Theogene Habimana, PhD
Department of Finance and Economics, Hanken School of Economics
Arkadiankatu 22, 00100 Helsinki, Finland
theogene.habimana@hanken.fi | +358 45 162 3411
www.theogenehabimana.com

10 September 2026

Workshop Selection Committee
Workshop on Development Economics and
Networks for Early-Career Researchers
National Bureau of Economic Research
1050 Massachusetts Avenue, Cambridge, MA 02138, USA

Re: Application to the Workshop on Development Economics and Networks for Early-Career Researchers

Dear Professors,

I am writing to apply to the NBER Workshop on Development Economics and Networks for Early-Career Researchers on December 5, 2026. I completed my PhD in Finance at Hanken School of Economics in 2025 and am currently a University Teacher at Hanken. My research lies at the intersection of development economics, international finance, and corporate finance, with a focus on how government financing and external macro-financial shocks shape firm behavior in developing economies.

I would like to present my working paper, *Aid and Corporate Leverage: Evidence from Africa*. The paper studies 2,803 public and private firms from 29 African countries over 2000–2019 and examines how foreign aid inflows are associated with corporate borrowing. Using OLS, a donor-side supply-push instrument, and mediation analysis, I find important heterogeneity across firms. Export-oriented firms reduce leverage when aid-related currency appreciation weakens competitiveness, while foreign-listed firms tend to increase leverage as appreciation improves international financing conditions. Exchange-rate movements account for roughly 60% of the estimated aid–leverage relationship in the relevant heterogeneous specifications.

The paper's identification strategy is built on persistent bilateral donor–recipient relationships: predetermined recipient shares in donor aid are interacted with changes in donor budgets. The current version uses these links primarily for identification, but they naturally form a weighted donor–recipient network. I am developing this dimension further by asking how common-donor exposure, concentration of aid relationships, and propagation of donor shocks shape recipient-country and firm-level financing outcomes. The workshop would be especially valuable for sharpening this extension and learning from researchers at the frontier of empirical network research in development economics.

If I am shortlisted, the following faculty member can provide a recommendation:

> **Jesper Haga Head of the Department of Finance and Economics**
> Hanken School of Economics
> jesper.haga@hanken.fi

Thank you for considering my application. I would be grateful for the opportunity to present this work, receive feedback, and engage with the workshop community.

Sincerely,

Theogene Habimana, PhD

Motivation and Current Research Interests

Theogene Habimana

My research examines how public financing, international capital flows, and macro-financial shocks affect firms in developing economies. I am particularly interested in settings where aggregate policies or external shocks are transmitted unevenly across firms because of differences in market access, sectoral exposure, ownership, and international financial linkages. This agenda sits at the intersection of development economics, international finance, and corporate finance. My broader work studies government debt and corporate borrowing, wartime financing, foreign aid, exchange-rate exposure, and the financing decisions of firms in emerging and developing markets.

The working paper I propose to present, *Aid and Corporate Leverage: Evidence from Africa*, asks how foreign aid inflows affect corporate leverage in African economies. I assemble a panel of 2,803 public and private firms from 29 African countries over 2000–2019. Because standard commercial databases have limited coverage of African firms, a substantial part of the corporate debt information is manually collected. The paper combines these firm-level data with OECD aid flows, exchange-rate and macroeconomic variables, exchange-rate-regime classifications, and BIS information on foreign-currency debt.

A central empirical challenge is that aid allocation is endogenous to recipient-country conditions. To address this, I use a supply-push instrument based on long-standing donor–recipient relationships. Recipient exposure is determined by historical bilateral aid shares from a pre-sample period and is interacted with time variation in donor aid budgets. This design uses the structure of the international aid system to isolate donor-driven changes in aid supply. The current paper uses these links as an identification device; I now want to develop the project further by treating them explicitly as a network.

The network extension motivates my interest in this NBER workshop. The international aid system naturally forms a weighted bipartite network connecting donor and recipient countries. I am interested in asking whether the position of a recipient in that network changes the transmission of donor shocks to the local private sector. For example, recipients that depend heavily on a small number of donors may respond differently from recipients with diversified aid relationships; countries exposed to common donors may experience correlated shocks; and changes originating with major donors may propagate across multiple recipient economies before reaching firms through exchange rates and financing conditions. These are questions for which empirical network methods can add substantial value beyond the current reduced-form design.

The paper's existing results provide a useful firm-level setting in which to study such propagation. Foreign aid has no uniform leverage effect across all firms, but the response differs sharply with firms' exposure to international markets. Export-oriented firms reduce leverage when aid inflows are associated with currency appreciation and weaker export competitiveness. Foreign-listed firms, in contrast, increase leverage, consistent with improved international financing conditions and lower local-currency burdens of foreign-denominated debt. Mediation analysis indicates that exchange-rate movements account for roughly 60% of the estimated aid–leverage relationship in the relevant heterogeneous specifications. These findings suggest that the effect of a shock transmitted through the donor–recipient system depends on the financial and real exposure of firms at the receiving end.

I would use the workshop to sharpen this network-based extension, learn how to address identification and inference when shocks are correlated across links, and receive feedback on how best to connect donor-network exposure to heterogeneous firm outcomes. I am also eager to engage with other early-career researchers working on networks in developing economies and to bring the perspective of African firm-level finance into that community. My goal is to develop a research program that links international financing networks to private-sector responses in developing countries using transparent empirical designs and newly assembled firm-level data.

Curriculum Vitae

Theogene Habimana, PhD

September 2026

Contact

Hanken School of Economics
Department of Finance and Economics
Arkadiankatu 22, 00100 Helsinki, Finland
Helsinki, Finland

theogene.habimana@hanken.fi
+358 45 162 3411
www.theogenehabimana.com
ORCID: 0000-0002-5203-8452

Academic Appointments

- **University Teacher**, Hanken School of Economics, August 2026–present.
- **Postdoctoral Researcher**, Hanken School of Economics, June 2025–July 2026. Foundation for Economic Education (Liikesivistysrahasto) grant-funded position.
- **Doctoral Researcher and Teaching Assistant**, Hanken School of Economics, September 2019–June 2025.

Education

- **PhD in Finance**, Hanken School of Economics, Helsinki, Finland, 2020–2025.
- **Graduate School of Finance doctoral coursework**, Hanken School of Economics, 2018–2020.
- **MBA**, Mount Kenya University, 2012–2014.
- **BSc in Applied Mathematics**, National University of Rwanda, 2008–2012.

PhD Coursework

Graduate School of Finance (GSF) doctoral coursework, Hanken School of Economics, 2018–2020.

Research Interests

Development economics; corporate finance; international finance; government financing; foreign aid; public debt; exchange rates; emerging and developing economies; empirical networks and cross-border financial linkages.

Publications and Working Papers

- **Habimana, T.**, Colak, G., and Korkeamäki, T. (2025). "The Effects of Government Debt on Corporate Borrowing in Developing Economies: Evidence from Africa." *Journal of International Business Studies*. doi:10.1057/s41267-025-00791-1.
- **Habimana, T.**, Colak, G., and Korkeamäki, T. (2025). "Wartime Financing and Corporate Leverage." Working paper. SSRN.
- **Habimana, T.**, Colak, G., and Korkeamäki, T. (2025). "Aid and Corporate Leverage: Evidence from Africa." Working paper. SSRN.

Work in Progress

- **Habimana, T.** "Digital Threats and Corporate Finance: Capital Structure Theories' Responses to AI Adoption and Cybersecurity Risk."
- **Habimana, T.**, Colak, G., Senbet, L. W., and Korkeamäki, T. "Governance, Ownership Concentration, and Agency Conflicts in Capital Structure Adjustments of Multinational Firms."
- **Habimana, T.**, Colak, G., Senbet, L. W., and Korkeamäki, T. "Financial Crowding-In vs. Crowding-Out Effects: A Theoretical Approach."

Research Funding and Grants

- OP Ryhmän Tutkimussäätiö (2026): €43,500, joint project with Benjamin Maury and Niclas Meyer.
- Foundation for Economic Education (2025): €30,000 for postdoctoral research.
- Foundation for Economic Education (2022, 2024): €23,000 each.
- Center for Financial Research Grant (2023): €12,000.
- Finland Sustainable Investment Forum Doctoral Grant (2023): €8,000.
- Hanken Support Foundation (2023): €3,845; additional research support (2024): €2,400.

Awards and Honours

- Hanken Foundation Outstanding Publication Award (2025): €3,335.
- AIB Doctoral Student Stipend (2024): €1,000.

Teaching

Corporate Finance; Advanced Time Series and Econometrics; Mathematics for Economics and Business; Capital Budgeting and Investment; Machine Learning for Finance; Statistics and Economics.

Research Supervision and Academic Service

- Master's thesis supervision in finance-related topics.
- Academic reviewer; organizer/participant in academic workshops and seminars.

Methods and Data

Methods/software: Stata, Python, R; panel-data econometrics, instrumental variables, mediation analysis, machine learning.
Data platforms: WRDS/Compustat–CRSP, Audit Analytics, LSEG/Worldscope, FactSet, S&P Capital IQ Pro, Orbis; IMF, World Bank, OECD, and BIS macro-financial data.

Additional Training

- Coursera: Supervised Machine Learning: Regression and Classification.
- Coursera: Advanced Learning Algorithms.
- Coursera: Unsupervised Learning, Recommenders, Reinforcement Learning.
- Participation in doctoral workshops, 2020–2024.

Languages and Professional Memberships

Languages: Kinyarwanda (native), English (fluent), French (fluent), Finnish (intermediate).
Memberships: Financial Management Association; Econometric Society; American Finance Association; European Finance Association; Academy of International Business; European Accounting Association; American Accounting Association.

Selected Referees

- **Professor Gonul Colak**, Hanken School of Economics – gonul.colak@hanken.fi.
- **Professor Timo Korkeamäki**, Aalto University School of Business – dean-biz@aalto.fi.
- **Professor Lemma W. Senbet**, University of Maryland – lwsenbet@umd.edu.
- **Professor Iftekhar Hasan**, Fordham University – ihasan@fordham.edu.

Working Paper

Aid and Corporate Leverage: Evidence from Africa

Paper submitted for presentation consideration

Applicant/Presenter: Theogene Habimana

Hanken School of Economics

NBER Workshop on Development Economics and Networks for Early-Career Researchers
December 5, 2026 – Cambridge, Massachusetts

Aid and Corporate Leverage: Evidence from Africa

Abstract

Using a manually collected dataset of African public and private firms, I explore the relationship between foreign aid inflows and corporate borrowing. The analysis focuses on export-oriented and foreign-listed firms, revealing that these firms respond differently to foreign aid inflows. Export-oriented firms tend to reduce their leverage when their countries receive foreign aid, potentially reflecting the effects of local currency appreciation on export competitiveness. In contrast, foreign-listed firms generally increase their leverage under similar conditions due to their greater access to international financial markets. The analysis also shows that firms in countries with higher corporate foreign currency debt increase their leverage when aid increases. A supply-push instrument supports these results. Mediation analysis indicates that approximately 60% of the relationship between aid inflows and corporate leverage is attributed to currency appreciation. This explains the significant role of exchange rate fluctuation in linking aid inflows and corporate leverage, highlighting the effects of Dutch disease on corporate financing decisions.

Keywords: Foreign aid, Dutch Disease, Supply-push, Export-oriented, Foreign-listing and Leverage

JEL Classification: F0,F1,F34,F35, F38, F65, G38

1. INTRODUCTION

Foreign aid is expected to play a critical role in the development strategies of receiver countries. However, despite its primary purpose of advancing economic growth, foreign aid inflows have unintended consequences, especially within the private sector. One such consequence is the phenomenon of "Dutch disease," where large foreign capital inflows cause a country's currency to appreciate, reducing the competitiveness of its export-oriented sectors (Rajan & Subramanian, 2011). While foreign aid has been extensively studied at the macroeconomic level (Cerra et al., 2008; Rajan & Subramanian, 2011; Temple & Van de Sijpe, 2017), its effects on corporate financing decisions remain an underexplored area.

In this paper, I use a comprehensive dataset of 2,803 public and private firms from 29 African countries during a twenty-year period (2000-2019) to examine the relationship between foreign aid inflows and firm capital structure. The dataset includes 1,601 private and 1,202 publicly traded companies, providing a broad perspective on firm-level financial behavior across different sectors. I focus on the association between foreign aid and corporate leverage in African countries, many of which depend on such aid. I contrast the behaviors of export-oriented and foreign-listed firms. My results indicate that, in general, foreign aid inflows do not display a significant direct relationship with corporate leverage in the full sample comprised of both public and private firms. These findings are consistent with earlier economic literature, such as (Boone, 1996; Temple & Van de Sijpe, 2017), which indicates that foreign aid tends to be more connected to consumption than investment.

However, notable variations in results appear when the analysis accounts for firm-specific characteristics such as export-oriented, foreign-listing, and the level of corporate foreign currency (FX) debt in a country. Firms in export-oriented industries indicate a significant negative relationship between foreign aid inflows and corporate leverage. This connection is due to aid inflows being linked to local currency appreciation, which decreases the competitiveness of

export-oriented firms by making their goods more expensive in the international markets. Studies explain that this loss of competitiveness is driven by the spending and resource movement effects (see Corden & Neary, 1982; Rajan & Subramanian, 2011)[1]. Furthermore, I examine whether foreign aid inflows influence the maturity structure of debt for export-oriented firms. The findings indicate that export-oriented firms tend to decrease long-term debt while increasing their short-term debt in response to the growth in aid inflows. These findings align with the literature, particularly the findings of Kalemli-Ozcan et al. (2021), who argue that firms strategically shift toward short-term debt to benefit from the lower cost of financing during periods of currency appreciation.

Foreign-listed firms, on the other hand, tend to raise their leverage with the increase in aid inflows, reflecting their enhanced access to international capital markets(Colak et al., 2025). The analysis shows a positive significant correlation between foreign aid inflows and corporate borrowing among these firms, suggesting that they benefit from favorable borrowing conditions associated with aid-driven currency appreciation. I also observe this result among firms in countries with higher corporate foreign currency debt levels, including export-oriented firms, which may leverage improved balance sheets to secure additional financing. For firms with foreign currency debt, the local currency's appreciation improves their balance sheets and allows them to increase leverage (Kalemli-Ozcan et al., 2021). I also examine how the exchange rate regimes of the country influence the correlation between foreign aid inflows and corporate leverage. My findings indicate that foreign aid is associated with higher corporate leverage in countries with fixed exchange rate regimes, particularly for foreign-listed firms. This relationship can be attributed to lower borrowing costs and increased reliance on foreign currency reserves under these regimes. Fixed exchange rate regimes provide implicit guarantees that reduce

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[1]. The resource movement effect refers to reallocating resources and labor to non-tradable sectors. The spending effect describes how the increased need for goods that are not traded internationally (non-tradable goods) raises their prices relative to tradable goods.

perceived risks (Calvo & Reinhart, 2002; Levy-Yeyati et al., 2013). My findings align with the previous literature, including Martínez and Werner (2002), Rossi (2009), and Ye et al. (2014), highlighting the significant influence of fixed exchange rate regimes on firms' financial behavior and strategies. These findings emphasize the influences of international market access and foreign currency exposure in shaping firm-level financial responses to aid inflows.

This paper goes beyond OLS and 2SLS analyses by conducting mediation analysis to better understand the mechanisms and economic channels through which foreign aid flows are related to corporate borrowing. The mediation analysis shows how aid, currency appreciation, and corporate borrowing interact. First, the results show a significant positive relationship between aid and currency appreciation, consistent with Rajan and Subramanian (2011) . Second, while currency appreciation does not significantly mediate the link between foreign aid inflows and leverage, its effect becomes more evident when firm-specific characteristics, such as foreign-listed and export-oriented firms, are considered. For foreign-listed firms, a substantial portion of the significant positive association between foreign aid and leverage is mediated by currency appreciation, as indicated by Sobel test results. This result is consistent with the literature on the influence of exchange rate fluctuations and firms' financing decisions (Kalemli-Ozcan et al., 2021). On the other hand, export-oriented firms tend to reduce leverage in the context of currency appreciation, consistent with the loss of competitiveness in international markets. I explain these results in detail in section four, where I focus on the role of corporate debt maturity. Mediation analysis helps estimate the percentage of the association between foreign aid and leverage that is explained by currency appreciation. The results show that approximately 60% of this relationship is mediated by the exchange rate movements, underlining their crucial role in shaping corporate financing behavior in aid-receiving countries.

