By providing clear policy recommendations based on empirical evidence, this study can help these countries take informed action to reduce capital flight and strengthen their economies. Overall, this paper represents a significant contribution to the field of international finance, offering new insights into

the relationship between capital flight, tax revenue, and ICT reforms, and highlighting the importance of focusing on Africa in this discussion. We hope that our research will inspire further exploration of this topic and lead to more effective policies to combat capital flight and promote sustainable economic development. The reminder of this paper is as follow. Next section gives insights on how the paper is situated in the existing literature. Section 3 describes the data, and the methodology applied to assess the contribution of ICT in controlling illicit financial flows and thereby affecting countries' tax revenue. Section 4 presents the results and test the sensitivity of these findings to alternative specification. Section 5 concludes and provides some policy implications of the different results.

3.2 Literature Review

Capital flight is defined as a thread and should be eliminated to strengthen domestic investment planning argued John Maynard Keynes and he recommended that central bank should get an exclusive control of inward and outward financial movements of a country (Crotty, 1983). Cuddington (1986) defined capital flight as a short-term speculative capital outflow meaning that shift in domestic portfolio towards foreign liquid assets. Specifically capital flight is the export of capital by the private nonbank sector. Thus, the broad definition of capital flight depends on the country jurisdiction of controlling or adopting a laissez-faire policy arose a real issue relating to quantifying the variable capital flight. Although there are conceptual measurements problems with capital flight, empirical studies on capital flight existed in the literature using various estimations tools.

Most of the studies on capital flight either focused on the nexus between capital flight and development either look at the relationship between tax revenues and ICT. Recently, Sodji (2022) investigated the relationship between capital flight and economic growth within the ECOWAS region. The residual method is employed over 46 years, and it is found that in the long run, capital flight significantly reduces economic growth in countries. It is recommended that improving governance, strengthening the quality of institutions, and promoting a stable policy environment may reduce capital flight. In broadly manner, Agyeman et al. (2022) used a dynamic generalized method of moments (GMM) between 2000 and 2015 to estimate the effect

of capital flight and external debt on economic growth for 27 SSA countries. The impact of capital flight effect on economic growth was found to be negative and statistically significant. Study made by Ogieva & Oshodin (2022) on capital flight and development covers 46 SSA where capital flight is represented by Foreign Direct Investment Outflows (FDIO). They found that FDIO negatively affect development in SSA countries. Also, the work done by Salisu & Isah (2021) on a sample of 28 African countries covered the period 1986-2010. They employed the Mean Group and Pooled Mean Group estimators to analyse the effect of capital flight on growth in these selected countries. They found that capital flight has more devastating effects on long run growth of the oil-exporting region than their non-oil counterpart. An emphasis has been made on selected countries, Boyce & Ndikumana (2012) estimate the capital flight in Africa over the period 1970-2010. Over 33 countries in SSA, the top five countries with high amount of capital flight are: Nigeria, Angola, Cote d'Ivoire, South Africa and Sudan.

The capital flight phenomenon is also seen at firms' levels, Johannesen & Pirttilä (2016) found evidence that firms operate profit shifting via transfer pricing for developed countries as well as developing countries. For developing countries, this practice of profit shifting by multinationals has a negative impact on revenues due to their dependance on corporate income. However, developing countries should improve their consumption and income taxation capacity through instruments responsible for raising the bulk of the tax revenue. Ahmed et al. (2020) argued about the possible link between multinationals, tax haven and foreign direct investment. The study employed data from 19 developed economies and about 35 000 multinational enterprises. The study found that multinationals enterprises that have a subsidiary in developing countries refers to tax havens in developing countries with high capital flight rate.

Many studies (Haykal Amal & Kartika, 2021; Casi et al., 2020; Leenders et al., 2023; Kvasha et al., 2019) identified innovative mechanisms to reduce capital flight loss. The Global Financial Integrity (2017) recommended 6 practices that may affect capital flight and among which there are Anti-Money Laundering, Beneficial Ownership of Legal Entities, Automatic Exchange of Financial Information, Country-by-Country Reporting, Curtailing Trade Misinvoicing and Addis Tax Initiative. Ofoeda et al., (2022)

argued about the effect of Anti-money laundering regulations on the financial sector in 165 economies. They use the Prais-Winsten approach and the panel threshold estimation to find that anti-money laundering regulations promote financial sector development in developing economies. Therefore, anti-money laundering has a positive effect in developing countries. Another study on the effectiveness of Anti-money laundering has been conducted by Gerbrands et al. (2022), the study found that after the announcement of the fourth EU anti-money laundering directive in 2015, money laundering networks show a significant increase in the use of foreigners and corporate structures. Further, Beer et al. (2019) analyzed the impact of exchange of information between 39 countries over the period 1995-2018. They found that recent automatic exchange of information frameworks reduced foreign-owned deposits in offshore jurisdictions by an average of 25 percent. Over the last decade scholars have shown a particular interest in assessing the effectiveness of tax-related information exchange agreements. In fact, in the aftermath of the 2008's financial crisis, the G20 and the OECD highly committed to crack down tax havens and curb tax evasion (Johannesen & Zucman, 2014). As a results, they urge country members to sign at least 12 information sharing agreements with other partners. This results in many empirical assessments of these anti-corruption and transparency tools (Traore et al., 2023; Jansky, Knobel, et al., 2018; Jansky, Meinzer, et al., 2018). For instance, Traore et al., (2023) carried out a regression to test if information exchange agreements enhance tax revenue collection in Africa. Using a sample of 54 African countries spaning 1990-2020, they found that tax revenue increases with exchange of information for tax purpose.

The abovementioned literature found little evidence concerning the possible relationship between capital flight and tax revenues under ICT reform. The outcome of such an investigation will add to the existing literature another orientation in the field of capital flight. In fact, over the last decades, many African countries have established important regional and international trade agreements. However, this part of the world is still unbalanced in terms of economic capacity, but only few has been made to accelerate the reduction of capital flight in this region.

In the next section, we present the data, and the methodology applied to assess the role of information and communication technology in curbing capital flight and enhancing tax revenue collection in developing countries.

3.3 Theoretical framework

Why do individuals and corporates evade tax? Referring to the taxation theory as underlined by Sandmo (2005), a good tax system in which the costs of administration are low is more likely to minimize tax evasion. This theory underlined the key role of administration costs in preventing the distortion of price mechanism which may affect incentives in the tax system. The modern taxation theory points out two types of costs related to the collection of tax. First, the costs supported by public tax authorities in assessing tax liabilities, reviewing tax returns, and pursuing tax evaders. Second, the costs that taxpayers carry by spending time understanding tax rules and fill out tax forms. A striking aspect of these distortion costs can be highlighted in the case of firms mandated by the government to collect tax such VAT for the administration. If the processes of tax collection and declaration are time and money consuming then those firms are likely to fail their duties resulting in loss of tax revenue. Therefore, an inefficient tax system that generates additional costs for tax collectors and taxpayers may result in less compliance and important evasion of tax. As a results, minimizing tax evasion require a tax system with low costs of administration.

The ability of a government to mobilize tax revenue is a key determinant of what economic scholars have called "the state capacity" (Besley & Persson, 2009; Savoia & Sen, 2015; Pomeranz & Vila-Belda, 2019; Prummer & Squintani, 2023). This concept refers to the ability of a government to resolve administrative problems of varying complexity such as tax collection (Prummer & Squintani, 2023). The ability to mobilize tax revenue in fact measures a state's ability to survive by designing and enforcing rules and regulations. A state disability will demonstrate its failure and which in turn expose some citizens to oppression by others (Englehart, 2009). Therefore, strong institutional and administrative frameworks are required to boost state capacity. Better institutions are more likely to protect property rights and promote private investments leading to higher taxable income. However, such good institutions and effective administrations are often the

outcome of important public investment in R& D and infrastructures that enhance administrative management and processes. Theoretically, a well-equipped administration is more likely to perform better than a less equipped one. In that perspective, information and communication technology (ICT) may enhance administrative capacities in terms of quality and effectiveness. In the specific case of tax administration, we assume that the ICT development can provide huge support for tax collection. At the theoretical level, the description of the link between ICT and increased tax revenue remain scarce in the economic literature as underlined by Mallick (2021) who argues that digital technology may influence tax revenue mobilization through the channel of governance. In fact, Mallick (2021) assumes that in lack of a good institutional background the contribution of ICT systems to tax revenue mobilization will be unsignificant. Yet, we argue that this statement must be taken with caution given the potential endogeneity bias between the two concepts. In fact, the willingness of a state to promote governance can induce a higher ICT penetration. Otherwise, some scholars (Asongu & Nwachukwu, 2019; Sabani et al., 2019) argue that digital technology can contribute to law enforcement an improved governance. Our prediction on the role of ICT with regard to tax revenue enhancement can be explained via the increase of tax compliance and the reduction of the compliance costs. First, ICT may contribute to tax revenue mobilization by reducing compliance costs and providing incentives to taxpayers. The case of electronic payment can illustrate such a mechanism. In fact, when tax authorities make electronic tax payment tools available to taxpayers, tax payments can avoid transport costs and take less time. Second, digital technologies can reduce tax evasion and improve taxpayers' compliance. In fact, internet usage or spatial technology can provide information on tax loopholes and reduce tax crimes. These infrastructure enable access to better information by tax authorities and improve automatic exchange of information among different administrations. For instance, with regard to trade misinvoicing, accurate information are necessary to detect and prevent fraudulent invoicing of goods value which represent an important source of illicit financial flows. ICT development enable real time information sharing between tax authorities at the global level leading to higher tax revenue (Traore et al., 2023).

3.4 Data and Methodology

This section describes the variables and data sources used in the paper then presents the methodology.

3.4.1 Data

Based on a sample of 30 African countries, the current study spans the period 1995-2018 with a focus on ICT role on the capital flight-tax revenue nexus. We assume that ICT adoption in Africa would likely mitigate the negative effects of capital flight on tax revenue mobilization.

Mainly, data are extracted from the world development indicators, UNIWIDER government revenue database.

We use capital flight data from Ndikumana & Boyce (2021) where capital flight are computed as outflows from a country to another jurisdiction for tax avoidance purpose. Indeed, capital flight are broadly seen as illicit because such flows result in illegal activities that are not declared to tax and financial authorities and reduce tax payment on wealth and assets. Capital flight are generally illicit financial flows (IFFs), however IFFs stand beyond the scope of capital flight. For instance, bribery and payments for smuggled imports are illicit flows but distinct from capital flight.

Regarding ICT, several measures are provided by the literature. For instance, Ofori et al., (2022) propose a classification of ICT into three groups encompassing access, usage, and skills. The most popular measures of information and communication technology that we use in this paper are provided in table C.1 (see Appendix).

The summary statistics based on our sample show that on average, 3.042% of people have an active analogue fixed telephone line. This highlights that in general African countries experience weak usage of fixed telephone. However, mobile cellular is the most used ICT component with an average usage of 39.08% of people. The World Bank defines mobile cellular

telephone subscriptions as subscriptions to a public mobile telephone service that provide access to the PSTN[19] using cellular technology.
To capture the level of ICT penetration in each country, we use variables such as the degree of fixed broadband subscriptions, mobile phones subscriptions, fixed telephones subscriptions internet users is used for that purpose. The fixed broadband allows high-speed data transmission and includes technologies such as T1, cable, DSL[20] and FIOS[21]. The average fixed broadband subscription (0.95 percent) shows that internet quality is still a problem in many African countries, which explains why electronic data transmission can take time.
Internet users corresponds to the number of persons that have used the internet (from any location) in the last 3 months. While mobile phones subscriptions refer to the subscriptions to a public mobile cellular service which provides access to the Public Switched Telephone Network (PSTN) using cellular technology. It includes postpaid and prepaid subscriptions and includes analogue and digital cellular systems[22]. The World Bank defines fixed telephones subscriptions refers to the sum of active number of analogue fixed telephone lines, voice-over-IP (VoIP) subscriptions.

The paper use several variables as tax revenue measures namely corporates income tax (CIT), individuals income tax (IIT) and tax on international trade (TIT) because of their potential link with ICT usage and that such tax revenue are more likely to experience illicit outflows. In fact, the literature on tax evasion has stressed tax avoidance by multinational companies as a most widely recognize tax injustice (Leask, 2020). Moreover, recent tax scandals such as Swiss leaks, Panama and Pandora Papers etc. have shed light on the potential illicit activities related to individual income tax evasion. Therefore,

[19] PSTN is defined as public switched telephone network. It includes all the switched telephone networks in the world operated by local, national or international operators. These networks provide the infrastructure and services for public telecommunications.
[20] DSN is defined as deep space network. It technological infrastructure used for communications with its interplanetary space probes and for a number of missions in orbit around the Earth.
[21] FIOS, fiber optic service is an internet, TV and phone service from Verizon that employs optical fibers from the telephone company's facilities into individual homes and offices.
[22] Cellular phone subscribers (per 100 population) (who.int)

we focus the analysis on capital flight-IIT nexus and how ICT can improve individual income tax collection.

Tax on international trade is our last measure of tax revenue defined as tax charged on the value of products that flow into and out of a country, notably in the form of import and export duties. International trade represent an important source of illicit financial flows due to trade misinvoicing. Trade mispricing is the falsification of price, quality and quantity of traded goods for many purposes such as evading custom duties. The usage of ICT in tax administrations or customs for example with pre-shipment inspection can contribute to the detection of mispricing or fraud and enhance tax revenue.

While, ICT and capital flight may influence tax revenue oppositely, other factors related to economic performance and macroeconomic stability can also affect tax revenue mobilization in developing countries. As a results, we control for these effects by including variables such as GDP growth, inflation and the degree of industrialization (proxied by manufactured value added) in the right-hand side of our model. Additional control variables namely FDI and remittances are also added to the model. All these control variables are defined in table C1 (see appendix) and are extracted from the World Development Indicators.

Otherwise, the pairwise correlation matrix presented by table C6 (appendix) shows that capital flight is negatively correlated with tax revenue and other variables except for public debt (column 1 and 2). This is consistent with the empirical literature that capital flight can be fueled by governments' external borrowing and yet impedes economic progress (Ndikumana and Boyce, 2003, 2011; Leykun Fisseha, 2022). Column (3) to (7) highlight that most of the ICT infrastructures types positively affect tax revenue and economic performance. In order to better understand the causal link between our variables of interest, it would be interesting to apply a more robust econometric approach. The section below describes the model and estimation strategies used in the current paper.

3.4.2 Stylized facts

This section describes the dynamics of the variables of interest in this study.

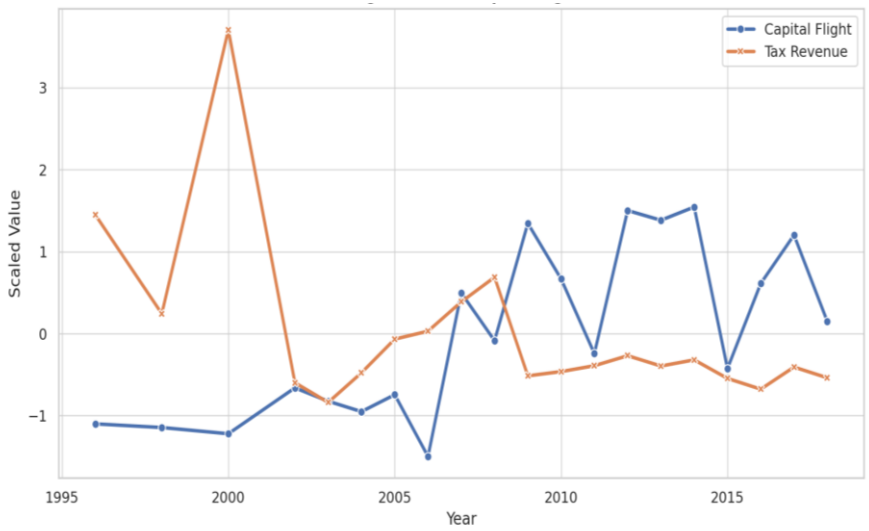


Figure 3.1: Scaled annual average values of capital flight and tax revenue (*Author calculation)*

Figure 3.1 displays how the scaled values of capital flight and tax revenue have fluctuated over the years. Since the data is scaled, the focus is on the trend and variability rather than absolute values. The graph reveals different patterns of variability for the two variables. Capital flight shows more pronounced fluctuations, suggesting more volatility in capital movements in and out of the country. On the other hand, tax revenue appears to be more stable, indicating a relatively consistent government revenue system in comparison, albeit with some noticeable variations.

There are points on the graph where the trends of capital flight and tax revenue converge or diverge. Convergence might suggest periods where government revenue as a percentage of GDP increased as capital outflows

decreased, possibly indicating economic stability or effective financial governance. Divergence, especially where capital flight increases as tax revenue decreases, might point towards economic or political instability, prompting capital outflows and reducing the government's revenue base. For policymakers, understanding these trends is crucial. Periods of increased capital flight might require policy interventions to stabilize the economy and retain capital. Conversely, stable or increasing tax revenue trends could indicate effective tax policy or economic growth. The interaction between capital flight and tax revenue can have broader implications for fiscal stability, investment in public services, and overall economic confidence.

The above graph (Figure 3.1), especially when examined over a consistent timeline, provides a visual tool for understanding the interplay between external economic pressures (capital flight) and internal fiscal health (tax revenue), which is vital for strategic economic planning and policymaking.

