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École doctorale 396 :
Économie, Organisation et Société
Laboratoire :
EconomiX (UMR 7235)

Pablo AGUILAR PÉREZ

Politique Monétaire, Instabilité Financière et Gouvernance Multilatérale

Essais sur les dimensions macroéconomiques et institutionnelles de la stabilité financière mondiale

Thèse présentée et soutenue publiquement le 10 juillet 2025
en vue de l'obtention du doctorat de Sciences économiques de l'Université Paris Nanterre

sous la direction de
Cécile COUHARDE (Université Paris Nanterre) et Aurélien SAÏDI (Université Paris Nanterre)

Jury :

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Essays on the Macroeconomic and Institutional Dimensions of Global Financial Stability

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Caminante no hay camino, se hace camino al andar

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Résumé

Cette thèse explore les dynamiques récentes de la stabilité financière mondiale à travers trois dimensions complémentaires : les effets des politiques monétaires non conventionnelles, les transmissions financières internationales et le rôle des institutions multilatérales. Le premier chapitre analyse l'impact des taux d'intérêt durablement bas sur les intermédiaires financiers non bancaires, notamment les assureurs-vie français. Il montre que l'environnement post-crise a fragilisé certains modèles d'assurance-vie en réduisant l'écart entre le rendement des actifs et les taux garantis, tout en mettant en lumière les stratégies d'adaptation des bancassureurs. Le deuxième chapitre étudie le rôle des transferts de fonds dans le cycle financier mondial. À partir d'un modèle de projections locales, il révèle la procyclicité des remittances par rapport à la politique monétaire américaine et leur influence ambivalente sur la stabilité macrofinancière des pays bénéficiaires. Le troisième chapitre examine le rôle du FMI comme fournisseur de signal. Il démontre que les communiqués Article IV influencent significativement les primes de risque souverain et les conditions d'emprunt externe. La thèse souligne l'importance d'une coordination renforcée entre politique monétaire, régulation prudentielle et gouvernance multilatérale.

Abstract

This Ph.D dissertation investigates the evolving dynamics of global financial stability across three interconnected dimensions: the impact of unconventional monetary policies, the international transmission of financial shocks, and the signaling role of multilateral institutions. The first chapter examines how persistently low interest rates have affected non-bank financial intermediaries, particularly French life insurers. It highlights that the post-crisis environment weakened traditional business models by compressing the spread between asset returns and guaranteed liabilities, while bancassurers adopted flexible strategies to sustain profitability. The second chapter analyzes remittance flows as a transmission channel of the global financial cycle. Using a local projection approach, it demonstrates the procyclical behavior of remittances in response to an unexpected U.S. monetary tightening and their mixed effects on the macro-financial stability of recipient countries. The third chapter focuses on the International Monetary Fund's role as a source of market signals. It shows that the publication of Article IV reports significantly influences sovereign risk premia and external financing conditions. Collectively, these findings underscore the need for enhanced coordination between monetary policy, macroprudential oversight, and multilateral governance to manage systemic financial risks.

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Acronyms

APP	Asset Purchase Programs
ATT	Average Treatment On The Treated
BERT	Bidirectional Encoder Representation From Transformers
CERS	Comité Européen Du Risque Systémique
DiD	Difference-In-Differences
DIOC	Database On Immigrants In OECD And Non-OECD Countries
ECB	European Central Bank
EIOPA	European Insurance And Occupational Pensions Authority
EMBI	Emerging Markets Bonds Index
EME	Emerging Market Economies
FDI/IDE	Foreign Direct Investments
FICO	Financial Conglomerates
FSAP	Financial Sector Assessment Program
FSOC	Financial Stability Oversight Council
GDDS	General Data Dissemination System
GFC	Global Financial Crisis
IMF/FMI	International Monetary Fund
LP	Local Projections
NLP	Natural Language Processing
OAS	Option Adjusted Spread
OECD/OCDE	Organisation For Economic Co-Operation And Development
PIN	Public Information Notices
PSM	Propensity Score Matching
PSW	Propensity Score Weighting
REER	Real Effective Exchange Rate
ROI	Return On Investments
ROA	Return On Assets
SDDS	Special Data Dissemination Standard
SMD	Standardized Mean Difference
TWFE	Two-Way Fixed Effects
UNGA	United Nations General Assembly
US	United States
USD	United States Dollar

INTRODUCTION GÉNÉRALE

La baisse substantielle de la volatilité macroéconomique, observée depuis le milieu des années 1980 et durant deux décennies, avait convaincu les banquiers centraux de concentrer leurs efforts sur le contrôle de l'inflation. Dans ce contexte, l'ajustement des taux directeurs avait fini par s'imposer comme un instrument efficace et durable de régulation du cycle économique. À l'instar de Bernanke (2004), certains économistes voyaient dans la politique monétaire l'une des principales raisons du succès économique de cette période de "Grande Modération", contrastant notamment avec les expériences moins concluantes qu'avaient pu connaître les États-Unis avant l'arrivé de Paul Volcker à la présidence de la Réserve fédérale.

La prévention des crises d'illiquidité et d'insolvabilité était alors confiée à la seule responsabilité des régulateurs bancaires, tandis que les banques centrales se cantonnaient à intervenir en cas de panique financière pour jouer leur rôle de prêteur en dernier ressort (Blinder, 1999; Bernanke, 2013; Adrian *et al.*, 2010). Dans cette perspective, les marchés financiers étaient perçus comme un mécanisme efficace pour corriger les asymétries d'information et permettre aux investisseurs d'allouer les capitaux vers les projets les plus productifs. Toute friction ou entrave dans ce rôle de correction des asymétries d'information était présentée comme étant la cause majeure de l'instabilité financière (Mishkin, 1999). Dans ces circonstances, une montée significative de l'incertitude—qu'elle soit liée à la défaillance d'une institution de premier plan, à une récession ou à de l'instabilité politique—se traduirait inévitablement par un resserrement du crédit, une baisse de l'investissement et, à terme, un ralentissement marqué de l'activité économique.

Les turbulences financières, sanitaires et géopolitiques qui se sont succédées depuis la fin des années 2000 ont remis en question notre perception du rôle et des modalités de la politique monétaire, ainsi que notre manière de concevoir et d'appréhender l'instabilité financière, du moins dans le discours académique. Ces perturbations ont mis en lumière les limites d'une politique monétaire excessivement centrée sur la stabilité des prix, négligeant d'autres aspects essentiels de la stabilité économique et financière. Elles ont souligné la nécessité d'adopter une approche plus globale et proactive, capable de prendre en compte les interactions complexes entre les différents secteurs de l'économie et de s'adapter aux chocs exogènes. En outre, ces turbulences ont replacé sur le devant de la scène les institutions multilatérales nées du système de Bretton Woods, dont les interventions—souvent décriées—avaient pu susciter une certaine défiance au tournant des années 1990 (Buira, 2005). Ces institutions sont désormais appelées à retrouver leur rôle de garant de la stabilité financière mondiale, en étroite collaboration avec les banques

centrales et les régulateurs nationaux.

Cette thèse examine l'adéquation des politiques monétaires et multilatérales face à l'augmentation et la persistance de l'instabilité financière, ainsi que l'opportunité d'une possible adaptation de ces politiques. Elle articule trois perspectives complémentaires : premièrement, les répercussions domestiques des taux d'intérêt durablement bas sur les intermédiaires financiers non bancaires ; deuxièmement, les canaux, souvent négligés, par lesquels la politique monétaire d'une puissance hégémonique se diffuse à l'international ; et, enfin, la capacité des institutions financières internationales à coordonner et à crédibiliser les réponses nationales face aux défis posés par cette instabilité persistante. En combinant ces trois angles d'analyse, cette thèse vise à offrir une vision plus complète et nuancée des enjeux auxquels sont confrontées les autorités monétaires et les institutions multilatérales dans un contexte d'incertitude accrue et de changements structurels profonds au sein du système financier international.

Avant d'aborder en détail chacun de ces trois axes, il est nécessaire de préciser le cadre dans lequel ils s'inscrivent. Au cours des quinze dernières années, une gouvernance macro-prudentielle s'est progressivement imposée, avec pour objectif de limiter les risques systémiques et d'anticiper les déséquilibres financiers. Cette approche vise à compléter les outils traditionnels de la politique monétaire en agissant sur les facteurs structurels qui contribuent à l'accumulation de vulnérabilités au sein du système financier. Ces évolutions s'inscrivent dans un contexte marqué par l'émergence d'un "cycle financier mondial" (Rey, 2015), une dynamique intégrée qui structure les flux de capitaux, l'endettement global et la transmission des politiques monétaires à l'échelle internationale. Ce phénomène souligne l'interdépendance croissante des économies et la nécessité d'une coordination renforcée entre les autorités monétaires, les institutions multilatérales et les régulateurs financiers nationaux, pour assurer la stabilité du système dans son ensemble.

Le renforcement progressif et généralisé de la régulation macro-prudentielle

La prise de conscience précoce de la dimension systémique des crises financières avait entraîné, dès la fin des années 1990, un renforcement continu des dispositifs de surveillance et de régulation. Ainsi, en 1999, à la suite des crises latino-américaines puis asiatiques, le Fonds monétaire international (FMI) a inauguré son Financial Sector Assessment Program (FSAP). Ce programme effectue des

diagnostics approfondis de la résilience des secteurs financiers et cartographie leurs vulnérabilités, en les assortissant de stress tests et de recommandations visant à améliorer les cadres réglementaires (Iornenge, 2024). Cette initiative témoigne de la volonté des institutions internationales de promouvoir une approche plus globale et proactive de la stabilité financière, en identifiant les risques potentiels et en encourageant les réformes nécessaires. Depuis la crise financière mondiale de 2007-2008, la stabilité financière est également redevenue une préoccupation majeure des banques centrales. Ces dernières ont pris conscience de la nécessité d'intégrer les considérations de stabilité financière dans la conduite de leur politique monétaire et de renforcer leur coordination avec les autorités de régulation et de supervision.

L'effondrement du marché des subprimes et la faillite de grandes institutions financières ont démontré à quel point des déséquilibres financiers peuvent se propager très rapidement à l'économie réelle, engendrant récessions, hausse de la volatilité des marchés et tensions sur les finances publiques. Face à ce constat, les banques centrales ont élargi leur mandat pour y faire figurer explicitement la prévention des risques systémiques (Blinder, 2010). Cette évolution marque un tournant dans la conception du rôle des banques centrales, qui ne se limite plus à la seule stabilité des prix, mais s'étend désormais à la prévention des risques systémiques et à la promotion de la résilience du système financier dans son ensemble. Dans le même temps, le FMI a franchi une étape supplémentaire en 2012 en légitimant, aux côtés des instruments macroprudentiels, le recours à des mesures temporaires de régulation des flux de capitaux. Ces mesures sont spécifiquement conçues pour atténuer les épisodes de *sudden stop*—arrêts brusques des entrées de capitaux susceptibles de fragiliser la stabilité financière. Ce tournant constitue une rupture nette avec l'approche du Consensus de Washington, qui préconisait jusqu'alors la libéralisation intégrale du compte de capital (Ghosh *et al.*, 2020).

Sur le plan national, les initiatives se sont multipliées pour s'adapter à cette nouvelle donne. Aux États-Unis, la loi Dodd-Frank de 2010 a institué le Financial Stability Oversight Council (FSOC), chargé d'identifier et d'atténuer les vulnérabilités systémiques. De même, au Royaume-Uni, la réforme de 2013 a confié à la Banque d'Angleterre la responsabilité explicite de veiller à la stabilité financière. Cette réforme a également créé un Financial Policy Committee, doté d'un arsenal macroprudentiel comprenant des coussins contracycliques de capital, des plafonds prêt-valeur et des outils de contrôle du levier financier, afin de freiner l'accumulation de risques. Dans la zone euro, des initiatives ont également été

prises pour renforcer la stabilité financière au niveau supranational. Le Comité européen du risque systémique (CERS), créé en 2010, coordonne la surveillance des déséquilibres financiers à l'échelle européenne. Par ailleurs, l'Union bancaire, mise en place en 2014, a établi un mécanisme de surveillance unique, renforçant ainsi la cohérence et l'efficacité de la supervision bancaire dans la zone euro.

Ces différentes initiatives, tant aux États-Unis qu'en Europe, témoignent de la volonté des autorités nationales et supranationales de se doter d'outils et de structures adaptés pour prévenir et gérer les risques systémiques. Elles illustrent également l'importance croissante accordée à la coordination et à la coopération entre les différents acteurs de la régulation financière, afin de promouvoir une approche plus globale et intégrée de la stabilité financière. En effet, dans un contexte de financiarisation croissante, le risque systémique ne se limite plus au seul secteur bancaire. Les compagnies d'assurance, les fonds de pension et les gestionnaires d'actifs peuvent également déclencher des phénomènes de contagion (Borio, 2014; Cerutti *et al.*, 2017). L'intervention de l'État américain pour sauver la compagnie American International Group (AIG) en 2009, alors première compagnie d'assurance mondiale, illustre cette fragilité. La situation d'AIG était liée à son exposition massive aux contrats sur le risque de défaut (*credit default swaps*) envers d'autres intermédiaires financiers (Sjostrom, 2009). La régulation a aussi été étendue aux acteurs non bancaires et aux marchés de capitaux. L'intermédiation financière non-bancairee ou *shadow banking* est désormais soumise à des normes prudentielles et de liquidité, tandis que les stress tests sont généralisés pour évaluer la résilience des institutions systémiques et, le cas échéant, renforcer leurs fonds propres (Marcelo *et al.*, 2008). Ces mesures visent à prévenir l'accumulation de risques dans des zones moins régulées du système financier et à assurer une surveillance plus complète et cohérente de l'ensemble des acteurs susceptibles de présenter un risque systémique.

Face à ces nouveaux enjeux, deux réformes d'envergure ont été menées. D'une part, les accords de Bâle III, adoptés sous l'impulsion du Conseil de stabilité financière et du G20, ont opéré un tournant macroprudentiel. Ces accords ont renforcé les ratios de capital, institué des coussins contracycliques et introduit les ratios de liquidité LCR (Liquidity Coverage Ratio) et NSFR (Net Stable Funding Ratio), afin de maîtriser l'effet de levier et de prévenir les tensions de trésorerie. D'autre part, Solvency II, le cadre assurantiel européen inspiré de Bâle III, est entré en vigueur en 2016. Ce dispositif impose aux compagnies d'assurance des normes de solvabilité et de liquidité équivalentes à celles des banques. Il s'appuie

sur une supervision fondée sur la pondération des risques, intégrant les corrélations et les effets de diversification (Gatzert et Wesker, 2012). Ces deux réformes complémentaires visent à renforcer la résilience des institutions financières face aux chocs économiques et à limiter la propagation des risques au reste de l'économie mondiale.

L'ensemble de ces évolutions traduit un changement de paradigme : la stabilité financière, longtemps cantonnée à une dimension nationale et basée sur la surveillance d'institutions individuelles, est désormais considérée dans une perspective systémique et transfrontalière. Cette nouvelle approche oblige à concevoir des outils plus sophistiqués et à renforcer la coopération au niveau des banques centrales et des institutions financières internationales. En effet, les interactions entre les politiques monétaires des grandes économies peuvent générer des déséquilibres financiers internationaux imprévus. L'exemple du *taper tantrum* de mai 2013 en témoigne : l'annonce par la Réserve fédérale américaine de la réduction de ses rachats d'actifs a provoqué une brusque remontée des rendements obligataires et des sorties massives de capitaux des marchés émergents, illustrant la rapidité de la contagion des chocs monétaires à l'échelle mondiale (Adrian *et al.*, 2019).

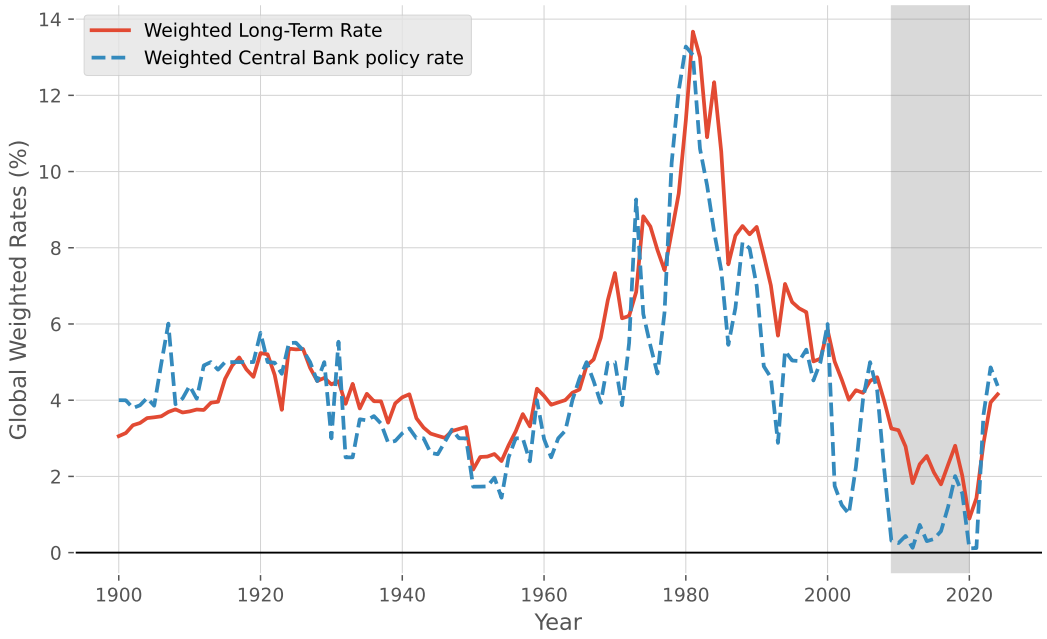
Les effets des politiques non conventionnelle sur les acteurs financiers non bancaires

La décennie post-crise 2007-2008 a confronté les économies avancées, en particulier européennes, à un phénomène inédit cumulant inflation anémique, taux d'intérêt planchers et croissance atone. Cette "nouvelle stagnation séculaire", conceptualisée par Summers (2014), remet en question l'efficacité des instruments monétaires conventionnels pour concilier plein-emploi, croissance et stabilité financière. Si la crise du COVID-19 a rompu ce cycle par une reprise synchronisée mondiale et un pic inflationniste en 2022, des forces structurelles sous-jacentes—vieillissement démographique (European Commission, 2021) et productivité atone (Goldin *et al.*, 2024)—continuent de comprimer les taux d'intérêt naturels à long terme, laissant planer l'ombre d'un possible retour aux rendements modestes.

L'évolution des taux depuis 1900 (cf. Figure 1) révèle que l'environnement actuel ne trouve d'équivalent historique que durant la Seconde Guerre mondiale, période caractérisée par l'instauration de mécanismes de contrôle des taux destinés à financer l'effort militaire (Toma, 1992). Le Japon constitue un laboratoire précurseur : confronté à la borne du zéro dès les années 1990, l'archipel a plongé

dans la déflation, illustrant parfaitement le phénomène de "trappe à liquidité" théorisé par Krugman (2000). Pionnière des politiques non-conventionnelles, la Banque du Japon a adopté la politique de taux zéro dès 1999 avant d'inaugurer un ambitieux programme d'assouplissement quantitatif en 2001 (Kuroda, 2016).

Figure 1: *Taux d'intérêts pondérés au niveau mondial, 1900-2023*



Note: Taux à long terme (rendement des obligations d'État à 10 ans) et taux directeurs des banques centrales, pondérés par la part de chaque pays dans le PIB mondial en dollars, issus de la Global MacroDatabase (Müller *et al.*, 2025)

Si l'injection de liquidités par les banques centrales en période de crise est aujourd'hui un principe établi, les taux d'intérêt bas génèrent aussi des effets pervers, qui peuvent compromettre cette stabilité : une quête effrénée de rendement (*reach for yield*) précipitant les investisseurs vers des actifs plus risqués et un assouplissement des conditions de financement à l'égard des projets les moins rentables. L'épisode américain de 2003 à 2007 illustre parfaitement cette dynamique, qui a largement nourri la bulle immobilière (Taylor, 2007). De nombreuses études mettent en évidence l'érosion de l'efficacité de la politique monétaire dans cet environnement de taux bas : réactivité limitée de l'offre de crédit (Borio et Gambacorta, 2017), effets négatifs amplifiés sur la profitabilité des banques (Claessens *et al.*, 2018), multiplication d'entreprises "zombies", dont les dettes sont systématiquement reconduites plutôt qu'apurées, détournant des ressources au détriment du financement d'entreprises plus productives (Banerjee et Hofmann, 2018).

Le **Chapitre 1** enrichit la littérature consacrée aux conséquences de la période

de taux bas consécutive à la crise financière de 2007-2008. Là où les recherches antérieures privilégiaient l'analyse du canal bancaire de transmission monétaire, notre étude explore un territoire largement inexploré : celui des intermédiaires financiers non bancaires, en accordant une attention particulière au secteur assurantiel. L'écosystème français de l'assurance vie—cinquième marché mondial et deuxième européen—offre un cas d'étude idéal pour décrypter ces mécanismes. En scrutant les trajectoires des 31 principaux assureurs vie opérant sur le territoire national durant la décennie 2009-2018, nous disséquons méthodiquement l'impact durable d'un environnement de taux historiquement bas sur leurs équilibres financiers.

L'approche économétrique mobilisée repose sur un modèle en panel avec effets fixes, intégrant une variable originale mesurant l'écart entre rendement des investissements et rendement garanti. Au-delà d'une analyse classique fondée sur la taille, nous démontrons que la transmission de la politique monétaire dépend principalement du modèle d'activité assurantiel. Selon Kablau et Wedow (2012), les assureurs vie sont vulnérables lorsque l'écart entre rendement d'actifs et taux minimum garanti devient insuffisant. Notre analyse révèle que les bancassureurs—au contraire des sociétés d'assurance traditionnelles et des mutuelles—maintiennent une rentabilité supérieure en ajustant plus rapidement les rendements offerts aux assurés, préservant ainsi leurs marges. Les stratégies d'allocation d'actifs montrent également une recherche de rendement via un recours accru aux unités de compte et des choix de provisionnement différenciés.

Ce chapitre apporte ainsi un éclairage original sur les tensions structurelles du secteur de l'assurance vie dans un contexte de taux durablement faibles, et souligne les risques systémiques potentiels liés à l'essor des conglomérats financiers. Il suggère la nécessité d'une régulation différenciée prenant en compte la diversité des modèles économiques afin de préserver la stabilité du secteur dans son ensemble. Cette hétérogénéité des réactions à la politique monétaire s'inscrit dans un contexte global où les effets monétaires transcendent les frontières nationales, comme le documentent Monnet et Puy (2019) et Bruno et Shin (2015), ainsi que le chapitre suivant.

Cycle financier mondial et politique monétaire hégémonique : le canal des transferts de fonds

La mondialisation financière a renforcé les interdépendances entre économies, créant un "cycle financier mondial" où appétit pour le risque, liquidité internationale, et orientations monétaires des grandes puissances, exercent une influence conjointe sur les marchés (Bruno et Shin, 2015; Rey, 2015; Miranda-Agrippino et Rey, 2020). Cette dimension transfrontalière est cruciale pour comprendre l'impact de la politique monétaire sur les dynamiques économiques globales. Les décisions des principales banques centrales, principalement la Fed, dépassent leurs frontières nationales : une baisse des taux d'intérêt ou un assouplissement quantitatif modifie les taux de change, façonne les marchés internationaux et redéfinit les flux de capitaux transfrontaliers. Les agents économiques ajustent alors leurs stratégies d'endettement, de placement et de gestion des risques, renforçant la synchronisation des marchés financiers au niveau mondial (Bruno et Shin, 2015; Rey, 2015).

Plusieurs épisodes illustrent cette dynamique : après la récession de 2001, les bas taux de la Fed ont favorisé l'endettement en dollars du reste du monde et multiplié les opérations de "carry trade", stratégie exploitant le différentiel de taux entre devises pour générer des profits à partir d'actifs offrant un rendement élevé (Bernanke, 2013; Taylor, 2007). Ces flux peuvent alimenter des bulles en phase d'expansion ou accentuer les vulnérabilités lors d'un resserrement (Lane, 2013). Cette co-variation du prix des actifs, du crédit et des conditions de financement confirme l'existence d'un cycle financier mondial limitant l'autonomie des banques centrales nationales (Rey, 2015). Si la littérature s'est concentrée sur les canaux classiques de transmission—crédit bancaire (Morais *et al.*, 2019), investissements de portefeuille et IDE (Cerutti *et al.*, 2019), le Chapitre 2 met en avant les transferts de fonds des migrants (Machasio et Tillmann, 2023). Ces transferts représentent parfois plus de 20% du PIB des pays bénéficiaires (Ratha *et al.*, 2023).

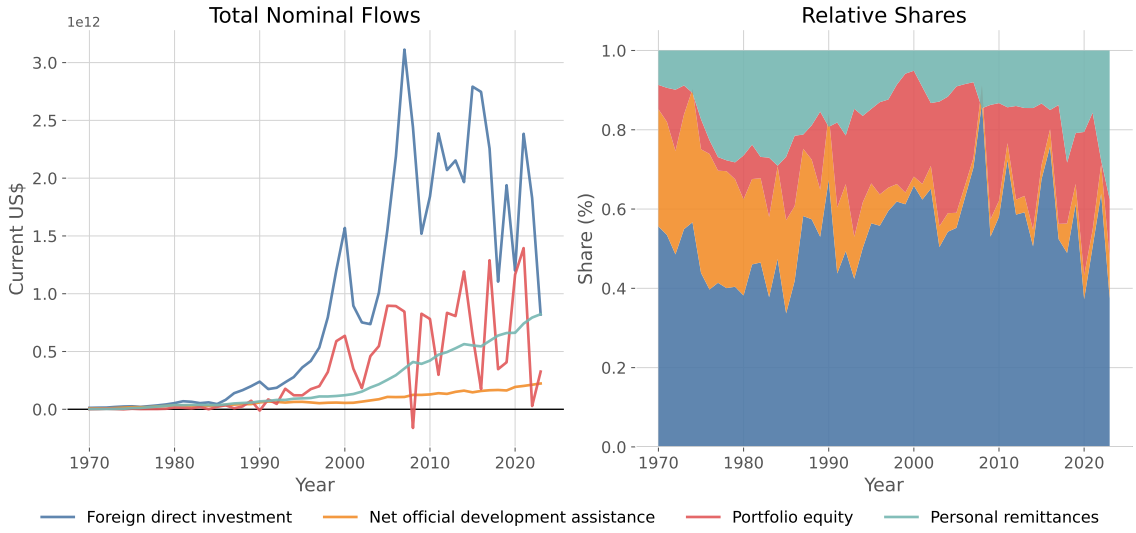
La Figure 2 illustre la répartition des différents flux de capitaux à l'échelle mondiale. Si les investissements directs à l'étranger (IDE) demeurent majoritaires (53,8 % en moyenne sur la période étudiée), la progression constante des migrations a porté, pour la première fois en 2023, les envois de fond au rang de premier flux le plus important (37,5 %), devant les autres composantes de capitaux internationaux. Cette évolution s'explique tant par un léger recul des IDE que par la multiplication de services de transfert à moindre coût. Par ailleurs, l'intensification attendue des migrations sous l'effet du changement climatique devrait continuer de renforcer le

poids de ces envois dans les décennies à venir (Kaczan et Orgill-Meyer, 2020).

Les travailleurs migrants sont particulièrement sensibles à la situation de l'emploi et aux niveaux de salaire dans leur pays d'accueil, si bien que leurs revenus fluctuent au rythme du cycle économique local. Or, leurs envois, souvent jugés relativement stables, peuvent tantôt exacerber la vulnérabilité d'une économie réceptrice, tantôt en renforcer la résilience, selon le degré de dépendance aux remittances et la réaction de la politique économique domestique.

Au-delà des canaux traditionnels de transmission monétaire et financière, la mondialisation se manifeste aussi à travers les comportements agrégés de migrants, de ménages et de petites entreprises, dont les décisions collectives pèsent de façon non négligeable sur le cycle financier mondial.

Figure 2: *Flux de capitaux mondiaux, 1970-2023*



Note: Evolution en valeur nominale $US et en part des flux globaux des différents flux de capitaux entre 1970 et 2023. Source: World Bank Data. Noms des séries utilisées: Foreign direct investment, net inflows (BoP, current US$), Net official development assistance and official aid received (current US$), Portfolio equity, net inflows (BoP, current US$), Personal remittances, received (current US$).

C'est dans cette perspective que le **Chapitre 2** se penche sur l'évolution des transferts des migrants, en tant que composante à part entière du cycle financier international, et examine leurs conséquences pour la stabilité macrofinancière des économies émergentes et en développement. Plus précisément, ce chapitre étudie les répercussions transfrontalières de la politique monétaire américaine sur ces transferts. À l'aide de données couvrant huit pays émetteurs et quarante et un pays bénéficiaires de ces transferts sur la période 1997-2017, nous estimons un modèle

basé sur la méthode des projections locales (Jordà, 2005) pour suivre la dynamique des *remittances* suite à un choc monétaire américain non anticipé.

Nous montrons qu'un resserrement monétaire dans les pays émetteurs réduit les envois de fonds, confirmant la procyclicité des transferts (Rapoport et Docquier, 2006). Du côté des pays bénéficiaires, la réaction dépend du degré de dépendance aux transferts : dans les États faiblement ou modérément dépendants, les flux entrants augmentent après un choc récessif—témoignant de motifs altruistes ou d'un mécanisme d'assurance—tandis que dans les pays très dépendants, les transferts diminuent, comportement davantage guidé par l'intérêt personnel ou l'allocation de capitaux à des fins d'investissement. Nous montrons que cette hétérogénéité s'explique par la composition des diasporas : les migrants issus des pays très dépendant, majoritairement peu qualifiés, effectuent des transferts de fonds fortement procycliques, alors que les diasporas des États moins dépendants sont plus diversifiées et qualifiées, capables de mobiliser une épargne excédentaire pour stabiliser les flux.

Ces *spillovers* asymétriques des politiques monétaires révèlent la capacité des flux privés à synchroniser les cycles économiques et à moduler les tensions macrofinancières. L'arsenal macroprudentiel conventionnel, malgré sa robustesse, peine à saisir pleinement ces dynamiques transfrontalières : ainsi, une contraction des *remittances* peut forcer une banque centrale à durcir sa politique monétaire pour défendre sa devise, amplifiant paradoxalement les effets récessifs initiaux. Face à cette complexité, les organisations internationales ont élargi leur mandat au-delà de l'assistance financière, plaçant la surveillance au cœur de leur action. Le troisième chapitre examine le rôle de ces institutions dans la prévention des désordres financiers et la diffusion d'informations publiques.

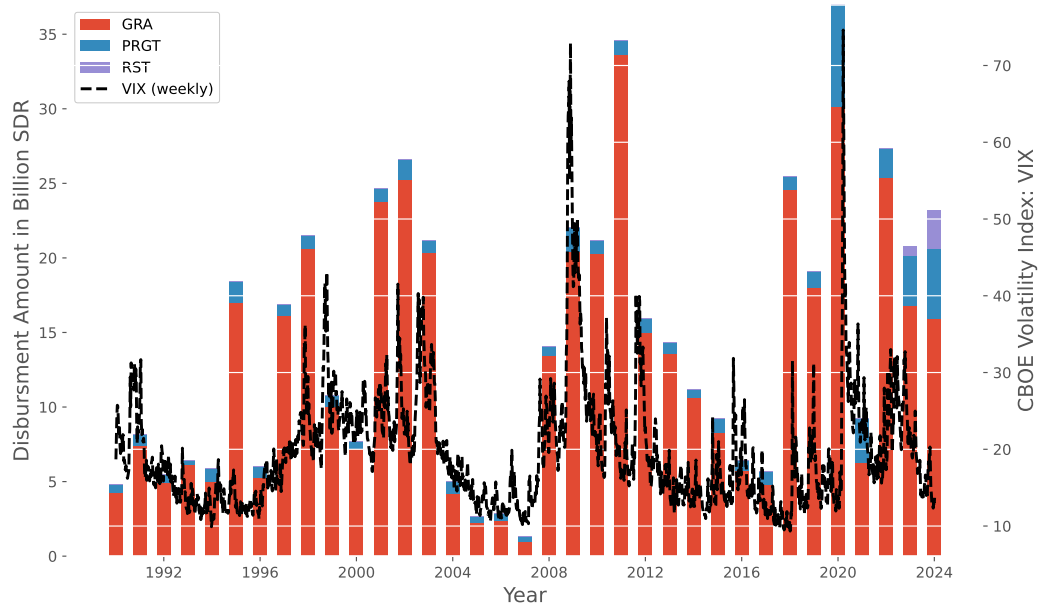
Surveillance multilatérale et stabilité financière : le rôle informationnel du FMI

Dans une économie mondialisée, la stabilité financière dépasse le cadre national (Obstfeld, 2015). Depuis Bretton Woods, le FMI s'est imposé comme gardien de cette stabilité, son mandat évoluant de la régulation des changes fixes vers une surveillance macroéconomique plus large (Lombardi et Woods, 2008). En période d'incertitude, l'asymétrie d'information paralyse les marchés et freine l'allocation des capitaux (Mishkin, 1999). C'est alors que le FMI intervient, débloquant des ressources pour soutenir les pays en difficulté—qu'il s'agisse de faillites souveraines

ou de mobilisation de financements face à un ralentissement économique. La Figure 3 illustre la corrélation entre les pics de volatilité (VIX) et les décaissements du FMI lors des crises asiatique et russe, de la crise financière mondiale de 2007-2008 et de la crise sanitaire de 2020, confirmant son rôle de prêteur en dernier ressort.

Parmi ses instruments, les droits de tirage spéciaux (DTS) renforcent la liquidité mondiale sans conditionnalité. Créés en 1969, ils ont connu quatre allocations, dont celle de 2009 qui a fourni 100 milliards de dollars aux économies émergentes et en développement, augmentant leurs réserves internationales de 20% en moyenne (Ahluwalia *et al.*, 2024). Au-delà du soutien financier, le FMI identifie en amont les vulnérabilités économiques potentielles. Son rapport de 2003 (IMF, 2003) souligne ce mandat de surveillance, incarnant le concept de *soft law* dans la gouvernance économique internationale : non contraignant mais influent, favorisant la coopération tout en préservant la souveraineté des États (Gold, 1983). La participation aux processus de surveillance mis en œuvre par des institutions telles que le FMI ou l'OMC relève d'une responsabilité inhérente à l'appartenance plutôt que d'une obligation juridiquement contraignante.

Figure 3: *Décaissements des programmes du FMI et instabilité financière, 1990–2024*



Note: Le graphique à barres empilées illustre la répartition des décaissements des ressources du FMI en milliards de SDR selon différentes catégories : le GRA (General Resources Account), le PRGT (Poverty Reduction and Growth Account) et le RST (Resilience and Sustainability Trust), introduit en 2023. Le VIX mesure l'anticipation hebdomadaire du marché quant à la volatilité à court terme. Sources : FMI et FRED St Louis.

Ces instruments permettent aux organisations internationales d'orienter efficacement les politiques nationales, favorisant la coopération sans recourir à des

mécanismes de contrainte lourds. Malgré son caractère non contraignant, la *soft law* produit des effets réels, par exemple via l'exclusion de prêts en cas de non-respect ou grâce à l'impact réputationnel du mécanisme de "naming and shaming" (Terman et Voeten, 2018). Ainsi, la fonction de surveillance de l'architecture économique mondiale joue à la fois un rôle de veille et un levier de convergence des politiques, contribuant à la gouvernance économique globale. La capacité d'influence du *soft law* du FMI s'inscrit dans deux grands courants théoriques en relations internationales. Selon l'approche rationaliste-institutionnaliste, la simple publication de rapports et la mise en place d'une surveillance multilatérale créent un espace d'information partagé qui rapproche les anticipations des États et des acteurs financiers, favorisant ainsi un climat de coopération analogue à un équilibre de Nash (Drezner, 2002). À l'inverse, les théories constructivistes soulignent que l'impact du FMI tient avant tout à sa faculté à façonner les discours et les normes nationales : c'est la légitimité normative véhiculée par ses évaluations qui amène gouvernements et marchés à ajuster leurs comportements (Goldstein et Keohane, 1993).

Pourtant, dès la fin des années 1990, et de façon plus prononcée après la crise financière de 2008, le rôle du FMI dans la gouvernance multilatérale a été sérieusement remis en question. Deux évolutions majeures en expliquent la remise en cause : d'une part, malgré leur forte croissance économique et démographique, la Chine, l'Inde et d'autres pays du Sud global n'ont pas vu leur poids décisionnel augmenter à proportion dans les institutions internationales, ce qui les a conduits à créer des coalitions alternatives—notamment les BRICS—pour s'affirmer face à l'ordre international dominé par les États-Unis. D'autre part, de nombreux États emprunteurs ont manifesté une forte réticence vis-à-vis des programmes de conditionnalité du FMI, jugée trop contraignante et imposée par des économies avancées elles-mêmes dispensées de ces mêmes réformes (Buira, 2005). Parallèlement, l'économie politique des organisations multilatérales a mis en lumière plusieurs biais institutionnels : l'octroi des prêts y répondrait parfois à des priori-tés géopolitiques plus qu'à des critères économiques objectifs (Dreher *et al.*, 2009), la sévérité des conditions imposées varierait selon les affinités politiques (Stone, 2012), et les prévisions du FMI font l'objet de critiques quant à leur fiabilité, en particulier pour les économies émergentes où peu d'autres institutions offrent des diagnostics indépendants (Dreher *et al.*, 2008). Dans ce contexte, la crédibilité et la transparence de l'institution sont déterminantes pour l'efficacité de son "pouvoir d'information".

Cette influence s'exerce notamment via les consultations au titre de l'Article IV, aboutissant à des communiqués officiels (PIN) qui synthétisent les conclusions. Ces publications font du FMI un "certificateur" auprès des investisseurs internationaux, affectant la perception du risque souverain, particulièrement pour les économies émergentes dépendantes des marchés de dette extérieure (Edwards, 2018).

Pour mesurer empiriquement cette capacité d'influence, le **Chapitre 3** mobilise un panel mensuel couvrant 67 pays émergents et en développement sur la période 2004–2023. Cet échantillon, varié tant sur les plans macroéconomique que géopolitique, permet de tester la robustesse des effets des PIN dans des contextes différents au travers de leur effet sur les spreads souverains et l'emission de dette étrangère. Chaque PIN, daté au mois près, est conçu comme un choc informationnel susceptible de modifier instantanément la perception du risque souverain. Afin d'isoler l'impact causal de ces publications, nous recourons à une méthode d'appariement dynamique à traitements répétés fondée sur l'approche en doubles différences proposée par Imai *et al.* (2023). Pour chaque pays traité à la date de diffusion d'un PIN, nous constituons un groupe de comparaison dont les trajectoires préalables (sur le plan des indicateurs macroéconomiques et institutionnels) sont similaires. Cette approche neutralise l'effet des chocs globaux et permet d'estimer de façon fiable l'effet moyen des PIN sur la formation des primes de risque et les conditions de financement externe.

Les résultats montrent que la publication d'un PIN entraîne une baisse significative des spreads et une augmentation des émissions de dette souveraine dès le mois de diffusion. Ces effets sont renforcés lorsque le ton du communiqué est positif et lorsque le pays bénéficie d'un ancrage géopolitique étroit avec les États-Unis, soulignant l'importance conjointe de la tonalité et de la crédibilité institutionnelle pour déclencher une réaction favorable des investisseurs. Indépendamment de son rôle de prêteur, le FMI exerce un effet informationnel d'ampleur sur les marchés de capitaux internationaux. En enrichissant la littérature sur le rôle des institutions financières internationales, ce chapitre montre que la surveillance et la diffusion d'informations publiques sont des leviers essentiels pour la formation du risque souverain et pour accompagner la stabilité financière mondiale.

En conjuguant ces trois volets, la thèse démontre qu'une approche holistique de la stabilité financière—alliant politique monétaire, régulation macro-prudentielle et coordination multilatérale—demeure indispensable pour prévenir les prochaines vagues d'instabilité systémique.

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CHAPTER I

Monetary Policy and Life Insurance Profitability: Bancassurance's Edge in a Low-Yield World*

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1. Introduction

In response to the 2007 financial crisis, central banks from advanced economies implemented unconventional monetary policies, including significant reductions in monetary policy rates coupled with asset purchase programs (APP) targeted mainly but not exclusively at government bonds.[1] By adjusting short-term interest rates, central banks aimed to "flatten" the yield curve, leading to a reduction in long-term interest rates by influencing market participants' expectations. This allowed governments to issue bonds with lower interest payments, increasing their fiscal flexibility and supporting the economic recovery (DeLong and Summers, 2012).

While there is widespread agreement that central banks' aggressive response at the early stage of the crisis was critical in preventing a financial and economic meltdown (Chailloux et al., 2008), concerns have mounted that the negative side effects of prolonged monetary accommodation may outweigh the net benefits after several years of implementation (e.g., Dale, 2012; Rajan, 2013). This is particularly true for banks and insurers, whose incentives and business models can be severely disrupted. The impact of monetary policy differs between life and non-life insurance due to their distinct operational dynamics. Life insurance is more sensitive to monetary policy changes because its liabilities have longer maturities, requiring insurers to match them with suitable long-term assets. In contrast, non-life insurance, such as property insurance, focuses on short-term coverage, relying on safer, short-term assets to cover potential losses. Consequently, life insurers are more vulnerable to fluctuations in interest rates than non-life insurers (Berdin et al., 2015).

Profitable insurance companies are an essential component of a stable financial system, acting as key players in financial intermediation. Life insurers, in particular, are fundamental in channeling household savings into the economy through their dominant participation in fixed-income markets. Sustaining robust profitability and solvency among life insurers is necessary for ensuring that savings are efficiently converted into productive investments, thereby supporting both economic growth and financial stability. Profits serve as a buffer against which insurance can write off underwriting losses and a source of funds for rebuilding capital should an insurance company incur significant losses. They also allow life insurers to attract outside

[1] Namely the central banks of the United States, United Kingdom, Japan, and euro area.

capital (Domanski et al., 2017).

Monetary policy affects life insurers through the mismatch between their long-term liabilities and shorter-term assets. In a low interest rate environment, returns on insurers' investments decrease, negatively impacting their profitability. Simultaneously, insurers are required to hold more capital to manage the risk of policy surrenders and comply with regulatory requirements that prevent excessive risk-taking. The combination of lower returns and higher capital requirements erodes life insurers' profitability (Trichet, 2005).

The decline in guaranteed rates of life insurance policies in France and Europe can be attributed to the low interest rate environment. Guaranteed policies, which are the cornerstone of life insurance, provide a minimum return regardless of market performance. Although this return is typically lower than insurers' investment yields, low interest rates can reverse this spread, making it difficult for insurers to maintain profitability. Insurers are reluctant to further reduce their offered yields to avoid policyholder surrenders, which exacerbates the issue. To mitigate the potential impact of the low-yield environment, regulators and insurers have implemented various measures, such as promoting the distribution of unit-linked (non-guaranteed) policies, facilitated by new legislation like the "loi Pacte" enacted in France in 2019 (Guiguet-Schielé, 2019), committing to reducing guaranteed rates and diversifying their portfolios (Löfvendahl and Yong, 2017).

This paper examines the impact of the low interest rate environment on French life insurers by analyzing the sources of heterogeneity in the transmission of monetary policy. The French insurance market serves as a representative case study, offering unique insights into the European market. Despite the strong fragmentation and diverse range of players across Europe, the French market stands out for its distinctive characteristics. As the second largest market in Europe after the United Kingdom (Boissin et al., 2013), the French market is particularly interesting to examine the effects on profitability. Its net investment spread—the difference between the yield of the French 10-year government bond and the average yield on guaranteed policies—remains remarkably close to zero, unlike other European counterparts. Furthermore, the share of guaranteed policies, which are the most vulnerable in a low-yield environment (EIOPA, 2020), is quite high in France, representing 70 percent of all premiums in 2015, compared to the EU weighted average of 51 percent. These distinctive features make the French market a valuable reference point for understanding the impact of low interest rates on life insurers.

Our contribution to the literature is twofold. First, we comprehensively analyze

the link between the low-yield environment and profitability, focusing on the life insurance sector. While this relationship has been extensively studied for the banking sector (Altavilla et al., 2018; Borio et al., 2017; Hack and Nicholls, 2021), research on the life insurance sector remains limited. We address this gap by drawing on a dataset that covers 31 life insurance companies headquartered in France for the period 2009-2018, using the overall return on assets (ROA) as a measure of profitability.

Second, we introduce a novel categorization framework for life insurers based on their distinct legal and business models. This framework includes *bancassurers*, which are financial conglomerates offering both banking and insurance services, traditional insurers that exclusively operate in the insurance sector as limited companies, and mutual insurance companies, which are non-profit entities without share capital.[2] Notably, non-bancassurers represent close to 60 percent of total life insurance assets over the period. Despite its inherent appeal, this aspect has been largely overlooked in empirical research, with previous studies primarily focusing on categorization based on insurer size (Pouvelle et al., 2022).

We show that these new categories play an important role in evaluating the impact of monetary policy on the life insurance market. For instance, a small company offering life insurance products may benefit from its association with a larger banking conglomerate—gaining easier access to clients, enhanced liquidity within the group, and a broader range of policies and investments. Overlooking these factors can lead to an incomplete understanding of how the low-yield environment is reshaping the market.

This study employs panel data econometrics to investigate the impact of monetary policy on the profitability of French life insurers. The analysis reveals mixed evidence, which can be attributed to the heterogeneity within the sample. By introducing a novel categorization of life insurers, it becomes clear that monetary policy significantly influences *non-bancassurance* players, including limited insurance companies and mutual insurers.

Furthermore, the study reveals new insights into how insurers' characteristics, such as portfolio choices, premiums, and reserve adequacy, affect their profitability. The findings indicate marked differences among insurers, which are reshaping the life insurance market. In particular, *bancassurance* companies leverage the low-

[2] Mutual insurance companies should not be confused with health mutuals, which are governed by a separate legal framework, the Mutuality Code.

interest environment to lower guaranteed rates while expanding their market share. The results offer new perspectives on how monetary policy affects market power dynamics and highlight potential risks to financial stability due to the growing interconnectedness of financial conglomerates (Duval et al., 2021).

The remainder of the paper is structured as follows. Section 2 examines the primary channels through which a low-yield environment affects life insurers' profitability and presents the accompanying empirical evidence. Section 3 provides an overview of the French life insurance market. Section 4 outlines stylized facts and describes the data used, followed by a discussion of the empirical strategy and testable hypotheses in Section 5. Section 6 presents the econometric results and the robustness tests. The conclusion emphasizes the main findings and their implications.

2. The impact of a low-yield environment on life insurers profitability

2.1. The channels at stake: insights from the literature

The 2007 financial crisis prompted central banks to significantly lower interest rates for an extended period, aiming to stimulate the economy and raise inflation expectations. However, the resulting low-yield environment did not favor all sectors equally, with the financial sector being particularly affected. The business models of both banks and insurance companies are highly sensitive to interest rate changes, as their assets and liabilities are directly influenced by monetary policy (Berends et al., 2013).

Banks, for instance, rely on the interest rate spread between their liabilities (deposits) and assets (loans). As the adjustment speed is lower for deposits than for loans, a decrease in interest rates compresses banks' net interest margins (Wang, 2020). The negative effects of a protracted period of low interest rates become more pronounced over time (Altavilla et al., 2018). Similarly, Borio et al. (2017) highlight that the low rate environment's negative impact on bank profitability outweighs the positive effects of increased provisions and valuation gains.

Despite the similarities in the impact of the low-yield environment on banks and insurers, there are several key differences between these financial intermediaries. Banks have access to central bank liquidity, while insurers do not. Additionally, banks manage long-term assets with short-term liabilities, whereas insurers handle

shorter-term assets with longer-term liabilities. Finally, banks primarily focus on lending activities, while insurers invest mainly in bonds and other capital markets assets (Argimon et al., 2019).

The "income channel" is the primary mechanism through which the low-yield environment affects the profitability of life insurers. Life insurers' assets typically have shorter maturities than their liabilities, resulting in a duration mismatch. As a consequence, when maturing assets are reinvested at lower yields, life insurers' investment income progressively decreases (Claeys and Darvas, 2015). Across European life insurance companies, the average liability is 4.21 years longer than the average asset, with French life insurance companies slightly above the average, exhibiting a duration mismatch of 4.82 years (EIOPA, 2014).

Reinvestment risk poses a significant challenge for life insurers, as newer investments often have lower yields. To maintain profitability, companies are forced to adjust the returns they offer, which can make policies less attractive to policyholders. This, in turn, creates a risk of policy surrenders, as policyholders may seek higher returns elsewhere.[3]

A company's business model determines its level of vulnerability to the income channel. Insurers that have sold policies with built-in guarantees promising a minimum return throughout the duration of the policies are more severely impacted, as these guarantees reduce their profit margins. Consequently, insurers with a smaller proportion of unit-linked contracts and those with higher guaranteed rates and longer contract maturities are the most vulnerable to the effects of the low-yield environment (EIOPA, 2019, 2020). This vulnerability is evident in the case of European insurers with a higher share of liabilities with minimum return guarantees in 2016, which experienced lower stock returns during the COVID-19 crisis (Koijen and Yogo, 2022).

Due to the lack of firm-level data, studies have often relied on the stock returns of life insurance companies to measure the impact of monetary policy on profitability (Hartley et al., 2016). This "top-down" approach assumes that lower profits are reflected in lower stock prices, as stock analysts and rating agencies consider the interest rate sensitivity of an insurer's liabilities. However, this method has limitations. First, it only includes publicly traded companies, introducing a selection bias. Second, stock returns do not fully capture a company's financial

[3] Interestingly, empirical evidence suggests that during low-yield periods, policyholders are less likely to surrender their policies, which accelerates the negative duration gap (Berends et al., 2013).

performance, as they are also influenced by the overall performance of the national stock market where the company is listed. This introduces a large home bias, even though large life insurance companies may operate in multiple markets.

Furthermore, Domanski et al. (2017) suggest that life insurers pursued a "hunt for duration" strategy in response to the low-yield environment. This strategy involved increasing their acquisition of bonds with longer maturities, mainly sovereign bonds. The increased demand for these bonds led to excess demand and subsequently lowered their yields, creating a vicious cycle that perpetuated the low-yield environment.