Although aid is among the main government financing sources in developing countries[2], the relationship between aid and corporate leverage remains less examined in international finance literature. My paper is closely related to Kalemli-Ozcan et al. (2021), who examine the effect of exchange rate fluctuations on firm leverage utilizing data at the firm level from 10 countries. Their findings indicate that companies in markets where the non-financial sector holds a higher ratio of FX-debt tend to increase their leverage more significantly following home currency appreciations. My paper differs from theirs, as my primary contribution is to explore the connection between foreign aid inflows and corporate debt in developing economies using African data.

Specifically, I quantify how currency appreciation mediates the association between foreign aid inflows and firm leverage. My findings also provide valuable insights into the interconnection between aid, currency appreciation, and corporate borrowing. First, this paper indicates that export-oriented firms reduce their leverage in response to increased foreign aid as currency appreciation decreases their international competitiveness. However, this is not true for export-oriented firms in markets with higher corporate FX-debt. Secondly, this paper is the first to indicate that aid inflows allow foreign-listed firms to increase their leverage, benefiting from lower borrowing costs as currency appreciation reduces the value of their foreign-denominated debt. I corroborate the result in Kalemli-Ozcan et al. (2021) which shows that currency appreciation allows firms with foreign currency debt to increase leverage. Moreover, by distinguishing between export-oriented and foreign-listed firms, my paper sheds light on the heterogeneous effects of foreign aid inflows on different types of firms, highlighting the need for targeted policies that consider the diverse needs and challenges firms face in aid-receiving countries.

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[2] The mean of aid disbursement to GDP is approximately 27% in my sample (see Table 2 on summary statistics by country)

Thirdly, I contribute to the international capital structure literature by examining how foreign aid affects corporate leverage in African economies, challenging the traditional understanding of other studies focusing on the other types of government financing and capital structure(Badoer & James, 2016; Demirci et al., 2019). Fourthly, by providing African firm-level evidence on the financial consequences of foreign aid, I contribute to the growing literature in international and development economics that examine the broader economic implications of aid inflows in developing economies (Burnside & Dollar, 2000; Easterly, 2003; Faye & Niehaus, 2012; Hansen & Tarp, 2001; Kalu & Kim, 2014; Kumar, 2017; McArthur & Sachs, 2019; Rajan & Subramanian, 2011; Temple & Van de Sijpe, 2017). While the above studies focus on the macroeconomic effects of foreign aid, my study emphasizes the importance of understanding how aid-induced currency appreciation relates to corporate debt. Therefore, my study contributes to the broader literature on the financial effects of foreign aid and offers new perspectives on how aid can shape firm-level financial decisions in different exchange rate regimes.

2. LITERATURE REVIEW AND HYPOTHESES

Much of the foreign aid has been given enthusiastically to developing countries, but it appears that the donor countries have paid little attention to local private-sector development. Nonetheless, academic studies indicate that developing the private sector should be the primary source of economic development, and foreign aid should be invested in supporting local businesses (Hubbard & Duggan, 2009). Previous studies indicate dual effects of foreign aid (Rajan & Subramanian, 2008, 2011; Temple & Van de Sijpe, 2017). This complexity of the effects of foreign aid on the receiving countries calls for further academic work. For instance, the relationship between foreign aid, Dutch disease, and currency appreciation is a complex yet critical area of research in international and development economics (Rajan & Subramanian, 2011; Temple & Van de Sijpe, 2017). However, we know very little about foreign aid in capital structure.

While essential for economic development in low-income countries, foreign aid often carries unintended macroeconomic consequences. One of the most notable issues is the Dutch disease, a phenomenon where large inflows of foreign capital lead to real exchange rate appreciation (Ojapinwa & Nwokoma, 2018; Rajan & Subramanian, 2011). This appreciation can make a country's exports less competitive internationally by increasing the cost of tradable compared to non-tradable goods (Rajan & Subramanian, 2011). Acosta et al. (2009) find that foreign capital inflows increase domestic consumption, particularly non-tradable, resulting in a shifting of labor from the tradable sector and thus creating Dutch disease effects. Similarly, Cerra et al. (2009) demonstrate that short-term real exchange rate appreciation caused by foreign transfers could disrupt export sectors unless those transfers are directed toward enhancing productivity, mitigating long-term negative effects.

The recipient economy's absorptive capacity further complicates the broader economic implications of foreign aid inflows and currency appreciation. Temple and Van de Sijpe (2017)

find that aid inflows often lead to increased consumption but have less consistent effects on investment and long-term growth. In some cases, foreign aid can crowd out private sector activity, particularly when it fuels inflationary pressures or distorts labor markets by driving resources into non-tradable sectors. This point is reinforced by demonstrating that aid inflows contribute to currency appreciation, which, in turn, erodes the competitiveness of traditional export sectors (Li & Rowe, 2007).

Currency appreciation also has significant implications for corporate borrowing and debt management. As demonstrated by Kalemli-Ozcan et al. (2021), firms with substantial FX-denominated debt benefit from the appreciation of their home currency. When the local currency strengthens, the relative burden of foreign debt decreases, improving firms' net worth and enabling them to increase borrowing. However, this advantage is typically short-lived, as prolonged currency appreciation can destabilize export-oriented sectors, reducing their profitability and potentially resulting in declining economic activity. Broll and Wong (2006) explore how corporations manage currency risk through hedging strategies and capital structure adjustments. Their research demonstrated that firms often opt for FX-denominated debt to protect against fluctuations in local currency, which can lower the global weighted average cost of capital. This strategy is particularly useful for companies operating in volatile currency environments, where sudden depreciations could otherwise inflate debt burdens and harm profitability. Hedging through currency markets may be a vital tool for firms seeking to navigate the difficulties of international finance.

The concept of Dutch disease describes the adverse economic effects often resulting from resource windfalls, such as foreign aid flows and natural resource discoveries. These can lead to local currency appreciation and a contraction in the tradable sector. Adam and Bevan (2006) highlight how aid-financed public expenditure can exacerbate these dynamics, yet they also identify potential productivity spillovers through public infrastructure investments. Extending the discussion by exploring the effects of resource windfalls on non-resource export concentration,

Bahar and Santos (2018) reveal that resource booms can increase export concentration, primarily favoring capital-intensive goods over labor-intensive ones, as higher wages undermine the latter's competitiveness.

The intersection of foreign aid, Dutch disease, currency appreciation, and corporate borrowing may present a challenging landscape for policymakers and firms alike. While foreign aid can provide much-needed resources for economic development, it also risks undermining the competitiveness of key industries through its effects on the exchange rate. Firms must navigate these dynamics carefully, using capital structure strategies to mitigate potential risks. In this context, understanding the interconnection of aid inflows, local currency movements, and corporate leverage is essential for fostering sustainable economic growth in developing countries.

2.1 Dutch Disease and Sectorial Effects

The literature widely discusses the concept of Dutch disease. Early theoretical literature by (Corden & Neary, 1982; Wijnbergen, 1986) highlight the effects of currency appreciation on tradable sectors. Empirical studies regarding aid-induced exchange rate appreciation are mixed. Empirical Studies by (Elbadawi, 1999; Rajan & Subramanian, 2011) support the notion of Dutch disease, indicating a positive connection between aid inflows and appreciation, which can negatively affect export-oriented sectors.

Several academic papers study this basic mechanism of Dutch disease in different ways. For instance, Torvik (2001) and Temple and Van de Sijpe (2017) argue against the Dutch disease aspect, suggesting that consumption and subdued exchange rate responses may mitigate its effects. Yano and Nugent (1999) show that foreign aid inflows lead to currency appreciation in 21 countries and depreciation in 23 countries, revealing the significant role of economic factors in the effects of aid. This variability arises from differences in how aid is used—whether it increases productivity in the non-traded goods sector, creates excess demand, or causes sectoral imbalances. In some cases, aid-driven expansion of non-traded goods raises their relative prices,

causing appreciation. In other cases, aid is directed toward reducing external debt or stimulating exports, which can prevent appreciation or even lead to depreciation. These conflicting findings explain the complexity of aid's macroeconomic and financial effects.

2.2 Foreign Aid and Export Competitiveness

Due to its macroeconomic implications, the interconnection of foreign aid, currency appreciation, and export-oriented industry is a critical debate in international and development economics. Foreign aid, while aimed at fostering growth, can inadvertently lead to Dutch Disease, wherein large capital inflows appreciate the local currency, reducing the competitiveness of export-oriented industries. Rajan and Subramanian (2011) demonstrate that foreign aid systematically undermines the growth of manufacturing sectors, particularly in export-oriented industries like textiles and footwear, by driving up production costs due to currency appreciation. The Dutch Disease effect has been validated in other studies, such as Li and Rowe (2007), who show similar dynamics in Tanzania, where aid inflows cause currency appreciation, reducing the competitiveness of export sectors. Temple and Van de Sijpe (2017) Further, it is argued that although foreign aid boosts consumption, its impact on investment and productivity is constrained by different macroeconomic pressures.

Moreover, recent studies also consider currency appreciation and corporate borrowing. For instance, Kalemli-Ozcan et al. (2021) highlight that firms with FX-denominated debt may benefit in the short term from currency appreciation. Broll and Wong (2006) suggests that firms attempt to protect currency risks through FX-denominated debt. However, while foreign aid is vital in supporting developing economies, its effects on export firms' competitiveness present challenges. The above discussions imply testable hypotheses whereby the differential role of currency appreciation affecting the relation between foreign aid and corporate leverage can be empirically tested.

Hypothesis One A*: Foreign aid inflows appreciate the local currency in aid-receiving countries.*

Hypothesis One B: *The real exchange rate appreciation reduces corporate borrowing in aid-receiving countries.*

2.3 Foreign Aid and Borrowing in International Markets

Literature indicates that currency appreciation influences firm borrowing behavior in international markets. Aid-induced currency appreciation can alleviate the burden of FX-debt by reducing the value of debt obligations, strengthening balance sheets of firms, and enabling them to borrow more. According to Kalemli-Ozcan et al. (2021), when local currencies appreciate, firms holding FX-denominated debt benefit from improved net worth, leading to higher leverage and increased investment. This dynamic supports the view that appreciations facilitate foreign currency debt expansion(Bruno & Shin, 2017, 2020).

However, the ability of currency appreciation to promote expenditure switching —where demand shifts from foreign to domestic goods due to local currency movements— remains debated. The literature suggests that under the dominance of foreign currency, expenditure switching is muted, primarily impacting imports rather than exports (Boz et al., 2022; Eren & Malamud, 2022; Gopinath et al., 2020; Mayer & Steingress, 2020; Temple & Van de Sijpe, 2017). This weakens the theoretical framework that assumes flexible exchange rates will lead to greater demand for domestic goods during periods of foreign aid-induced appreciation. Further complicating the issue, the "fear of floating" identified by Calvo and Reinhart (2002), explains why many EMEs resist allowing their exchange rates to fluctuate freely. This fear is often driven by liability dollarization, where firms' foreign currency-denominated liabilities make them vulnerable to exchange rate volatility. Burstein and Gopinath (2014) add that high inflation pass-through in EMEs exacerbates the risks associated with exchange rate volatility, further explaining

the reluctance to embrace flexible rates despite the potential benefits of appreciation for reducing foreign debt burdens.

The empirical literature also highlights significant risks during periods of depreciation. Aguiar (2005) notes that firms heavily exposed to short-term foreign currency debt face low investment levels after currency crises. Kalemli-Ozcan et al. (2021) confirm these findings, showing that domestic firms with balance sheet mismatches decrease their investments following currency depreciation. At the same time, exporters owned by foreign entities with access to liquidity from their parent companies can maintain or even increase investment. Similarly, Serena and Sousa (2017) observe that firms in EMEs with currency mismatches[3] suffer contractionary effects during depreciations. Bleakley and Cowan (2008) claim that export-oriented firms avoid these mismatches due to their natural hedge of FX-revenue. However, this may not hold for firms that are also importers, as they face higher costs for imported inputs during depreciations. The cost of imported goods can exacerbate the contractionary effects of depreciation (Gopinath & Neiman, 2014; Mendoza & Yue, 2012).

While foreign aid-induced currency appreciation can reduce the value of FX-debt and increase corporate debt in foreign currency, the extent of these benefits is constrained by weak expenditure switching, the fear of floating[4], and the sectoral composition of firms. Exporters may be shielded by their foreign currency revenues, but importers and firms with significant short-term foreign currency debt face considerable risks during periods of depreciation. Thus, the positive effects of appreciation on firm borrowing are far from uniform, requiring careful

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[3] Currency mismatches arise when corporate liabilities are in one currency, while its assets or revenue streams are in a different currency.

consideration of sectoral differences and macroeconomic conditions. From the above theoretical literature, I formulate the following hypothesis:

Hypothesis Two*: Currency appreciation resulting from foreign aid inflows positively influences foreign-listing firms' borrowing capacity.*

2.4 Carry Trades and Corporate Borrowing

Carry trades is a financing policy generally observed among firms globally of borrowing in a lower and investing in a higher interest rate currency to profit from the interest rate differential (Brunnermeier et al., 2008; Jurek, 2014; Lustig et al., 2019). In the context of corporate debt, companies in EMEs often engage in foreign currency borrowing to exploit these favorable differentials. This phenomenon, however, exposes firms to significant foreign exchange risks, particularly during periods of financial distress, as evidenced during the 2013 taper tantrum (Bruno & Shin, 2017; Chui et al., 2014; Du & Schreger, 2022). Macroprudential measures, such as interest rate caps on FX-debt, have shown effectiveness in reducing risky borrowing and limiting systemic vulnerabilities without significant spillovers into alternative financing avenues (Ahnert et al., 2021; Korinek, 2018). Bruno and Shin (2017) note that favorable global financing conditions lead many firms to engage in carry trades, borrowing in FX at lower interest rates and reinvesting domestically to exploit arbitrage opportunities. Supporting this notion, McBrady & Schill, 2007) find that firms often leverage deviations from uncovered interest parity to reduce borrowing costs.

Foreign currency debt has become a significant component of corporate financing in EMEs, charmed by interest rate differentials, global liquidity conditions, and firms' strategic objectives. However, foreign currency debt introduces substantial risks, particularly during currency depreciation. Firms with unhedged foreign currency liabilities face considerable exposure (Bris & Koskinen, 2002; Caballero, 2021). The literature indicates that foreign currency borrowing might provide immediate benefits but can significantly destabilize companies during

unfavorable market situations. Extending this analysis, (Ağca & Celasun, 2012; Du & Schreger, 2022) show that corporate reliance on FX borrowing elevates sovereign credit risks by limiting the sovereign's power to manage debt burdens through inflationary policies. Bruno and Shin (2020) reveal that macroprudential targeting the profitability of carry trades may limit firms' motivations to engage in foreign currency borrowing. Similarly, Pradhan and Hiremath (2021) highlight the role of increasing offshore derivatives markets to provide firms with adequate tools to hedge exchange rate risks. Capital inflows also occur when the domestic currency appreciates. Chui et al. (2014) highlight that the macroprudential measures have been particularly effective in emerging markets, where regulatory frameworks have curbed speculative borrowing without leading to significant regulatory arbitrage.

The relationship between foreign currency debt, currency crises, and investment introduces additional complexity to corporate financial decision-making. Kalemli-Ozcan et al. (2016) emphasize that in times of currency crises, domestic exporters with unhedged FX-debt reduce their investments, whereas foreign exporters with greater access to financing increase their investments despite also having unhedged FX-debt. Di Giovanni et al. (2022) indicate that an easing in international markets conditions lowers borrowing costs and increases domestic banks' exposure to global capital markets, where the main channel is the spillover effect (Chari et al., 2021). However, Rajan and Subramanian (2011) highlight that currency appreciation might reduce the competitiveness of export-oriented firms. The challenges of managing foreign currency borrowing go beyond the immediate risks of currency mismatches, as the systemic consequences of private-sector currency mismatches for sovereign credit spreads underscore the need for a harmonized tactic to managing firm and government debt exposures (Caballero, 2021; Du & Schreger, 2022).

The literature on the interconnection between aid, carry trades, and corporate leverage is scarce. A few papers, such as Rajan and Subramanian (2011), highlight the potential adverse effects of foreign aid on the competitiveness of export sectors, primarily through exchange rate

appreciation. Kalemli-Ozcan et al. (2021) provide insights into how currency appreciation increases corporate leverage, mainly through the balance sheet effects of foreign-denominated liabilities. Literature also shows that firms in tradable sectors mitigate adverse balance sheet effects during currency depreciations (Bleakley & Cowan, 2008; Caballero, 2021; Kalemli-Ozcan et al., 2021). Considering the dual effects of FX exposure—competitiveness losses versus balance sheet gains—I hypothesize the following:

Hypothesis Three*: The relationship between foreign aid and corporate leverage varies based on the extent of corporate FX-debt within a country.*

2.5 Exchange Rate Regimes

The change in exchange rate regimes and their implications for currency fluctuations have remained crucial in economic research, particularly in developing regions. Over the decades, developing economies have transitioned from rigidly fixed regimes to more float systems driven by economic pressures, structural reforms, and global trends. This transformation explains the complexities of maintaining currency stability while addressing broader macroeconomic challenges. Current economic literature documents a global shift away from fixed exchange rate systems (Levy-Yeyati & Sturzenegger, 2024).

