The Globalization of Corporate Control*

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Abstract

The internationalization of corporate control is a significant facet of globalization that is not well-understood, as it is challenging to trace controlling shareholders from the esoteric structure of corporate ownership, often hidden behind "shell" vehicles in offshore centers. We identify ultimate controlling shareholders from complex ownership networks across 22,000 publicly-traded firms in 2012 and 2019 and study the globalization of control. In the descriptive part, we map the global network of corporate control and ownership linkages to grasp its main features. While there is considerable home bias, there are vast cross-country differences in the fraction of domestic firms controlled by foreign entities. In some countries, a sizable portion of controlling stakes passes via tax-haven-incorporated companies, even when domestic shareholders own local firms. The network of international control appears very sparse, with much fewer links than ownership. In the empirical part, we parameterize cross-border corporate control and ownership with the gravity model to study its driving forces. Bilateral links are more potent for populous, affluent, and proximate countries. Nonetheless, the gravity model's explanatory power for control is much smaller than international goods and services trade. While adding source and destination country fixed effects improves the gravity model for control fit, it fares worse than trade, suggesting that other than distance, bilateral features play a chief role. Legal system similarities and deeply-rooted genetic differences play a non-negligible role, telling of deep barriers in the globalization of corporate control markets.

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1 Introduction

The opening of the markets for corporate control is a major facet of globalization. While much ink has been spilled studying the origins and implications of the expansion of trade, outsourcing, foreign direct and portfolio investment, there is little work on the globalization of corporate control. This may not be surprising, as mapping the global network of corporate control is challenging, even for publicly-traded companies under regulatory-supervisory scrutiny. Corporate ownership structures are complex and esoteric; there are pyramid arrangements and equity cross-holdings between parents, subsidiaries, and holding companies, often involving various family members. In addition, controlling ownership stakes often go through "shell" companies and special purpose/investment vehicles in offshore financial centers, whose role seems to be nowadays central in the international financial system (Zucman (2015)). As we document, even domestic shareholders, individuals/families and institutional investors use tax-haven conduits to control companies trading in the local stock market. The recent leaks on wealth held offshore brought these issues into the spotlight. The sanctions imposed on Russian high-net-worth individuals, corporates, banks, and other financial institutions, have further revealed the challenges of identifying controlling rights even in large and eponymous companies.[1]

In this paper, we advance on the measurement of corporate control of listed companies worldwide to provide mappings of the network structure and understand the features shaping the integration of global control and ownership markets. We provide new measures of corporate control and ownership internationalization (and home bias) in 2019, just before the pandemic, and in 2012, after the world financial crisis. Our sample covers about $22,000$ listed firms, both with a controlling shareholder (voting rights over 20%) and widely-held, in 82 countries and jurisdictions. Our data reflect positions of all sorts of shareholder entities (individuals, families, listed and private firms, banks, governments, and non-bank financial institutions) from 158 countries. We trace controlling shareholder entities from pyramidal corporate structures — often hidden behind shell companies and conduits— to provide more accurate mappings of the internationalization of corporate control, taking into account indirect links.[2] We distinguish between three types of (controlling) shareholders: domestic, foreign, and in tax-haven jurisdictions. Our analysis proceeds in two major parts.

[1]For example, there was uncertainty on whether Mr. Alexey Mordashov, sanctioned by the European Union in early March 2022, is still controlling TUI, the German tour operator, as it was unclear who are the ultimate owners of the two subsidiaries used as conduits.

[2]Our data compilation extends our effort in Aminadav and Papaioannou (2020) that focused on 2004-2012 without looking at the international aspect of corporate control and in Aminadav et al. (2022) where we zoomed into 2012. Our effort was to augment, update, clean, and revise Bureau van Dijk's widely-used ORBIS database, relying on company regulatory filings, government reports, financial media and data providers, and recent leaks on ownership and control in tax-haven jurisdictions.

1.1 Results Preview

In the descriptive part of our paper (Section 3), we use the newly-compiled data to shed light, descriptively, on some core questions in international finance. First, we examine the internationalization of ownership and control taking a destination country (of the listed firm) and a source country (the nationality of controlling shareholding entity) viewpoint. Home bias is considerable, as shareholding entities (individuals, families, banks, governments, non-bank financial institutions, private and public firms) own and control about 75% of domestic market capitalization, with foreign entities holding the remaining 25%. On the one hand, the share of market capitalization controlled by foreign entities is tiny for some large advanced economies, especially in East Asia (Taiwan, South Korea, and Japan) and the United States. On the other hand, it is around 50% or higher in the United Kingdom, Portugal, Bangladesh, and Pakistan. Cross-border ownership and control appear, on average, larger in smaller countries. Besides, shareholding entities from smaller countries hold a higher share of (controlling) equity stakes abroad. The inverse relation between foreign control of listed corporations and economy size echoes the international trade and portfolio investment evidence.

Second, we zoom into the role of financial offshore jurisdictions, as there huge interest from policymakers and the public in their functions (Zucman, 2015). On average, the use of holding companies and special investment/purpose vehicles in offshore jurisdictions is modest, if not low. But there is considerable variation. Shareholders in offshore financial centers hold controlling rights in more than a fourth of the market capitalization in many Eastern and Southern European countries, like Ukraine, Russia, Romania, Slovenia, Serbia, and some large emerging markets, like Nigeria and Thailand. Besides, in some countries [Ukraine, Portugal, Greece, Estonia, Russia], a sizable portion of the domestic market capitalization of controlled firms is by domestic shareholders, who use, however, intermediate firms incorporated in tax-haven jurisdictions. In contrast, corporate control from or via shareholding entities in tax havens is minimal in the United States, Germany, Japan, the Scandinavian countries, South Korea and Taiwan.

Third, we study the bilateral positions of ownership and control. Many of the most prominent links in ownership involve tax-haven jurisdictions; four of the ten largest ownership links are between pairs of off-shore centers (the Cayman Islands, the British Virgin Islands, and Hong Kong). There are evident regional patterns in corporate ownership. At the same time, there are strong connections across large economies. However, the international corporate control network is considerably more sparse, with few controlling links even when we zoom in on advanced economies.

In the empirical part (Section 4), we estimate gravity-style specifications to characterize the vast heterogeneity of international corporate ownership and control. For comparison, we run analogous specifications for goods and services trade, as a voluminous literature shows a tight link between size, distance, and international trade (Head and Mayer, 2014). Our exploration uncovers

some interesting regularities. First, links are stronger for proximate dyads, more populous, and richer countries. However, the gravity model fit for corporate control fares considerably worse than international trade, hinting that other than size features play a role.

Second, other than population and income, country features explain a non-negligible portion of international of control (and ownership); the "pseudo-R^2" of the Poisson Pseudo Maximum Likelihood (PPML) estimator significantly increases when we add source and destination constants. Institutions in the destination and at source explain a modest part of ownership and control. The model fit improves modestly when we add indicators identifying when the controlling entity or the listed company are incorporated in tax haven jurisdictions. When we look at corporate control, the role of tax havens falls, although many controlling shareholding entities are incorporated in financial off-shore centers. In contrast, capital and labor taxes are only weakly correlated with ownership and control, most likely because investors, controlling and passive, can bypass them or exploit tax loopholes and exemptions.