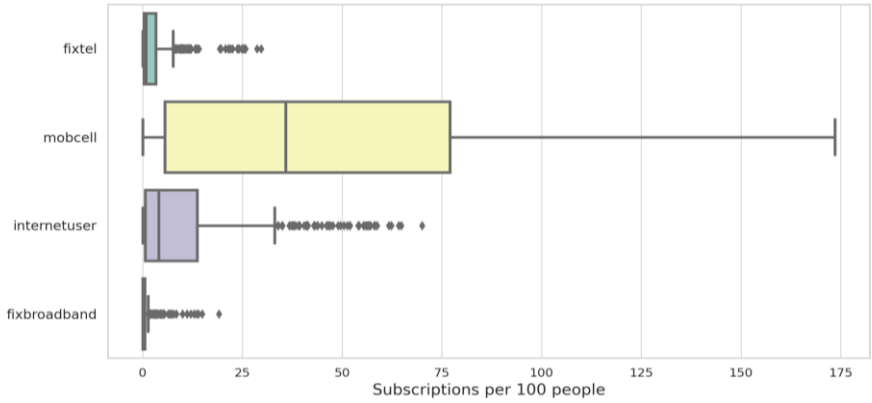


Figure 3.2: Box plots of Telecom Indicators (Author calculation)

Figure 3.2 displays the box plots of telecom indicators. The distribution of Fixed Telephone Lines (fixtel) is relatively compact, indicating less variation across countries. The median (middle line in the box) is quite low compared to other indicators, suggesting that on average, fewer people have fixed telephone lines per 100 inhabitants. There are some outliers on the higher end, showing that a few countries have unusually high fixed line penetration.

Concerning Mobile Cellular Subscriptions (mobcell), the value are ranged broadly, with a higher median, indicating that mobile phone usage is extensive and more evenly spread across different countries. The spread from the lower to upper quartile is wide, suggesting significant variability in mobile phone penetration rates among countries. Few outliers indicate that most countries fall within a standard range, though some have exceptionally high mobile cellular subscriptions.

The distribution of internet users per 100 people also varies widely, with a median that suggests moderate penetration. The widespread between the quartiles indicates that internet access varies greatly across different countries. Similar to fixed Telephone lines, there are several outliers suggesting that some countries have significantly more internet users per capita than others. Fixed Broadband Subscriptions (fixbroadband) has a lower median compared to mobile cellular subscriptions, reflecting less penetration in fixed broadband services. The values for this digital asset show moderate spread, indicating a reasonable amount of variation in fixed broadband availability among countries. The upper end outliers suggest that a few countries have high levels of fixed broadband subscriptions.

Overall, the box plots highlight that while mobile cellular subscriptions are quite common and broadly distributed, fixed broadband and internet usage show significant variation, indicating differing levels of technology adoption and infrastructure development across countries. Fixed telephone lines are generally less common and less variable, potentially being phased out or overtaken by mobile and broadband services.

Table 3.1: Pearson Correlation Coefficients

Indicator	**Correlation with transformed capital flight**	**Correlation with Original capital flight**
Fixtel	-0.086	-0.061
Mobcell	0.069	0.097
Internetuser	0.055	0.080
Fixbroadband	-0.026	-0.028

Source: Author calculation

Table 3.1 presents the correlation coefficients between various telecommunications indicators and the level of capital flight (transformed capital flight and original capital flight). Regarding Fixed Telephone Lines, the results indicate that correlations are negative and relatively low, indicating a weak inverse relationship. As the number of fixed telephone lines increases, capital flight slightly decrease.

However, the correlation between mobile cellular subscriptions and capital flight is positive indicating an enabling effect of mobile cellular. Mobile cellular can influence the level of cross-border financial trade via international mobile money services and the challenge that many developing jurisdictions can face in controlling and taxing these transactions. Nevertheless, the contribution of mobile cellular subscription to capital flight has not been clearly established in the economic literature. Similar to mobcell, the number of internet user is positively related to capital flight indicating that an increase in internet users is slightly associated with an increase in capital flight. Finally, fixed broadbands are inversely related to capital flight showing that digital infrastructures contribute to fight against corruption and prevent capital flight. Overall, the interaction between technological development, financial crime and compliance must be interpreted with caution. It is essential to consider the broader context and how technology interacts with economic factors. So as argued by the World Bank[23], policymakers should balance between technological advancement and economic stability. Moreover, any argument on the link between digitalization and transparency should be based on empirical evidences not only on theoretical assumptions. In the following, we describe an empirical approach to assess the role of digital technology in countering criminal activities and enhancing resources mobilization.

[23] http://documents.worldbank.org/curated/en/736611492123483697/Capital-flight-estimates-issues-and-explanations

3.5 Methodology

Along with above mentioned determinants of tax revenue, we follow existing literature on tax revenue mobilization by including the lag of the endogenous variable in the model (Adegboye et al., 2022; Ofori et al., 2022; Gnangnon, 2022). Previous studies assume that current performance of tax revenue mobilization is influenced by the level of past performance. As a results, we choose a one lag period of the tax revenue ratio. This paper has two objectives namely it assesses the impact of capital flight and ICT on tax revenue mobilization separately and evaluate capital flight effect on tax revenue mobilization in presence of information and communication technology infrastructures. Therefore, we include interaction terms between capital flight and different type of ICT variables. Definitely, we use the following dynamic model (1) for empirical estimation.

$$TAX\_REV_{it} = \lambda_0 + \alpha_i + \mu_t + \beta_1 TAX\_REV_{i\,t-1} + \beta_2 KFLIGHT_{i\,t} + \beta_3 ICT_{i\,t} + \beta_4 (ICT_{i\,t} * KFLIGHT_{i\,t}) + \sum_{k}^{p} \theta_k X_{k\,i\,t-\tau} + \varepsilon_{it} \quad (1)$$

Where TAX_REV_{it} and TAX_REV_{it-1} are our variables of tax revenue mobilization representing the level of tax revenue as a share of GDP (%GDP) for country i at time t and $t-1$. $KFLIGHT$ stand for the proportion of capital flight (%GDP) experienced in each country. $ICT_{i\,t}$ is the information and communication technological variable for country i at time t. λ_0 is a constant. α_i and ; μ_t are respectively the time-invariant country fixed effect and the time dummy variables. β_1 and β_1 give respectively the impact on tax revenue of the lag(1) of tax revenue and capital flight. X_k is a set of additional control variables (GDP growth, FDI, MVAD, ICT etc.) p gives the number of these additional control (except for the endogenous lag and capital flight). θ_k states for the k^{th} additional control variable effect on tax revenue. While τ denotes the coefficient of autoregression that is set to one in the case of this study. Finally, ε_{it} gives the idiosyncratic error term.

Otherwise, following Ofori et al. (2022), we estimate bivariate relationships between tax revenue, capital flight, and the different ICT variables resulting from the two bivariate models (2) and (3).

$$TAX\_REV_{it} = \lambda_0 + \delta_1 KFLIGHT_{i\,t} + \varepsilon_{it} \quad (2) \qquad ; \qquad TAX\_EV_{it} = \lambda_0 + \gamma_1 ICT_{i\,t} + \varepsilon_{it} \quad (3)$$

Model (2) and (3) are estimated using Ordinary Least Square strategy (OLS) and the results are gathered in table 3.2 and in appendix (C4; C5).
Estimation of coefficients β_2 , β_3 and β_4 in model (1) provide important information for our analysis. In fact, β_2, and β_3 give the unconditional effect of capital flight and ICT penetration on tax revenue mobilization respectively. Moreover, the conditional effect of capital flight and ICT on domestic resource mobilization is obtained from the variation of TAX_REV_{it} following a one-unit variation of capital flight (4) and ICT component (5)

$$\frac{\partial(TAX\_REV_{it})}{\partial(KFLIGHT_{it})} = \beta_2 + \beta_4(ICT_{i\,t}) \qquad (4)$$

$$\frac{\partial(TAX\_REV_{it})}{\partial(ICT_{it})} = \beta_3 + \beta_4(\overline{KFLIGHT}_{i\,t}) \qquad (5)$$

Where $\overline{ICT}_{i\,t}$ and $\overline{KFLIGHT}_{i\,t}$ are respectively the mean of the technological and capital flight variables selected in the case of this study. The specification of model (1) arises a number of concerns about the validity of the estimated coefficients β_1 ; β_2 , β_3 ; β_4 and θ_k and restrict suitable estimation strategies. The first problem arising from the estimation of model (1) is related to endogeneity. Endogeneity can be caused by simultaneity between the endogenous and its lagged independent variable but also by reverse causality between the endogenous and other control variables. Therefore, we adopt a two-step System Generalized Method of Moments (GMM) estimation strategy of Arellano and Bover (1995) and Blundell and Bond (1998). More specifically, the paper relies on the two-step system GMM estimation process of Roodman (2009) with a comprehensive implementation guide. Another argument favoring GMM is the number of time periods (T) and cross-

sections (N) of our sample where N>T. GMM is also robust to heteroskedasticity and autocorrelation within individuals (Roodman, 2009). Various empirical works have used GMM, and its effectiveness is well documented. Therefore, we adopt a two-step system GMM to assess the effect of capital flight on tax revenue mobilization and how technology enhances domestic resources.

3.6 Results

This section describes the results from different estimations using OLS and two-step system GMM approaches. In the following, we begin by the bivariate estimations results.

The tables 3. 3 presents empirical evidence regarding the impact of capital flight and ICT development on tax revenue mobilization. The findings indicate that tax revenue collection is negatively affected by capital flight, while it is enhanced by technological development. Specifically, all tax revenue variables exhibit negative effects due to capital flight with lags. This implies that the drain of financial resources caused by capital flight today will affect the amount of tax revenue collected by tax authorities tomorrow. As a result, capital flight is likely to decrease the tax potential in countries experiencing important outflows. Furthermore, we observe that the coefficient of capital flight for lag(2) is higher and statistically significant than lag (1). This results suggest that capital flight has an a priori adverse effect on tax revenue mobilization in Africa. Moreover, this negative impact on tax revenue become strong in the medium term (from two years after). In fact, by compromising growth perspectives, capital flight undermine progressively economic performance thereby decreasing future tax revenue. On the contrast, ICT development has a priori positive effect on tax revenue mobilization. The coefficient of most ICT variables are positive and statistically significant at 5% level at least. The next part of this section provides results from the two-step system GMM.
Before analyzing the different estimations, we check the GMM validity in line with the statistical requirements stressed in GMM literature (Blundell and

Bond, 2000; Andrews, 2018) and many empirical works (Abdallah et al., 2015; Asongu and De Moor, 2017; Adegboye et al., 2022 among others). The post diagnostics information criteria (below table 3.3) suggest that our two-step system GMM estimators are valid. First, we observe that for all specifications, estimations accept the null hypothesis of the presence of first-order serial correlation
in the first-differenced error term (AR(1)) and no second-order autocorrelation in the first-differenced error term (AR(2)). Second, the hypothesis of the joint validity of instruments used in the regressions is also accepted since all the Hansen p-values are statistically insignificant. Third, the number of instruments is consistently lower than the number of countries across all columns of the different estimation tables.
Otherwise, the coefficient of the lag of the dependent variable is positive and statistically significant at the 1% level, which confirms the findings of previous studies that tax revenue performance exhibits a state-dependence path. As a results, it confirms the appropriateness of our dynamic model (1). Overall, the post diagnostics information criteria stress the appropriateness of using the two-step system GMM approach in the case of this study.
In the next step, we analyze the estimates from column [1] to [11] of results table 3.3.
Results show that capital flight is detrimental for corporate income tax (CIT). In fact, capital flight coefficients are negative and statistically significant at 1% level for all the specifications columns and whatever lag 1 or 2. By focusing on estimation (1), the average effect of capital flight on corporate income tax is [-0.0378] for capital flight at lag 1. It implies that a 1% increase in capital flight today (year T) will induce tomorrow (year T+1) a decrease of CIT of 0.038%. The highest decline of CIT [-0.061%] is obtained in column (6). As stated above, all these coefficients are significant at 1% level.

Regarding ICT, estimations show that technological development improve tax revenue collection in Africa. This results are in line with previous findings with regard to the contribution of ICT to government revenue enhancement. The findings show that all the ICT components used in this paper positively affect tax resources at a significant effect level of 5% to 1%. For instance, the percentage of individuals using the internet in the population has a

coefficient of 0.0514 at 1% level of significance. This suggest that a 1% additional increase of individuals using the internet enhance CIT revenue by 0.051% of GDP. Besides, with fixed broadband and fixed telephone subscription, the amount of CIT revenue generated is 0.115% and 0.125% of GDP respectively. Such a contribution to domestic resources mobilization is important given the constraints of external financing sources. The contribution of ICT to economic outcomes is documented by numerous empirical works (Shokrkhodaei & Salatin, 2018; Gnangnon & Brun, 2018; Adegboye et al., 2022).

Table 3.2: Bivariate results for the effect of capital flight and ICT on corporate income tax (CIT)

Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**
Kflight_lag 1	-0.0327						
	(0.0307)						
Kflight_lag 2		-0.0665***					
		(0.0125)					
Fixed Telephone			0.1569**				
			(0.0621)				
Mobile Cellular				0.1614***			
				(0.0440)			
Fixed Broadband					0.1393***		
					(0.0382)		
Internet Users						0.1554***	
						(0.0483)	
ICT goods Export							0.0015
							(0.0688)
_cons	2.2587***	2.2944***	1.7049***	1.9664***	3.1953***	2.2405***	2.6161***
	(0.0067)	(0.0027)	(0.2092)	(0.0828)	(0.0860)	(0.0087)	(0.1332)
N	458	438	479	456	251	459	319
N_g	26	26	26	26	24	26	24
r2_b	.0043	.0034	.7228	.2683	.4638	.4527	.126
r2_w	.0024	.0105	.0447	.1831	.0742	.155	3.5e-06

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

Table 3.3: SYSTEM-GMM results for the interacted effect of capital flight and ICT on corporate income tax (CIT) revenue

Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**
L.Corporate Tax	0.9719***	0.9673***	0.9647***	0.8485***	0.9597***	0.9585***	0.9706***	0.9618***	0.8481***	0.9391***	0.9120***
	(0.0075)	(0.0063)	(0.0094)	(0.0205)	(0.0125)	(0.0168)	(0.0065)	(0.0087)	(0.0167)	(0.0096)	(0.0144)
L.Kflight	-0.0575***	-0.0398***	-0.0522***	-0.0378***	-0.0515***	-0.0614***	-0.0439***	-0.0459***	-0.0485***	-0.0409***	-0.0459***
	(0.0028)	(0.0026)	(0.0028)	(0.0044)	(0.0039)	(0.0043)	(0.0018)	(0.0028)	(0.0036)	(0.0031)	(0.0046)
L2.Kflight	-0.0476***	-0.0490***	-0.0422***	-0.0370***	-0.0429***	-0.0387***	-0.0896***	-0.0681***	-0.0297**	-0.0599***	-0.0559***
	(0.0013)	(0.0008)	(0.0011)	(0.0020)	(0.0014)	(0.0016)	(0.0254)	(0.0170)	(0.0116)	(0.0129)	(0.0136)
GDP_growth	0.1122***	0.1252***	0.0902***	-0.0016	0.0996***	0.0656	0.1129***	0.0885***	0.0425	0.0988***	0.0678
	(0.0301)	(0.0270)	(0.0268)	(0.0484)	(0.0320)	(0.0552)	(0.0319)	(0.0219)	(0.0445)	(0.0291)	(0.0505)
FDI	0.0669***	0.0911***	0.0541**	0.1309***	0.0685***	0.1668***	0.0687***	0.0595***	0.0718***	0.0710***	0.1703***
	(0.0234)	(0.0212)	(0.0206)	(0.0322)	(0.0187)	(0.0314)	(0.0193)	(0.0142)	(0.0336)	(0.0150)	(0.0331)
Manufac_VAD	0.1392***	0.1475***	0.1142***	0.0567	0.0834***	-0.0206	0.1207***	0.1135***	0.0939	0.0643***	0.0512
	(0.0283)	(0.0197)	(0.0225)	(0.0976)	(0.0236)	(0.0850)	(0.0215)	(0.0201)	(0.0692)	(0.0185)	(0.0740)
Year	0.0002	0.0040**	-0.0087	-0.0432***	-0.0158**	-0.0079	0.0041**	-0.0094**	-0.0284***	-0.0239***	-0.0049
	(0.0024)	(0.0016)	(0.0054)	(0.0064)	(0.0062)	(0.0059)	(0.0015)	(0.0046)	(0.0043)	(0.0046)	(0.0050)
Fixed telephone s.		**0.1252*** **					0.1239***				
		(0.0113)					(0.0077)				
Mobile cellular s.			**0.0334** **					0.0344**			

			(0.0157)					(0.0144)			
Fixed broadband s.				**0.1150*****					0.1055**		
				(0.0100)					(0.0084)		
Internet users					**0.0514****					0.0778***	
					(0.0212)					(0.0146)	
ICT goods_export						**0.1050*****					0.0954***
						(0.0256)					(0.0170)
Kflight **x** Fixed Tel.							0.0126				
							(0.0081)				
Kflight **x** Mobile cel.								0.0069*			
								(0.0036)			
Kflight **x** Fixed broad.									-0.0105		
									(0.0076)		
Kflight **x** Internet Use										0.0066*	
										(0.0034)	
Kflight **x** ICT_export											-0.0080**
											(0.0037)
_cons	-0.9211	-8.4495**	17.1457	87.3648***	31.4143**	15.8752	-8.6000**	18.5642*	57.5142***	47.7872***	9.8482
	(4.8632)	(3.2158)	(10.8704)	(13.0150)	(12.4064)	(12.0265)	(3.0941)	(9.1531)	(8.5817)	(9.2535)	(10.2790)
N	366	366	357	210	361	255	360	357	205	359	245
ar1p	.0105	.009	.0107	.0139	.0107	.0168	.0095	.0114	.0155	.013	.0206
ar2p	.163	.2575	.1651	.3009	.1609	.2139	.2897	.1654	.2885	.1658	.2257
hansenp	.286	.2595	.2676	.3477	.2787	.4247	.6138	.4078	.3132	.3205	.3101
j	17	20	20	20	20	20	23	23	23	23	23
N_g	26	26	26	23	26	24	26	26	22	26	24

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

ICT adoption through improved access to the internet, mobile phones and fixed broadband subscriptions ease information sharing and enabling apparition of payment platforms which facilitate taxpayers identification and tax collection. Otherwise digital adoption can increase firms and workers productivity thereby improving return on investment, wages and tax revenue. The above presented estimates are unconditional effect of capital flight and ICT adoption respectively.