Mundell (2000) highlights the limitations of fixed regimes in a globalized economy, arguing that they often impose monetary constraints and expose countries to external vulnerabilities. Free-float regimes offer substantial benefits, especially for managing external shocks. Floating systems mitigate exchange rate misalignments, enhance macroeconomic stability, and support economic growth in economies vulnerable to commodity price volatility (Helpman & Razin, 1982; Klein & Shambaugh, 2008; Levy-Yeyati & Sturzenegger, 2003; Obstfeld & Rogoff, 1995; Reinhart, 2000). Such regimes are also better aligned with structural adjustment and trade liberalization policies.

Currency fluctuations, a critical dimension of exchange rate policy, present unique challenges for policymakers in developing economies. As highlighted by Levy-Yeyati et al. (2013), interventions to manage appreciation often involve reserve accumulation and regulatory controls. While these measures aim to maintain export competitiveness, they can distort financial markets and exacerbate structural vulnerabilities. Yet, as the literature suggests, intermediate—between fully fixed and purely floating systems— continue to be widely adopted due to their pragmatic balance between stability and flexibility (Reinhart & Rogoff, 2004; Shambaugh, 2004). By recognizing the distinct roles that various exchange rate regimes may play in influencing corporate financing, I propose the following hypothesis:

Hypothesis Four*: Fixed exchange rate regimes strengthen the association between foreign aid inflows and corporate leverage for firms accessing global debt markets.*

2.6 Fear of Floating and Appreciation

The concept of "fear of floating" describes the reluctance of many countries to allow their currencies to fluctuate freely despite officially adopting floating exchange rate regimes(Calvo & Reinhart, 2002). This behavior reflects deep-seated worries about the effects of the exchange rate volatilities, including inflationary pressures, external debt burdens, and investor confidence. This demonstrates a significant deviation from the theoretical notion of a "clean float," where market forces determine exchange rates. In an increasingly globalized economy, the persistence of fear of floating underscores the practical challenges of achieving the theoretical ideals of exchange rate regimes. While clean floats remain a theoretical benchmark, many countries opt for reasonable exchange rate management to navigate the complex interplay of domestic and external pressures(Levy-Yeyati & Sturzenegger, 2024).

The fear of the floating phenomenon has significant implications for macroeconomic policymaking. Many governments rely heavily on interventions to stabilize exchange rates, especially during financial instability or speculative pressure(Ilzetzki et al., 2019). This has led to

debates over the "corner solutions hypothesis," which suggests that nations should decide between hard pegs (e.g., dollarization) or true floating regimes to avoid the risks associated with intermediate exchange rate arrangements (Obstfeld & Rogoff, 1995). Fear of floating raises questions about the feasibility of clean floats, particularly for economies facing external vulnerabilities and capital mobility constraints (Fischer, 2001). On the other hand, the fear of appreciation is a phenomenon where policymakers, especially in emerging markets, actively intervene to limit the upward pressure on their currencies. Concerns about competitiveness, macroeconomic stability, and long-term growth prospects drive this approach. Unlike the fear of floating, which emphasizes the challenges of managing depreciation, the fear of appreciation focuses on preventing overvaluation, which could harm the competitiveness of local firms and exacerbate trade imbalances (Levy-Yeyati et al., 2013).

The empirical literature has shown that interventions to resist appreciation are associated with improved economic performance. Effective exchange rate management can act as a development tool, encouraging the reallocation of resources toward high-productivity sectors (Habib et al., 2017; Rodrik, 2008). Obstfeld et al. (2008) argue that reserve accumulation, while useful in the short run, can lead to significant fiscal costs. The accumulation of reserves also reflects precautionary motives, as governments aim to avoid reliance on international financial institutions during crises. The economic implications of fear of appreciation extend beyond trade. Rodrik (2008) highlights how undervaluation affects savings rates and capital formation, providing a growth channel unrelated to traditional trade advantages. However, the policy is not without risks. Prolonged undervaluation can distort resource allocation and invite trade tensions or accusations of currency manipulation. Shambaugh (2004) noted that these distortions could hinder the long-term competitiveness of non-tradable sectors, raising questions about the sustainability of such policies in a globalized economy. Levy-Yeyati et al. (2013) find that the interventions of the central bank often sustain a real exchange rate depreciation, which fosters capital accumulation and domestic savings.

From the above literature, we conclude that fear of floating and currency appreciation exposes economies to distinct yet interconnected risks. Fear of Floating arises from liability dollarization, where deprecation heightens the cost of foreign-denominated debt, risking financial instability and inflationary pressures because of currency fluctuations (Kalemli-Ozcan et al., 2021). Conversely, fear of currency appreciation reduces debt costs in the international market, but erodes export competitiveness, fosters trade imbalances, and risks asset bubbles through capital inflow (Kalemli-Ozcan et al., 2021; Levy-Yeyati et al., 2013).

3. DATA SOURCES AND METHODOLOGY

This section outlines the data sources, variables, and methodologies used to analyze the relationship between aid and corporate leverage using a sample of 29 African countries.

3.1 Aid and Macro-Level Data

Foreign aid variable is derived from Table 2a of the OECD Development Assistance Committee (DAC). Following Temple and Van de Sijpe (2017), I address missing data by assuming that the missing values represent zeroes. The analysis is based on net aid disbursements. It is crucial to focus on aid disbursements because they reflect the tangible flow of resources (amounts) from donors to recipient government, unlike aid commitments, which are merely promises or pledges that may not materialize. Disbursements reflect the tangible flow of funds into the recipient economy, directly influencing its financial landscape. This makes disbursements a more accurate indicator of the actual effect of aid on the local market's economic activity.

I collect data for the exchange rate regimes analysis from the Levy-Yeyati and Sturzenegger (2024) dataset (LYS Database)[5]. The dataset is categorized into three broad groups: fixed, floating, and intermediate. Fixed regimes are characterized by substantial central bank intervention to maintain a stable nominal exchange rate, while floating regimes exhibit minimal intervention, allowing market forces to determine the exchange rate. Intermediate regimes represent a middle ground, combining fixed and floating systems elements, often involving managed flexibility. The database covers a broad time span and includes extensive country-year observations, making it a reliable and widely used resource for analyzing the dynamics of exchange rate regimes. Its robust classification framework enables detailed examinations of how exchange rate systems influence macroeconomic variables, including the effects of foreign aid. Besides foreign aid and exchange rate regimes, the World Bank, IMF, and World Economic

[5] https://sites.google.com/udesa.edu.ar/lys

Outlook (WEO) source other country-level variables. These variables include the exchange rate, inflation, and the GDP per capita.

3.2 Firm-Level and Corporate Foreign Currency Data

Firm-level accounting and market data are sourced from Capital IQ, Compustat Global, Eikon, FactSet, and Orbis. The study emphasizes African firms, both public and private. However, due to incomplete data within these databases, additional data is gathered manually. This process involves reviewing annual financial reports from open-access sources like company websites. Notably, about 63% of the corporate debt data comes from manual collection efforts[6]. Corporate leverage (*Leverage*) is assessed using book leverage (the ratio of total debt to the book value of assets). Additional firm-level attributes include firm size (*Lnassets*), *Tangibility* (the proportion of net property, plant, and equipment relative to total assets), *ROA*, and *Market-to-Book* (the ratio of the market value of assets to the book value of the firm). I also collect corporate foreign currency data from the Bank for International Settlements (BIS) dataset[7]. Obtaining the debt currency composition at the firm level for African firms in our sample is challenging. However, aggregate data can be partially accessed through the BIS Global Liquidity Indicators (GLI) database based on the BIS International Debt Securities Statistics. This database provides information on foreign currency (FX) debt exposures.

3.3 Models

The sample includes 1601 private and 1202 public firms, forming an unbalanced panel comprising 22,737 firm-year observations from 2000 to 2019. The total number of the firms is

[6] See Colak et al. (2025) for more details about the sources and descriptive statistics of firm-level accounting and market data.
[7] https://data.bis.org/topics/IDS

2,803 from 29 different countries.[8] Our empirical methodology uses Ordinary Least Square, supply-push instrument, and mediation analysis.

Ordinary Least Square

Based on the previous capital structure studies, especially Demirci et al. (2019), the main analysis builds on the following empirical setup:

$$Leverage_{i,c,t} = \beta \frac{Aid_{c,t}}{GDP_{c,t}} + \gamma Firm\ control\ variables_{ic,t} +$$

$$\theta Country\ control\ variables_{c,t} + \sum_t Year + \sum_j Industry + \sum_c Country + u_{it} \quad \text{(Equation 1: OLS)}$$

All regressions are conducted without including a constant term to address multicollinearity associated with country-fixed effects. Consistent with Demirci et al. (2019), the first lag of both foreign aid and control variables is applied. Using lagged values allows the study to account for delayed impacts, mitigate endogeneity concerns, and align with theoretical frameworks. This methodology strengthens the robustness and reliability of the results. I also employ analysis based on the above OLS model to analyze how foreign aid relates to the leverage of export-oriented and foreign-listed firms. I include the interaction term (*Aid X Export-Oriented*) or (*Aid X foreign-listing*) to capture the differential effects of aid on firms in export-oriented industries, respectively, foreign-listed firms. Export-oriented and foreign-listing are binary indicators identifying firms by their industry export focus or foreign exchange listing.

Supply-Push Instrument and Endogeneity in Aid Flows

A key challenge in analyzing the relationship between foreign aid inflows and corporate leverage is that aid distribution across countries is not random. Even when accounting for country,

[8] Out of these 29 countries, 9 of them have missing observations for all the public firms from that country (although those countries have information about the private firms) and thus, when conducting the analyses with public firms our sample includes 20 African countries.

industry, and time-fixed effects, aid and corporate debt are likely influenced by unobserved, time-varying factors.

When analyzing the relationship between foreign aid and corporate leverage, the donor-recipient relationships between countries, such as the United Kingdom-Uganda and France-Senegal, highlight clear endogeneity issues. The comparison of aid flows from the United Kingdom and France to their respective recipients, Uganda and Senegal, highlights how political and economic relationships shape donor-recipient dynamics. Over the observed period (1960 to 2029), the United Kingdom provided Uganda with 4.59 billion USD in net aid disbursement, while France allocated 0.66 billion USD to Uganda. Conversely, France provided a staggering 10.38 billion USD to Senegal, far surpassing the 0.18 billion USD Senegal received from the UK[9]. These stark differences reflect the historical and geopolitical priorities of the donor countries. As a former British colony and a member of the Commonwealth, Uganda has been a focal point of the UK's aid development strategy. The UK's aid to Uganda aligns with its historical responsibility and strategic interest in fostering economic stability in East Africa. The 10.38 billion USD provided to Senegal reflects France's strategy of using aid to preserve its cultural, economic, and political influence in West Africa. This relationship is rooted in colonial history and sustained through the CFA franc zone, which ties many West African economies, including Senegal, to France. The much smaller contribution from France to Uganda highlights the donor's focus on Francophone regions rather than East Africa.

I utilize a supply-push instrument to address this issue. The weights remain constant over time but differ across aid-recipient countries[10]. This instrument captures exogenous variations in foreign aid, allowing for a more accurate measurement of the relationship between aid and

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[9] See Figure 2. The indicated amounts are not the total aid received by these countries. In this study, I focus exclusively on aid disbursement, reflecting the financial resources transferred to recipient countries.

[10] The supply-push instrument addresses the endogeneity challenge in aid study (Temple & Van de Sijpe, 2017).

leverage, free from biases that might arise from endogenous relationships. In particular, this instrument isolates the effect of aid by concentrating on determinants that affect the supply of aid rather than demand-side conditions in recipient countries, thus reducing concerns about reverse causality. The instrument relies on donor-side factors, such as changes in donor budgets, which are independent of conditions in recipient countries. By leveraging these exogenous changes in aid supply, the instrument measures recipients' exposure to variations in aid from specific donors. This exposure is based on each country's initial aid shares during a baseline period (1960-1999, as my sample period is 2000-2019), reflecting long-standing donor-recipient relationships. These initial shares are then used to predict aid flows in subsequent periods, with changes in donor budgets driving the variations in aid disbursements.

The supply-push instrument is expressed as: $\mathrm{AS_{it}} = \sum_{d=1}^{D} \mathrm{a_{i0}^{d}} \cdot \mathrm{D_{dt}}$ Where: AS_{it} represents the predicted aid supply for country i at time t, a^{d}_{i0} is the initial share of aid received by country i from donor d during the baseline period (1960-1999), D_{dt} is the total aid budget of donor d at time t. The initial aid share a^{d}_{i0} is calculated as :$\mathrm{a_{i0}^{d}} = \frac{\mathrm{A_{i0}^{d}}}{\sum_{i=1}^{N} \mathrm{A_{i0}^{d}}}$, Where $\mathrm{A_{i0}^{d}}$ represents the total aid received by country i from donor d during the baseline period (1960-1999) and $\sum_{i=1}^{N} \mathrm{A_{i0}^{d}}$ represents the total aid all countries receive from that donor during the same period. By basing the instrument on these initial shares, the supply-push instrument captures donor-driven changes in aid supply, minimizing the risk that recipient-specific conditions influence the results. This approach is particularly valuable in this research because it reduces endogeneity concerns. Endogeneity typically arises when aid is influenced by recipient countries' economic conditions, making it difficult to establish causality. By focusing on changes in donor-side factors, the supply-push instrument provides a clearer picture of how aid is related to corporate borrowing.

Mediation Analysis

In this model, I employ a mediation analysis following the framework established by Baron and Kenny (1986) to assess the effects of corporate leverage through currency appreciation as a

mediator. This analysis is conducted separately for two groups: export firms and foreign-listed firms. The mediation process involves three main steps: estimating the total, indirect, and direct effects while accounting for control variables in each model. *Step one (estimating the total effect):* The total effect (path c) represents the overall influence of aid on corporate leverage without accounting for the mediator (*appreciation*). *Step two (estimating the effect of aid on the mediator (Path a):* Next, I estimate the effect of aid on the mediator, *appreciation*, which captures the first stage of the mediation pathway. The mediator, appreciation, is calculated as the inverse of the exchange rate relative to the US dollar. *Step three (estimating the direct and mediated effects):* In the third step, both the independent variable (*aid)* and the mediator (appreciation*)* are included in the regression model to estimate both the direct effect of aid on leverage *(Path c')* and the effect of the mediator on leverage *(Path b)*. This step highlights how aid and currency movements relate to leverage independently from other economic conditions.

The indirect effect is calculated by multiplying the coefficients from Step 2 and Step 3: Indirect Effect = a*b. The proportion mediated measures the extent to which the mediator explains the total effect of aid on leverage. It is calculated as: $\text{Proportion Mediated} = \frac{\text{Indirect Effect}}{\text{Total Effect}} = \frac{a \times b}{c}$. Finally, the significance of the mediation effect is tested using the Sobel test. The Sobel test statistic is calculated as: $Z = \frac{a \times b}{\sqrt{(b^2 \times s_a^2) + (a^2 \times s_b^2)}}$. Where s_a and s_b are the standard errors of the coefficients *a* and *b*, respectively. The Sobel test assesses whether the indirect effect is statistically significant, indicating that currency appreciation significantly mediates the relationship between aid and corporate leverage. Furthermore, mediation analysis clarifies the role of currency appreciation as a channel through which aid correlates to corporate leverage.

4. EMPIRICAL ANALYSIS

This section focuses on empirical analysis using ordinary least squares and instrumental variable approaches (specifically a supply-push instrument).

4.1 Foreign Aid Flows and Corporate Debt Financing

The empirical analysis presented in Table 3 explores the relationship between aid and leverage through OLS and 2SLS methodologies. The OLS analysis delivers an initial picture of the correlation between aid and corporate leverage. Meanwhile, I use the supply-push instrument in the 2SLS regression to offer a more robust estimation by addressing potential endogeneity in aid allocation. This approach enhances the analysis by providing a more exogenous measure of foreign aid inflows. Both methods indicate that foreign aid is not significantly associated with corporate leverage in either public or private firms.