Third, while the gravity model fit increases when we add source and destination fixed-effects to absorb all features relevant for the globalization of control (and ownership) country, it still fares worse than international trade, suggesting that other than geographic distance bilateral features play a chief role. As a fourth step, we therefore turn to the role of bilateral features. We start examining the impact of economic policy ties, associating international ownership and control with indicators for pairs with major investment treaties and free trade agreements, and variables for European Union and Euro area member countries. International economic integration treaties and being part of the EU play a non-negligible role on corporate ownership and control. We then explore the role of deep historical, cultural, linguistic, and genetic ties. Linguistic and especially genetic distance correlates strongly with cross-border corporate control, telling of deep barriers to cross-border control markets, as shown also for technology adoption (Spolaore and Wacziarg (2009)). Besides, control links are considerably larger across country-pairs with similar legal systems.[3] Fifth, exploiting the richness of the data we distinguish by investor type, banks, other financial institutions, families/individuals. Bilateral economic policy links and deep ties are relatively more important for banks and non-banking financial institutions, as compared to individuals, families, and other investors.

1.2 Related Literature

Our paper relates to various strands of research in international economics and corporate finance.

[3]Interestingly, when we look at ownership, without tracing ultimate controller we find much lower connections between civil law countries and very large links between common law jurisdictions, compared to country dyads with different legal systems. Yet, this reflects the fact that many important tax-haven jurisdictions have UK-originated common law systems.

First, our paper is part of the broad research agenda on the determinants of various aspects of globalization: trade, foreign direct investment (FDI), portfolio, bank, and debt flows (Lane and Milesi-Ferretti, 2008; Portes and Rey, 2005; Aviat and Coeurdacier, 2007; Hau and Rey, 2008; Alfaro et al., 2008, 2020; Lane and Milesi-Ferretti, 2018), as well as cross-border mergers and acquisitions (Rossi and Volpin, 2004; di Giovanni, 2005; Erel et al., 2012; Meier and Smith, 2022). Rather than looking at volatile capital flows, we examine international corporate control of listed corporations that have been not much studied by earlier works on home bias (Coeurdacier and Rey, 2013). Besides, looking at corporate control allows for a more in-depth mapping of global equity market integration, as controlling shareholder positions are persistent (Franks et al. (2014), Franks et al. (2012)). Our effort and data maps actual-effective bilateral ties, incorporating indirect investment, often via special purpose/investment vehicles (SPVs) and holding companies in financial off-shore centers; for example, a Russian national controlling a German-incorporated public firm via a Cypriot "shell" company.[4] Our effort aims to address a major shortcoming of most international asset holdings and liabilities positions data-sets (IMF International Financial Statistics (IFS), US Treasury International Capital (TIC) System) that following the *residence principle* miss indirect exposure. While international institutions, policy-makers, and researchers have long acknowledged this limitation, there has been little progress capturing indirect exposure, which anecdotal evidence, press leaks, and case studies suggest are extensive. In this regard our paper relates to the parallel and independent works of Coppola et al. (2021) and Damgaard et al. (2019). Coppola et al. (2021) study international bond and equity issuance via SPVs documenting the chief role of tax havens.[5] We examine the role of source and destination country features, related to taxation and institutional quality, as well as the impact of geographic, cultural, and historical ties and proximity affecting international corporate control. In this regard our paper relates to the parallel theoretical and empirical exploration by Pellegrino et al. (2021) on the deep barriers to global debt and equity market integration that also uncovers the importance of historical and linguistic ties (see also (Burchardi et al., 2018)).

Second, our documentation that a non-negligible portion of corporate control of listed companies gets through offshore financial centers, whose role if anything has increased over $2012-2019$, contribute to a nascent, but fast-growing agenda on their growing role in the global economic system (Hines and Rice, 1994; Zucman, 2015; Tørsløv et al., 2018).[6] The literature focuses on

[4]This is the case, for example, for Swiss agrobusiness firm Syngenta AG, which was acquired in 2015 by China's National Chemical Corporation (ChemChina), a state-owned chemical company. Control is exerted through a Dutch entity, CNAC Saturn (NL) B.V..

[5]Damgaard et al. (2019) combine foreign direct investment data from various sources to approximate real and "phantom" FDI, often channeled via countries with tailored for multinationals low-tax systems. Rather than looking at corporate debt issuance and multinationals' activities, we look at corporate control and ownership, major facets of globalization that have not been much researched due to data limitations. Coppola et al. (2021) record direct US investments into the Brazilian corporate bond market and indirect investments via subsidiaries in the Cayman Islands and Bermuda. Likewise, we trace both direct equity stakes of US nationals to listed companies in Brazil, but also indirect links via conduits in offshore financial centers (e.g., Panama), but also other jurisdictions (Chile).

[6]We plan to explore in detail dynamics, after we finalize the dataset, correcting some errors and expanding

offshore center's role enabling large corporations to shift earnings across jurisdictions (Johannesen et al., 2019; Guvenen et al., 2018), hiding assets (Alstadsæter et al., 2018), even obscure money laundering and criminal activity (Andersen et al., 2020). We show that offshore centers play a chief conduit role in the internationalization of corporate control. As the data come mostly from *publicly available* sources, such as regulatory reports that firms periodically file to supervisors, our study highlights their tax and convenience benefits. In line with this interpretation, we show that while the residence of the shareholder entity, and whether it is in a tax haven jurisdictions or not, matters chiefly, corporate tax rates at source and destination play no role, most likely because firms bypass them.

Third, our paper adds to research in (international) corporate finance that links corporate control across countries to differences in investor protection, legal origin, culture, and economic development (La Porta et al., 1999a; Claessens et al., 2000; Faccio and Lang, 2002; Laeven and Levine, 2008; Franks et al., 2012; Rajan and Zingales, 1995; Pagano and Volpin, 2005).[7] Our key contribution in this research agenda is zooming in the internationalization of corporate control, a major facet of globalized financial markets that has not been much studied (with De La Cruz et al. (2019) as an exception). The country analysis shows a higher level of international control from and to common law countries, a novel regularity that complements the well-established pattern that control is, on average, higher in civil law countries (La Porta et al., 1999a; Laeven and Levine, 2008; Aminadav and Papaioannou, 2020). The bilateral specifications uncover considerably higher control links between pairs of the same legal family (common and civil law); however, this is not the case with cross-border ownership which is considerably higher when one of the two jurisdictions is a common law country and especially when both economies have common law legal systems.

Paper Structure We structure our paper as follows. In the next section, we present the ownership data, summarize our methodology to identify ultimate controlling shareholders, and discuss the aggregation of the firm-level information across countries and country-pairs. Section 3 gives preliminary patterns of the internationalization of corporate ownership and control, taking both a (source and destination) country level viewpoint and a bilateral angle. Section 4.1 reports our core gravity specifications on the globalization of corporate ownership and control that zooms into the roles of source and destination countries' size, taxation, and institutions, alongside country-pair features, related to geographic, linguistic, and historical ties. In Section 6, we explore heterogeneity across investor type. In Section 7 we summarize and present some avenues for future research.

further the number of firms.

[7]This research agenda mostly works with relatively small samples and countries. We take a panoramic view covering the vast majority of listed corporations across the world. We extend the dataset of Aminadav and Papaioannou (2020), who in turn updated and extended the widely-used ORBIS dataset, to have both the widest coverage and identify ultimate control from the often obscure pyramid and complex structures of corporate ownership structure.

2 Data and Methodology

In this section, we first present the firm-level ownership data of public corporations. Second, we discuss our methodology to identify ultimate controlling shareholders. Third, we discuss the aggregation of the firm-level information into country and country-pair structures.