Now we turn to the conditional effect capital flight on tax revenue mobilization which is among the contribution of this paper. Indeed, we seek to assess how ICT mitigate the negative effects of capital flight on tax revenue. Therefore, we analyze the coefficients of interactions between ICT and capital flight.

As shown above, equation (4) gives the effect of capital flight on tax revenue conditional to ICT adoption. The last column of table 3.4 below shows the conditional coefficients of capital flight. β_2 and β_4 are the unconditional effect of capital flight and the coefficients of interaction terms respectively while ICT is the average value of each technological variable. Interestingly, we find that although capital flight negatively affect tax revenue mobilization in African countries, technological adoption is likely to mitigate the adverse effects of illicit financial leakages on tax resources.

Table 3.4: Effect of capital flight on tax revenue conditional to ICT adoption

N°	Variables (ICT)	$\overline{ICT}$ (mean)	β_2	β_4	
1	Fixed telephone	3.042	-0.0439	0.0126	-0.00557
2	Mobile celullar	39.08	-0.0459	0.0069	0.223752
3	Fixed broadband	0.945	-0.0485	-0.0105	-0.05842
4	Internet user	8.846	-0.0409	0.0091	0.039599

Source: Author calculations

For instance, for line 1, the unconditional effect of capital flight on corporate income tax (CIT) revenue is -0.0439. However, with equation (4), the conditional effect of capital flight on CIT revenue is -0.00557 which is lower than -0.0439. This result is provided by the formula bellow:

$$\frac{\partial(TAX\_REV_{it})}{\partial(KFLIGHT_{it})} = 3.042 + 0.0126 * (3.042) = -0.00557$$

For the rest of ICT variables the values of the unconditional effects of capital flight are provided in table 3.4.

The results with additional controls are provided in table 3.3; C2 and C3 and highlight the sensitivity of tax revenue to each variables. We observe that GDP growth, foreign direct investment and industrialization increase tax revenue. Estimated coefficients are generally significant at the 1% level. These findings support a share of the literature on the issue of domestic revenue mobilization in developing countries. Regarding FDI, Camara (2023) find that FDI inflows lead to a significant tax revenue increase specifically in non-resources-exporting developing countries. However, for Jemiluyi & Jeke (2023) FDI have not improved tax revenue mobilization is South Africa between 1994 and 2021. Yet, this debate is not scope of this study and we argue that FDI is more likely to promote tax revenue mobilization except for phantom FDI which are with no real activity but are investments made by shell corporates aiming to evade tax (Hong & Smart, 2010; Perez et al., 2012; Merz et al., 2017; Damgaard et al., 2019). Industrialization that is the transformation of economy from row materials to manufactured production increases valued added and thereby the taxable income. Moreover, industrialization positively affects growth and exerts positive spillover effects on domestic non-resources revenue.

Overall, capital flight decrease tax revenue in African countries, but such adverse effects are mitigated by ICT adoption. Moreover, by preventing capital from being evaded outside domestic borders, technological development improves the level of tax revenue mobilization. In the next section we apply some robustness tests to check our results sensitivity to alternative measure tax revenue. Furthermore, we group the data into five years breaks to assess the sensitivity to short term fluctuations.

3.7 Robustness check

In this section, we test the previous results sensitivity to change in tax revenue mobilization proxy. In fact, two alternative tax variables namely tax on income and profit and tax on international trade are used as tax revenue

proxies. Moreover, we use the tax effort scores of Mcnabb et al.(2021) as a measure of tax performance. Lastly, we break the data into 5 years average annual data and re-estimate the model.
Table C2 and C3 in appendix provide the results of the sensitivity analysis for the two alternative tax variables. As expected, our interest variables, capital flight and ICT adoption, affect tax revenue in a similar way. Furthermore, the coefficient of the interaction between ICT and capital flight are generally positive as in the previous estimation that used corporates income tax. These results highlight the potential negative effect of capital on tax revenue mobilization and the mitigating properties of technological development in African countries.

3.8 Discussion

Our results highlight important points in terms of contribution to the existing literature regarding the adverse effects of capital flight on domestic resource mobilization and anti-capital flight policies. Consistent with previous research (Johannesen & Pirttilä, 2016; Thiao, 2021; Combes et al., 2021; Zimunya et al., 2022), this paper shows that capital flight negatively affects domestic tax resources. For instance, Johannesen & Pirttilä (2016) argued that profit shifting by multinational corporations (MNCs) has a negative impact on revenues in developing countries due to the dependance on corporate income tax (CIT). Such dependence on CIT may be explained by the comparative advantage of collecting tax in the formal sector dominated by MNCs. In fact, the large size of the informal sector in many developing countries increase tax collection costs. As a results, tax authorities are more likely to rely on the formal sector's Corporates income. Therefore, the illegal shift of MNCs' profit to tax havens or foreign jurisdictions can strongly undermine domestic revenue mobilization. Seade (1990) gave another explanation where capital flight can result in loss of tax revenue. According to him, an overvalued currency can develop expectation of future devaluation. As a results, capital flight may follow and bring about loss of tax revenue.
Capital flight per se represent a loss of money evaded without being taxed. This increases tax base erosion and tax revenues decline. In addition, the rapid increase in digital transactions in developing countries has increased

the possibility of concealing criminal proceeds, fueling capital flight and tax evasion (Tropina, 2016).

Another key finding of this paper is the role of information and communication technologies (ICT) in reducing capital flight and enhancing tax revenues. This findings are confirmed by early empirical works (Tropina, 2016; Ngunjiri, 2022; Padalkar, 2023; Nose, 2023) showing that adoption of digital technologies could enhance realization of revenue gains in tax administrations. In fact, the use of ICT in tax administrations reduces tax loopholes and capital flight via tax evasion (Ngunjiri, 2022) and thereby improves tax collection. However, as argued by Nose (2023) ICT effect on tax revenues may depend on the type of technology.

As shown in our results, fixed broadbands induce a much higher effect on corporate income tax than other type of technological infrastructures such as internet usage. However, providing explanations of such heterogenous impact of the different types of digital infrastructures is beyond the scope of the present paper. Nonetheless, we can speculate on cultural factors and high transactions costs causing weak usage of electronic payment of tax in some developing countries. On the contrary, large penetration of fixed broadbands may improve network access and the capacities of tax administrations to detect and collect more tax revenue.

The results of the current study are consistent with Ngunjiri's (2022) and Nose (2023) findings of the effectiveness of digital technology in strengthening tax administration enabling curbing of illicit financial flows and improving tax revenues. ICT penetration is likely to decline capital flight by shifting the tax collection processes from mechanical to digital, enabling more effective detection of corruption and fraud. Otherwise, the recent development of electronic transactions has generated many activities that escape from taxation and present important loss of revenue for governments. Thus, improving the digitalization in the tax administration and the financial sector would decrease corruption, tax evasion, money laundering and affects positively the tax collection. Kitsios et al. (2020) show that domestic resources can be enhanced if illicit financial flows are tackled efficiently. They point out the contribution of digital technology to operational efficiency and the quality of information in trade transactions which improve transparency, tax compliance and enhance mobilized resources. In fact,

digital technology facilitates the collection of authentic, accurate and complete information about traded goods which enhances the ability of border agents to collect the appropriate level of taxes on trade. Consequently, it implies that developing countries should promote digital penetration. This could be done by providing more incentives to actors in the technological market. In turn, these actions may accelerate the development of the technological sector and improves the population access to digital infrastructures. Moreover, governments can support the digital transformation in both tax and financial sector with adapted regulation and legal instruments to accelerate enforcement of the adopted policies.

3.9 Conclusion

This paper investigates whether information and communication technology enhance tax resources mobilization if illicit financial flows are tackled efficiently. Previous empirical papers such as Adegboye et al., (2022b) have devoted only to the effect of ICT on tax revenue. However, the current research assess how digital penetration affects tax mobilization via capital flight channel. The empirical findings are based on the Generalized Method of Moments (GMM) using a sample of 27 Emerging Markets over the period 1980-2018. We use several technological variables and three types of taxes which are supposed to be highly affected by tax evasion and capital flight. The findings highlights several key points and imply policy interventions.

A key finding of this paper is that capital flight can deter tax collection by eroding the tax base via the Multinational Corporates' profit shifting. But, interestingly, the results show that ICT development can be used to curb capital flight and stop the loss of domestic resources in developing countries. These findings are stable when we apply some changes in the different controls variables and to alternative measures of tax revenue. We argue that developing countries can promote digital penetration by providing more incentives on the technological market in order to boost technological development and improves the population access to digital infrastructures. In addition, governments can support the digital transformation of tax administration and the financial sector by adopting appropriate regulations and legal instruments to accelerate the implementation of adopted policies.

The results of the current paper are consistent with many previous empirical studies. Moreover, the paper extend existing research by analyzing the different phenomenon (capital flight-ICT-tax revenue) interactively. We believe that these results will be useful to academics and policymakers in developing effective policies to strengthen domestic resource mobilization to finance sustainable development goals and accelerate poverty reduction.

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Appendix

Table C1: Description of variables

Variables	Definitions	Descriptions
Kflight	Capital Flight	
Ictgoodexp	ICT goods exports (% of total goods exports) from WDI	Information and communication technology goods exports include computers and peripheral equipment, communication equipment, consumer electronic equipment, electronic components, and other information and technology goods.
Ictgoodimp	ICT goods imports (% of total goods imports) from WDI	Information and communication technology goods imports include computers and peripheral equipment, communication equipment, consumer electronic equipment, electronic components, and other information and technology goods
Fixtel	Fixed Telephone subscriptions (per 100 people) from WDI	Fixed telephone subscriptions refers to the sum of active number of analogue fixed telephone lines, voice-over-IP (VoIP) subscriptions, fixed wireless local loop (WLL) subscriptions
Mobcell	Mobile cellular subscriptions (per 100 people) from WDI	Mobile cellular telephone subscriptions are subscriptions to a public mobile telephone service that provide access to the PSTN using cellular technology.
Internetuser	Individuals using internet (% population) from WDI	Internet users are individuals who have used the Internet (from any location) in the last 3 months. The Internet can be used via a computer, mobile phone, personal digital assistant, games machine, digital TV etc.
Fixbroadband	Fixed Broadband subscription from WDI	Fixed broadband subscriptions refers to fixed subscriptions to high-speed access to the public Internet (a TCP/IP connection), at downstream speeds equal to, or greater than, 256 kbit/s
Tax_income	Taxes on income, profits, and capital gains (UNUWIDER)	Taxes on income, profits, and capital gains are levied on the actual or presumptive net income of individuals, on the profits of corporations and enterprises, and on capital gains, whether realized or not, on land, securities, and other assets.
Tax_indiv	Individuals income Tax (UNUWIDER)	The individual income tax (or personal income tax) is a tax levied on the wages, salaries, dividends, interest, and other income a person earns throughout the year.
Tax_corp	Tax on Corporations and other enterprises (UNUWIDER)	A corporate tax is a tax on the profits of a corporation. The taxes are paid on a company's taxable income, which includes revenue minus cost of goods sold, general and administrative expenses, selling and marketing, research and development, depreciation, and other operating costs.
Tax_trade	Taxes on international trade and transactions, Total (UNUWIDER)	Trade taxes are charged on the value of products that flow into and out of a country, notably in the form of import and export duties.
Gdpth	GDP growth (annual %) from WDI	GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products.
FDI	Foreign direct investment, net inflows (% of GDP) from WDI	Foreign direct investment are the net inflows of investment to acquire a lasting management interest (10 percent or more of voting stock) in an enterprise operating in an economy other than that of the investor.
Manfvad	Manufacturing, value added (% of GDP) from WDI	Manufacturing refers to industries belonging to ISIC divisions 15-37. Value added is the net output of a sector after adding up all outputs and subtracting intermediate inputs.
Inflcpi	Inflation, consumer prices (annual %) from WDI	Inflation as measured by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly.
Aid2	Net official development assistance and official aid received (current US$) from WDI	
Remit	Personal remittances, paid (current US$) from WDI	Personal remittances comprise personal transfers and compensation of employees.
Agri_vad	Agriculture, forestry, and fishing, value added (% of GDP) from WDI	Agriculture, forestry, and fishing corresponds to ISIC divisions 1-3 and includes forestry, hunting, and fishing, as well as cultivation of crops and livestock production

Table C2: SYSTEM-GMM results for the interacted effect of capital flight and ICT on Revenue of Tax International Trade

Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**
L.Trade_Tax	0.9951***	0.9953***	0.9836***	1.0110***	0.9967***	1.0354***	1.0062***	1.0040***	0.9811***	0.9535***	0.9574***
	(0.0199)	(0.0187)	(0.0077)	(0.0174)	(0.0145)	(0.0157)	(0.0095)	(0.0194)	(0.0143)	(0.0211)	(0.0114)
L.Kflight	-0.0221***	-0.0224***	-0.0230***	-0.0236***	-0.0369***	-0.0269***	-0.0226***	-0.0241***	-0.0251***	-0.0165***	-0.0193***
	(0.0031)	(0.0028)	(0.0027)	(0.0029)	(0.0023)	(0.0010)	(0.0060)	(0.0022)	(0.0011)	(0.0029)	(0.0012)
GDP	0.0321***	0.0325***	0.0357***	0.0270***	0.0271***	0.0428***	0.0358***	0.0374***	0.0314***	0.0499***	0.0462***
	(0.0080)	(0.0066)	(0.0056)	(0.0070)	(0.0075)	(0.0084)	(0.0093)	(0.0052)	(0.0044)	(0.0085)	(0.0061)
FDI	0.0044	0.0076	0.0152**	-0.0072	-0.0019	0.0076	-0.0011	-0.0008	0.0062	-0.0203*	0.0057
	(0.0114)	(0.0105)	(0.0073)	(0.0119)	(0.0100)	(0.0114)	(0.0078)	(0.0095)	(0.0095)	(0.0107)	(0.0087)
Manufac.VAD	0.0024	0.0082	0.0076	0.0052	0.0085	0.0489***	0.0291**	-0.0035	0.0011	-0.0128	-0.0057
	(0.0099)	(0.0079)	(0.0076)	(0.0084)	(0.0064)	(0.0176)	(0.0113)	(0.0079)	(0.0044)	(0.0181)	(0.0174)
Year	0.0026*	0.0029**	0.0023**	0.0033***	0.0035***	0.0071***	0.0059***	0.0031**	0.0024*	0.0021**	0.0014**
	(0.0014)	(0.0013)	(0.0011)	(0.0011)	(0.0010)	(0.0014)	(0.0010)	(0.0014)	(0.0012)	(0.0010)	(0.0006)
Fixed telephone		0.0059	0.0199***								
		(0.0065)	(0.0013)								
Kflight **x** Fixed Tel			0.0044***								
			(0.0012)								
Mobile Cellular				0.0020	-0.0010						
				(0.0014)	(0.0008)						
Kflight **x** Mobile cell					0.0031***						
					(0.0003)						
Fixed broadband						0.0100	0.0119**				
						(0.0081)	(0.0052)				
Kflight **x** Fixed broad.							-0.0053				
							(0.0038)				

Internet Use								0.0004	0.0012		
								(0.0018)	(0.0017)		
Kflight **x** Internet Use									-0.0032***		
									(0.0001)		
ICT_export										-0.0025	0.0072
										(0.0072)	(0.0047)
Kflight **x** ICT_G_export											0.0468***
											(0.0081)
_cons	-5.3965*	-5.9438**	-4.7579**	-6.6465***	-7.0737***	-14.6024***	-12.0434***	-6.2503**	-4.8256*	-4.1692**	-2.9089**
	(2.7231)	(2.6613)	(2.1806)	(2.2190)	(1.9722)	(2.7769)	(2.0349)	(2.8991)	(2.4783)	(1.9857)	(1.1361)
N	534	534	534	529	529	297	297	522	520	356	345
ar1p	.0048	.0045	.0038	.0054	.0052	.1038	.1052	.0042	.0035	.001	7.3e-04
ar2p	.9819	.9836	.993	.9844	.966	.4489	.5237	.4341	.3671	.8442	.8494
hansenp	.4487	.5776	.5326	.575	.425	.7694	.5904	.6468	.3715	.5668	.4444
j	19	23	27	23	27	23	27	23	27	23	27
N_g	30	30	30	30	30	28	28	30	30	27	27

Table C3: SYSTEM-GMM results for the interacted effect of capital flight and ICT on CIT revenue (5 years average annual data)

Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**
L.Corporate Tax	0.6064***	0.7334***	0.6388***	0.3920***	0.5178***	0.5992***	0.6868***	0.6896***	0.2494**	0.6659***	0.4837***
	(0.0749)	(0.0567)	(0.0780)	(0.1190)	(0.0394)	(0.0860)	(0.0640)	(0.0690)	(0.1130)	(0.0627)	(0.0884)
L.Kflight	-0.2775**	-0.3590***	-0.3245***	-0.4039***	-0.3091***	-0.3948***	-0.0588	-0.3631***	-0.2900***	-0.0312	-0.4036***
	(0.1219)	(0.0867)	(0.0923)	(0.0801)	(0.0491)	(0.0890)	(0.0819)	(0.0875)	(0.0449)	(0.1005)	(0.0822)
GDP_growth	0.5818***	0.5618***	0.2002	0.1810	0.1374	0.6617***	0.3660**	-0.0628	0.3547	0.4501***	0.5972***
	(0.1294)	(0.0885)	(0.1613)	(0.2874)	(0.1760)	(0.1341)	(0.1328)	(0.1047)	(0.3138)	(0.1178)	(0.1909)
FDI	0.4728***	0.4325***	-0.1288	0.5323***	0.2718*	0.4992***	0.5538***	0.1605*	0.5115**	0.2035*	0.5231**
	(0.1037)	(0.1069)	(0.1167)	(0.1658)	(0.1559)	(0.1625)	(0.0727)	(0.0929)	(0.2149)	(0.1058)	(0.2096)
Manufac_VAD	1.2187***	1.0180***	0.3508***	0.8953	0.3678	1.2936***	0.9665***	0.3882***	1.3762*	0.5576**	1.5024***
	(0.2138)	(0.1583)	(0.1228)	(0.5399)	(0.2414)	(0.3016)	(0.1912)	(0.1018)	(0.7901)	(0.2480)	(0.2975)
Rule of Law	-0.0971	-0.5558	-0.0188		-0.8901**	-0.4682*	-0.1289	-0.0504		-0.2740	-0.2568
	(0.5479)	(0.4773)	(0.3546)		(0.3984)	(0.2683)	(0.3172)	(0.1984)		(0.3753)	(0.3220)
Corruption	-0.2479	0.1271		-0.4456	0.3038				-0.3643		
	(0.3604)	(0.3562)		(0.4142)	(0.2829)				(0.3527)		
Year	0.2036***	0.1760***	-0.4724***	-0.3364**	-0.7012***	0.2093**	0.1446***	-0.4970***	-0.2650	-0.3503**	0.2000***
	(0.0608)	(0.0413)	(0.1453)	(0.1477)	(0.1347)	(0.0786)	(0.0438)	(0.0894)	(0.2155)	(0.1552)	(0.0569)
Fixed telephone s.		0.1128***					0.1216***				
		(0.0224)					(0.0181)				
Mobile cellular s.			0.4896***					0.4537***			
			(0.1310)					(0.0845)			
Fixed broadband s.				0.3244***					0.3317**		
				(0.0795)					(0.1211)		
Internet users					0.5822***					0.2913**	

					(0.0634)					(0.1167)	
ICT goods_export						0.0033					0.0891*
						(0.0821)					(0.0495)
Kflight x Fixed Tel.							0.2561***				
							(0.0309)				
Kflight x Mobile cel.								0.0496***			
								(0.0141)			
Kflight x Fixed broad.									0.0441		
									(0.0682)		
Kflight x Internet Use										0.1721***	
										(0.0249)	
Kflight x ICT_export											-0.1589***
											(0.0477)
_cons	-4.0417***	-3.6860***	0.1848	0.6255	1.4329	-4.3816***	-3.1758***	0.1887	-0.6018	-0.5984	-4.3085***
	(0.6008)	(0.4699)	(0.5850)	(2.3295)	(1.0548)	(1.0031)	(0.8454)	(0.5483)	(3.7844)	(0.8735)	(1.1287)
N	73	73	73	57	73	67	73	73	56	73	67
ar1p	.06	.0424	.0411	.1976	.0406	.0324	.0289	.0281	.3907	.1124	.0607
ar2p	.8901	.883	.3239	.2614	.7635	.7303	.7016	.307	.2406	.3238	.5495
hansenp	.0761	.0914	.3621	.2145	.5768	.1098	.5991	.2929	.4855	.7916	.1303
j	21	24	21	21	24	21	24	24	24	24	24
N_g	25	25	25	23	25	23	25	25	23	25	23

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

Table C4: Bivariate results for the effect of capital flight and ICT on international trade tax (ITT)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Kflight_lag1	-0.1652**						
	(0.0617)						
Kflight_lag2		-0.1679*					
		(0.0982)					
Fixed Telephone			0.0623**				
			(0.0261)				
Mobile Cellular				0.0047			
				(0.0031)			
Fixed Broadband					0.0022		
					(0.2809)		
Internet Users						-0.0831	
						(0.0702)	
ICT goods Export							-0.0320
							(0.0287)
_cons	2.4721***	2.4280***	-0.0733***	-0.0880***	-0.0566	2.5918***	-0.0694***
	(0.0096)	(0.0153)	(0.0007)	(0.0123)	(0.0474)	(0.0917)	(0.0006)
N	630	603	624	619	329	611	393
N_g	30	30	30	30	28	30	28
r2_b	.0018	4.4e-05	.0531	.1223	.3097	.2025	.0246
r2_w	.0219	.0256	.0032	.0015	8.8e-07	.014	8.4e-04

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

Table C5: Bivariate results for the effect of capital flight and ICT on individuals income tax (IIT)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Kflight_lag1	-0.0266						
	(0.0339)						
Kflight_lag 2		-0.0126					
		(0.0196)					
Fixed Telephone			-0.0116				
			(0.0216)				
Mobile Cellular				0.1204***			
				(0.0368)			
Fixed Broadband					0.0524***		
					(0.0186)		
Internet Users						0.1287***	
						(0.0347)	
ICT goods Export							0.0083
							(0.0265)
_cons	0.3681***	0.4014***	0.3740***	0.1471**	0.8501***	0.3710***	0.6314***
	(0.0068)	(0.0040)	(0.0723)	(0.0646)	(0.0407)	(0.0023)	(0.0510)
N	463	441	486	463	245	464	318
N_g	29	29	29	29	25	29	27
r2_b	.0085	.0115	.0018	.1792	.1331	.1713	.3298
r2_w	.0027	6.5e-04	4.3e-04	.1691	.044	.1873	2.3e-04

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

Table C6: Pairwise correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
(1) L.Kflight	1.000																		
(2) L2.Kflight	0.210*	1.000																	
(3) Fixed telephone	-0.007	-0.019	1.000																
(4) Fixed broadband	0.022	0.047	0.565*	1.000															
(5) Mobile cellular	-0.032	-0.039	0.282*	0.768*	1.000														
(6) Internet User	-0.016	-0.023	0.394*	0.831*	0.937*	1.000													
(7) Internet Server	-0.008	-0.003	0.223*	0.462*	0.452*	0.663*	1.000												
(8) Corporates Income Tax	-0.007	-0.015	0.665*	0.616*	0.504*	0.573*	0.313*	1.000											
(9) Individuals income Tax	-0.005	0.010	0.199*	0.301*	0.395*	0.409*	0.501*	0.403*	1.000										
(10) Income, Profit Tax	-0.006	-0.007	0.596*	0.442*	0.405*	0.544*	0.445*	0.858*	0.654*	1.000									
(11) Tax on Trade	-0.034	-0.040	0.217*	0.040	-0.077*	-0.035	-0.231*	0.180*	-0.129*	0.250*	1.000								
(12) Property Tax	-0.016	0.036	0.225*	0.073	0.030	0.015	0.379*	0.145*	-0.020	0.206*	0.096	1.000							
(13)GDP growth	-0.074*	0.042	-0.098*	-0.154*	-0.002	-0.007	-0.162*	-0.021	-0.047	0.042	0.031	-0.077	1.000						
(14) FDI	-0.047	-0.052	0.009	0.091*	0.193*	0.167*	-0.200*	0.193*	0.028	0.114*	0.076*	-0.039	0.032	1.000					
(15) Manufac. VAD	-0.018	-0.019	0.360*	0.240*	0.027	0.134*	0.167*	0.291*	0.056	0.218*	-0.022	0.217*	-0.098*	-0.159*	1.000				
(16) Inflation	-0.002	-0.023	-0.096*	-0.220*	-0.181*	-0.175*	0.023	-0.391*	-0.295*	0.049	-0.048	-0.232*	0.086*	0.019	-0.084*	1.000			
(17) Foreign aid	-0.022	-0.022	-0.204*	-0.180*	0.209*	0.201*	0.196*	0.025	0.115*	0.037	-0.188*	-0.101*	0.198*	0.013	-0.055	-0.041	1.000		
(18) Remittances	-0.031	-0.038	0.131*	0.112*	0.245*	0.253*	0.323*	0.233*	0.294*	0.258*	-0.111*	0.425*	-0.054	-0.075*	0.027	0.002	0.066*	1.000	
(19) Public Debt	0.184*	-0.065	-0.322*	0.200*	-0.628*	-0.562*	0.239*	-0.441*	-0.375*	-0.568*	-0.193*	0.063	-0.368*	0.044	0.055	0.584*	-0.177*	-0.051	1.000

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

Table C7: Summary statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
Capital Flight (Point of GDP)	717	1627.091	6109.963	-19767.9	56470.898
Fixed Telephone Subscriptions	718	3.042	5.007	0	29.748
Fixed Broadband Subscriptions	414	.945	2.275	0	19.097
Mobile Cellular Subscriptions	715	39.08	43.218	0	173.564
Internet Users	705	8.846	14.202	0	70.1
ICT goods exports	466	.748	1.489	0	7.377
Corporates Income Tax Revenue	480	2.23	1.715	.059	10.334
Individuals Income Tax Revenue	492	2.134	2.068	0	13.38
Tax on income, profits (% GDP)	574	4.639	3.34	.178	24.074
Tax on trade (% GDP)	661	2.498	2.495	0	20.153
Property Tax (% GDP)	413	.148	.285	-.084	1.298
GDP growth	720	4.479	4.716	-20.599	35.224
FDI	720	3.601	5.694	-10.725	57.877
Manufactured value added	692	11.341	6.455	1.533	49.879
Inflation	678	24.268	193.503	-8.484	4145.106

CHAPTER 4

GOVERNANCE, CAPITAL CONTROLS AND ECONOMIC STABILITY: A STUDY OF CAPITAL FLIGHT IN EMERGING MARKETS

Abstract

This paper explores whether capital controls and institutional quality reduce the impact of capital flight on key macroeconomic variables. We examine this issue empirically by using an interacted panel VAR approach. This methodology deals with several technical problems like endogeneity and allows to capture the effects of shocks along with the difference stance of the capital account policy and the governance quality simultaneously. Our results suggest an existing but limited and unprevisible effectiveness of tight capital controls in reducing capital flight shock on macroeconomic stability. However, we interesstingly find that capital controls policy yields bettter results when institutional frmaework is good. This highlihgts the catalytic role of governance in shaping capital controls effectiveness. The implication of these results are twofolds: First, it implies the validity of capital controls as a stabilizer against capital flight spillover effects which udermine the domestic macroeconomic framework. Second, developing countries must combine capital controls with a better institutional quality to reduce the policy transaction costs.

JEL Classification F21; G38; C23; H26
Keywords capital flight; capital controls; governance; macroeconomic stability

4.1 Introduction

The Addis Ababa Action Agenda recognizes macroeconomic instability as a threat for achieving the sustainable development goals (SDGs) in developing countries. Therefore, the United Nations call on international financial institutions to further improve early warming of macroeconomic and financial risks (United Nations, 2021). Economic instability is strongly related to exogenous shocks such as natural disasters, trade shock or cross-border capital flows etc. Large amount of inflows or outflows can be damaging for countries with earlier weak macroeconomic management system.

During the 2008 financial crisis, many countries suffered important leakages of financial flows toward foreign destinations. This financial hemorrhage also known as *capital flight* undermines domestic resources mobilization and constrains financial buffers. Capital flight from Africa is fueled by the increasing number of secrecy jurisdictions, safe havens or tax havens that provide opportunities for transfer and concealment of illicit capital. This includes proceeds of embezzlement of natural resource exports, tax evasion, corruption, transfer pricing, and outright smuggling of capital out of African countries.

Several academic works and practitioners provide estimates of the size of revenue loss due to capital outflows. Most of the studies suggest an alarming situation with regard to the amount of money that is fleeing across the borders every year. In a recent report, Ndikumana & Boyce (2021) shed light on the stock of offshore wealth coming from developing countries and accumulated abroad in 2018. In fact, the experts argue that it is about $2.4 trillion that is hidden in tax havens and representing about 85 % of total GDP of all African countries in 2018. Furthermore, the study highlights that about $45 billion is

evaded per year over the period 2000-2018. This situation poses important threats to the SDGs implementation and more specifically compromises poverty alleviation. The Organization of Economic Cooperation and Development (OECD) argue that excluding China, the SDG financing gap for developing countries increased by more than 50% due to COVID-19 pandemic and reach about $ 4 trillion in 2020.

From an empirical perspective, early studies showed that capital flight undermines macroeconomic stability and compromises economic performance. Ajayi (2014) shows that capital flight constrains economic growth and development in Africa through the channel of financing resources. In fact, by draining domestic resources, capital flight exacerbates the resource gap and thereby deepening the fiscal deficit. This, therefore, negatively affects the efficiency of public resources allocation and increases the government investment or borrowing costs. For instance, Dachraoui et al., (2020) show that capital flight is a driver of government bonds spreads in Latin America. Their results confirm that in the long-run, capital flight positively affects sovereign default, inflation, government final consumption expenditure, and unemployment. However, variables such as economic growth, trade openness and governance index are negatively affected by financial outflows. Default risks may increase following the capital flight amplification which undermines the solvency conditions. In addition, domestic investment is severely constrained by capital flight in many African economies (Leykun Fisseha, 2022) leading to an increase of the output gap. Furthermore, growth suffers from illegal unrecorded outflows because of the induced exchange rate volatility caused by capital flight. According to Fofack and Ndikumana (2014), capital flight depletes countries foreign exchange reserves and induces depreciation of the national currency through exerting upward pressure on exchange rate.

Curbing illicit capital flight and preserving developing countries from financial hemorrhage has been the cornerstone of many policy discussions and academic works during the last decades. Notwithstanding the growing literature on this issue the phenomenon is still amplifying and there is no consensus in empirical literature with regard to effective solutions. For instance, Fofack and Ndikumana (2014) argue that government should maintain domestic stability in order to prevent capital flight from African countries. However, such arguments are not clear and encompass several actions which are not clearly defined. Otherwise, Ndikumana (2014) proposes a package of solutions to prevent effectively capital flight from African countries. According to him, governments or global political leaders can effectively prevent capital flight through the deterring of illegal export of honestly acquired capital, addressing trade-related capital flight and tax evasion, recovering and repatriating stolen assets, tackling the revolving door and odious debt, and enforcing banking transparency and tax compliance in safe havens. These points are in line with previous researches on the subject. However, they do not explicitly focus on one key policy action which has been subject of vivid debate among academics, practitioners or international organizations during several years but yet unconclusive.

The current paper aims to give new insights on the role capital controls in preventing the adverse effects of capital flight. It adopts a line of research as yet weakly explored by previous empirical work. It aims to assess whether tight capital controls in time of huge capital flight shock can prevent the deterioration of a country macroeconomic framework. Moreover, the paper investigates the role of institutional quality in shaping capital account policy.

The effectiveness of capital controls has always been questioned because of their assumed pervasive effects. In fact, restrictions

on capital movement have been banned globally for decades. Many academics (Lensink et al., 1998; Glick & Hutchinson, 2005; Quinn & Toyoda, 2008; Bhatia & Sharma, 2019), international institutions in charge of the global financial stability like the IMF argued that financial liberalization better promotes financial integration and enhance growth. However, with the financial turmoil of the last few years, some scholars and even the IMF questioned capital openness and advocated more restrictions on cross-border capital flows (Yalta & Yalta, 2012; Demirgüç-Kunt & Detragiache, 1998; Bergin et al., 2023; Furceri & Loungani, 2015). In fact, the global financial crisis has triggered a transformation in thinking and practice regarding the role of government in managing international capital. According to Gallagher (2012), from 2009 to early 2011, a number of developing nations resorted to capital controls to halt the appreciation of their currencies, and to pursue independent monetary policies to cool asset bubbles and inflation. As a results, capital restrictions is regaining the attention of several international organizations, scholars and policymakers.

While capital controls is progressively legitimated as a preventing tool against capital flight, some empirical studies show that all the countries did not succeed in curbing capital flight by using tight capital controls (Edwards, 1999; Glick & Hutchinson, 2005; Gallagher, 2012). In fact, a strand of literature argues that capital controls alone cannot be effective. Therefore, government should improve their controls with additional countries specific factors. For instance, Cezar & Monnet, (2023) find that when combined with foreign exchange intervention capital controls better tame the effects of international shocks.

The contribution of this paper to existing literature is twofold. In fact, existing empirical papers have focused on the direct

effect of capital controls on macroeconomic variables such as inflation, investment or growth etc. We assume that this strategy could lead to wrong results. Indeed, capital controls affect these macroeconomic variables indirectly through the channel of capital flows. Therefore, we choose an estimation strategy which allows interactions between capital flight, capital controls and the macroeconomic variables. Otherwise, the paper goes further from previous studies by questioning the role of institutional quality in shaping a country's capital account management and its ability to prevent capital drain.