The results show that foreign aid does not exhibit a meaningful association with changes in leverage ratios across a broad set of firms. The findings are consistent with aid literature that argues that aid generally increases consumption rather than private investment (Boone, 1996; Temple & Van de Sijpe, 2017). While essential for broader economic stability and development, aid does not directly drive firm-level borrowing behavior. When focusing on public firms, the results remain consistent with those observed in the entire sample.

Additionally, large aid inflows can lead to currency appreciation, generally described as "Dutch Disease," reducing the competitiveness of export-oriented industries (Rajan & Subramanian, 2011), which may discourage their borrowing for expansion. Aid likely boosts GDP per capita growth, but its effects diminish with higher aid levels. Controlling for investment and human capital reveals no direct aid effect (Hansen & Tarp, 2001). The temporary and uncertain nature of aid flows may make firms hesitant to take debt due to sustainable long-term productivity and growth concerns. These dynamics highlight that while foreign aid can influence macroeconomic conditions (Dalgaard et al., 2004; Djajić et al., 1999; Hansen & Tarp, 2001),

macroeconomic conditions may mediate its direct effects on corporate debt. The literature suggests that aid significantly influences consumption patterns, highlighting an overlooked aspect of aid's effects. This explains why the expected direct relationship between aid and leverage does not emerge clearly.

(Insert Table 3 here)

4. 2 Effects of Aid on Leverage of Export-Oriented Firm

Table 4 presents the analysis of foreign aid's relationship with corporate leverage by export-oriented industries. I report the results into three panels: Panel A, which uses OLS; Panel B, which employs 2SLS with a supply-push instrument to account for potential endogeneity of aid allocation; and Panel C, for debt maturity. The discussion below combines these two approaches and highlights the role of the Export-Oriented industry in shaping the association between foreign aid and leverage.

In the full sample (columns 1-3), the interaction between *aid* and *Export-Oriented* shows a strong, negative association with leverage. In contrast, the direct effect of aid on leverage is not statistically significant. This result is consistent with previous findings that aid hurts export-oriented industries through exchange rate appreciation, disproportionately affecting industries reliant on international competitiveness. Foreign aid inflows often lead to genuine local currency appreciation, which can negatively affect the competitiveness of tradable sectors, especially in manufacturing. Rajan and Subramanian (2011) emphasize that aid-induced changes favor non-tradable sectors, reducing export-oriented industries' growth potential. Other studies also corroborate that the exchange rate appreciation influences resource allocation across sectors (Adam & Bevan, 2006; Fielding & Gibson, 2013). Together, these studies highlight the vulnerability of export-oriented firms to macroeconomic shifts induced by aid, which can influence corporate financing. The results for public firms (columns 4-6) also show a significant negative correlation between foreign aid and the leverage of export-oriented firms. For private

firms (columns 7-9), the negative relationship between aid and leverage of export-oriented firms is also negative. Private firms are also sensitive to changes in the markets' financial conditions, and the reduction in their leverage suggests that they adjust their financial structure in response to the competitive pressures caused by foreign aid inflows.

In Table 4, panel C, I find that the maturity structure of the export-oriented firms appears to be influenced by foreign aid inflows. Export-oriented firms tend to lower their long-term leverage while increasing their use of short-term debt as aid inflows rise. This behavior aligns with the findings of Kalemli-Ozcan et al. (2021), who find that firms strategically pivot short-term debt to capitalize on reduced financing costs during periods of currency appreciation. Such appreciations improve firms' financial health, enabling the refinancing of long-term obligations into more cost-effective short-term debt. This adjustment reflects the broader trend in which export-oriented firms actively manage their financial obligations in response to external economic dynamics (Demirgüç-Kunt & Maksimovic, 1999; Rajan & Zingales, 1998).

My findings align with some previous studies in international and development economics . Foreign aid inflows affect export-oriented industries, depending on different factors. For instance, Selaya and Thiele (2010) add that the effects of aid are contingent on labor market conditions, noting that a sizeable idle labor capacity can mitigate the effects of exchange rate appreciation. Werker et al. (2009) emphasize that aid often leads to short-term consumption boosts rather than long-term investment, explaining the reduction in leverage observed in Export-Oriented firms. Clemens et al. (2012) highlight the often-delayed effects of foreign aid on private-sector investment. The reduction in leverage observed in this paper suggests that aid inflows reduce the ability of private firms to borrow and invest in export-oriented firms.

Both OLS and 2SLS results reveal that the relationship between foreign aid and leverage varies depending on whether the firm operates in an Export-Oriented industry. The coefficient for the interaction term between *aid* and *Export-Oriented* is negative and statistically significant

across all samples, indicating that firms in more export-oriented industries experience a reduction in leverage as foreign aid inflows increase. This finding aligns with the effects of Dutch disease, as Rajan and Subramanian (2011) outline, where aid leads to local currency appreciation in receiving countries, reducing the competitiveness of export-oriented industries. The negative interaction suggests that firms in these sectors may reduce their leverage as their profitability and growth prospects decline due to aid-induced exchange rate pressures. One possible economic channel for this effect is that the exchange rate appreciation driven by aid inflows diminishes export revenues for firms operating in these industries (Corden & Neary, 1982; Rajan & Subramanian, 2011). This leads to reduced internal funds being available for investment. Consequently, these firms might be less inclined to or able to access external debt financing to compensate for declining competitiveness.

On the other hand, I indicate that export-oriented firms with access to foreign currency debt increase their leverage during currency appreciation. In section 6, I detail that export-oriented firms with opportunities to borrow in the international market in foreign currency do not experience a negative relationship. Another potential channel is the reallocation of economic resources, such as aid. While aid's main purpose is to promote development, the unintended reallocation of resources can challenge its effectiveness by slowing the tradable sector closer to the export-oriented sector, which is the key to economic sustainability estate (Adam & Bevan, 2006; Torvik, 2001). This reallocation may exacerbate the challenges faced by export-oriented firms in accessing credit. The literature summarizes these effects into dual effects of resource movement and spending (Corden & Neary, 1982). Together, these effects explain why export-oriented firms may face heightened financial challenges, such as lower leverage, as aid inflows intensify Dutch disease.

(Insert Table 4 here)

4.3 Effects of Aid on the Leverage of Foreign-listing Firms

The relationship between foreign aid and leverage for foreign-listing firms, as presented in Table 5, explores how firms listed on foreign exchanges adjust their leverage in response to foreign aid inflows. The discussion combines the results of the OLS and 2SLS methods, showing that foreign-listed firms respond differently to foreign aid than domestically listed firms. The direct association between aid and leverage is generally weak, with no statistical significance. This finding aligns with Kalemli-Ozcan et al. (2021), who demonstrate that external macroeconomic factors, such as exchange rate fluctuations, may influence firm leverage through other channels like access to foreign currency debt. The analysis of aid's effects on leverage shows that aid alone does not strongly correlate with changes in firm leverage, but foreign-listing appears to modify this relationship. The interaction term of aid and *foreign-listing* dummy is highly significant across all models in Table 5. This positive interaction suggests that foreign-listed firms with access to global capital markets and better financial conditions can increase their leverage in response to the increase of foreign aid.

The positive and significant correlation between *foreign-listing* dummy and leverage aligns with existing literature, highlighting the reduced cost of capital accompanying cross-listing. Doidge et al. (2004) demonstrate that firms listed abroad benefit from enhanced investor protection in foreign markets, which mitigates the expropriation risks posed by controlling shareholders and improves access to debt opportunities. Similarly, Lang et al. (2003) show that cross-listing boosts firm visibility, lowering the cost of capital by reducing information asymmetries. The higher leverage observed in foreign-listed firms, reflected by the significant coefficient on the *foreign-listing* dummy, indicates that these firms are in a stronger position to secure funding and leverage external financial flows, such as foreign aid, often holding a more significant proportion of foreign currency-denominated debts to mitigate exchange rate risks. Foreign-listing encourages commitment to higher disclosure standards, which improves a firm's

information by fostering greater transparency (Fernandes & Ferreira, 2008). This enhancement lowers the cost of borrowing and allows firms to tap into global financial markets.

Using the supply-push instrument, the 2SLS results (columns 4-6) offer further robustness to the OLS findings. The instrument, which isolates exogenous variations in foreign aid based on donor decisions rather than recipient country needs, confirms that foreign-listed firms respond more positively to foreign aid in terms of leverage than domestically listed firms. The interaction term between aid inflows and foreign-listing remains positive and significant, underscoring that foreign-listed firms can better exploit aid inflows to enhance their borrowing capacity due to their access to international markets. The lack of significant direct effects of aid on leverage across both OLS and 2SLS methods suggests that foreign aid alone does not relate to firm-level borrowing behavior. However, the significant interaction with foreign-listing indicates that aid inflows can indirectly influence leverage for firms integrated into international markets. Werker et al. (2009) claim that aid inflows often support consumption or government investments rather than directly driving private business. This could explain the lack of a significant direct effect.

(Insert Table 5 here)

5. MEDIATION ANALYSIS

The mediation analysis section explores how foreign aid affects corporate leverage, explicitly considering the mediating role of currency appreciation. The focus is on export firms and foreign-listed companies. I employ a well-established methodological framework based on Baron and Kenny (1986) approach, enhanced by recent research, including studies by Çolak and Korkeamäki (2021) and Fedaseyeu et al. (2018). All mathematical formulas and procedures are thoroughly explained in the methodology section.

In the non-interaction scenario, in Table 6, the mediation analysis proceeds through a three-step process. First, appreciation is regressed against aid, showing a statistically significant positive relationship with a coefficient of 0.4388. These findings suggest that higher foreign aid inflows are linked to a rise in the value of the local currency and are consistent with some of the Dutch disease literature (Corden & Neary, 1982; Elbadawi, 1999; Rajan & Subramanian, 2011; Werker et al., 2009; Wijnbergen, 1986). In the second step, I estimate the total effect of foreign aid on leverage. The analysis finds a positive and statistically insignificant coefficient of 0.0725 for export-oriented firms and 0.0570 for foreign-listed firms. These findings indicate that while foreign flows aid may influence overall economic conditions, its direct influence on corporate leverage is limited. The third stage introduces currency appreciation into the regression alongside total aid to examine the direct effect of aid on leverage (controlling for appreciation) and the mediating effect of currency appreciation on leverage. For export firms, the direct effects of aid on leverage slightly decrease to a coefficient of 0.0631 when controlling currency appreciation. However, the effect of currency appreciation on leverage is positive and non-significant, with a coefficient of 0.181. This result suggests that, for export firms, currency appreciation has a positive but weak effect on leverage. In contrast, for foreign-listed firms, the direct effect of aid on leverage becomes negligible (0.0004) when currency appreciation is considered.

The interaction term, *Aid* × *Export-Oriented*, is negative and statistically significant. These findings reveal that aid is associated with decreased leverage for export-oriented firms and aligns with the Dutch disease hypothesis, where aid-induced currency appreciation can reduce export competitiveness (Rajan & Subramanian, 2011). As a result, the profitability and growth of export-oriented firms may be adversely affected, leading to lower leverage. In contrast, the interaction term between aid and foreign-listing (*Aid* × *Foreign-Listing*) is positive and statistically significant. These firms tend to raise their leverage in response to aid inflows. Because they have access to international capital markets, foreign-listed firms may benefit from aid-induced appreciation through reduced costs for servicing foreign currency-denominated debt, allowing for higher borrowing. These findings support the idea that currency appreciation can adversely affect export firms' competitiveness (Rajan & Subramanian, 2011) while benefiting foreign-listed corporations with access to global capital markets (Kalemli-Ozcan et al., 2021).

The proportion mediated measures the magnitude to which the total effect of foreign aid on leverage is transmitted through currency appreciation. Export-oriented firms show a proportion of 60.20%, and the proportion for foreign-listed firms is 57.40%, indicating a significant influence of currency appreciation on these firms' financing decisions. In summary, while currency appreciation has limited mediation effects in the general sample, its influence is more pronounced when considering firm characteristics. Export firms tend to reduce leverage in response to currency appreciation related to aid, aligning with the Dutch disease hypothesis. In contrast, foreign-listed firms often leverage the favorable financial conditions brought about by currency appreciation. I use the Sobel test to evaluate the significance of the mediation effect. The Sobel test statistic shows a more significant mediation effect. For export firms, it reports a Z-value of 2.30 and a p-value of 0.0215. For foreign-listed firms, the Z-value is 2.32, with a p-value of 0.0015. These results emphasize the importance of currency appreciation for firms involved in international markets.

(Insert Table 6 here)

6. FOREIGN CURRENCY(FX) DEBT AND LEVERAGE

The findings in Table 7 provide a detailed exploration of the association between foreign aid, foreign currency debt, and firm leverage in developing economies. The results suggest that when considered independently, foreign aid inflows are not linked to changes in firm leverage. Nevertheless, the interaction between foreign aid and FX- debt appears to play an important role, particularly for public firms, which seem more exposed to the effects of FX-debt.

The positive association observed between foreign aid and high FX-debt debt aligns with the patterns documented by (Kalemli-Ozcan et al., 2021). Their research indicates that corporations in economies with higher levels of foreign currency debt tend to experience higher leverage adjustments during exchange rate appreciation. Often connected to international market risks, public firms exhibit stronger links between foreign currency debt and leverage. These firms may experience an improvement in their financial position when the local currency appreciates as the value of foreign-denominated liabilities decreases, potentially supporting borrowing. However, this relationship may also reflect the sensitivity of public firms to macroeconomic factors influenced by foreign aid inflows.

Panel B of Table 7 highlights export firms, offering additional insights into their financial dynamics. Export firms appear to encounter challenges and opportunities associated with exchange rate movements. According to Rajan and Subramanian (2011), currency appreciation linked to foreign aid inflows might reduce the competitiveness of export firms in international markets. However, I indicate that when these firms carry substantial foreign currency debt, appreciation may improve their financial standing by lowering the value of their liabilities. This dual aspect is especially evident for public export firms, where the connection between foreign aid and FX-debt seems most pronounced. These observations suggest that measures addressing FX-debt and exchange rate exposure could shape firm outcomes in aid-receiving economies. For export firms, particularly public ones, approaches that strengthen financial resilience and

operational competitiveness may help navigate the complexities associated with foreign aid inflows. Such considerations are relevant for maintaining financial stability in these contexts.

(Insert Table 7 here)

7. EXCHANGE RATE REGIMES AND LEVERAGE

This section examines the discussion of exchange rate regimes and corporate leverage. It highlights how exchange rate frameworks influence corporate leverage in interconnected economies.

7.1 Comparative Analysis of Fixed vs. Floating Regimes

The results in Table 8 demonstrate that the association between aid and corporate leverage varies significantly depending on the type of exchange rate regimes. The findings on the correlation between the interaction term of foreign aid and exchange rate regime on leverage are only statistically significant for fixed regimes. So, they remain insignificant for floating and intermediate regimes. This variation highlights the mechanisms through which different exchange rate regimes respond to foreign aid inflows.

For fixed exchange rate regimes, the interaction term "*Aid X Fixed*" is highly significant across multiple models in Panel A, particularly in the full sample and for public firms. This suggests that the effects of foreign aid are amplified in economies with fixed exchange rate regimes, where fixed systems require central banks to intervene heavily in foreign exchange markets to maintain a stable exchange rate (Levy-Yeyati & Sturzenegger, 2005, 2024; Reinhart & Rogoff, 2004). Rajan and Subramanian (2011) indicates that when foreign aid increases, local currency appreciates[11]. Local currency appreciation increases the corporate leverage of firms with access to international debt markets(Kalemli-Ozcan et al., 2021). Additionally, fixed regimes may create an environment of perceived stability, encouraging higher borrowing and leverage among public firms.

In contrast, the interaction term "*Aid X Float*" in Panel B is not statistically significant, indicating that floating regimes are less affected by the economic distortions associated with aid

[11] The "Dutch disease" phenomenon is particularly relevant in this context.

inflows. These findings align with the Mundell-Fleming paradigm (Calvo & Reinhart, 2002)[12]. A floating regime is a key mechanism for stabilizing macroeconomic fluctuations(Ilzetzki et al., 2019; Schmitt-Grohé & Uribe, 2016). A floating regime may allow exchange rates to adjust naturally in response to foreign aid inflows, reducing the need for central bank intervention. This flexibility mitigates the currency appreciation observed in a fixed regime. For intermediate regimes, as shown in Panel C, the interaction term "*Aid X Intermediate*" is generally insignificant, indicating that these regimes exhibit only a partial response to foreign aid inflows. Intermediate regimes involve some level of intervention of central bank to manage exchange rate fluctuations, but this intervention is not as extensive as in fixed systems.