2.1 Ownership Data

Procedure Our corporate ownership and control data builds on and extends the work in Aminadav and Papaioannou (2020), Aminadav et al. (2022), and Unal (2022).[8] In this paper, we focus on 2012 and 2019, for which we have traced ultimate control for almost the universe of listed firms across the world. We work on a balanced sample retaining firms appearing in both years to ensure comparability across the two years. We start with 24 633 listed firms in 120 jurisdictions. To obtain meaningful country-level statistics, we drop: (i) Companies from jurisdictions with 10 or fewer public companies.[9] (ii) Listed firms with a market capitalization below 1 million USD of for which we could not obtain market capitalization in either year.[10]

Sample Features Our sample consists of 22 187 listed firms in 82 jurisdictions.[11] The sample countries represent approximately 95% of global GDP in 2019. According to World Bank statistics, the firms account for about 80% of total global market capitalization in 2019 and about 67% in 2012 . Shareholders come from 158 countries/jurisdictions. We have information on the nationality for about 70% of them, accounting for the overwhelming majority of the market value of equity stakes (94%). Regarding ultimate controlling shareholders, we have information on the nationality of 89%, accounting for 97% of the market capitalization of controlled firms; controlling shareholders come from 109 jurisdictions. The combined market capitalization is 36 661 and 62 920 billion USD in 2012 and 2019 respectively. Our data capture equity holdings for roughly half, 17 691 billion in 2012 and 27 897 billion in 2019. There is strong home-bias, as domestic shareholder entities hold stakes around 12 306 USD in 2012 and 19 645 USD billion in 2019 (70% in both years).

[8] Aminadav and Papaioannou (2020) extend, clean, and update Bureau van Dijk's (BvD) ORBIS dataset for the universe of public companies between 2004 and 2012. Their objective was to examine the link between corporate control and legal origin and institutions for the largest possible sample of publicly traded firms. In Aminadav et al. (2022) we extend this work, by improving the coverage of ultimate control of private firms in 2012. We refer interested readers to those works for further details on the data and the control tracing procedure.

[9] We lose 98 listed companies from 31 small jurisdictions, namely: Anguilla, Bahamas, Barbados, Benin, Botswana, Burkina Faso, Cameroon, Côte d'Ivoire, Curaçao, Ecuador, Gabon, Gambia, Georgia, Gibraltar, Iraq, Jamaica, Kazakhstan, Lebanon, Liberia, Liechtenstein, Malawi, Monaco, North Macedonia, Palestinian Territories, Panama, Papua New Guinea, Senegal, Tanzania, Trinidad & Tobago, Uganda, and Zimbabwe.

[10] We lose 2 533 companies from 59 (typically small) countries.

[11] The number of firms does not match the difference between the starting number and the sum of firms dropped in each criterion because multiple criteria can exclude a firm.

2.2 Corporate Control

A significant challenge is identifying controlling shareholders from the often obscure, pyramidal, and esoteric firm ownership structures. As we detail the procedure to trace ultimate controlling shareholder entities in Aminadav and Papaioannou (2020) and Aminadav et al. (2022), we provide here a summary.

We start with the ORBIS database, which collects ownership (voting rights) information from roughly half of the equity stakes in listed companies worldwide. We corrected inconsistencies, omissions, and errors (e.g., double entries). ORBIS data has gaps on shareholders for many private firms holding large equity stakes in listed companies, which prevents tracing ultimate controllers. We manually checked and added information on the control for listed firms with incomplete coverage. We used information from regulatory filings, government reports, financial press and websites, media leaks on offshore wealth, and country-specific data providers. For $2004-2012$, Aminadav and Papaioannou (2020) and Aminadav et al. (2022) gathered information for 14 859 firms. For 2019, we got information for 5 003 private firms that hold controlling equity stakes in listed corporations worldwide.[12]

We follow the corporate finance literature and apply a 20% voting rights cutoff to identify controlled, as opposed to widely held, companies (e.g., La Porta et al. (1999b)).[13] We thus classify as controlled listed firms where a shareholder (individual, family, state, another firm, mutual fund) has voting rights over 20%. As in Aminadav and Papaioannou (2020), but in contrast to earlier studies, we aggregate the voting rights of all firms that an individual (family or entity) uses to exercise control and aggregate the voting rights of all family members.

Figure 1 shows the share of controlled and widely-held firms in 2012 and 2019. The share of controlled firms as measured by market capitalization has increased from 44% in 2012 to 56%.[14]

[12] We continue our work, cleaning further the data and pinpointing controlling shareholders of many private firms, which in turn hold large voting rights blocks in listed companies.

[13] Corporate finance research has employed various cutoffs. For example, Lins et al. (2013) employ a 25% cutoff, while Laeven and Levine (2008) use 10%. As we show in Aminadav and Papaioannou (2020), the exact threshold does not much affect country patterns. Besides, the cross-country patterns appear similar when one employs a voting power (Shapley-Shubik) algorithm to identify control that considers the distribution of the main shareholders.

[14] As this increase may stem from better ORBIS coverage, we are currently delving into it. Besides, we conduct the analysis separately in the two years to account for changes in reporting.

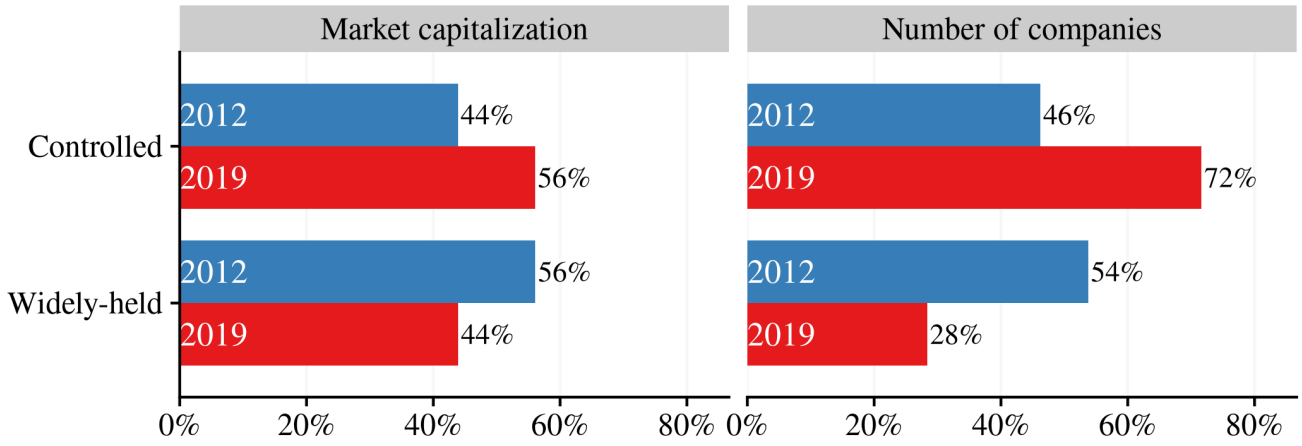


Figure 1: Share of controlled (voting rights in excess of 20%) and widely-held listed firms in 2012 and 2019, in market capitalization and number of firms. The sample (in both years) covers 22 187 listed firms in 82 jurisdictions.

2.3 International Corporate Ownership and Control

We aggregate the firm-level data in two ways. First, we compile corporate ownership and control statistics of listed companies across countries in 2012 and 2019, taking either a source or a destination country viewpoint. Second, we compile bilateral (country-pair) integration statistics of ownership and control. For ownership, we focus on the value of the equity stakes in listed firms in the destination country, d, held by entities from a given source, s, jurisdiction. We calculate this statistic by multiplying the market capitalization of the listed firm by the percentage of the equity held by various shareholders. We calculate equity positions across controlled and widely-held listed companies. For control, we focus on the total market capitalization of listed firms in a destination country, controlled by entities from a given source country.

We distinguish between three nationality types for shareholders (in controlled and widely-held firms) and *ultimate* controlling entities (in firms with a shareholder with a stake over 20%): (a) domestic, (b) foreign, and (c) tax-haven (foreign), using the classification in Tørsløv et al. (2018).[15] Two caveats are needed. First, the tax haven classification misses control and ownership of mostly US firms via Delaware and other states that offer tax-haven-style convenience and tax incentives. Likewise, the United Kingdom is not classified as tax-haven, although many argue that it does offer, at least some, of the benefits of financial off-shore centers. Second, as we trace the nationality of ultimate controlling shareholders and the nationality of the immediate shareholder, but not other firms in the control chain, the tax-haven estimates are lower bounds.