The rest of the paper is organized as follow. The next section shed light on exiting literature. Section 3 presents the data and describes the methodology applied at the empirical level. Section 4 gives the results and test their sensitivity to alternative specifications. Finally, we conclude and provide some policy recommendations.

4.2 Literature Review

Our paper speaks to three strands of the litterature. It explores the issue of capital flight, the role of capital controls in limiting outflows effects and the complementarity or substituality between capital controls and governance. The literature on capital flight encompasses measurement issue (Boyce, 2010; Ndikumana, 2014; Johannesen & Pirttilä, 2016), determinants (Alam & Quazi, 2003; Osemenshan Anetor, 2019; Muchai & Muchai, 2016; Ndikumana & Boyce, 2011; Hermes & Lensink, 2001) and impacts (Leykun Fisseha, 2022; Le & Zak, 2006; Ajayi, 2014; Ndikumana, 2014; Dachraoui et al., 2020). Scholars have indentified several causes of capital flight generally correlated with economic or political instability as showed by Le & Zak (2006). In such context private investors or individuals are concerned about the possibility to loss control over their wealth or fear the decline of money value as in

currency crisises or exchange rate drop. Otherwise, Ndikumana & Boyce (2011) showed that external borrowing is an important source of capital flight in many developing countries and specially in sub-saharan Africa (SSA). In an empirical work, the authors find that 60% of every dollar in external loans to Africa flowed back as capital flight during the same year, over the period 1970-2004. Many additional empirical evidences established causal links between capital flight and key economic variables such interest rates spreads, inflation and trade openness. For intance, Osemenshan Anetor (2019) find no significant link between capital flight and above variables in SSA. While Alesina & Tabellini (1989) and Hermes & Lensink (2001) argue that uncertainty over government furture fiscal and tax policy generate capital flight.

According to Boyce, (2010) capital flight represents a serious development challenge for African countries because it erodes the domestic resources and affect macro-financial stability. However, only few empirical works are devoted to this literature line. Exceptionnally, Ajayi (2014) and Ndikumana (2014) contribute to this gap by investigting the effects of capital flight on origin countries' economy. The authors argue that huge illicit capital outflows can induce deviation of key economic variables from their potential levels. For instance, Dachraoui et al. (2020), find that capital flight increases sovereign bonds spreads in Latin America after using a dynamic heterogenous panel regression and pooled mean group estimators. Moreover, the destabilizing effects of capital flight on interest rates may affect investment perspectives in the private sector leading to drop in domestic investments as showed by Leykun Fisseha (2022). Our paper contributes to this literature by exploring new causal links between capital flight and some key economic variables. Even though there are few empirical evidences that shed light on the link between capital flight and many

macroeconomic variables, it is generally accepted that capital flight undermines development prospects. As a result, the fight against resource drain has been on the agenda of many developing countries, and has also motivated some empirical research. However, the debate on the effectiveness or ineffectiveness of policies to curb this phenomenon remains unresolved among academics and policy-makers.

In recent years, discussions have increasingly focused on the use of strict capital controls. The main issue is whether capital controls are effective to protect countries from the macroeconomic instability due to negative shocks (Glick & Hutchinson, 2005; Magud et al., 2007; Gallagher, 2012; Alami, 2019; Bhargava, 2023). In fact, controls on capital movement was longly considered by many institutions as suboptimal (Cezar & Monnet, 2023) and detrimental for economic development and cooperation (Cooper, 1999). In his paper, Cooper takes a look at the history of capital controls and pointed out several key facts related to the context in wich capital restrictions has evolved. Notably, capital controls were used by many countries in wartimes and were progressively banish after this period. However, in the aftermath of 2008 financial crisis, the International Monetary Fund (IMF) publicly express support for capital controls as a result of the global financial crisis and regarding the vulnerabilities associated with capital flows (Kalim Siddiqui, 2017).

Several empirical investigations have been conducted to test capital controls effectiveness. However, the results are still inconclusives. While some scholars advocate capital controls as a first policy choice to guarantee financial stability (Gallagher, 2012; Kalim Siddiqui, 2017; Alnasaa et al., 2022; Zehri, 2020; Yalta & Yalta, 2012) other reject the use of strict restrictions on capital movement because of their distorsting effects (Glick & Hutchinson, 2005); Quinn & Toyoda, 2008). Moreover,

another stream of empirical work argues that capital controls need to be combined with certain country-specific characteristics to shape their effectiveness (Magud et al., 2007; Bush, 2019; Bawuah, 2022; Cezar & Monnet, 2023). For instance, Kalim Siddiqui (2017) expresses a skepticism on financial liberalization because he observed that most developing countries become more vulnerable following the adoption of financial liberalization. However, Quinn & Toyoda, 2008 assume that financial liberalization is positively associated with economic performance in both developed and emerging markets. But the arguments of Hjortsoe et al., (2018) support Siddiqui (2017), showing that in countries with lax capital controls, the current account is more likely to go into deficit following an expansionary monetary policy. This suggests that the effects some type of shocks on the domestic economy can be often a function of the capital account policy stance.

Our paper contribute to this literature by investigating how some key macroeconomic variables react to capital flight shock under different degree of capital controls. Some scholars react to the debate and argue that tight restrictions on capital account cannot be effective in isolation of some country-specific backgrounds such as the level of financial development or the institutional quality. Bush (2019) examines the 1990s capital account liberalization policy effect on international capital flows and argue the the effectiveness of capital account liberalization (restriction) requires a deep domestic financial system. Similarly, Cezar & Monnet (2023) show that FX reserves and capital controls should be combined to tame the effects of an international financial shock. The reason of widespread arguments related to capital controls effectiveness are twofold. First, it highlights the renewed importance of capital controls as stabilizers against shocks. Second, it shows

that more in-depth analysis is needed before any conclusions can be drawn. However, only few empirical papers have lightly explored the question. The current paper aims to contribute to this literature by assessing the role capital controls in limiting the macroeconomic effects of capital flight. Moreover, we test the hypothesis that institutional quality can catalyze capital account policy.
The next section describes the methodology, the data and their related sources

4.3 Data and Methodology

This section presents the data and empirical strategy applied to assess the macroeconomic effects of capital flight in developing countries. Therefore, we discuss some key notions of the subject and shed light on the reasons guiding the choice of each variable, data sources and methodology.

4.3.1 Data and Sources

The paper is based on a sample of 27 developing countries over the period 1980-2017. Sample selection relies on data availability that are collected from several sources. We analyze the economic impact of capital flight, and as a result we assess the responses of key macroeconomic variables to an increase in capital outflows. Our main variables are selected according to existing literature and their importance for macroeconomic stability. For instance, policy makers may be concerned with the fluctuation of the exchange rate, GDP growth, tax revenue, external debt, public consumption, foreign direct investment etc.

Overall, we assume that the selected variables can be affected by any variation in capital flight.

4.3.1.1 Notion of capital flight

Capital flight is broadly defined as financial flows that are removed from a country by individuals of corporates. These flows can be licit or illicit and caused by domestic imbalances such as political or economic factors (economic recession, aggressive tax or fiscal policy). Generally, the removing financial flows are unrecorded by tax and financial authorities. Yalta (2007) defined capital flight as capital outflows that are not recorded by origin countries. In fact, the notion of capital flight is not clearly cut among researchers and policy makers and the debate around this notion is still unconclusive. A line of researchers (L. Ndikumana & Sarr, 2019; Osei-Assibey et al., 2018; Forson et al., 2017) claim that capital flight relies on the *portfolio choice* theory. This approach advocates investors' risk aversion of losing their money value as the main motive of capital flight. As a result, the risk-adjusted rate of returns on investment is considered a key indicator of investment. Therefore, these authors somewhat legitimate capital flight as something normal. In contrast, this conception of capital flight is not shared by authors like Ndikumana and Boyce (2003, 2011b, 2018) who argue that capital flight has criminal motives. Contrary to the above perception of capital flight, Ndikumana and Boyce argue that country risks is not per se the main cause of capital flight because any honest investor would previously choose the location that maximizes its risk-adjusted returns on investment. However, capital evaders are attracted by banking secrecy which make it easier to conceal their criminal income. Our definition of capital flight refers to Ndikumana and Boyce (2003). The authors estimate capital flight based on the "residual" approach. This approach takes the "net errors and omissions" of the balance of payment as the baseline measure of capital flight. Net errors and omissions are the difference

between recorded inflows and recorded outflows. Therefore, the baseline capital flight is given by the following formula:

$kf_{it} = \Delta extdetadj_{it} + fdi_{it} - (ca_{it} + \Delta res_{it})$ where,
$\Delta extdetadj_{it}$ is the change in external debt outstanding adjusted from exchange rate fluctuations, fdi_{it} is the net FDI while ca_{it} is the current account deficit and Δres_{it}, the net addition to the stock of foreign reserves. The total level of capital flight is then estimated by including trade misinvoicing and unrecorded workers' remittances. Trade misinvoicing is the sum of export misinvoicing and import misinvoicing. A positive sign implies net increasing in capital flight and vis versa. Workers' remittances are often misreported leading generally to underreported remittances and increased capital flight. The overall capital flight is computed using the formula below:
$kf_{it} = \Delta extdetadj_{it} + fdi_{it} - (ca_{it} + \Delta res_{it}) + misinv_{it} + rid_{it}$
where,
$misinv_{it}$ is trade misinvoicing and rid_{it} is the remittances inflow discrepancy in country i in year t;. Conveniently, we apply a logarithm transformation and first differentiation to convert data into stationary. Moreover, to overcome the negative values issue in log transformation, we follow Gnangnon (2017) and Camara (2022) by using the following formula,
$log(x) = sign(x) * log\big(1 + abs(x)\big), \quad x \leq 0$

4.3.1.2 Capital controls vs financial liberalization

Financial liberalization refers to the deregulation of the domestic financial markets leading to a more open capital account. Therefore, capital restriction is opposed to financial openness. Measuring capital restrictions presents a challenge in economic literature. Many attempts to define a universal criteria exist (Chinn and Hito, 2007; Quinn and Toyoda, 2008)

however a proper methodology is still questioned. Chinn and Hito (2007) argue that measurement challenges rely on the lack of conventional method to quantify capital control. De Gregorio (1998) and Rajan (2003) measure the level of financial integration by analyzing the *de facto restrictions* on cross-border financial transactions. However, the IMF uses an approach based on the *de jure restrictions* on capital account. This methodology is based on information contained in the IMF's annual report on exchange arrangements and exchange restrictions (AREAER) and provides an aggregate index to capture the overall openness of the capital account.

This paper uses the *Chinn-Ito index* that is constructed with the AREAER codification and incorporates the extent and intensity of capital control. The Chinn-Ito index also refers as kaopen index. Kaopen presents many advantages as compared to other indicators of financial liberalization. Contrary to the *Quinn index* where data are not publicly available, kaopen provides downloadable data for a large coverage of countries and time period. The dataset covers 182 countries from 1970 to 2020. The Chinn-Hito index is binary variable that takes one(1) for high degree of financial openness and zero (0) for low degree. In addition to capital account policies used as interaction term, we also assess governance role in countering illicit outflows from developing countries.

4.3.1.3 Governance

Governance is a widely discussed concept among scholars and policy makers. Generally, governance embodies institutions and human capacities to rule these institutions in order to maintain social, economic and political welfare. According to the UN, the quality of governance is proportional to the exercise of political and administrative authority at all levels of a country's affairs. In fact, governance is about how a country is

governed and how law, democracy, transparency and human rights are effective.

Given that governance is a broad concept its measurement is still a challenge. For instance, the *International Country Risk Guide (ICRG)* assesses the level of governance by computing an index that captures the risk associated to a country's political, financial and economic framework. The ICRG converts political information and financial and economic data into risk points and computes the risk associated to each component. Finally, an overall or composite risk index is computed for each country. The higher the risk index, the lower the quality of governance. This index is not a direct measure of governance rather it evaluates the risk associated to the quality of governance.

In this paper, we use the governance data proposed by Kaufmann et al. (2011). These data are available in the world development indicators database and consist of six composite indicators covering over 200 countries since 1996. These aggregate indicators combine the views of a large number of enterprises, citizens and experts survey respondents in industrial and developing countries. The worldwide governance indicators proxy governance by the quality of the government selection process and its ability to effectively formulate and implement sound policies, as well as by the respect of citizens and the state for the country's institutions.
This definition is straightly related to the notion of setting rules and principles to manage the state. Moreover, it fits well with our approach to the concept of governance. The WGI consists of six governance indicators related to corruption (cce), rule of law (rle), government effectiveness (gee), regulatory quality (rqe), political stability (pve) and voice and accountability (vae). This study relies on pve and gee as proxies of governance measure. These indicators range from 0 to 100 in percentile rank terms and from -2.5 to 2.5 for standard normal units.

Therefore, the high values of these indicators represent good governance while low values indicate poor governance. In the following subsection, key macroeconomic variables used in this paper are presented.

4.3.1.4 Macroecomic variables

Many variables are identified in the literature as key macroeconomic indicators. However, for the purpose of this study, we choose GDP growth, exchange rate, government external debt, resources rent, foreign direct investment and tax revenue. The choice of these variables, which are all taken from the world development indicators (WDI) dataset, is motivated by their accuracy in analyzing the effects of capital flight at macroeconomic level.

There are strong theoretical and empirical evidences that growth is fueled by private and public investments among others. However, these growth enhancing channels can be affected by outflows of capital. For instance, Leykun Fisseha (2022) has showed that domestic investment in Africa is severely constrained by capital flight. This adverse effect of illicit outflows may be true for public investment and thereby affecting the growth potential. Moreover, capital flight can affect growth perspectives by impacting currency stability and exchange rate.
Otherwise, we include external debt and government consumption among variables that can be potentially affected by illicit outflows. We expect external debt to rise with capital flight, as the latter can lead to loss of tax revenue and an increase in fiscal deficit. On the other hand, government consumption can increase or decrease if capital flight rise. Concerning tax revenue and resources rent, there are some evidence in the literature that these domestic resources can be drained by illicit outflows. Tax revenue are the compulsory

transfers to the central government for public purposes. While resources rent refer to the difference between the price of a commodity and the average cost of producing it. These resources are used to finance economic development in a country and are important for poverty alleviation.

4.3.2 Stylized Facts

In this subsection we explore informations behind the data through several graphical analysis. Figure 4.1 depicts the trend of capital controls and capital flight over the period 1980-2018. While, figure 4.2 plots the log transformation of capital flight data and finally, figure 4.3 tests the correlation between capital flight, capital controls and governance using scatter plots.

The histogram (figure 4.2) shows normally distributed data with the highest frequencies for positive values. Thinks to the log transformation method used for this purpose, the log and non-log values have the same sign (see Gnangnon (2017) and Camara (2022)). As a result, most countries are experiencing outflows on average.

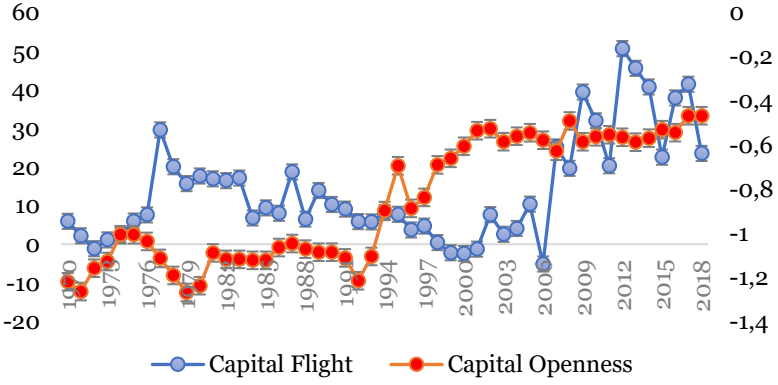

Figure 4.1: Capital flight and capital openness dynamic (Author calculation)

Figure 4.1 illustrates the trends in capital controls and capital flight from 1980 to 2018. Notably, capital controls and capital flight exhibit opposing trajectories. The blue and red lines correspond to the average annual values of capital flight and capital openness across 27 countries. These trends describe the historical reality faced by many African countries with regard to the issue of capital flight and capital openness over the last decades. In fact, capital liberalization rapidly increased over the mid-1990s, on average. However, the degree of financial openness was low before this period.

Under moderate financial openness, capital flight remained at a consistently low level while gradually declining. The average amount of capital outflows was estimated at about $ 5 billion in 1993 compared to its $ 29 billion of 1977. The accelerated increase of capital openness from 1994 was accompanied by a boom in capital flight that reached more than $ 50 billion in 2012 in the aftermath of the 2008 financial crisis. The historical lines show that capital flight has nearly evolved in a similar direction with the degree of capital openness.

Figure 4.3 shows that capital flight seem to be negatively related to governance but increases with the degree of capital openness. However, the regression line between capital flight and the combination of governance and capital controls has a negative slope. These descriptive statistics may suggest that countries of good institutional quality are more likely to liberalize their capital account. Overall, the above figures give preliminary insights on the issue of capital flight in developing countries and provides some possible solution to curb the loss of resources. However, strong econometric methodology are needed to support assumptions that infer from these stylized facts.