The findings highlight the critical role of exchange rate regimes in shaping the economic effects of aid. Fixed regimes amplify the effects of aid through mechanisms such as currency appreciation. My findings align closely with the existing literature on exchange rate regimes and their interaction with economic policies. The significant effects observed under fixed regimes are consistent with findings by Rossi (2009), which emphasizes that fixed regimes lead to greater corporate reliance on foreign currency-denominated debt, exacerbating firms' financial vulnerabilities.

Under fixed regimes, firms are often encouraged by implicit government guarantees that reduce perceived exchange rate risks. These guarantees create moral hazard, leading firms to borrow excessively in foreign currencies without adequately hedging their exposure. Rossi (2009), also observes that during Brazil's fixed exchange rate period (1996–1999), the proportion of firms holding FX-debt and the share of foreign debt in total corporate debt increased significantly. This behavior reflects the reduced incentives for firms to manage exchange rate

[12] The Mundell-Fleming paradigm is a macroeconomic model analyzing the interaction between monetary and fiscal policies under different exchange rate regimes in open economies. Mundell-Fleming paradigm explores the interplay between monetary policy, fiscal policy, and exchange rate regimes under conditions of capital mobility (Mundell, 2000).

risks actively when the central bank intervenes heavily to maintain currency stability. However, firms adjusted their financial strategies once Brazil transitioned to a floating regime in 1999. They reduced FX-debt and increased their use of currency derivatives, highlighting how floating regimes compel firms to internalize exchange rate risks. Martínez and Werner (2002) indicate that a fixed regime encourages firms to borrow in foreign currencies due to indirect promises provided by the government. These guarantees reduce firms' perception of exchange rate risks, leading to significant balance sheet mismatches.

(Insert Table 8 here)

7.2 Exchange Rate Regimes and Foreign-listing Firms

The analysis of foreign aid and exchange rate regimes elaborates on the influence of local currency appreciation on the financial leverage of foreign-listed firms. The results align with the existing literature[13]. They provide a comprehensive view of how aid inflows interact with exchange rate regimes to shape firm behavior and financial conditions. The findings in Table 9 reveal that fixed exchange rate regimes create a more favorable financial environment for borrowing in international markets. These regimes ensure absorbing aid inflows into reserves and minimize currency appreciation risks (Calvo & Reinhart, 2002), fostering predictable financial conditions for firms. This stability reduces borrowing costs, enhancing firms' ability to secure foreign debt (Rossi,2009).

The interaction between foreign aid and exchange rate regimes significantly influences the corporate leverage of foreign-listing firms. The results in Table 9 show that aid inflows amplify leverage, particularly in fixed regimes, where implicit guarantees of exchange rate stability reduce perceived risks and encourage borrowing (Martínez & Werner, 2002). Conversely, floating regimes may reduce corporate leverage as firms internalize exchange rate

[13] See (Martínez & Werner, 2002; Rossi, 2009; Ye et al., 2014).

risks, promoting more cautious financial strategies. This dynamic aligns with Levy-Yeyati et al. (2013) , who discuss the "fear of appreciation," where governments intervene to prevent currency appreciation.

Borrowing conditions in the international market under fixed regimes remain consistently more favorable than those under floating regimes. The predictability and stability of fixed regimes lower lenders' perceived risk, facilitating better borrowing terms for firms. Rossi (2009) highlights this advantage, showing how fixed regimes reduce unhedged foreign currency debt and improve the currency alignment of liabilities. On the other hand, floating regimes compel firms to adopt more disciplined financial practices, such as using hedging instruments to manage currency risks (Ye et al., 2014).

My results suggest that aid-dependent economies may benefit from prioritizing fixed or managed exchange rate regimes. Such regimes reduce financial vulnerabilities and allow firms to maximize the benefits of foreign aid inflows. Furthermore, Martínez and Werner (2002) suggest that transitioning to a floating regime mitigates moral hazard issues but requires a robust financial infrastructure to handle the risks associated with greater exchange rate volatility. The consistency between the literature and my study’s findings underscores the importance of aligning exchange rate policies with foreign aid strategies to foster economic stability and growth.

(Insert Table 9 here)

8. CONCLUSION

This study explores how foreign aid inflows relate to corporate leverage. The OLS and instrumental variable analysis results with supply push instruments show the lack of a significant association between aid and leverage. These findings align with earlier research (Boone, 1996; Temple & Van de Sijpe, 2017), highlighting that foreign aid tends to be more connected to consumption than private sector development. However, firm heterogeneity does matter in this context. By examining export-oriented and foreign-listed firms, my analysis sheds light on how firm-specific characteristics shape the leverage response to aid inflows. Findings reveal that foreign aid has different effects on corporate leverage in Africa. Firms in export-oriented sectors, whose competitiveness decreases with currency appreciation, tend to reduce leverage in response to aid increases. Conversely, foreign-listed firms benefit from the reduced debt servicing costs accompanying currency appreciation, enabling them to increase leverage.

My findings emphasize the importance of recognizing how macroeconomic shifts induced by aid inflows can affect firm-level outcomes differently based on firm characteristics and exposure to international markets. This study reports a positive correlation between aid and leverage for firms located in countries with higher corporate FX-debt. This result highlights how aid influences leverage adjustments, particularly for firms with access to international markets. The results are still consistent with the supply push instrument. The mediation analysis indicates that currency appreciation mediates roughly 60% of the connection between foreign aid and firm borrowing.

Additionally, I analyze the role of currency fluctuations in companies' financing decisions. The findings indicate that foreign aid significantly enhances foreign-listed firms' leverage when combined with a fixed exchange rate regime. The findings align with the empirical literature, which collectively highlights the broader implications of exchange rate regimes and firms' financial policies (Martínez & Werner, 2002; Rossi, 2009; Ye et al., 2014). These results

provide critical insights into how strategic exchange rate management can maximize the economic benefits of foreign aid, particularly in developing markets.

These findings advance our understanding of foreign aid's macroeconomic and microeconomic implications by integrating theories of Dutch Disease with firm-level financial behavior. As such, my work helps enrich academic discourse and provide practical insights for policymakers designing aid programs to mitigate risks while fostering sustainable financial resilience in recipient countries. Future research could explore the sustainability of such arrangements amid evolving global financial conditions. However, the present findings underline the role of firm heterogeneity and exchange rate stability in achieving optimal outcomes from foreign aid.

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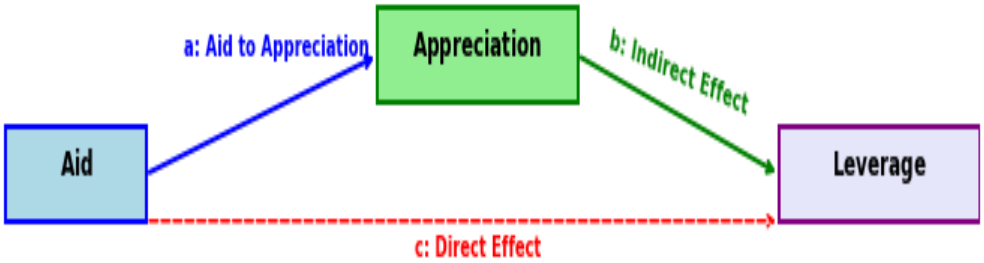


Figure 1: Schematic Representation of Aid, Appreciation and Leverage

This figure presents a conceptual model of how foreign aid influences corporate leverage, illustrating both direct and indirect effects and highlighting the role of Appreciation as a mediator. The pathways labeled a, b, and c trace the interactions between Aid, Leverage, and currency appreciation (exchange rate appreciation), offering insight into how aid affects firms differently depending on their market access. The red dashed line, labeled A: Direct Effect, captures the immediate influence of Aid on Leverage.

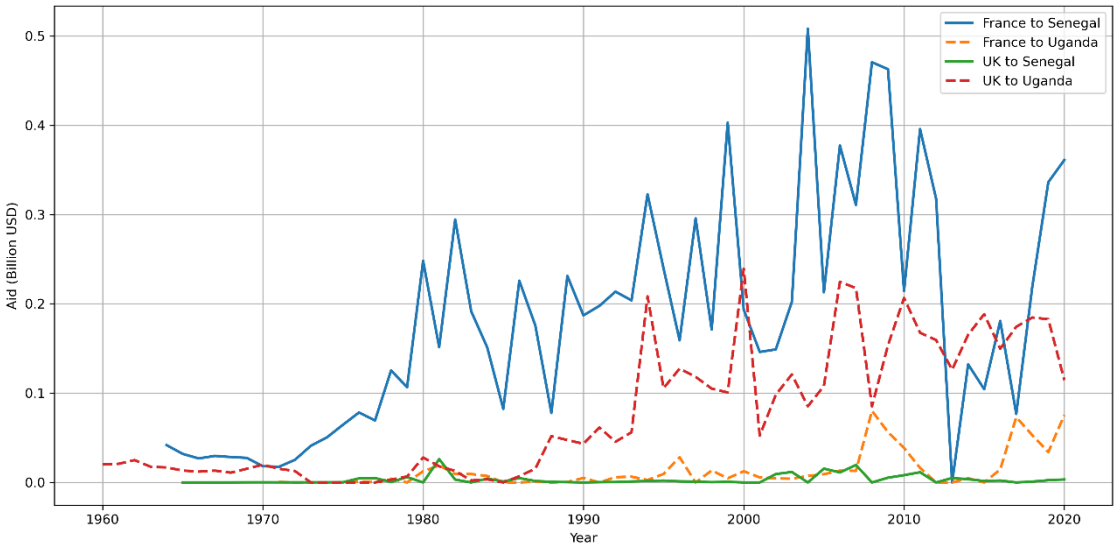


Figure 2: Donor-Aid Dynamics

The figure provides a comparative example analysis of the net aid disbursement provided by France and the UK to Uganda and Senegal over time, offering a framework to examine the supply-push instrument's relevance in aid studies. France's aid to Senegal shows consistent growth with periodic spikes, reflecting the strong political and economic ties rooted in colonial history and the Francophone alliance. Similarly, the UK's aid to Uganda has steadily risen since the 1990s, driven by the UK's focus on East African development. These aid flows highlight the enduring geopolitical and economic strategies shaping donor-recipient relationships. The consistent and substantial aid flows in these relationships provide a robust basis for using the supply-push instrument in aid studies.

Table 1: Summary Statistics

Panel A: Firm Level	Full Sample n=22737			Public n=12808			Private n=9929			*t*-test
	Mean	std.dev.	Median	Mean	std.dev.	Median	Mean	std.dev.	Median	(4)-(7)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Leverage	0.2041	0.1971	0.1658	0.2172	0.1868	0.1992	0.1911	0.2073	0.1199	16.52***
Long-term-leverage	0.1267	0.1592	0.067	0.1308	0.1512	0.0806	0.1227	0.1691	0.0521	3.69***
Short-term-leverage	0.0847	0.1133	0.042	0.1025	0.1149	0.0612	0.0668	0.1082	0.0213	23.80***
Tangibility	0.2901	0.2737	0.2274	0.3657	0.2656	0.3265	0.2144	0.2606	0.0895	42.91***
ROA	0.2732	1.7164	0.0633	0.1187	0.1337	0.1027	0.4277	2.5822	0.0148	-13.88***
Lnassets	16.5567	2.9924	17.2932	18.5476	1.8641	18.4796	14.5657	2.6527	13.7542	13.29***
Assets	352.817	983.854	32.384	574.506	1377.51	107.239	131.128	599.334	9.405	17.95***

Panel B: Aid Variables	Mean	std.dev	Median	N
Aid	0.1357	0.0975	0.1023	415
Donor-budget (Billion USD)	115.847	251.096	124.834	415
Supply-push	0.10589	0.11188	0.080489	415
Panel C: Other Macro Variables				
Unemployment	10.9143	7.5126	8.5415	415
Inflation	8.9316	2.5987	3.58625	415
Appreciation	0.11821	0.21792	0.037231	415
LnExchange-rate	3.0447	2.6823	3.5697	415
LnGDP-per-capita	7.5988	0.8830	7.4578	415

The table presents the descriptive statistics for various firm-level, aid, and macroeconomic variables. The sample comprises 2,803 firms (22,737 firm-year observations) from 29 countries from 2000 to 2019. This includes 1,202 public firms (12,808 firm-year observations) and 1,601 private firms (9,929 firm-year observations). For detailed definitions of variables and data sources, please refer to the Appendix. "N" indicates the number of country-year observations with available data. *** indicate p <0.01; ** indicate p <0.05; and * indicates p <0.1, where p-values from the t-test for sample differences.

Table 2: Country Characteristics

Receiver Country	Aid (Bn USD)	FX-Debt (Bn-USD)	Aid to GDP	FX-Debt to-GDP	Initial Share	Supply Push	Appreciation	Fixed	Float	Inter-mediate
Algeria	0.9826	0	0.0083	0	0.1848	0.1671	0.0017	0.15	0.7	0.15
Botswana	0.4721	0	0.0371	0	0.0083	0.0697	0.1408	0.4	0.1	0.5
Cameroon	2.5696	0.5357	0.074	0.0151	0.0161	0.0578	0.0019	1	0	0
Comoros	0.1547	0	0.1436	0	0.003	0.3477	0.0017	1	0	0
Cote d'Ivoire	2.8942	2.1968	0.1119	0.0755	0.0189	0.0769	0.0018	1	0	0
Egypt	4.1582	6.5896	0.0248	0.0243	0.089	0.0497	0.1437	0.05	0.8	0.15
Ethiopia	2.7341	1	0.0075	0.0028	0.089	0.0343	0.0596	1	0	0
Eswatini	0.2667	0	0.0605	0	0.0074	0.2169	0.0017	0.05	0.1	0.85
Gabon	0.3773	1.8449	0.0248	0.1111	0.0066	0.0487	0.0018	1	0	0
Ghana	4.832	2.854	0.1813	0.053	0.0273	0.0911	0.765	0.3	0.25	0.45
Guinea	0.9976	0	0.0771	0	0.0092	0.0919	0.1917	0.1	0.55	0.35
Kenya	5.5411	1.8187	0.1252	0.026	0.0412	0.1051	0.0118	0.05	0.85	0.1
Liberia	1.559	5.6913	0.5074	1.9248	0.0228	0.9884	0.0098	0.25	0.4	0.35
Madagascar	1.4079	0	0.1343	0	0.0185	0.2135	0.1188	0	0.65	0.35
Malawi	3.1202	0	0.4567	0	0.0186	0.3273	0.0055	0.35	0.05	0.6
Mauritius	0.4335	1.6137	0.0418	0.1927	0.0036	0.0412	0.0319	0.1	0.7	0.2
Morocco	3.8207	2.3213	0.042	0.0222	0.0721	0.0912	0.1141	0.5	0.5	0
Mozambique	5.7454	0.4101	0.4318	0.0277	0.0041	0.0403	0.1188	0.1	0.4	0.5
Namibia	0.8479	0.4659	0.081	0.0354	0.0186	0.19	0.1097	1	0	0
Nigeria	8.8015	5.3641	0.0273	0.0134	0.0467	0.0155	0.006	0.45	0.1	0.45
Rwanda	2.6729	0.3025	0.3444	0.0315	0.0086	0.1421	0.0019	0.9	0.05	0.05
Senegal	3.0728	0.95	0.1814	0.0433	0.0218	0.1376	0.0018	1	0	0
Seychelles	0.0586	0.1603	0.0536	0.1397	0.0013	0.144	0.0017	0.1	0.75	0.15
South Africa	4.2129	8.7861	0.0122	0.0255	0.0179	0.006	0.1052	0	0.1	0.9
Sudan	6.3592	0	0.1247	0	0.0119	0.0264	0.2916	0.05	0.8	0.15
Tanzania	6.7057	0.21	0.2267	0.0046	0.0288	0.1009	0.0007	0.15	0.7	0.15
Tunisia	2.1387	1.4175	0.0516	0.0339	0.0667	0.1828	0.6188	0.05	0.9	0.05
Uganda	6.441	0	0.2839	0	0.0179	0.0793	0.0004	0	0.45	0.55
Zambia	4.2006	1.5	0.2689	0.0607	0.0157	0.0955	0.1848	0.05	0.1	0.85

This table presents detailed descriptive statistics on aid disbursement and other country-level variables in selected African countries included in the study sample. The table captures the absolute aid received, measured in U.S. dollars, and its relative share as a percentage of each country's Gross Domestic Product (GDP). The table also captures the absolute foreign currency debt, measured in U.S. dollars, and its relative share as a percentage of each country's Gross Domestic Product (GDP). The initial share is the proportion of total foreign aid a recipient country receives from a specific donor. Fx-Debt is the aggregate foreign currency debt. Appreciation is the inverse of the exchange rate relative to USD. Supply-push is the exogenous variations in foreign aid driven by changes in donor budgets. These metrics provide critical context on the role of foreign aid in supporting national economies, highlighting variations in aid dependency and economic resilience across countries. Notable examples include Mozambique, Rwanda, Uganda, and Liberia, where aid constitutes 43.18%, 34.44%, 28.39%, and 25.07% of GDP, respectively, illustrating high aid dependency essential for economic operations. In contrast, more extensive and more diversified economies, such as Algeria, Nigeria, and South Africa, receive substantial aid amounts in absolute terms—$0.98 billion, $8.8 billion, and $4.21 billion—but with lower dependency ratios of 0.83%, 2.73%, and 1.22%, respectively, indicating reduced reliance on aid. *fixed* is a dummy variable that equals 1 if a country uses a fixed exchange rate regime and 0 otherwise. *Float* is a dummy variable that equals 1 if a country uses a floating exchange rate regime, and 0 otherwise. *Intermediate* is a dummy variable that equals 1 if a country uses an intermediate exchange rate regime.