[15]The tax haven jurisdictions are Andorra, Anguilla, Bahamas, Bahrain, Barbados, Belgium, Belize, Bermuda, British Virgin Islands, Cayman Islands, Curaçao, Cyprus, Gibraltar, Hong Kong SAR China, Ireland, Isle of Man, Jersey, Lebanon, Liberia, Liechtenstein, Luxembourg, Macao SAR China, Maldives, Malta, Marshall Islands, Mauritius, Monaco, Netherlands, Panama, Puerto Rico, Samoa, Seychelles, Singapore, St. Kitts & Nevis, St. Lucia, St. Vincent & Grenadines, Switzerland, and Vanuatu

3 Mappings and Descriptives

This Section presents descriptive patterns on the globalization of ownership and control of listed companies. First, we take a source and a destination country viewpoint, zooming into the role of tax havens and foreigners. Second, we turn to bilateral patterns to provide some preliminary visualizations of the network structure of ownership and control.

3.1 Destination and Source Country Viewpoint

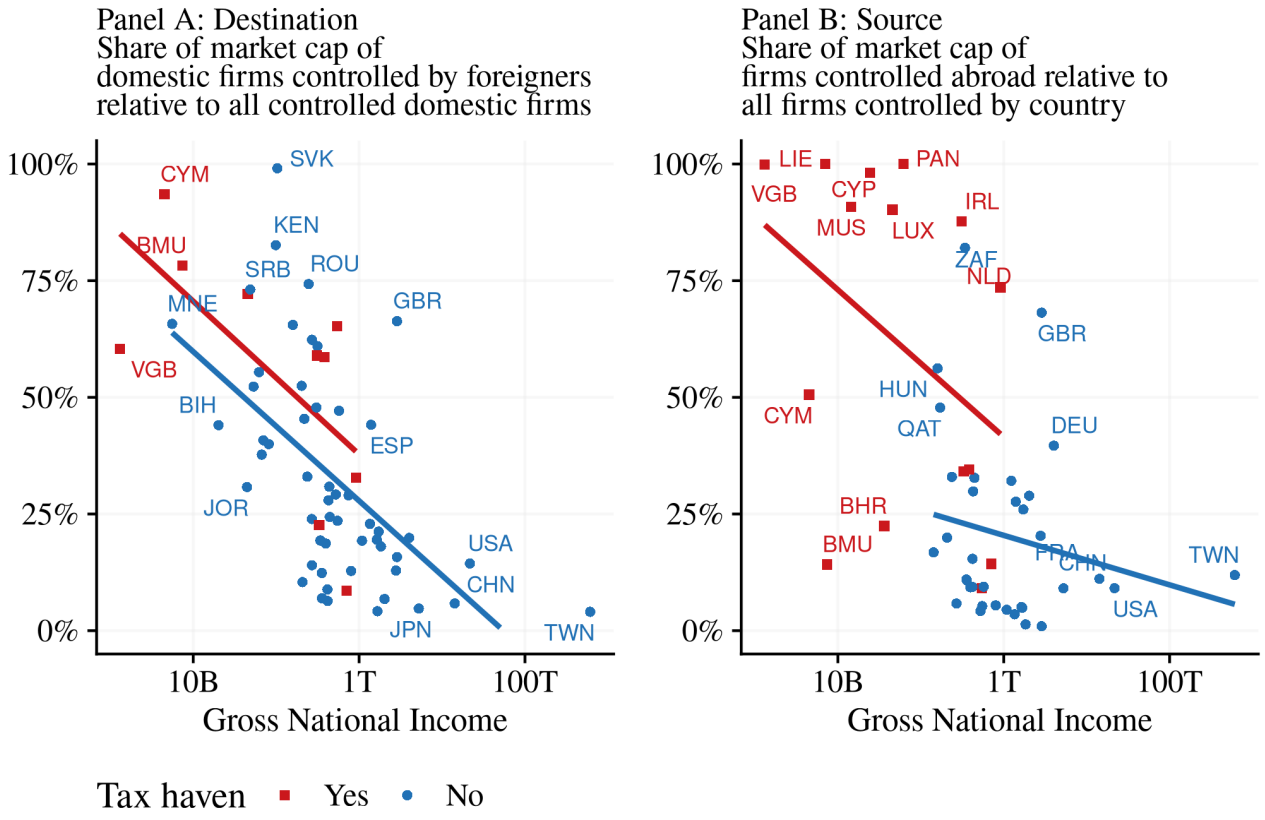
Before we turn to the bilateral analysis, it is instructive to map the internationalization of ownership and control from a source and a destination country viewpoint.

Figure 2 - Panel *A* plots the share of total market capitalization in firms with a controlling shareholder, at the destination country, controlled by foreign entities against destination countries' Gross National Income (GNI) in 2019. Panel *B* takes a source country viewpoint, plotting the share of the total market capitalization controlled abroad by entities of the source country against the source country's GNI. The figure distinguishes tax havens, as they play an outsized role in channeling foreign control and ownership. The control of listed corporations at destination appears, on average, larger for relatively smaller countries (panel *A*). Besides, shareholders from relatively smaller (less developed and with a smaller population) countries control a relatively larger fraction of firms abroad (panel *B*). Conversely, home bias is stronger for wealthier and larger economies, a pattern in line with the idea that these countries offer greater diversification opportunities to their residents (Hau and Rey, 2008; Hassan, 2013). Tax havens also follow this pattern, with the smallest of them displaying the highest rates of openness.

Figures 3 and 4 plot the share of total market capitalization of controlled firms for high-income and middle and low-income countries, respectively, distinguishing by the three nationality types of the *ultimate controlling entity*. The left panel takes a destination viewpoint, while the right panel a source country viewpoint. Within income groups, countries are ordered by the size of their economy as measured by GNI. Figure 5 shows regional aggregates (excluding tax havens) and countries classified as tax havens.

Home bias (blue bars) is high, with foreign and tax haven control (green and red bars) being, on average, small. However, the graphs uncover the considerable variation in the internationalization of corporate control across the world.

- Foreign (including tax haven) control of listed corporations (a shareholder holding more than 20% voting rights) is considerable in Eastern Europe and Balkan countries. It hovers or exceeds 50% in Romania, Slovakia, Croatia, Lithuania, Serbia, Latvia, Bosnia and Herzegovina, Ukraine, and Poland.



Only countries with at least 10 listed and controlled companies (Panel A) or whose entities control at least 10 companies (Panel B) are shown.

Figure 2: Economy Size and Cross-Border Corporate Control in 2019
Panel *A* plots the share of total market capitalization in all firms at destination with a controlling shareholder (voting rights exceeding 20%) controlled by foreign entities (individuals, families, banks, financial institutions, etc.) against destination countries' Gross National Income (GNI) in 2019. Panel *B* plots the share of the total market capitalization controlled abroad by shareholders in source country against source country's GNI. The (red and blue) lines show linear estimates of the relation between the two variables, estimated separately for tax-haven and non-tax-haven countries/jurisdictions.

- In high-income countries, foreign control is considerable in the United Kingdom, Belgium, Hong Kong, and Southern European countries such as Spain, Greece, and Portugal.
- Foreign control is substantial in some large emerging markets in Asia. It exceeds 50% in Pakistan and Bangladesh, in in Sri Lanka is 45%, and in India 25%.
- Foreign control is tiny in the US, Japan, and Germany and in the developing world in China.
- In Latin America and the Caribbean, in the Middle East and in Africa, foreign control is relatively moderate.
- The source country tabulations are telling of tax-havens influence in the global control market. Most controlling firms' market capitalization for shareholding entities in the Netherlands, Ireland, Luxembourg, Singapore, Hong Kong, and smaller financial off-shore centers is held abroad, quite often in other off-shore centers.