One measure for evaluating the impact of the low interest rate environment is the net investment spread, which is the difference between the 10-year sovereign bond yield and the national average guaranteed rate, as highlighted by Löfvendahl and Yong (2017).[4] Many life insurers in certain jurisdictions have struggled to meet the investment guarantees they promised policyholders. To ensure they can meet these guarantees, insurers can invest in government bonds with a duration similar to the underlying insurance contract.[5]

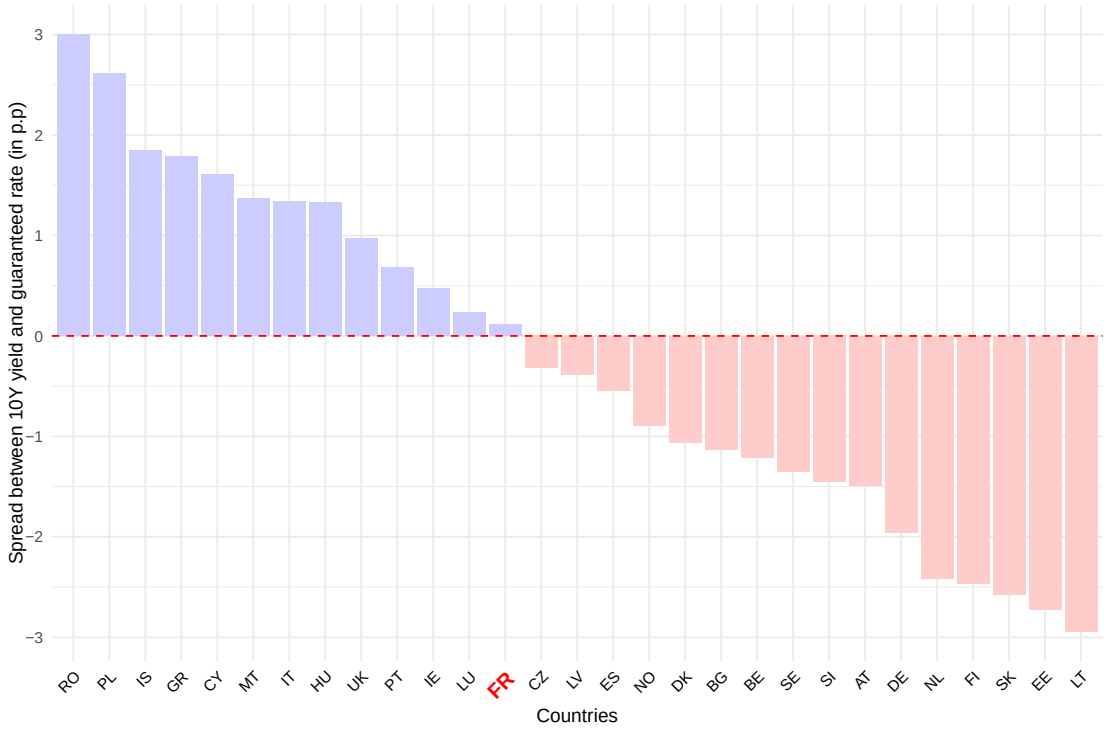
By adopting this investment approach, insurers can assess their ability to honor investment guarantees by comparing the yields they can earn from the reference government bond (10-year sovereign bond) with the guaranteed yield offered to policyholders. Figure 1 shows that in the 2017-2018 period, 15 out of 29 European countries reported a negative net investment spread, with France slightly above zero percent.

The income channel and its effects on insurers' profitability in the low-yield environment have been investigated in the literature. Berdin et al. (2015) demonstrate that lower long-term rates reduce insurance profitability across EU life insurance companies, while non-life insurance companies remain unaffected. Although this study is the only industry-wide empirical analysis across EU member states, cross-country comparisons remain challenging due to variations in business operations and significant differences in guarantee levels.

[4] The guaranteed rate offered by life insurance companies is the minimum yield that the insurer commits to pay on the policyholder's investment or savings component, regardless of market conditions.

[5] For France, the average duration of life insurance policies is 12 years, but it ranges from 5 to 15 years for the rest of the European countries.

Figure 1: *Net investment spread per EU country*



Note: Sample of 29 European countries overseen by EIOPA, including Iceland, Norway, and the UK. Each country's spread averaged for 2017-2018. Source: Data from https::/www.eiopa.europa.eu/tools-and-data/statistics-and-risk-dashboards/insurance-statistics (EIOPA) and ECB Statistical Data Warehouse.

The literature also emphasizes the "balance-sheet channel", which examines how interest rates affect insurers' solvency through valuation effects, potentially impacting profitability. Lower interest rates typically increase the values of both assets and liabilities. However, under Solvency II, liabilities tend to increase more than assets, particularly as fixed-term investments make up only a fraction of total liabilities. This dynamic increases capital ratios under Solvency II, but life insurers face challenges, as unrealized bond gains rise without a matching yield increase (Berdin et al., 2015).

Regulators have raised ongoing concerns about life insurers potentially engaging in "hunt for yield" behavior—allocating assets to riskier investments with lower credit ratings, reduced liquidity, or higher yields—in response to low interest rate environments (EIOPA, 2020; Boubaker et al., 2018). To mitigate this risk, regulatory frameworks like Solvency II have implemented risk-weighted capital requirements. These requirements aim to encourage diversification while discouraging investments in riskier, higher-yielding assets. Capital requirements serve a dual purpose: reducing the risk of insurer insolvency and maintaining market stability

by promoting diversified, balanced asset portfolios (Bijapur et al., 2007).

These regulations significantly influence insurers' investment decisions by (1) determining profit distribution to policyholders, and (2) establishing risk weightings for various asset categories. As a result, insurers may be incentivized to invest in lower-yield assets with favorable risk weightings, which frees up more reserve capital. Conversely, investments in higher-yielding corporate bonds or stocks are heavily penalized under solvency regulations.

A third indirect channel, known as the "economic activity channel," emerges from the broader economic effects of lower interest rates. Central banks typically lower rates to stimulate economic activity by encouraging borrowing and spending. This economic stimulus can indirectly benefit life insurers through a knock-on effect. As economic conditions improve, households generally experience higher disposable income and savings. This increase in savings often translates into greater demand for life insurance products. Consequently, life insurers may see an uptick in new premiums, potentially offsetting the low returns on their investment portfolios (Berends et al., 2013). Chebbi (2018) also notes that lower rates and unconventional monetary policy can enhance financial asset performance, prompting policyholders to shift toward unit-linked policies. This shift is supported by regulations offering incentives and flexibility for transitioning to non-guaranteed policies.

2.2. Evidence on firm size as a determinant of profitability

Having examined the primary channels through which monetary policy influences insurers' profitability, it is important to consider additional factors that modulate this impact on financial intermediaries, notably company size. Size has long been recognized as a significant determinant of profitability across various sectors, primarily due to the ability of larger entities to diversify and balance asymmetric shocks (Ehrmann, 2005; Thürwächter, 2022). In the financial sector, where companies are highly sensitive to interest rate changes, the effects of monetary policy can vary significantly depending on a firm's size.

To date, existing research has predominantly focused on the banking sector, revealing that institutional size can predict access to capital markets, diversification strategies, and risk-taking behaviors. These factors, in turn, either amplify or mitigate the effects of interest rate changes (Saona Hoffmann, 2011; Pham et al., 2021; Hack and Nicholls, 2021). Further evidence indicates that bank size influences monetary policy sensitivity. Larger banks appear more affected by interest rate changes during periods of loose monetary policy, while smaller banks exhibit

greater sensitivity under tight monetary policy regimes (Naqvi and Pungaliya, 2023). Meanwhile, research in the insurance sector has produced mixed results, with studies on the European market suggesting a complex relationship between company size and sensitivity to interest rate changes. Berdin et al. (2015) find that large life insurance companies' profitability remains largely unaffected by interest rate fluctuations. In contrast, smaller companies appear more vulnerable in a low-yield environment, primarily due to their less diversified portfolios and limited geographical scope. This vulnerability of smaller insurers can be attributed to their limited resources and reduced flexibility in managing interest rate fluctuations, which increases their susceptibility to financial stress.

However, the picture is not straightforward. Berends et al. (2013) present a contrasting view, noting that large life insurance firms face their own set of challenges. These larger entities often have more interest-rate-sensitive liabilities, a greater proportion of non-insurance assets, and face increased pressure from the stock market. These factors can potentially amplify the negative effects of a low-interest environment on larger insurers.

The impact of monetary policy on life insurance profitability is complicated by the growing link between bank and non-bank intermediaries and the rise of financial conglomerates. Size alone doesn't capture all factors; business models and legal structures may offer better insights. Decades of financial sector consolidations have led researchers and regulators to study the risks of conglomerates (Yoo, 2010). Van Lelyveld and Knot (2009) find that firms engaging in multiple activities are valued lower, while Amel et al. (2004); Montgomery et al. (2014) reveal evidence of diminishing scale returns over a certain size for financial intermediaries, compensated by increased market power.

The French market serves as an excellent case study due to the strong growth of financial conglomerates in its life insurance sector, known as "bancassurers"—banks operating in the life insurance industry—, and a significant share of guaranteed products. This environment underscores the need to consider factors beyond size to effectively understand the transmission of monetary policy on life insurers.

3. Segmentation-based transmission mechanisms

3.1. The French case study

France boasts one of the world's most developed insurance markets, ranking fifth globally and second in Europe—surpassed only by the UK—in terms of gross written premiums (GWP). The significance of life insurance in the French financial landscape is evident: in 2018, the outstanding value of life insurance policies represented a substantial 70 percent of French GDP, amounting to 1.7 trillion EUR. Within the broader financial system, the entire French insurance sector's assets accounted for 118 percent of GDP in 2018. While impressive, this figure is dwarfed by the banking sector, which was three times larger at 344 percent of GDP. However, life insurance has been gaining ground as the preferred savings vehicle for French households. The proportion of households holding life insurance policies has steadily increased from 35 percent in 2010 to 39.2 percent in 2018, establishing it as the primary savings choice (Fraysse et al., 2020).

The life insurance industry plays a key role in channeling household savings into investments. Despite a relative decline in the number of life insurance providers since 2014,from 93 to 83, the 20 largest firms now represent 89% of the market, up from 85% in 2011.

Since 2014, the number of life insurance providers—including those offering both life and non-life insurance—has steadily decreased from 93 to 83 companies in 2018. This decline reflects a broader consolidation process in the market, mirroring similar trends in the non-life sector. The consolidation's impact is evident in the concentration of market share: the twenty largest premium collectors now represent 89 percent of total premiums, up from 85 percent in 2011.[6]

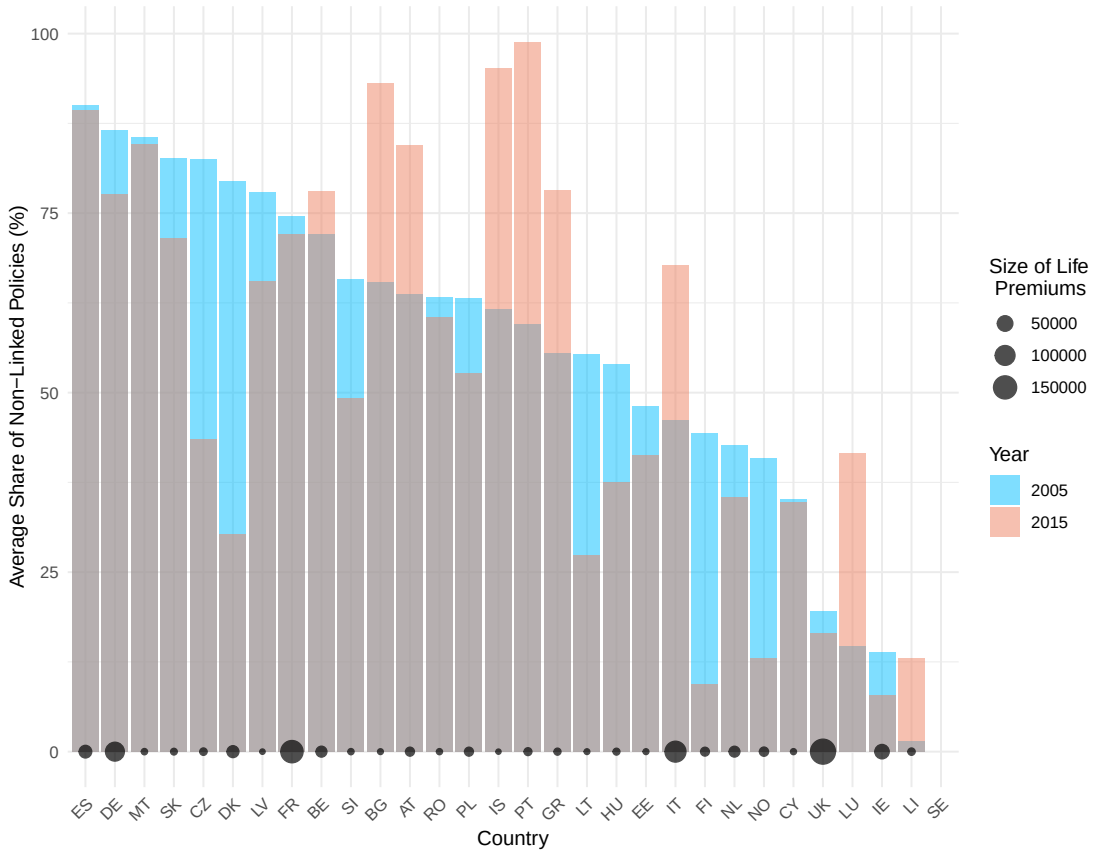
Euro-guaranteed contracts have emerged as a cornerstone of French household financial wealth, accounting for 40 percent of aggregate holdings in 2015 (Perdu and Marionnet, 2019). These contracts appeal to risk-averse policyholders, offering a savings plan with guaranteed capital and a minimum guaranteed return. The popularity of life insurance policies among French savers is further bolstered by attractive tax incentives. Investors enjoy tax relief on gains if they maintain their investment for at least four years, with even more substantial tax breaks after eight years.[7]

[6] In our 2009-2018 sample, the average HHI over the period stands at 892.

[7] The tax relief reduces the tax rate from 35 percent after five years to 7.5 percent after eight

Figure 2 illustrates a prevailing downtrend in the share of guaranteed policies across Europe, signaling a significant shift in consumer preference towards unit-linked policies. An analysis of the European sample, comprising 29 countries, reveals that 20 nations experienced a decline in the share of guaranteed policies between 2005 and 2015. Interestingly, France, where guaranteed policies remain the primary saving instrument for households, witnessed only a marginal decrease in the share from 74 percent to 72 percent. This trend highlights a widespread effort by life insurers throughout Europe to guide consumers away from guaranteed policies and towards unit-linked alternatives, reflecting a strategic realignment within the industry to adapt to changing market conditions and consumer demands.

Figure 2: *Share of guaranteed policies over total policies in the EU from 2005 to 2015*



Note: Data from 29 European countries (EIOPA oversight), including Iceland, Norway and UK. Share = guaranteed policies premiums / total gross written premiums. Sources: https://www.eiopa.europa.eu/tools-and-data/statistics-and-risk-dashboards/insurance-statistics, EIOPA and ECB Statistical Data Warehouse.

years.

In France, life insurers are mandated by the Insurance Code to distribute 85 percent of the financial surplus and 90 percent of the technical surplus to policyholders (Borel-Mathurin et al., 2018). The remaining portion can be allocated to the provision for deferred profit-sharing, which must be distributed within the next eight years. This mechanism allows life insurers to smooth the distribution to policyholders, mitigating the impact of poor financial performance. The ten-year sample covered in the article, spanning from 2009 to 2018, captures the full cycle of profit-sharing dynamics, as the average length of these contracts ranges from 8 to 12 years. This overview shows how life insurance in France serves not only as a major savings and investment avenue for individuals but also as a significant source of capital for the corporate sector and the broader economy.

3.2. The role of business model segmentation

Over the last few decades, *bancassurance* players have emerged as dominant forces in the European insurance industry. Bancassurance refers to the practice of distributing insurance products through banks or other financial institutions, capitalizing on the integration of banking and insurance services. This convergence has reshaped the European insurance landscape (Benoist, 2002), raising various questions regarding profitability, resilience, risk diversification, competition, and systemic risks. Bancassurers leverage their extensive customer base and distribution network by bundling insurance products with banking services such as loans, mortgages, or investment products. These advantages have propelled bancassurers to the forefront of the insurance industry, enabling them to capture a significant market share throughout Europe, as illustrated in Figure A.3 in the Appendix. According to (Pouvelle et al., 2022), the bancassurance model originated in France during the 1980s as a strategic response to the growing life insurance market, generating synergies for the distribution of life insurance products.

As the model gained prominence in Europe, the need for specific regulatory oversight became apparent. In response, the European Union introduced the Financial Conglomerates (FICO) directive in 2002. This directive outlines the identification criteria and rules governing the oversight of bancassurance-type players, ensuring that these entities are subject to appropriate regulatory requirements. To qualify for FICO status, three cumulative conditions must be met: (i) the head of the group must be a "regulated entity"; (ii) at least one entity within the group must belong to the insurance sector, and at least one other must belong to the banking sector; (iii) the consolidated or aggregated activities of the group in the insurance,

banking, and investment services sectors must be significant, with the ratio of the total balance sheet in the financial sector to the total balance sheet of the group surpassing 40 percent (Meyers and Ballegeer, 2003).

The FICO categorization, which recognizes the unique position of bancassurance players in the French life insurance market, is crucial for the next step of our empirical analysis. This analysis distinguishes bancassurance players from traditional S.A. insurance companies and mutual insurance companies, taking into account the distinct features and market dynamics associated with each category. By differentiating between these types of life insurance actors, the study can provide a more nuanced understanding of the French life insurance landscape and the role of financial conglomerates within it. This approach allows for a comprehensive examination of the performance, risk profiles, and competitive dynamics of each category, shedding light on the implications of the bancassurance model for the broader insurance industry.

In France, *bancassurance* players, consisting of insurance companies tied to large banking groups such as BNP Paribas Cardif, Crédit Agricole Assurances, Société Générale Assurances, or BPCE Vie, dominate the life insurance market. In 2018, these entities collectively held a 65 percent share of life insurance premiums, solidifying their position as the predominant type of life insurers in the French market. However, as Capitaine et al. (2019) points out, the net average revaluation rate served for *bancassurers'* policies is lower than the market average.[8] In 2018, *bancassurers* offered a net average rate of 1.93 percent, compared to the average market rate of 2.43 percent. This disparity has been growing steadily since 2011 when the average served rate was equal to the average market rate. *Bancassurers* leverage their integrated banking networks for policy distribution, enabling them to charge higher fees and offer lower revaluation rates while still being regulated under the French Insurance Code.

The second group comprises traditional life insurers, predominantly structured as limited companies (S.A.) and often publicly traded. These insurers, including notable firms like Axa, Allianz, Aviva, and Generali, provided a net average revaluation rate of 2.70 percent in 2018, consistently outperforming the market average over the past decade. Similar to *bancassurers*, they are governed by the Insurance Code, but insurance services constitute their core activities.

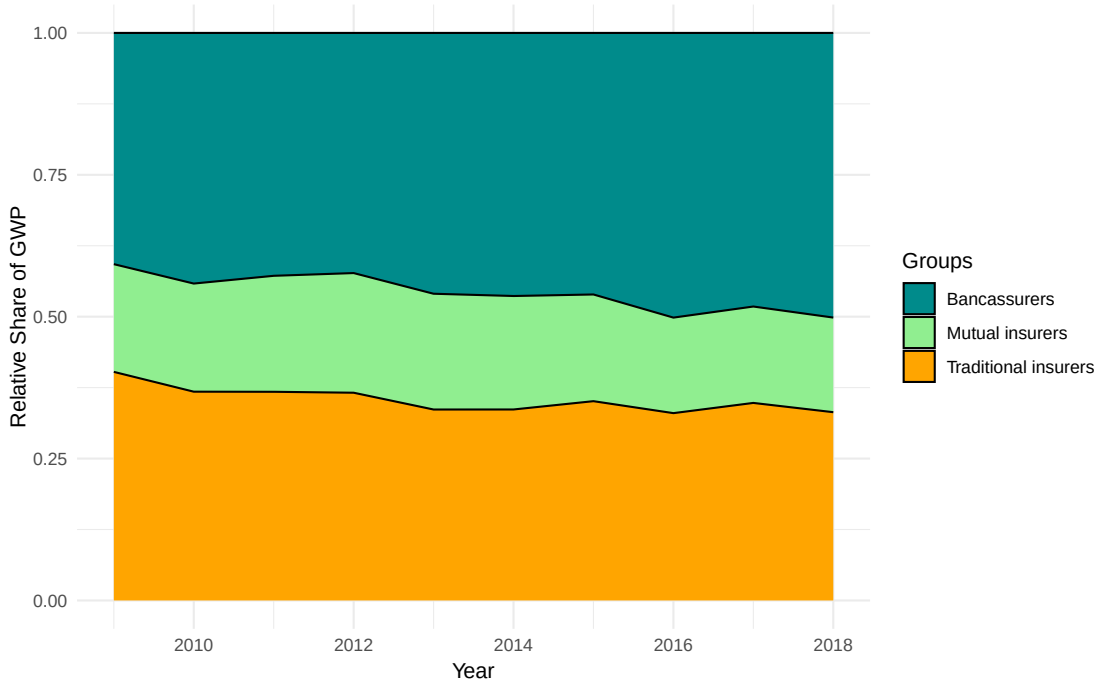
The third type of life insurance company operating in France is the mutual

[8] The net average revaluation rate is weighted by mathematical provisions.

life insurer. Mutual life insurers are non-profit organizations owned by their policyholders, setting them apart from traditional life insurers and *bancassurers*. Notable examples of French life mutuals include La Mondiale, AGPM, CARAC, and La France Mutualiste. These insurance companies typically boast stronger capitalization and maintain more prudent investment portfolios compared to their counterparts.[9]

Figure 3 illustrates the structural changes in the French life insurance sector over the last decade. *Bancassurers* have significantly increased their market share from 40% to nearly 45%, solidifying their dominant position in the industry. In contrast, S.A. insurance companies have experienced a decline, with their market share falling from 44% to 39%. Mutual companies have demonstrated remarkable stability, maintaining a consistent share of approximately 20% of total life insurance assets throughout the period.

Figure 3: *Concentration of life insurance industry in France*



Note: Sample of 31 French life insurers (2009-2018). A proportional stacked area chart shows the share of gross written premiums for each group. Source: Data from AMBest and annual reports.

Adopting a business model-centric perspective in the classification of life insur-

[9] Insurance companies governed by the Insurance Code but affiliated with property and casualty (P&C) groups often exhibit "mutualist behavior," allocating a larger share of investment returns to policyholders while opting for safer investment choices.

ance players offers a more insightful understanding of the industry compared to categorizing them solely by asset size. While asset size is an important factor, it fails to capture the distinct characteristics of the business models and regulatory frameworks that differentiate insurers such as *bancassurance* players, traditional S.A. insurance companies, and mutual insurance providers.

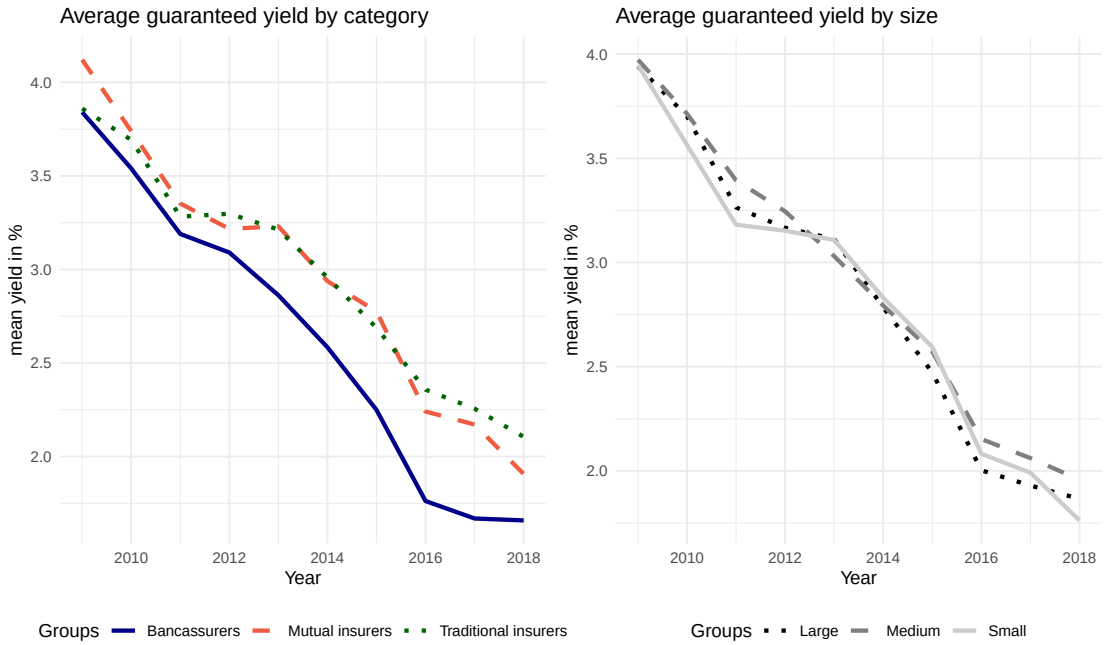
This business model-centric approach allows for a more granular analysis of the regulatory environment, competitive landscape, distribution strategies, and risk profiles associated with each type of player. By examining the industry through this lens, researchers can better understand the complex interplay between organizational structure, market dynamics, and regulatory frameworks that shape the life insurance sector. This perspective is particularly relevant when investigating topics such as market concentration, profitability drivers, product innovation, and regulatory compliance, as it enables a more targeted exploration of the factors that drive performance, innovation, and risk management within each category.

An analysis of the data reveals that current classifications of insurers, which primarily rely on size, fail to capture important differences between the various types of insurers. This leads to ambiguous and incomplete categorization. To address this issue, we propose to retain a division based on the legal framework and business model that better reflects the unique characteristics of each type of insurance, as highlighted by Figure 4.

The figure illustrates a clear downward trend in guaranteed rates across all life insurance players, a natural consequence of the persistent low-yield environment. Initially, both traditional insurers and *bancassurers* offered similar guaranteed rates on average, with mutual insurers providing slightly higher rates. However, over the observed period, *bancassurers* managed to reduce their guaranteed rates more swiftly while maintaining their market share. In contrast, traditional insurers demonstrated a more gradual reduction in their guaranteed rates. By the end of the period, traditional insurers' guaranteed rates were higher than those of mutual insurers. The right figure shows that the gap is not representative when considering the size of the life insurers, as it demonstrates homogeneous decreases across the sample. Despite variations in business models, the consistent downward trend in guaranteed rates is evident for all life insurers, irrespective of their size.

A business-model classification has the potential to improve the efficiency and accuracy of insurance industry analysis and enhance regulatory oversight. By taking into account the unique characteristics and challenges faced by each type of insurer, analysts and regulators can gain a more comprehensive understanding of

Figure 4: *Guaranteed yield heterogeneity: Legal vs. Size classifications*



Source: Individual insurers' financial statements and AM Best ratings data.

the industry's structure and dynamics beyond just asset size. This enables more targeted and effective decision-making, as it considers the distinct opportunities and risks associated with each category of insurance player.

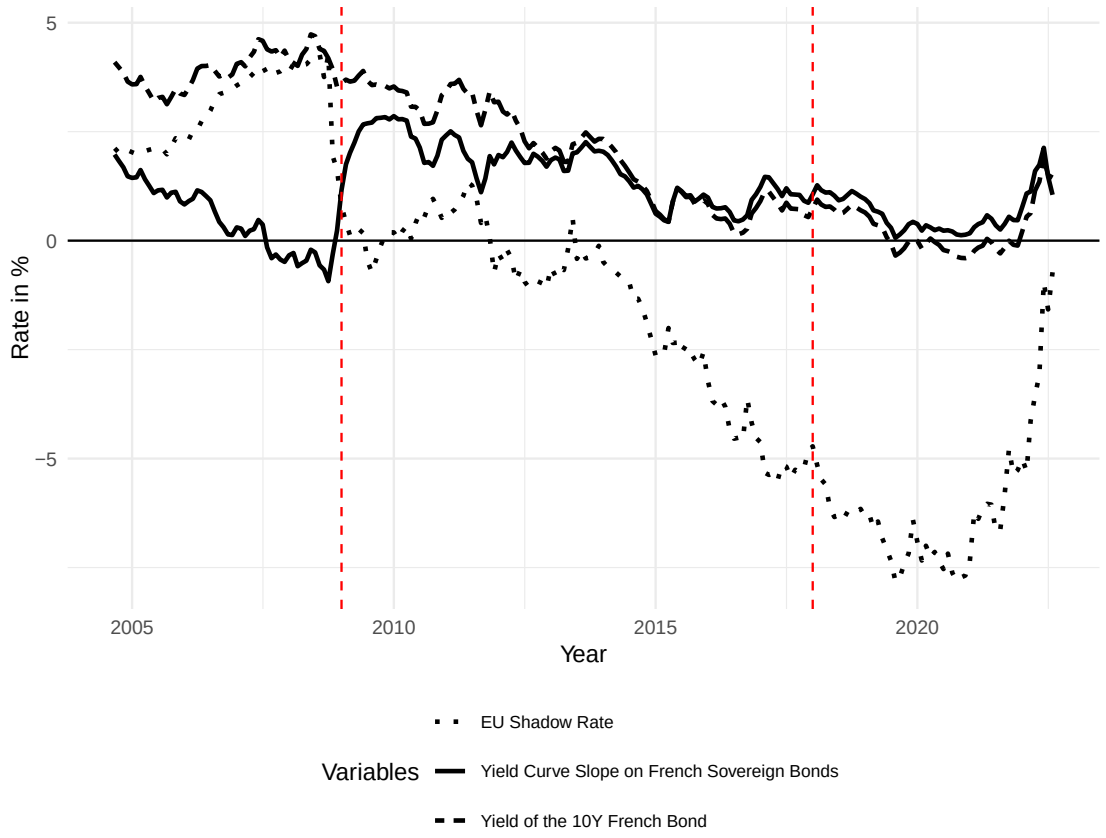
4. Data and stylized facts

The current section presents stylized facts about the French life insurance market and describes the data used in this analysis. The dataset consists of insurance-level information from AMBest, a credit rating agency. It includes balance sheet statements, annual reports, and Solvency and Financial Condition Reports (SFCR), focusing specifically on the life insurance branches of major companies operating in France. The sample spans a decade from 2009 to 2018, a period that covers the years following the Great Financial Crisis. During this time, interest rates decreased persistently, and the European Central Bank implemented unconventional monetary policy measures, as illustrated in Figure 5.

The final dataset comprises yearly information on 31 French life insurers, resulting in a total of 300 observations. These insurers collectively account for life written premiums totaling 144 billion EUR, which represents nearly 90 percent of total life gross written premiums in France. Each insurer in the sample has data

for at least 8 years. As shown in Annex A.1, the business model categories for the life insurance companies in the sample include 12 *bancassurers*, 7 limited (S.A.) companies, and 12 mutual insurance companies.[10]

Figure 5: *Low-yield environment, 2004-2022*



Note: Slope of the yield curve refers to the difference between 10-year and 3-month French sovereign bond yields. The dashed vertical lines delimitate the 2009-2018 study period. Source: the EU shadow rate is derived from Wu and Xia (2016).

Table 1 presents the descriptive statistics of the variables used in this study, revealing significant disparities among life insurers' individual characteristics. For example, the inter-quartile range (25th to 75th percentile) for bond holdings as a percentage of the non-linked investment portfolio spans from 73 to 88 percent. This finding is consistent with existing literature, which typically identifies bonds as the predominant asset in life insurers' portfolios.[11] The data also demonstrate considerable variability in portfolio composition. Equity holdings in the portfolios

[10] Missing data concerns the following insurers: BPCE Vie (2012 and 2016-2018), Assurance du Crédit Mutuel Nord Vie (2017-2018), Oradea Vie (2017-2018), AGPM (2017), and Associations Mutuelles Conservateur (2011-2012).

[11] Data derived from aggregated individual balance sheets.

range from 8% to nearly 20% (inter-quartile), while unit-linked policies constitute between 5% and 22.5% of total assets. These summary statistics highlight how life insurers use varied asset allocation strategies to balance risk and return.

Table 1: *Summary statistics*

Statistics	N	Mean	St. Dev.	25th Pctl	75th Pctl
Variables of interest					
Return on assets	300	3.72	3.74	1.80	4.70
Return on investments	302	3.55	1.72	2.90	4.34
Return on equity	300	7.64	6.95	4.80	10.11
Solvency I ratio	292	259.72	134.03	152.76	343.47
Monetary policy variables					
Yield on guaranteed funds	305	2.83	0.76	2.22	3.40
EU shadow rate	302	−1.80	2.25	−4.03	0.05
Yield curve slope	302	1.59	0.58	1.07	1.96
Individual features					
Share of bonds	302	79.69	12.64	72.91	88.06
Share of equities	302	15.34	11.18	7.98	19.35
Share of unit-linked investments	301	16.73	16.63	5.00	22.49
Net reserves ratio	291	11.48	4.33	8.77	13.52
Yearly growth in premiums	266	2.35	15.07	−5.94	10.72
Total assets	305	59,460.53	80,495.28	6,452	85,178

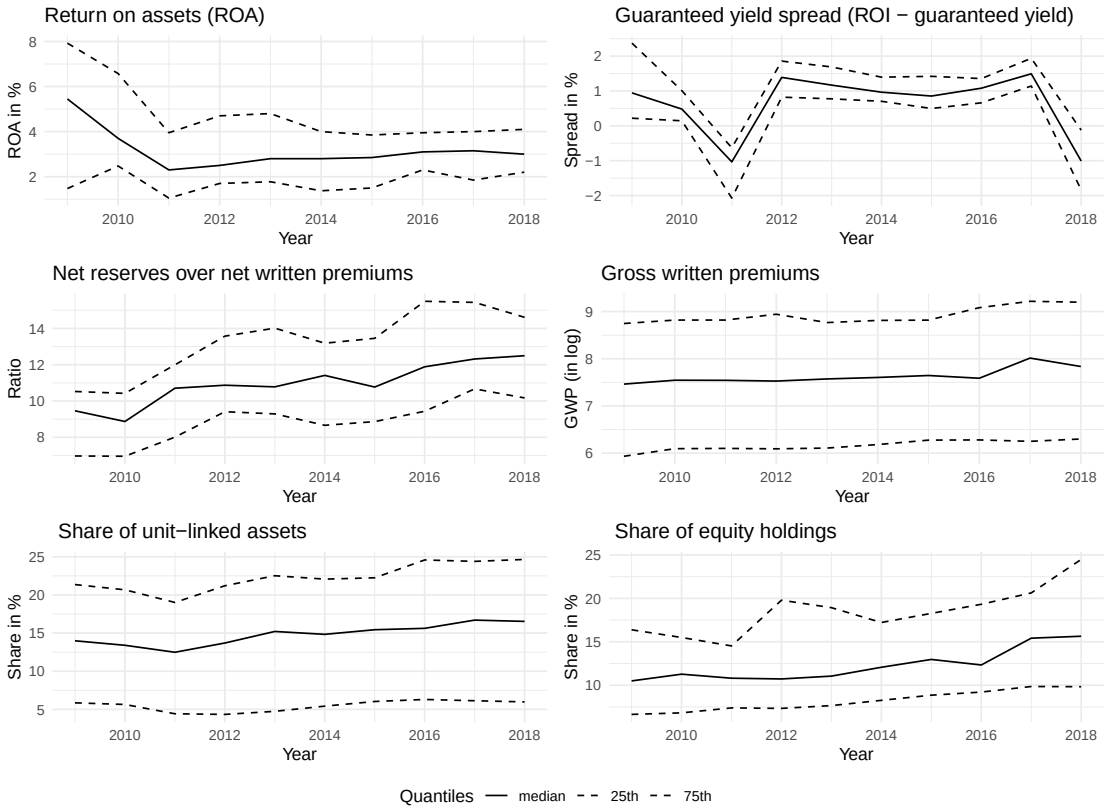
Note: N: number of observations; ROA, ROI, ROE, Solvency I ratio, Yield on guaranteed funds, EU shadow rate, Slope of the yield curve: in %; Share of bonds, equities, unit-linked investments: % of investment portfolio; Net reserves ratio: net reserves/net written premiums; Yearly growth in premiums: % change in written premiums.

Figure 6 illustrates the main trends among the industry's variables. Return on Assets (ROA), an indicator of profitability, declines steadily from 2009 to 2018. A pronounced drop occurs between 2009 and 2011, after which the values level off, though the dashed lines reveal considerable variation across percentiles. The Guaranteed Yield Spread—calculated as the difference between the Return on Investments (ROI) and the average guaranteed yield—fluctuates, with a marked decline in 2012, a subsequent recovery, and another drop between 2017 and 2018. Overall, the spread remains relatively stable or shows a slight decrease, possibly reflecting the varied influence of monetary policy via the income channel.

The figure also depicts the portfolio mix variables, revealing two significant trends. First, the steady share of unit-linked assets over the sample period suggests a consistent allocation of funds to these investment vehicles. However, the heterogeneity implies that different insurance companies may have varying levels of exposure to unit-linked assets, depending on their portfolio strategy. Second, the increasing trend in equity holdings indicates a rising preference for equity investments by insurance companies. This trend may be driven by the search

for higher returns in a low-interest-rate environment or the desire to diversify investment portfolios.

Figure 6: *Variables of interest*



Source: Individual insurers' balance sheet data, AMBest data for the 31 life insurance companies operating in France in the sample over the period 2009-2018.

5. Empirical strategy

5.1. Econometric framework

The baseline empirical model is estimated with the following regression:

$$Y_{it} = \alpha + \beta_1 \text{MP}_t + \beta_2 \text{GYS}_{it} + \beta_3 X_{it} + \omega_i + \gamma_t + \epsilon_{it} \tag{1}$$

where the i and t subscripts denote the spatial and temporal parameters of the panel, respectively and ϵ_{it} is the residual term. The dependent variable Y_{it} measures the profitability of entities using the *return on assets* (ROA).[12] MP_t denotes the *slope*

[12] ROA, calculated as the ratio of net profit to average assets over three years, is widely used by

of the yield curve, the difference between 10-year and 3-month French sovereign bond yields, controlling for unconventional monetary policy effects (Altavilla et al., 2018; Borio et al., 2017). For robustness, we also consider the *EU shadow rate* (Wu and Xia, 2016) as an alternative indicator for euro area unconventional monetary policy.

The *average yield on guaranteed policies*, used to compute the *guaranteed yield spread* GYS_{it}, is derived from web-scraping the yield of 127 guaranteed policies for the 31 life insurance companies in the sample over the period from 2009 to 2018, resulting in a total of 1,042 observations.[13] Consequently, GYS_{it} represents the average gap between the actual return of insurance companies on their investments, which includes unrealized gains and losses, and the yield allocated to policyholders.

The model accounts for life insurance characteristics by including a set of individual fixed effects ω_i, and a vector of time-varying, insurance-specific indicators X_{it}. These indicators are crucial for identifying factors that influence the profitability of life insurers (Kozak et al., 2011). The vector X_{it} comprises four key components:

(i) Premium evolution: This is measured as the natural logarithm of total gross written premiums in millions of euros (Malik, 2011).

(ii) Share of equities: This is calculated as the share of equity investments relative to bonds in guaranteed policy investments. It is a measure of the "hunt for yield" of life insurance companies throughout the period. [14]

(iii) Share of unit-linked assets: This is defined as unit-linked assets as a share of total assets. This variable takes into account the switch suggested by regulatory agencies to enhance the profitability of life insurers, as policyholders bear all the risk resulting from these investments.[15]

(iv) Net reserves over net written premiums ratio (NRNWP): This ratio serves as a proxy indicator of the solvency position and measures the risk aversion of

prudential authorities and in literature to monitor insurer and bank profitability (Altavilla et al., 2018; Borio et al., 2017; Berdin et al., 2015; Kwon and Wolfrom, 2017).

[13] The websites used for web-scraping were *L'Argus de l'assurance* and *Money Vox*, specialized insurance news providers listing the major policies and their yearly yields. We compute the average over the policies without missing observations for each year and insurer. The number of policies per insurer ranges from 1 to 14, with an average of 4.

[14] It has shown an increasing trend as life insurers diversify their portfolios. A positive coefficient is expected, as a higher share of equity holdings implies more remunerating higher-risk investments, which could boost profitability.

[15] A positive coefficient is expected for this variable, as insurers display net gains from these products with fees slightly higher than for guaranteed policies (CLCV, 2019).

each life insurer considering its reserves' policy. This variable accounts for the mathematical provisions kept by insurers to cover net written premiums.[16]

The decision to include time-fixed effects in the regression instead of macroeconomic control variables, such as inflation, real GDP growth, and the yearly return of the CAC 40 French stock index, was based on two considerations. First, including macroeconomic variables could lead to multicollinearity with the monetary policy variable. Second, given the limited number of observations available for the analysis, including additional variables would decrease the degrees of freedom, potentially reducing the statistical power of the regression. However, the robustness section provides an alternative specification that incorporates these macroeconomic control variables to validate the consistency of the results under different model assumptions. This approach ensures that the findings are not driven by the exclusion of relevant macroeconomic factors.

5.2. Testable hypotheses

The empirical analysis on the impact of the low-yield environment on life insurance companies in France explores several testable hypotheses derived from insights provided by Löfvendahl and Yong (2017), who surveyed life insurance companies and regulators. The study examines the potential measures that insurers and regulators may adopt in response to the low interest rate environment.

Regulators' feedback suggests that they are likely to impose higher capital requirements and demand higher technical provisions from life insurance companies. Life insurance companies usually focus on three key strategies to navigate the challenges posed by the low-yield environment. First, they consider lowering guaranteed interest rates on their policies to align with the current market conditions. Second, insurers aim to increase the diversification of their investment assets to mitigate the risks associated with low yields. Finally, life insurance companies encourage policyholders to surrender their guaranteed policies in favor of unit-linked policies, which transfer the investment risk to the policyholders.

The results from Löfvendahl and Yong (2017) provide a comprehensive framework for investigating the strategies and actions that insurers and regulators may implement in response to the low-yield environment. By controlling for macroeconomic conditions through time-fixed effects, several testable hypotheses emerge

[16] A negative coefficient is expected for this variable, as an increase in the ratio could imply a trade-off between risk aversion and profitability.

regarding the impact on life insurance companies' profitability:

(i) The guaranteed yield spread is expected to have a negative coefficient on the return on assets. This would indicate that reducing guaranteed yields enhances profitability.

(ii) Increasing asset diversification by raising the portfolio share of equities is anticipated to have a positive effect on the return on assets. Diversifying investments may help improve overall returns.

(iii) A negative relationship is expected between the increase in the net reserves ratio, which serves as a proxy measure of capital requirements, and the return on assets. Higher capital requirements may constrain insurers' ability to generate profits.

(iv) The share of unit-linked assets is hypothesized to have a positive relationship with profitability. The risk transfer to policyholders eliminates the obligation for insurers to provide guaranteed yields on these policies, allowing them to benefit from reduced risk exposure.

Testing these hypotheses empirically will provide valuable insights into the effectiveness of the strategies adopted by life insurance companies and the impact of regulatory measures on their profitability in the low-yield environment.

5.3. Econometric considerations

The common econometric issues of heteroskedasticity, and autocorrelation associated with panel data are addressed by using robust standard errors (MacKinnon and White, 1985).[17] To determine the most appropriate specification for the models, the Hausman test (Hausman, 1978) and the Breusch-Pagan Lagrangian Multiplier test (Breusch and Pagan, 1980) are conducted. These tests favor the use of a fixed effects (FE) model for determining the profitability of life insurers, which is in line with the previous literature on the subject.

One possible identification problem in the analysis of life insurance profitability is endogeneity, as the profitability of insurers could impact the balance sheet items listed above and influence monetary policy. To minimize potential endogeneity issues, Pearson correlation coefficients between the variables are calculated (see Annex A.2), with all coefficients remaining below 0.3. Furthermore, the Variance

[17] As the time dimension is low ($T = 10$), the possible unit root in the series is ignored. In short periods, trends are usually confirmed, although it is not necessarily the case for the longer term. Collinearity is also examined through Table A.2 in the Appendix.

Inflation Factor (VIF) values of the regression coefficients are checked, and none exceeds 1.3, indicating a satisfactory level.[18]

The banking sector literature has eagerly relied on dynamic System Generalized Method of Moments (S-GMM) panel methodologies (Blundell and Bond, 1998) to address endogeneity issues. However, this specification has been shown to produce biased estimation results when examining reduced samples. Moreover, the endogeneity problem may be less severe due to the sample's characteristics. Although aggregate life insurance industry conditions could influence monetary policy decisions by affecting long-term yields through portfolio switches to sovereign bonds, focusing on a benchmark market, such as the French life insurance market, diminishes the likelihood of observing a significant impact on monetary policy decisions. Furthermore, insurers' investments in both domestic and foreign assets further mitigate this risk.

6. Estimation results

6.1. Benchmark results

The results presented in Table 2 for the simple specification (1) discussed earlier do not reveal a discernible impact of monetary policy on the profitability (ROA) of life insurers, considering both the slope of the yield curve and EU shadow rate variables and accounting for the full set of variables. This suggests that the relationship between monetary policy and profitability is not apparent when considering only these variables, indicating potential heterogeneity across insurers. However, one noteworthy finding is the negative relationship observed between the share of equity holdings variable and the ROA. The coefficient estimates suggest that an increase in equity holdings has a detrimental effect on the performance of life insurers, contrary to the existing literature. This finding aligns with the risk-based Solvency II regulation, which imposes a 39 percent risk charge on capital requirements for equities investments in the European Economic Area (EEA) and 49 percent for non-EEA equities (OECD, 2015).[19] These additional capital requirements can reduce the available capital for further investments in other products such as

[18] More specifically, the VIF values are as follows: Slope of the yield curve 1.11, Share of equities 1.18, Net reserves ratio 1.22, Total gross written premiums 1.13, Share of unit-linked assets 1.1.

[19] According to the 2017 annual report of the French Insurance Association, sovereign bonds have no additional capital requirements (0 percent), while corporate bonds, with an A rating and a 5-year maturity, generally require an additional 7 percent in capital.

bonds and weigh on overall profitability. The ambiguous effects and non-significant coefficients in the initial regressions may be explained by heterogeneity among the life insurers in the sample (Berdin et al., 2015).

Table 2: *Benchmark regressions results - Return on Assets*

	ROA and Yield curve slope			ROA and EU shadow rate		
	(1)	(2)	(3)	(4)	(5)	(6)
Yield curve slope	2.59***	0.56	0.69			
	(0.86)	(0.70)	(0.77)			
EU shadow rate				0.58***	0.13	0.15
				(0.19)	(0.16)	(0.17)
Share of equities		−0.21***	−0.17**		−0.21***	−0.17**
		(0.07)	(0.06)		(0.07)	(0.06)
Net reserves ratio		−0.10	−0.10		−0.10	−0.10
		(0.06)	(0.06)		(0.06)	(0.06)
Log gross written premiums		−3.10***	−2.79***		−3.10***	−2.79***
		(0.76)	(0.94)		(0.76)	(0.94)
Share of unit linked policies		0.02	0.02		0.02	0.02
		(0.09)	(0.09)		(0.09)	(0.09)
Guaranteed yield spread			−0.13			−0.13
			(0.16)			(0.16)
Constant	0.47	38.77***	34.52***	6.70***	40.11***	36.17***
	(1.29)	(8.91)	(10.55)	(0.96)	(8.47)	(9.65)
FE	YES	YES	YES	YES	YES	YES
TE	YES	YES	YES	YES	YES	YES
Num. obs.	300	291	287	300	291	287
R^2 (full model)	0.48	0.54	0.51	0.48	0.54	0.51
Adj. R^2 (full model)	0.41	0.46	0.43	0.41	0.46	0.43

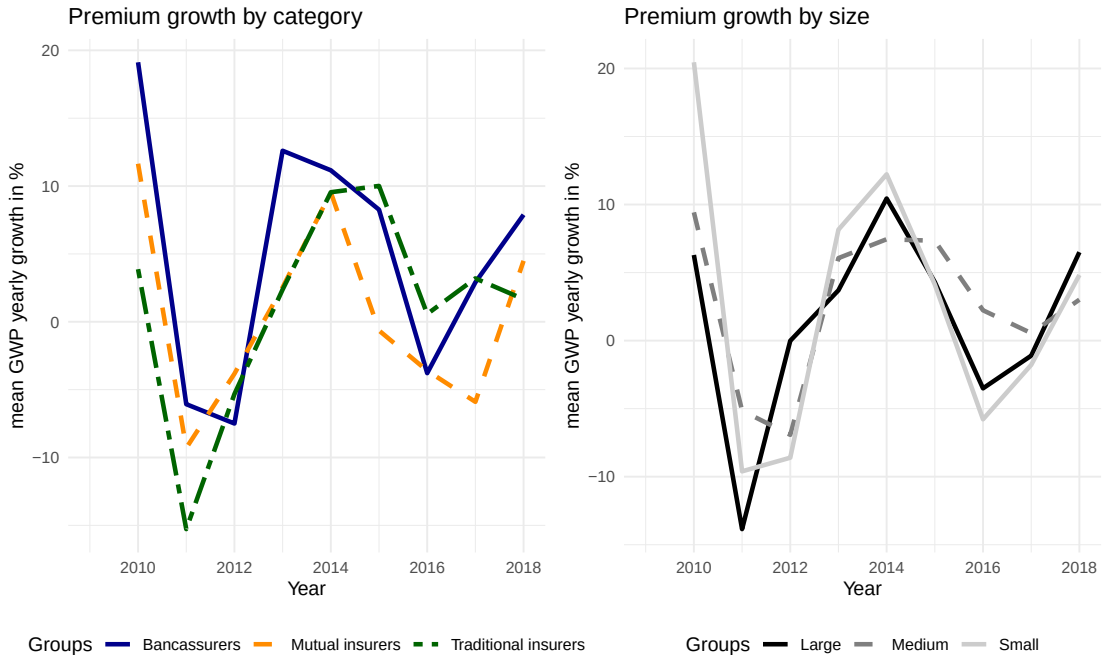
Note: $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$. Robust standard errors are reported in parentheses.

6.2. Heterogeneity results

While size has traditionally been the primary measure of heterogeneity in the literature for bank and non-bank financial intermediaries, our data reveal significant differences in monetary policy transmission within the life insurance sector when considering business model categories. Figures 4 and 7 illustrate the sample's heterogeneity using the legal classification, focusing on the guaranteed yield spread and premium growth. These figures highlight the competitive advantage of *bancassurers*, who experience the highest premium increases while simultaneously lowering their guaranteed rates more rapidly than competitors. This discrepancy,

not adequately captured by insurer size alone, serves as the primary rationale for implementing an alternative classification.[20]

Figure 7: *Premium growth heterogeneity: Legal vs. Size classifications*



Note: Sample of 31 life insurance companies operating in France for the period 2009-2018.
Source: Data extracted from AMBest and individual annual reports.