Table 3: Foreign Aid Flows and Corporate Debt Financing

Panel A: OLS	(1) Leverage Full Sample	(2) Leverage Full Sample	(3) Leverage Full Sample	(4) Leverage Public	(5) Leverage Public	(6) Leverage Public	(7) Leverage Private	(8) Leverage Private	(9) Leverage Private
Aid	0.0039	0.0103	0.0007	0.0090	0.0100	0.0089	0.2469	0.2175	0.2480
	(0.899)	(0.757)	(0.982)	(0.828)	(0.805)	(0.830)	(0.152)	(0.206)	(0.149)
LnGDP-per-capita	0.0318*	0.0286	0.0349**	0.0374	0.0329	0.0201	0.0549**	0.0410**	0.0540***
	(0.081)	(0.101)	(0.047)	(0.455)	(0.515)	(0.637)	(0.011)	(0.038)	(0.006)
LnExchange-rate	0.0006	0.0008	0.0003	0.0310***	0.0305***	0.0284***	0.0002	0.0001	-0.0001
	(0.691)	(0.613)	(0.810)	(0.002)	(0.002)	(0.005)	(0.946)	(0.966)	(0.959)
Tangibility	0.1271***	0.1271***	0.1271***	0.1539***	0.1539***	0.1539***	0.1099***	0.1102***	0.1100***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Lnassets	-0.0015	-0.0015	-0.0015	0.0059***	0.0059***	0.0059***	-0.0178***	-0.0177***	-0.0178***
	(0.182)	(0.207)	(0.183)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ROA	-0.0012	-0.0012	-0.0012	-0.1881***	-0.1881***	-0.1882***	-0.0016*	-0.0016*	-0.0016*
	(0.159)	(0.162)	(0.156)	(0.000)	(0.000)	(0.000)	(0.068)	(0.067)	(0.069)
Market-to-book				-0.0005	-0.0003	-0.0001			
				(0.800)	(0.789)	(0.804)			
Unemployment	-0.0041***	-0.0051***	-0.0041***	-0.0039***	-0.0041***	-0.0039***	-0.0052**	-0.0069**	-0.0053**
	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)	(0.000)	(0.041)	(0.013)	(0.029)
Inflation	-0.0012	-0.0015	-0.0009	0.0002	0.0001	0.0002	0.0014	0.0011	0.0012
	(0.286)	(0.284)	(0.355)	(0.665)	(0.695)	(0.583)	(0.486)	(0.528)	(0.535)
Observations	22,737	22,737	22,737	10,180	10,180	10,180	9,929	9,929	9,929
R-squared	0.586	0.586	0.586	0.651	0.651	0.651	0.524	0.524	0.524
Country FE	NO	YES	YES	NO	YES	YES	NO	YES	YES
Firm FE	YES	NO	NO	YES	NO	NO	YES	NO	NO
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Industry X Year FE	NO	NO	YES	NO	NO	YES	NO	NO	YES

Panel B: 2SLS Supply-Push Instrument	(1) First Stage Aid	(2) Second Stage Leverage Full Sample	(3) Second Stage Leverage Full Sample	(4) Second Stage Leverage Full Sample	(5) Second Stage Leverage Public	(6) Second Stage Leverage Public	(7) Second Stage Leverage Public	(8) Second Stage Leverage Private	(9) Second Stage Leverage Private	(10) Second Stage Leverage Private
Supply-push	1.0197***									
	(0.002)									
Aid		0.3358	0.5113	0.3290	0.2117	0.1750	0.2229	0.5152	0.4225	0.1341
		(0.440)	(0.189)	(0.445)	(0.777)	(0.801)	(0.765)	(0.239)	(0.134)	(0.245)
Observations	380	10,180	10,180	10,180	10,180	10,180	10,180	1,929	1,929	1,929
R-squared	0.860	0.585	0.583	0.585	0.648	0.648	0.648	0.484	0.500	0.490
Anderson LM statistic	Pval=0									
C-D Wald F statistic	21.52									
Country FE	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
Firm FE	NO	YES	NO	NO	YES	NO	NO	YES	NO	NO
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year X Industry FE	NO	NO	NO	YES	NO	NO	YES	NO	NO	YES
Control Variables	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Panel A of this table reports our OLS results showing the relation between aid and firm leverage obtained from the regression shown in Eqn. (1). Leverage is defined as the ratio of total book debt to book assets of the firm. Aid is the total aid disbursement made by donors divided by GDP. Columns (1), (2), and (3) report the results for the full sample. Columns (4), (5), and (6) report the results for public firms. Columns (7), (8), and (9) report the results for private firms. The market-to-book variable does not exist for private firms, and thus, it is not included in the regressions under columns that belong to the private firms or the full ample. Panel B reports the results for the 2SLS using the supply-push instrument. A "supply-push" instrument measures how changes in donor budgets affect aid recipients, independent of the recipient's economic conditions. In panel B, column (1) indicates the first stage results, i.e., the relationship between supply-push and aid. Columns (2), (3), and (4) report the results for the full sample. Columns (5), (6), and (7) report the results for public firms. Columns (8), (9), and (10) report the results for private firms. Other variables are defined in the Appendix. Various fixed effects (firm, year, country, or interacted industry-year) are applied at the bottom of each column. The standard errors are clustered at the year level. p-values are reported in parentheses. *** indicate $p < 0.01$; ** indicate $p < 0.05$; and * indicates $p < 0.1$

Table 4: The Role of Export-Oriented Firms

Panel A: OLS	(1) Leverage Full Sample	(2) Leverage Full Sample	(3) Leverage Full Sample	(4) Leverage Public	(5) Leverage Public	(6) Leverage Public	(7) Leverage Private	(8) Leverage Private	(9) Leverage Private
Aid	0.0725	0.0802	0.0696	0.0792	0.0801	0.0793	0.3324	0.3100	0.3337
	(0.376)	(0.368)	(0.385)	(0.173)	(0.168)	(0.176)	(0.166)	(0.185)	(0.164)
Aid X Export-Oriented	-0.0938***	-0.0565***	-0.0553***	-0.0134***	-0.0134***	-0.0135***	-0.0888**	-0.0930**	-0.0885**
	(0.001)	(0.001)	(0.001)	(0.010)	(0.010)	(0.009)	(0.033)	(0.026)	(0.035)
Export-Oriented	0.1430***	0.1385***	0.1429***	0.0392***	0.0395***	0.0389***	0.2212***	0.3302***	0.0411***
	(0.007)	(0.008)	(0.007)	(0.003)	(0.007)	(0.003)	(0.009)	(0.006)	(0.000)
Observations	22,737	22,737	22,737	10,180	10,180	10,180	9,929	9,929	9,929
R-squared	0.586	0.586	0.586	0.652	0.652	0.652	0.524	0.524	0.524
Country FE	NO	YES	YES	NO	YES	YES	NO	YES	YES
Firm FE	YES	NO	NO	YES	NO	NO	YES	NO	NO
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year X Industry FE	NO	NO	YES	NO	NO	YES	NO	NO	YES
Control Variables	YES	YES	YES	YES	YES	YES	YES	YES	YES

Panel B: 2SLS Supply-Push Instrument	(1) Leverage Full Sample	(2) Leverage Full Sample	(3) Leverage Full Sample	(4) Leverage Public	(5) Leverage Public	(6) Leverage Public	(7) Leverage Private	(8) Leverage Private	(9) Leverage Private
Aid	0.3938	0.5587	0.3866	0.1059	0.1008	0.1039	0.3114	0.2430	0.2945
	(0.369)	(0.154)	(0.374)	(0.154)	(0.129)	(0.161)	(0.380)	(0.284)	(0.399)
Aid X Export-Oriented	-0.0538**	-0.0599**	-0.0567**	-0.0348***	-0.0347***	-0.0348***	-0.0213**	-0.0213**	-0.0215**
	(0.045)	(0.036)	(0.047)	(0.001)	(0.001)	(0.001)	(0.014)	(0.013)	(0.013)
Export-Oriented	0.1165***	0.1387***	0.1699***	0.1851***	0.1789***	0.1687***	0.2447***	0.1826***	0.2331***
	(0.008)	(0.006)	(0.004)	(0.006)	(0.003)	(0.005)	(0.008)	(0.002)	(0.001)
Observations	22,737	22,737	22,737	10,180	10,180	10,180	9,929	9,929	9,929
R-squared	0.585	0.584	0.585	0.639	0.641	0.640	0.499	0.509	0.504
Country FE	NO	YES	YES	NO	YES	YES	NO	YES	YES

Firm FE	YES	NO	NO	YES	NO	NO	YES	NO	NO
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year X Industry FE	NO	NO	YES	NO	NO	YES	NO	NO	YES
Control Variables	YES	YES	YES	YES	YES	YES	YES	YES	YES

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel C: OLS Debt Maturity	Long-term Leverage Public	Long-term Leverage Public	Short-term Leverage Public	Short-term Leverage Public	Long-term Leverage Private	Long-term Leverage Private	Short-term Leverage Private	Short-term Leverage Private
Aid	0.0757*	0.0786*	0.0514	0.0514	0.3284	0.3136	0.0194	0.0071
	(0.083)	(0.066)	(0.136)	(0.136)	(0.117)	(0.127)	(0.833)	(0.938)
Aid X Export-Oriented	-0.1378***	-0.1372***	0.0710**	0.0710**	-0.4697**	-0.4975**	0.3777*	0.3830*
	(0.000)	(0.001)	(0.032)	(0.032)	(0.030)	(0.025)	(0.095)	(0.096)
Export-Oriented	0.0155***	0.0155***	0.0323	0.0323	0.0825***	0.0104***	0.0101	0.2972
	(0.000)	(0.000)	(0.790)	(0.790)	(0.000)	(0.00)	(0.209)	(0.123)
Observations	10,180	10,180	10,180	10,180	9,929	9,929	9,929	9,929
R-squared	0.493	0.492	0.490	0.490	0.424	0.424	0.312	0.347
Control Variables	YES	YES	YES	YES	YES	YES	YES	YES
Country FE	YES	NO	YES	NO	YES	NO	YES	NO
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Year X Industry FE	NO	YES	NO	NO	NO	NO	NO	NO

This table analyzes the effects of Dutch disease on the relationship between aid and the leverage of export firms. *Export-Oriented* is a dummy variable that takes the value of 1 if a company is classified in an industry that focuses on exports, as described in Rajan and Subramanian (2011), and 0 otherwise. This indicator measures how much an industry relies on exports compared to other industries. Export-Oriented companies make up 45.47% of my sample. Panel A of this table presents the Ordinary Least Square (OLS) results, showing how the relationship between aid and firm leverage depends on the firm's industry classification. *Leverage* is defined as the ratio of total book debt to book assets. Aid is measured as the total aid disbursement by donors divided by GDP. The control variables are the same as in the main table; I define them in the Appendix. Columns (1), (2), and (3) report results for the full sample. Columns (4), (5), and (6) show results for public firms, while Columns (7), (8), and (9) present results for private firms. Panel B shows the Two-Stage Least Square (2SLS) estimation results using the supply-push instrument. Panel B reports only the second stage results, I report first stage in Table 3 panel B column 1. Panel C reports the results for the debt maturity for both private and public firms. *Long-term Leverage* is defined as the ratio of long-term book debt to book assets of the firm. *Short-term Leverage* is defined as the ratio of short-term book debt to book assets. Various fixed effects (firm, year, country, or industry-year interactions) are applied, as indicated at the bottom of each column. Standard errors are clustered at the year level, and p-values are shown in parentheses. *** indicates $p < 0.01$; ** indicates $p < 0.05$; and * indicates $p < 0.1$.

Table 5: The Role of Foreign-listing Firms

VARIABLES	(1) Leverage OLS	(2) Leverage OLS	(3) Leverage OLS	(4) Leverage 2SLS	(5) Leverage 2SLS	(6) Leverage 2SLS
Aid	0.0570	0.0561	0.0573	0.2629	0.2250	0.2552
	(0.479)	(0.481)	(0.472)	(0.210)	(0.152)	(0.213)
Aid X Foreign-Listing	0.1824***	0.1787***	0.1823***	0.1737***	0.1711***	0.1731***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Foreign-Listing	0.0908**	0.0626*	0.0906**	0.0060**	0.0082*	0.0056**
	(0.031)	(0.088)	(0.030)	(0.039)	(0.087)	(0.318)
Observations	10,180	10,180	10,180	10,180	10,180	10,180
R-squared	0.857	0.855	0.857	0.541	0.570	0.547
Country FE	NO	YES	YES	NO	YES	YES
Firm FE	YES	NO	NO	YES	NO	NO
Year FE	YES	YES	YES	YES	YES	YES
Industry X Year FE	NO	NO	YES	NO	NO	YES
Control Variables	YES	YES	YES	YES	YES	YES

This table analyzes the role of foreign-listed firms in forming the relationship between aid and firm leverage. *Foreign-listing* is a dummy variable that equals 1 if a local firm is listed on a foreign exchange and 0 otherwise. The foreign-listing companies are 36% of our sample. Columns (1), (2), and (3) report results for OLS. Columns (4), (5), and (6) show results for 2SLS. All the variables are defined in the Appendix. Various fixed effects (firm, year, country, or interacted industry-year) are applied at the bottom of each column. The standard errors are clustered at the year level. *p*-values are reported in parentheses. *** indicate $p < 0.01$; ** indicate $p < 0.05$; and * indicates $p < 0.1$

Table 6: Mediation Analysis: Currency Appreciation Channel

Panel A Export-Firms	(1) Appreciation	(2) Leverage	(3) Leverage
Aid	0.4388***	0.0725	0.0631
	(0.000)	(0.176)	(0.062)
Appreciation			0.181
			(0.124)
Aid X Export-Oriented		-0.0938***	-0.0755***
		(0.001)	(0.001)
Appreciation X Export-Oriented			-0.1367***
			(0.009)
Export-Oriented		0.1430***	0.0056**
		(0.007)	(0.039)
Observations	415	22,737	22,737
R-squared	0.856	0.586	0.586
Country FE	YES	YES	YES
Year FE	YES	YES	YES
Control Variables	YES	YES	YES
Sobel Test (Export-Oriented)	Test statistic=2.30	P-Value=0.0215	
Proportion			60.2%

Panel B Foreign-Listing	(1) Appreciation	(2) Leverage	(3) Leverage
Aid	0.4388***	0.0570	0.0004
	(0.000)	(0.479)	(0.909)
Appreciation			0.1106***
			(0.000)
Aid X Foreign-Listing		0.1824***	0.0147
		(0.000)	(0.814)
Appreciation X Foreign-Listing			0.2386***
			(0.000)
Foreign-Listing		0.0908**	0.0465
		(0.031)	(0.306)
Observations	415	10,180	10,180
R-squared	0.855	0.857	0.649
Country FE	YES	YES	YES
Year FE	YES	YES	YES
Control Variables	YES	YES	YES
Sobel Test (Foreign-Listing)	Test statistic=2.32	P-values=0.0015	
Proportion			57.4%

This table presents a mediation analysis of the relationship between aid and leverage through currency appreciation, with results for export firms (Panel A) and foreign-listed firms (Panel B). *Appreciation* refers to currency appreciation relative to USD, calculated as the inverse of the exchange rate. *Aid X Export-Oriented* and *Appreciation X Export-Oriented* capture the interaction of aid and appreciation with the Export-Oriented dummy, respectively. Panel A shows the impact of aid on appreciation (Column 1) and leverage (Columns 2 and 3). Panel B focuses on foreign-listed firms, where *Aid X Foreign-Listing* and *Appreciation X Foreign-Listing* represent the interaction between aid, appreciation, and a foreign-listing dummy. *Foreign-listing* is a dummy variable for firms listed on foreign exchanges, and *Export-Oriented* is a dummy for firms in export-focused industries. The control variables are the same as in the main table; I define them in the appendix. The *Sobel test* assesses the significance of a mediator(appreciation) variable's role in transmitting the effect of an independent variable (*aid*). Fixed effects (year, country, industry-year) are applied as indicated. Standard errors are clustered by year, and p-values are shown in parentheses. *** indicate p <0.01; ** indicate p <0.05; and * indicates p <0.