Figures 3, 4 and 5 are also telling of tax haven's role.

- The share of foreign-controlled firms, appears the highest in tax havens, hinting at the strong interconnections between them. This pattern applies both in economically large tax-haven jurisdictions, like Belgium, Luxembourg, and Hong Kong, but also smaller, such as the British Virgin Islands, Cayman Islands, Bermuda, and Mauritius.
- Control by shareholding entities in financial off-shore jurisdictions appears large in Belgium and the United Kingdom, although not in the Netherlands; these are countries where there is an ongoing debate on whether they should be classified as tax havens.
- Control by tax haven shareholders is considerable in Romania, Portugal, Poland, Slovenia, and to some lesser extent in Greece and Spain. Across middle-income countries, tax havens role is considerable in Thailand, Egypt, and Pakistan.
- There are some extreme cases. Almost all foreign-controlled market capitalization in Nigeria, Thailand, and China is controlled by tax-haven incorporated entities. The particular case of China, a significant one, reflects Hong Kong's special status for investment in and out of mainland China (see also Coppola et al. (2021)).

Figure 6 delves into the usage of tax haven entities for the control of public companies, using our classification of the nationality type of *both* the controlling and the immediate controlling shareholder entity. As there are three nationality types of investors (domestic, foreign, and tax-haven),

there are nine possibilities.[16] The figure plots the percentage of the total market capitalization of controlled firms at the destination where tax-haven shareholding entities appear either as ultimate controlling shareholders or as immediate controllers (or both). The figure, therefore, plots five (of the nine) possible combinations: tax haven ultimate controller (and domestic, foreign or tax-haven immediate controller) and tax haven immediate controller (and domestic, foreign, or tax-haven ultimate controller, the latter of both groups overlapping). Zooming on tax-havens yields some further evidence.

- In some countries, domestic residents [individuals/families, banks, non-bank financial institutions] exert control of local public firms using firms in tax-haven jurisdictions [blue]. This practice, which may stem from tax and convenience consideration, extends to signifiant shares of market capitalization in Portugal, Greece, Estonia, Czechia, Russia, Ukraine, and Italy.[17]

- We often observe that control is exercised by a tax-haven-based shareholder either directly or via another company in (the same or another) tax haven jurisdictions [dark red], including in many Eastern European countries. In Eastern and Southern Europe, we also observe foreign control passing via tax-haven incorporated companies [green].

[16]The categories [with examples] are: (i) Control of local listed firm by a national of the same country either directly or via a domestic firm. [Walton family controlling Wal-Mart stores by Walton Enterprises.] (ii) Control of local firm by a local shareholder via a foreign company. [Example: Paul Singer, an American citizen, controls Barnes & Noble, a US listed firm, via a British firm, Elliott Advisors]. (iii) Control of a domestic listed company by a domestic shareholder via a tax-haven incorporate company.[The Lee Hyson family of Hong Kong controls Hysan Development Company Limited in Hong Kong via a holding company in Jersey, which appears as British.] (iv) Control of a listed firm by a foreign shareholder either directly or via another foreign intermediary. [Unilever Plc (UK) controlling Hindustan Unilever Lt in India]. (v) Control by a foreign shareholder via a domestic entity. [The Ontario Teachers Pension Fund controls the Copenhagen Airport in Denmark via Copenhagen Airports Denmark ApS (Denmark)]. (vi) Foreign control via tax-haven. [ChemChina, ultimately controlled by the Chinese State, controls Syngenta AG, a large Swiss agriculture company via a Dutch company, Cnac Saturn.] (vii) Control of a listed firm by a tax-haven entity directly or via a another tax-haven vehicle. [Hongkonger Lawrence Ho controls Cayman-Islands-incorporated resort company Melco Resorts & Entertainment Ltd through a British Virgin Islands vehicle] (viii) Control of a listed firm by tax-haven entity via a foreign shareholder [Singapore citizen Goh Cheng Liang controls Australian paintmaker DuluxGroup Ltd through Japanese firm Nippon Paint]. (ix) Control of a firm by a tax-haven entity via a domestic (to the firm) entity. [The State of Singapore, through Singtel Global Investment Pte Ltd, controls Thai telecommunications company Advanced Info Service Pcl through Thai entity Intouch Holdings PCL.]

[17]For example, Jerónimo Martins SGPS, a Portuguese food distribution and retail group is controlled by the family of Alexandre Soares dos Santos through Dutch-based entity Sociedade Francisco Manuel dos Santos BV. Greek retailer Jumbo SA is controlled by Greek citizen Apostolos Vakakis through Tanocerian Maritime S, a Luxembourg-registered entity A. Russian steelmarker Novolipetsk is controlled by Russian citizen Vladimir Lisin through Fletcher Group Holdings Limited, a Cyprus-based vehicle.