Table 3 examines the impact of insurer classification on profitability in the low-yield environment. The panel regressions incorporate dummy variables based on the business model categories, along with individual and time fixed effects. Column (1) confirms the ambiguous influence of the slope of the yield curve on overall profitability when controlling for insurer-specific variables. Subsequent regressions introduce interactions with different insurer classifications, enriching our understanding of sector-specific responses to monetary policy shifts. The dummy category coefficients are significant across all specifications, underscoring the relevance of the legal classification.

[20] Size categories are determined by ranking insurers by average asset size and dividing them into terciles, ensuring equal sample sizes. Annex A.4 illustrates the heterogeneity across the full set of variables.

Table 3: *Benchmark heterogeneous regressions results - Return on Assets*

	(1)	(2)	(3)	(4)
Yield curve slope	0.56	1.15	−0.06	0.61
	(0.70)	(0.79)	(0.68)	(0.73)
Log gross written premiums	−3.10***	−3.18***	−3.25***	−3.11***
	(0.76)	(0.78)	(0.77)	(0.76)
Share of equities	−0.21***	−0.21***	−0.21***	−0.21***
	(0.07)	(0.07)	(0.07)	(0.07)
Net reserves ratio	−0.10	−0.09	−0.10	−0.10
	(0.06)	(0.06)	(0.06)	(0.06)
Share of unit-linked policies	0.02	0.06	0.02	0.01
	(0.09)	(0.09)	(0.09)	(0.09)
Bancassurer dummy		13.46**		
		(5.93)		
Yield curve slope * Bancassurer dummy		−1.41**		
		(0.59)		
Mutual dummy			−14.81**	
			(5.85)	
Yield curve slope * Mutual dummy			1.53**	
			(0.72)	
SA dummy				−12.33***
				(3.66)
Yield curve slope * SA dummy				−0.31
				(0.61)
Constant	38.77***	26.72***	41.33***	38.97***
	(8.91)	(6.12)	(9.09)	(8.90)
FE	*YES*	*YES*	*YES*	*YES*
TE	*YES*	*YES*	*YES*	*YES*
Num. obs.	291	291	291	291
R^2 (full model)	0.54	0.55	0.55	0.54

Note: $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$. Robust standard errors are reported in parentheses.

Notably, being a bancassurer increases ROA by 13 basis points, while it decreases by 14 and 12 basis points for mutual and traditional SA insurers, respectively. By interacting the monetary policy variable (slope of the yield curve) with categorical dummies, we disentangle insurer-specific characteristics:

1. The interaction with the Bancassurer dummy suggests a mitigated effect of monetary policy on profitability, implying dampened sensitivity to interest rate changes.
2. Conversely, the interaction with the Mutual insurer dummy amplifies the effect, indicating that monetary policy easing significantly enhances profitability for mutual insurers.
3. The interaction effect for the S.A. insurer dummy remains statistically non-significant. This suggests that the overall effect across S.A. insurers does not

follow any specific category-wise trend.

Additionally, we verified the results using categorization by size, finding that none of the interaction coefficients yield significant results, further confirming the validity of the business model categories (see Table A.3 in Annex).

While business model categories offer valuable insights, other factors like portfolio allocation (equities vs. bonds), unit-linked policies, the guaranteed yield spread, and the net reserves ratio significantly shape how monetary policy impacts profitability. These variables are key to understanding how different insurers respond to monetary policy and the rise of the bancassurance model. Bancassurers, with more diverse portfolios and stronger financial integration, have greater flexibility and resilience to policy shifts, highlighting the importance of portfolio management in profitability analysis.

Table 4 presents findings on the legal classification while exploring the impact of individual features. The results reveal that monetary policy, measured by the slope of the yield curve, exerts a more pronounced effect on non-bancassurers, including traditional S.A. insurers and mutual insurers, showing a stronger association with their profitability compared to bancassurers. The guaranteed yield spread emerges as a crucial factor in shaping life insurers' profitability, with divergent effects across categories. Bancassurers exhibit a negative coefficient for this spread, indicating that a narrower gap between return on investments (ROI) and average guaranteed yield to policyholders positively impacts their profitability.

Mutual insurers show a positive coefficient, indicating that a lower spread negatively affects their profitability. These findings underscore the important role that the guaranteed yield spread plays in establishing competitive advantages among insurers. Notably, bancassurers seem better able to offer lower guaranteed rates while simultaneously expanding their market share. Ultimately, these outcomes demonstrate that monetary policy changes, variations in business models, and specific insurance-level features—such as the guaranteed yield spread—collectively drive differences in profitability and the competitive landscape within the life insurance industry.

Table 4: *Heterogeneous model results - Return on Assets*

	Bancassurers			Mutual insurers			SA insurers		
	(a)	(b)	(c)	(a)	(b)	(c)	(a)	(b)	(c)
Yield curve slope	1.15	1.18	1.28*	−0.06	0.06	0.05	0.61	0.97	0.21
	(0.79)	(0.89)	(0.76)	(0.68)	(0.75)	(0.60)	(0.73)	(0.81)	(0.73)
Log GWP	−3.18***	−3.10***	−3.95***	−3.25***	−3.15***	−3.61***	−3.11***	−3.12***	−3.37***
	(0.78)	(0.76)	(0.80)	(0.77)	(0.74)	(0.74)	(0.76)	(0.74)	(0.75)
Share of equities	−0.21***	−0.22***	−0.29***	−0.21***	−0.22***	−0.07	−0.21***	−0.21***	−0.22**
	(0.07)	(0.07)	(0.09)	(0.07)	(0.07)	(0.04)	(0.07)	(0.07)	(0.09)
NRNWP ratio	−0.09	−0.09	−0.10	−0.10	−0.10	−0.10**	−0.10	−0.10	−0.22
	(0.06)	(0.06)	(0.07)	(0.06)	(0.06)	(0.05)	(0.06)	(0.06)	(0.14)
Share of UL policies	0.06	0.05	0.17	0.02	0.00	−0.08	0.01	0.01	0.00
	(0.09)	(0.09)	(0.11)	(0.09)	(0.09)	(0.11)	(0.09)	(0.10)	(0.10)
Bancassurer dummy	13.46**	12.68**	18.69**						
	(5.93)	(5.82)	(7.65)						
Yield curve slope * Bancassurer	−1.41**	−1.35**	−1.00*						
	(0.59)	(0.56)	(0.57)						
GYS		0.31			−0.18			−0.22	
		(0.28)			(0.16)			(0.16)	
GYS * Bancassurer		−0.56**							
		(0.24)							
Share of equities * Bancassurer			0.32***						
			(0.10)						
NRNWP ratio * Bancassurer			−0.26**						
			(0.12)						
Share of UL policies * Bancassurer			−0.39***						
			(0.15)						
Mutual dummy				−14.81**	−14.56**	−7.33			
				(5.85)	(5.62)	(8.08)			
Yield curve slope * Mutual				1.53**	1.80**	0.82			
				(0.72)	(0.70)	(0.68)			
GYS * Mutual					1.27***				
					(0.48)				
Share of equities * Mutual						−0.29**			
						(0.11)			
NRNWP ratio * Mutual						−0.28			
						(0.23)			
Share of UL policies * Mutual						0.39*			
						(0.20)			
SA dummy							−12.33***	−12.28***	−17.69***
							(3.66)	(3.61)	(4.67)
Yield curve slope * SA							−0.31	−0.30	0.49
							(0.61)	(0.62)	(0.69)
GYS * SA								0.08	
								(0.20)	
Share of equities * SA									0.05
									(0.10)
NRNWP * SA									0.19
									(0.14)
Share of UL policies * SA									0.08
									(0.17)
Constant	26.72***	26.99***	32.20***	41.33***	40.63***	44.61***	38.97***	38.34***	43.67***
	(6.12)	(6.01)	(6.52)	(9.09)	(8.85)	(8.96)	(8.90)	(8.72)	(9.13)
FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
TE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Num. obs.	291	291	291	291	291	291	291	291	291
R^2 (full model)	0.55	0.56	0.59	0.55	0.58	0.59	0.54	0.54	0.55

Note: $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$. Robust standard errors are reported in parentheses.

The analysis shows that increasing equity holdings generally lowers insurer profitability. Across the different specifications, a larger equity share in an insurer's portfolio is linked to lower profitability—likely because holding more equities raises capital requirements and investment risks for life insurers. However, there is a notable exception: the interaction between the bancassurer indicator and the equity share is slightly positive and statistically significant. This suggests that bancassurers might actually benefit from higher exposure to equity markets. Their

advantage may stem from greater access to international equities, more diversified portfolios, and stronger risk management practices.

The interaction coefficients for the share of unit-linked policies reveal a clear difference between bancassurers and mutual insurers. For mutual insurers, a higher proportion of these non-guaranteed policies is linked to increased profitability. In contrast, bancassurers experience a decline in profitability when they expand their unit-linked offerings. This difference stems from bancassurers already holding a large number of unit-linked policies while relying on the lower yields of guaranteed policies as their competitive advantage. By shifting further toward unit-linked products, bancassurers reduce their guaranteed policy offerings, thereby weakening that advantage. Conversely, mutual insurers benefit from growing their unit-linked business, which leads to higher profitability in line with theoretical expectations.

In a surprising twist, the analysis also reveals that bancassurers actually benefit from reducing their Net reserves ratio—a strategy that differs from the approach taken by traditional S.A. and mutual insurers. Because bancassurers start with lower ratios, they can maintain a leaner solvency position relative to reserve requirements. This leaner position allows them to reallocate resources more efficiently and reduce their capital burden by taking advantage of intra-group transfers and advanced risk management techniques. In optimizing their reserves, bancassurers secure a competitive edge that distinguishes them in the market.

6.3. Robustness

To assess the robustness of our findings, we conducted additional tests. These included two alternative specifications that use different monetary policy variables, one specification incorporating macroeconomic controls, and another targeting an alternative measure of profitability.

Table A.5 in Appendix examines how unconventional monetary policy and the prolonged low-yield environment affect life insurer profitability, employing the EU shadow rate as an alternative monetary policy variable. The findings largely corroborate the previous results, with a notable negative coefficient for the interaction between the EU shadow rate and the bancassurer dummy, indicating that monetary policy has a negligible overall effect on bancassurers compared to other market participants. Furthermore, the interactions between the guaranteed yield spread and the business model dummies reveal clear differences: bancassurers show a significant negative effect, while mutual insurers exhibit a significant positive impact. This suggests that bancassurers are better equipped to thrive in a low-yield

setting.

In an additional robustness test, we account for the unexpected component of monetary policy by using the Altavilla et al. (2019) EA-MPD database. Specifically, we focus on the unexpected change in the 10-year French bond rate during the press release window. The results, presented in Table A.6 in Appendix, align closely with our benchmark findings, showing a heterogeneous transmission of monetary policy. Notably, the higher sensitivity of non-bancassurers' profitability to these shocks appears linked to their reduced flexibility in lowering guaranteed yields, which increases their vulnerability to interest rate fluctuations.

Although the main specification does not include macroeconomic variable controls, as these effects are captured through time fixed effects, we conduct an additional robustness check to account explicitly for these influences. We incorporate the real GDP growth rate, inflation rate, and CAC 40 index returns into the regression model. The results, presented in Table A.7 in Appendix, confirm the robustness of our findings. Specifically, the CAC 40 index returns exhibit a positive and statistically significant effect on the profitability of insurers, underscoring the relevance of market conditions.

Table A.8 in Appendix provides additional confirmation of these findings using an alternative profitability measure, the Return on Equity (ROE), which is widely used by regulators to assess the financial health of life insurance companies. The results reveal that monetary policy has a more pronounced impact on non-bancassurers and highlight the role of the guaranteed yield spread in the income channel. Additionally, a positive coefficient on the share of unit-linked assets among non-bancassurers suggests a potential lever for regulators to create a more balanced and competitive market.

7. Conclusion

The prolonged low-interest rate environment presents a range of complex challenges for life insurers. This study examines the French market, a choice motivated by its substantial size and representative characteristics, which include a high prevalence of traditional guaranteed policies, a net investment spread indicative of the European insurance sector, a significant bancassurance sector, and a diversified market structure. Unlike the banking sector, our findings show that overall monetary policy changes—reflected in the sovereign yield curve spread and the EU shadow rate—do not significantly affect the French life insurance industry as a whole.

However, when we segment the market based on their legal frameworks (bancassurers, traditional S.A. insurers, and mutual insurers), clear differences emerge. Using panel econometrics on 31 leading life insurers, we find that monetary policy impacts non-bancassurance firms more strongly. Bancassurers are less affected by the low-yield environment, which helps them grow their market share, underscoring the income channel's role in shaping profitability.

The second key contribution of this article is its insight into the mechanisms shaping the life insurance market. The findings highlight the central role played by guaranteed policies. Bancassurers gain an edge when the gap between their investment returns and guaranteed yields narrows, which improves their profitability. Their ability to offer lower guaranteed rates, leverage extensive banking networks, benefit from customer trust, access intra-group capital transfers, and maintain diversified portfolios reinforces their leading position. In contrast, higher reserve requirements tend to undermine the profitability of other insurers.

Based on these insights, the article highlights key priorities for regulators, stressing the need to account for the impact of monetary policy on the competitive landscape of the life insurance industry. The rise of financial conglomerates that merge insurance and banking activities poses systemic risks, as these institutions are more prone to risky behavior—evidenced by higher equity holdings and lower reserve requirements in bancassurer portfolios—while maintaining profitability. As a result, their consolidation could amplify economic cycles and reduce market competition.

To address these risks, regulators must closely monitor and implement appropriate measures. Supervisors should proactively prevent the bundling of banking and insurance products while promoting unit-linked policies. This can help rebalance competition, reduce the dominance of bancassurers, and foster a more diverse and resilient market. Enforcing stricter capital and liquidity standards would also reduce concentration risks and help institutions endure economic shocks. Moreover, regulators should encourage transparency and risk management practices to effectively identify and control systemic risks in areas where banking and insurance activities converge.

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Appendix

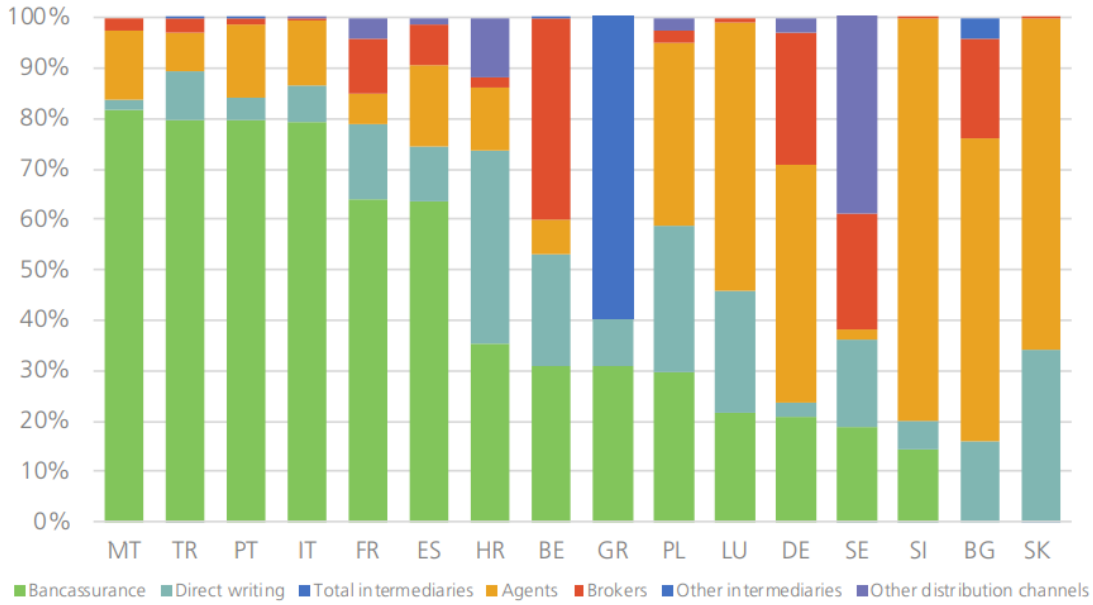
Table A.1: *Life insurance companies by category*

Company Name	Category
Credit Agricole	Bancassurer
Cardif Assurance Vie	Bancassurer
SOGECAP	Bancassurer
BPCE Vie	Bancassurer
Groupe des Assurances du Credit Mutuel	Bancassurer
Suravenir	Bancassurer
HSBC Vie France	Bancassurer
PREPAR Vie	Bancassurer
Neuflize Vie	Bancassurer
Assurances Credit Mutuel Nord Vie	Bancassurer
Oradea Vie	Bancassurer
AGEAS France	Bancassurer
CNP Assurances	SA Limited company
AXA France Vie	SA Limited company
Generali Vie SA France	SA Limited company
Allianz Vie	SA Limited company
Swisslife France	SA Limited company
Aviva Vie	SA Limited company
Unofi Assurances SA	SA Limited company
Mondiale Societe Asr Mutuelle sur la Vie	Mutual company
Groupama GAN Vie	Mutual company
Mutavie	Mutual company
MACSF Epargne Retraite	Mutual company
Parnasse MAIF	Mutual company
AGPM	Mutual company
CARAC Mutuelle d'Epargne Retraite Prevoyance	Mutual company
APICIL Epargne	Mutual company
CAPMA CAPMI	Mutual company
SAF BTP Vie	Mutual company
Monceau Retraite Epargne	Mutual company
Covea	Mutual company

Table A.2: *Correlation table*

	ROA	Yield curve slope	EU shadow rate	GYS	Share of equities	NRNWP	Total GWP	Share of UL assets
ROA	1.00	0.14	0.06	0.05	-0.03	0.04	0.15	-0.20
Yield curve slope		1.00	0.82	0.05	-0.16	-0.24	0.02	-0.07
EU shadow rate			1.00	0.06	-0.18	-0.24	-0.03	-0.07
GYS				1.00	-0.02	0.30	-0.02	0.11
Share of equities					1.00	0.30	-0.24	-0.11
NRNWP						1.00	-0.14	-0.21
Total GWP							1.00	-0.15
Share of UL assets								1.00

Figure A.3: *Distribution of life insurance policies by country (% of GWP)*



Source: Insurance Europe, Key Fact European insurance 2016 (2015 data). The data considers the distribution of life insurance policies through banking intermediaries, which do not always correspond to *bancassurance* players, as there can be agreements between actors to cooperate in the distribution of policies.

Table A.3: *Heterogeneous regressions results - Size categories*

	(1)	(2)	(3)	(4)
Yield curve slope	0.56	0.52	0.53	0.68
	(0.70)	(0.73)	(0.68)	(0.82)
Log gross written premiums	−3.10***	−3.10***	−3.07***	−3.07***
	(0.76)	(0.78)	(0.82)	(0.77)
Share of equities	−0.21***	−0.21***	−0.21***	−0.20***
	(0.07)	(0.07)	(0.07)	(0.08)
Net reserves ratio	−0.10	−0.10	−0.10	−0.10
	(0.06)	(0.06)	(0.06)	(0.06)
Share of unit-linked policies	0.02	0.02	0.02	0.03
	(0.09)	(0.09)	(0.09)	(0.09)
Large dummy		−11.64*		
		(6.29)		
Yield curve slope * Large dummy		0.10		
		(0.58)		
Medium dummy			−7.95***	
			(2.67)	
Yield curve slope * Medium dummy			0.16	
			(0.72)	
Small dummy				11.69*
				(5.94)
Yield curve slope * Small dummy				−0.26
				(0.54)
Constant	38.77***	38.90***	38.43***	26.86***
	(8.91)	(9.17)	(9.54)	(6.53)
FE	YES	YES	YES	YES
TE	YES	YES	YES	YES
Num. obs.	291	291	291	291
R^2 (full model)	0.54	0.54	0.54	0.54

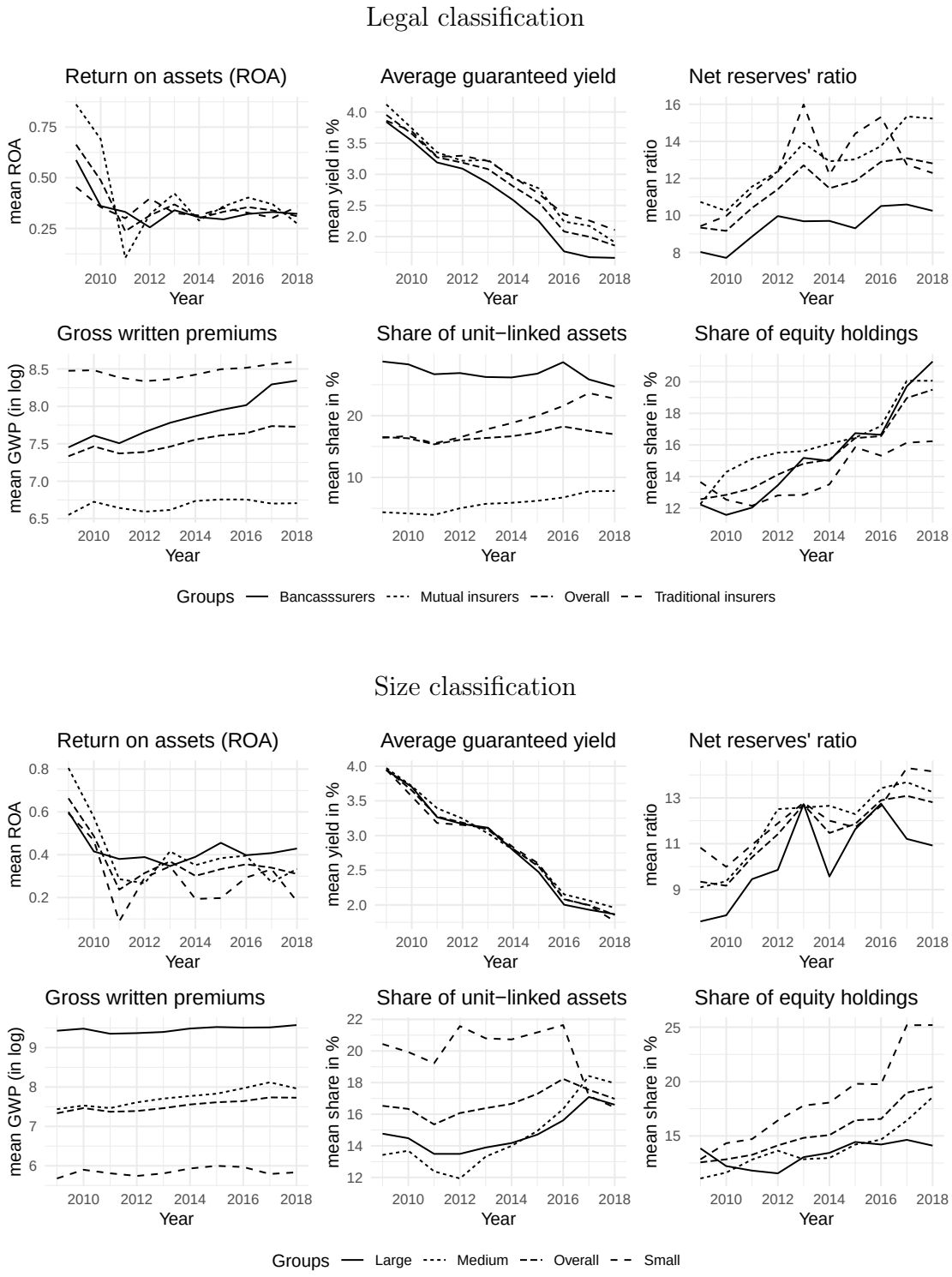
Note: $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$. Robust standard errors are reported in parentheses.

Table A.4: *Benchmark heterogeneous regressions results - EU Shadow Rate*

	(1)	(2)	(3)	(4)
EU shadow rate	0.13	0.22	0.03	0.12
	(0.16)	(0.17)	(0.16)	(0.16)
Log gross written premiums	-3.10^{***}	-3.13^{***}	-3.21^{***}	-3.08^{***}
	(0.76)	(0.77)	(0.77)	(0.76)
Share of equities	-0.21^{***}	-0.22^{***}	-0.21^{***}	-0.21^{***}
	(0.07)	(0.07)	(0.07)	(0.07)
Net reserves ratio	-0.10	-0.10	-0.09	-0.10
	(0.06)	(0.06)	(0.06)	(0.06)
Share of unit-linked policies	0.02	0.04	0.01	0.03
	(0.09)	(0.09)	(0.09)	(0.10)
Bancassurer dummy		10.54^{*}		
		(6.11)		
EU shadow rate * Bancassurer dummy		-0.27^{**}		
		(0.14)		
Mutual dummy			-11.82^{**}	
			(5.94)	
EU shadow rate * Mutual dummy			0.22	
			(0.16)	
SA dummy				-12.46^{***}
				(3.69)
EU shadow rate * SA dummy				0.04
				(0.12)
Constant	40.11^{***}	29.29^{***}	41.19^{***}	39.85^{***}
	(8.47)	(6.09)	(8.58)	(8.52)
FE	YES	YES	YES	YES
TE	YES	YES	YES	YES
Num. obs.	291	291	291	291
R^2 (full model)	0.54	0.55	0.54	0.54

Note: $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$. Robust standard errors are reported in parentheses.

Figure A.4: *Sample's heterogeneity: Legal vs. Size classifications*



Note: Sample of 31 life insurance companies operating in France for the period 2009-2018.
Source: Data extracted from AMBest and individual annual reports.

Table A.5: *Heterogeneous model results - Return on Assets and EU shadow rate*

	Bancassurers			Mutual insurers			SA insurers		
	(a)	(b)	(c)	(a)	(b)	(c)	(a)	(b)	(c)
Eu shadow rate	0.22	0.24	0.26	0.03	0.07	0.13	0.12	0.20	−0.04
	(0.17)	(0.19)	(0.17)	(0.16)	(0.17)	(0.14)	(0.16)	(0.18)	(0.17)
Log GWP	−3.13***	−3.06***	−3.94***	−3.21***	−3.12***	−3.50***	−3.08***	−3.08***	−3.47***
	(0.77)	(0.74)	(0.82)	(0.77)	(0.74)	(0.75)	(0.76)	(0.74)	(0.75)
Share of equities	−0.22***	−0.23***	−0.29***	−0.21***	−0.22***	−0.03	−0.21***	−0.21***	−0.24***
	(0.07)	(0.07)	(0.09)	(0.07)	(0.07)	(0.04)	(0.07)	(0.07)	(0.09)
NRNWP ratio	−0.10	−0.10	−0.11	−0.09	−0.09	−0.08*	−0.10	−0.10	−0.25*
	(0.06)	(0.06)	(0.07)	(0.06)	(0.06)	(0.04)	(0.06)	(0.06)	(0.14)
Share UL policies	0.04	0.03	0.16	0.01	−0.01	−0.04	0.03	0.03	−0.02
	(0.09)	(0.09)	(0.12)	(0.09)	(0.09)	(0.11)	(0.10)	(0.10)	(0.11)
Bancassurer	10.54*	9.88*	16.47**						
	(6.11)	(5.94)	(7.80)						
Eu shadow rate * Bancassurer	−0.27**	−0.26**	−0.17						
	(0.14)	(0.13)	(0.17)						
GYS		0.29			−0.21			−0.22	
		(0.29)			(0.16)			(0.16)	
GYS * Bancassurer		−0.56**							
		(0.25)							
Share of equities * Bancassurer			0.33***						
			(0.10)						
NRNWP ratio * Bancassurer			−0.23*						
			(0.13)						
Share of UL policies * Bancassurer			−0.40**						
			(0.17)						
Mutual				−11.82**	−11.15*	−1.49			
				(5.94)	(5.70)	(8.74)			
Eu shadow rate * Mutual				0.22	0.29*	−0.15			
				(0.16)	(0.16)	(0.21)			
GYS * Mutual					1.20**				
					(0.50)				
Share of equities * Mutual						−0.36***			
						(0.12)			
NRNWP ratio * Mutual						−0.37			
						(0.24)			
Share of UL policies * Mutual						0.31			
						(0.21)			
SA							−12.46***	−12.35***	−18.66***
							(3.69)	(3.66)	(4.76)
Eu shadow rate * SA							0.04	0.05	0.47**
							(0.12)	(0.13)	(0.23)
GYS * SA dummy								0.07	
								(0.20)	
Share of equities * SA									0.12
									(0.11)
NRNWP * SA									0.22
									(0.15)
Share of UL policies * SA									0.23
									(0.20)
Constant	29.29***	29.67***	35.43***	41.19***	40.99***	42.77***	39.85***	40.02***	45.85***
	(6.09)	(6.07)	(6.62)	(8.58)	(8.33)	(8.75)	(8.52)	(8.35)	(8.91)
FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
TE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Num. obs.	291	291	291	291	291	291	291	291	291
R^2 (full model)	0.55	0.56	0.59	0.54	0.57	0.59	0.54	0.54	0.55

Note: $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$. Robust standard errors are reported in parentheses. Log GWP: Logarithm of Gross Written Premiums, Share of equities: Proportion of equity investments in the insurer's portfolio, NRNWP ratio: Net Reserves to Net Written Premiums ratio, Share UL policies: Share of unit-linked policies, GYS: Guaranteed Yield Spread.

Table A.6: *Heterogeneous model results - Return on Assets and Altavilla et al. (2019) Yield Curve ECB shock*

	Bancassurers			Mutual insurers			SA insurers		
	(a)	(b)	(c)	(a)	(b)	(c)	(a)	(b)	(c)
FR 10Y MP shock	0.17	0.20	0.22*	0.06	0.11	0.06	0.10	0.17	0.02
	(0.14)	(0.17)	(0.13)	(0.14)	(0.16)	(0.12)	(0.14)	(0.16)	(0.14)
Log GWP	−3.19***	−3.12***	−3.94***	−3.20***	−3.11***	−3.56***	−3.09***	−3.10***	−3.39***
	(0.74)	(0.70)	(0.77)	(0.75)	(0.71)	(0.74)	(0.76)	(0.74)	(0.73)
Share of equities	−0.22***	−0.23***	−0.30***	−0.21***	−0.22***	−0.05	−0.21***	−0.21***	−0.22**
	(0.07)	(0.07)	(0.09)	(0.07)	(0.07)	(0.04)	(0.07)	(0.07)	(0.09)
NRNWP ratio	−0.09	−0.09	−0.10	−0.09	−0.08	−0.09**	−0.10	−0.10	−0.24
	(0.06)	(0.06)	(0.07)	(0.06)	(0.06)	(0.04)	(0.06)	(0.06)	(0.15)
Share UL policies	0.04	0.04	0.15	0.02	0.01	−0.06	0.02	0.03	−0.00
	(0.09)	(0.09)	(0.11)	(0.09)	(0.09)	(0.10)	(0.09)	(0.09)	(0.10)
Bancassurer	11.18*	10.41*	16.31**						
	(5.81)	(5.62)	(7.16)						
FR 10Y MP shock * Bancassurer	−0.17***	−0.19***	−0.13**						
	(0.07)	(0.06)	(0.06)						
GYS		0.32			−0.23			−0.22	
		(0.29)			(0.17)			(0.16)	
GYS * Bancassurer		−0.61**							
		(0.25)							
Share of equities * Bancassurer			0.34***						
			(0.10)						
NRNWP ratio * Bancassurer			−0.26**						
			(0.13)						
Share of UL policies * Bancassurer			−0.37***						
			(0.14)						
Mutual				−11.92**	−11.27**	−3.80			
				(5.89)	(5.57)	(8.28)			
FR 10Y MP shock * Mutual				0.14*	0.19**	0.02			
				(0.08)	(0.07)	(0.10)			
GYS * Mutual					1.25**				
					(0.51)				
Share of equities * Mutual						−0.32***			
						(0.12)			
NRNWP ratio * Mutual						−0.32			
						(0.26)			
Share of UL policies * Mutual						0.35*			
						(0.19)			
SA							−12.54***	−12.46***	−16.97***
							(3.62)	(3.57)	(4.33)
FR 10Y MP shock * SA							0.04	0.04	0.12*
							(0.06)	(0.06)	(0.06)
GYS * SA dummy								0.08	
								(0.20)	
Share of equities * SA									0.05
									(0.11)
NRNWP * SA									0.21
									(0.15)
Share of UL policies * SA									0.08
									(0.15)
Constant	29.28***	29.77***	35.31***	40.85***	40.56***	43.89***	39.90***	40.05***	44.62***
	(6.00)	(5.95)	(6.58)	(8.38)	(8.04)	(8.51)	(8.47)	(8.30)	(8.58)
FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
TE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Num. obs.	291	291	291	291	291	291	291	291	291
R^2 (full model)	0.55	0.56	0.59	0.55	0.57	0.59	0.54	0.54	0.55

Note: $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$. Robust standard errors are reported in parentheses. Log GWP: Logarithm of Gross Written Premiums, Share of equities: Proportion of equity investments in the insurer's portfolio, NRNWP ratio: Net Reserves to Net Written Premiums ratio, Share UL policies: Share of unit-linked policies, GYS: Guaranteed Yield Spread.

Table A.7: *Heterogeneous model robustness - ROA with macroeconomic control variables model*

	Bancassurers			Mutual insurers			SA insurers		
	(a)	(b)	(c)	(a)	(b)	(c)	(a)	(b)	(c)
Yield curve slope	0.34	0.33	0.34	−0.87	−0.86	−0.48	−0.27	−0.25	−0.63
	(0.54)	(0.54)	(0.55)	(0.54)	(0.53)	(0.45)	(0.52)	(0.51)	(0.55)
Log GWP	−2.93***	−2.85***	−3.44***	−2.98***	−2.89***	−3.21***	−2.85***	−2.85***	−3.10***
	(0.72)	(0.71)	(0.78)	(0.71)	(0.70)	(0.69)	(0.70)	(0.69)	(0.66)
Share of equities	−0.19***	−0.20***	−0.28***	−0.19***	−0.20***	−0.04	−0.19**	−0.19***	−0.20**
	(0.07)	(0.07)	(0.09)	(0.07)	(0.07)	(0.04)	(0.07)	(0.07)	(0.08)
NRNWP	−0.13*	−0.13**	−0.14*	−0.13**	−0.13**	−0.12**	−0.14**	−0.13**	−0.26*
	(0.07)	(0.07)	(0.08)	(0.06)	(0.06)	(0.05)	(0.07)	(0.06)	(0.14)
Share of UL policies	0.16**	0.16**	0.24**	0.12*	0.11	0.05	0.11	0.12	0.11
	(0.07)	(0.08)	(0.11)	(0.07)	(0.07)	(0.07)	(0.08)	(0.08)	(0.09)
Stock market YoY	0.05**	0.05**	0.03	0.05**	0.04**	0.04**	0.05**	0.05**	0.06**
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Inflation rate	−0.30	−0.30	−0.28	−0.29	−0.31	−0.17	−0.30	−0.39	−0.29
	(0.25)	(0.28)	(0.26)	(0.25)	(0.29)	(0.29)	(0.25)	(0.27)	(0.28)
Real GDP growth	−0.77**	−0.81**	−0.64**	−0.80**	−0.78**	−0.73**	−0.80**	−0.86**	−0.93**
	(0.33)	(0.35)	(0.32)	(0.33)	(0.34)	(0.32)	(0.33)	(0.36)	(0.37)
Bancassurer	11.44**	10.66*	12.91*						
	(5.60)	(5.55)	(7.77)						
Yield curve slope * Bancassurer	−1.50**	−1.44**	−0.94*						
	(0.61)	(0.59)	(0.56)						
GYS		0.27	0.33		−0.19	−0.13		−0.14	−0.11
		(0.23)	(0.23)		(0.12)	(0.11)		(0.14)	(0.14)
GYS * Bancassurer		−0.50**	−0.45*						
		(0.24)	(0.23)						
Share of equities * Bancassurer			0.32***						
			(0.10)						
NRNWP * Bancassurer			−0.25**						
			(0.12)						
Share of UL policies * Bancassurer			−0.28*						
			(0.15)						
Mutual				−12.47**	−12.25**	−1.06			
				(5.51)	(5.37)	(8.03)			
Yield curve slope * Mutual				1.47**	1.71**	0.63			
				(0.73)	(0.72)	(0.65)			
GYS * Mutual					1.20**	1.31**			
					(0.51)	(0.54)			
Share of equities * Mutual						−0.33***			
						(0.12)			
NRNWP * Mutual						−0.31			
						(0.22)			
Share of UL policies * Mutual						0.27			
						(0.21)			
SA							−10.40***	−10.36***	−15.87***
							(3.28)	(3.24)	(4.21)
Yield curve slope * SA							−0.12	−0.11	0.70
							(0.60)	(0.61)	(0.66)
GYS * SA								0.06	0.02
								(0.19)	(0.19)
Share of equities * SA									0.08
									(0.10)
NRNWP * SA									0.21
									(0.14)
Share of UL policies * SA									0.06
									(0.16)
Constant	25.86***	26.02***	31.37***	38.04***	37.42***	38.70***	35.77***	35.81***	40.26***
	(5.92)	(5.90)	(6.61)	(8.08)	(8.01)	(7.96)	(7.90)	(7.79)	(7.87)
FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
TE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Num. obs.	291	291	291	291	291	291	291	291	291
R^2	0.52	0.53	0.56	0.52	0.55	0.58	0.51	0.51	0.52

Note: $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$. Robust standard errors are reported in parentheses. Log GWP: Logarithm of Gross Written Premiums, Share of equities: Proportion of equity investments in the insurer's portfolio, NRNWP ratio: Net Reserves to Net Written Premiums ratio, Share UL policies: Share of unit-linked policies, GYS: Guaranteed Yield Spread.

Table A.8: *Heterogeneous model robustness - Return on Equity (ROE) model*

	Bancassurers			Mutual insurers			SA insurers		
	(a)	(b)	(c)	(a)	(b)	(c)	(a)	(b)	(c)
Yield curve slope	25.80***	29.49***	27.02***	7.13	14.36	12.19	14.96	23.88**	11.84
	(7.78)	(8.85)	(5.96)	(14.81)	(13.31)	(13.03)	(9.26)	(7.38)	(13.41)
Log GWP	−23.44	−22.28	−36.19**	−24.10*	−22.76	−26.73*	−21.93	−22.14	−27.23
	(13.16)	(13.12)	(12.09)	(12.89)	(12.89)	(12.44)	(12.95)	(13.10)	(16.24)
Share of equities	−4.31***	−4.49***	−5.88***	−4.23***	−4.42***	−1.52	−4.22***	−4.27***	−4.16**
	(1.26)	(1.30)	(1.53)	(1.20)	(1.26)	(0.95)	(1.25)	(1.21)	(1.36)
NRNWP ratio	−0.28	−0.24	−0.50	−0.35	−0.26	−0.77	−0.38	−0.26	−1.08
	(1.50)	(1.30)	(1.60)	(1.56)	(1.35)	(1.38)	(1.63)	(1.46)	(2.69)
Share UL policies	1.37	1.19	3.12**	0.60	0.38	−0.43	0.72	0.73	−0.17
	(0.88)	(0.91)	(1.17)	(0.96)	(0.94)	(1.44)	(1.47)	(1.36)	(2.94)
Bancassurer	61.04	46.57	116.00						
	(97.38)	(98.00)	(105.18)						
Yield curve slope * Bancassurer	−24.62*	−22.45*	−13.77						
	(11.63)	(10.66)	(8.46)						
GYS		3.25			−5.13			−5.76	
		(6.86)			(4.38)			(5.41)	
GYS * Bancassurer		−9.26*							
		(4.90)							
Share of equities * Bancassurer			6.41**						
			(2.35)						
NRNWP ratio * Bancassurer			−4.31*						
			(2.19)						
Share UL policies * Bancassurer			−6.37*						
			(2.89)						
Mutual				−70.98	−64.39	67.88			
				(98.58)	(99.20)	(163.44)			
Yield curve slope * Mutual				20.64	22.74	8.51			
				(15.70)	(15.41)	(7.93)			
GYS * Mutual					17.31				
					(13.33)				
Share of equities * Mutual						−5.15**			
						(1.90)			
NRNWP ratio * Mutual						−1.49			
						(2.23)			
Share UL policies * Mutual						3.90			
						(3.97)			
SA							−81.94	−81.03	−163.38
							(54.90)	(56.60)	(170.10)
Yield curve slope * SA							2.99	3.09	15.59
							(13.46)	(13.67)	(14.09)
GYS * SA								2.90	
								(6.50)	
Share of equities * SA									−0.22
									(1.29)
NRNWP * SA									1.35
									(2.55)
Share UL policies * SA									3.21
									(6.02)
Constant	313.00**	311.40**	421.47***	383.91**	363.15**	388.04**	347.32*	331.41*	426.29
	(101.20)	(100.70)	(106.74)	(154.19)	(151.22)	(153.13)	(156.45)	(155.80)	(242.94)
FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
TE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Num. obs.	291	291	291	291	291	291	291	291	291
R^2 (full model)	0.45	0.46	0.49	0.45	0.47	0.47	0.44	0.45	0.45

Note: $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$. Robust standard errors are reported in parentheses. Log GWP: Logarithm of Gross Written Premiums, Share of equities: Proportion of equity investments in the insurer's portfolio, NRNWP ratio: Net Reserves to Net Written Premiums ratio, Share UL policies: Share of unit-linked policies, GYS: Guaranteed Yield Spread.

CHAPTER II

Global Spillovers of US Monetary Policy: New Insights from the Remittance Channel*

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1. Introduction

In their efforts to mitigate the impact of international spillovers on their domestic economies, policymakers have sought to identify the channels through which monetary policy shocks originating from the United States (US) propagate and influence economies worldwide. Several key transmission mechanisms have been established, including the aggregate demand channel, the expenditure-switching channel, and the financial channel (Ca' Zorzi et al., 2020).

Recently, remittances have emerged as a potential channel for the transmission of US monetary policy across borders due to the remarkable growth of these capital flows, coupled with the US's position as the largest source of remittances (Ratha et al., 2023).[1] Despite this, the implications of US monetary policy shocks on remittance flows—particularly how these shocks propagate internationally—have remained underexplored.

In this paper, we aim to fill this gap by showing that remittances serve as a significant vehicle for transmitting US monetary policy effects to various remittance-sending and receiving countries. We hypothesize that an unexpected monetary tightening in the US could trigger a ripple effect on other remittance-sending countries due to their close trade and financial integration, and their increased synchronization resulting from the Global Financial Cycle, as described by Rey (2015). This ripple effect may lead to economic downturns in these remittance-sending nations, which could, in turn, result in a reduction in global remittance outflows. Consequently, the repercussions of US monetary tightening could spread across a wide range of recipient countries, thereby amplifying the global synchronization of business cycles. Beyond the extent of these spillovers, understanding their full impact also requires close attention to their timing, as monetary shocks may transmit across borders at a different pace or in a different sequence than they do within the US economy.

To empirically examine these cross-border effects, we use a comprehensive dataset that encompasses a wide range of countries—8 remittance-sending countries and 41 recipient countries—spanning the period from January 1997 to December

[1] Remittances now surpass foreign direct investment and development aid in low- and middle-income countries. According to the last figures provided by the World Bank, personal remittances received have experienced remarkable growth, evolving from negligible amounts in 1980 to reach 766,85 billion current US$ in 2022—equivalent to 0.8 percent of global GDP. https://data.worldbank.org/indicator/BX.TRF.PWKR.CD.DT.

2017. We rely on a local projections empirical framework (Jordà, 2005), which allows us to trace the dynamic responses of macro-financial variables in both remittance-sending and receiving countries to US monetary policy shocks. We instrument unexpected changes in the federal funds rate using the US monetary policy shock, incorporating the information channel as suggested by Miranda-Agrippino and Ricco (2021) and Jarociński and Karadi (2020). By estimating the impulse responses of macro-financial variables, we specifically investigate how the transmission of US monetary shocks is shaped by the degree of reliance on remittances in recipient countries.

Consistent with the existing literature on the global financial cycle, we find that tightening US monetary policy is associated with widespread declines in output, prices, and credit in advanced economies. Importantly, these cross-border spillovers are not only widespread but also marked by important cross-country asymmetries in timing and intensity. While US monetary policy typically affects domestic output with a lag of several months, our results show a more immediate response in other remittance-sending countries. This faster adjustment underscores the high degree of financial integration and sensitivity of these economies to global monetary conditions. Importantly, the economic slowdown in these economies—many of which are also major sources of remittances—leads to a substantial and more immediate reduction in remittance outflows, illustrating the pro-cyclical nature of these flows in their countries of origin.

We also present a novel finding. Unlike remittance-sending countries, the impact of US monetary policy tightening on recipient countries varies based on their level of dependence on remittances. Specifically, countries with a lower reliance on remittances—less than 4 percent of GDP—exhibit counter-cyclical behavior in remittance flows, in contrast to those more heavily reliant. In other words, following an unexpected tightening of US monetary policy, most countries experience an economic slowdown, except for those with moderate reliance on remittances —1 to 4 percent of GDP.

To better understand how a US monetary policy shock affects remittance behavior, we explore the channels through which these effects materialize—focusing on migrants' motivations for remitting and their skill composition. We distinguish between altruistic and self-interest motives by examining the cyclicality of remittance flows in response to external economic conditions. We also account for migrant heterogeneity by incorporating data on the educational attainment of diaspora populations, allowing us to assess how skill levels shape remittance

resilience during downturns.

Our results reveal distinct patterns in remittance behavior that reflect both the economic context and the characteristics of migrant populations. In countries with low to moderate remittance dependence, inflows increase following US monetary tightening—consistent with altruistic or insurance-driven motives. By contrast, countries highly reliant on remittances experience a decline in inflows, indicating pro-cyclical dynamics aligned with self-interest motives. These patterns persist even after controlling for external economic conditions. We further show that this heterogeneity is structurally linked to migrant skill composition: countries with a predominance of low-skilled migrants—often the most remittance-dependent—exhibit stronger pro-cyclical responses, while those with more skilled or diversified diasporas benefit from more stable, counter-cyclical remittance flows. These findings illustrate the dual role of remittances as both amplifiers and stabilizers of the global business cycle, while also emphasizing how the scale and nature of remittance flows can either constrain or bolster the monetary policy autonomy of recipient countries.

This paper makes several contributions to the existing literature on global economic dynamics and the transmission of US monetary policy. While previous studies have primarily focused on direct financial channels (Rey, 2015; Bruno and Shin, 2015)—such as capital flows, exchange rates, and interest rates—this research highlights the significant role of remittances in shaping global economic outcomes.

Second, we extend the understanding of the remittance channel as a critical conduit through which US monetary policy shocks influence emerging markets and developing countries. Machasio and Tillmann (2023) demonstrate that monetary policy tightening by the Federal Reserve leads to a reduction in remittance inflows to economies in Latin America and the Caribbean, consequently amplifying the volatility of their business cycles. However, while their findings are suggestive, their applicability may be limited to this specific region due to the significant influence of geographical proximity. Indeed, a considerably high percentage of migrants originating from these countries reside in the US. By incorporating a broader range of countries in different regions, this paper provides a more comprehensive analysis of how US monetary policy influences economies worldwide through this channel.

Finally, this study contributes to the policy debate by shedding light on the potential vulnerabilities of economies that are heavily dependent on remittances, particularly in the context of global financial cycles driven by US monetary policy. By identifying threshold effects—where countries with high remittance dependence

experience pro-cyclical impacts, while those with moderate dependence exhibit counter-cyclical responses—this paper underscores the need for targeted policy interventions to mitigate the adverse effects of external financial shocks on these economies.

The remainder of the paper is organized as follows: Section 2 provides some background on the impact of remittances in recipient countries and explores the potential mechanisms through which US monetary policy may be transmitted internationally via these personal transfers. Section 3 describes our sample of countries, outlines the methodology for identifying US monetary policy shocks, and details the empirical framework employed in our analysis. In Section 4, we present our primary findings on the effects of US monetary policy on both remittance-sending and -receiving countries, while discussing pro and counter-cyclicality controlling for external economic conditions and considering the role of migrant skill levels. Section 5 conducts several robustness checks to validate our results. Finally, Section 6 concludes.

2. Remittances and US monetary policy

Remittances have been extensively studied for their role in supporting development in emerging and developing economies (Ahmed et al., 2021; Gapen et al., 2009; Giuliano and Ruiz-Arranz, 2009). These financial flows provide a unique form of external funding, offering foreign currency to countries and additional income to households, which is then used for both consumption and investment purposes. However, as remittances grow in importance, they also present macroeconomic challenges. For instance, the literature has explored how remittances can trigger a "Dutch disease" effect, leading to an appreciation of the real exchange rate, which in turn suppresses exports and reduces competitiveness, potentially hindering emerging economies from overcoming the middle-income trap (Acosta et al., 2009; Lartey et al., 2012). Additionally, high levels of remittances can create a wealth effect, leading households to increase their leisure time, which may depress output over time (Vacaflores, 2012).

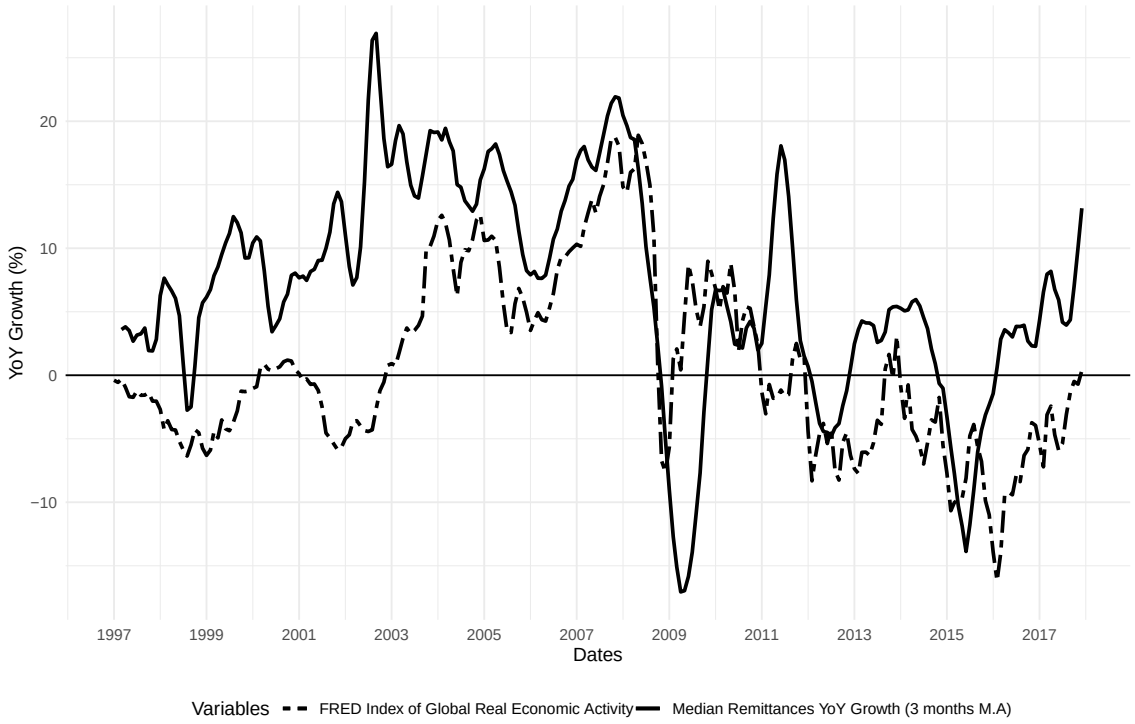
Remittances also present challenges for the implementation of monetary policy. When households rely heavily on remittances as a primary income source, the effectiveness of a country's monetary policy may be dampened. The reason lies in the dual impact of these foreign flows, which can either dampen or stimulate demand and consumer spending, depending on their cyclical nature. For instance,

if remittance inflows increase during an economic expansion and the central bank raises interest rates to tighten monetary conditions, these inflows could counteract the intended tightening effect, potentially leading to higher inflation by elevating demand. Conversely, a reduction in remittance inflows might coincide with the central bank's tightening measures, thereby reinforcing their impact on real economic indicators (Acosta et al., 2009; Giuliano and Ruiz-Arranz, 2009; Sayan, 2006).