Table 7*:* Corporate Debt Denominated in Foreign Currency

Panel A: All Types of Firms	(1) Leverage Full Sample	(2) Leverage Full Sample	(3) Leverage Full Sample	(4) Leverage Public	(5) Leverage Public	(6) Leverage Public	(7) Leverage Private	(8) Leverage Private	(9) Leverage Private
Aid	0.0280	0.0128	0.0288	0.0330	0.0002	0.0467	0.0518	0.0355	0.0513
	(0.474)	(0.749)	(0.469)	(0.216)	(0.993)	(0.978)	(0.255)	(0.133)	(0.233)
Aid X High-FX-Debt	0.0429***	0.0532***	0.0431***	0.0560***	0.0448***	0.0581***	-0.0544	-0.0324	-0.0539
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.394)	(0.443)	(0.383)
High FX-Debt	0.0686**	0.0768***	0.0680**	0.0035***	0.0209***	0.0094***	0.0103**	0.0087***	0.0103**
	(0.017)	(0.010)	(0.019)	(0.000)	(0.000)	(0.000)	(0.019)	(0.001)	(0.019)
Observations	22,737	22,737	22,737	10,180	10,180	10,180	9,929	9,929	9,929
R-squared	0.583	0.581	0.583	0.638	0.640	0.637	0.463	0.496	0.465
Country FE	NO	YES	YES	NO	YES	YES	NO	YES	YES
Firm FE	YES	NO	NO	YES	NO	NO	YES	NO	NO
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Industry X Year FE	NO	NO	YES	NO	NO	YES	NO	NO	YES
Control Variables	YES	YES	YES	YES	YES	YES	YES	YES	YES

Panel B: Only Export-Oriented	(1) Leverage Full Sample	(2) Leverage Full Sample	(3) Leverage Full Sample	(4) Leverage Public	(5) Leverage Public	(6) Leverage Public	(7) Leverage Private	(8) Leverage Private	(9) Leverage Private
Aid	0.0269	0.0555	0.0280	0.0118	0.0107	0.0119	0.0143	-0.0260	-0.0053
	(0.656)	(0.379)	(0.636)	(0.275)	(0.319)	(0.306)	(0.931)	(0.441)	(0.963)
Aid X High- High-FX-Debt	0.0247***	0.0287**	0.0242***	0.0398***	0.0325**	0.0378**	0.4646	0.1839	0.3373
	(0.009)	(0.040)	(0.007)	(0.003)	(0.016)	(0.014)	(0.671)	(0.686)	(0.661)
High-FX-Debt	0.0552**	0.0483**	0.0553**	0.0491***	0.0352**	0.0448*	0.0059**	0.0657**	0.0007**
	(0.043)	(0.024)	(0.041)	(0.007)	(0.023)	(0.075)	(0.046)	(0.027)	(0.022)
Observations	10,338	10,338	10,338	5,450	5,450	5,450	4,888	4,888	4,888
R-squared	0.860	0.594	0.860	0.835	0.645	0.626	0.873	0.526	0.879
Country FE	NO	YES	YES	NO	YES	YES	NO	YES	YES

Firm FE	YES	NO	NO	YES	NO	NO	YES	NO	NO
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Industry X Year FE	NO	NO	YES	NO	NO	YES	NO	NO	YES
Control Variables	YES	YES	YES	YES	YES	YES	YES	YES	YES

This table analyzes the role of foreign currency debt in the relationship between aid and firm leverage. *High-FX-Debt* is a dummy variable equal to one if a firm is in a country where the share of foreign currency debt to total debt is above the median (7.05%) and zero otherwise. The mean share of foreign currency debt to total debt in our sample is 14.73%. *FX-Debt* represents the country-level foreign currency debt of the non-financial sector. Panel A presents results for all types of firms, while panel B focuses only on export firms. Columns (1), (2), and (3) report results for the full sample. Columns (4), (5), and (6) show results for public firms, while columns (7), (8), and (9) show results for private firms. All variables are defined in the Appendix. Various fixed effects (firm, year, country, or interacted industry-year) are applied as indicated at the bottom of each column. Standard errors are clustered at the year level, and p-values are reported in parentheses. *** indicates $p < 0.01$; ** indicates $p < 0.05$; and * indicates $p < 0.1$.

Table 8*:* Exchange Rate Regime, Aid and Leverage

Panel A: Fixed	(1) Leverage Full Sample	(2) Leverage Full Sample	(3) Leverage Full Sample	(4) Leverage Public	(5) Leverage Public	(6) Leverage Public	(7) Leverage Private	(8) Leverage Private	(9) Leverage Private
Aid	0.2719	0.5331	0.4511	0.4473	-0.0347	0.3414	0.3657	0.3596	0.3297
	(0.448)	(0.186)	(0.241)	(0.434)	(0.957)	(0.217)	(0.587)	(0.139)	(0.672)
Aid X Fixed	0.2475***	0.1663***	0.7281***	0.2095***	0.2724***	0.7318***	0.2952	0.3436	0.7600
	(0.002)	(0.006)	(0.000)	(0.008)	(0.009)	(0.000)	(0.736)	(0.403)	(0.396)
Fixed	0.0085**	0.0015**	0.0338**	0.0033***	0.0134***	0.0509***	0.2093	0.1212	0.0169
	(0.021)	(0.027)	(0.021)	(0.000)	(0.000)	(0.000)	(0.576)	(0.525)	(0.731)
Observations	22,737	22,737	22,737	10,180	10,180	10,180	9,929	9,929	9,929
R-squared	0.852	0.566	0.578	0.846	0.648	0.640	0.839	0.499	0.513
Country FE	NO	YES	YES	NO	YES	YES	NO	YES	YES
Firm FE	YES	NO	NO	YES	NO	NO	YES	NO	NO
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Industry X Year FE	NO	NO	YES	NO	NO	YES	NO	NO	YES
Control Variables	YES	YES	YES	YES	YES	YES	YES	YES	YES

Panel B: Float	(1) Leverage Full Sample	(2) Leverage Full sample	(3) Leverage Full Sample	(4) Leverage Public	(5) Leverage Public	(6) Leverage Public	(7) Leverage Private	(8) Leverage Private	(9) Leverage Private
Aid	0.1512	0.1313	0.0908	0.8630	0.6707	0.8494	0.3081	0.3189	0.0963
	(0.674)	(0.705)	(0.760)	(0.149)	(0.280)	(0.197)	(0.284)	(0.135)	(0.882)
Aid X Float	0.1901	0.1933	0.1787	0.2911	0.2589	0.2663	-0.0480	-0.1884	-0.4172
	(0.208)	(0.205)	(0.206)	(0.150)	(0.265)	(0.245)	(0.912)	(0.647)	(0.241)
Float	-0.0055	-0.0058	-0.0057	-0.0134	-0.0123	-0.0105	-0.0448	-0.0349	0.0132
	(0.274)	(0.250)	(0.260)	(0.143)	(0.271)	(0.324)	(0.185)	(0.155)	(0.406)
Observations	22,737	22,737	22,737	10,180	10,180	10,180	9,929	9,929	9,929
R-squared	0.852	0.852	0.852	0.848	0.644	0.625	0.475	0.503	0.513
Country FE	NO	YES	YES	NO	YES	YES	NO	YES	YES
Firm FE	YES	NO	NO	YES	NO	NO	YES	NO	NO
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Industry X Year FE	NO	NO	YES	NO	NO	YES	NO	NO	YES
Control Variables	YES	YES	YES	YES	YES	YES	YES	YES	YES

Panel B: Intermediate	(1) Leverage Full Sample	(2) Leverage Full Sample	(3) Leverage Full Sample	(4) Leverage Public	(5) Leverage Public	(6) Leverage Public	(7) Leverage Private	(8) Leverage Private	(9) Leverage Private
Aid	0.1522	0.3107	0.3188	0.8808	0.7017	0.8905	-11.9188	-4.3810	-4.1887
	(0.703)	(0.482)	(0.475)	(0.163)	(0.338)	(0.277)	(0.679)	(0.270)	(0.141)
Aid X Intermediate	0.0858	0.0199	0.0154	-0.0431	-0.0272	-0.7262	2.9587	0.3168	3.2318
	(0.312)	(0.851)	(0.885)	(0.738)	(0.857)	(0.320)	(0.640)	(0.429)	(0.116)
Intermediate	-0.0019	0.0027	0.0030	0.0120	0.0073	0.0425	-0.2244	-0.0288	-0.1492
	(0.781)	(0.746)	(0.723)	(0.188)	(0.497)	(0.270)	(0.659)	(0.543)	(0.191)
Observations	22,737	22,737	22,737	10,180	10,180	10,180	9,929	9,929	9,929
R-squared	0.852	0.585	0.585	0.848	0.644	0.639	0.669	0.488	0.448
Country FE	NO	YES	YES	NO	YES	YES	NO	YES	YES
Firm FE	YES	NO	NO	YES	NO	NO	YES	NO	NO
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year X Industry FE	NO	NO	YES	NO	NO	YES	NO	NO	YES
Control Variables	YES	YES	YES	YES	YES	YES	YES	YES	YES

The above table presents the influence of a country's exchange rate regime on the relationship between aid and leverage. *Fixed* is a dummy variable that takes 1 if the firm is located in the country that uses the fixed regime and 0 otherwise. *Float* is a dummy variable that takes 1 if the country uses the float regime and 0 otherwise. *Intermediate* is a dummy variable that takes 1 if the country uses the intermediate regime and 0 otherwise. A float exchange rate regime is characterized by minimal or no intervention by central banks in the foreign exchange market. A fixed exchange rate regime involves substantial intervention by the central bank to maintain a stable nominal exchange rate. The intermediate exchange rate regime represents a middle ground between fixed and floating regimes, characterized by partial central bank intervention or managed flexibility. The control variables are the same as in the main table. I define other variables in the appendix. Panel A presents results for the fixed regime, Panel B presents results for the floating regime, and Panel C presents the results for the intermediate regime. Columns (1), (2), and (3) report results for the full sample. Columns (4), (5), and (6) show results for public firms, while columns (7), (8), and (9) show results for private firms. Various fixed effects (firm, year, country, or interacted industry-year) are applied as indicated at the bottom of each column. Standard errors are clustered at the year level, and p-values are reported in parentheses. *** indicates $p < 0.01$; ** indicates $p < 0.05$; and * indicates $p < 0$.

Table 9: Exchange Rate Regimes and Leverage of Foreign Listed Firms

VARIABLES	(1) Leverage	(2) Leverage	(3) Leverage
Aid	0.7543	0.7932	0.4485
	(0.261)	(0.291)	(0.458)
Fixed X Foreign-Listing	0.6493*	0.7933**	0.6026*
	(0.054)	(0.049)	(0.052)
Aid X Fixed	0.1232*	0.1489*	0.1088*
	(0.081)	(0.079)	(0.094)
Aid X Foreign-Listing	0.7598***	0.8999**	0.7573***
	(0.010)	(0.012)	(0.009)
Aid X Fixed X Foreign-Listing	0.7424***	0.8637***	0.6756***
	(0.000)	(0.001)	(0.000)
Fixed	0.1098***	0.1372***	0.0983***
	(0.001)	(0.000)	(0.000)
Foreign-Listing	0.0578**	0.0677**	0.0545**
	(0.024)	(0.028)	(0.025)
Observations	10,180	10,180	10,180
R-squared	0.434	0.376	0.480
Control Variables	YES	YES	YES
Country FE	NO	YES	NO
Year FE	YES	YES	YES
Firm FE	YES	NO	NO
Year X Industry FE	NO	NO	YES

This table presents the role of aid and exchange rate regimes on the leverage of foreign-listed firms. *Foreign-listing* is a dummy variable that equals 1 if a local firm is listed on a foreign exchange and 0 otherwise. Fixed is a dummy variable that takes 1 if the firm is located in the country that uses the fixed regime and 0 otherwise. The foreign-listing companies are 36% of our sample. All the variables are defined in the Appendix. Various fixed effects (firm, year, country, or interacted industry-year) are applied at the bottom of each column. The standard errors are clustered at the year level. p-values are reported in parentheses. *** indicate $p < 0.01$; ** indicate $p < 0.05$; and * indicates $p < 0.1$

Appendix 1*:* Description of ISIC 3-digit industries

ISIC Code	Industrial Sector	Export-Oriented Index
311	Food products	1
313	Beverages	0
314	Tobacco	0
321	Textiles	1
322	Wearing apparel, except footwear	1
323	Leather products	1
324	Footwear, except rubber or plastic	1
331	Wood products, except furniture	1
332	Furniture, except metal	0
341	Paper and paper products	0
342	Printing and publishing	0
351	Industrial chemicals	1
352	Other chemicals	0
353	Petroleum refineries	1
354	Miscellaneous petroleum and coal products	1
355	Rubber products	0
356	Plastic products	0
361	Pottery and earthenware	0
362	Glass and glass products	0
369	Other non-metallic mineral products	0
371	Iron and steel	0
372	Non-ferrous metals	1
381	Fabricated metal products	0
382	Machinery, except electrical	1
383	Machinery, electrical	0
384	Transport equipment	1
385	Professional and scientific equipment	1
390	Other manufactured products	1

Following Rajan and Subramanian (2011) on the industry classification, I categorize 3-digit ISIC industries by their export potential, indicated by the Export-Oriented index. This index assigns a "1" to export-oriented sectors, thus more sensitive to international market dynamics, while a "0" indicates industries with lower export activity. By classifying industries such as food products, textiles, and machinery based on Export-Oriented, the table provides insights into the structure of the manufacturing sector, helping to identify which industries are more integrated into global trade and potentially more influenced by exchange rate movements.