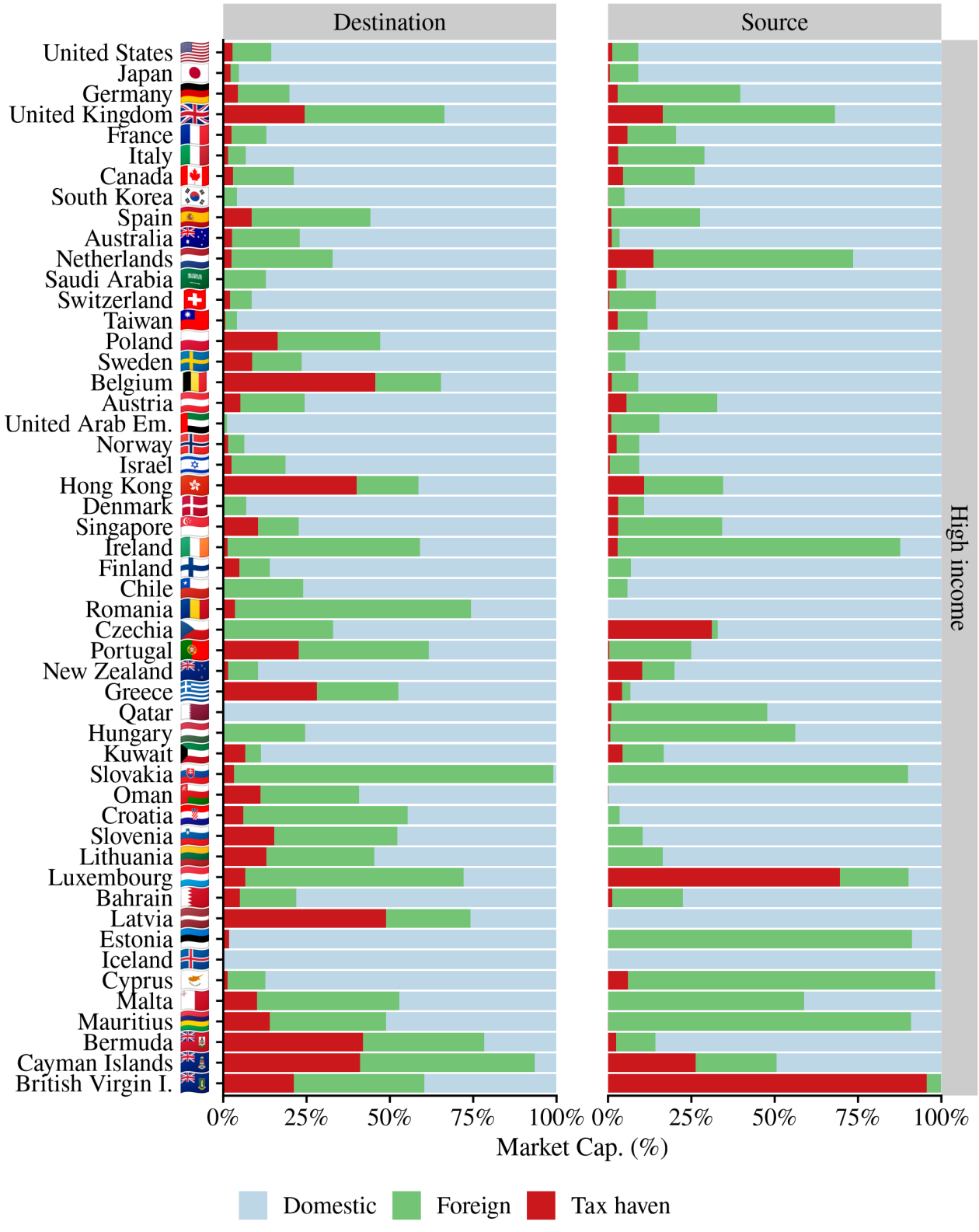


Figure 3: Nationality of Controlling Shareholders in High-Income Countries in 2019. The figures distinguish across three nationality types of the *ultimate controlling entity*: (i) domestic (blue), (ii) foreign (green), and tax haven (red). The left panel takes a destination country viewpoint, i.e. country of listed firm. The right panel takes a source country viewpoint, i.e. country of controlling shareholder entity. Countries are sorted by Gross National Income in 2019.

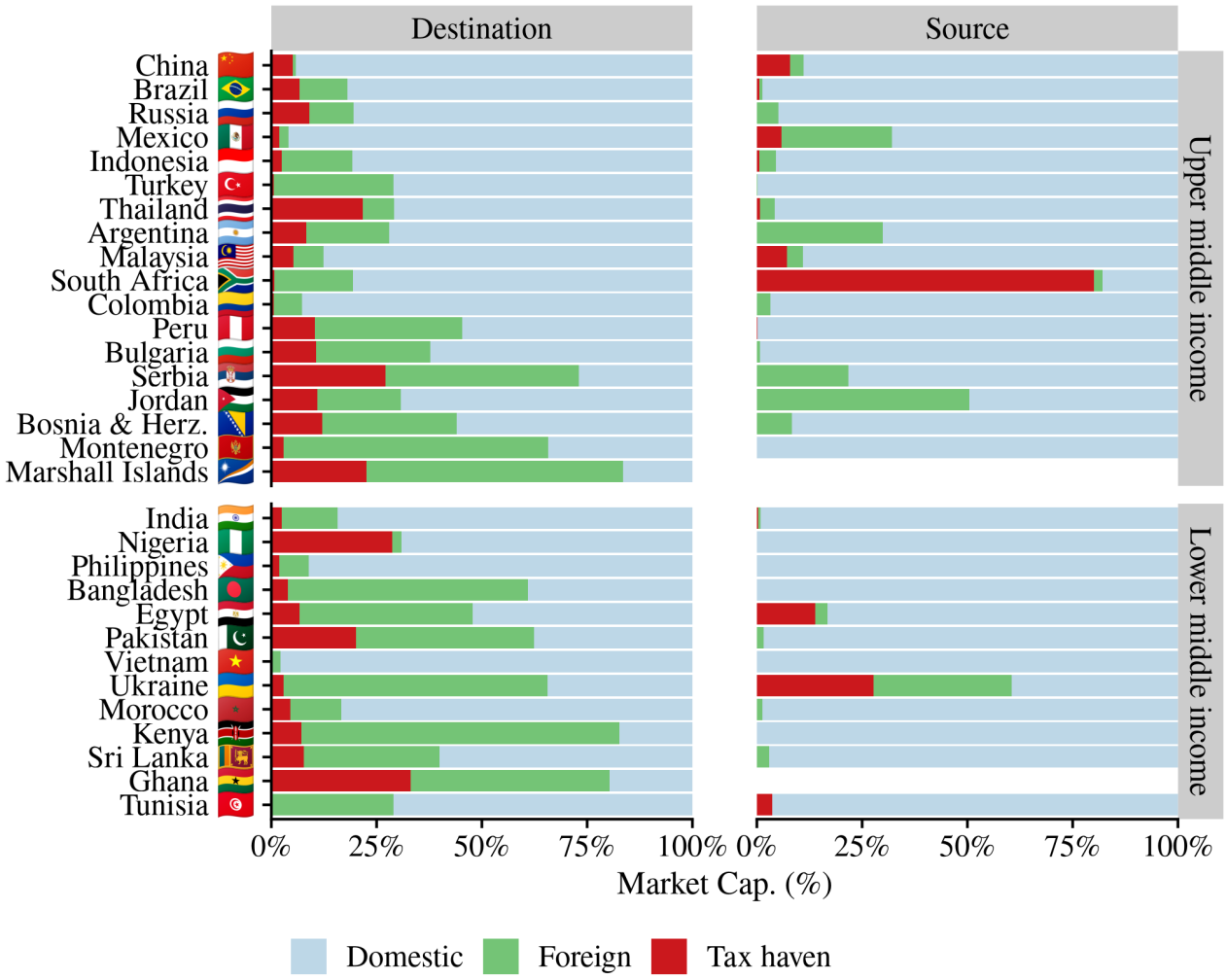


Figure 4: Nationality of Controlling Shareholders in Middle-Income and Low-Income Countries in 2019. The figures distinguish across three nationality types of the *ultimate controlling entity*: (i) domestic (blue), (ii) foreign (green), and tax haven (red). The left panel takes a destination country viewpoint, i.e. country of listed firm. The right panel takes a source country viewpoint, i.e. country of controlling shareholder entity. Countries are sorted by Gross National Income in 2019.