Further research highlights the importance of remittances in the financial system, particularly emphasizing the key role banks play in transmitting monetary policy (Barajas et al., 2018). The interest rate channel effect is notably significant in countries with high levels of remittance inflows. When external financing conditions are favorable, allowing for borrowing at lower interest rates from abroad, domestic loan rates may become less responsive to changes in the policy rate for two main reasons. First, substantial inflows can reduce the risk premium for households, diminishing the impact of monetary tightening on lending rates. Second, when foreign funds—arising from remittance inflows—are abundant, banks may choose not to increase lending rates in response to domestic monetary policy tightening. This decision is influenced by the higher levels of liquidity provided by remittances, which can lead banks to reduce their interest rate pass-through. As a result, banks may insulate themselves from the actions of the domestic central bank, thereby weakening a key channel of monetary policy transmission (Barajas et al., 2018).

Although a significant body of research has examined the influence of US monetary policy on capital flows—especially showing that expansionary measures boost capital inflows into emerging markets—the impact on remittances remains relatively underexplored (Calvo et al., 1993; Dahlhaus and Vasishtha, 2020). To our knowledge, the only study examining the impact of US monetary policy on remittances finds that a surprise tightening is associated with a reduction in remittance inflows to Latin American and Caribbean countries. However, this analysis overlooks potential heterogeneities across countries within the sample and does not account for the broader business cycle implications for real domestic variables (Machasio and Tillmann, 2023). US monetary policy spillovers are global in nature, with repercussions that extend far beyond regional boundaries, affecting economies worldwide. Figure 1 shows that remittance outflows move pro-cyclically with global economic activity, revealing how large remittance inflows may leave recipient countries especially vulnerable to external shocks.

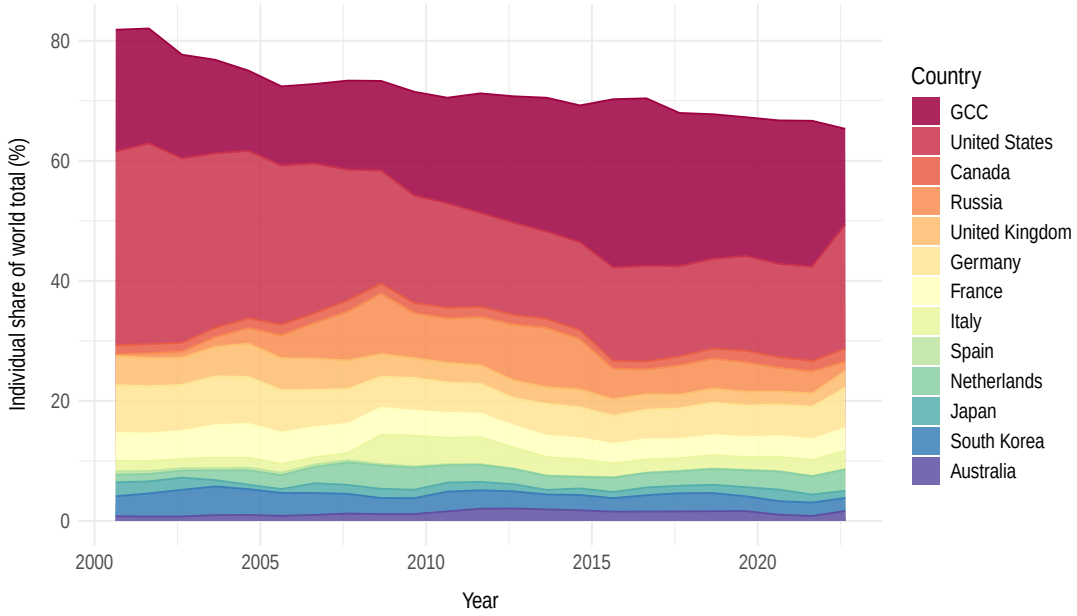
Figure 1: *Procyclicality of remittance outflows*



Note: The dotted line represents the year-over-year (YoY) growth of the Index of Global Real Economic Activity while the solid line represents the median YoY growth of remittance outflows. Source: Outward remittances from World Bank data - Personal remittances, paid (current US$) and Index of Global Real Economic Activity (IGREA) extracted from https://fred.stlouisfed.org/series/IGREA.

The US plays a key role as a major sender of remittances, significantly contributing to international remittance outflows. From 2000 to 2022, the US consistently maintained a prominent position, as illustrated in Figure 2, accounting for more than 20 percent of total global remittance outflows. The dominant role of the US as the main sender of remittances, coupled with its significant influence on global economic conditions, underscores the crucial role of US monetary policy on foreign economies via remittances. When US monetary policy tightens, it can slow domestic economic activity, leading to lower income and job opportunities for migrants. As remittances are a share of migrant earnings, reduced income means fewer remittances sent home. Additionally, tighter policy can reduce US demand for imports, further affecting foreign GDP and remittance flows. The effects on recipient countries' economies can be significant, though the overall impact may vary depending on various factors, including the structural characteristics of both remittance-receiving and -sending countries, as well as the monetary policy responses of foreign central banks.

Figure 2: *Outward remittances, share of world total*



Note: GCC refers to the Gulf Cooperation Council (GCC) countries consisting of Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates. Outward remittances are extracted from https://www.knomad.org/data/remittances.

3. Data and empirical methodology

Our approach includes three key elements: a comprehensive sample that covers a broad spectrum of remittance-receiving and -sending countries, a precise indicator for identifying US monetary policy shocks, and the estimation of impulse response functions using local projections, as developed by Jordà (2005).

3.1. The sample

Remittances include all regular transfers, whether in cash or in kind, made by non-resident households to resident households (De Arcangelis et al., 2023). These transfers are primarily made by individuals who have migrated to foreign countries (Orrenius and Zavodny, 2015). The International Monetary Fund (IMF) is the leading source of statistics on international remittances, compiling data from central banks. National authorities have updated their data collection methodologies and sources to align with the recommendations of the IMF's Balance of Payments and International Investment Position Manual, sixth edition (BPM6) (IMF, 2014).

To quantify formal remittance flows, central banks predominantly rely on reports from resident banks and payment institutions under their supervision,

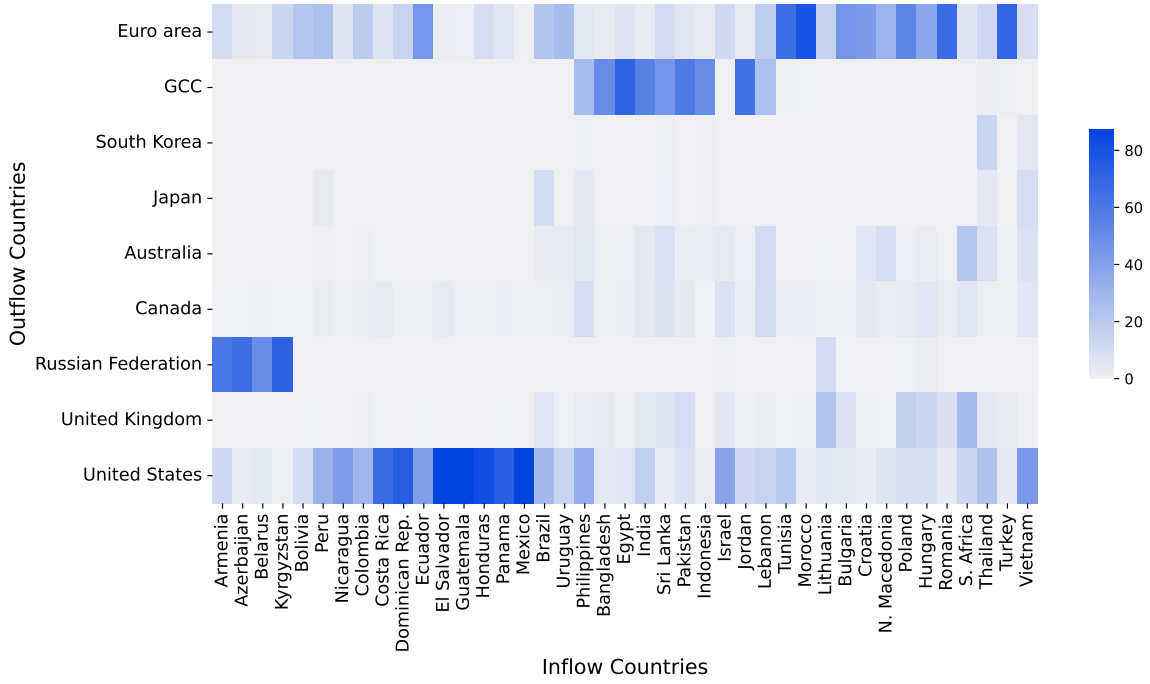
whether these reports are submitted in physical or electronic form. Additionally, central banks may analyze their own Foreign Exchange balance, which records transactions involving the purchase and sale of foreign currencies within the domestic financial system. However, measuring informal remittances poses more significant challenges, often requiring estimations. To address this issue, authorities utilize various approaches, including targeted surveys of non-resident individuals.[2]

Despite the growth in remittance flows and improved methods for tracking cross-border transfers, accurately measuring these flows remains a major challenge. As depicted in Figure A.1 in Appendix A, there is a notable disparity between the amounts sent by individuals abroad and the funds received by recipients in their home countries, as recorded by the IMF and the World Bank based on Balance of Payments data. This difficulty in precise quantification is closely associated with the challenges of monitoring transfers that occur outside the traditional banking system, including those conducted through money transfer operators and cash payments (Brown et al., 2014; De Arcangelis et al., 2023; Seth and Kalyanaraman, 2017). Over the past decade, these alternative methods have become increasingly significant, highlighting the issue of under-reporting, with a growing gap between remittance inflows and outflows, which reached 326 billion US$ in 2022, equivalent to 0.4 percent of global GDP. The KNOMAD-World Bank database, which provides bilateral remittance estimates based on migrant stocks, host country incomes, and origin country incomes, reported total remittance flows of 781 billion US$ for 2021. This figure was approximately 6 percent higher than the official reported figures (Ratha, 2017).

To identify countries that play a significant role in international remittance flows, we use bilateral data from the KNOMAD-World Bank matrix for 2021 (Ratha, 2017). This level of granularity helps to identify the most significant remittance corridors and better understand the dynamics of remittance flows globally. Additionally, the dataset covers a wide range of countries, making it an invaluable resource for assessing the role of remittances in different economic contexts and understanding their impact on both sending and receiving economies. The bilateral remittance flows derived from this dataset are depicted in Figure 3.

[2] A common method employed by central banks for assessing informal remittances involves conducting surveys at airports during holiday seasons. These surveys specifically target non-resident individuals, seeking to gather comprehensive data about the remittances they send, including the amounts transferred, the methods of transfer, and the geographical origins of these transactions.

Figure 3: *Bilateral remittances matrix*



Note: The x-axis represents countries receiving remittances (inflow countries), while the y-axis represents countries sending remittances (outflow countries). The color gradient displays the share of remittances that each country receives from a particular outflow country, ranging from 0 (white) to 100 percent (dark blue). Source: Data is extracted from KNOMAD/World Bank Bilateral Remittance Matrix 2021, December 2022.

The matrix underscores the dominant role of the US in remittance flows across all regions, while also highlighting the crucial roles of other countries as key regional players. For instance, Germany is a major source of remittances for Eastern European nations such as Croatia, Poland, and Hungary, among others. Similarly, Russia is vital for former Soviet Union nations, including Kyrgyzstan, Armenia, Azerbaijan, and Georgia. Spain emerges as a significant remittance sender to Latin American countries, while France plays a key role in remittance flows to the Middle East, North Africa, and Sub-Saharan Africa. The United Kingdom, with its historical ties, emerges as an influential global remittance sender, notably affecting countries in Southeast Asia, East Africa, and the Middle East.

Drawing on these bilateral remittance flows, we identify countries that account for at least 1 percent of total global remittance outflows. However, due to data limitations, we limit our selection to 12 countries and exclude from the empirical analysis the regional economic area formed by the 6 Gulf Cooperation Council (GCC) countries, which collectively contributed nearly 15 percent of global remittance

outflows in 2021.[3]

In selecting recipient countries, we apply specific criteria given the vast number of economies receiving transfers. We focus on countries that, according to KNOMAD data, received at least 0.1 percent of total global remittance inflows annually, on average, from 2000 to 2017.[4] Additionally, we exclude countries where remittance outflows surpass inflows, and those lacking a monthly output index or available data on personal transfers. Countries that do not meet these criteria account for a relatively minor share of total inflows (14 percent). When including China, which alone contributes 9.3 percent to global inflow figures, the unaccounted portion of flows increases to 23 percent.[5] Our final selection includes 41 remittance-receiving countries, which collectively represent an average of 65 percent of total remittance inflows, as shown in Figure A.2 in Appendix A.

The descriptive statistics presented in Tables A.1 and A.2 in Appendix A shed light on the average values of several key macroeconomic indicators for the sample of countries sending and receiving remittances. No distinct pattern is evident across these countries. However, countries with a higher reliance on remittances tend to favor fixed exchange rate regimes, whereas those with lower dependency generally adopt floating exchange rate regimes and often have higher per capita income levels. Despite these trends, there seems to be no clear correlation between income levels, dependency on remittances, average growth and inflation rates.

3.2. Identification of US monetary policy shocks

Monetary policy plays a significant role not only in directly influencing economic conditions but also in signaling the central bank's stance on the economy's current state and its expectations for future developments. This signaling aspect complicates the identification of the international spillover effects of the Federal Reserve's policy actions, as highlighted by Bernanke (2017). When analyzing the impact of US monetary policy on global economies, it's crucial to distinguish between the actual

[3] GCC corresponds to the Gulf Cooperation Council countries: Saudi Arabia, Kuwait, the United Arab Emirates, Qatar, Bahrain and Oman. These countries have only begun releasing quarterly and monthly data very recently.

[4] This threshold corresponds to an average annual inflow of 500 million US$.

[5] Countries excluded from the eligible sample due to data limitations include Albania, Algeria, Argentina, Bermuda, Bosnia, Brazil, Cambodia, China, Chile, Czech Republic, Georgia, Ghana, Haiti, Jamaica, Kenya, Kosovo, Latvia, Moldova, Nepal, Nigeria, Senegal, Serbia, Slovakia, Sudan, Tajikistan, Ukraine, Uzbekistan, Yemen, and Zimbabwe. In the case of China, despite being the third-largest recipient in 2022 with 51 billion US$, remittances only account for 0.2 percent of their GDP.

shocks resulting from policy changes and the signals sent by the central bank regarding broader economic and financial conditions. Failing to separate these factors can lead to a misunderstanding of the true effects of US monetary policy on other countries and the broader impact of global economic shocks.

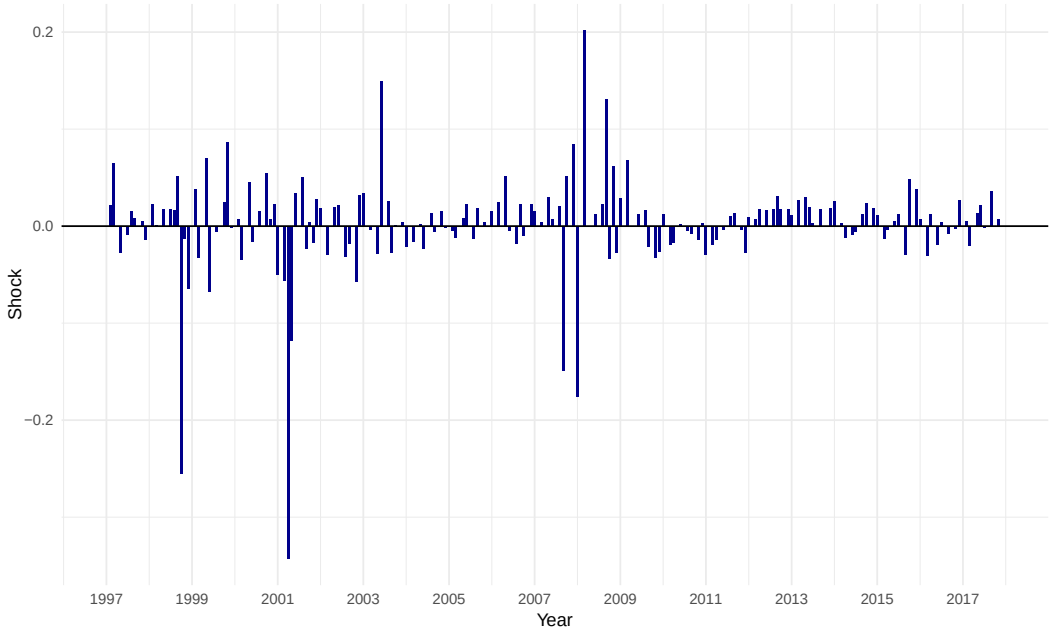
Romer and Romer (2004) introduced the narrative approach as a robust and reliable method for identifying US monetary policy shocks by isolating exogenous changes in the Fed's policy through an examination of Federal Open Market Committee (FOMC) minutes. However, the seminal contributions of Kuttner (2001) and Cochrane and Piazzesi (2002), which identify "high-frequency monetary policy shocks" based on changes in futures rates around central bank policy announcements, have become the empirical standard in monetary economics (Gertler and Karadi, 2015). These high-frequency shocks are constructed using various indicators, such as the fourth Federal Funds futures contract (FF4) (Gertler and Karadi, 2015; Jarociński and Karadi, 2020; Miranda-Agrippino and Ricco, 2021; Romer and Romer, 2004), the first principal component of changes in short-term interest rates up to two years (Barakchian and Crowe, 2013; Nakamura and Steinsson, 2018a), or the entire US yield curve (Bu et al., 2021).

Recent advancements in analyzing monetary policy shocks have focused on the implications of information asymmetries (Melosi, 2017). Notably, research has highlighted that market-based measures of monetary surprises often presuppose that private agents have access to perfect information (Gertler and Karadi, 2015), while narrative approaches assume that central banks are endowed with perfect information (Romer and Romer, 2004). Information asymmetries can lead to puzzling outcomes, such as the simultaneous movement of interest rates and stock prices following policy announcements. For instance, an unexpected tightening due to economic overperformance may drive up stock prices (Jarociński and Karadi, 2020). To disentangle the "information effect" from the pure recessionary shock, Miranda-Agrippino and Ricco (2021) have developed an instrument that directly controls for the signaling channel of monetary policy. This instrument is derived by regressing high-frequency surprises from the FF4 indicator against the macroeconomic forecasts contained in the Greenbook, which are publicly released with a five-year delay, covering the period from January 1990 to December 2017.

We choose to use the US monetary policy instrument developed by Miranda-Agrippino and Ricco (2021) shown in Figure 4 due to (i) its comparability, as it uses the benchmark FF4 shocks; (ii) its ability to isolate the pure recessionary shock from the central bank's information shock; (iii) its adoption of the Fed's private

(Greenbok) forecasts as in Romer and Romer (2004), thus combining the narrative and high-frequency approaches; (iv) its use in related literature for examining the international transmission of US monetary policy, which facilitates cross-country comparability (Degasperi et al., 2020).

Figure 4: *US monetary policy shock*



Note: This Figure illustrates the shock identified by Miranda-Agrippino and Ricco (2021), which displays a correlation of 0.69 with the shock identified by Jarociński and Karadi (2020). These high-frequency shocks, recognized as the industry standard in recent monetary policy research, specifically address the information effect. Source: Degasperi et al. (2020).

3.3. Empirical methodology

We derive impulse response functions using local projections (LP) following the approach developed by Jordà (2005). The LP method is favored for its straightforward nature in estimation and structural interpretation, as pointed out by Stock and Watson (2018). This iterated approach also yields more efficient parameter estimates compared to Vector Autoregressive (VAR) models, which are prone to bias escalation in cases of model misspecification. Furthermore, while both approaches have been shown to provide the same impulse responses (Plagborg-Møller and Wolf, 2021), the LP method's resilience to model misalignment is particularly advantageous, given the difficulties in consistently achieving accurate specification, especially within typically low-order autoregressive models (Marcellino et al., 2006;

Miranda-Agrippino and Ricco, 2021).[6] Finally, LP inference remains robust when dealing with two common features in macroeconomic applications: highly persistent data and the estimation of impulse responses over long horizons (Montiel Olea and Plagborg-Møller, 2021).

We begin by estimating the following linear model for each country in our sample:

$$y_{t+h} = \alpha_h + \sum_{s=1}^{h} \delta_{'h} y_{t-s} + \beta_h USMP_t^{shock} + \sum_{s=1}^{h} \gamma_{'h} X_{t-s} + \varepsilon_{t+h} \tag{1}$$

Where y_t is the dependent variable, y_{t-s} represents the lagged dependent variable, and $\mathbf{X}_t$ is a vector of domestic variables. The identified US monetary policy shock is denoted by $USMP_t^{shock}$. Hence, the coefficient β_h measures the impact of a policy change at time t on the dependent variable h periods ahead. We consider $s = 12$ lags, following the common practice in monthly specifications and consistent with the approaches of Ramey (2016), Degasperi et al. (2020), and Bauer and Swanson (2023).

We estimate Equation (1) using the LP approach across a dataset spanning from January 1997 to December 2017, covering 240 monthly periods.[7] Our country-specific sample size ($T = 240$) is comparable to that of Jordà ($T = 300$), thereby reducing the risk of small-sample bias (Herbst and Johannsen, 2021). By plotting β_h against h, we obtain the impulse response function.

The LP estimator is potentially more robust to inaccuracies in the specification of the actual data generation process compared to the SVAR specification, due to its greater flexibility (Nakamura and Steinsson, 2018b). However, since the error term ε_{t+h} is expected to exhibit serial correlation for all horizons $h > 0$ (Ramey, 2016), we estimate Equation (1) using OLS and apply the Newey and West (1987) correction to appropriately address this serial correlation.

For each country, we consider the following monthly variables: (i) remittance inflows (credit) or outflows (debit) in US$; (ii) nominal short-term interest rate; (iii) Nominal Effective Exchange Rate (NEER) ; (iv) trade balance with the US (scaled to GDP) (v) Consumer Price Index (CPI); (vi) real output; and (vii) real domestic credit. Except for short-term interest rates and the trade balance with the

[6] The LP method, which involves incorporating an external instrument such as the US monetary policy shock, is comparable to the standard Structural Vector Autoregression (SVAR) methods that employ Choleski decomposition ordering the monetary policy shock first.

[7] The data regarding the US monetary policy shock developed by Miranda-Agrippino and Ricco (2021) is available until December 2017.

US, all variables are seasonally adjusted using the X-12-ARIMA method (Findley et al., 1998) and undergo logarithmic transformation. Further details regarding the data sources for each series are provided in Table A.3 in Appendix A.

We classify countries as remittance senders or receivers based on their net debtor or creditor status in the personal transfers account of the balance of payments' secondary income. A country is identified as a sender if it holds a net debtor position for at least two-thirds of the sample periods, and as a receiver if it maintains a net creditor position for the same duration.

4. Results

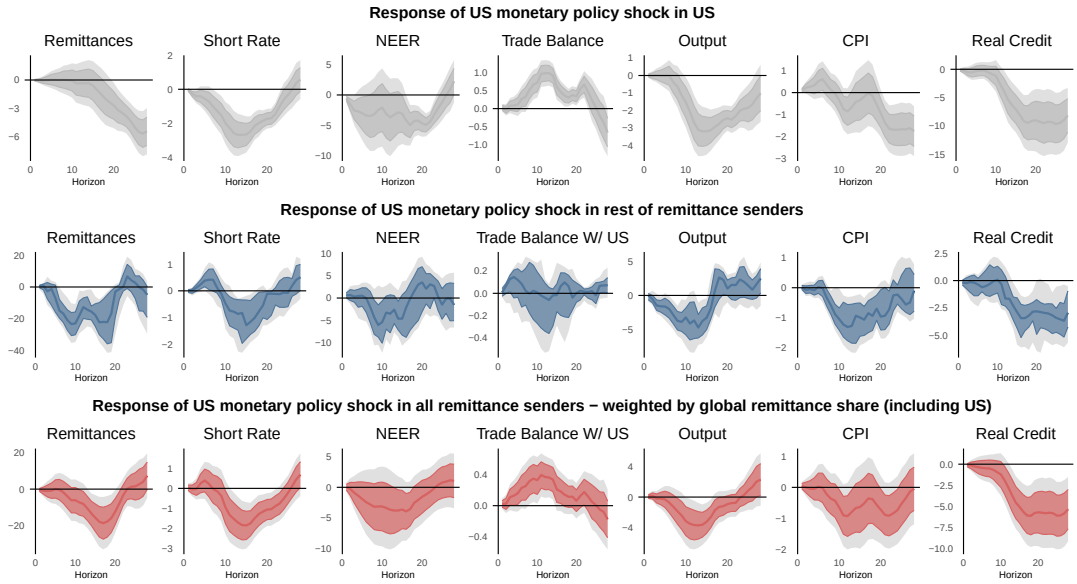
While the impact of US monetary policy shocks on the US is direct, we assess the median dynamic responses for remittance-sending and -receiving countries separately. To achieve this, we aggregate the individual impulse response functions from the local projections to determine the median response across countries. Our goal is to assess how a "median" economy, representing each group, would respond to such shocks. This method is especially valuable in datasets with outliers or high variability. By focusing on the median rather than the mean, the analysis becomes more resilient to extreme values, offering a clearer picture of the typical response. However, recognizing that this measure does not capture the full range of responses, we also report in Figure B.3 in Appendix B the 25th, median (50th percentile), and 75th percentile responses for both sending and receiving countries, to give a more comprehensive picture of the impacts across countries.

4.1. US monetary policy transmission to remittance senders

In response to a contractionary US monetary policy shock, the domestic economy experiences substantial recessionary effects, notably on output, prices, and credit, signaling a broad economic slowdown. The first row of Figure 5 captures these responses. Output contracts sharply, declining by nearly 3 percent within one to two quarters, while real domestic credit also falls significantly. Remittance outflows from the US show a delayed but considerable reduction, with a 6 percent decrease by the end of the cycle, as households respond to the economic downturn, adjusting their remittance behavior in line with lower income and declining price levels.

[8] The set of remittance-sending countries includes South Korea (KR), Japan (JP), Canada (CA), Russia (RU), Australia (AU), the Euro-area (EZ) and the United Kingdom (GB).

Figure 5: *Responses of remittance senders to a US monetary policy shock* [8]



Note: The first cluster focuses on the US IRF. The second one presents a comprehensive overview of major net remittance-sending nations, deliberately excluding the US. The final grouping encompasses all remittance-sending countries, integrating the US. Median of country-by-country responses of endogenous variables to a contractionary one standard deviation US monetary policy shock, resorting to local projections with 12 lags and Newey-West corrected standard errors. Shaded areas correspond to 68 and 90 percent confidence intervals. Monthly sample 1997:01-2017:12.

The analysis reveals significant inflation dynamics: core CPI responds more strongly to the monetary policy shock compared to overall CPI, as shown in the second row of Figure B.1 in Appendix B. The core CPI, which excludes volatile items such as food and energy, reacts more immediately, reflecting underlying inflationary pressures, whereas overall CPI lags, driven in part by external factors such as commodity price fluctuations. However, focusing on core CPI may overlook important second-round effects. For countries other than the US, it is better to focus on overall CPI, as prior research highlights the significant role of US monetary policy in driving global inflation, especially through commodity prices (Breitenlechner et al., 2022; Miranda-Pinto et al., 2023). Figure B.2 in Appendix B provides additional evidence, offering further insight into how rising unemployment and falling asset prices contribute to the transmission of monetary policy effects to households. This finding is consistent with the literature on the macroeconomic determinants of remittance outflows, which suggests that households tend to remit based on their economic circumstances, influenced by their income levels, unemployment, and wealth (Vargas-Silva and Huang, 2006; Hathroubi and Aloui, 2016).

Turning to the global transmission of US monetary policy, we focus on the effects across other major remittance-sending countries. The remaining rows of Figure 5 reveal an important asymmetry in the timing of output responses to a US monetary policy shock. Specifically, while the output response in the US is relatively delayed—becoming statistically significant only around the eighth month after the shock—remittance-sending countries outside the US experience an immediate and pronounced contraction in output. One key mechanism explaining this dynamic is the anticipatory nature of global financial markets. As emphasized by Rey (2015), the global financial cycle transmits US monetary policy across borders almost instantaneously through synchronized movements in capital flows, asset prices, and credit conditions. Similar patterns have been documented by Obstfeld (2020), who notes that US policy surprises often generate global spillovers through financial channels that operate faster than traditional trade or output linkages. Additionally, domestic policy responses in remittance-sending countries likely reinforce the immediacy of the output contraction. Following a US monetary tightening, many of these economies raise their own policy rates in a preemptive attempt to stabilize capital flows and defend their currencies. Such defensive rate hikes, while mitigating external imbalances, impose tighter financial conditions that immediately weigh on domestic demand. The rapid contraction in CPI seen in Figure 5 aligns with this explanation. Consequently, these compounded effects—anticipatory financial market tightening and preemptive domestic policy adjustments—result in a faster and sharper decline in output in remittance-sending countries than in the US itself. The most consequential outcome is the substantial and immediate contraction in remittance outflows from remittance-sending countries, occurring more rapidly and sharply than the output response observed in the US. This reduction is not only statistically significant but also considerably larger than the corresponding decline within the US economy. Specifically, following a tightening of US monetary policy, remittance outflows contract by approximately 20 percent within one year.

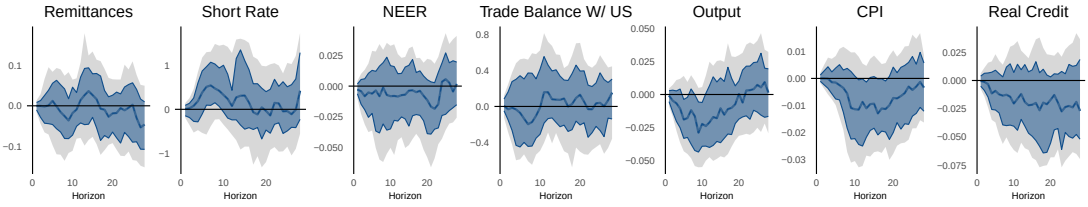
These results shed light into the role of US monetary policy in shaping global financial flows and economic conditions. While the US experiences significant domestic impacts, the spillover effects to other major remittance-sending countries are also pronounced, particularly in terms of remittance outflows. This is consistent with the literature on the global transmission of US monetary policy, which highlights its influence on both advanced and emerging economies (Bekaert et al., 2013; Bruno and Shin, 2015; Rey, 2015). Our findings suggest that US monetary policy shocks impact both domestic financial conditions and at the same time exert significant influence on global remittance flows, thereby increasing the

interconnection between the US policy cycle and the global economy.

4.2. US monetary policy transmission to remittance recipients

After exploring the dynamics in remittance-sending countries, we now turn our attention to how US monetary policy shocks affect remittance-receiving countries. Figure 6 presents the median IRFs for all recipient countries. This initial analysis reveals no strong statistical significance, except for a modest increase in the short-term interest rate and a slight decrease in output and prices.

Figure 6: *Response of all remittance recipient countries to a US monetary policy shock*



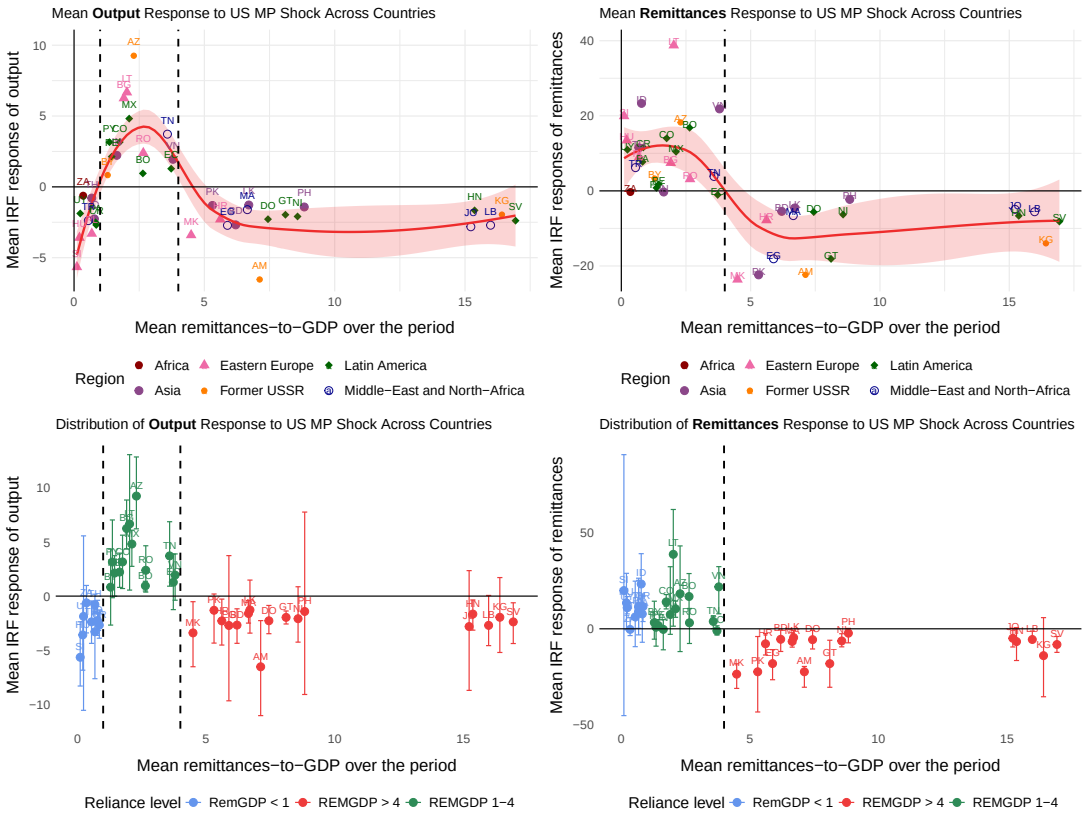
Note: Median of country-by-country responses to a contractionary one standard deviation US monetary policy shock resorting to local projections with 12 lags and Newey-West corrected standard errors. Shaded areas correspond to 68 and 90 percent confidence intervals. Monthly sample 1997:01-2017:12.

We then estimate the response of each endogenous variable to a US monetary policy shock on a country-specific basis over a two-year horizon. Figure 7 shows the average responses of output and remittances at the individual country level, alongside the distributions of the coefficients representing the 25th and 75th percentile responses over the horizon. These are analyzed as a function of the average remittances-to-GDP ratio over the period.[9]

The figures indicate that output and remittance IRF responses differ once remittance flows reach certain thresholds, specifically when they account for between 1 and 4 percent of GDP. This non-linear behavior suggests that below, within, or above these limits, the economic reactions to US monetary policy shocks vary. Moreover, these effects appear consistent across different geographical regions, emphasizing the broad relevance of these thresholds.

[9] Table B.1 in Appendix C summarizes the responses that are statistically significant at the 90 percent confidence level over a continuous period of at least three months. Responses with a positive average are marked in green, while those with a negative average are marked in red. This table includes data for both remittance-receiving and remittance-sending countries. Remittance-receiving countries are listed in descending order according to their average remittance-to-GDP ratios for the period 1997-2017. This table illustrates the varied responses in output and remittances across recipient countries, whereas responses from sending countries appear more uniform.

Figure 7: *Responses of recipient countries to a US monetary policy shock, by level of reliance to remittances*



Note: Countries are classified based on the average remittances-to-GDP ratio over the 1997-2017 period. Mean output and remittances responses to a contractionary one standard deviation US monetary policy shock. Sample 1997:01- 2017:12. Each dot corresponds to the mean IRF response of output/remittances to a US MP shock over the horizon $t = 24$ for the top graphs while the bottom graphs also show the box plot 25th and 75th percentile response over the period. Vertical dashed lines at 1 and 4 percent show the threshold levels. Furthermore, the red line represents the nonlinear trend line while the red shade corresponds to the corresponding loess standard errors.

To confirm the statistical reliability and validate the accuracy of these thresholds, we employ the t-test and the Mann-Whitney U-test in Table 1. These tests specifically assess the statistical differences in the responses of groups categorized by their reliance on remittances to a US monetary policy shock. By applying these tests, we ensure that our threshold selections are not solely based on stylized facts but are also supported by robust statistical evidence, thereby enhancing the credibility of our findings.

The results clearly indicate significant differences between countries with moderate remittance-to-GDP ratios (1-4 percent of GDP) and other groups of countries. While the remittance coefficients are not statistically significant, the output coefficients show a significant difference between these countries and those with low

Table 1: *T-test of output and remittance coefficients*

	Output coefficients		**Remittance coefficients**	
	T-test	**U-test**	**T-test**	**U-test**
Remittances-to-GDP < 1 versus Remittances-to-GDP 1-4	0.00002^{***}	0.000001^{***}	0.8147	0.4031
Remittances-to-GDP < 1 versus Remittances-to-GDP $>= 4$	0.8937	0.7114	0.00181^{***}	$2.0 \times 10^{-7***}$
Remittances-to-GDP 1-4 versus Remittances-to-GDP $>= 4$	0.000006^{***}	$8.0 \times 10^{-9***}$	0.000003^{***}	$7.0 \times 10^{-9***}$

Note: Pairwise t-tests were conducted to compare estimated coefficients between groups categorized by their reliance on Remittances-to-GDP. The t-statistic measures the difference in means, while the p-value assesses statistical significance. A small p-value (< 0.05) indicates significant differences between groups.

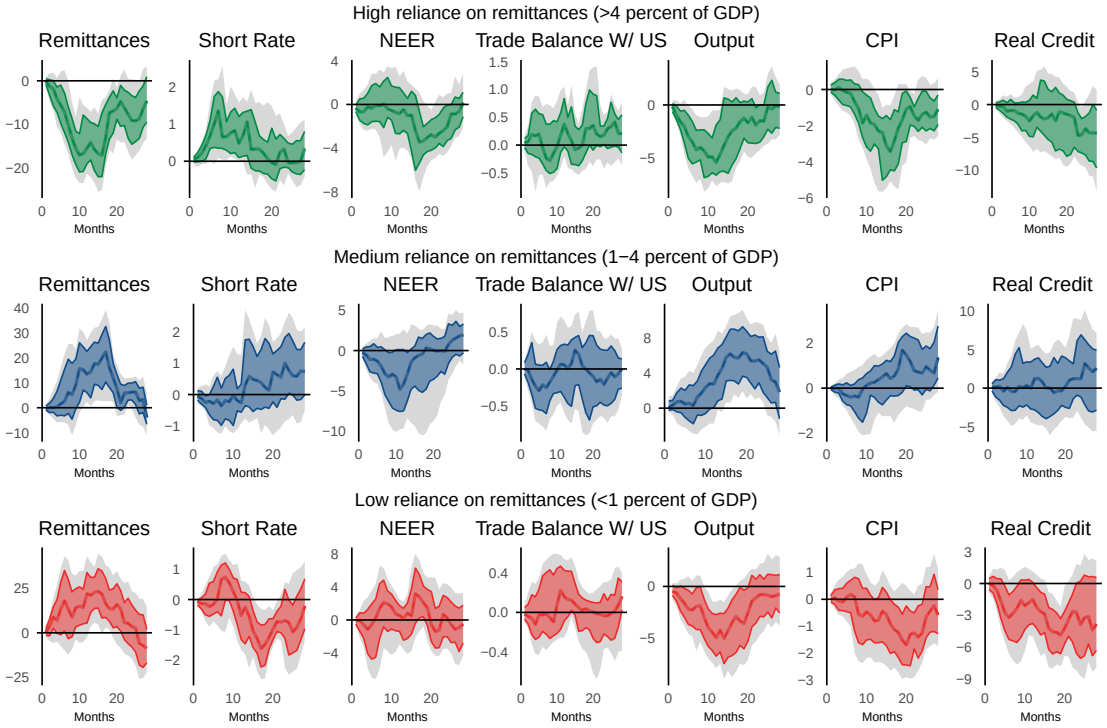
remittance inflows ($<$ 1 percent of GDP). Moreover, both test metrics are statistically significant, highlighting clear and significant differences in the remittances and output coefficients between these countries and those with high remittance-to-GDP ratios ($>$ 4 percent). These findings imply that the international spillover effects of US monetary policy shocks depend on remittance inflow levels; in particular, exceeding thresholds of 1 and 4 percent of GDP leads to marked changes in the responses of domestic variables.

Figure 8 presents the median outcomes for 41 recipient countries, categorized by their average remittances-to-GDP levels based on the thresholds previously defined.

The results indicate that following a tightening of US monetary policy, remittance inflows experience a statistically significant increase in recipient countries where remittances account for less than 4 percent of their GDP on average over the period. This increase amounts to nearly 20 percent, peaking after one year.

[10] Countries with remittances exceeding 4 percent include Guatemala (GT), Nicaragua (NI), Philippines (PH), Honduras (HN), Lebanon (LB), Jordan (JO), El Salvador (SV), Kyrgyzstan (KG), Croatia (HR), North Macedonia (MK), Dominican Republic (DO), Armenia (AM), Morocco (MA), Ecuador (EC), Egypt (EG), Pakistan (PK), Bangladesh (BD), and Sri Lanka (LK). Countries where remittances average 1-4 percent of GDP include Bulgaria (BG), Belarus (BY), Peru (PE), Colombia (CO), Mexico (MX), Bolivia (BO), Tunisia (TN), Vietnam (VN), Paraguay (PY), Romania (RO), Lithuania (LT), Azerbaijan (AZ), and India (IN). Conversely, countries where inflows represent less than 1 percent on average include Thailand (TH), Indonesia (ID), Turkey (TR), Uruguay (UY), South Africa (ZA), Slovenia (SI), Poland (PL), Hungary (HU), Panama (PA), and Costa Rica (CR).

Figure 8: *IRF median responses by degree of exposure to remittance flows*[10]



Note: Median of country-by-country responses to a contractionary one standard deviation US monetary policy shock resorting to local projections with 12 lags and Newey-West corrected standard errors. Shaded areas correspond to 68 and 90 percent confidence intervals. Monthly sample 1997:01-2017:12. Countries are classified based on the average remittances-to-GDP ratio over the 1997-2017 period. This graph presents the average remittances as a percentage of GDP for various countries from 1997 to 2017.

Another notable observation is that output declines across all categories except for countries where remittances constitute 1-4 percent of GDP over the period. For all other categories, output decreases by an average of 5 percent over the initial 12 months. In contrast, the output response in Row (2) of Figure 8 shows a minimal effect during the first 10 months, followed by a 6 percent increase, peaking at 20 months after the monetary policy shock.

CPI responses also vary among recipient countries. In countries heavily reliant on remittances, a noticeable decline in the CPI is observed. However, the surge in remittance inflows for less dependent economies appears to lead to a divergence from the overall decrease in inflation observed in other countries, including those sending remittances. This divergence is particularly pronounced in countries where remittances make up less than 4 percent of GDP. By considering the classic channels of international monetary policy transmission outlined by Taylor (1995)—specifically the exchange rate and interest rate channels (the "money view") and the bank-lending channel (the "credit view")—we can evaluate the full impact of the

remittance channel while also accounting for spillovers into these other channels (Acosta et al., 2009; Barajas et al., 2018).[11]

When analyzing the median IRFs across countries where remittances represent at least 4 percent of GDP, several key observations emerge. Firstly, an unexpected tightening of US monetary policy results in a nearly 20 percent reduction in remittance inflows, peaking after 12 months. This decline can be attributed to households in sending countries experiencing decreased incomes, rising unemployment, and asset depreciation, consistent with prior research (Machasio and Tillmann, 2023). Following this reduction, we observe a subsequent depreciation of the NEER, primarily because remittances often constitute a significant source of foreign currency reserves. Consequently, a decrease in remittances diminishes the demand for the local currency, leading to its depreciation.

These changes have a significant impact on the real economy, resulting in nearly a 6 percent decline in output and a 3 percent reduction in the price index. Interestingly, the short-term interest rate rises after a monetary tightening shock. This may seem counterintuitive, as short-term rates are generally expected to decrease following a contractionary shock to stimulate economic activity—similar to what is observed in remittance-sending countries, which are mainly advanced economies. However, in countries highly dependent on remittances, the decline in remittance inflows, combined with the depreciation of the exchange rate, exerts upward pressure on short-term interest rates. This increase aims to counter capital outflows and stabilize the economy, but it further weakens economic activity. De Leo et al. (2024) attribute this response to emerging economies' banking sector relying on international markets for dollar funding, often supported by remittance inflows, which impairs the transmission of monetary policy (Barajas et al., 2018). Consequently, a significant drop in remittances in economies heavily reliant on these inflows triggers an increase in short-term interest rates. The trade balance with the US does not seem to have a significant overall impact.

Overall, our findings reveal a distinct pattern: in countries with moderate reliance on remittances, inflows tend to rise during periods of US monetary tightening, suggesting counter-cyclicality. Conversely, in countries heavily reliant on remittances, inflows often contract, indicating a pro-cyclical dynamic. This

[11] The "money view" focuses on how monetary policy influences the prices and returns of financial assets. In our model, this is represented by the short-term interest rate and NEER. On the other hand, the "credit view" emphasizes the importance of the balance sheet and bank-lending channels. In our model, this is represented by the real credit variable.

divergence reflects the dual role of remittances—acting both as a stabilizing buffer and as a transmission channel for external shocks.

4.3. Evidence on channels behind remittance responses

Our estimates identify significant heterogeneity in remittance responses to US monetary policy shocks, conditional on countries' dependence on these inflows. A key question in interpreting these results is through what channels these responses are shaped.

4.3.1. External conditions and remittance motives

We examine how US monetary policy shocks influence remittance behavior by focusing on the underlying motivations for remitting—namely, whether remittances are driven by altruistic or self-interest motives. Existing literature distinguishes between these motives based on the cyclicality of remittance flows: altruistic and insurance-driven remittances tend to rise during downturns in the recipient country (counter-cyclical), while strategic, investment, and inheritance-driven remittances generally increase during periods of economic strength (pro-cyclical) (Rapoport and Docquier, 2006).

To empirically assess the strength of these motives, we extend our empirical strategy by incorporating externally weighted economic activity indices for both remittance-receiving and remittance-sending countries. For remittance-receiving countries, we follow Vacaflores (2018) and construct a weighted index of external economic activity using the KNOMAD bilateral remittances matrix to weight the industrial production indices of the ten most important remittance-sending countries. This allows us to account for how sensitive remittance inflows are to economic fluctuations in migrants' host countries, thereby endogenizing each receiving country's exposure to external business cycle conditions. For remittance-sending countries, we apply a symmetric approach: we use bilateral remittance outflow data to construct a weighted index reflecting the economic conditions of their main remittance-receiving partners. This second index is constructed by weighting recipient countries' industrial production by the share of remittances they receive from each sender. In doing so, we capture the external demand conditions that may influence both remittance behavior and broader macroeconomic adjustments in sending countries.

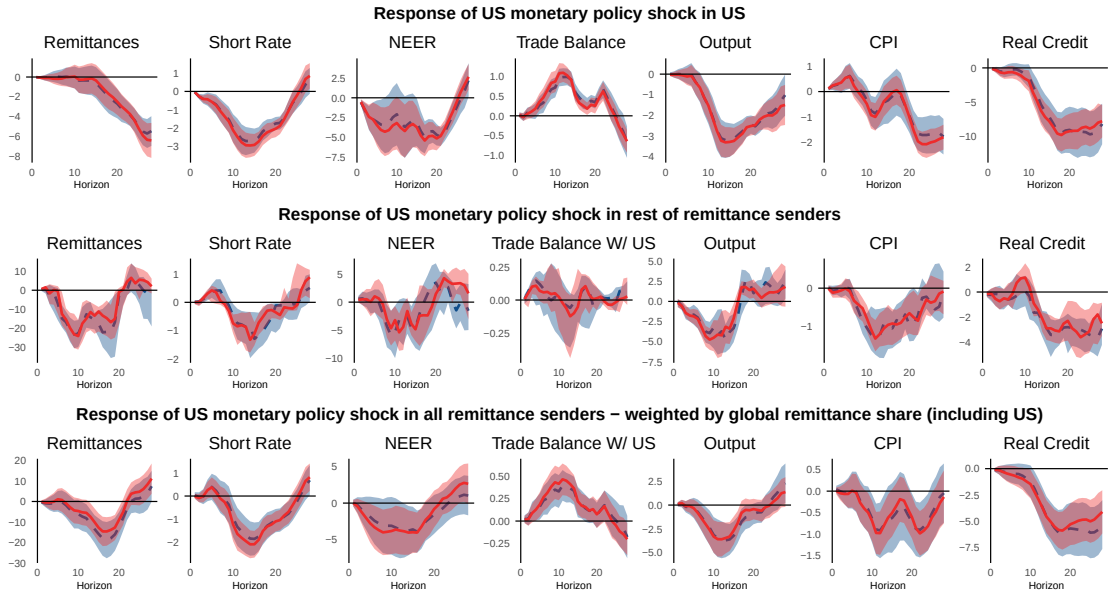
Both indices are included as exogenous variables in our median local projection specification to more accurately capture the differential exposure and responsive-

ness of remittance flows and output to US contractionary monetary policy. The augmented specification is as follows:

$$y_{t+h} = \alpha_h + \sum_{s=1}^{h} \delta_{'h} y_{t-s} + \beta_h USMP_t^{shock} + \sum_{s=1}^{h} \gamma_{'h} X_{t-s} + \sum_{s=1}^{h} \sigma_{'h} WEO_{t-s} + \varepsilon_{t+h} \quad (2)$$

where y_t is the dependent variable of interest, y_{t-s} represents its lagged values, X_t is a vector of domestic control variables, and WEO_t denotes the weighted external output index. The error term ε_t captures unobserved shocks.