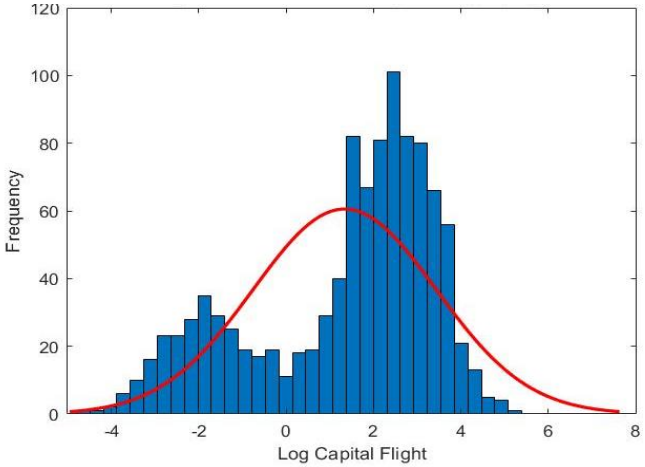

Figure 4.2: Histogram of capital flight distribution

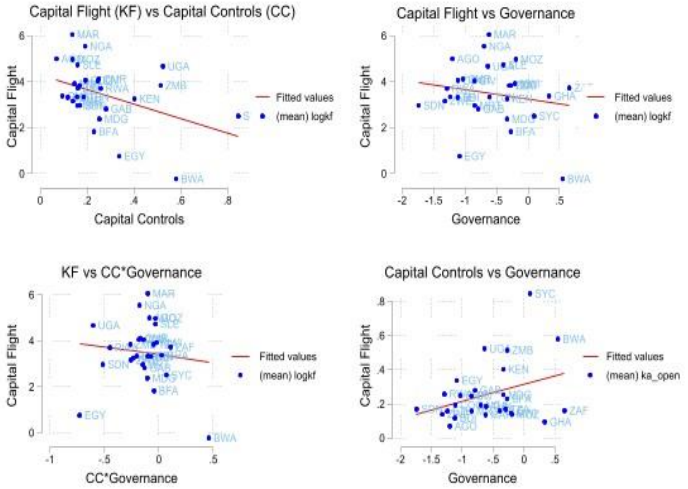

Figure 4.3: Scatter plots of capital flight vs controls and governance

4.4 Methodology

In the current section, we describe the empirical model, and the estimation strategy applied to assess the macroeconomic impact of capital flight under different states of governance and capital liberalization policy.

Our empirical model is based on an interacted panel VAR (IPVAR) approach as employed in Towbin and Weber (2013) and Sá et al., (2014). IPVAR allows coefficients to vary deterministically with a country's structural characteristics, which is not the case for standard Panel VAR models.
The recursive form of the interacted panel VAR model is generally written as follow:

$$\Omega_{i,t} Y_{i,t} = \lambda_i + \sum_{k=1}^{l} A_k . Y_{i,t-k} + \emptyset_{i,t} . X_{i,t} + \sum_{k=1}^{l} \varphi_k \cdot X_{i,t} . Y_{i,t-k} + \mu_{i,t} \quad (1)$$

$$t = 1, \ldots, T \qquad i = 1, \ldots, N \qquad \mu_{i,t} \sim N(0, \Sigma) \quad (2)$$

Where t and i denote respectively time and country. $Y_{i,t}$ is a $p \times 1$ matrix of endogenous variables. λ_i is a p×1 vector of country-specific intercepts. $A_{j,k}$ is a p×p matrix of autoregressive coefficients up to lag l. The optimal lag length is obtained by using the Schwarz information criterion for panel data. $\mu_{i,t}$ is the p×1 vector of residuals. These residuals are assumed to be uncorrelated across countries and normally distributed with a p×p constant covariance matrix Σ.
$X_{i,t}$ stands for interaction terms that influence the dynamic relationship between endogenous variables and also allowed to affect the level of variables via the variables ∅. $\Omega_{i,t}$ is a lower

triangular matrix that stands for the contemporaneous effect of variables in the VAR model.

Let us consider a and b as the ordering position of variables in the VAR model. Then, $\Omega_{i,t}(a,b)$ is the contemporaneous effect of the b^{th} ordered variable on the a^{th} ordered variable for all $a > b$. $\Omega_{i,t}(a,b) = 1$ if $a = b$ and $\Omega_{i,t}(a,b) = 0$ if $a < b$. From the above-mentioned properties $U_{i,t}$ is a lower triangular matrix with ones on the diagonal and $\Omega_{i,t}(a,b)$ is modelled as:

Therefore, by putting endogenous variables in equation (1), it can be rewrite as:

$$\begin{bmatrix} 1 & 0 & 0 & 0 \\ \alpha_{0,it}^{21} & 1 & 0 & 0 \\ \alpha_{0,it}^{31}\alpha_{0,it}^{32} & 1 & 0 \\ \alpha_{0,it}^{41}\alpha_{0,it}^{42} & \alpha_{0,it}^{43} & 1 \end{bmatrix} \begin{bmatrix} kfl_{it} \\ extdebt_{it} \\ rer_{it} \\ rent_{it} \end{bmatrix} = \lambda_i + \Theta \cdot X_{it} + \sum_{k=1}^{L} \begin{bmatrix} \alpha_{k,it}^{11} & \alpha_{k,it}^{12} & \alpha_{k,it}^{13} & \alpha_{k,it}^{14} \\ \alpha_{k,it}^{21} & \alpha_{k,it}^{22} & \alpha_{k,it}^{23} & \alpha_{k,it}^{24} \\ \alpha_{k,it}^{31} & \alpha_{k,it}^{32} & \alpha_{k,it}^{33} & \alpha_{k,it}^{34} \\ \alpha_{k,it}^{41} & \alpha_{k,it}^{42} & \alpha_{k,it}^{43} & \alpha_{k,it}^{44} \end{bmatrix} \begin{bmatrix} kfl_{it-k} \\ extdebt_{it-k} \\ rer_{it-k} \\ rent_{it-k} \end{bmatrix} + \mu_{i,t} \quad (3)$$

with $\begin{bmatrix} kfl_{it} \\ extdebt_{it} \\ rer_{it} \\ rent_{it} \end{bmatrix} = Y_{i,\ t}$ the vector of endogenous variables kfl_{it}, $extdebt_{it}$, rer_{it}, and $rent_{it}$ stand respectively for capital flight, government external debt, real exchange rate and resources rent. We also estimate the effect of sovereign debt shock on additional variables such as gdp, private investment and domestic savings. $\alpha_{k,it}^{ab}$ is a matrix of non-linear coefficients representing the effect of the of b^{th} ordered variable on the a^{th} ordered variable. For k=o, $\alpha_{k,it}^{ab}$ represents the contemporaneous effects between lagged variables. The other elements of equation (3) were defined above. The non-linearities of $\alpha_{k,it}^{ab}$ come from the fact that coefficients are treated as a function of cross-time-varying structural characteristics and can be written as:

$$\alpha_{k,it}^{ab} = \beta_k^{ab} + \delta_k^{ab} X_{i,t} \quad (4)$$

In this paper, we use the degree of financial restrictions (capital control) and institutional quality as structural characteristics or interaction terms. Therefore, we obtain from (4) the following equation:

$$\alpha_{k,it}^{ab} = \beta_k^{ab} + \delta_{k1}^{ab} kaopen_{i,t} + \delta_{k2}^{ab} instit_{i,t} + \delta_{k3}^{ab} kaopen_{i,t} \cdot instit_{i,t} \quad (5)$$

Where *kaopen* stands for the degree of capital restrictions on cross border financial flows and *instit* represents the country institutional quality or level of governance. Controlling these characteristics is relevant because of the close relation between the level of governance in a country and its ability to counter corruption and illicit financial activities. Moreover, this paper will provide more highlights for policy implication. Notwithstanding, the relevance to account for those structural characteristics, previous studies have ignored the degree capital control and the institutional environment in the sovereign debt-capital flight nexus (Ize and Ortiz, 1987; Ndikumana and Boyce, 2011). In the first specification, we set $\delta_{k2}^{ab} = \delta_{k3}^{ab}$=0 to isolate the effect of capital restrictions on capital flight following a shock on capital flight. In a second specification, we allow $\delta_{k1}^{ab} = \delta_{k3}^{ab} = 0$ this disentangles from the other determinants the role of governance quality on capital flight after change in sovereign debt level. Finally, we account for the concomitant role of capital restrictions and governance quality by setting $\delta_{k1}^{ab} \neq 0$; $\delta_{k2}^{ab} \neq 0$; $\delta_{k3}^{ab} \neq 0$. The combination of the different interactions terms allows to control for correlation between these determinants of the macroecomic variables-capital flight nexus.

The model is estimated using a Cholesky ordering and imposing zero restrictions on variables in the VAR model. The restrictions matrix is as follow:

$$restr = \begin{bmatrix} rest_{11} & rest_{12} & rest_{13} & rest_{14} \\ rest_{21} & rest_{22} & rest_{23} & rest_{24} \\ rest_{31} & rest_{32} & rest_{33} & rest_{34} \\ rest_{41} & rest_{42} & rest_{43} & rest_{44} \end{bmatrix}$$

$rest_{11}$ represents the impact of lagged capital flight on its current value. $rest_{12}$ $rest_{13}$ $rest_{14}$ are respectively the impact of capital flight on public external debt, real exchange rate and resources rent. While $rest_{21}$ $rest_{31}$ $rest_{41}$ stand respectively for the impact of capital flight shock on external debt, real exchange rate and resources rent.

In a zero restrictions setting, 1 implies an exclusion of interaction or variable and 0 indicates no restrictions on variable in the VAR model. Here, we impose $rest_{11} = [0 \quad 1 \quad 1 \quad 1]$ and $rest_{12} = rest_{13} = rest_{14} = [1 \quad 1 \quad 1 \quad 1]$; while the remaining restrictions are set to $[0 \quad 0 \quad 0 \quad 0]$. We assume that capital flight reacts only to its own lags and does not react to other endogenous variables. However, there are empirical evidences that external debt and resources rent can affect capital flight with lag. Yet, for the purpose of the study we adopt the above assumption. Moreover, we allow government external debt, exchange rate and resources rent to react to capital flight shock with an effect depending on country structural characteristics.

These endogenous variables respond to their lag and but also to country structural characteristics. In this paper, capital controls and institutional quality are the structural characteristics around which the responses of endogenous variables to capital flight shock are estimated.

For each interaction term, we consider two distinct regimes namely low and high the degree of capital controls and weak and good institutional quality. The two regime of capital controls are taken at the 25th (high restrictions) and 75th (low restrictions) percentile of the capital openness variable (kaopen). For governance; regimes are separated by the 50th

(weak governance) and 60th (strong governance) percentile of the governance variable. These thresholds are chosen in line with Ito (2006) and Fernández et al.(2016).

4.5 Results

Our baseline results assess the response of each macroeconomic variables to capital flight shock separately under capital account restrictions and governance quality. Then in alternative specifications we analyze the impact of outflows shock interactively under capital restrictions conditional on institutional quality.

4.5.1 Impulses reponse of macroeconomic variables under capital control and governance

Figure 4.4 depicts the IRFs of the key macroeconomic variables under capital controls regimes. The first line depicts (figure 4.4) the reaction of capital flight to its own shock. The rest of the lines provide the responses of exchange rate, public external debt and natural resources rent to a 1% increases in capital flight. In the left-hand panel we estimate the impulses response under low capital controls, whereas the right-a-hand panel provide variables dynamics under tight capital controls. As stated above, we considered great financial openness for higher values of *kaopen* as indicated in (Ito, 2006) and vis-versa.

Capital flight shock keeps the outflows permanently positive until the second year when it stagnate at a constant level. Exchange rate and resources rent are negatively affected by capital flight shock both in flexible and tight capital controls regime. However, we observe a rise in public external debt induced by the rise of capital outflows. Table 4.1 presents the estimated IRFs coeficients for the five first years following the shock. The last column gives the differences between impulse

responses over the two regimes of capital account policy: *low minus high* degree of capital controls. We state that positive values in the last column indicate that the effect size of capital flight shock is higher under flexible capital controls as compared to that of high capital controls.

In an environment with high capital controls, a sudden surge in capital flight shock can lead to a more pronounced decline in the exchange rate and negatively impact the income generated from natural resources. This finding indicates that despite tight capital controls, there has been a loss of domestic resources and a decline in exchange rates due to capital outflows. From year 2 to year 5, exchange rates continuously drop from 0.012% to 0.044% in countries with flexible capital controls and from 0.015% to 0.052% under highly restricted capital regimes. Concerning resources rent, the drop is estimated at 0.005% to 0.032% under lowly restricted capital and at 0.009% to 0.032% for countries with strong capital controls. These results imply that capital controls are likely to mitigate resources drain under capital flight shock and prevent high exchange rate volatility.

Table 4.1: Variables responses to capital flight shock under different capital controls regimes.

Variables	Horizons	Low capital control	High capital control	Difference
Exchange rate	1	0.004	-0.004	0.008
	2	-0.012	-0.015	0.003
	3	-0.023	-0.027	0.004
	4	-0.033	-0.04	0.007
	5	-0.044	-0.052	0.008
External debt	1	0.024	0.021	0.003
	2	0.032	0.029	0.003
	3	0.035	0.032	0.003
	4	0.036	0.033	0.003
	5	0.036	0.034	0.002
Resources rent	1	0.000	-0.002	0.002
	2	-0.005	-0.009	0.004
	3	-0.011	-0.017	0.006
	4	-0.025	-0.025	0.000
	5	-0.032	-0.032	0.000

Empirical evidence on the impact of strict capital controls on exchange rate stability is mixed. While some studies suggest that capital controls can help offset large exchange rate movements (Frenkel et al., 2002; Glick and Hutchinson, 2005) , others find little effect on overall flows or currency appreciation (Dominguez, 2020; Edison and Reinhart, 2001). It is important to note that data limitations and variations in capital account regimes contribute to the mixed results in the literature. Therefore, the efficacy of capital controls remains a topic of ongoing research. Our findings bring some evidences on this unconclusive question in the economic literature. The

current results suggest that capital controls can mitigate exchange rate overwelming .

Alike Alesina and Tabellini (1989), we find that restricted capital controls effectively limit overcumulated external debt after a shock of capital flight. The response gap of external debt response under low and high capital control regime is positve through the considered horizons suggesting that external debt response (upward) to outflows shock is higher when capital controls are relaxed. The stabilizing role of restricted capital controls in this case may come from exchange rate stabilization maecanism. In fact, Laurent et al., (2003) show that exchange rate volatility is a major factor that explains external debt dynamic.

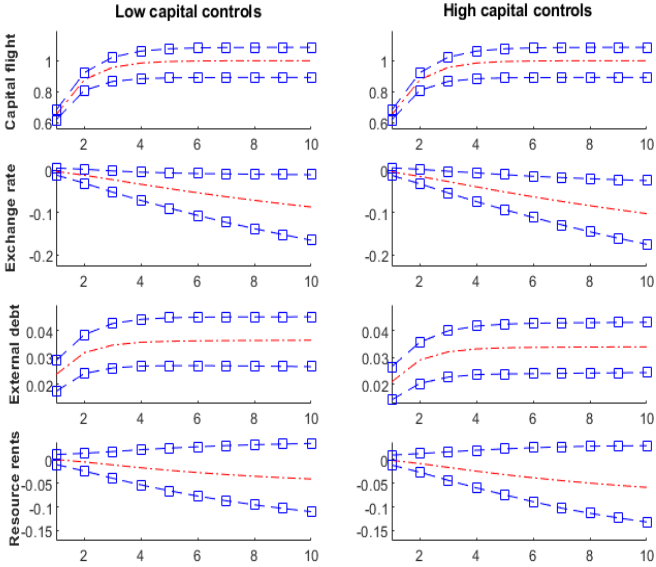

Figure 4.4: Variables response to capital flight shock under capital controls

4.5.2 Does instutitional quality shapes capital account policy?

The estimated impulse responses presented in table 1 and 2 show differences which highlight some heterogenous macroeconomic impact of capital flight shock under capital account policy and governance regimes. In the second case, exchange rate and ressources rent decline when governance is weak but not under strong governance (Table 2).

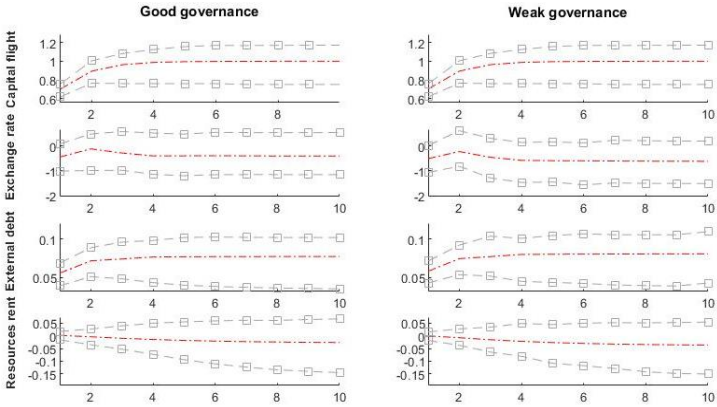

Figure 4.5:Variables responses to capital flight shock under governance regimes.

In the following, we use alternative specifications to analyze the reponses of each variable depending on capital controls stance and institutional quality. Figure 4.6 depicts the dynamic of each variable to capital flight shock. Strong capital controls policy do not insulate better from capital flight shock under good governance. However, when governance is weak, tight capital controls do better in preventing macroeconomic volatility caused by capital flight shock.