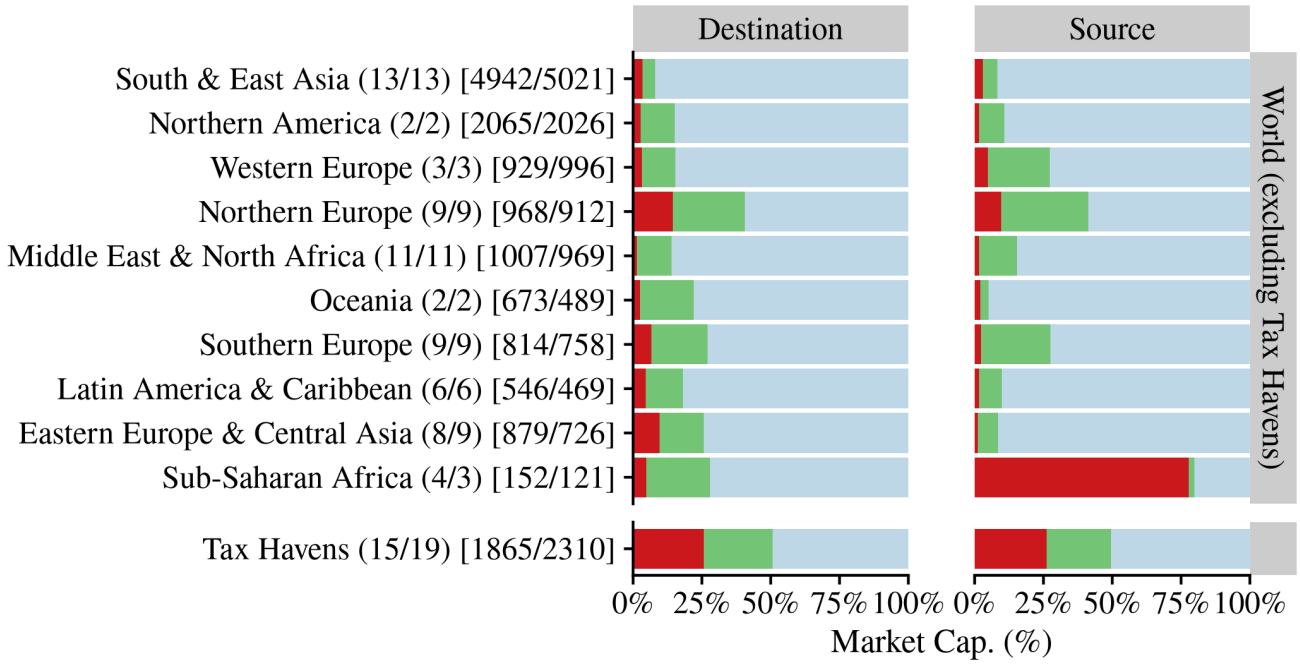
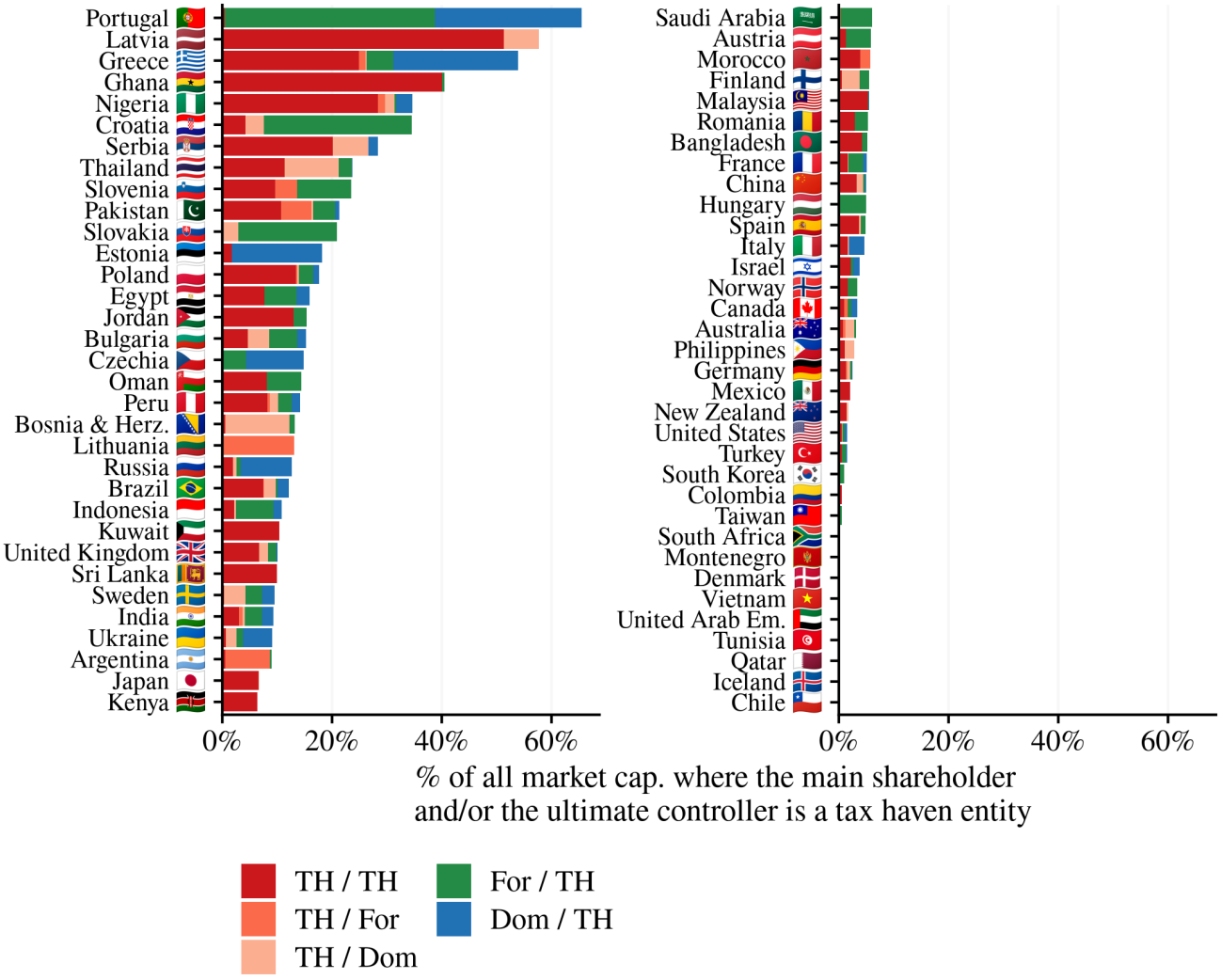


Figure 5: Nationality of Controlling Shareholders across World's Main Regions in 2019. The figures distinguish across three nationality types of the *ultimate controlling entity*: (i) domestic (blue), (ii) foreign (green), and tax haven (red). The left panel takes a destination country viewpoint, i.e. country of listed firm. The right panel takes a source country viewpoint, i.e. country of controlling shareholder entity. The figures also give in parentheses the number of destination and source countries. The figure also reports in square brackets the number of public firms of each region at destination and at source.



Dom indicates a domestic shareholder or controlled. For indicates a foreign non-tax haven. TH indicates a foreign tax haven. E.g., Dom / TH indicates that the controller is domestic, and the main shareholder is from a foreign tax haven.

Figure 6: Tax Haven Incorporated Vehicles in Corporate Control Chain across countries (Destination)

3.2 Country-Pair Patterns

3.2.1 Bilateral Links

Table 1 portrays the ten largest corporate ownership and control links between countries. The importance of financial off-shore jurisdictions is apparent. Three out of the ten largest ownership and control links are between two tax haven jurisdictions: The British Virgin Islands links with Hong Kong, Bermuda, and the Cayman Islands.[18] The equity links in the United States stock markets from Switzerland, another tax-haven country, are of the same size as from Canada, which has a 4.5 times higher population and two times higher output.

Table 2 zooms into the largest five bilateral corporate ownership (Panel A) and control (Panel B) links in 2019 for the ten economies with the largest controlled market capitalization. Panel A shows that American entities are the largest foreign shareholders in public firms in Australia, France, India, Japan, Switzerland, and the United Kingdom. Large American asset managers and investment banks are significant contributors to these stakes, as they own significant stakes in large companies worldwide. The United Kingdom is the most important foreign shareholder in India and the United States, telling of the strong links between countries with deep historical ties. The significance of tax havens is apparent. Shareholding entities in Ireland and Luxembourghold larger equity stakes in the US stock makers than many large economies. Shareholders in Mauritius are larger than Japanese or German investors in Indian public firms. Effectively, all investment in the Chinese stock markets passes via Hong Kong; we see $286 bn links from Hong to China compared to 12 bn from the United States, the second-largest investor.

Turning to control (Panel B), we see that the largest bilateral link is between Cayman Islands and South Africa. This is driven by Tencent Holdings Ltd., a conglomerate operating in China which is incorporated in the Caribbean archipelago, and in which Naspers Limited, a South African holding company, holds a controlling stake. The remaining cells provide multiple examples of the globalization of corporate control. We highlight a few. In the United States, German and Japanese are the largest controllers.[19] We can see that shareholders in the United Kingdom and in Japan are the largest foreign controllers India.[20]

[18] For comparison, tax haven jurisdictions appear once in the ten most extensive international trade (destination-source) links (Germany-Netherlands) and three times in the largest service trade links in 2019 (Ireland-Netherlands, Ireland-US, and Hong Kong-China).