Figure 9: *Responses to a US monetary policy shock in remittance-sending countries: benchmark specification versus extended specification*



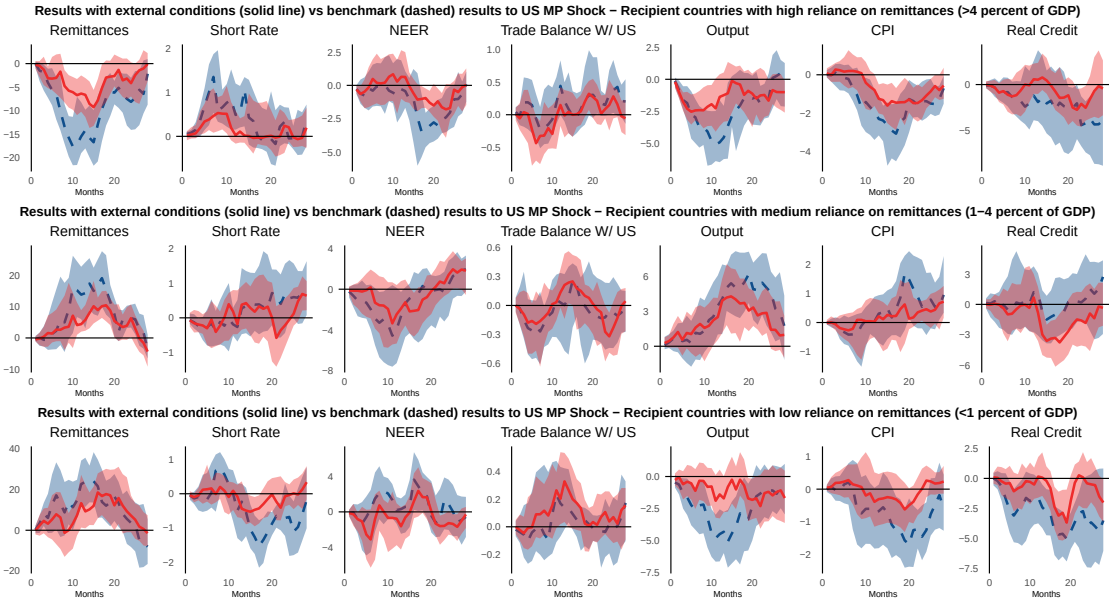
Note: This figure displays the median impulse response functions of key macroeconomic variables and remittance flows to a one standard deviation contractionary US monetary policy shock. The responses are shown separately for three groups: the United States, the rest of the remittance-sending countries, and all remittance senders weighted by their global remittance share (including the US). Each panel presents results from both the benchmark model (dashed blue line with shaded band) and an extended model incorporating weighted external output (solid red line with shaded band), with Newey-West corrected standard errors and 12 lags. The sample covers the period from January 1997 to December 2017.

Figure 9 shows a comparison between the median impulse response functions obtained from regressions that control for external conditions and those from our benchmark specification for remittance-sending countries. The extended specification consistently yields more precise estimates across variables, as reflected in the narrower confidence intervals. However, the overall picture remains unchanged. The response patterns for remittances, output, credit, and trade largely match those in the benchmark model. In particular, the timing asymmetry persists between the

US and other remittance-sending countries. In non-US senders, remittance outflows decline more rapidly following the policy shock, with the response materializing in the early horizons. In contrast, the decline in remittances from the US exhibits a delay, peaking after several months. This finding suggests that migrants adjust transfers in response to deteriorating conditions in their own economic environments. Such behavior is consistent with self-interest motives, whereby remittances are more likely to be sent during favorable economic periods, when migrants have disposable income.

Figure 10 presents the results for remittance-receiving countries grouped by their average remittances-to-GDP ratio—high, medium, and low. Again, the extended specification yields narrower confidence intervals across all groups, reflecting improved estimation precision. Importantly, the overall pattern remains consistent with our main results.

Figure 10: *Responses to a US monetary policy shock by remittance dependence: benchmark specification versus extended specification*



Note: This figure presents the median country-specific responses to a one standard deviation contractionary US monetary policy shock, estimated using local projections with 12 lags and Newey-West standard errors (±1 standard deviation bands). The sample spans January 1997 to December 2017. Countries are grouped based on their average remittances-to-GDP ratio over the period: high dependence ($\geq 4\%$), medium dependence (1–4%), and low dependence ($< 1\%$). For each group, the impulse response functions are shown for both the benchmark specification (dashed blue line with shaded band) and the extended specification that incorporates weighted external output (solid red line with shaded band).

Specifically, in countries with moderate and low reliance on remittances, inflows tend to rise following a contractionary US monetary policy shock, suggesting a

counter-cyclical response consistent with altruistic or insurance motives. This dynamic is preserved in the extended specification, indicating that controlling for external conditions does not reverse the underlying behavioral mechanism. In contrast, countries with high reliance on remittances continue to exhibit a pro-cyclical pattern, consistent with self-interest or investment-driven motives—remittance inflows decline following monetary tightening, with the contraction appearing somewhat later and less persistently once external conditions are accounted for. This suggests that in highly dependent countries, remittances are more sensitive to the economic constraints or incentives faced by migrants in host economies, reinforcing their role as a transmission channel rather than a buffer.

4.3.2. Migrant skill composition and the cyclicality of remittances

Beyond individual behavioral motives, the education and skill levels of migrants are also key determinants of remittance behavior. These attributes influence migrants' income stability, employment security, and access to financial services—factors that critically affect how remittances respond to external shocks. Research by Bollard et al. (2011) finds that higher-income and better-educated migrants tend to remit larger amounts per transfer, supported by their more stable earnings and stronger integration into financial networks. This financial resilience allows skilled migrants to adjust their remittance flows more flexibly in the face of economic disruptions in the host country. In contrast, low-skilled migrants, who are more likely to experience job insecurity and limited access to banking services, may be less able to sustain remittances during downturns.

Building on this, we introduce the skill composition of migrant populations as an important determinant of aggregate remittance cyclicality. To quantify this effect, we use data from the OECD's Database on Immigrants in OECD and non-OECD Countries (DIOC), classifying migrants into three skill groups based on educational attainment: low-skilled (ISCED 0–2), medium-skilled (ISCED 3–4), and high-skilled (ISCED 5A/5B–6). We calculate the average skill distribution of each country's diaspora using data from 2006, 2011, and 2021, and link this to the estimated impulse responses of remittances to a contractionary US monetary policy shock.

Table 2 presents the average skill composition of migrant populations across countries grouped by their level of remittance dependence. It highlights a clear gradient: countries with higher remittance reliance tend to have a larger share of low-skilled migrants, while those with moderate or low dependence are more

likely to have medium-skilled migrant populations. This distribution reflects long-standing differences in migration patterns and labor demand across host economies, and it has important implications for how countries experience remittance flows in response to external shocks.

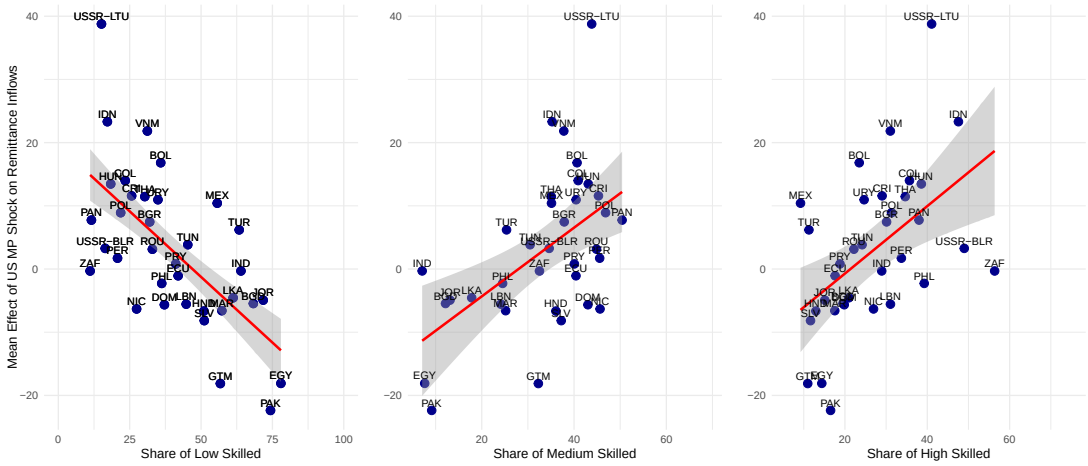
Table 2: *Average migrant skill composition by remittance dependence level*

Remittance dependence	Average remittances (in % of GDP)	Average migrant skill composition (%)		
		Low skilled	Medium skilled	High skilled
Low	0.6	26.0	39.4	34.6
Moderate	2.3	35.1	36.9	28.1
High	9.8	55.0	25.2	19.8

Note: Skill composition reflects the average share of low-, medium-, and high-skilled migrants in each remittance-dependence group. Values are calculated using the OECD DIOC data for the years 2006, 2011, and 2021.

Figure 11 builds directly on this insight by examining how the skill composition of migrants affects the cyclicality of remittances following a contractionary US monetary policy shock.

Figure 11: *Remittance responses to a US monetary policy shock by skill composition of migrant populations*



Note: Mean remittances responses to a contractionary one standard deviation US monetary policy shock. Sample 1997:01-2017:12. Each dot corresponds to the mean IRF response of remittances to a US monetary policy shock over the horizon $t = 24$ for the y-axis, while the x-axis indicates the share of the migrant population in each skill group, as derived from the OECD DIOC database. The red line represents the linear trend line while the gray shade corresponds to the corresponding standard errors.

The results show a clear pattern: countries with a higher share of low-skilled migrants experience significantly more negative remittance responses, while those

with greater shares of medium- or high-skilled migrants display attenuated or even counter-cyclical responses. These patterns align with theoretical expectations. Low-skilled migrants, often concentrated in informal and vulnerable employment, are more susceptible to income volatility during downturns and may struggle to sustain remittances. In contrast, higher-skilled migrants typically enjoy greater employment stability, higher earnings, and access to financial services, enabling them to smooth or even increase remittance flows when economic conditions tighten.

Therefore, Figure 11 provides evidence that differences in migrant skill levels align with the strength and direction of remittance responses, indicating that a country's remittance cyclicality is driven by its migrant population's skill composition. Countries with high remittance dependence—and a predominance of low-skilled migrants—are more likely to experience pro-cyclical remittance behavior, making them more vulnerable to external financial shocks. Conversely, countries with a more diversified or skilled diaspora may benefit from more stable or counter-cyclical remittance flows, reinforcing their resilience during global downturns.

5. Robustness checks

In this section, we conduct several robustness checks to ensure the reliability of our findings. These include analyzing an alternative high-frequency shock, adding control variables, examining various lag structures, and estimating a panel local projection model.

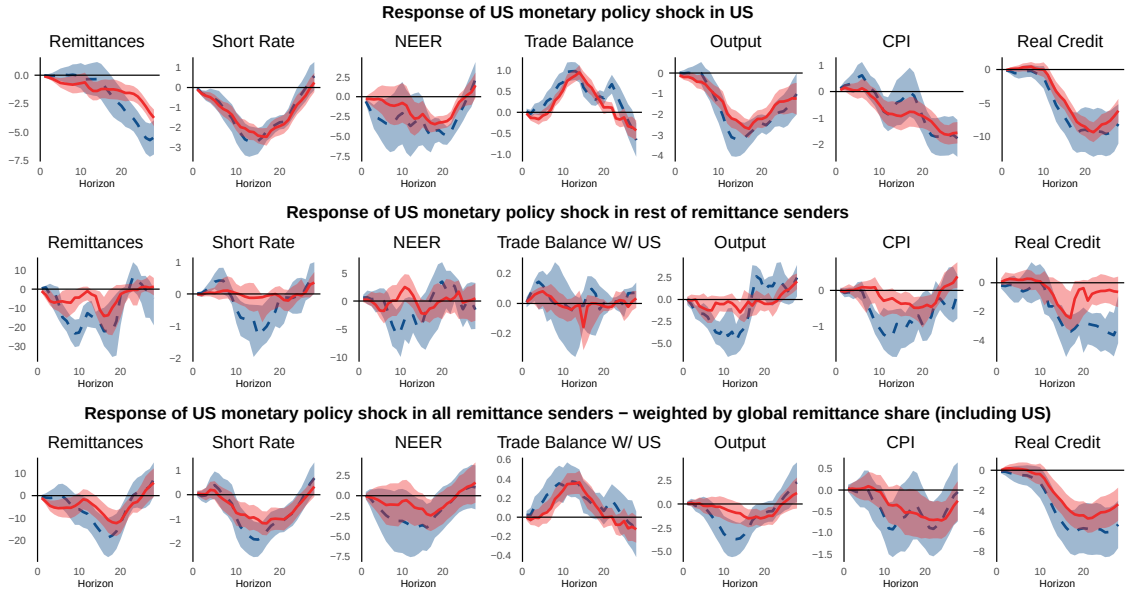
5.1. Using an alternative high-frequency shock

We compare the impulse responses obtained using two high-frequency monetary policy shocks. The main difference lies in how they each account for the central bank information (CBI) effect. The first is the Jarociński–Karadi (JK) shock (Jarociński and Karadi, 2020), which captures both the surprise in policy rates and the CBI effect by exploiting the co-movement of stock prices around Federal Reserve announcements. The second is the Miranda-Agrippino–Ricco (MAR) instrument (Miranda-Agrippino and Ricco, 2021), employed throughout our main analysis, which isolates the pure policy surprise by conditioning on the Fed's Greenbook forecasts to account for its information set at the time of each announcement.

Figure 12 illustrates the differential effects of US monetary policy shocks across remittance-sending countries, using these two high-frequency identification strategies. This distinction in identification leads to notable differences in the

magnitude and timing of macroeconomic responses. In the United States (top row), both shocks generate contractionary dynamics following a tightening: output, credit, and inflation fall, while interest rates and the exchange rate rise. However, the MAR shock produces substantially stronger declines, particularly for remittances. In the rest of the remittance-sending countries (middle row), the divergence between the two shocks becomes even more pronounced. The MAR shock results in steep declines in remittances, output, and credit, suggesting strong international spillovers when only the surprise policy component is considered. The JK shock, again, leads to more gradual and muted responses. Remittances in these countries also fall, but with a lag relative to output, suggesting a sequential transmission: US monetary tightening first slows economic activity in sending countries, which then leads to reduced remittance transfers. The bottom row shows global responses across all remittance-sending countries, weighted by remittance shares. Patterns are consistent: remittances, output, and credit fall across both shocks, but again with sharper movements under MAR.

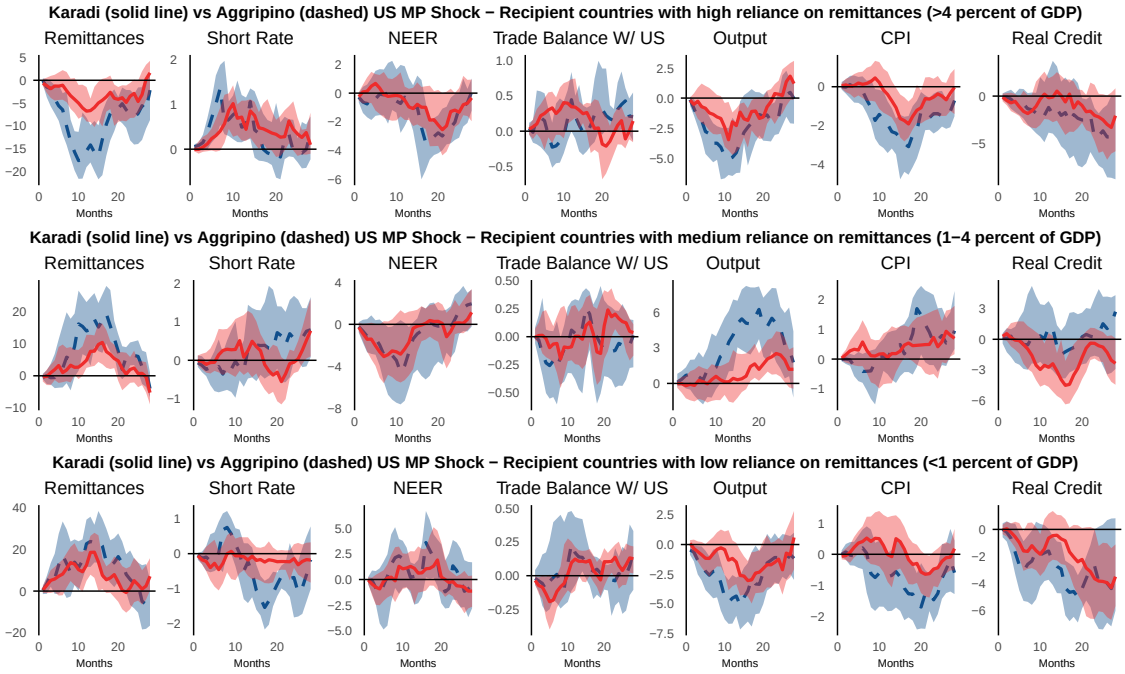
Figure 12: *Robustness to high frequency US monetary policy shock: Jarociński and Karadi (2020) vs Miranda-Agrippino and Ricco (2021) - Median IRF in remittance-sending countries*



Note: Median of country-by-country responses to a contractionary one standard deviation US monetary policy shock resorting to local projections with 12 lags and Newey-West corrected standard errors and standard deviation error bands. Monthly sample 1997:01-2017:12. In each graph we show the median and standard errors for the US monetary policy shock estimated by Jarociński and Karadi (2020) (solid line and red shade) and the previous one estimated by Miranda-Agrippino and Ricco (2021) (dash line and blue shade).

In recipient countries (Figure 13), the JK shock leads to smaller movements in remittances. This is consistent with the pattern observed in remittance-sending countries, where the contractionary effects—on output, credit, and remittance outflows—are also more moderate under the JK shock. Despite these differences in sensitivity, the overall pattern of transmission remains unchanged across the three categories of recipient countries: Specifically, for countries with remittances-to-GDP ratios above 4 percent, both measures of shock indicate a decrease in remittances and economic output, along with a rise in short-term interest rates, highlighting the vulnerability of these economies to sudden changes in US monetary policy. For countries with remittances-to-GDP ratios between 1 and 4 percent, the analysis consistently shows positive impacts on remittances and economic output from both shocks.

Figure 13: *Robustness to high-frequency US monetary policy shock: Jarociński and Karadi (2020) vs Miranda-Agrippino and Ricco (2021) – Median IRF responses by degree of reliance to remittances as a share of GDP*

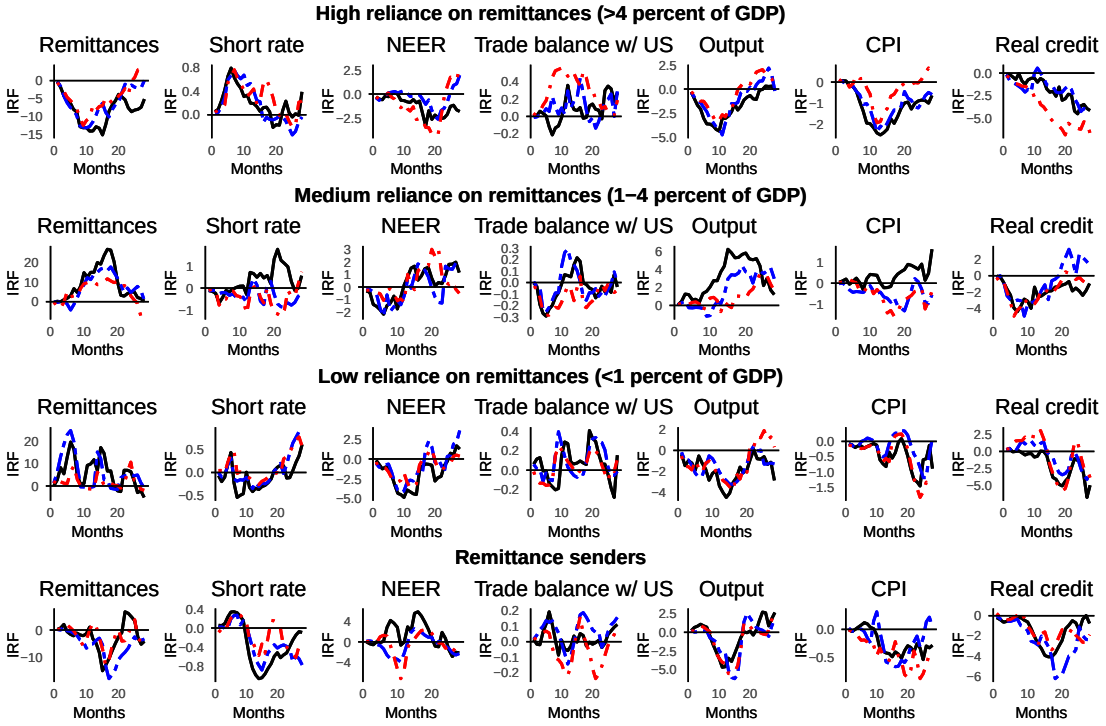


Together, these results highlight how shock identification critically shapes the magnitude and the temporal structure of international transmission, but not the underlying structure or direction of the responses across countries.

5.2. Adding control variables

We also add control variables to test the robustness of our results. Figure C.1 in Appendix C controls for the commodities cycle, while Figure C.2 controls for financial crises throughout the Financial stress index (Ahir et al., 2023). Figure C.3 controls for the excess bond premium as outlined by Gilchrist and Zakrajšek (2012), and Figure C.4 controls for foreign exchange reserves held by central banks. All these specifications are consistent with the benchmark results, showing an inverse U-shaped effect of the US tightening shock on output, depending on the reliance on remittances as a share of GDP, and a negative effect on remittances in countries that are highly dependent on them.

Figure 14: *Robustness to lag specification (6, 9 and 12 lags) – Median IRF responses by degree of reliance to remittances as a share of GDP*



Note: Median of country-by-country responses to a contractionary one standard deviation Miranda-Agrippino and Ricco (2021) US monetary policy shock resorting to local projections with 12 (black, solid), 9 (blue, twodash) and 6 (red, dotdash) lag specifications and Newey-West corrected standard errors. Monthly sample 1997:01-2017:12. Countries are classified based on the average remittances-to-GDP ratio over the 1997-2017 period while the last row corresponds to remittance-sending countries.

5.3. Sensitivity to the choice of lag length

Figure 14 investigates the impact of lag length on our findings, systematically presenting the results from employing different lag lengths—6, 9, and 12—in our

LP analysis.

The main insight from this analysis is the remarkable consistency of the results across various lag configurations. Whether we use 6, 9, or 12 lags, our core conclusions remain unchanged, indicating that our findings are robust and not contingent upon a specific lag length. However, given that our dataset includes monthly observations, the 12-lag structure uniquely allows for a comprehensive capture of annual dynamics.

5.4. Estimating panel local projections

Finally, we employ an alternative econometric approach by applying panel LP to various subsamples. This method allows us to evaluate the effectiveness of using median responses from specific subgroups for analysis. Specifically, we estimate a linear panel model for each group of countries, categorized according to their dependence on remittances:

$$y_{i,t+h}^{(v)} = \alpha_{i,h}^{(v)} + \sum_{s=l}^{h} \delta_h^{(v)} y_{i,t-s}^{(v)} + \beta_h^{(v)} USMP_{i,t}^{shock} + \sum_{s=l}^{h} \Omega_h^{(v)} X_{i,t-s}^{(v)} + \lambda_i + \varepsilon_{i,t+h}^{(v)} \quad (3)$$

where v represents each of the dependent variables: *Remittances*, *Short rate*, *NEER*, *Trade balance with the US*, *Output*, *CPI*, and *Real credit*. $y_{i,t+h}^{(v)}$ is the dependent variable, $y_{i,t-s}^{(v)}$ is the lagged dependent variable, λ_i corresponds to the country fixed effects and $X_{i,t-s}^{(v)}$ is a vector encompassing the rest of the lagged dependent variables as controls. The identified US monetary policy shock is denoted by $USMP_{i,t}^{shock}$. Thus, the coefficient $\beta_h^{(v)}$ measures the impact of a policy change at time t on the dependent variable v h periods ahead. We also consider $s = 12$ lags.

We estimate Equation (3) using the LP approach over a sample period from January 1997 to December 2017, resulting in 240 monthly periods.[12] We employ Driscoll and Kraay (1998) robust standard errors to account for cross-sectional and serial correlation in panel models .

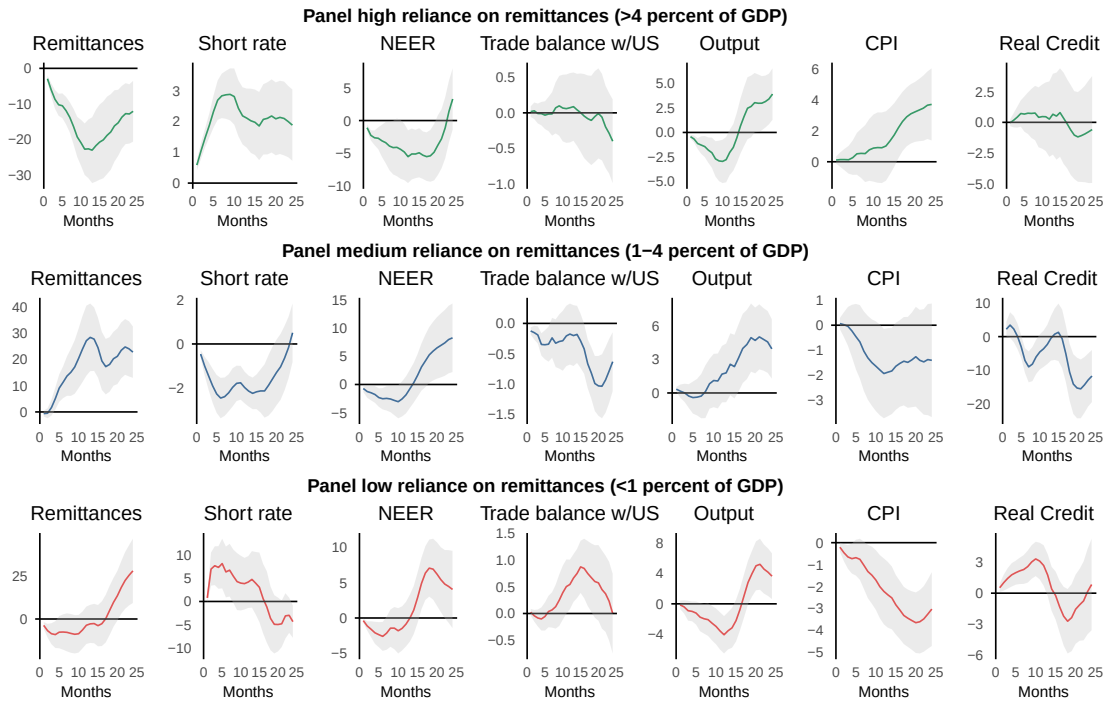
Figure 15 clearly illustrates how different levels of reliance on remittances affect economic indicators, corroborating our initial findings with median IRFs on a country-by-country basis.

For the panel of countries with a remittances-to-GDP ratio exceeding 4 percent, there is a noticeable drop in remittances accompanied by a downturn in economic

[12] Due to data availability of the monetary policy instrument.

performance, confirming our previous results about these economies' vulnerability to external financial shifts. These countries also exhibit a significant decline in their NEER despite a rise in short-term interest rates, leading to an increase in prices. In contrast, the panel of countries with a remittances-to-GDP ratio of 1 to 4 percent shows a different pattern, with increases in both remittance inflows and economic output, alongside a decrease in short-term interest rates. This improvement is accompanied by a rise in NEER and a slight decrease in CPI. For the panel of countries with a remittances-to-GDP ratio below 1 percent, the effects are subtler and less clear-cut. Remittances dip briefly and then bounce back over the next few months, short-term interest rates inch down, output contracts, and prices edge lower. This limited reaction likely reflects the small role that remittance inflows play in these economies; it may also be that other factors dampen external shocks in ways our panel specification may not fully capture.

Figure 15: *Robustness to panel local projections, by degree of reliance to remittances as a share of GDP*



Note: Responses to a contractionary one standard deviation US monetary policy shock resorting to panel local projections with 12 lags and Driscoll and Kraay's corrected standard errors along with 1 standard deviation error bands. Monthly sample 1997:01-2017:12. Countries are classified based on the average remittances-to-GDP ratio over the 1997-2017 period.

Overall, the panel data evidence supports the validity of our analysis for these countries by shedding light on the underlying mechanisms. The only substantial difference noted is a decrease in short-term rates for countries with moderate

reliance on remittances, following an increase in remittance flows. This specific pattern reveals that remittances can affect monetary policy autonomy—giving central banks the leeway to cut rates and better absorb external shocks.

6. Conclusion

This article expands the empirical evidence supporting the existence of a "Global Financial Cycle" linked to economic conditions in the "center country" (Rey, 2015), with a particular focus on the unique role of remittance dependence within this framework. As remittances have now surpassed foreign direct investment and development aid in numerous countries, they have become a critical driver of growth and stability for recipient economies. Moreover, remittances are highly sensitive to monetary policy changes, serving as a significant transmission channel through which US monetary policy influences other nations' economies. This sensitivity amplifies the impact of US monetary tightening, particularly in countries that heavily rely on remittance inflows, affecting their economic resilience and stability.

We find that reliance on remittances has an inverse U-shaped effect on the output response to a US monetary policy shock. We identify a threshold of remittance inflows that shapes the spillover effects of a US monetary policy shock. When remittances constitute a moderate portion of a country's GDP—less than 4 percent—they tend to follow a counter-cyclical pattern after US monetary tightening. Specifically, for flows between 1 and 4 percent of a country's GDP, remittances can help soften and even counteract the global downturn triggered by tighter US monetary policy. On the other hand, countries more dependent on remittances—exceeding 4 percent of their GDP—face significant recessionary effects, with adverse impacts on various economic indicators, including remittances, output, prices, and credit. The direction of these responses across countries remains robust across various robustness checks, including alternative high-frequency shocks, different lag structures, and panel local projection model estimates.

Incorporating weighted external output indices confirms that self-interest motives dominate in high-dependence countries, whereas altruistic and insurance-based motives are more relevant in lower-dependence contexts. Furthermore, we document a clear gradient in remittance cyclicality by migrant skill composition: countries with a larger share of low-skilled migrants experience more pro-cyclical remittance responses, making them more vulnerable to external shocks. By contrast, countries

with a more skilled diaspora benefit from more stable or even counter-cyclical remittance flows.

Our findings highlight the risks associated with heavy reliance on remittance flows. Contrary to previous literature suggesting that remittances help smooth economic cycles, our results indicate that such dependence can exacerbate downturns and increase vulnerability—a sharp decline in remittances inflows can quickly translate into a weakening of domestic demand and output. Moreover, the resulting decline in foreign currency reserves may prompt countercyclical increases in short-term interest rates to prevent sharp currency depreciation, further deepening economic instability. Given the additional implications for financial sector stability, these findings call for regulatory oversight similar to that applied to other capital flows. Policymakers should recognize these vulnerabilities and consider strategies to reduce excessive reliance on remittances, thereby protecting monetary policy autonomy and overall economic stability.

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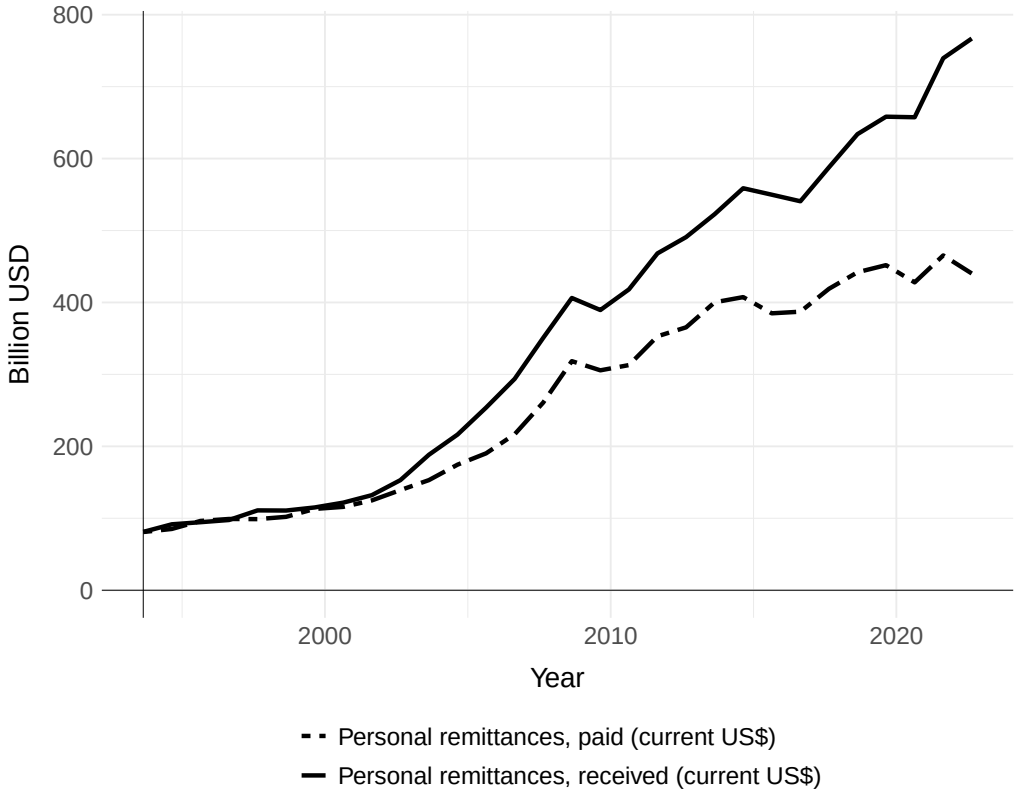
Appendices

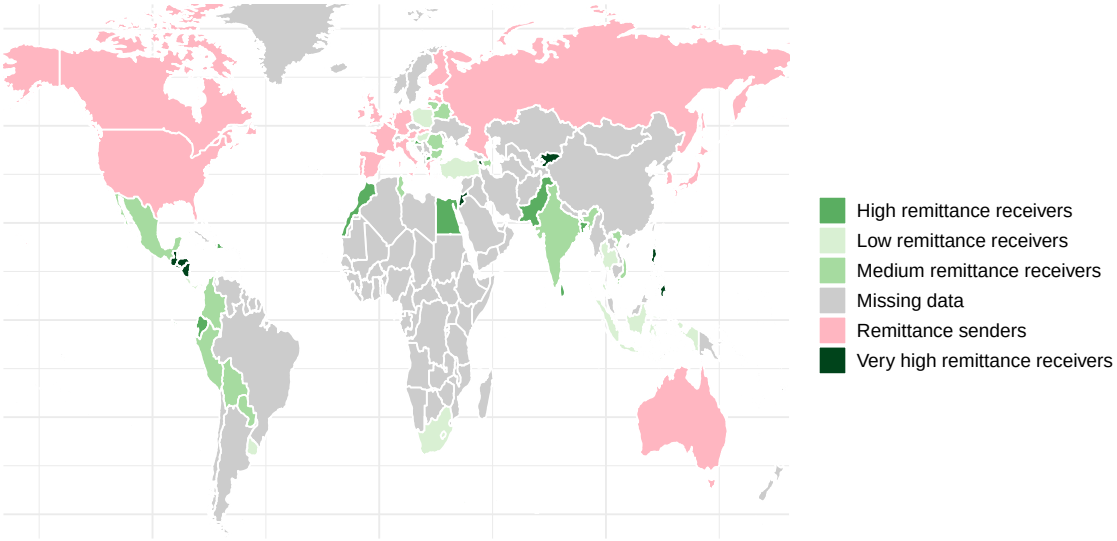
Appendix A - Data and sample

Figure A.1: *Remittance reporting gap*



Note: The figure reports personal remittances paid (dashed line) and received (solid line) in billions current US$. Source: Total personal remittances data are extracted from https://data.worldbank.org/indicator/BM.TRF.PWKR.CD.DT.

Figure A.2: *Countries in the sample*



Note: The world map represents the countries included in the sample, colored by the average level of remittances-to-GDP over the 1997-2017 period.

Table A.1: *Descriptive statistics - Recipient countries*

	Country	Remittances in % of GDP	Exchange Regime Arrangement	Capital account openness	GDP PC (PPP)	Average inflation	Average monthly growth	Trade balance to GDP	Trade with US with US	Share of trade with US (%)	Trade openness
KG	Kyrgyzstan	16.2	Floating	Open	3811.4	7.8	0.8	-29	-1.2	1.9	70.8
SV	El Salvador	17.5	Fixed	Open	7218	2.6	0.2	-20.8	-0.6	43	54.2
LB	Lebanon	16.8	Fixed	Open	15905.2	2.8	0.5	-2.9	-2.7	6.4	42.9
HN	Honduras	13.8	Intermediate	Closed	4654.7	7.9	0.6	-25.9	1.9	96.5	57.3
JO	Jordan	15.6	Intermediate	Open	10071.6	3.4	0.2	-38.4	-0.1	10.7	67.4
PH	Philippines	9.9	Floating	Closed	5598.5	4.4	0.2	-3.4	2.5	20.2	53.7
GT	Guatemala	8.4	Intermediate	Open	6945.9	5.9	0.4	-13.6	0.2	41.7	42.4
NI	Nicaragua	8.4	Intermediate	Open	4561.9	8	0.3	-24.2	10	48.2	50.3
AM	Armenia	8.1	Intermediate	Open	8053.6	4.1	1.8	-24.2	-0.7	4.4	45.7
DO	Dominican Republic	7.3	Intermediate	Open	11737.6	8.7	0.5	-15.4	-1.9	51.3	43.1
LK	Sri-Lanka	7	Intermediate	Closed	8498.4	8.5	0.6	-9.1	5.8	14.2	39.8
BD	Bangladesh	7.2	Intermediate	Closed	3288.2	6.7	1.4	-7.3	3.4	13.7	27.9
MA	Morocco	6.8	Intermediate	Closed	6245.9	1.6	0.2	-15.9	-0.6	4.6	46
EG	Egypt	5.4	Intermediate	Open	9844.1	9	0.3	-1.3	-1.9	11.1	33.2
PK	Pakistan	4.9	Intermediate	Closed	4237.5	7.5	0.5	-6.1	1.1	11.3	21.3
HR	Croatia	5.4	Intermediate	Closed	22475.6	2.3	0.1	-17.9	0.2	2	50.8
MK	North Macedonia	4.5	Intermediate	Closed	13162.2	1.9	0.1	-20.8	1.3	2.7	77.2
EC	Ecuador	4.5	Fixed	Open	9942.4	15.4	0.3	0.8	5	37.4	38.1
VN	Vietnam	4	Intermediate	Closed	5485.8	6.4	2.1	-5.1	6.9	9.9	84.7
TN	Tunisia	3.6	Intermediate	Closed	9369.4	3.8	0.1	-12	-0.3	2.6	62.8
BO	Bolivia	3.3	Intermediate	Open	6344.4	5	0.4	1.3	0.5	11.1	45.6
BG	Bulgaria	2	Fixed	Open	14375	70.8	0.30	-11.6	0.70	54.5	51.5
IN	India	1.7	Floating	Closed	3556.4	6.8	0.7	-5.2	1.1	8	24.2
RO	Romania	3.2	Floating	Open	7930	21.3	0.5	-9	0.5	2.4	55.9
MX	Mexico	1.9	Floating	Open	18065.1	6.5	0.1	-0.8	5.3	68.3	44.9
CO	Colombia	1.7	Floating	Closed	11486.7	6.7	0.3	-1.2	1.6	36.1	23.3
AZ	Azerbaijan	2.3	Intermediate	Closed	12369	5.6	0.3	12.8	0.7	5.9	46.1
PE	Peru	1.6	Floating	Open	8958.1	3.3	0.3	2.1	0.4	22.7	30.9
LT	Lithuania	2.4	Fixed	Open	23507	2.4	0.6	-10.7	0.8	3.1	93.6
PY	Paraguay	1.4	Floating	Open	9748.5	6.8	0.4	-8.3	-5.7	12.4	45.7
BY	Belarus	1.3	Floating	Closed	16103.4	45	0.5	-8.3	0.7	1	96.9
ID	Indonesia	0.9	Floating	Open	7645	10.2	0.4	7	2.8	11.1	35.7
CR	Costa Rica	0.9	Intermediate	Open	15148.2	8.2	0.2	-8.9	3.5	50.9	57.1
TH	Thailand	0.6	Floating	Closed	12910.3	2.5	0.1	1.5	5.8	12.3	88.4
PL	Poland	0.7	Floating	Closed	21472.1	3.9	0.8	-4.9	0.2	2.1	53.8
TR	Turkey	0.5	Floating	Closed	19238.7	25.5	0.3	-8.2	-0.2	5.9	31.8
ZA	South Africa	0.3	Floating	Closed	12642	5.9	0.1	-0.8	0.7	9.9	34.3
HU	Hungary	0.2	Floating	Open	24554.4	5.9	0.4	0.3	2.1	3.4	106.6
SI	Slovenia	0.10	Fixed	Open	29852.40	3.90	0.20	-3.40	0.70	1.90	87.50
PA	Panama	0.8	Fixed	Open	19598.9	2.4	0.9	-19.8	-13.9	63.8	23.2
UY	Uruguay	0.3	Floating	Open	17069.8	8.9	0.2	-3.7	-0.8	11.5	26.7

Note: All data extracted from IHS Markit, national Central Bank data, SPGlobal and StLouis FRED.

Table A.2: *Descriptive statistics - Sending countries*

	Country	Remittances in % of GDP	Exchange Regime Arrangement	Capital account openness	GDP PC (PPP)	Average inflation	Average monthly growth	Trade balance to GDP	Trade with US with US	Share of trade with US (%)	Trade openness
KR	South Korea	0.7	Floating	Closed	30146.2	2.8	0.6	3.1	1.7	8.4	54.1
JP	Japan	0.1	Floating	Open	37865.9	0.1	0	0.8	1.5	18	19.6
RU	Russia	0.8	Floating	Closed	20561.4	16	0.4	10.4	1.1	5.4	34.4
AU	Australia	0.1	Floating	Open	37980.2	2.5	0.2	-0.4	-1.2	10.6	26.3
GB	United Kingdom	0.1	Floating	Open	41584.8	2	0.1	-5.4	0.2	10.9	30.8
CA	Canada	0.4	Floating	Open	44189.2	1.8	0.1	2	4.1	71.7	47.9
US	United States	0.9	Floating	Open	53279.6	2.2	0.1	-3.5	-3.5	100	17
EZ	Euro area	0.1	Floating	Open	31548.3	1.7	0.1	1.1	0.7	3.7	53.2

Note: All data extracted from IHS Markit, national Central Bank data, SPGlobal and StLouis FRED.

Table A.3: *Data description for monthly time series*

Variable	**Description**	**Source**	**Coverage**
Output	Production index, industry, harmonized / Coincident economic activity index based on data availability	IHS Markit, national central bank data	1997m1 - 2017m12
CPI	Harmonized Index of Consumer Price (HICP)	IHS Markit	1997m1 - 2017m12
Remittances	Secondary income, financial corporations, non-financial corporations, households and nphishs, personal transfers, credit(debit), BOP, US$, Millions	IHS Markit	1997m1/1999m6 - 2017m12
NEER	Nominal effective exchange rates (51 trading partners considered)	See Darvas, Zsolt (2021)	1997m1 - 2017m12
REER	Real effective exchange rates (51 trading partners considered)	See Darvas, Zsolt (2021)	1997m1 - 2017m12
Short rate	Interest rate, short term rate - which consists of the Treasury Bill Yield under 365 Days (aop) or the Short-Term Money Market Rate (aop) - based on data availability	IHS Markit	1997/2000m1 - 2017m12
Real domestic credit	Depository Corporations, Claims on Other Sector, Claims on Private Sector (Local currency Unit), Inflation-Adjusted	IHS Markit	1997m1 - 2017m12
Trade balance with US	Monthly merchandise trade balance with US —Imports from country (CIF, MUSD) minus Exports to country (FAS, MUSD)— expressed as a percentage of nominal GDP in USD	IHS Markit/U.S Census Bureau	1997m1 - 2017m12
Trade balance	Monthly merchandise trade balance	IHS Markit/IMF	1997m1 - 2017m12
US MP instrument	High-frequency instrument for monetary policy	Degasperi and Ricco (2021)	1997m1 - 2017m12
ER classification	Fine and coarse de facto exchange rate classification	Ilzetzki, Reinhart and Rogoff (2021)	1997m1 - 2017m12
Capital account openness	Chinn-Ito index (KAOPEN) measuring a country's degree of capital account openness	Chinn and Ito (2006)	1997m1 - 2017m12
Core CPI	Consumer Price Index Excluding Energy and Food	IHS Markit	1997m1 - 2017m12

Note: All data extracted from IHS Markit, national Central Bank data, SPGlobal and StLouis FRED.

Appendix B - Additional results

Figure B.1: *US response - robustness including CPI and Core CPI*

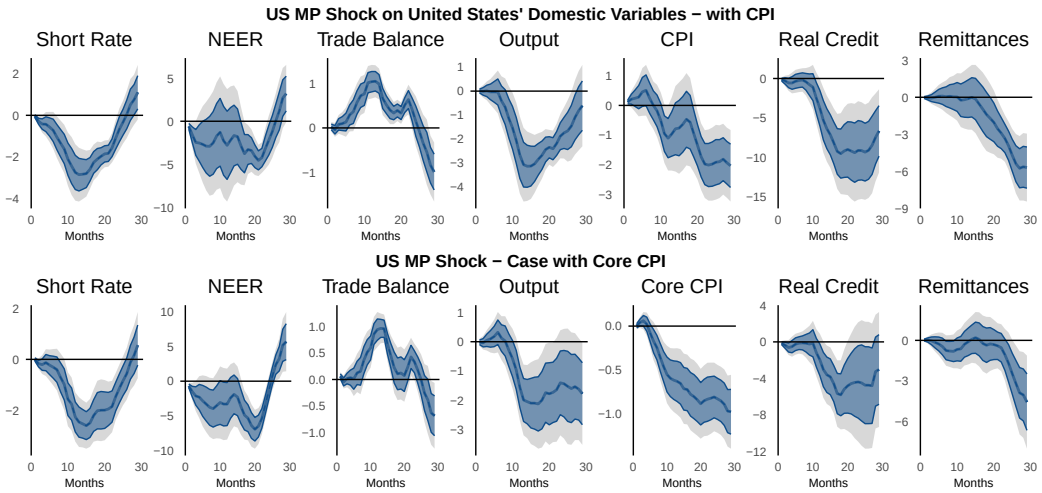
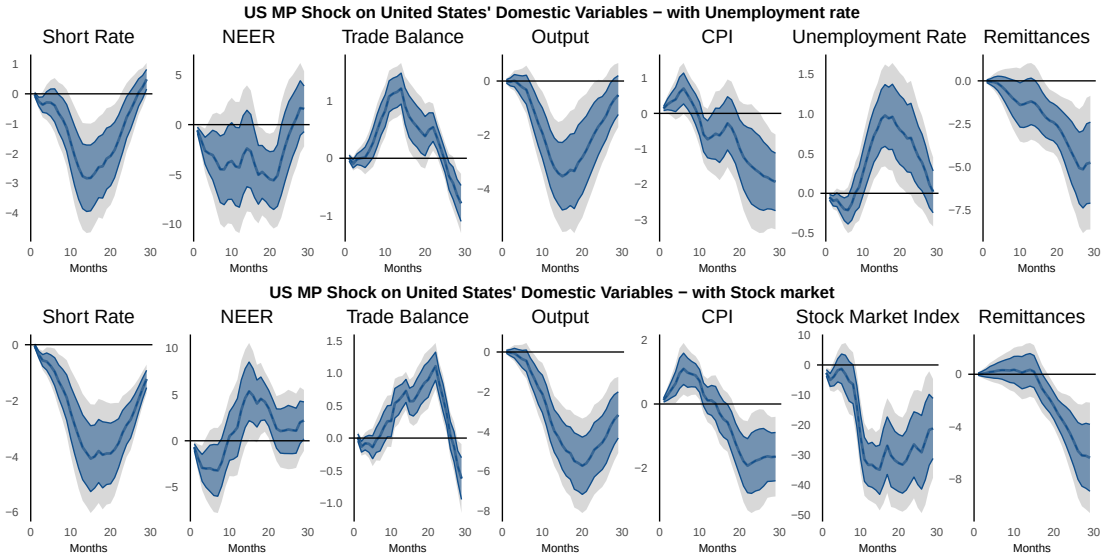
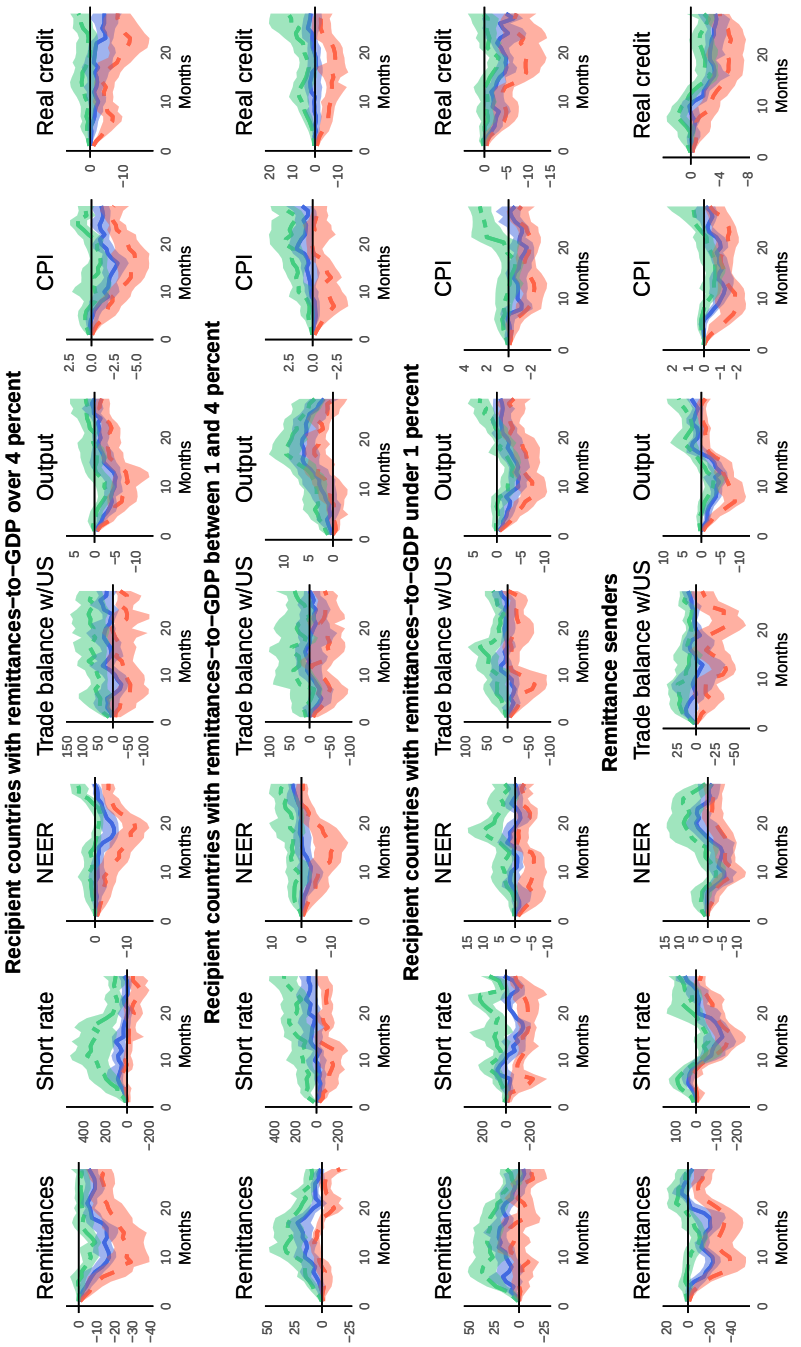


Figure B.2: *US response - robustness including the unemployment rate and the stock market index*



Note: Impulse responses of domestic endogenous US variables to a contractionary one standard deviation US monetary policy shock, resorting to local projections with 12 lags and Newey-West corrected standard errors. The unemployment rate corresponds to the U-3 rate reported by the Bureau of Labor Statistics. The stock market index corresponds to the S&P 500 Composite Index. Shaded areas correspond to 68 and 90 percent confidence intervals. Monthly sample 1997:01-2017:12.