For instance, in the fith and tenth year, exchange rate falls by 0.014% and 0.015% respectively under low capital controls for governance good regime. However, for countries emplementing high restrictions on the capital account, exchange rate drops by 0.015% and 0.016% (Table 3). On the other hand, in a weak institutional context, strict capital controls moderate exchange rate decline with a drop of 0.005% on the fith year in countries with low capital account restrictions and 0.004% for countries with strict capital controls.

As illustrated in Table 4.2, governance plays a crutial role in the transmission mechanism of capital flight shock. The better the governance reduces the drained resources rent from emerging markets. Precisely, on the first-year following the capital flight shock, resources rent reponds nesgatively at 0.002% under moderate capital controls and at 0.004% under high capital restrictions.

Table 4.2: Variables responses to capital flight shock under different governance regimes.

Variables	Horizons	Good gov.	Weak gov.	Difference
Exchange rate	1	-0.45	-0.509	0.059
	2	-0.119	-0.225	0.106
	3	-0.284	-0.457	0.173
	4	-0.4	-0.579	0.179
	5	-0.398	-0.592	0.194
External debt	1	0.055	0.058	-0.003
	2	0.072	0.075	-0.003
	3	0.074	0.077	-0.003
	4	0.077	0.08	-0.003
	5	0.077	0.08	-0.003
Resources rent	1	0.001	0.000	0.001
	2	-0.004	-0.008	0.004
	3	-0.01	-0.056	0.046
	4	-0.015	-0.016	0.001
	5	-0.018	-0.022	0.004

Table 4.2 also illustrates the role of governance in mitigating the effects of capital flight shock on the economy. The behavior of economic variables indicates that countries with strong institutional quality and stringent capital control tend to avoid excessive public external debt accumulation and prevent resource rent draining, as compared to countries with more relaxed capital restrictions. After one year of the shock, public external debt rises by 0.036% then stabilize at around 0.047% under low capital controls for countries with good governance rank. But under strong capital controls, external debt increases by 0.033% to 0.045% over five years after the shock. Yet, the difference over governance regimes is not economically significant.

Regarding resources rent the column diff (1) highlights a deeper decline under low capital controls for countries with good governance. The same result is provided with diff (2) for bad institutional regime. From these results, we observe that restricted movement of capital is more stabilizing than flexible ones with a catalytic role of institution quality. Yet, the insulating role of governance is not statistically significant In the previous results, we did not find any evidence about this insulation role of restricted capital policy regarding exchange rate stability to outflows shocks. This role is therefore highlighted for contries with good level of governance.
Furthermore, we assess the joint role of capital controls and governance for additional variables. Figure D.1 (appendix) and table 4.3 depict the cumulated responses and coeficients of impulse responses of each variable. Overall, we find that accumulated capital flight inflate interest rates while domestic credit to the private sector and economic growth decline. These results are in line with our expectations and confirm the theory and some empirical evidences (Baradjwaj and al.,2016; Valerio et al., 2020;Bawuah, 2022).

The upward movement of interest rates caused by capital flight shock in countries with weak governance is above that of countries with strong institutions. For the first category of countries, interest rates increase by 0.36% in low restrictions regime and by 0.24% when capital controls are tight. Under good institutional quality, interest rate increase by 0.205% and 0.206% in less and more resctricted capital regime respectively. This results consider the IRFs of the first year after the shock. However, the dynamic is similar on the future horizons.
In countries with weak governance, the impulse responses of economic growth depict a decline by 0.071% when countries relax capital controls and by 0.07% when capital controls are strict. However, when governance is better, the negative impact

of capital flight is moderate whatever the orientation of the capital accounnt policy. Nontheless, the growth decline is less when capital controls are tight. Specifically, growth rate drops by 0.058% and 0.049% over the same hoirizons as above. These results show that good institutions catalyze capital controls policy to better prevent against macroeconomic volatilities caused by capital flight. Our findings are in line with Valerio et al., 2020 and Bawuah (2022) who argue that good instituituons improve the cost-effectiveness of regulatory policies by reducing transactions costs and other factors underpining policies in developing countries. Therefore, strong institutions are viewed as pre-conditions for the successful capital account policy. Bergin et al. (2023) argue that capital controls are growth enhencing if combined with reserve accumulation. In the baking system, Bawuah (2022) supports that institutional quality and capital controls have direct positive impact on banks liquidity creation in emerging economies.

Similarly, Baradjwaj and al.,(2016) drew the conclusion that in the US, governance and capital controls are also simultaneously effective for bank liquidity creation. Even if this latter case is not per see comparable to the situation of many emerging markets however it shed light on the complementarity between capital account policy and institutional quality.

The same conclusion is drawn on the joint stabilizing role against adverse shocks of capital controls and governance whith regard to the exchange rate. As mentioned, exchange rate is more stable under tight capital controls and strong governance. The domestic economy is thus better protected against the negative effects of financial leakage. In fact, the decline of exchange rate pushes the prices of foreign goods and services upward leading to higher imported prices and inflation which undermine aggregate demand and accelerate economic slowdown. We argue that capital restrictions also affect economic growth through exchange rate. Moreover, restrictive

capital controls are effective when transaction costs are reduced by good institutional quality.

The dynamics of the domesctic credit based on the estimated IRFs in table 3 highlights the role of governance conditional to the capital account policy stances. The rapid increase on capital flight causes credit to the private sector to decrease in both stance of capital restrictions and over governance regimes. This result stress that capital outflows is detrimental for the domestic financial development with decline of loanable funds and increase of domestic interest rates. This finding shows that institutions lack capacities to curb illicit outflows and to bring a zero effect of capital flight in developing countries. However, the negative impact of capital leak on domestic credit seem moderate in countries whith better institutional quality. For instance, under flexible controls, credit-to-GDP declines by 0.06% for countries with strong institutions and by 0.23% in countries of weak governance and during the second year after the shock.

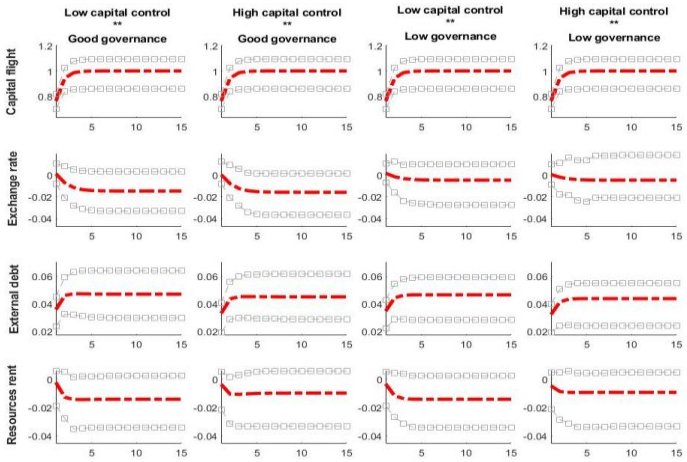

Figure 4.6: Variables response to capital flight shock (1%) under additional regimes of capital control and governance

The dynamics of the domesctic credit based on the estimated IRFs in table 3 highlights the role of governance conditional to the capital account policy stances. The rapid increase on capital flight causes credit to the private sector to decrease in both stance of capital restrictions and over governance regimes. This result stress that capital outflows is detrimental for the domestic financial development with decline of loanable funds and increase of domestic interest rates. This finding shows that institutions lack capacities to curb illicit outflows and to bring a zero effect of capital flight in developing countries. However, the negative impact of capital leak on domestic credit seem moderate in countries whith better institutional quality. For instance, under flexible controls, credit-to-GDP declines by 0.06% for countries with strong institutions and by 0.23% in countries of weak governance and during the second year after the shock. However, under tight restrictions, banks' credit to the private sector drops by 0.22% in countries of weak governance and by 0.36% under improved governance. Therefore, the adverse effect of capital flight on financial deepening is light when institutions work. As pointed out by Khan & Zahid (2020), good institutions encourage banks to adopt prudential financial strategies which reinforce banks stability. Moreover, other empirical studies demonstrate that strong institutions stimulate credit supply and decrease lending costs which prevent banks default.

Even if our findings generally follow economic theory predictions and are in line with some empirical studies, these results must be tested with alternative methodology and other measure of capital controls or institutional variables.

4.6 Robustness check

In the current section, we test the sensitivity of previous results to alternative specifications.

4.6.1 Alternative estimation method (local projection)

We check the robustness of the findings by using local projection as an alternative methodology to VAR estimation strategies. Local projection (LP) was first introduced by Jordà (2005) and since then it has been widely used in emprical literature because it offers several advantages. One main important advantage of local projection relies on its flexibility to misspecifications. Precisely, we use the non-linear LP to account for different regimes of capital controls. As in previous section, we estimate impulse responses of macroeconomic variables over less and highly restricted capital regimes. We split the data using the Hodrick-Prescott (HP) filter and the logistic function.
Figures D.2 and D.3 (appendix) present the estimated IRFs and the associated confident bands for each variable.
Interestingly, the responses of most variables are not sensitive to this alternative estimation strategy. Rather some variables react more significantly to shock while keeping the same sign. For instance, exchange rate and GDP become statistically significant under relaxed capital controls. However, we notice a light difference with regard to capital controls stabilizing role on exchange rate. In fact, tight capital controls provide a better result in limiting the decline of exchange rate. This may be related to the fact local projection minimize misspecification biais leading to more expected results.
Another little difference regarding previous results concerns the reaction of GDP to shock under relaxed capital controls.

Counter-intuitively, current estimations show that GDP reacts positvely to capital flight shock in countries with highly open capital account. However, under strict capital restrictions, the response of GDP is negative and statistically significant as expected. It is generally admitted that economic growth is adversly affected by capital flight. Once again, external debt reacts positively to capital flight shock yet the borowing level is moderate under restrictives capital controls.

Table 4.3: Variables response to capital flight shock under capital controls and governance regimes.

Horizons	Good governance			Low governance			(1)-(2)
	Low capital control	**High capital control**	Difference (1)	**Low capital control**	**High capital control**	Difference (2)	
Exchange rate							
1	0.001	0	0.001	0	0	0	0.001
5	-0.005	-0.004	-0.001	-0.014	-0.015	0	-0.002
10	-0.005	-0.005	0	-0.015	-0.016	0.001	-0.001
External debt							
1	0.035	0.032	0.003	0.036	0.033	0.003	0
5	0.047	0.044	0.003	0.047	0.045	0.002	0.001
10	0.047	0.044	0.003	0.047	0.045	0.002	0.001
Resources rent							
1	-0.003	-0.005	0.002	-0.002	-0.004	0.002	0
5	-0.014	-0.01	-0.004	-0.014	-0.01	-0.004	0
10	-0.01	-0.01	0	-0.014	-0.009	-0.005	0.005
Interest rate							
1	0.205	0.206	-0.001	0.375	0.235	0.14	-0.141
5	1.057	1.214	-0.157	1.09	1.27	-0.18	0.023
10	1.58	1.74	-0.16	1.53	1.78	-0.25	0.09
Credit/GDP							
1	0.008	0.028	-0.02	-0.024	-0.003	-0.021	0.001
5	-0.061	-0.219	0.158	-0.232	-0.356	0.124	0.034
10	-0.241	-0.526	0.285	-0.464	-0.702	0.238	0.047
GDP growth							
1	-0.049	-0.058	-0.009	-0.071	-0.07	-0.001	-0.008
5	-0.26	-0.227	0.033	-0.286	-0.245	-0.041	0.074
10	-0.278	-0.247	0.031	-0.294	-0.256	-0.038	0.069

4.6.2 Alternative measures of governance: government effectiveness, Corruption

In this last subsection, we test the robustness of the baseline results to alternative specification of governance. In the previous findings we proxy governance based on political volatility and absence of violance or terrorism which is assumed to be a source macroeconomic instability. Now, we use two alternative measures of governance namely the control of corruption and government effectiveness. These proxies are relevant approaches of governance and specially when assessing the determinant of illicit financial flows. Control of corruption capture the perception to which the public power is devoted to private gain while government effectiveness measures the quality of policy formulation and implementation and government commitment to such policies.

The results are close to the baseline however, there are some differences in reaction size of some variables. As expected, capital flight is source of macroeconomic volatility. For all the macroeconomic variable, we find that an increase of 1% deviation of capital flight causes a prompt reaction of each variable. Furthermore, the impluse response function of these variables are similar to what we observe in the previous results. Comparison of the macroeconomic effect of capital flight over different institutional variable show a sensitivity regarding the insulting role governce. For instance, when using government effectiveness, institutional quality plays a better insulating role by limiting growth decline. More specifically, after a 1% increase in capital flight, growth drops by 0.15 to 0.19% for an effective government implementing flexible capital controls. However, growth declines by 0.22 to 0.26% for a less corrupted governement applying the same policy of capital controls. The results are similar over the two alternative measures

governance for the weak institutional quality. We argue that combating capital flight is a whole package of multiple policy actions and should not focus only on controling one aspect of governance.

4.7 Conclusion

Overall, several points can be drawn from the above findinds leading to policy implications. First, analysis of the different IRFs and their related confident intervals suggests that the responses of many variables are significant at least at 10%. We find that capital flight is destabilizing for the macroeconomic framework in emerging markets by causing threats such as currency instability, loss of domestic resources mainly from the extractive sector. The significant shrink of domestic resources lead to public external debt overaccumulation. We also find that capital flight induces an upward pressure on interest rates which dampens financial development. All these adverse macroenomic effects are detrimital for the domestic economy causing decline of economic growth.

By assessing the role of capital controls as a stabilizer against these adverses economic effects of capital flight, our results suggest that capital account policy may be effectice during uncertainties. Tight capital controls reduce the volatility of most variables. However, strict restrictions on capital movement were not effective in reducing exchange rate depreciation. We argue that this ineffectiveness relies on the abusive and repeatedly use of capital controls as stressed by Bakker and Chappel on the IMF analysis on capital controls and exchange rates policy .

We also tested the role of institutions in limiting macroeconomic imbalances caused by financial outflows. Institutions appear to be effective in reducing the economic volatility in most cases. Furthermore, the paper assess the joint

role of capital controls and institutional quality. Interesstingly, we find that capital controls policy yields bettter results when institutional frmaework is good. Most of variables are less affected by capital flight shock under tight capital controls and strong governance regime. We argue that governance plays a catalytic role on capital account policy by reducing transaction costs and other factors underming policy effectiveness.

Futhermore, we test the sensitivity of these findings to alternatives methodological approaches. Instead of interacted panel VAR strategy, we estimate the macroeconomic effects of capitl flight using the Jordà (2005) 's non linear local projection. In addition, we change the previous governance variable by using government effectiveness and control of corruption to measure country's institutional quality. The obtained results are less sensitive to alterntive specifictions. The estimted impulse response function of most of the macroeconomic variables move on the same direction. However, the size of the of IRFs show some light differences.

We conclude that the debate on capital account liberalization advocated by the neo-liberal vision but rejected by Keynes is still questioned by economic scholars. Our results, follow the Keynesian argument that tight capital controls can be effective during uncertainties. Our paper also contributes to this debate by arguing that good institutional quality plays a catalytic role regarding capital controls effectiveness. Overall, our findings imply the validity of capital controls as necessary for macroeconomic stability and domesctic growth. Moreover, we argue that a better intitutional quality should be combined with capital account policy to shape its effectiveness.