Appendix 2*:* Data Sources and Definitions

Firm Variables	Definition	Data Source
Lnassets	Natural log of total book assets	Factset, Eikon, and Capital IQ, Annual financial reports of the companies
ROA	Operating income (Before depreciation) / Assets	Factset, Eikon, and Capital IQ, Annual financial reports of the companies
Tangibility	Net PPE / Assets	Factset, Eikon, and Capital IQ, Annual financial reports of the companies
Market value of equity	share price*common shares outstanding	Factset, Eikon, and Capital IQ, Annual financial reports of the companies
Market value of assets	MVA = Total assets - common equity + Market value of equity	Factset, Eikon, and Capital IQ, Annual financial reports of the companies
Market to book	Market value of assets/ Total book assets	Factset, Eikon, and Capital IQ, Annual financial reports of the companies
Total capital	Total debt + common equity	Factset, Eikon, and Capital IQ, Annual financial reports of the companies
Total debt	Short-term debt + Long-term debt	Factset, Eikon, and Capital IQ, Annual financial reports of the companies
Book leverage	Total debt / Total book assets	Factset, Eikon, and Capital IQ, Annual financial reports of the companies
Market leverage	Total debt / Market Value of Assets	Factset, Eikon, and Capital IQ, Annual financial reports of the companies
Long-term leverage	Long-term debt / Total book assets	Factset, Eikon, and Capital IQ, Annual financial reports of the companies
Short-term leverage	Short-term debt / Total book assets	Factset, Eikon, and Capital IQ, Annual financial reports of the companies
Macro variables	Definition	Data Source
Aid	Aid disbursement (% GDP)	Organization for Economic Co-operation and Development (OECD)
DAC aid	Aid from OECD members of the Development Assistance Committee (DAC)	Organization for Economic Co-operation and Development (OECD)
Non_DAC aid	Aid from non-OECD members of the Development Assistance Committee (DAC)	Organization for Economic Co-operation and Development (OECD)
Multilateral aid	Multilateral aid is provided through organisations (IMF, UN, World bank).	Organization for Economic Co-operation and Development (OECD)
Donor-Budget	The total financial resources allocated by donor countries for foreign aid.	Own calculations based on (Temple & Van de Sijpe, 2017)
Supply-push	Exogenous variations in foreign aid driven by changes in donor budgets.	Organization for Economic Co-operation and Development (OECD)
Bilateral aid	Bilateral aid is provided directly from one country to another	Organization for Economic Co-operation and Development (OECD)
Inflation	Inflation, consumer prices (annual %)	World Bank
Exchange rate	Official exchange rate (LCU per US$)	World Bank
Unemployment	Unemployment refers to the share of the labor force that is without work.	World Bank
LnGDP per capita	The natural log of GDP per capita	World Bank
Appreciation	The inverse of the exchange rate relative to USD	World Bank
FX-Debt	Aggregate foreign currency debt	Bank for International Settlements (BIS)
Initial share	Proportion of total foreign aid a recipient country received from a specific donor.	Own calculations based on Temple and Van de Sijpe (2017)
Export-Oriented	A dummy that equals 1 if a firm operates in an export-oriented industry and 0 otherwise.	I follow (Rajan & Subramanian, 2011)
Foreign-Listing	A dummy that equals 1 if a local firm is listed on a foreign exchange and 0 otherwise	I follow Fernandes and Ferreira (2008)
Fixed	A dummy that equals 1 is a country uses fixed exchange regime and 0 otherwise	Levy-Yeyati and Sturzenegger (2024) dataset (LYS Database)[14]
Float	A dummy that equals 1 if a country uses float regime and 0 otherwise	Levy-Yeyati and Sturzenegger (2024) dataset (LYS Database)
Intermediate	A dummy that equals 1 if a country uses intermediate regime and 0 otherwise	Levy-Yeyati and Sturzenegger (2024) dataset (LYS Database)

[14] https://sites.google.com/udesa.edu.ar/lys

ONLINE APPENDIX

Table A 1: Comparison of Exchange Rate Regimes by Country and periods

	1970-1999			2000-2019		
Country	**Fixed**	**Float**	**Intermediate**	**Fixed**	**Float**	**Intermediate**
Algeria	0.0385	0.8846	0.0769	0.1500	0.7000	0.1500
Botswana	0.9615	0.0000	0.0385	0.4000	0.1000	0.5000
Cameroon	0.9615	0.0000	0.0385	1.0000	0.0000	0.0000
Comoros	1.0000	0.0000	0.0000	1.0000	0.0000	0.0000
Côte d'Ivoire	0.9615	0.0000	0.0385	1.0000	0.0000	0.0000
Egypt	0.8077	0.0385	0.1538	0.0500	0.8000	0.1500
Eswatini	1.0000	0.0000	0.0000	1.0000	0.0000	0.0000
Ethiopia	0.7308	0.2692	0.0000	0.0500	0.1000	0.8500
Gabon	0.9615	0.0000	0.0385	1.0000	0.0000	0.0000
Ghana	0.3846	0.0769	0.5385	0.3000	0.2500	0.4500
Guinea	0.4615	0.1923	0.3462	0.1000	0.5500	0.3500
Kenya	0.1154	0.5769	0.3077	0.0500	0.8500	0.1000
Liberia	1.0000	0.0000	0.0000	0.2500	0.4000	0.3500
Madagascar	0.4615	0.1538	0.3846	0.0000	0.6500	0.3500
Malawi	0.3846	0.1154	0.5000	0.3500	0.0500	0.6000
Mauritius	0.3077	0.2692	0.4231	0.1000	0.7000	0.2000
Morocco	0.1154	0.8846	0.0000	0.5000	0.5000	0.0000
Mozambique	0.1538	0.0385	0.8077	0.1000	0.4000	0.5000
Namibia	1.0000	0.0000	0.0000	1.0000	0.0000	0.0000
Nigeria	0.2692	0.3462	0.3846	0.4500	0.1000	0.4500
Rwanda	0.3846	0.4231	0.1923	0.9000	0.0500	0.0500
Senegal	0.9615	0.0000	0.0385	1.0000	0.0000	0.0000
Seychelles	0.5385	0.4231	0.0385	0.1000	0.7500	0.1500
South Africa	0.1923	0.3077	0.5000	0.0000	0.1000	0.9000
Sudan	0.5000	0.1538	0.3462	0.0500	0.8000	0.1500
Tanzania	0.1154	0.3077	0.5769	0.1500	0.7000	0.1500
Tunisia	0.0000	0.9231	0.0769	0.0500	0.9000	0.0500
Uganda	0.0385	0.1154	0.8462	0.0000	0.4500	0.5500
Zambia	0.4231	0.0000	0.5769	0.0500	0.1000	0.8500
Total	**0.5252**	**0.2241**	**0.2507**	**0.3845**	**0.3448**	**0.2707**

The above comparison table analyzes the mean proportions of exchange rate regimes—fixed, floating, and intermediate—from 1970 to 1999 and 2000 to 2019. The results reveal a clear shift in African countries' exchange rate policies. Fixed exchange rate regimes, which were dominant during the earlier period, significantly declined in my sample period, 2000 to 2019. This trend reflects the challenges many countries faced in maintaining rigid pegs, particularly in the face of limited foreign reserves, external shocks, and the need for monetary policy flexibility. Conversely, float regimes became more prevalent from 2000 to 2019, indicating a move toward market-determined exchange rates. This shift aligns with broader economic liberalization trends, including structural adjustment programs, greater global trade integration, and efforts to mitigate currency volatility during periods of economic uncertainty. Intermediate regimes remained relevant but varied across both periods. In my sample, the fixed regime is still dominant. The results in the table align with existing literature on exchange rate regime transitions (Calvo & Reinhart, 2002; Fischer, 2001; Levy-Yeyati & Sturzenegger, 2005, 2024).

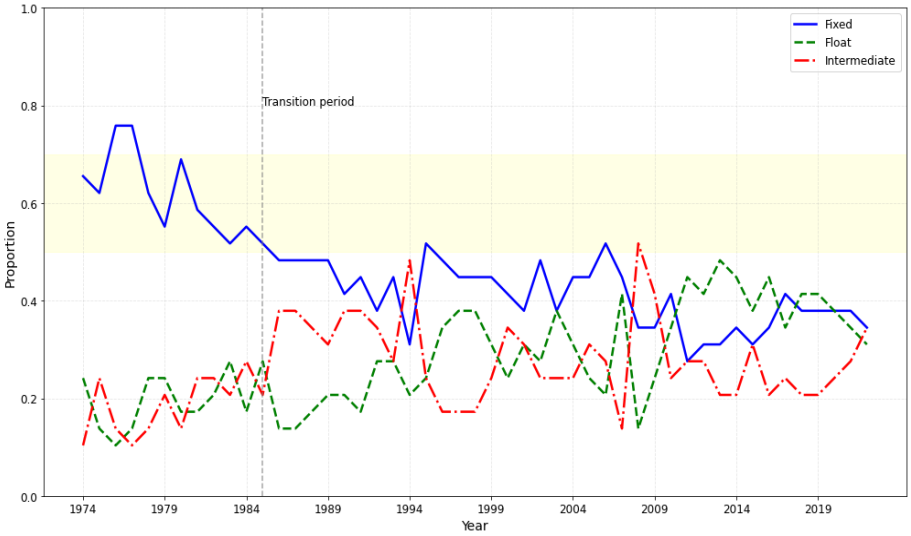


Figure A 1: Trends of Exchange Rate Regimes

The figure shows the trends of exchange rate regimes—fixed, floating, and intermediate—among 29 African countries over time. The data reveals a decline in the proportion of countries using Fixed regimes (blue line), starting from a dominant position in the 1970s and increasing adoption of floating regimes (green line) in recent decades. Intermediate regimes (red line) fluctuate significantly, reflecting their transitional nature. The 1985 "Transition Period" marks a significant shift[15]. Many African countries faced economic challenges during the 1980s, including external debt crises, Structural Adjustment Programs (SAPs) imposed by the IMF and World Bank, and trade liberalization policies. These pressures often forced countries to abandon Fixed regimes, which required substantial foreign reserves, and move toward intermediate arrangements to adapt to market conditions.

[15] The 1985 "Transition Period" reflects a pivotal shift driven by the Plaza Accord, which coordinated global efforts to weaken the overvalued U.S. dollar (Williamson, 1987). This period marked the decline of fixed exchange rates as countries adopted other regimes to manage economic volatility, trade imbalances, and capital flow challenges.

Model of Fear of Floating

In an increasingly globalized economy, the persistence of fear of floating underscores the practical challenges of achieving the theoretical ideals of exchange rate regimes. While clean floats remain a theoretical benchmark, many countries opt for pragmatic exchange rate management to navigate the interplay of domestic and external pressures. Following Calvo and Reinhart (2002), I describe the phenomenon of fear of floating in a mathematical framework that captures the dynamics of exchange rate management under external shocks. The central equation of this framework is the uncovered interest parity (UIP) condition, which links the domestic nominal interest rate (i) to the foreign interest rate (i^*), the expected depreciation of the domestic currency (e), and a risk premium (p). This relationship is expressed as $(i = i^* + e + p)$, where the risk premium reflects the additional return investors require to compensate for perceived risks in holding domestic assets. The purchasing power parity (PPP) assumption complements this, linking the domestic price level (p) to the exchange rate (s) and the foreign price level (p^*) through the relationship $(p = s + p^*)$. This assumption implies that exchange rate fluctuations have a direct and proportional impact on domestic price levels, an effect particularly pronounced in economies with high import dependence.

The demand for real money balances is modeled as $(\frac{M}{p} = c - \eta i + \epsilon)$, where (M) is the nominal money supply, (p) is the price level, (c) is the autonomous component of real money demand, (η) represents the sensitivity of money demand to changes in the nominal interest rate, and (ϵ) is a random shock with mean zero and variance (σ_ϵ^2). Central banks generate seigniorage revenue (R) from issuing money, which is given by $(R = i\frac{M}{p})$. This revenue depends on both the stock of real balances and the nominal interest rate. The central bank's welfare function, defined as $(W = R - \frac{\beta}{2}\pi^2)$, reflects a trade-off between maximizing seigniorage revenue and minimizing inflation deviations (π) from a target level. Here, (β) represents the weight assigned to inflation stability in the welfare function. In this framework, the variance of the exchange rate (σ_s^2) is determined by $(\sigma_s^2 = \frac{\sigma_\epsilon^2}{\eta^2+\beta})$, where (η) represents the sensitivity of money demand to interest rate changes and (β) reflects the central bank's emphasis on inflation stability. A higher (β) reduces exchange rate variance, indicating that a stronger commitment to inflation targeting results in less exchange rate flexibility. Conversely, the variance of the nominal interest rate $\left(\sigma_i^2\right)$ is given by $(\sigma_i^2 = \sigma_p^2 + \frac{\sigma_\epsilon^2}{\eta^2})$, where (σ_p^2) represents the variance of the risk premium. This equation shows that higher risk premium volatility and money demand shocks lead to greater variability in the domestic interest rate.

This model highlights the critical trade-offs faced by central banks. The presence of large risk premium shocks and high money demand volatility often compels monetary authorities to intervene in currency markets to stabilize the exchange rate. However, such interventions typically come at the cost of increased interest rate volatility or inflation pressures. The model also underscores the challenges of achieving exchange rate flexibility in economies with substantial liability dollarization, where exchange rate fluctuations can severely affect debt servicing costs and financial stability. The mathematical framework provides a robust theoretical basis for understanding fear of floating as a policy response to these constraints, illustrating the interplay between exchange rate management, inflation targeting, and external vulnerabilities.

Model of Fear of Appreciation

The fear of appreciation is modeled as a policy response by central banks to manage upward pressures on their domestic currencies. This response typically involves foreign exchange interventions aimed at stabilizing the nominal exchange rate by accumulating foreign reserves. Following Levy-Yeyati et al. (2013), the central bank's intervention is mathematically expressed as $(I_t = \Delta R_t = M_t \cdot (\Delta s_t - \Delta s_t^*)$ where (I_t) represents the intervention at time (t), (ΔR_t) is the change in foreign reserves, (M_t) is the monetary base, (Δs_t) is the observed change in the exchange rate, and (Δs_t^*) is the targeted change in the exchange rate. This equation captures the central bank's objective of minimizing deviations from the desired exchange rate path.

The central bank's behavior is further formalized through an objective function that balances the trade-off between exchange rate stability and intervention costs. This is given by $(\min_{I_t} L = \frac{1}{2}\alpha(\Delta s_t - \Delta s_t^*)^2 + \frac{1}{2}\beta(\Delta R_t)^2)$, where (α) reflects the weight assigned to exchange rate stability and (β) reflects the costs of reserve accumulation. The loss function highlights the dual objectives of limiting currency appreciation while avoiding excessive economic costs associated with intervention. To mitigate the inflationary pressures associated with reserve accumulation, central banks often sterilize the monetary impact of these interventions. Sterilization can be represented as $(\Delta M_t^S = \Delta M_t - \lambda \cdot I_t), where (\Delta M_t^S)$ is the sterilized monetary base, (ΔM_t) is the total monetary base, and (λ) represents the degree of sterilization with ($\lambda = 1$) indicating complete sterilization. This ensures that interventions to stabilize the exchange rate do not disrupt domestic price stability or monetary policy objectives.

Interventions also influence the real exchange rate (q_t), which is defined as $(q_t = s_t + p_t^* - p_t)$, where (s_t) is the nominal exchange rate, (p_t^*) is the foreign price level, and (p_t) is the domestic price level. By stabilizing the nominal exchange rate, reserve accumulation indirectly impacts the real exchange rate, thereby supporting export competitiveness and macroeconomic balance. Furthermore, reserve accumulation has broader macroeconomic implications, particularly for economic growth and investment. This mathematical framework demonstrates that the fear of appreciation reflects a desire to stabilize the currency and a strategic approach to fostering macroeconomic stability and long-term growth. However, the associated costs, including inflationary pressures, fiscal burdens, and potential misallocations of resources, underline the importance of carefully calibrating these policies to balance short-term objectives with long-term economic sustainability.

Model of Dutch Disease

The Dutch Disease model, formulated by (Corden & Neary, 1982), provides a comprehensive theoretical framework for understanding the economic consequences of a resource boom in a small, open economy. This model delineates three key economic sectors: the booming sector, often associated with resource extraction industries such as oil or natural gas; the lagging sector, representing traditionally traded goods such as manufacturing or agriculture; and the non-traded sector, encompassing domestic goods and services. By examining the interactions among these sectors, the model highlights two principal mechanisms—the resource movement effect and the spending effect—that collectively drive structural adjustments and economic imbalances during a resource boom.

The resource movement effect is initiated when the booming sector's increased profitability attracts labor and capital from other sectors. This reallocation raises the marginal productivity of factors employed in the booming sector, resulting in higher wages and a shift of resources away from the lagging and non-traded sectors. Consequently, the output of the lagging sector declines as its labor supply diminishes and input costs rise. This dynamic can be expressed mathematically as $(Q_l = Q_l(L_l - \Delta L))$, where (Q_l) represents the output of the lagging sector, (L_l) is the initial labor allocation, and \(\Delta L \) denotes the labor reallocated to the booming sector. This reallocation imposes significant constraints on the lagging sector's capacity to maintain its competitiveness and output levels. On the other hand, the spending effect is driven by the higher revenues generated in the booming sector, which increases national income and stimulates greater demand for non-traded goods. This increased demand leads to an appreciation of the real exchange rate, defined as $(RER = \frac{P_n}{P_t})$, where (P_n) is the price of non-traded goods and (P_t) is the price of traded goods. The appreciation of the real exchange rate reduces the competitiveness of the lagging sector in international markets by making its exports relatively more expensive. As a result, the combined effects of resource movement and spending accelerate the contraction of the lagging sector, often called de-industrialization.

The combined impact of these mechanisms on the lagging sector can be captured in the expression $(Q_l = F(K_l, L_l) - RER \cdot D_t)$, where $(F(K_l, L_l))$ is the production function of the lagging sector, reliant on capital (K_l) and labor (L_l), and (D_t) represents domestic demand for traded goods. This equation encapsulates the dual pressures exerted on the lagging sector: a reduction in resource availability due to reallocation and diminished competitiveness caused by real exchange rate appreciation. These mechanisms collectively explain the structural shifts a resource boom induces in small open economies. The Dutch Disease model thus underscores the trade-offs between the economic gains derived from resource inflows and the long-term challenges posed to other sectors. By reallocating resources and altering price dynamics, resource booms significantly reshape the economic landscape, often to the detriment of traditional traded goods sectors. This framework provides a critical lens for analyzing the broader implications of resource-driven growth, particularly for economies heavily reliant on primary commodities and vulnerable to the volatility of global resource markets.