Figure B.3: *IRF 25th, median and 75th percentile responses by degree of exposure to remittance flows*



Note: Median of country-by-country responses to a contractionary one standard deviation US monetary policy shock resorting to local projections with 12 lags and Newey-West corrected standard errors. We report the results for the 68 percent confidence intervals. Monthly sample 1997:01-2017:12. Countries are classified based on the average remittances-to-GDP ratio over the 1997-2017 period. In each graph we show the median (blue shade), 25th (red shade) and 75th (green shade) percentiles of the endogenous variables responses and standard errors from each group of countries.

Figure B.4: *Stability of group categories based on average remittances-to-GDP over period 1997-2017*

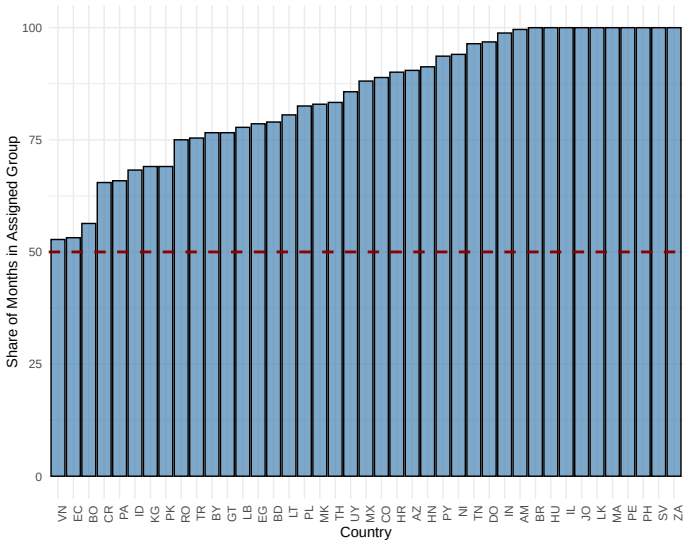
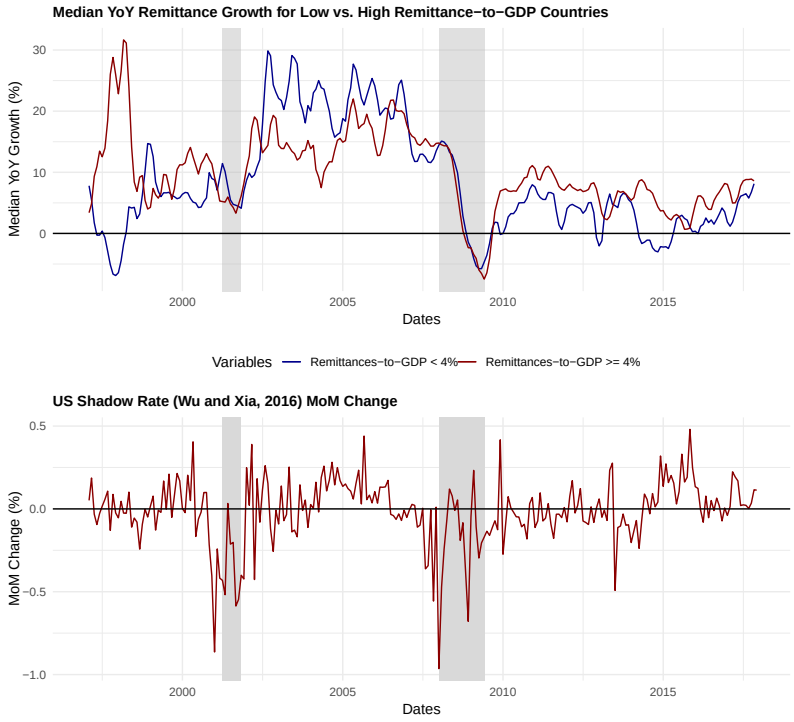


Figure B.5: *Divergence in remittance inflows, by degree of GDP-weighted exposure*



Note: Countries are classified based on the average remittances-to-GDP ratio over the 1997-2017 period. The histogram shows the average share of months in which each countries' remittance-to-gdp ratio is within its whole period average group. For instance El Salvador has a remittance-to-gdp ratio over 4 percent of GDP over the whole sample period. Shaded area corresponds to the NBER based Recession Indicators for the US from the period following the peak through the trough, retrieved from https://fred.stlouisfed.org/series/USREC.

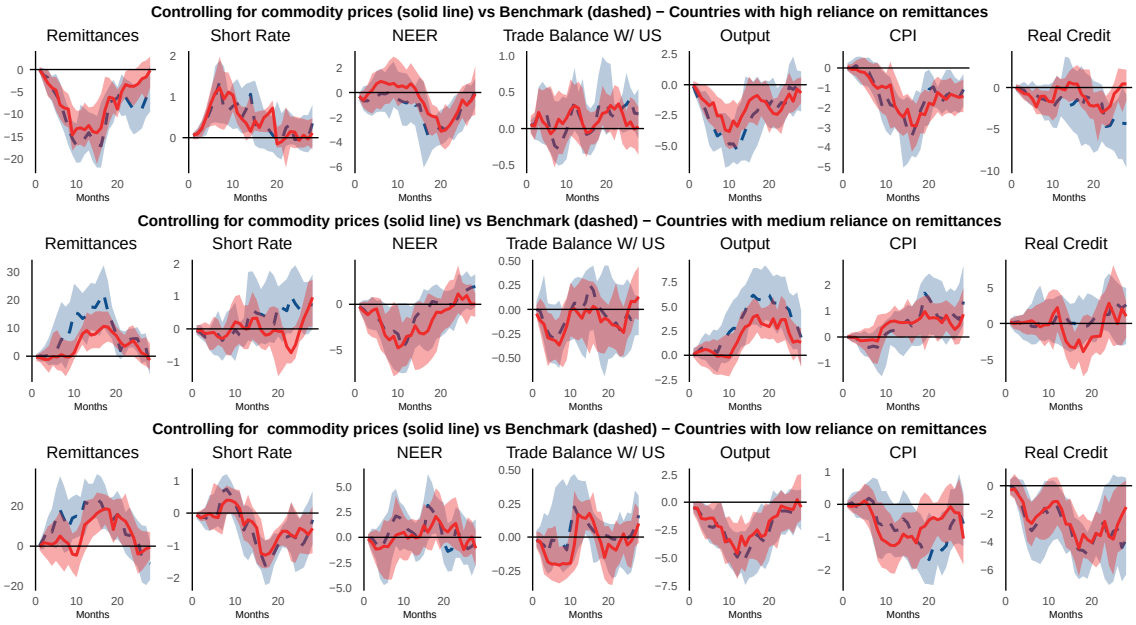
Table B.1: *IRF Responses and Significance for All Countries in the Sample*

Country ISO code	Signs: Shock on remittances	Shock on output	Shock on CPI	Shock on NEER	Shock on short rate	Shock on real credit	Shock on trade balance w/US
Remittance receivers							
SV (El Salvador)	-	+	-	-	-	-	+
LB (Lebanon)	-	-	-	+	-	+	+
KG (Kyrgyzstan)	-	+	-	-	-	-	-
JO (Jordan)	-	+	-	-	-	-	+
HN (Honduras)	-	+	-	+	-	-	+
PH (Philippines)	-	+	-	-	-	-	-
NI (Nicaragua)	-	+	-	+	-	+	-
GT (Guatemala)	-	+	-	+	-	-	-
AM (Armenia)	-	+	-	-	-	-	-
DO (Dominican Republic)	-	+	-	+	-	+	-
BD (Bangladesh)	-	-	+	-	-	-	-
LK (Sri Lanka)	-	-	+	+	-	-	+
MA (Morocco)	-	+	-	+	-	-	-
EG (Egypt)	-	-	-	-	-	-	+
HR (Croatia)	-	+	-	+	-	+	+
PK (Pakistan)	-	+	+	+	-	-	-
EC (Ecuador)	-	-	-	-	+	-	+
MK (North Macedonia)	-	+	-	+	-	-	-
VN (Vietnam)	+	+	-	-	+	+	+
TN (Tunisia)	+	-	-	-	+	+	+
BO (Bolivia)	+	-	+	+	+	+	-
RO (Romania)	+	-	+	+	+	+	-
LT (Lithuania)	+	-	+	+	+	-	+
AZ (Azerbaijan)	+	+	+	+	+	-	-
BG (Bulgaria)	+	+	+	-	+	+	+
MX (Mexico)	+	+	-	+	+	+	+
CO (Colombia)	+	+	-	-	+	+	+
IN (India)	-	+	-	-	+	+	-
PE (Peru)	+	-	-	+	+	-	-
PY (Paraguay)	+	+	+	+	+	-	-
BY (Belarus)	+	+	-	+	+	+	-
CR (Costa Rica)	+	-	-	+	-	-	-
ID (Indonesia)	+	+	-	+	-	+	-
PA (Panama)	+	+	+	+	-	-	-
PL (Poland)	+	-	+	-	-	-	-
TH (Thailand)	+	-	+	-	-	-	-
TR (Turkey)	+	+	+	+	-	-	+
ZA (South Africa)	-	-	+	-	-	-	-
UY (Uruguay)	+	-	+	-	-	-	-
HU (Hungary)	+	+	-	+	-	+	-
SI (Slovenia)	+	-	+	-	-	-	-
Remittance senders							
AU (Australia)	-	+	+	+	-	-	+
CA (Canada)	-	-	-	-	-	-	-
EZ (Eurozone)	-	-	-	+	+	+	-
GB (United Kingdom)	-	-	-	-	-	+	-
JP (Japan)	-	-	+	-	-	-	-
KR (South Korea)	-	+	+	-	-	-	-
RU (Russia)	-	+	+	-	-	-	-
US (United States)	-	-	-	+	-	-	-

Note: The sign corresponds to the average IRF response of each country and each variable to a US monetary policy shock over the period. Whenever the cell is colored, it indicates that the response is significant for at least 3 consecutive periods at the 90 percent confidence interval.

Appendix C - Robustness checks

Figure C.1: *Robustness to controlling for commodities - Median IRF responses by degree of reliance to remittances as a share of GDP*[13]



Note 1: Median of country-by-country responses to a contractionary one standard deviation US monetary policy shock resorting to local projections with 12 lags and Newey-West corrected standard errors and 1 standard deviation error bands. Monthly sample 1997:01-2017:12. Countries are classified based on the average remittances-to-GDP ratio over the 1997-2017 period. In each graph we show the median and standard errors for the US monetary policy shock estimated by including the world bank real commodity price index (solid line and red shade) and the benchmark without controls (dash line and blue shade).

Note 2: Countries with remittances exceeding 4 percent include Guatemala (GT), Nicaragua (NI), Philippines (PH), Honduras (HN), Lebanon (LB), Jordan (JO), El Salvador (SV), Kyrgyzstan (KG), Croatia (HR), North Macedonia (MK), Dominican Republic (DO), Armenia (AM), Morocco (MA), Ecuador (EC), Egypt (EG), Pakistan (PK), Bangladesh (BD), and Sri Lanka (LK). Countries where remittances average 1-4 percent of GDP include Bulgaria (BG), Belarus (BY), Peru (PE), Colombia (CO), Mexico (MX), Bolivia (BO), Tunisia (TN), Vietnam (VN), Paraguay (PY), Romania (RO), Lithuania (LT), Azerbaijan (AZ), and India (IN). Conversely, countries where inflows represent less than 1 percent on average include Thailand (TH), Indonesia (ID), Turkey (TR), Uruguay (UY), South Africa (ZA), Slovenia (SI), Poland (PL), Hungary (HU), Panama (PA), and Costa Rica (CR).

Figure C.2: *Robustness to controlling for financial crises - Median IRF responses by degree of reliance to remittances as a share of GDP*[14]

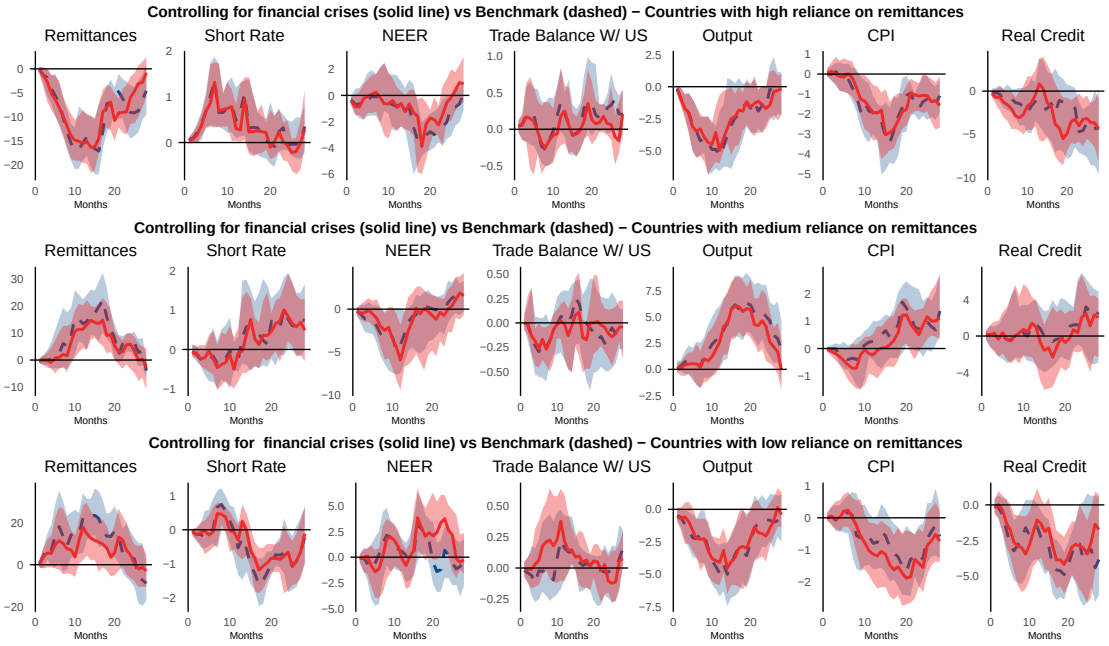


Figure C.3: *Robustness to controlling for the Excess Bond Premium (Gilchrist and Zakrajšek, 2012) - Median IRF responses by degree of reliance to remittances as a share of GDP*[15]

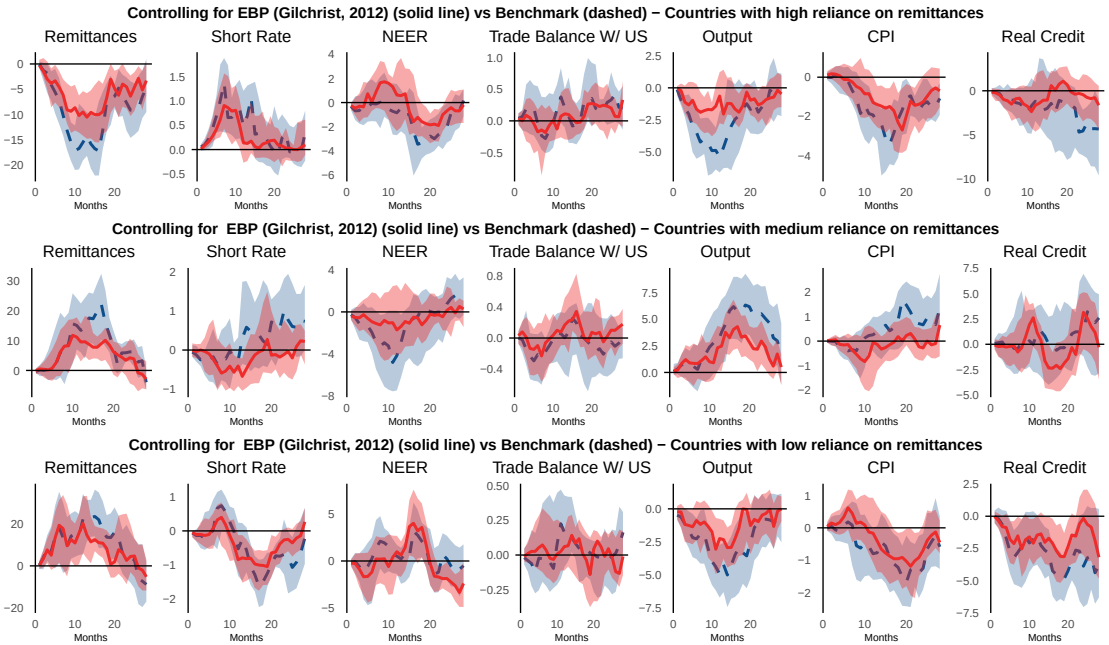
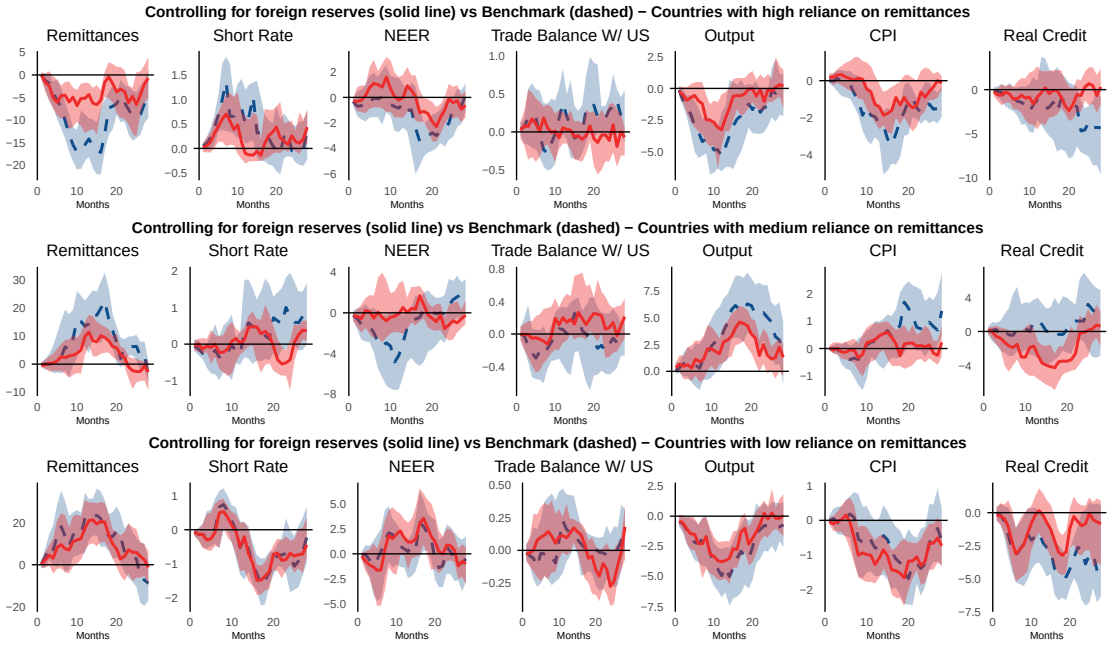


Figure C.4: *Robustness to controlling for foreign reserves - Median IRF responses by degree of reliance to remittances as a share of GDP*[16]



CHAPTER III

Gatekeepers of the Market? IMF Surveillance and Sovereign Access to Global Finance*

* This version has been submitted to the Special Issue, "International Organizations as Information Sources," of *The Review of International Organizations*.

1. Introduction

The International Monetary Fund (IMF) plays a key role in shaping global macroeconomic governance through its surveillance activities. Surveillance is widely regarded as a critical tool through which the IMF encourages compliance with policies that promote global stability and facilitate the macroeconomic coordination essential to sustaining it (Mussa, 1997). One of the core mechanisms the IMF uses to conduct surveillance is the Article IV consultation—a periodic, comprehensive assessment of a member country's economic policies, institutional frameworks, and macroeconomic outlook (Mussa, 1997; Bird and Rowlands, 2017; Momani and Hibben, 2024).

These consultations typically culminate in the publication of Public Information Notices (PINs), which summarize IMF staff assessments, policy recommendations, and evaluations of macroeconomic risks (Fratzscher and Reynaud, 2011). While PINs are designed to enhance transparency and bolster policy credibility, these official communications may also have tangible financial consequences—particularly in sovereign bond markets, where country risk is shaped not only by fundamentals but also by assessments issued by international institutions.

Despite growing recognition of the IMF's signaling role, empirical research has primarily focused on the effects of its lending programs, with relatively limited attention to surveillance (Eichengreen et al., 2006; Chapman et al., 2017; Reinsberg et al., 2022; Shim, 2022). Among the few studies that do examine surveillance, methodological limitations persist. Most rely on panel regressions or event-study designs that fail to adequately address selection into surveillance or the dynamic and repeated nature of treatment timing (Fratzscher and Reynaud, 2011; Breen et al., 2020). As a result, the causal impact of surveillance disclosures—such as PINs—on market outcomes remains insufficiently identified.

This article addresses these limitations by employing the generalized panel matching framework developed by Imai et al. (2023), which is specifically designed for settings with dynamic, repeated treatments. We adapt this approach to estimate the causal effect of IMF surveillance activities—measured by the release of PINs—on sovereign borrowing conditions. This framework is especially appropriate for our context, as it allows countries to be treated multiple times at irregular intervals, reflecting the institutional reality of recurring Article IV consultations. In addition to accommodating repeated treatments, the method facilitates identification of both pre-treatment trends and post-treatment dynamics. By implementing this

flexible and credible identification strategy, we offer new evidence on how IMF surveillance communications influence financial markets—providing a more rigorous basis for assessing their signaling effects.

Using monthly data for 67 emerging market economies (EMEs) from 2004 to 2023, we find that Article IV PIN releases lead to a statistically significant reduction in sovereign bond spreads, consistent with improved investor confidence following public surveillance disclosures. These releases are also associated with increased sovereign debt issuance and reserve accumulation, indicating that the IMF's signaling role can ease access to external finance. To validate these findings, we implement a series of robustness checks, including a future-leads falsification test, alternative treatment definitions using IMF Staff Reports, and sensitivity analyses that vary the time window and account for global shocks, such as the Global Financial Crisis and COVID-19. All results remain consistent, reinforcing the informational value of surveillance.

To examine the mechanisms behind market reactions, we test whether the effect of Article IV PINs varies systematically along two dimensions: the tone of the surveillance message and the geopolitical alignment of the recipient country. These factors may condition how investors interpret and respond to IMF communications. First, the tone—whether optimistic or critical—likely shapes expectations regarding a country's macroeconomic trajectory. A favorable PIN may signal policy credibility and macroeconomic stability, lowering risk premiums. Conversely, a pessimistic tone may raise concerns over fiscal or external vulnerabilities. We quantify tone using a sentiment index derived from FinBERT, a language model trained on financial text (Yang et al., 2020).

Second, we explore how market reactions vary with geopolitical alignment, measured by United Nations General Assembly voting similarity (Fjelstul et al., 2025). Countries more closely aligned with key IMF shareholders—particularly the United States—may receive a credibility premium, whereby IMF endorsement is interpreted as a signal of broader political and financial backing. In contrast, countries with weaker geopolitical ties may face muted responses, as investors question the impartiality or weight of IMF surveillance.

Our findings suggest that IMF surveillance affects financial markets not only through the content of its assessments, but also through the credibility context in which they are received. Optimistic PINs and those issued in geopolitically aligned countries generate stronger market responses, indicating that both informational clarity and political proximity shape the interpretation and effectiveness of IMF

signaling.

This article contributes to the literature in two important ways. First, it introduces a methodological innovation by applying the dynamic panel matching framework of Imai et al. (2023) to the study of IMF surveillance. This approach enables credible causal inference in a setting characterized by repeated and non-random treatment, addressing both selection and treatment timing heterogeneity. Second, it advances our understanding of the mechanisms through which public IMF communications influence sovereign markets. By examining heterogeneity in market responses by tone and geopolitical alignment, the paper identifies when and for whom IMF surveillance has the greatest impact. This mechanism-based perspective highlights the non-financial influence of international organizations and their capacity to shape sovereign market access through surveillance-based communication—independent of lending or crisis interventions.

The paper proceeds as follows. Section 2 reviews the literature on IMF surveillance, policy signaling, and the financial market effects of public communication. Section 3 provides the institutional background on IMF Article IV consultations and PIN disclosures, and introduces the dataset used in the analysis. Section 4 details the empirical strategy. Section 5 presents baseline estimates of the impact of PIN releases on sovereign bond spreads, debt issuance, and reserve movements and conducts a series of robustness checks. Section 6 explores the underlying mechanisms, focusing on the informational content of sentiment and geopolitical alignment as moderators of investor response. Section 7 concludes.

2. Literature review and contribution

2.1. IMF surveillance and sovereign market access

A broader body of literature portrays the IMF as a multi-channel actor, shaping sovereign bond-market access through lending, surveillance, capacity development, and debt-restructuring advice. Together, these strands form a coherent narrative of how Fund interventions influence both the likelihood of tapping capital markets and the cost of borrowing.

Early work documented the catalytic effect of IMF programs on bond spreads, conditional on borrower characteristics (Mody and Saravia, 2006). Subsequent research emphasized that it is the credibility of conditionality (Chapman et al., 2017) and the borrower's domestic political conditions (Shim, 2022) that drive

market reactions. Building on these findings, Kogan et al. (2024) demonstrate that IMF program participation increases the probability of restoring market access for financially distressed sovereigns. Complementary evidence indicates that technical assistance related to debt-market reforms (IMF, 2022) and IMF-supported debt restructurings (Schlegl et al., 2019) both lower bond spreads and accelerate market re-access.

This paper contributes to the literature on the relationship between IMF surveillance and sovereign access to international debt markets by providing a causal estimate of how the content and timing of surveillance communications influence borrowing conditions. We draw on two strands of existing research that form the foundation for our study.

First, Breen and Doak (2023) employ an event-study framework to examine how financial markets respond to IMF surveillance publications. They find evidence that investor behavior reacts to the timing of Article IV releases, particularly in emerging markets, reinforcing the view that IMF surveillance acts as a significant informational signal. Second, Choi and Hashimoto (2018) evaluate the effects of data transparency reforms—such as subscription to the IMF's Special Data Dissemination Standard (SDDS) and General Data Dissemination System (GDDS)—on sovereign borrowing costs. Their results indicate that greater transparency lowers bond spreads, consistent with markets rewarding improved information quality.

While this literature highlights the importance of IMF surveillance and communication in shaping investor expectations, the empirical strategies most often employed—notably event-study designs—face limitations related to selection bias and endogeneity. Specifically, such designs risk conflating IMF influence with coincident domestic developments. As a result, it remains difficult to isolate whether changes in borrowing conditions are driven by surveillance and communications or by concurrent shifts in macroeconomic or political fundamentals.

To determine an appropriate identification strategy, we draw on existing evidence regarding the non-randomness of PIN publication timing. As Glennerster and Shin (2008) note, although Article IV consultations are conducted on a regular schedule, PIN publication is not strictly exogenous. Delays or deviations from expected release dates often result from contemporaneous developments—such as missed program targets, political transitions, or disagreements over content. Each of these factors may correlate with changes in a country's macroeconomic outlook, introducing potential endogeneity.

Given this potential non-randomness in publication timing, a conventional

event-study approach may fail to eliminate pre-trends around the PIN release. In particular, if IMF and national authorities delay PIN publication in response to deteriorating market conditions—such as rising sovereign bond spreads or worsening macroeconomic indicators—then simply controlling for calendar time effects would be insufficient. Event-study estimates could thus capture both the true effect of the PIN release and pre-existing trends in market outcomes.

As a result, we adopt a difference-in-differences (DiD) strategy that compares countries receiving a PIN release to those not treated in the same period. This setup allows us to control for both calendar time effects and event-specific dynamics, providing a more credible estimate of the causal impact of surveillance communications on sovereign borrowing conditions. Specifically, we adopt the non-parametric causal inference framework introduced by Imai et al. (2023), which accommodates repeated and staggered treatment assignments over time—a feature that closely reflects the institutional reality of IMF surveillance, where countries may receive consultations multiple times throughout the sample period. This framework enables more credible causal identification by conditioning on a country's full treatment history and a rich set of pre-treatment covariates, and by constructing matched counterfactuals that did not receive a PIN release in the same period.

In our setting, the treatment is defined as the publication of a PIN following an Article IV consultation. We then examine the causal impact of this surveillance communication on sovereign bond spreads and broader financial outcomes, isolating its signaling function while controlling for contemporaneous macroeconomic conditions and the non-random timing of PIN disclosures.

2.2. A sentiment-based mechanism framework for IMF surveillance effects

Recent work at the intersection of international political economy and computational linguistics has increasingly focused on the textual content of IMF communications. Similar to the rise of natural language processing (NLP) in analyzing financial disclosures (Du et al., 2025) and monetary policy statements (Pfeifer and Marohl, 2023), a parallel literature has emerged examining how the tone, framing, and thematic structure of IMF reports shape economic expectations, reform credibility, and market behavior.

The earliest illustration came from Glennerster and Shin (2003), who showed that sovereign spreads narrow once countries begin publishing Article IV reports and Reports on the Observance of Standards and Codes—evidence that investors

reward transparency. Hand-coding 157 PINs, Fratzscher and Reynaud (2011) documented a country-specific relationship between more favorable IMF language and tighter EMBI spreads, pointing to a systematic signaling channel.

Advances in NLP have since moved the field from labor-intensive coding to scalable, automated text-as-data techniques. Mihalyi and Mate (2019) compiled a 2,500-plus-document corpus of Article IV and program reviews across 189 economies, using dictionary counts and regular-expression searches to track policy priorities over time and across countries. Their dataset underpins a new generation of automated topic models and sentiment indices. For example, Fayad et al. (2020) train a deep-learning sentiment model on surveillance texts to show how national authorities perceive IMF tone. Gehring and Lang (2018) analyze 117 rating-agency reports referencing the IMF and find that favorable references during a program's tenure strengthen sovereign creditworthiness, revealing a "confidence" channel that complements formal surveillance signals.

Researchers have also begun to unpack the substantive focus of IMF communications. Ramos et al. (2022) track the rise of climate-risk language across reports, while Goes and Chapman (2024) show that resource-rich developing countries are more likely to pass extractive-sector reforms following Article IV consultations that emphasize natural resource governance.

We build on this literature by distinguishing not only the occurrence of surveillance events, but also the content and tone of the messages conveyed. Much of the existing work treats surveillance as a binary signal of engagement or transparency. In contrast, we examine both the occurrence and substance of IMF communications, with particular attention to the tone—that is, the degree of optimism or pessimism expressed in official assessments.

When the IMF publishes a PIN, it transmits an institutional judgment on a country's macroeconomic outlook, policy framework, and associated risks. Even when the underlying information is partly known, the official nature of the disclosure acts as a certification (if favorable) or warning (if critical) to external investors, rating agencies, and international institutions. A positive PIN may suggest policy credibility or debt sustainability, reassuring markets and reducing perceived risk. Conversely, a PIN that flags fiscal or institutional weaknesses may trigger investor caution and elevate borrowing costs.

Understanding this signaling mechanism is particularly important in settings characterized by high information asymmetries, such as emerging markets, or when domestic policy signals are ambiguous. In such contexts, the IMF's assessments are

not merely technical—they actively shape investor beliefs about future economic and policy trajectories, which in turn influence sovereign spreads, credit ratings, and access to capital markets.

To capture the tone embedded in PINs, we apply FinBERT (Bidirectional Encoder Representation from Transformers), a financial-domain language model developed by Liu et al. (2020) from Google AI, to the full text of IMF PINs. This allows us to generate sentiment scores that quantify optimism or pessimism in surveillance communications. By linking these scores to movements in sovereign financing conditions, we assess whether variation in how the IMF communicates—conditional on the occurrence of surveillance—affects investor perceptions of sovereign risk.

Additionally, we investigate how this relationship is moderated by geopolitical alignment, proxied by United Nations General Assembly (UNGA) voting similarity with key IMF shareholders (Fjelstul et al., 2025). This allows us to assess whether the credibility and market impact of IMF communications are shaped by the political context in which they are received.

In sum, this paper makes three novel contributions. First, it provides the first causal estimate of Article IV surveillance effects on sovereign spreads and issuance using a dynamic matched DiD design. Second, it develops a new monthly panel dataset integrating macro-financial indicators, political variables, and textual surveillance data. Third, it introduces a mechanism-based analysis of IMF surveillance tone and geopolitical context, advancing our understanding of how international institutions influence financial markets through non-lending channels.

3. Institutional context and data

3.1. Evolution of IMF surveillance and reporting

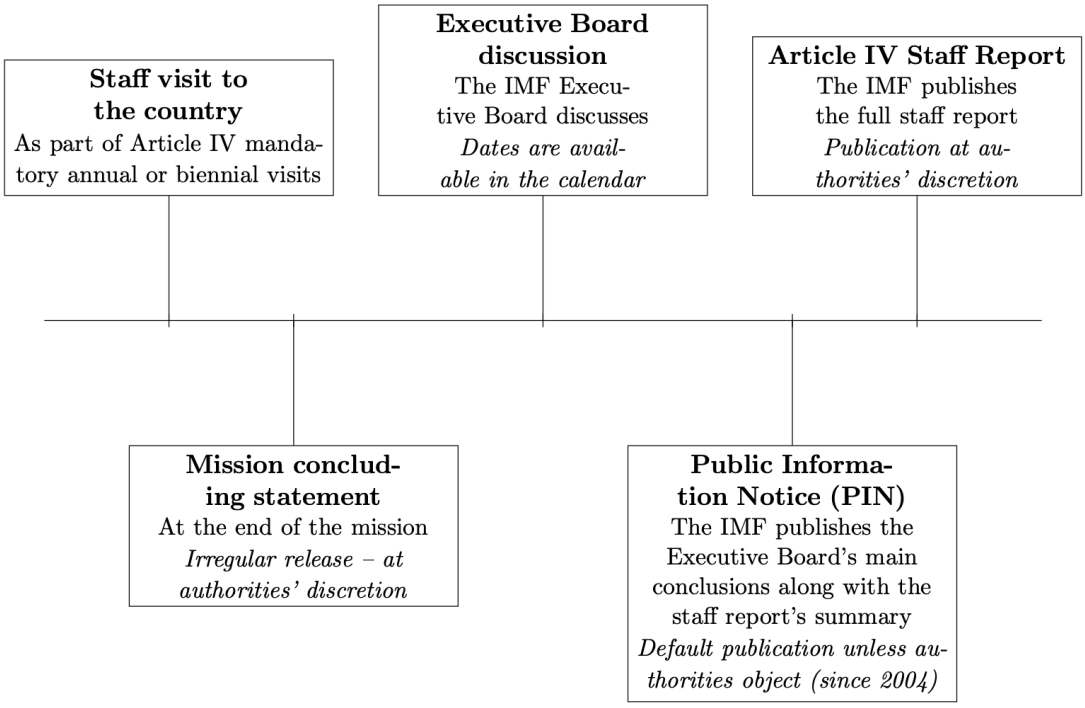
Following the collapse of the Bretton Woods system, the IMF amended its Articles of Agreement in 1977, redefining its surveillance responsibilities under Article IV. Section 3 specifies three key functions of surveillance: (i) monitoring the international monetary system; (ii) assessing members' adherence to obligations under Article IV, Section 1; and (iii) evaluating the consistency of each member's exchange rate policy with system stability (Mussa, 1997). As clarified in the IMF's 2003 Annual Report, surveillance also entails a comprehensive review of domestic and external policies, making it central to peer review and international policy

signaling (IMF, 2003a).

IMF surveillance operates at two levels: multilateral and bilateral. Multilateral surveillance includes flagship reports such as the World Economic Outlook, Global Financial Stability Report, and Fiscal Monitor. Bilateral surveillance is carried out through Article IV consultations, which involve in-depth dialogue between IMF staff and individual member countries. These discussions encompass fiscal and monetary policy, financial supervision, exchange rate frameworks, and structural reform agendas (IMF, 2016a).

These consultations follow a structured, multi-stage process that combines policy dialogue with a formal reporting cycle aimed at enhancing transparency and external communication, as summarized in Figure 1. This entire cycle—from initial preparation to public disclosure—typically spans several months and reflects the IMF's dual mandate of technical surveillance and policy signaling. Typically conducted on an annual basis, the process begins with a two-week in-country mission, during which IMF staff meet with government officials, central bankers, legislators, business leaders, and civil society representatives. The goal is to assess macroeconomic developments and policy risks while fostering open dialogue. These consultations culminate in a closing meeting with top officials to recap findings. After returning to headquarters, the IMF team drafts a comprehensive Article IV staff report summarizing their findings, assessments, and recommendations. The report undergoes rigorous internal review, including clearance by IMF management, before being finalized and submitted to the Executive Board for formal review and discussion—typically during a one-day meeting in Washington, D.C. Following the Board's deliberations, the Chair (often the IMF's Managing Director) issues a confidential "Summing Up" of the Board's views, which is sent to national authorities. With the authorities' consent, the IMF proceeds to publicly disclose a set of key documents, including the full Article IV Staff Report, the "Summing Up," any accompanying statements by the authorities, and a Public Information Notice (PIN) summarizing the Board discussion in non-technical language. These materials are published on the IMF website and disseminated via official press releases and media briefings (Boughton, 2012).

Figure 1: *IMF visit timeline*



Note: Author's representation of the timeline of IMF missions.

Over time, IMF surveillance has evolved from a confidential process to a highly transparent reporting regime. As Edwards et al. (2011) note, "*A dramatic change has taken place in the manner in which the IMF conducts its annual surveillance of member state economies. These annual consultations (known as Article IV consultations) were originally viewed as private matters that were never intended to be made public.*"

The first major shift occurred in April 1997, when the Executive Board authorized the release of PINs to summarize Article IV consultations. Although issuance required member consent, more than half (56%) of the 136 consultations conducted in 1997–98 resulted in a PIN (IMF, 1998, 2001). A second landmark occurred in June 1999, when the Board launched a pilot allowing full staff report publication. Between 1999 and 2001, roughly 47% of staff reports and 83% of consultations (via PINs) were published (IMF, 2001).

Encouraged by the pilot's success, the IMF adopted a standing voluntary publication policy in January 2001, introducing a presumption in favor of disclosing "policy-intention" documents. Publication rates rose significantly: by 2002-03, more than 90% of members had issued at least one PIN (IMF, 2003b). Transparency became the norm following the February 2004 adoption of a "voluntary-but-presumed"

policy, whereby staff reports are published unless authorities object. By 2008-09, over 95% of Article IV consultations generated a PIN, leading the IMF in 2013 to discontinue the separate "PIN" designation, issuing the identical format document as a standard press release (IMF, 2009).

These transparency gains were consolidated during the 2010s. The 2013 Transparency Policy Review reported a staff-report publication rate of 92% overall and virtually 100% for advanced economies (IMF, 2013). A 2016 follow-up showed that by 2015, 98% of consultations were accompanied by a press release, with emerging-market and developing countries achieving 80–90% publication rates (IMF, 2016b). Today, the regime is effectively universal, with press releases issued for nearly every consultation. Disclosure is no longer an optional add-on but an integral component of IMF surveillance (IMF, 2024).

In this study, we leverage this disclosure regime to assess how the release of PINs affects sovereign borrowing conditions. Because PINs contain direct and coded signals regarding macroeconomic risks, policy credibility, and reform priorities, they constitute a key informational channel through which the IMF can influence investor expectations, even in the absence of lending arrangements.

3.2. Data

Our analysis uses monthly data for 67 emerging market economies (EMEs) covering the period from January 1, 2004, to January 1, 2024. This frequency is essential to capture short-term market responses and anticipation effects. The list of countries included in the sample is provided in Appendix A Table A.1.

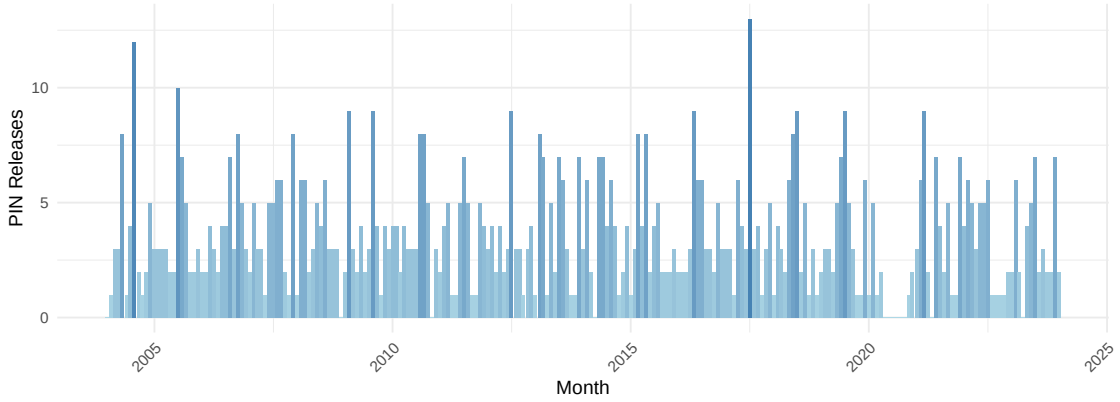
To construct the dataset of IMF Article IV PIN release dates, we manually collected the publication timings from the official IMF Press Release Archive on the Fund's website.[1] For each country between 2004 and 2023, we identified the month and year when the corresponding PIN was published. These PINs, which summarize the Article IV staff report and Executive Board discussions, serve as the key moment of public disclosure. We merged the release dates with a country-month panel to generate a binary treatment indicator, equal to 1 if a PIN was released in that month and 0 otherwise.

To describe the distribution of PIN disclosures, we present two complementary figures. Figure 2 displays the monthly frequency of PIN releases between 2004 and

[1] https://www.imf.org

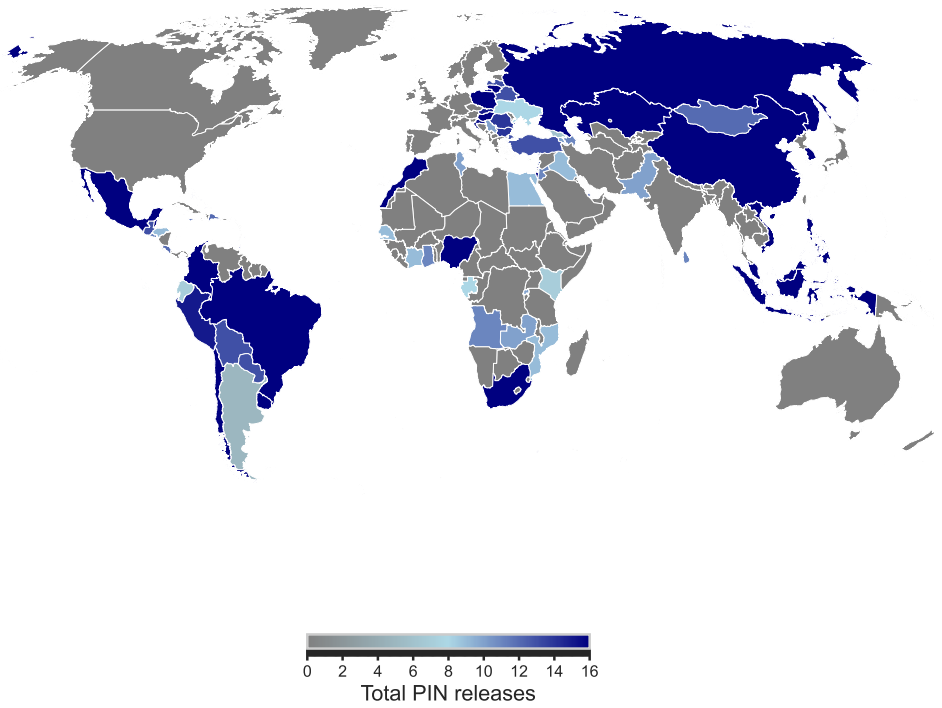
2023, with each bar indicating the number of countries receiving a PIN in a given month.

Figure 2: *Monthly Public Information Notice (PIN) releases, 2004-2023*



Note: Bar chart plots the number of countries receiving an IMF Article IV Public Information Notice (PIN) in each month between 2004 and 2023. Data compiled from IMF press release archives.

Figure 3: *Global distribution of total IMF Article IV PIN releases, 2004-2023*



Note: The world map displays the total number of IMF Public Information Notices (PINs) released per country between 2004 and 2023, covering a sample of 63 emerging market economies (or countries formerly classified as such), for which JP Morgan EMBI spread data is available at the time of release. All data were collected from the IMF website.

While the overall distribution reflects the IMF's annual surveillance cycle,

the figure reveals temporal clustering, including a sharp decline in 2020 due to COVID-19-related operational disruptions. This variation underscores the importance of conducting robustness checks that exclude or account for major global episodes—such as the Global Financial Crisis and the COVID-19 pandemic—to ensure that our results are not driven by these exceptional periods.

Figure 3 illustrates the total number of PIN releases per country over the study period. It highlights substantial cross-country variation, confirming that surveillance frequency is not uniform and that many countries appear repeatedly in the panel.

Descriptive statistics presented in Table 1 further support this heterogeneity.[2] On average, each country received approximately 13 PINs between 2004 and 2023, with the number of disclosures ranging from a minimum of 5 to a maximum of 19. Across countries, the mean interval between PINs is about 20 months, with considerable dispersion: some countries experienced intervals as short as 12 months, while others had gaps extending up to 50 months. This variation suggests that, although IMF surveillance is broadly standardized in principle, its practical implementation differs considerably across countries and over time.

Together, these patterns justify our adoption of a dynamic, repeated-event design, recognizing that surveillance exposure is neither uniform nor one-time, but varies across countries and over time.

Table 1: *Descriptive statistics on IMF PIN disclosures (2004–2023)*

Statistic	**Total PINs per country**	**Avg. months between PINs**
Mean	12.9	19.8
Median	13.0	17.8
Min	5.0	12.2
Max	19.0	50.0
Standard Deviation	3.5	6.8

Note: This table summarizes the distribution of IMF Public Information Notice (PIN) disclosures across 63 countries over the period January 2004 to December 2023. The left column reports the total number of PINs received by each country, while the right column shows the average number of months between successive PINs per country. These statistics capture both the intensity and frequency of surveillance exposure across countries.

To capture sovereign access to international capital markets, we rely on a broad set of macro-financial variables: sovereign bond spreads (in basis points), the real

[2] Figure A.1 in Appendix A illustrates the distribution of the treatment variable used in our analysis of IMF Article IV consultations.

effective exchange rate (REER index), foreign reserves (measured both in nominal US dollars (USD) and as a share of GDP), and hard-currency debt issuance. On the issuance side, we separately measure USD-denominated sovereign issuance (in nominal USD and relative to GDP), euro-denominated issuance (in nominal USD and relative to GDP), and total foreign-currency issuance (USD plus euro, both in nominal USD and as a share of GDP).

Our sovereign spread data come from two main sources: the J.P. Morgan Emerging Market Bond Index (EMBI) and the ICE BofA Option-Adjusted Spread (OAS). Both measure the premium countries pay to issue debt in US dollars relative to US Treasury securities of similar maturities. We also incorporate data from the ICE BofA US Emerging Markets External Sovereign Index, which tracks the performance of sovereign debt issued in USD and euros by emerging markets. For our analysis, we focus on face value in USD at issuance, including all foreign-currency government debt with maturities over one year and no rating constraints. Additional macro-financial variables—including spreads, issuance volumes, reserves (including gold), and the real effective exchange rate (REER)—are sourced from Refinitiv and Darvas (2021).

Table 2 presents summary statistics for key financial variables. On average, sovereign issuance in USD exceeds that in euros, both in nominal terms (8,530 vs. 4,564 million USD) and relative to GDP (6.6% vs. 2.4%), with USD issuance observed more frequently.

Table 2: *Summary statistics of sovereign bond spreads and financial indicators*

Variable	Unit	N	Mean	25th	Median	75th
EMBI spread	Basis point spread	13647	501.02	160.46	281.88	468.99
USD sovereign face value issuance	Nominal MUSD	13202	8529.53	1200.00	3250.00	9630.48
EUR sovereign face value issuance	Nominal MUSD	5146	4563.96	780.00	2050.00	5500.00
Total FX sovereign face value issuance	Nominal MUSD	13689	9941.78	1525.00	3800.00	12200.00
FX Reserves	Nominal MUSD	16133	76754.65	2673.18	10364.7	37399.29
Real Effective Exchange Rate	Index	16017	108.08	93.63	102.34	115.45
Variables as shares of GDP						
USD sovereign face value issuance % GDP	Share of GDP	13202	6.59	1.76	3.90	8.24
EUR sovereign face value issuance % GDP	Share of GDP	5146	2.39	0.42	1.32	3.42
Total FX sovereign face value issuance % GDP	Share of GDP	13689	7.25	2.29	4.83	9.08
FX Reserves % GDP	Share of GDP	16133	16.25	7.88	12.22	18.59

Note: This table presents the number of observations (N), mean, 25th percentile, median, and 75th percentile for the variables of interest, covering both the nominal variables and the variables expressed as a share of GDP.

4. Empirical strategy

4.1. Identification strategy

Our empirical design leverages the staggered rollout of IMF PINs across countries and months from 2004 to 2023. While a natural starting point is the difference-in-differences (DiD) framework, the conventional two-way fixed effects (TWFE) estimator is known to produce biased or inconsistent estimates of the Average Treatment Effect on the Treated (ATT) when treatment effects are heterogeneous across units or over time (Goodman-Bacon, 2021; Callaway and Sant'Anna, 2021; Sun and Abraham, 2021; De Chaisemartin and d'Haultfoeuille, 2020).