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Apendix

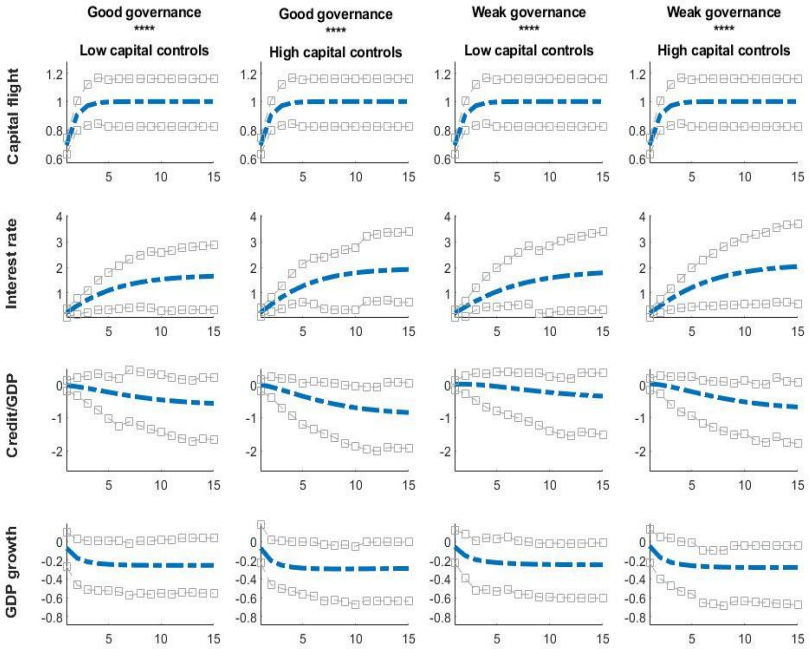

Figure D.1: Response of interest rate, credit to private sector and GDP growth to 1% positive shock of capital flight under alternative stage of capital control and governance

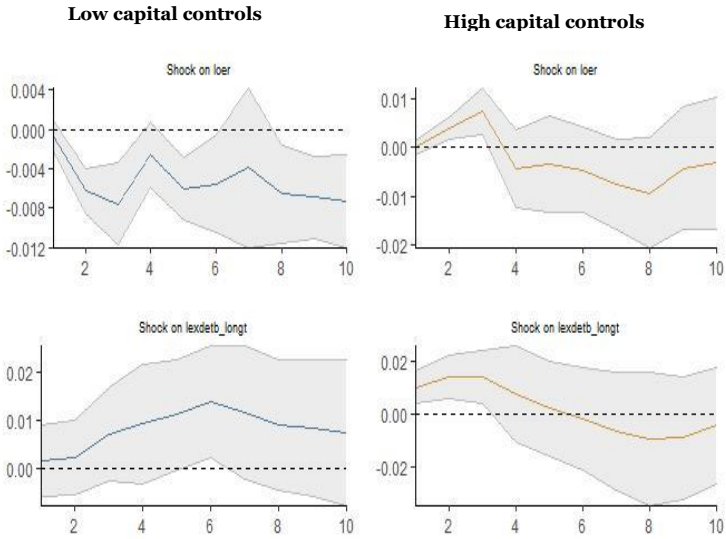

Figure D.2: Response of exchange rate, external debt to 1% positive shock of capital flight under alternative stage of capital controls

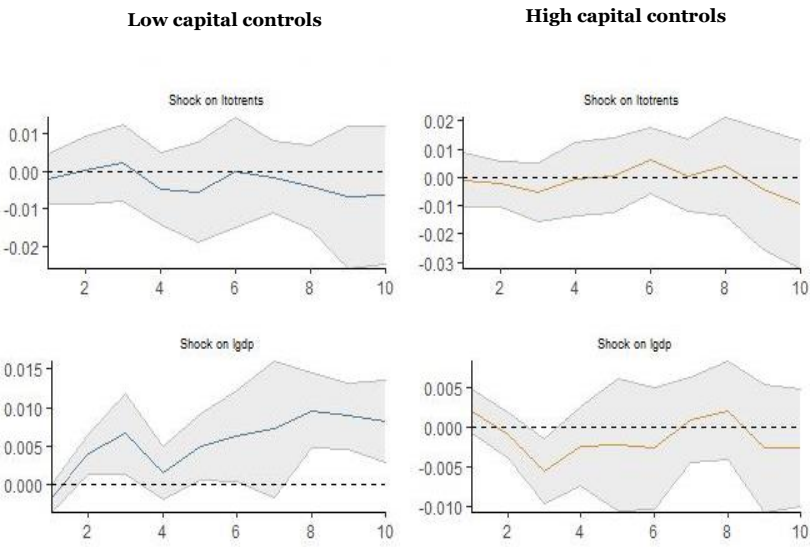

Figure D.3:Response of resources rent and GDP growth to 1% positive shock of capital flight under alternative stage of capital controls

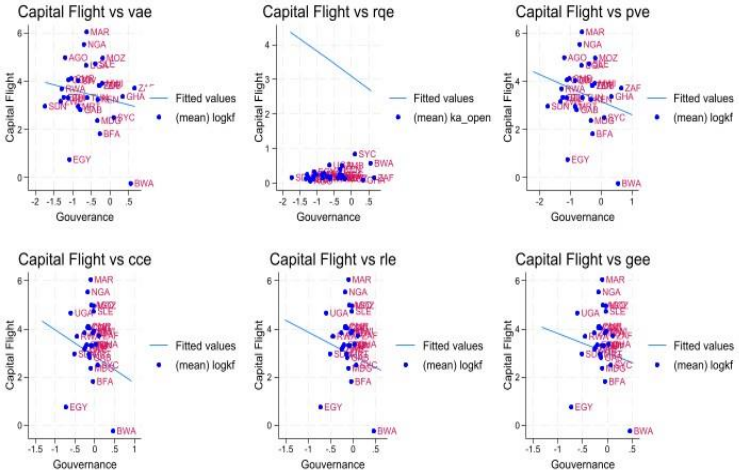

Figure D.4: Scatter plots of capital flight vs controls and governance

Table D1: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
kaopen	992	-.878	1.051	-1.924	2.322
capfl r	1007	1560.105	5231.793	-19767.9	56470.898
logkfl r	992	1.323	2.064	-4.232	5.032
vae	513	-.632	.613	-1.859	.863
pve	513	-.619	.809	-2.665	1.106
gee	513	-.618	.533	-1.662	1.02
rqe	513	-.571	.561	-2.236	.804
rle	513	-.643	.552	-1.852	.731
cce	513	-.625	.552	-1.528	1.217
tot rents	1003	11.43	10.139	.001	58.688
creditogdp 1	847	20.679	23.546	0	142.422
gdpth	1010	3.769	5.486	-50.248	35.224
rexr	478	152.835	216.91	46.981	3053.7
oer	1015	349.502	761.002	0	9686.77
taxrev	403	15.16	5.572	3.856	29.247
ir	592	21.019	17.591	4.737	217.875
logextdebt	999	22.041	1.205	18.577	25.23

Table D2: Variables description

Variables name	Variables labels
kaopen	Chinn-Ito index
capfl_r	Capital flight estimates: real values, million current US$
logkf	Log of capital flight estimates: real values, million current US
vae	Voice and Accountability, Estimate
pve	Political Stability and Absence of Violence/Terrorism, Estimate
gee	Government Effectiveness, Estimate
rqe	Regulatory Quality, Estimate
rle	Rule of Law, Estimate
cce	Control of Corruption, Estimate
tot_rents	Total natural resources rents (% of GDP)
creditogdp_1	Domestic credit to private sector (% of GDP)
gdpth	GDP growth (annual %)
rexr	Real effective exchange rate index (2010 = 100)
oer	Official exchange rate (LCU per US$, period average)
taxrev	Tax revenue (% of GDP)
ir	Lending interest rate (%)
logextdebt	Log of external debt, total (TDS, current US$)

Table D3: Country sample

N°	Country	ISO Code	N°	Country	ISO Code
1	Angola	AGO	15	Mozambique	MOZ
2	Burundi	BDI	16	Mauritania	MRT
3	Burkina Faso	BFA	17	Malawi	MWI
4	Botswana	BWA	18	Nigeria	NGA
5	Cote d'Ivoire	CIV	19	Rwanda	RWA
6	Cameroon	CMR	20	Sudan	SDN
7	Congo, Rep.	COG	21	Sierra Leone	SLE
8	Egypt, Arab Rep.	EGY	22	Tunisia	TUN
9	Ethiopia	ETH	23	Tanzania	TZA
10	Gabon	GAB	24	Uganda	UGA
11	Ghana	GHA	25	South Africa	ZAF
12	Kenya	KEN	26	Zambia	ZMB
13	Morocco	MAR	27	Zimbabwe	ZWE
14	Madagascar	MDG			

Table D4:Variable response to capital flight shock under different regimes of capital controls and governance

Horizons	Good governance			Low governance			(1)-(2)
	Low capital control	**High capital control**	Difference (1)	**Low capital control**	**High capital control**	Difference (2)	
Control of Corruption (CCE)							
Interest rate							
1	0.256	0.264	-0.008	0.206	0.326	-0.12	0.112
5	0.85	0.784	0.065	1.163	1.074	0.089	-0.023
10	1.176	1.099	0.077	1.46	1.396	0.064	0.013
Credit/GDP							
1	-0.002	-0.002	0	-0.007	-0.032	0.025	-0.025
5	-0.147	-0.109	-0.038	-0.499	-0.385	-0.114	0.076
10	-0.439	-0.298	-0.141	-0.959	-0.737	-0.222	0.081
GDP growth							
1	-0.037	-0.015	-0.022	-0.042	-0.022	-0.02	-0.0019
5	-0.225	-0.171	-0.054	-0.258	-0.208	-0.05	-0.004
10	-0.261	-0.216	-0.045	-0.292	-0.259	-0.033	-0.012
Government Effectiveness (GEE)							
Interest rate							
1	0.249	0.24	0.009	0.314	0.295	0.019	-0.01
5	1.564	1.34	0.224	1.903	1.613	0.29	-0.066
10	2.129	1.794	0.335	2.498	2.137	0.361	-0.026
Credit/GDP							
1	0	-0.031	0.031	-0.027	-0.047	0.02	0.011
5	-0.589	-0.436	-0.153	-0.92	-0.67	-0.25	0.097
10	-1.267	-0.871	-0.396	-1.799	-1.265	-0.534	0.138
GDP growth							
1	0.031	0.042	-0.011	0.043	0.05	-0.007	-0.004
5	-0.15	-0.121	-0.029	-0.187	-0.15	-0.037	0.008
10	-0.191	-0.178	-0.013	-0.24	-0.221	-0.019	0.006

Table D5: Forms of capital controls

Forms of capital controls

Capital controls represent measures taken by a government, central bank, or other regulatory body to limit the flow of foreign capital in and out of the domestic economy. These controls can take various forms, including:

1. **Exchange Controls**: These prevent or limit the buying and selling of a national currency at the market rate.
2. **Volume Restrictions**: Caps on the allowed volume for international sale or purchase of various financial assets.
3. **Transaction Taxes**: For instance, the proposed Tobin tax on currency exchanges.
4. Minimum Stay Requirements: These may restrict the ability of foreign investors to quickly exit the country.
5. **Mandatory Approval:** Requiring approval for specific capital movements.
6. Unremunerated Reserve Requirements: Holding a portion of foreign exchange reserves without earning interest.
7. **Credit Regulations**: Controlling access to credit for cross-border transactions.
8. **Outright Prohibitions**: Banning certain types of capital movements.

Table D6: Why do countries implement capital controls?

Why do countries implement capital controls?

Policymakers consider several factors when deciding whether to implement **capital controls**. These factors include:

1. **Economic Conditions**: Policymakers assess the overall economic situation, including exchange rate stability, inflation, and financial market conditions. If there are signs of instability or excessive volatility, they may consider capital controls.
2. **Balance of Payments**: Policymakers examine the balance of payments, which includes trade balances, foreign direct investment, and portfolio flows. If there is a risk of sudden capital outflows affecting the balance, controls may be considered.
3. **Currency Depreciation**: A sharp depreciation of the national currency can prompt policymakers to intervene with capital controls to stabilize the exchange rate.
4. **Financial Stability**: Policymakers evaluate the health of the financial system. If there are concerns about systemic risks due to large capital inflows or outflows, controls may be implemented.
5. **Speculative Attacks**: In cases of speculative attacks on the currency, policymakers may use controls to prevent excessive speculation and maintain stability.
6. **External Shocks**: External events (such as global financial crises or commodity price fluctuations) can impact a country's economy. Policymakers may respond with controls to mitigate adverse effects.
7. **Domestic Political Considerations**: Political factors, public opinion, and pressure from interest groups influence decisions. Policymakers weigh the costs and benefits of controls.
8. **Alternatives**: Policymakers explore alternative measures (such as monetary

Table D7: Pros and cons of capital controls

The debate around relaxing or tightening capital control measures

The debate around **relaxing or tightening capital control measures** continues among economists, policymakers, and financial experts. Here are some key points from both sides of the argument:

1. **Advocates for Relaxation**:
    - **Economic Efficiency**: Supporters argue that easing capital controls promotes economic efficiency. By allowing capital to flow freely, resources can be allocated more efficiently across borders.
    - **Attracting Investment**: Relaxing controls can attract foreign direct investment (FDI) and portfolio investment. This influx of capital can stimulate economic growth and create jobs.
    - **Financial Integration**: Advocates emphasize the benefits of financial integration. Open capital markets allow for diversification, risk-sharing, and access to global financial services.
    - **Market Discipline**: Some believe that market discipline (rather than government intervention) should regulate capital flows. Investors will respond to risks and opportunities, leading to better outcomes.
2. **Arguments for Tightening**:
    - **Financial Stability**: Critics of liberalization argue that capital controls can enhance financial stability. During crises, controls can prevent sudden capital flight and stabilize exchange rates.
    - **Speculative Attacks**: Tightening controls can deter speculative attacks on a country's currency. By limiting short-term capital flows, policymakers can reduce volatility.
    - **Prudential Measures**: Some view capital controls as prudential measures to prevent excessive risk-taking. For instance, restrictions on foreign borrowing can prevent debt crises.
    - **Macroprudential Policy**: Capital controls can be part of a broader macroprudential policy toolkit to manage systemic risks in the financial system.
3. **Middle Ground**:
    - Many economists advocate for a middle ground. They propose **targeted capital controls** that address specific vulnerabilities without completely restricting capital flows.
    - **Temporary Measures**: Instead of permanent controls, policymakers may use temporary measures during crises or when specific risks arise.
    - **Gradual Liberalization**: Gradually liberalizing capital markets allows countries to reap the benefits while managing risks.

In summary, the ongoing debate revolves around finding the right balance between openness and stability. Policymakers must consider their country's unique circumstances, economic goals, and potential risks when deciding on capital control measures.

Table D8: Recent cases of capital controls implementation

Example of recent cases of capital controls implementation

Greece (2015): Greece introduced capital controls in 2015 when its bailout extension period came to an end. The European Central Bank did not agree to extend the level of Emergency Liquidity Assistance, which had been provided as support to Greek banks1.

India (2013): In response to a rapidly weakening currency, the Reserve Bank of India imposed capital outflow controls in 20131.

Argentina (2011): The Argentine government faced a situation where it had been depleting its foreign exchange resources since 2001-02 to make foreign payments. By 2011, it reached a point where it could not sustain this practice any further, leading to the implementation of capital controls1.

Iceland (2008-2017): Iceland implemented capital controls during the global financial crisis to prevent a mass exodus of capital outflows2.

General Conclusion

The United Nations recognize the importance of the reduction of illicit financial flows (IFFs) as a priority to reduce global inequalities and build peaceful societies around the world. Therefore, the 2030 Agenda for Sustainable Development, in its Target 16.4 call for significant curbing in illicit financial flows and arms flows, as well as the recovery of stolen assets and combating organized crime[24]. Over the years, developing countries have been suffering loss of important amount of resources compromising their economic performance and the financing of key investments programs. Therefore, efforts have been made at both the global and domestic level to significantly reduce financial crime and better control their adverse effects in the developing world.

The thesis set out to scrutinize the effectiveness of anti-illicit financial flows (IFFs) policies in fostering economic stability and mobilizing resources in developing countries. Spanning several policy frameworks and tools, from international agreements to national regulations, the study aimed to unearth the multifaceted impacts these policies have on curbing IFFs.

The current thesis is structured in two distinct parts. While Part I is devoted to assessing the outcomes of global initiatives against IFFs, Part II focuses on the interaction between illicit financial flows, economic stability, resources mobilization and domestic actions to alleviate financial crimes. Through detailed quantitative analysis and qualitative assessments, the findings revealed varied impacts across different settings.

Chapter 1 in the first part, questions the effectiveness of that strategy. While chapter 2 revisits the impact of international cooperation through the exchange of information agreements (EIA) on illicit financial activities. In

[24] iff (unodc.org)

both chapters we use quasi-experimental methods of impact assessment to analyze policy outcomes related to financial crime.

The first chapter assesses the dynamic of illicit financial activities following the listing of a non-cooperative jurisdiction on a blacklist. Based on 118 developing countries of blacklisted and non-blacklisted, the study reveals that this strategy promotes financial crimes rather than deterring them resulting in a boomerang effect. Blacklisting, used as a deterrent against non-compliance with financial norms, often resulted in economic repercussions that suggest the need for more tailored approaches. Therefore, we recommend more assistance and cooperation with non-compliance jurisdictions. The second chapter provides backing for this recommendation by emphasizing the beneficial impact of international cooperation in combating illicit financial activities. However, international tax treaties, while broadly effective, may take time depending on enforcement rigor of the signatory countries. Therefore, these treaties need to be enforced with strong political support.

Chapter 3 assess the role of advanced technology in minimizing illicit financial activities (tax evasion, money laundering etc.) and improving tax revenue mobilization in developing countries. The results show that the usage of digital technology counter the damaging effects of financial crime on tax revenue collection in developing countries. In countries affected by illicit financial flows, digital technology increases government revenue from corporate income from a negative impact of -0.046 to a positive impact of 0.224. Developing countries are therefore encouraged to use digital infrastructures to support government fiscal policy. Finally, using interacted panel VAR approach chapter 4 shows that capital controls is a useful policy tool against capital flight in time of uncertainties. However, this policy should be supported by a strong institutional quality.

The different parts of this thesis suggest several targeted policy adjustments to enhance the effectiveness of current frameworks. It is imperative that international bodies and national governments work collaboratively to close legal loopholes that allow for tax evasion and money laundering. Additionally, there is a pressing need for investment in technological

infrastructure to support more robust monitoring and enforcement mechanisms.

The implications of these findings span various sectors, including financial regulation, technology development, and governmental policymaking. Each sector must address unique challenges and opportunities that arise from the global nature of IFFs and the localized impact of these financial flows.

While the study provides significant insights, it encounters limitations such as the reliance on available data, which may not fully capture the clandestine nature of IFFs. Additionally, the generalizability of the results across different socio-economic backgrounds remains a concern.

Future research should explore longitudinal impacts of policy changes, delve into case studies of countries with varied economic statuses, and employ emerging technologies to gather more reliable data. Such studies could enhance the understanding of the dynamic interplay between policy effectiveness and economic stability in the context of global financial integrity.

This research underscores the complexity of combating IFFs and highlights the need for an adaptive approach in policy development and implementation. The evolving nature of global finance requires that international policies be continuously reassessed and adjusted to meet new challenges and leverage technological advancements.

The findings advocate for a unified global effort to enforce and enhance financial regulations to protect and stabilize economies, particularly in developing regions. Stakeholders at all levels are called to action to uphold rigorous standards and to foster transparency and fairness in the international financial system.