Recent methodological refinements—such as group-time DiD estimators, doubly robust procedures, and reweighted event-study designs—address some of these issues but typically rely on an "absorbing treatment" assumption (i.e., once treated, always treated) or require a never-treated control group (De Chaisemartin and d'Haultfoeuille, 2024).

However, in our context, every country receives multiple PINs over the sample period, violating both the absorption assumption and the never-treated condition. To address this, we implement the panel-matching approach proposed by Imai et al. (2023)—a non-parametric framework that (i) explicitly accommodates non-absorbing treatments, allowing countries to repeatedly enter and exit treatment, and (ii) permits treatment effect heterogeneity across countries and over time. By matching treated and control observations on recent pre-treatment outcomes, covariates, and treatment history, this method constructs valid counterfactual trajectories for each PIN event. It thus captures the complex, recurring nature of IMF surveillance and yields unbiased estimates of ATT for our key macro-financial outcomes.

We define the treatment as the month in which a PIN is publicly released, aligning the intervention with the moment when IMF surveillance becomes visible to financial markets. To construct the counterfactual, we compare these treated country-months to a control group of country-months with no Article IV consultation or PIN release. While these control countries may eventually be treated later, they must remain untreated in both the current month and the preceding L months—the lookback window used for matching. This setup enables us to compare post-treatment outcomes of treated units to those of similar, recently untreated units, controlling for observed covariates and treatment history. By expanding the

pool of control observations, this approach enhances statistical power and allows for more robust causal inference across the full sample period.

The approach proceeds as follows: for each treated country-month, we first identify a set of control country-months that share an identical IMF consultation history over a prespecified number of prior periods. We refer to this group as the matched set. Second, we refine these matches by adjusting for observable economic and political covariates using standard matching and weighting techniques to ensure that treated and control units are balanced on pre-treatment characteristics. We then apply a difference-in-differences estimator to account for underlying time trends in sovereign financial outcomes.

The treatment variable X_{im} equals 1 if country i experiences the release of a PIN in month m, and 0 otherwise. The average treatment effect of PIN disclosure—interpreted as the impact of transitioning from no recent IMF Article IV consultation to one resulting in a disclosed PIN—is defined in Equation (1).

$$\begin{aligned}\delta(F,L) = \mathbb{E}\Big[& Y_{i,m+F}\big(X_{im}=1,\ X_{i,m-1}=0,\ \{X_{i,m-\ell}\}_{\ell=2}^{L}\big) \\ & -\ Y_{i,m+F}\big(X_{im}=0,\ X_{i,m-1}=0,\ \{X_{i,m-\ell}\}_{\ell=2}^{L}\big) \\ & \mid\ X_{im}=1,\ X_{i,m-1}=0\Big]\end{aligned} \tag{1}$$

In this setup, treated observations are those where a PIN is publicly released in month m, but not in the preceding month $m-1$ (i.e., $X_{i,m}=1$ and $X_{i,m-1}=0$). In our design, we exclude $X_{i,m-1}$ from the matching set because we explicitly condition on $X_{i,m-1}=0$ when defining eligible treatment and control units. The treatment history used for matching therefore begins at $m-2$ and extends back L months to account for prior patterns that may affect both treatment timing and potential outcomes. This estimand represents the average causal effect of initiating a PIN disclosure on outcomes such as sovereign bond spreads or debt issuance, measured F months after the release, and conditional on L months of prior treatment history.

The first step in our methodology is to select a non-negative integer F, which represents the number of months after the public release of the IMF Article IV PIN at which the outcome is measured.[3] Choosing $F>0$ allows us to examine the cumulative effects of PIN disclosures on outcomes such as sovereign bond spreads or debt issuance.

[3] For instance, $F=0$ captures the contemporaneous effect of the PIN release, while $F=9$ reflects its impact nine months later.

In parallel, the method requires choosing a non-negative integer L, which defines the number of lagged months used in the matching procedure. Unlike the number of leads F, the choice of L is a core component of the identification strategy, as it governs the conditioning set for treatment history and covariates. Failing to adequately adjust for past IMF engagement may introduce bias if previous PIN releases influence both current treatment assignment and subsequent outcomes (Imai and Kim, 2019). As in fixed effects regressions, selecting L involves a bias–variance tradeoff: higher values of L improve the credibility of the unconfoundedness assumption but reduce statistical efficiency by narrowing the pool of valid matches.

We set the lag window $L = 4$, incorporating four months of treatment and covariate history. This four-month period is sufficient to absorb residual effects from prior consultations, control for seasonal patterns, and satisfy the carry-over assumption—that is, that older treatments no longer influence current outcomes. A longer lag would sharply reduce matchable observations, while a shorter lag could omit relevant pre-treatment dynamics. Empirically, we verify that $L = 4$ achieves a favorable balance between covariates, maintains adequate matched set sizes, and meets standard diagnostics, supporting its use in our baseline design.

For the post-treatment lead horizon, we examine outcomes over $F = 1$ to 9 months following each PIN release. This nine-month window aligns well with the typical policy-response cycle to Article IV recommendations, which usually unfolds over roughly three quarters. It also precedes the arrival of any subsequent PIN, given that the minimum observed interval between consultations is 12.2 months. At the same time, this window is short enough to limit contamination from other macroeconomic shocks or overlapping treatments. To assess the robustness of our parameter choices, we conduct sensitivity analyses by varying the lag window L and the lead horizon F. The results remain stable across alternative specifications, supporting the credibility and flexibility of our empirical design.

Given our choice of parameters L and F, and our goal of estimating the causal effect of IMF PIN releases on sovereign outcomes, we must rely on an additional assumption to identify the treatment effect. Specifically, we assume that—conditional on recent history—the timing of a PIN release behaves as if it were random with respect to future outcomes. Formally, this means that, conditional on the past values of the outcome variable, relevant covariates, and the history of PIN releases over the previous L months, the probability of receiving treatment in month m is independent of the potential financial outcomes that would have occurred in the absence of treatment. This identifying condition is

known as the sequential ignorability assumption (Robins et al., 2000), which generalizes the standard unconfoundedness assumption to settings with time-varying treatments in panel data. In our context, this implies that once we account for recent macroeconomic and political conditions, countries do not systematically time the release of PINs based on expectations about future market developments. If this assumption holds, the observed differences in outcomes between treated and matched control units can be interpreted as causally attributable to the PIN disclosure, rather than the result of selection or latent trends.

In addition to sequential ignorability, our difference-in-differences (DiD) framework relies on a conditional parallel trends assumption: in the absence of treatment, the outcome trajectories for treated and control units would have evolved similarly over time. This assumption allows us to control for time-invariant unobserved heterogeneity, provided that its effects are common across units. More precisely, we impose parallel trends conditional on past treatment status, lagged outcomes, and observed covariates. Under this assumption, any divergence in outcomes between the treated and control groups following a PIN release can be interpreted as the causal effect of the surveillance disclosure, not a reflection of pre-existing differences or unrelated shocks.

We formally define this identification strategy as:

$$\begin{aligned}
&\mathbb{E}\big[Y_{i,t+F}(X_{it}=0, X_{i,t-1}=0, \{X_{i,t-\ell}\}_{\ell=2}^{L}, \{Z_{i,t-\ell}\}_{\ell=0}^{L}) - Y_{i,t-1} \,\big|\, X_{it}=1, \\
&\qquad\qquad X_{i,t-1}=0, \{X_{i,t-\ell}, Y_{i,t-\ell}\}_{\ell=2}^{L}, \{Z_{i,t-\ell}\}_{\ell=0}^{L}\big] \\
&= \mathbb{E}\big[Y_{i,t+F}(X_{it}=0, X_{i,t-1}=0, \{X_{i,t-\ell}\}_{\ell=2}^{L}, \{Z_{i,t-\ell}\}_{\ell=0}^{L}) - Y_{i,t-1} \,\big|\, X_{it}=0, \\
&\qquad\qquad X_{i,t-1}=0, \{X_{i,t-\ell}, Y_{i,t-\ell}\}_{\ell=2}^{L}, \{Z_{i,t-\ell}\}_{\ell=0}^{L}\big],
\end{aligned} \tag{2}$$

where the conditioning set includes the treatment history, $\{X_{i,t-\ell}\}_{\ell=2}^{L}$, the lagged outcomes (except the immediate lag $Y_{i,m-1}$), and the covariate history, $\{Z_{i,t-\ell}\}_{\ell=0}^{L}$.

This conditioning strategy aims to make treated and control units as comparable as possible prior to treatment, thereby minimizing bias arising from systematic differences. By matching on observed covariates and treatment history, we reduce the risk of confounding due to observable characteristics. However, the possibility of unobserved, time-varying confounders remains—factors not captured in our dataset that could influence both the timing of PIN disclosures and subsequent financial outcomes.

To enhance the credibility of our causal interpretation, we conduct empirical diagnostics focused on pre-treatment outcome dynamics. In particular, we test

whether treated and matched control units followed similar trajectories in our key financial variables before the treatment occurred. If pre-treatment trends are statistically indistinguishable, this supports both the sequential ignorability assumption and the validity of the matching procedure. Evidence of parallel trends in the pre-treatment period increases confidence that any observed post-treatment divergence in outcomes is due to the PIN release rather than to pre-existing trends or omitted variables.

The next step in our methodology is to construct, for each treated observation i, m—that is, a country experiencing a public release of an IMF Article IV PIN at time m—a matched set of control country-months that share an identical treatment history over the L months leading up to the treatment. We perform exact matching on PIN release history to account for potential carryover effects, based on the assumption that prior consultations may influence both the likelihood of current treatment and subsequent outcomes.

To ensure that treatment and control groups are comparable on relevant covariates, we implement multiple matching refinement strategies widely used in the panel data causal inference literature. Specifically, we apply both Mahalanobis distance matching and propensity score-based methods to define matched sets. This dual approach allows us to evaluate the robustness of our results across alternative matching designs.

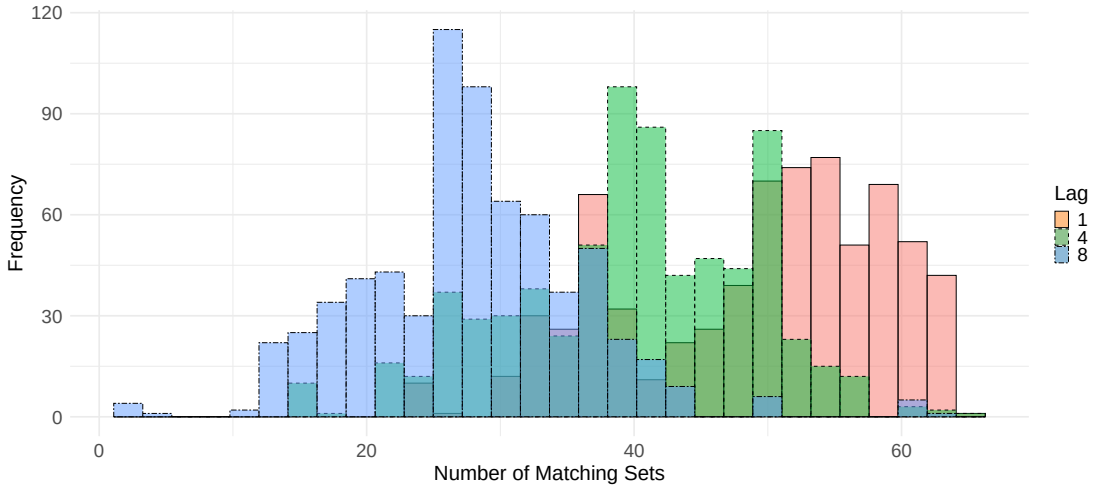
In the Mahalanobis matching approach, treated units are matched to control units based on the Mahalanobis distance, which adjusts for the variance and covariance structure of covariates. This method accounts for variable scaling and interdependence, yielding tighter control over covariate similarity than naïve distance metrics. In parallel, we implement propensity score matching, where we first estimate the probability of receiving treatment (i.e., a PIN release) using a logistic regression model that includes the treatment and covariate history over the past L months. Treated units are then matched to control units with similar estimated propensity scores. Additionally, we apply propensity score weighting, which retains the full sample while reweighting observations based on their proximity to the treated group in the propensity score distribution. This method places greater emphasis on control units that are more comparable to treated units, thereby improving internal validity without sacrificing sample size.

4.2. Constructing matched sets and assessing covariate balance

To illustrate our matching methodology, we begin by constructing the matched set for each treated observation based on its recent treatment and covariate history. Figure 4 presents the distribution of the number of matched control units per treated observation, comparing three specifications that vary the length of the lag history used in matching: a 1-month history (red solid bars), a 4-month history (green dashed bars), and an 8-month history (blue double-dashed bars).

As expected, increasing the conditioning window from 1 to 4- and 8-months results in a reduction in the number of matched control observations per treated unit, reflecting the more stringent requirements imposed by a longer treatment history. This pattern underscores the bias–variance tradeoff inherent in matching design: longer histories improve the credibility of identifying assumptions but reduce the number of comparable control observations. The comparison across specifications provides visual confirmation that our chosen lag length of $L = 4$ maintains a reasonable balance between covariate similarity and match availability.

Figure 4: *Distribution of matched control units per treated observation*



Note: The figure plots the number of matched control units associated with each treated observation under three matching specifications: one with a 1-month treatment history (red solid bars), one with a 4-month treatment history (green dashed bars) and one with a 8-month treatment history (blue two-dashed bars).

We construct a pre-treatment covariate set designed to capture factors relevant to both treatment assignment—that is, the timing and likelihood of a PIN release—and the outcome variables. These confounders encompass macroeconomic fundamentals and political-institutional characteristics that are empirically linked

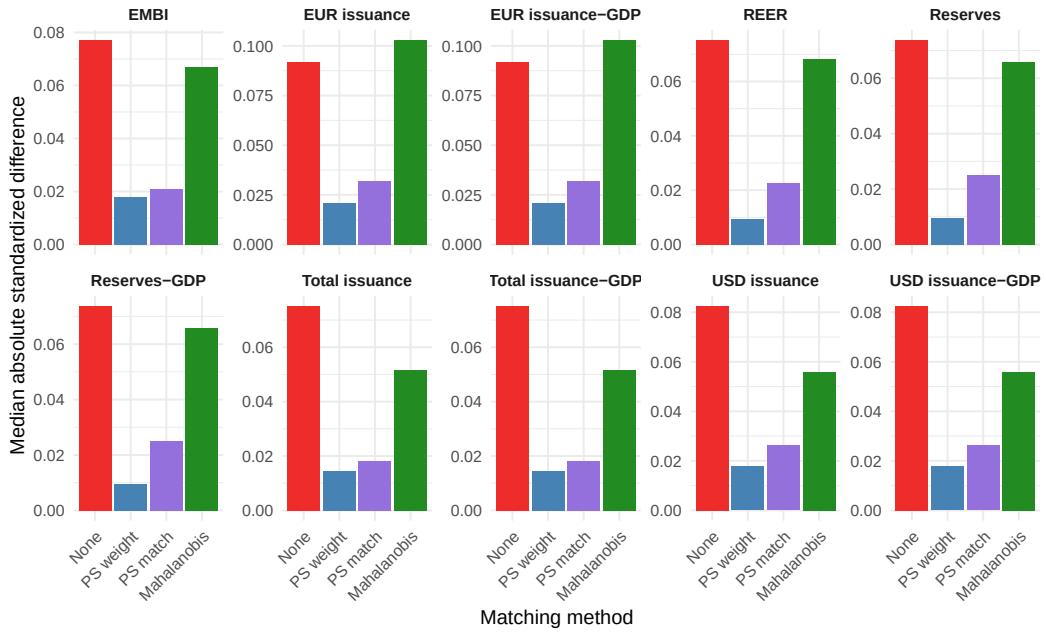
to a country's likelihood of IMF engagement and to investor assessments of sovereign creditworthiness. First, macroeconomic fundamentals include indicators such as the current-account balance, general government gross debt, net lending/borrowing, tax revenue, CPI inflation, real GDP growth, GDP per capita (PPP), and population size. These variables reflect economic performance and fiscal space—key dimensions that influence both IMF surveillance behavior and market perceptions of risk. Second, sovereign creditworthiness is proxied through long-term foreign-currency ratings from Fitch, Moody's, and S&P, which provide a market-based assessment of default risk. Third, political-institutional attributes include the V-Dem liberal democracy score, electoral-calendar dummies, UNGA voting alignment with the United States, the Chinn-Ito capital-account openness index, and the de facto exchange rate regime. These variables account for geopolitical alignment, regime type, and external financial integration—factors that can shape both IMF engagement patterns and investor sentiment.

All covariates are measured using values from the most recent full year prior to the start of the 4-month treatment risk window, which helps avoid post-treatment bias and mitigates concerns about introducing "bad controls" into the identification strategy. A full description and discussion of the selected covariates is provided in Appendix B.

For each refinement strategy—propensity-score weighting (PSW), propensity-score matching (PSM), Mahalanobis matching, and no matching—we measure covariate balance via the standardized mean difference (SMD). Concretely, at each period in the four-lag window, we compute the difference between each treated unit's covariate value and the weighted mean of its matched controls, average those differences across treated units, and then divide by the pooled standard deviation of that covariate. We report the absolute SMD (ASMDs) and adopt a threshold of 0.10 to signal acceptable balance, as recommended in the literature (Stuart et al., 2013; Zhao, 2019). To construct the final covariate set, we apply a two-step criterion (i) the ASMD must fall below 0.10 after weighting, and (ii) the matching or weighting procedure must improve balance relative to the unmatched sample, as indicated by a reduction in the absolute standardized difference.

Figure 5 presents the median ASMDs across all covariates for each outcome and matching method.

Figure 5: *Median covariate balance before and after matching and weighting*



Note: Each bar shows the median absolute standardized difference (ASD) across the full set of covariates for a given outcome variable and matching method —no matching, Mahalanobis matching, propensity-score matching, and propensity-score weighting—. ASDs are computed over four lags (as in our benchmark), and a lower median indicates better overall covariate balance.

Among all strategies, propensity score weighting (PS weighting) consistently produces the lowest ASMD values across outcome variables, indicating that it is the most effective method for covariate adjustment. While both propensity score matching (PS matching) and Mahalanobis distance matching also improve balance relative to the unmatched sample, they generally yield higher ASMDs than PS weighting, suggesting comparatively lower performance in aligning covariate distributions. As expected, the no matching specification results in the highest ASMDs, underscoring the importance of applying appropriate matching or weighting techniques to reduce pre-treatment differences and strengthen causal interpretation.

These results indicate that PS weighting is the most reliable method for achieving covariate balance in our context. Its advantage stems from its ability to assign greater weight to control observations that closely resemble treated units in terms of propensity scores, thereby enhancing the comparability of the two groups and improving the internal validity of the estimated treatment effects.[4]

[4] For a detailed, covariate-by-covariate breakdown under each method, see Appendix B.2 (Figure B.1 and Figure B.2). Appendix B.3 illustrates PSW's use in constructing the counterfactual around Angola's September 2014 PIN release.

With the matched sets constructed, we proceed to estimate the Average Treatment Effect on the Treated (ATT) of an IMF PIN release, as defined in Equation (1). For each treated country-month (i, m), we estimate the counterfactual outcome $Y_{i,m+F}(X_{im} = 0,,X_{i,m-1} = 0, \ldots, X_{i,m-L})$ by taking the weighted average of outcomes among control units in the matched set that share the same treatment history and are balanced on covariates. We then compute the difference-in-differences (DiD) estimate for each treated observation by comparing the actual post-treatment outcome to its estimated counterfactual. The overall ATT is obtained by averaging these DiD estimates across all treated units. Formally, our estimator is expressed as:

$$\hat{\delta}(F, L) = \frac{1}{\sum_{i=1}^{N} \sum_{t=L+1}^{M-F} D_{it}} \sum_{i=1}^{N} \sum_{m=L+1}^{M-F} D_{im} \left\{ (Y_{i,m+F} - Y_{i,m-1}) - \sum_{i \in \mathcal{M}_{im}} w_{i'm}^{i'} \left(Y_{i',m+F} - Y_{i',m-1} \right) \right\} \tag{3}$$

where $D_{im} = X_{im} \left(1 - X_{i,m-1}\right) \cdot \mathbb{1} \left\{ |\mathcal{M}_{im}| > 0 \right\}$, with $\mathcal{M}_{im}$, the matched set for the treated observations. $w_{i'm}^{i'}$ denotes the nonnegative normalized weight assigned to control country i', such that $w_{im}^{i'} \geq 0$ and $\sum_{i' \in M_{im}} w_{im}^{i'} = 1$.

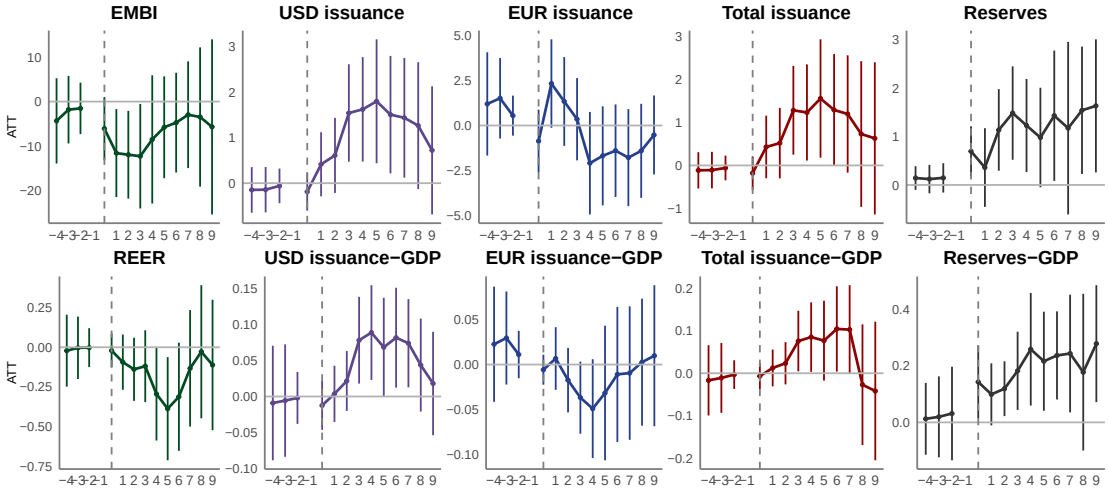
5. Estimates of the economic impact of PIN releases

5.1. Baseline results

Figure 6 presents our benchmark estimates of the Average Treatment Effect on the Treated (ATT) following the release of an IMF Article IV PIN using dynamic treatment horizons up to nine months.

The top-left panel reports dynamic ATT estimates indicating that sovereign bond spreads (EMBI) decline by approximately 15 basis points beginning in the second month after a positive IMF PIN release. This decline is statistically significant in months 2 through 4, before tapering off, with confidence intervals widening at longer horizons. These magnitudes are similar to the 17 bp abnormal spread returns reported by Breen and Doak (2023) for emerging markets, although our panel-matching DiD approach yields a more robust causal estimate and indicates stronger persistence.

Figure 6: *Estimated average effects of IMF PIN releases*



Note: This figure displays the dynamic treatment effects of IMF Article IV PIN releases on our variables of interest. We report the effects using the propensity score weighting methodology showing the estimated Average Treatment Effect on the Treated (ATT) over the nine-month horizon following the PIN release and the four-month horizon before. Shaded areas represent 90% confidence intervals based on bootstrapped standard errors.

Similarly, sovereign issuance indicators respond dynamically to the treatment. USD-denominated issuance increases significantly beginning in month four, with the ATT remaining statistically significant through month eight. This trajectory suggests that the observed decline in spreads enhances market access, enabling treated countries to increase issuance. Total foreign-currency sovereign issuance also rises, with the effect primarily driven by USD-denominated instruments, highlighting the dominance of USD markets in sovereign debt issuance.

The reserves panel shows a statistically significant and positive ATT across the post-release horizon, indicating that treated countries—those receiving a PIN release—accumulate more reserves compared to similar untreated counterparts. This causal effect is consistent with market reassurance following IMF communication, which may reduce capital flight risk or facilitate precautionary accumulation of reserves in response to improved sentiment.

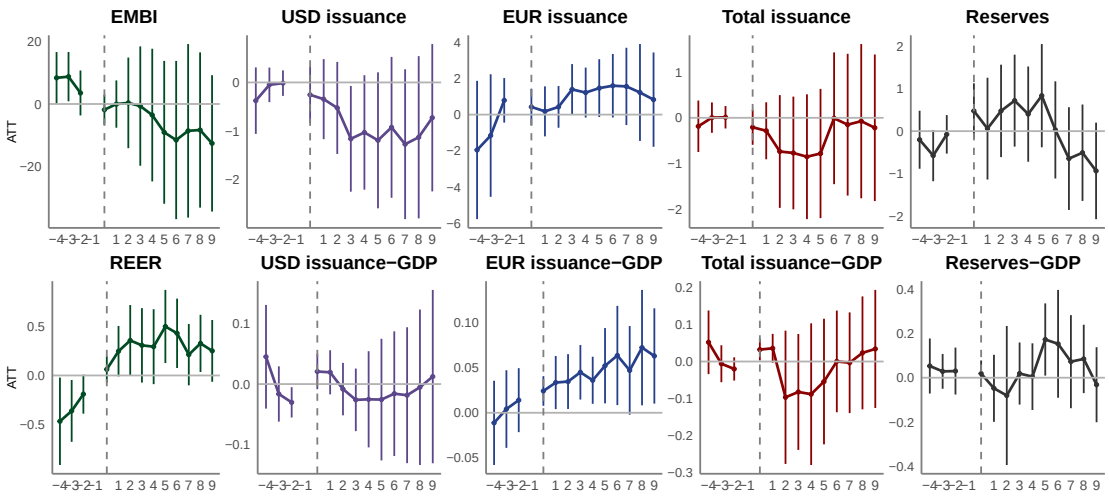
Overall, our findings show that PIN releases produce a clear compression in sovereign borrowing costs, consistent with prior event-study estimates, and provide further evidence that this temporary easing strengthens investor confidence, broadens market access, and supports greater sovereign issuance capacity.

5.2. Robustness checks

To assess the robustness of our causal estimates and evaluate whether observed effects are attributable to the timing of IMF Article IV PIN disclosures—as opposed to spurious correlations or unobserved time trends—we implement a "future-leads" falsification test, in which each treated unit is artificially coded as treated not in month m, the actual month of PIN release, but at a forward-shifted date—specifically, at $m + 6$. This approach preserves all actual pre-treatment histories and covariates but introduces a pseudo-treatment indicator artificially assigned to a future date. The test directly evaluates whether treatment effects observed prior to the actual PIN publication may be the result of anticipation effects or dynamic selection into treatment, rather than causal responses to the PIN release itself.

We compute dynamic ATT estimates over the same forward-looking horizon $F = 1, ..., 9$, using the same matching criteria (lag length L, treatment history, and covariates), standardization procedures, and estimation steps as in the baseline specification. Figure 7 reports these placebo results. Consistent with our "information shock" hypothesis, the placebo estimates are statistically insignificant across all event horizons.

Figure 7: *Future-leads placebo estimated average effects of IMF PIN releases*



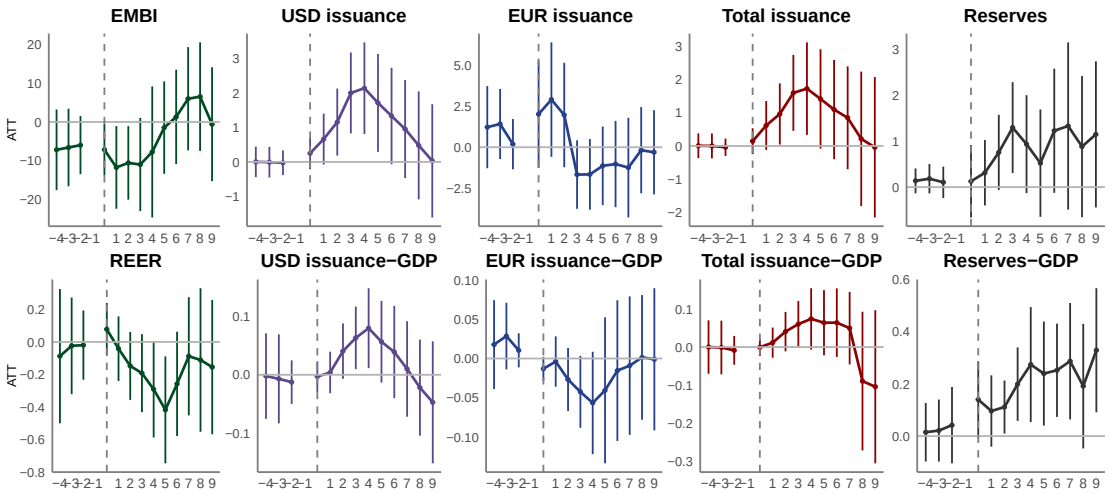
Note: This figure displays the dynamic treatment effects of IMF Article IV PIN placebo releases (coded at $m + 6$) on our variables of interest. We report the effects using the propensity score weighting methodology showing the estimated Average Treatment Effect on the Treated (ATT) over the nine-month horizon following the PIN release and the four-month horizon before. Shaded areas represent 90% confidence intervals based on bootstrapped standard errors.

As a further robustness check, we re-estimate our panel-matching model using the publication of the full IMF Article IV Staff Report—rather than the PIN—as the treatment indicator. Specifically, we define a binary indicator that equals one

in any month when an Article IV Staff Report is published. These comprehensive documents contain detailed macroeconomic analysis, forecasts, vulnerability assessments, and stress tests, and are released less frequently than the shorter and more summary-focused PINs.

Figure 8 presents the resulting dynamic ATT estimates. The patterns closely resemble those in our baseline PIN-based results across most variables, with one notable exception: the real effective exchange rate shows no significant response to Staff Report releases. While overall statistical significance is somewhat lower than in the PIN specification, the effect on USD-denominated issuance remains both strong and highly significant.

Figure 8: *Robustness - Estimated average effects of IMF Article IV Staff Report releases*



Note: This figure displays the dynamic treatment effects of IMF Article IV Staff Report releases on our variables of interest. We report the effects using the propensity score weighting methodology showing the estimated Average Treatment Effect on the Treated (ATT) over the nine-month horizon following the PIN release and the four-month horizon before. Shaded areas represent 90% confidence intervals based on bootstrapped standard errors.

We conduct additional robustness checks to assess the stability of our findings. First, we perform sensitivity analyses by varying the lag structure (Figure C.1) and the number of forward months (Figure C.2), both reported in Appendix C. The results remain highly consistent across these alternative specifications, reinforcing the reliability of our dynamic ATT estimates. Second, although our nonparametric panel-matching framework accounts for global shocks—such as the Global Financial Crisis (GFC) and the COVID-19 pandemic—these extreme events may still interact with IMF PIN announcements under heightened financial uncertainty. To address this possibility, we re-estimate our model after excluding all observations during the GFC and COVID-19 periods. As shown in Figure C.3 (Appendix C), the

core results remain robust, closely aligning with our benchmark estimates and confirming that the main findings are not driven by these global episodes.

6. Evidence on channels for PIN disclosures effects

Our benchmark estimates show that IMF Article IV PIN releases lead to lower sovereign bond spreads, increased external issuance, and higher reserve buffers. However, these aggregate effects do not fully explain how public disclosures influence investor behavior. In this section, we investigate two complementary transmission channels that may underlie the observed impacts.

We first examine the information channel. Under this interpretation, an optimistic PIN release serves as a public endorsement by the IMF of a country's economic program. By reducing uncertainty regarding policy stability and signaling the potential for future financial support, a favorable PIN can directly enhance investor confidence. We test this channel by constructing measures of sentiment surprises within PIN reports and estimating how these surprises affect sovereign bond spreads and other macro-financial outcomes of interest.

Second, we explore a geopolitical alignment channel. PINs may carry greater weight in markets when they concern countries whose foreign policy positions are closely aligned with major IMF shareholders. To capture this dimension, we use voting similarity in the United Nations General Assembly (UNGA) as a proxy for alignment with the United States—led international order. We then assess whether PIN releases trigger larger spread compressions and issuance increases in countries with high alignment scores.

6.1. The informational channel of IMF Article IV PIN releases

To empirically assess the informational channel of IMF Article IV PIN releases, we investigate whether the observed effects on our outcome variables are driven by the signal content disclosed in these communications. We conduct a text-based sentiment analysis of PIN documents using natural language processing (NLP) techniques, classifying the tone of each release along a favorable-unfavorable spectrum. Specifically, we employ the FinBERT model, an adaptation of the Bidirectional Encoder Representations from Transformers (BERT) architecture, which is specifically designed for financial sentiment analysis (Yang et al., 2020).

The BERT model is built on the Transformer architecture, which uses an attention mechanism capable of capturing contextual relationships across entire texts. Unlike traditional directional language models that analyze text sequentially (either left-to-right or right-to-left), the Transformer encoder processes entire sentences simultaneously, allowing it to incorporate bidirectional context and better understand each word in relation to its surroundings.

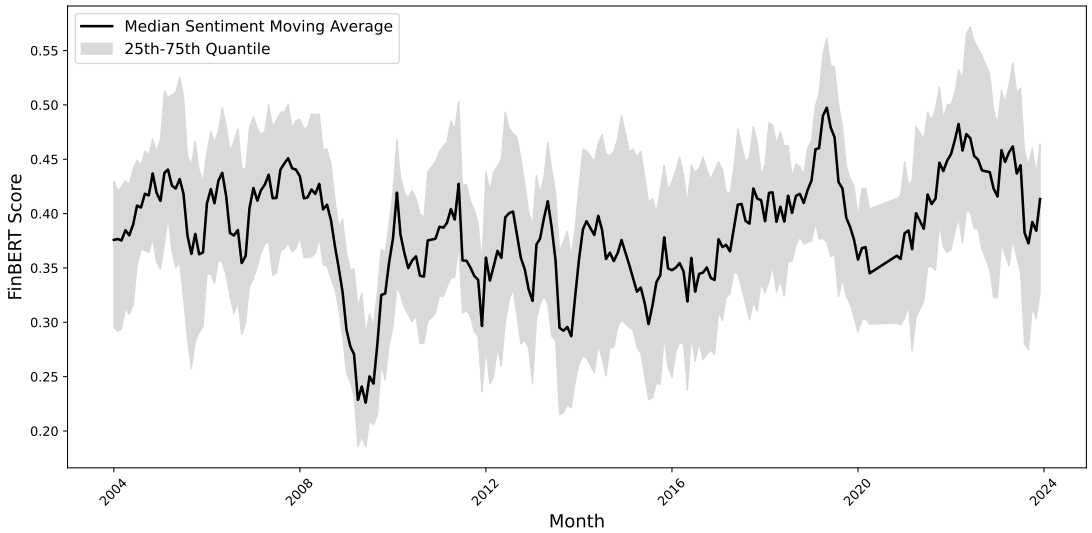
Due to the 512-token limit inherent in BERT-based models, we segment each PIN document into individual sentences prior to analysis. Each sentence is then evaluated using the FinBERT model, which assigns a sentiment score ranging from 0 (strongly negative) to 1 (strongly positive). We compute the average sentiment score across all sentences in a given PIN to derive a document-level measure of sentiment intensity. This approach enables us to quantify optimism or pessimism in IMF surveillance language, while capturing variation in tone both within and across documents.[5]

Figure 9 illustrates the evolution of IMF sentiment toward countries in our sample, based on the textual content of Article IV PINs from 2004 to 2023. The black line represents the two-quarter moving average of the median FinBERT sentiment score, while the shaded area denotes the interquartile range, capturing the cross-country dispersion in sentiment.

The data reveal pronounced fluctuations in IMF tone, with marked declines during periods of global financial distress—such as the 2008–2009 financial crisis and the COVID-19 shock in 2020—followed by gradual recoveries. The widening dispersion in certain periods suggests increased heterogeneity in IMF assessments across countries, likely reflecting diverse country-specific vulnerabilities.

[5] To further ensure the robustness of our sentiment measurement, we benchmark our FinBERT-based approach against the foundational Loughran and McDonald dictionary method (Loughran and McDonald, 2011). Specifically, for the Loughran and McDonald method, we calculate sentiment as the difference between the number of positive and negative words, divided by the total number of positive and negative words present in each PIN: Sentiment =((Positive Words - Negative Words)/(Positive Words + Negative Words)) This dictionary-based method imposes no tokenization limit, enabling analysis of the complete document text without segmentation. Figure D.1 in Appendix D compares both sentiment measures over time, highlighting a high correlation coefficient of 0.83 for the overall moving average series. Figure D.3 shows the distribution of the sentiment score for both the FinBERT and Loughran-McDonald (LM) methodologies along with the scatter of both measures. The FinBERT scores are more sharply centered around zero and exhibit lower variance, whereas the LM scores show a wider spread and a more left-skewed distribution, suggesting that LM may assign more extreme negative values. The correlation between the two sentiment measures, with a Pearson correlation coefficient of 0.69, indicate a relatively strong positive relationship.

Figure 9: *Trends in PIN sentiment scores using FinBERT, 2004–2023*



Note: The sentiment scores for each IMF Article IV Public Information Notice (PIN) are computed using the FinBERT model, which assigns a sentiment score to each sentence within the PIN text. These sentence-level scores are averaged to construct a document-level sentiment score per PIN. The figure presents a two-quarter moving average of median sentiment scores across all countries, along with the interquartile range (25th to 75th percentile), highlighting the evolution of IMF assessment tone over time.

In general, IMF PINs adopt cautious and measured language when discussing macroeconomic risks. Our FinBERT-based sentiment analysis indicates that the median sentiment score across all PINs is approximately 0.48, suggesting an overall neutral tone in the Fund's communication. This neutrality likely reflects a structural tension in IMF surveillance: the need to deliver credible and transparent assessments while avoiding the risk of triggering adverse market reactions. Overly negative assessments may provoke self-fulfilling investor responses—such as widening bond spreads or capital outflows—that could exacerbate the vulnerabilities the Fund seeks to mitigate.

To navigate the complexity of interpreting IMF communications, we isolate the idiosyncratic—or "surprise"—component of each PIN's tone; that is, the portion of sentiment that deviates from contemporaneous regional communication trends. Specifically, we construct a relative sentiment index by calculating the deviation of each PIN's FinBERT sentiment score from the median sentiment of all PINs issued within the same IMF-defined region during a six-month window centered on the publication month. This approach controls for both global and regional shifts in tone, allowing us to extract the country-specific informational content of each release. The resulting deviation serves as a cleaner proxy for the "information shock" conveyed by the IMF—that is, the degree to which a given PIN is unexpectedly

positive or negative relative to regional expectations.

Figure D.2 in Appendix D displays the evolution of FinBERT sentiment gap scores across the sample period, illustrating the de-trending effect of our methodology. By removing the common regional tone, the sentiment gap isolates idiosyncratic variation in IMF assessments. The resulting distribution fluctuates around zero, but exhibits pronounced positive and negative spikes. These sentiment "surprises" represent deviations from the regional average tone at the time of each PIN release, effectively capturing country-specific optimism or pessimism in IMF surveillance communications.

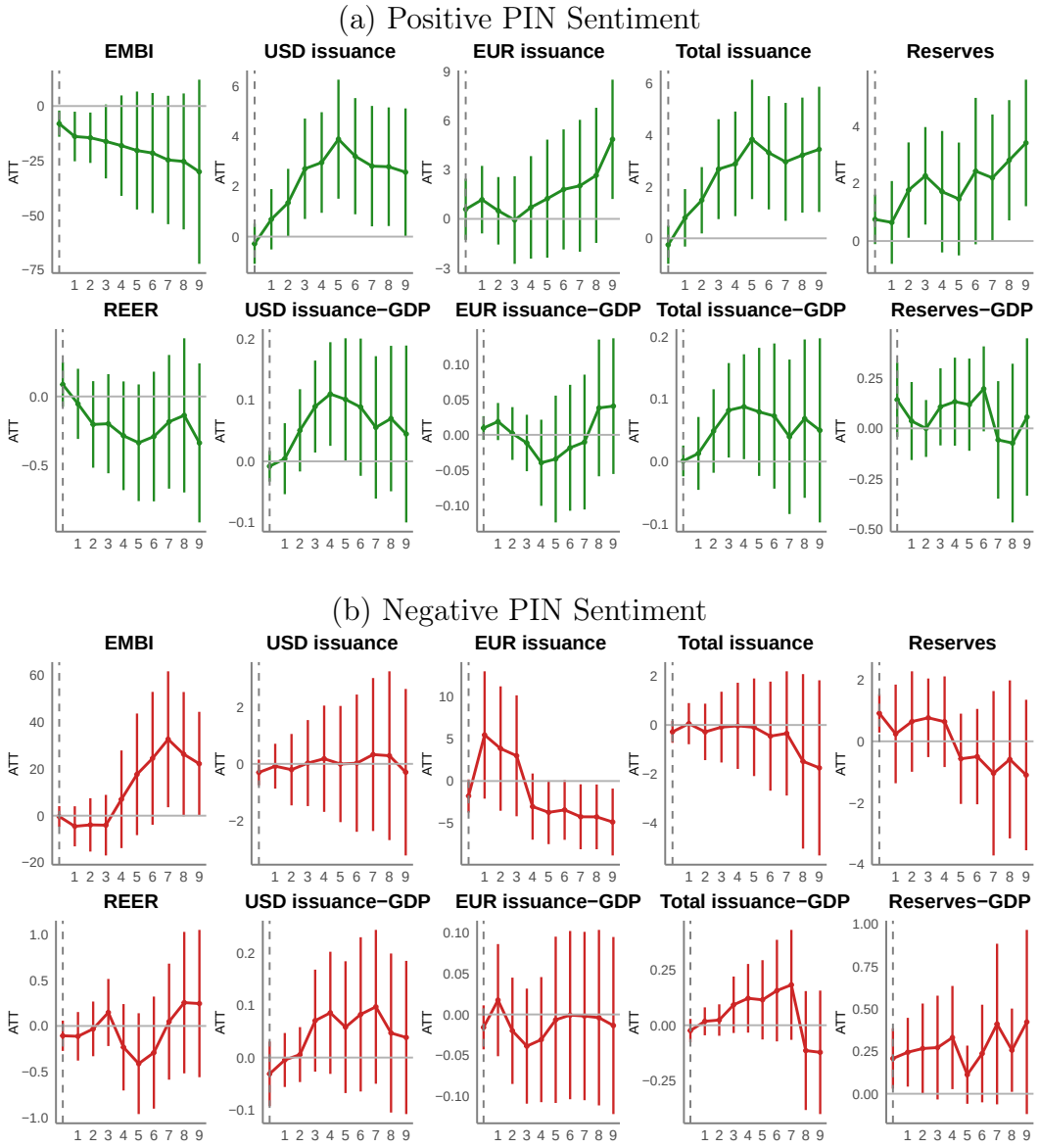
The presence of both upward and downward swings in the sentiment gap indicates that, at any given point in time, some countries received assessments notably more favorable or critical than their regional peers, even after conditioning on broader macroeconomic sentiment. This structure supports our interpretation of the FinBERT sentiment gap as a valid proxy for informational shocks, reflecting the unique tone embedded in each surveillance episode relative to prevailing regional narratives.

We follow the moderating-variable framework proposed by Imai et al. (2023), using each PIN's FinBERT sentiment score as a moderator of the treatment effect. This approach allows us to estimate two separate dynamic ATT paths—one for "optimistic" PINs (positive sentiment surprises) and one for "pessimistic" PINs (negative sentiment surprises)—across all of our outcome variables.

Figure 10 presents the dynamic ATT estimates, capturing the heterogeneous causal effects of IMF Article IV PIN releases by sentiment.

Panel (a) shows that optimistic sentiment surprises compress EMBI spreads by approximately 20–25 basis points—substantially larger than the 15 bp average effect in the baseline—and drive a 4 percent rise in USD-denominated sovereign issuance, compared to roughly 2 percent in the benchmark results. These effects are statistically significant between months 3 and 6, and the foreign-reserves-to-GDP ratio increases by 1–1.5 percentage points in months 4 through 6. Taken together, these findings suggest that positive PIN surprises not only lead to sharper reductions in borrowing costs but also translate into materially stronger improvements in market access.

Figure 10: *Heterogeneous treatment effects by PIN sentiment: optimistic vs. pessimistic releases*



Note: This figure displays the dynamic treatment effects of IMF Article IV PIN releases on sovereign bond spreads and related financial indicators, disaggregated by the sentiment of the PIN communication. Panel (a) reports results for PINs classified as optimistic, while Panel (b) reports results for PINs classified as pessimistic, based on the FinBERT sentiment score. Each subfigure plots the estimated Average Treatment Effect on the Treated (ATT) over a nine-month horizon following the PIN release. Shaded areas represent 90% confidence intervals based on bootstrapped standard errors. Estimates are derived using the same baseline specification as previous figures, with propensity score weighting (PSW) applied for covariate adjustment.

Panel (b), by contrast, shows that negative sentiment surprises yield flat and statistically insignificant ATT estimates across most variables. EMBI spreads rise significantly only by month 7, indicating delayed investor concern. Similarly, EUR-denominated issuance declines significantly at this horizon, reflecting a contraction in market access following pessimistic IMF messaging. These findings support a "warning effect" interpretation of negative IMF assessments, where causal effects emerge more gradually and selectively.

Overall, the evidence points to a clear asymmetry: while positive IMF communications elicit immediate and favorable market responses, negative sentiment—when statistically significant—tends to generate delayed and adverse impacts.[6]

6.2. The role of geopolitical alignment

The second channel we investigate is geopolitical alignment: how investors' reactions to IMF PINs vary depending on a country's alignment with the United States—led international order. When markets perceive a country as closely aligned with major IMF shareholders or influential financial coalitions, favorable IMF surveillance reports may carry a "credibility premium," signaling stronger institutional backing and greater policy stability. By contrast, countries viewed as less aligned—or even at odds diplomatically—may experience more muted or skeptical market responses to similar communications. We capture geopolitical alignment using voting similarity in the United Nations General Assembly (UNGA), which reflects long-run patterns of geopolitical affinity with key IMF stakeholders, particularly the United States.

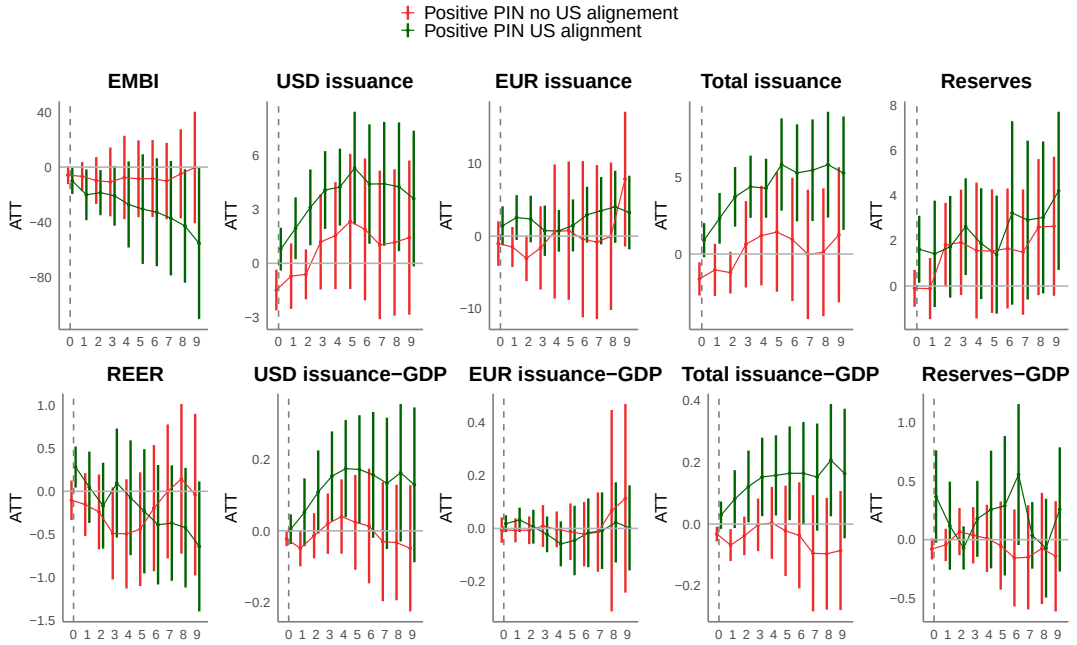
Prior studies have shown that closer alignment with the United States predicts both higher IMF lending volumes (Dreher et al., 2009) and more favorable program conditionality (Stone, 2012). However, these findings are often confounded by the fact that lending programs typically respond to acute macroeconomic crises and involve significant resource commitments. In contrast, Article IV surveillance and PIN disclosures represent low-stakes, bilateral engagements, making them well-suited for a natural-experiment framework to isolate how geopolitical alignment influences market reactions—independent of crisis dynamics or financial bailouts.

[6] As a robustness check, Figure D.4 in Appendix D replicates the dynamic treatment effect analysis using the Loughran–McDonald (LM) dictionary-based sentiment classification, in place of the FinBERT-based sentiment used in the main results. The core patterns remain broadly consistent: optimistic PINs are associated with improvements in market conditions and investor sentiment, whereas pessimistic PINs exhibit muted or negative effects.

To test this channel, we draw on UNGA ideal-point estimates from Fjelstul et al. (2025), which place countries along a latent dimension capturing their affinity with the United States—led liberal international order. We compute each country's bilateral ideological distance from the United States using these ideal points.[7]

We then interact each country's geopolitical distance from the United States in year t with the optimistic PIN surprises identified in the previous section—understood as the sentiment deviation of each PIN release compared to the regional sentiment over that period. This specification allows us to distinguish the political credibility channel from the pure informational channel, by testing whether positive IMF assessments elicit stronger market responses when issued for countries that are geopolitically aligned with the United States.

Figure 11: *Heterogeneity Results: Positive Sentiment and Geopolitical Alignment*



Note: The figure presents heterogeneity analysis results comparing optimistic IMF PIN releases with additional conditioning on geopolitical alignment. Specifically, the new results highlight countries that not only received optimistic PINs but also demonstrated higher geopolitical alignment with the United States, defined as above-median agreement in United Nations General Assembly (UNGA) voting patterns. The analysis uses the same baseline specification as previously shown, employing propensity score weighting (PSW) and bootstrapped 90 percent confidence intervals.

[7] The dynamic ordinal spatial model used to estimate ideal points treats each UNGA roll-call vote as an ordinal outcome, with probabilities determined by (a) the country's latent ideal point, (b) vote-specific discrimination parameters, and (c) thresholds that separate "No," "Abstain," and "Yes" responses. See Bailey et al. (2017) for full methodological details.

Figure 11 shows that the reduction in sovereign bond spreads and the corresponding increase in sovereign issuance—particularly in USD-denominated instruments—following optimistic PIN releases is concentrated among countries with above-median geopolitical alignment with the United States, as measured by UNGA voting similarity. In these geopolitically aligned states, USD-denominated issuance rises to approximately 6 percent, compared to a 4 percent peak in the overall optimistic-PIN sample. Similarly, the decline in sovereign spreads is sharply concentrated in this subgroup.

By contrast, for countries with below-median alignment, the effects of optimistic PINs on both spreads and issuance are statistically insignificant. This pattern suggests that positive IMF information surprises enhance access to international capital markets primarily for countries that are geopolitically proximate to the United States, reinforcing prior findings that geopolitical alignment conditions the credibility and market impact of IMF actions (Thacker, 1999; Barro and Lee, 2005).

7. Conclusion

In this paper, we investigate how the International Monetary Fund's Article IV Public Information Notices (PINs) influence sovereign market access in 67 emerging market economies (EMEs) between January 2004 and January 2024. To address the limitations of standard difference-in-differences two-way fixed effects estimators in settings with repeated treatments, we apply the panel-matching DiD approach developed by Imai et al. (2023). This method allows us to construct control groups matched on observed covariates and accommodates non-absorbing treatment structures, thereby enhancing the credibility of our causal estimates.

Our core finding is that PIN releases lead to an immediate reduction in sovereign bond spreads—by approximately 15 basis points on average—accompanied by a contemporaneous surge in hard-currency debt issuance. Notably, this issuance effect is concentrated in US dollar-denominated borrowing, while euro-denominated issuance remains largely unaffected. This divergence suggests that financial markets place greater weight on IMF signals when evaluating dollar-denominated debt, consistent with the dollar's role as the dominant global reserve currency.

Our results are robust across a series of validation checks, including: alternative treatment definitions based on staff report publication dates, placebo tests using future-dated PINs, and models that explicitly control for the Global Financial Crisis and COVID-19 pandemic. These findings also hold when outcomes are

expressed in nominal terms or normalized as shares of GDP.

To examine the role of information content, we use natural language processing (NLP) to extract sentiment surprises from the textual content of PINs. We find a clear asymmetry: positive sentiment shocks significantly ease market conditions and stimulate greater issuance, while negative shocks elicit only muted responses, though they are followed by delayed upward pressure on spreads. This pattern suggests that optimistic IMF language sends a powerful confidence signal, whereas negative assessments are likely tempered to avoid triggering adverse market reactions.

Finally, we show that the strength of these effects is conditioned by a country's geopolitical alignment, measured via voting similarity with the United States (US) in the United Nations General Assembly. Countries most closely aligned with the US experience the largest increases in dollar-denominated issuance following positive sentiment shocks. This mirrors earlier findings on IMF lending and conditionality, indicating that optimistic surveillance language only translates into improved market access for US geopolitical allies—revealing a structural bias in the operation of bilateral surveillance.

Together, these results underscore the powerful role of IMF surveillance in shaping sovereign access to global capital markets. By combining a causal panel-matching framework with textual sentiment analysis and measures of geopolitical proximity, we provide new evidence on the informational and political channels through which IMF PIN disclosures affect financial market outcomes.

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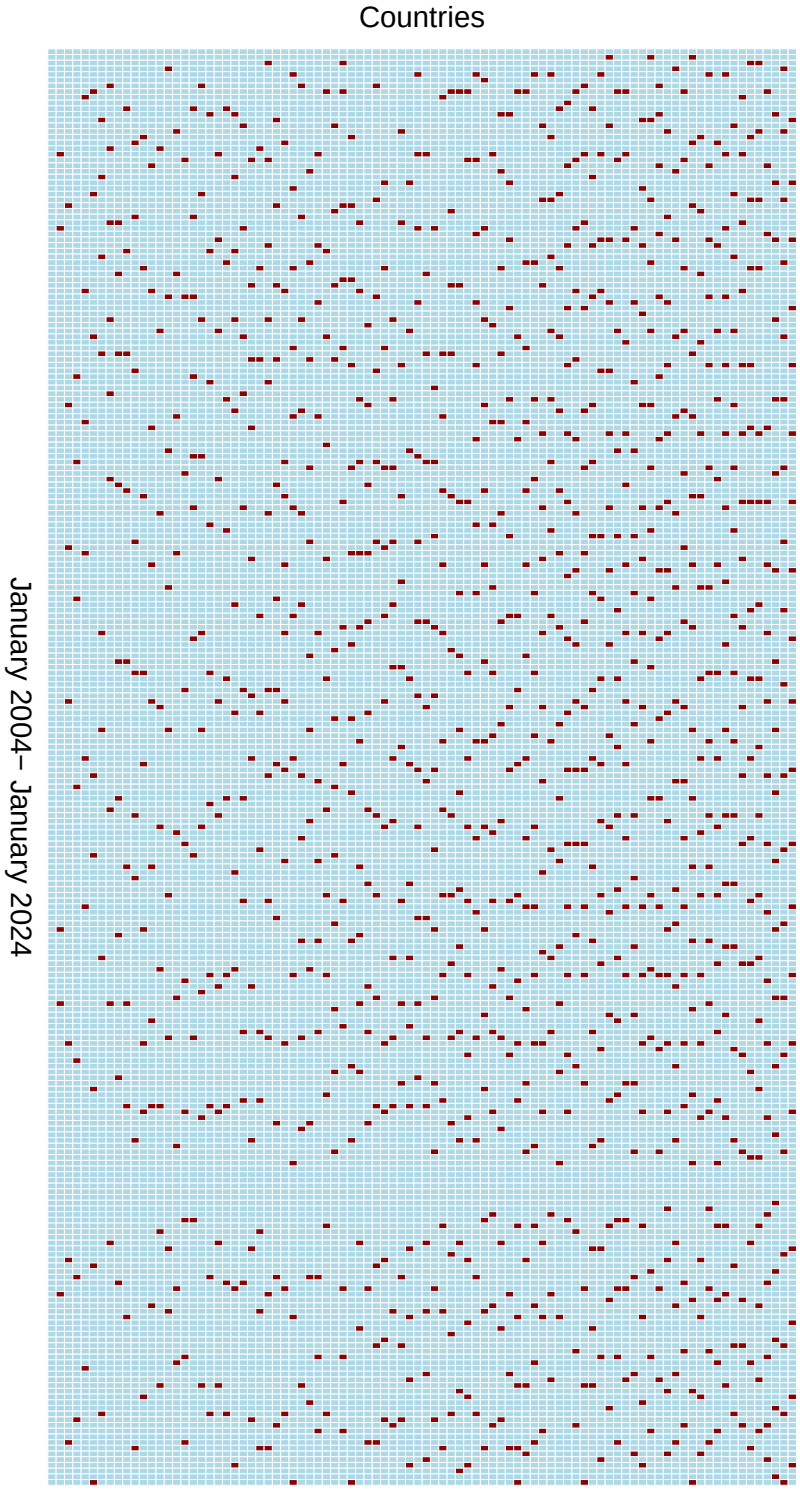
Appendix A - Data

Table A.1: *List of countries included in the sample*

Asia and Pacific	Europe	Middle East and Central Asia	Sub-Saharan Africa	Western Hemisphere
China	Bulgaria	Armenia	Angola	Aruba
Indonesia	Belarus	Azerbaijan	Côte d'Ivoire	Argentina
South Korea	Croatia	Bahrain	Gabon	Bahamas
Sri Lanka	Hungary	Egypt	Ghana	Belize
Mongolia	Lithuania	Georgia	Kenya	Bolivia
Malaysia	Latvia	Iraq	Mozambique	Brazil
Philippines	Poland	Jordan	Nigeria	Barbados
Vietnam	Romania	Kazakhstan	Rwanda	Chile
	Russia	Lebanon	Senegal	Colombia
	Serbia	Morocco	South Africa	Costa Rica
	Slovakia	Pakistan	Zambia	Dominican Republic
	Turkey	Qatar		Ecuador
	Ukraine	Tunisia		Guatemala
				Honduras
				Jamaica
				Mexico
				Peru
				Paraguay
				El Salvador
				Trinidad and Tobago
				Uruguay

Note: Countries are grouped according to the IMF regional classification. Africa includes Sub-Saharan African countries; Asia and Pacific covers countries in East Asia, South Asia, Southeast Asia, and the Pacific; Europe encompasses European countries, including both EU and non-EU members; Middle East and Central Asia comprises Middle Eastern countries, North Africa, and Central Asian republics; Western Hemisphere includes North America, Central America, the Caribbean, and South America.

Figure A.1: *IMF Article IV PIN release timing across countries (2004–2023)*



Note: The figure visualizes the distribution of IMF Public Information Notice (PIN) disclosures across countries and time. Each row corresponds to a country, while each column represents a month, spanning from January 2004 to January 2024. Red dots indicate treated country-month observations, defined as periods when a PIN was disclosed for a given country.

Appendix B - Covariates and covariate balance

B.1. Potential confounders

The choice of covariates should be guided by economic theory and prior empirical findings, while ensuring that the model remains parsimonious (Imbens and Rubin, 2015). Including extraneous variables can unnecessarily restrict common support, while omitting key confounders can introduce significant bias into estimated treatment effects (Brookhart et al., 2006).

We adjust for several types of covariates based on their theorized association with both treatment and outcome. First, we include macroeconomic variables that capture a country's external and fiscal position, which directly influence market risk assessments and IMF surveillance decisions. The current account balance (as a percentage of GDP) reflects a country's external financing needs and vulnerability to balance of payments crises. Countries with persistent current account deficits are more likely to attract IMF monitoring and face higher sovereign spreads (Reinhart and Rogoff, 2008). Similarly, general government gross debt and net lending/borrowing (both as a percentage of GDP) capture fiscal sustainability and potential financing gaps, making them key determinants of both IMF consultations and market pricing of default risk (Borgy et al., 2011). The tax revenue-to-GDP ratio reflects a government's capacity to generate resources, which affects IMF fiscal assessments and market confidence (Baldacci et al., 2008).

We also include indicators of economic performance and stability. Consumer Price Index (CPI)-based inflation, expressed as year-on-year change, is a core macroeconomic indicator that signals monetary stability and may trigger IMF concern in the context of overheating or demand collapse. Real GDP growth (YoY) and GDP per capita (PPP) are standard metrics of output performance and development level, which both the IMF and financial markets consider when assessing creditworthiness. Population size is included to proxy for market size and economic scale, which may influence IMF strategic interest and market perceptions of liquidity and debt absorption capacity.

In terms of sovereign risk perception, we include the sovereign credit ratings from Fitch, Moody's, and S&P. These ratings directly reflect market assessments of credit risk and often respond to IMF interactions, but also pre-determine market expectations of country risk (Cantor and Packer, 1996; Gaillard, 2014). They may also co-determine the likelihood of IMF consultations if declining ratings are viewed

as a signal of increasing vulnerability.

We further include political and institutional factors that influence both the IMF's surveillance intensity and investors' trust in a country's policy commitments. The liberal democracy index from V-Dem reflects the quality of governance and democratic accountability, which shape IMF engagement strategies (Abeywickrama et al., 2024) and investor confidence in policy stability (Jakobsen and De Soysa, 2006). Political timing variables such as election years are included to control for political cycles that may influence the timing of Article IV consultations or PIN releases, as well as investor concerns over policy uncertainty or fiscal populism during elections (Brender and Drazen, 2005). Finally, we control for a country's geopolitical alignment and global engagement using UN General Assembly voting patterns and ideal points (Fjelstul et al., 2025), which have been shown to influence IMF treatment and broader international financial relations Thacker (1999); Oatley and Yackee (2004).

We add the Chinn-Ito index (Chinn and Ito, 2008) to capture financial openness, since capital account liberalization increases vulnerability to external shocks and typically leads to greater IMF scrutiny (Eichengreen and Mussa, 1998). The exchange rate regime classification (Ilzetzki et al., 2022) is also critical, as exchange rate arrangements interact with monetary and fiscal policy credibility and IMF surveillance priorities.

The definitions and sources of data for confounding variables are presented in the following table.

Table B.1: *Covariates description and data sources*

Variable Name	Frequency	Source
Macroeconomic Data		
Current Account Balance (% of GDP)	Yearly data splined to monthly	S&P Global Market Intelligence
Consumer Price Index (CPI), Year-on-Year % Change	Monthly	S&P Global Market Intelligence
Real GDP, Growth Rate (YoY)	Yearly data splined to monthly	S&P Global Market Intelligence
Real GDP Per Capita (PPP 2019 USD)	Yearly data splined to monthly	S&P Global Market Intelligence
General government gross debt (% of GDP)	Yearly data splined to monthly	IMF World Economic Outlook
Sovereign rating (Fitch, Moody's and S&P	Monthly	Trading Economics
General government net lending/borrowing (% of GDP)	Yearly data splined to monthly	IMF World Economic Outlook
General government tax revenues (% of GDP)	Yearly data splined to monthly	Global Macro Database (Müller et al., 2025)
Population: Total (millions)	Yearly data splined to monthly	S&P Global Market Intelligence
Political Data		
Liberal democracy index	Yearly data splined to monthly	V-Dem Dataset v15[a]
Government stability index	Monthly	ICRG Historical Data
Chinn-Ito Index (KAOPEN Index)	Annual or latest available	Chinn and Ito (2008)[b]
Exchange rate regime classification	Monthly classification	Ilzetzki et al. (2022)[c]
Monitoring of Fund Arrangements (MONA)	Monthly	IMF[d]
United Nations GA Votes and Ideal Points	Annual Sessions	UN Votes (Fjelstul et al., 2025)[e]
Election year for parliament (if parliamentary) or president (if presidential)	Annual update	Database of Political Institutions 2020[f]

[a] https://www.v-dem.net/data/the-v-dem-dataset/

[b] https://web.pdx.edu/~ito/Chinn-Ito_website.htm

[c] https://www.ilzetzki.com/irr-data

[d] https://www.imf.org/external/np/pdr/mona/index.aspx

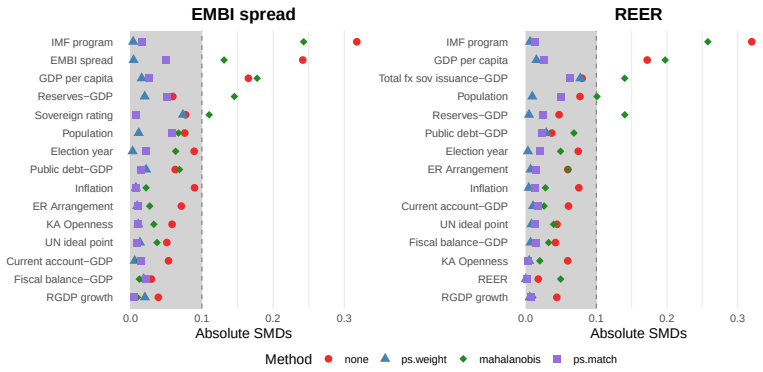
[e] https://github.com/evoeten/United-Nations-General-Assembly-Votes-and-Ideal-Points

[f] https://publications.iadb.org/en/database-political-institutions-2020-dpi2020

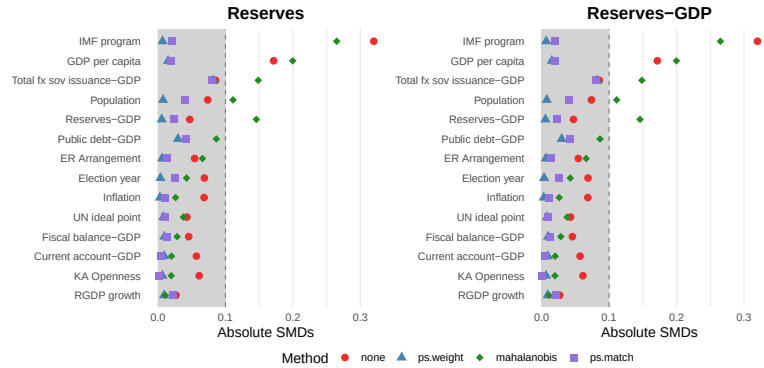
B.2. Covariate balance between treated and control groups

Figure B.1: *Covariate balance panels (1)*

(a)



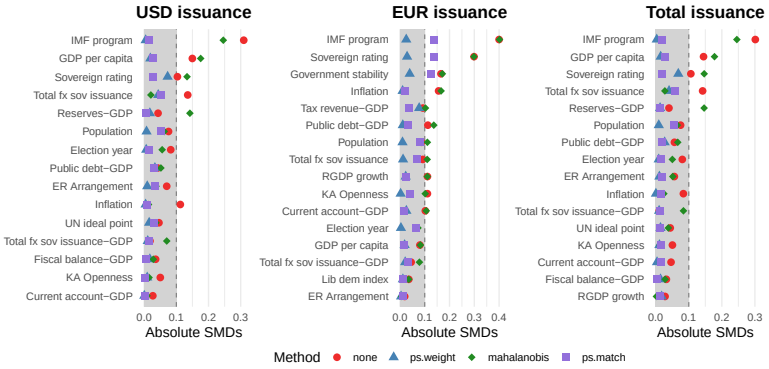
(b)



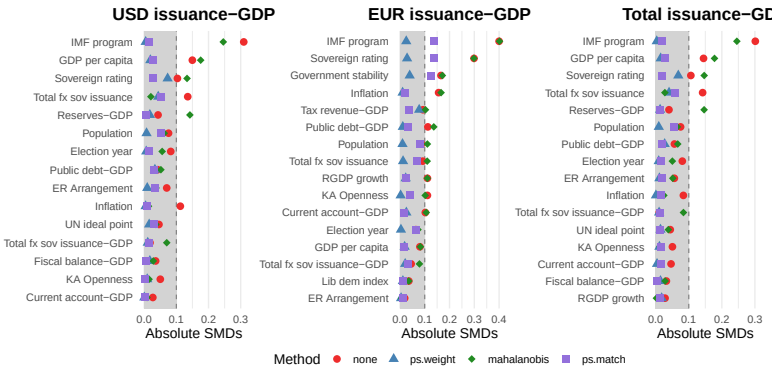
Note: Panels (a) and (b) display the absolute standardized differences (ASDs) of selected covariates—each computed over four lags, in line with our benchmark specification—under four methods: no matching (red circles), Mahalanobis matching (green diamonds), propensity-score matching (purple squares), and propensity-score weighting (blue triangles).Covariates are chosen based on the two rules for each given outcome, (1) their ASD under propensity-score weighting is below 0.1 and (2) that ASD is lower than under no matching. Panel (a) reports these ASDs for the EMBI spread and the real effective exchange rate (REER), while Panel (b) shows them for foreign reserves and foreign reserves-to-GDP.

Figure B.2: *Covariate balance panels (2)*

(c)



(d)



Note: Panels (c) and (d) plot the absolute standardized differences (ASDs) of selected covariates—each measured over four lags, as in our benchmark specification—under four approaches: no matching (red circles), Mahalanobis matching (green diamonds), propensity-score matching (purple squares), and propensity-score weighting (blue triangles). Covariates are chosen based on the two rules for each given outcome, (1) their ASD under propensity-score weighting is below 0.1 and (2) that ASD is lower than under no matching. Panel (c) reports these ASDs for the nominal sovereign issuance outcomes (USD, EUR, and total issuance in USD), while Panel (d) presents the ASDs for those same issuance measures expressed as percentages of GDP.

B.3. Example: September 2014 Angola PIN release

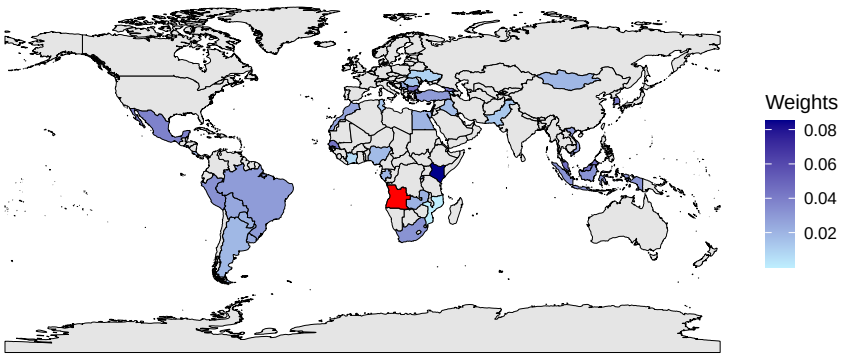
Figure B.3 illustrates the application of Propensity Score Weighting (PSW) in building a counterfactual for Angola's economic performance around the September 2014 Angola PIN release.

The figure is divided into two parts: the world map displays the weights attributed to various countries based on the Propensity Score Weighting methodology. Angola is highlighted in red, signifying that it is assigned the highest weight, reflecting its key role in the counterfactual analysis. Countries are color-coded based on the strength of the weight assigned, with shades of blue indicating countries with lower weights. The color gradient from dark blue to red emphasizes how the weights differ across countries, with Angola being the most influential country in the analysis due to its role in the study. This map showcases how countries are weighted to create a counterfactual comparison for Angola's economic trajectory post-2014.

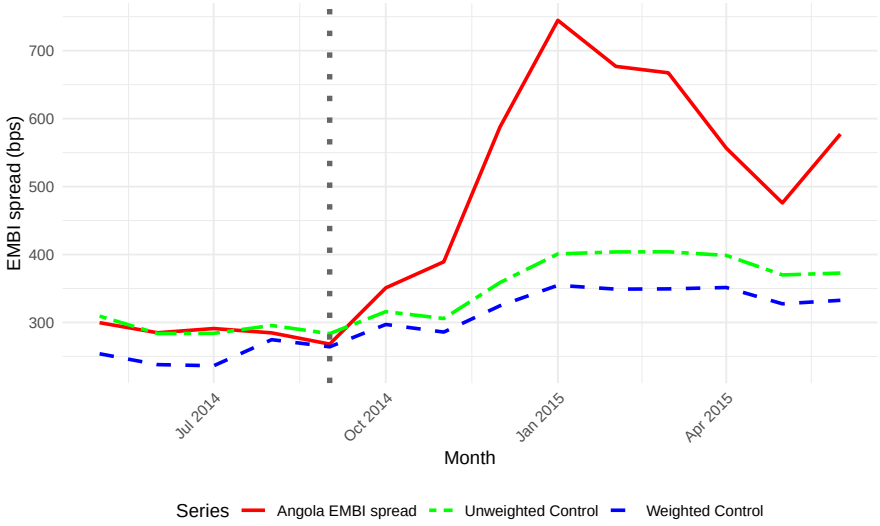
The plot illustrates the construction of the counterfactual series for Angola's EMBI spread. The figure compares Angola's observed EMBI spread (red line) with the weighted average EMBI spread of control countries (blue and green lines). The solid green line represents the "Weighted Control" series, which is the weighted average of control countries using Propensity Score Weights. The dashed blue line represents the "Unweighted Control" series, which is simply the unweighted average of control countries. The graph provides a clear visual comparison, showing how the post-release series for Angola differs from the counterfactual, constructed using the weighted control series.

Figure B.3: *Propensity score weighting at work: September 2014 Angola PIN release*

(a) World map propensity score weights



(b) Example on EMBI spread counterfactual



Note: The world map in Graph (a) shows the weights attributed to the other countries to build a counterfactual for the Angola 2014 PIN release. Angola is represented with a red color while the blue shade is stronger based on the weight given to each of the countries in the propensity score weighting methodology. The graph (b) illustrates the construction of the counterfactual scenario by comparing the observed post-event series for Angola with the weighted average of control countries, calculated using propensity score weights. The treatment effect is then measured as the difference between the observed series and this counterfactual series following the event.

Appendix C - Additional robustness checks

Figure C.1: *Lag length robustness: Effect of Public Information Notice (PIN) Releases*

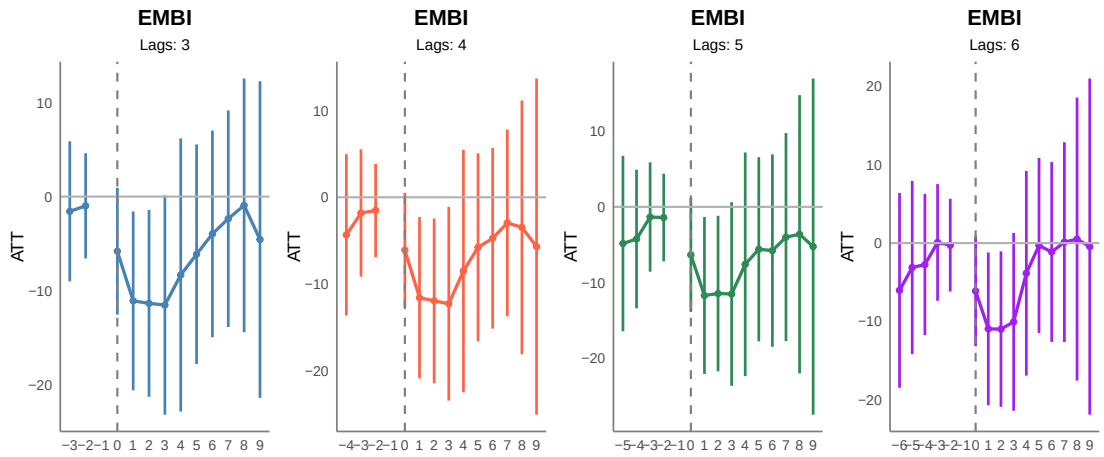
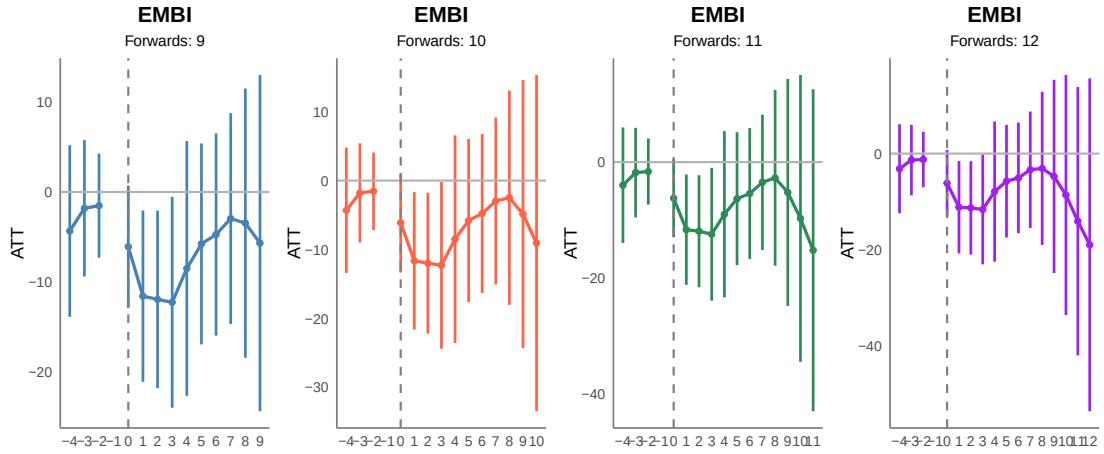
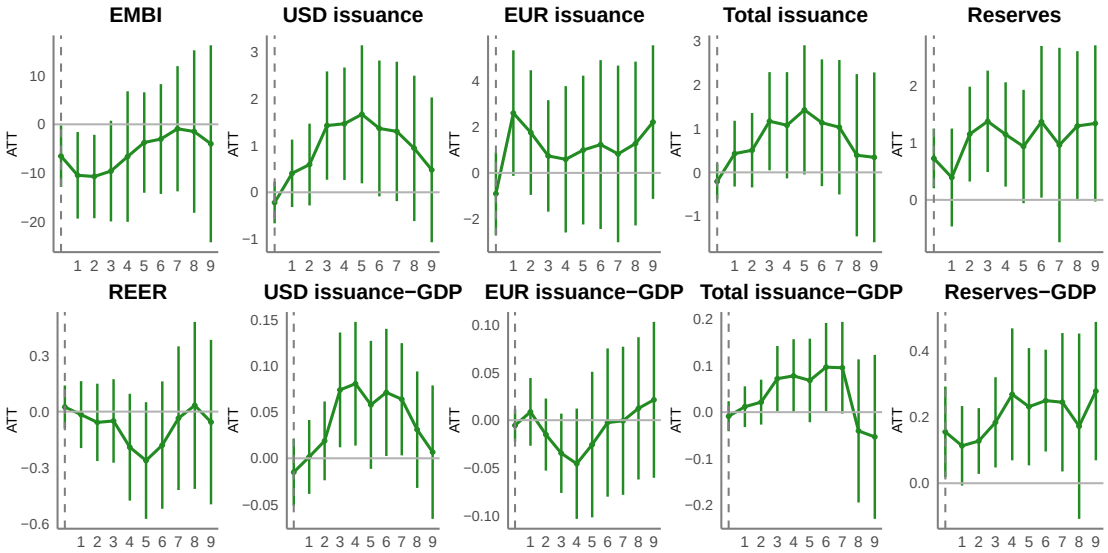


Figure C.2: *Forward horizon robustness: Effect of Public Information Notice (PIN) Releases*



Note: This figure displays the dynamic treatment effects of IMF Article IV PIN releases on the EMBI spread in basis points. We report the effects using four different lag specifications, from 3 months to 6 months. Each subfigure plots the estimated Average Treatment Effect on the Treated (ATT) over a nine-month horizon following the PIN release. Vertical lines represent 90% confidence intervals based on bootstrapped standard errors.

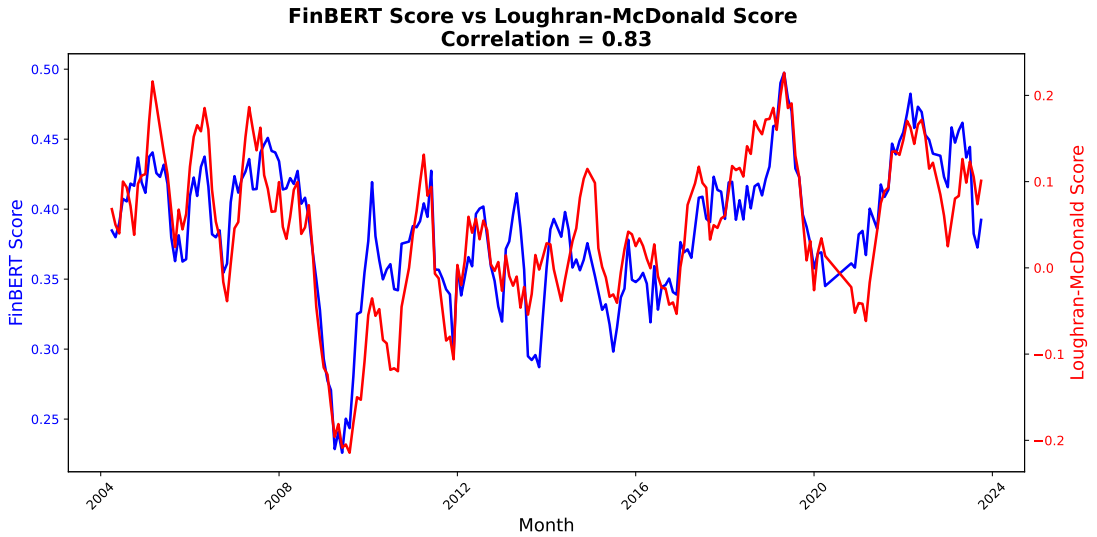
Figure C.3: *Excluding crisis periods: Effect of Public Information Notice (PIN) Releases*



Note: This figure displays the dynamic treatment effects of IMF Article IV PIN releases on our variables of interest. We report the effects using the propensity score weighting methodology showing the estimated Average Treatment Effect on the Treated (ATT) over the nine-month horizon following the PIN release and the four-month horizon before. Shaded areas represent 90% confidence intervals based on bootstrapped standard errors. We exclude from the sample the August 2008 to March 2009 for the GFC and the March 2020 to May 2020 for the pandemic based on spikes in the VIX.

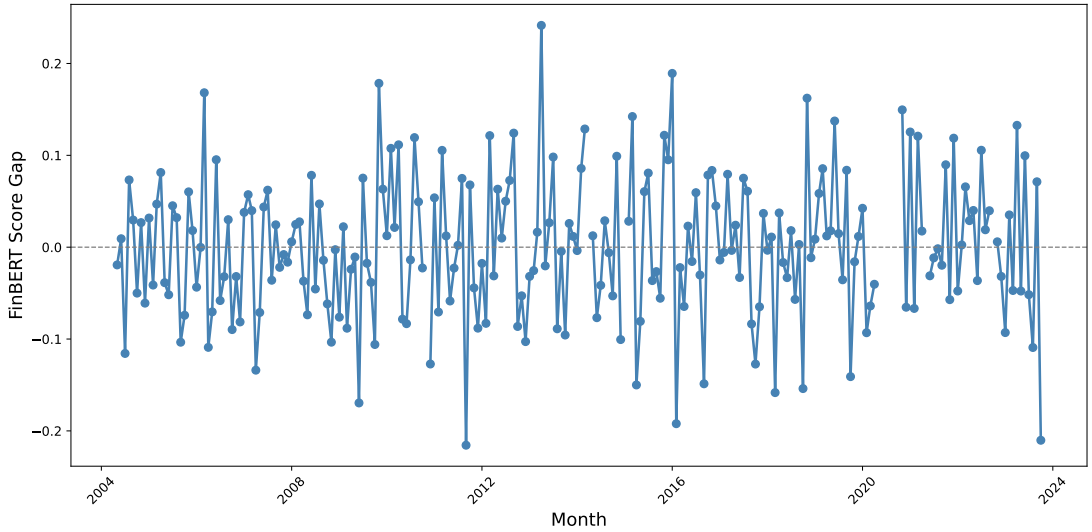
Appendix D - Sentiment analysis

Figure D.1: *Monthly sentiment scores from FinBERT and Loughran–McDonald Dictionary methods, 2004–2023*



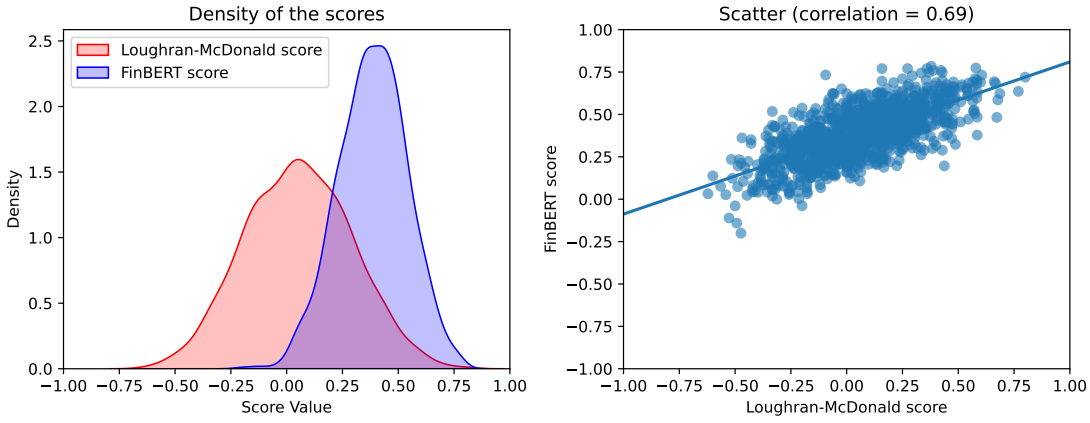
Note: This figure compares sentiment scores computed using the FinBERT model with those generated from the Loughran–McDonald financial dictionary approach. Each series represents the monthly average sentiment score across IMF Article IV PINs. The observed correlation of 0.83 suggests a strong alignment between the two sentiment measurement techniques, validating the consistency of FinBERT-based sentiment extraction over the analyzed period.

Figure D.2: *Country-specific sentiment gaps in IMF Article IV PINs, 2004–2023*



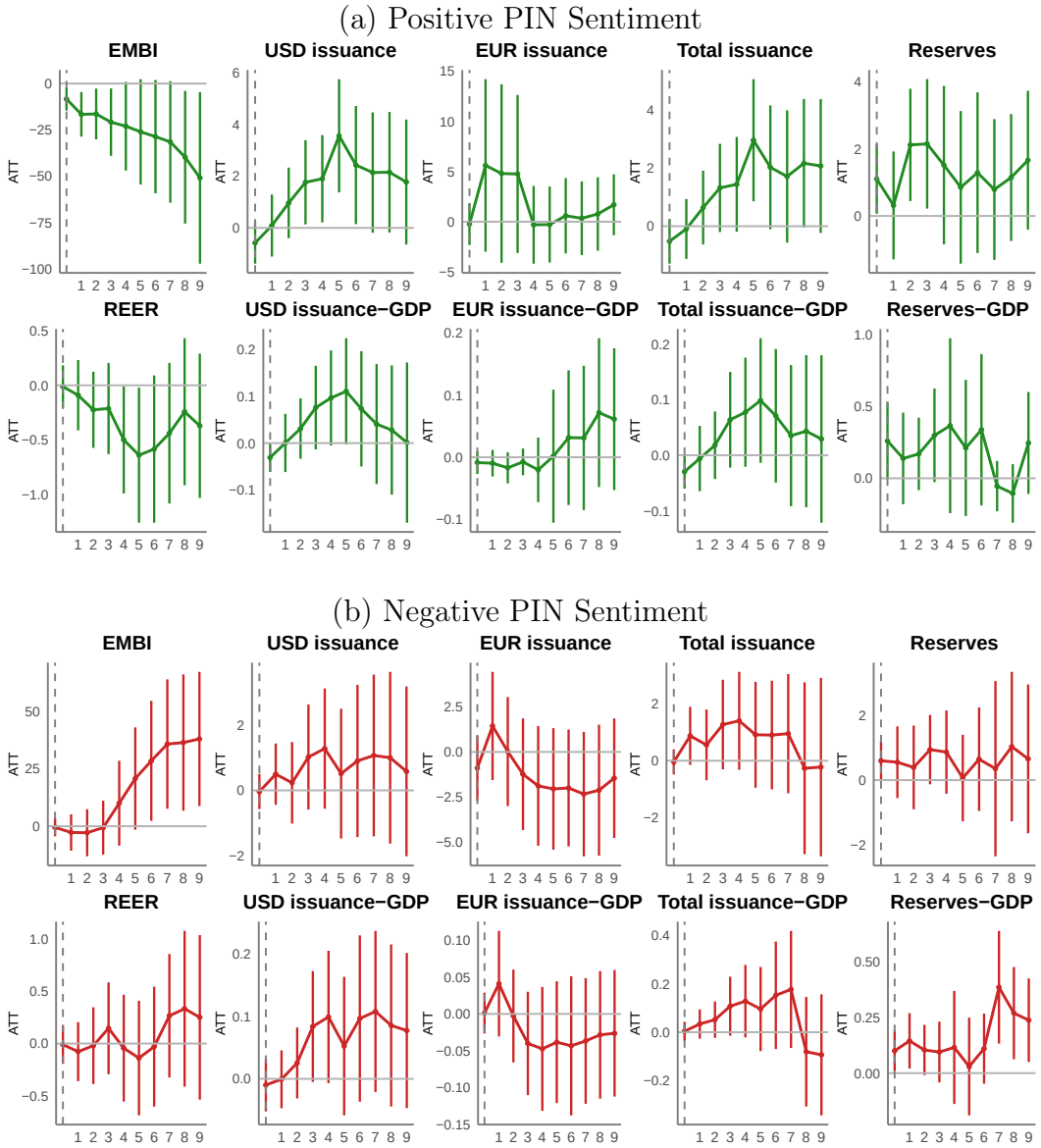
Note: This figure displays the monthly distribution of FinBERT sentiment gap scores, defined as the difference between a country's PIN sentiment score and the median sentiment of all PINs published in the same IMF-defined region during the same six-month window. This gap captures country-specific deviations from the regional communication tone, isolating the "surprise" or idiosyncratic component of IMF messaging. Positive values indicate sentiment more favorable than regional peers; negative values suggest more pessimistic or critical assessments.

Figure D.3: *FinBERT vs Loughran-McDonald Sentiment Scores*



Note: Comparing the sentiment scores on IMF Article IV Public Information Notice (PIN) computed with the FinBERT model and the Loughran-McDonald model. The left-hand graph shows the density plot of both sentiment scores, while the right-hand graph shows the correlation between the two scores in a scatter plot.

Figure D.4: *Loughran-McDonald Indicator - Heterogeneous treatment effects by PIN sentiment: optimistic vs. pessimistic releases*



Note: This figure displays the dynamic treatment effects of IMF Article IV PIN releases on sovereign bond spreads and related financial indicators, disaggregated by the sentiment of the PIN communication. Panel (a) reports results for PINs classified as optimistic, while Panel (b) reports results for PINs classified as pessimistic, based on the FinBERT sentiment score. Each subfigure plots the estimated Average Treatment Effect on the Treated (ATT) over a nine-month horizon following the PIN release. Shaded areas represent 90% confidence intervals based on bootstrapped standard errors. Estimates are derived using the same baseline specification as previous figures, with propensity score weighting (PSW) applied for covariate adjustment.

CONCLUSION GÉNÉRALE

Depuis les années 1980, une troisième vague de mondialisation a engendré une hausse inédite des flux commerciaux, financiers et migratoires. Si cette financiarisation accrue a d'abord été un vecteur de croissance, elle a rapidement révélé de nouveaux risques d'instabilité. L'ouverture généralisée des marchés a multiplié les canaux de transmission et les interconnexions financières transfrontalières, mettant en lumière d'importantes vulnérabilités systémiques. Ces transformations structurelles ont profondément redéfini les mécanismes de diffusion des chocs, complexifié la gestion des risques globaux et rendu plus prégnante l'interdépendance entre sphères réelles et financières.

Dans ce nouvel environnement financier mondialisé, la politique monétaire domestique joue un rôle central dans la stabilité macroéconomique, mais ses effets débordent souvent largement les frontières nationales. La politique monétaire américaine, en particulier, exerce une influence systémique sur les conditions financières mondiales en raison du rôle central du dollar comme monnaie de réserve internationale. Les ajustements de taux directeurs par la Réserve fédérale affectent directement les flux de capitaux, les taux de change, et les conditions de liquidité dans les économies émergentes et en développement, générant des effets de spillover parfois déstabilisants. Ces répercussions externes soulignent les tensions croissantes entre objectifs de politique interne et impacts internationaux, et rendent plus difficile la coordination des politiques macroéconomiques dans un monde multipolaire.

Les institutions multilatérales issues des accords de Bretton Woods—et tout particulièrement le Fonds Monétaire International—ont également vu leur mission se transformer. Dans un monde incertain, leur rôle de vigie économique à l'échelle planétaire est devenu essentiel : elles doivent désormais concilier gestion des déséquilibres macroéconomiques et fonction de stabilisation, tant par leurs prêts que par leurs dispositifs de surveillance et leurs recommandations de politiques publiques, afin de faire face aux nouveaux rapports de force d'un monde multipolaire. Leur légitimité repose désormais sur leur capacité à produire une expertise crédible, à diffuser une information valorisée sur les marchés, et à promouvoir une coopération internationale adaptée à la diversité des régimes économiques.

La présente thèse s'est inscrite dans cette dynamique, en analysant les conditions de possibilité d'une stabilité financière mondiale à la fois durable et inclusive, dans un contexte marqué par une forte volatilité des environnements économiques et une asymétrie croissante des capacités d'ajustement entre États. Pour répondre à ces défis, elle défend la nécessité d'une approche systémique intégrant étroitement les enjeux nationaux aux mécanismes de gouvernance financière internationale, dans

un espace où les marchés tendent à dépasser les cadres réglementaires traditionnels. L'analyse s'est structurée autour de trois chapitres, chacun abordant une dimension complémentaire de cette stabilité financière globale.

Dans le **Chapitre 1**, nous avons évalué l'impact de la politique de taux bas de la Banque centrale européenne sur les assureurs vie opérant en France. À cette fin, nous avons constitué une base de données au niveau des assureurs individuels couvrant la période d'après-crise (2009–2018), incluant des indicateurs de profitabilité, de composition de portefeuille et les taux distribués. L'analyse a mis en lumière un amplificateur du "canal des revenus" : le modèle d'activité—bancassureurs, sociétés par actions ou mutuelles—détermine en grande partie le niveau des taux offerts aux assurés. Nos résultats montrent que les bancassureurs, en ajustant plus rapidement leurs rendements, préservent des marges solides tout en gagnant des parts de marché. Cette résilience repose sur leur flexibilité tarifaire, soutenue par des structures intra-groupes robustes et le "bundling" de produits bancaires et assurantiels, qui leur permet de cibler directement leurs clients. En revanche, les assureurs vie indépendants des groupes bancaires voient leurs marges se contracter et leurs clients se détourner vers des placements plus rémunérateurs. Cette réaction hétérogène crée des distorsions concurrentielles et renforce les risques systémiques, d'autant que les conglomérats combinant activités bancaires et assurantielles prennent de l'ampleur. Ces constats soulignent l'urgence d'une surveillance macroprudentielle approfondie, non seulement des acteurs individuels, mais surtout de leurs interdépendances.

Ils soulèvent également la question du rôle que les autorités européennes pourraient jouer dans l'harmonisation des régulations prudentielles, face à des modèles économiques nationaux divergents, afin de limiter les risques de fragmentation du marché intérieur. Plus largement, ils invitent à réinterroger la cohérence du processus d'intégration financière européenne à l'aune des interactions entre politiques monétaires, structures de marché, et stabilité systémique. Une piste de recherche complémentaire consisterait à étendre l'analyse à l'ensemble de la zone euro, en incluant des pays caractérisés par des taux minimum garantis plus élevés. Cela permettrait d'approfondir la question du *duration gap*—l'écart de duration entre actifs et passifs—qui constitue l'un des principaux enjeux pour les assureurs vie en contexte de taux durablement bas.

Par ailleurs, un élargissement de la période d'observation au-delà de la crise du COVID-19, en intégrant la phase de remontée rapide de l'inflation et des taux d'intérêt, offrirait un cadre pertinent pour analyser les asymétries de comportement en fonction des cycles monétaires. Ce prolongement permettrait notamment

d'évaluer la résilience différenciée des modèles assurantiels européens face à des chocs de politique monétaire, et de mieux comprendre les mécanismes d'ajustement en période de normalisation financière.

Le **Chapitre 2** a examiné la transmission transfrontalière de la politique monétaire américaine par le biais des envois de fonds des migrants. Pivot du système monétaire international, les États-Unis en sont également la principale source à destination des économies émergentes. Pour étudier ces dynamiques, nous avons appliqué la méthode des projections locales à un échantillon couvrant huit pays d'origine et quarante-et-un pays de destination sur la période 1997–2017. Les résultats démontrent que l'impact d'un resserrement monétaire américain sur les envois dépend du degré de dépendance des pays récipiendaires : dans les États fortement tributaires de ces flux, un resserrement monétaire américain non-anticipé entraîne une contraction des transferts alors que ceux-ci augmentent pour les pays moins dépendants. En considérant le niveau de qualification des migrants, nous montrons que les travailleurs peu qualifiés, plus vulnérables, réduisent davantage leurs envois en période de resserrement monétaire, ce qui renforce la procyclicité des flux. À l'inverse, les envois des migrants hautement qualifiés se révèlent plus résilients. Ces variations s'inscrivent dans la même logique que les phénomènes de "sudden stops", caractérisés par la fuite des capitaux, l'épuisement des réserves internationales et la dépréciation des monnaies locales. Ces disparités soulignent l'importance pour les banques centrales et les régulateurs nationaux d'intégrer les flux privés de capitaux—et singulièrement les transferts de migrants—dans la conception et la calibration des politiques macroprudentielles, afin d'assurer un effet stabilisateur face aux chocs extérieurs.

À ce titre, une coordination plus étroite entre institutions financières internationales et autorités nationales pourrait renforcer la résilience des pays émergents, en tenant compte de la nature hybride de ces flux à la fois privés et systémiques. Ces résultats appellent également à une refonte des cadres analytiques standards utilisés par les bailleurs internationaux pour évaluer la vulnérabilité externe, en y intégrant pleinement le rôle amortisseur (ou amplificateur) des envois de fonds.

Afin d'approfondir ces résultats empiriques, il serait pertinent de développer un cadre théorique formalisant la décision d'envoi de fonds selon les caractéristiques individuelles des migrants. Un tel modèle permettrait d'intégrer à la fois le niveau de qualification, la trajectoire professionnelle et la capacité d'épargne des migrants, tout en tenant compte de leurs arbitrages en période de ralentissement économique. Ce cadre théorique contribuerait à mieux comprendre les logiques différenciées de

solidarité transnationale selon les profils sociodémographiques.

Par ailleurs, une déclinaison de l'analyse à l'échelle intra-nationale représenterait un prolongement utile, en permettant d'isoler les effets procycliques ou contracycliques des transferts de fonds à variables macroéconomiques constantes (taux de change, croissance, taux d'intérêt). Une telle approche mettrait en lumière les hétérogénéités territoriales de la résilience économique, et offrirait des éléments de réponse quant à l'efficacité des transferts comme mécanisme stabilisateur face aux chocs locaux.

Dans un contexte de montée des incertitudes géopolitiques et financières, les institutions financières internationales jouent un rôle clé pour informer et rassurer les marchés de capitaux. Le **Chapitre 3** a analysé le rôle informationnel du Fonds monétaire international à travers ses missions dans le cadre des Article IV et la publication subséquente des Public Information Notices (PIN) résumant l'évaluation du Fonds. En appliquant une approche en doubles différences à la diffusion des PIN entre 2004 et 2023 dans 67 pays émergents et en développement, nous montrons que la parution d'un PIN réduit significativement les spreads souverains et stimule les émissions de dette externe. Grâce aux techniques de traitement automatique du langage (NLP), nous distinguons l'effet des PIN à tonalité optimiste de celui des PIN pessimistes. Croisés avec le contexte géopolitique, ces résultats révèlent l'économie politique du "pouvoir d'information" du FMI, qui va bien au-delà de son rôle de prêteur : l'information qu'il diffuse, loin d'être neutre, peut conditionner l'accès des pays aux marchés internationaux de capitaux et soulève des enjeux de légitimité et de répartition du pouvoir.

Cela invite à repenser les modalités de transparence et de communication de ces institutions, afin qu'elles contribuent effectivement à un ordre financier plus équitable. Plus encore, cette analyse plaide pour une réévaluation des mécanismes de redevabilité du FMI, notamment dans les économies où la publication des PIN est susceptible d'alimenter une perception de surveillance asymétrique.

Pour approfondir cette perspective, l'analyse pourrait être élargie à une comparaison systématique du rôle d'autres acteurs de l'architecture mondiale de surveillance économique, tels que l'Organisation de coopération et de développement économiques (OCDE) ou les agences de notation privées. Une telle mise en parallèle permettrait d'évaluer la spécificité des mécanismes d'influence du FMI, tant en termes de diffusion normative que de signal transmis aux marchés.

En complément, il serait également pertinent d'intégrer des indicateurs fondés sur l'information économique publique issue de la presse, afin de capter le niveau

d'attention médiatique ou financière porté à un pays indépendamment de l'intervention du FMI. Cette approche permettrait de contrôler l'effet de sélection lié à l'intérêt préexistant des marchés, et ainsi de mieux isoler l'impact propre des dispositifs de surveillance du Fonds sur les comportements des investisseurs et des décideurs publics.