[19] As examples, T-Mobile US, Inc., is an American telecommunications company owned by Deutsche Telekom, which is itself controlled by the German state. Morgan Stanley, an American financial services is deemed controlled by Japanese holding company Mitsubishi UFJ Financial Group, Inc. thanks to a equity stake exceeding the 20% cut-off.

[20] As an example, Hindustan Unilever Ltd, a Mumbai-based subsidiary of Unilever, and ITC Ltd, a conglomerate where UK-based British American Tobacco owns a 30% equity stake. The principal Japanese shareholders in the Indian stock market are Maruti Suzuki India Ltd, a subsidiary of Japanese automaker Suzuki Motor Corporation, and Indian paint manufacturer Kansai Nerolac Paints Ltd, a subsidiary of Japanese chemical company Kansai Paint.

Onwership			Control		
Destination	Source		Destination	Source	
Cayman Islands	British Virgin I.	412.51B	Cayman Islands	South Africa	460.48B
Hong Kong	British Virgin I.	344.01B	Hong Kong	British Virgin I.	448.33B
China	Hong Kong	285.94B	Cayman Islands	British Virgin I.	380.39B
United States	United Kingdom	195.19B	United States	Germany	212.44B
United Kingdom	United States	141.29B	United Kingdom	United States	207.73B
Switzerland	United States	136.76B	Bermuda	British Virgin I.	177.39B
Bermuda	British Virgin I.	129.16B	United States	Japan	162.66B
Japan	United States	120.19B	United Kingdom	Netherlands	159.76B
Germany	United States	112.11B	China	Hong Kong	151.28B
Netherlands	United States	87.99B	Australia	United Kingdom	148.00B

Table 1: The table reports the ten largest bilateral links for corporate ownership (left panel) and corporate control (right panel) of listed companies across the world in 2019, measured in US Dollars.

Panel A. Ownership

	Market Cap. Owned		Largest 5 foreign ownership bilateral links				
Destination	by Domestic	by Foreign	1	2	3	4	5
Australia	853B	52B	United States (14B)	Japan (9B)	United Kingdom (6B)	Singapore (4B)	Canada (3B)
Cayman Islands	67B	569B	British Virgin I. (413B)	Hong Kong (65B)	United States (32B)	United Kingdom (12B)	China (12B)
China	2 543B	338B	Hong Kong (286B)	United States (12B)	Singapore (10B)	France (9B)	British Virgin I. (6B)
France	1 109B	357B	United States (88B)	Switzerland (66B)	Luxembourg (45B)	United Kingdom (39B)	Netherlands (24B)
Hong Kong	233B	454B	British Virgin I. (344B)	United States (41B)	United Kingdom (12B)	Cayman Islands (9B)	Panama (9B)
India	900B	315B	United Kingdom (80B)	United States (58B)	Mauritius (58B)	Singapore (29B)	Japan (25B)
Japan	1 671B	289B	United States (120B)	United Kingdom (53B)	Switzerland (32B)	Singapore (18B)	France (12B)
Switzerland	346B	322B	United States (137B)	United Kingdom (62B)	Netherlands (54B)	Germany (12B)	Luxembourg (12B)
United Kingdom	556B	541B	United States (141B)	Japan (85B)	Netherlands (61B)	Belgium (56B)	Norway (29B)
United States	5 344B	745B	United Kingdom (195B)	Canada (86B)	Japan (74B)	Ireland (73B)	Luxembourg (68B)

Panel B. Control

	Market Cap. Controlled		Largest 5 foreign control bilateral links				
Destination	by Domestic	by Foreign	1	2	3	4	5
Australia	837B	248B	United Kingdom (148B)	United States (32B)	Switzerland (14B)	China (13B)	Singapore (9B)
Cayman Islands	71B	1 027B	South Africa (460B)	British Virgin I. (380B)	China (81B)	Hong Kong (60B)	Taiwan (10B)
China	3 247B	202B	Hong Kong (151B)	British Virgin I. (24B)	France (10B)	Taiwan (6B)	United States (4B)
France	1 462B	216B	Italy (84B)	Germany (54B)	Switzerland (22B)	Qatar (17B)	Netherlands (16B)
Hong Kong	485B	687B	British Virgin I. (448B)	China (108B)	United Kingdom (97B)	Japan (12B)	Macao SAR China (6B)
India	1 458B	273B	United Kingdom (114B)	Japan (39B)	United States (37B)	Switzerland (24B)	Germany (20B)
Japan	3 929B	196B	Switzerland (52B)	United States (44B)	France (35B)	Hong Kong (17B)	Netherlands (16B)
Switzerland	1 463B	137B	China (44B)	United States (32B)	Netherlands (28B)	Germany (9B)	Saudi Arabia (7B)
United Kingdom	346B	682B	United States (208B)	Netherlands (160B)	Japan (100B)	France (52B)	Switzerland (40B)
United States	5 839B	981B	Germany (212B)	Japan (163B)	United Kingdom (140B)	Canada (127B)	Ireland (95B)

Table 2: The table reports the largest five bilateral ownership (Panel A) and control (Panel B) links in 2019, in US Dollars, for the ten economies (destination) with the largest market capitalization of listed firms.

3.2.2 Network Structure

Figure 7 illustrates the network structure of corporate ownership (in 2019). The figure plots in the horizontal axis listed firms' jurisdictions (destination), while on the vertical axis, the figure plots the nationality of shareholding entities (controlling or passive) from source countries. Dark(er) squares indicate larger equity stakes held by entities from the source country in public firms at the destination.[21] The countries chosen have the highest total value of equity stakes held by foreigners. The chart orders countries according to the similarity of their international ownership links.[22] Countries closer to each other, especially at the extremes, have similar patterns of bilateral ownership linkages. The United States, the United Kingdom, Switzerland, Germany, Netherlands, Japan, and Canada appear first, as shareholders in these countries hold large equity stakes in listed companies in each other and the majority of the other main countries. The lower half includes large emerging economies from various parts of the world, with the group of four large emerging markets sometimes grouped as BRICs (Brazil, Russia, India, and China) appearing last. While Chinese entities hold equity stakes in many of the other countries, the patterns are substantially different from the United States, with particular highlights in the small value of stakes in Dutch, Swiss, and Japanese companies. The other three countries display sparser links to the remaining jurisdictions in the heat map.

Figure 8 performs the exercise by looking at country-pair links on listed corporations at destination countries controlled by ultimate controlling shareholders from source jurisdictions in 2019. Some interesting patterns emerge, especially when compared with direct ownership links (in widely-held and controlled companies). The control matrix appears sparser as there are fewer (significant) links. Regional links appear weaker, as for example, we observe solid controlling investments in Japan from Europe [Switzerland, France, and Germany] while a sizable controlling shareholder country in France is China (besides Italy and Germany), and the closeness of the patterns of France and Switzerland with that of Asian jurisdictions such as China, Japan, India, and Hong Kong.

A clear noteworthy pattern emerging from the matrices of corporate ownership and control is the sparsity of the network. We see very little, if any, direct equity investment and controlling stakes from large economies, like Brazil, India, or even Canada, to many other large markets.[23]

In Figures 9 and 10, we zoom into the network structure, plotting the destination and source countries with the highest number of equity links (passive and controlling in controlled and widely-

[21] We exclude own-country (home bias) links, to zoom into the globalization of ownership. See Figures 3 and 4 above for the source and destination country home bias estimates.

[22] The ordering was obtained from the loading of each (source) country on the first principal component of the matrix shown in the chart with the addition of own-country links (diagonal).

[23] The data records direct investments by asset managers, mutual and pension funds, but not indirect exposures by their clients. While there are many country pairs with no exports and imports, international trade appears less sparse than global corporate ownership and control.

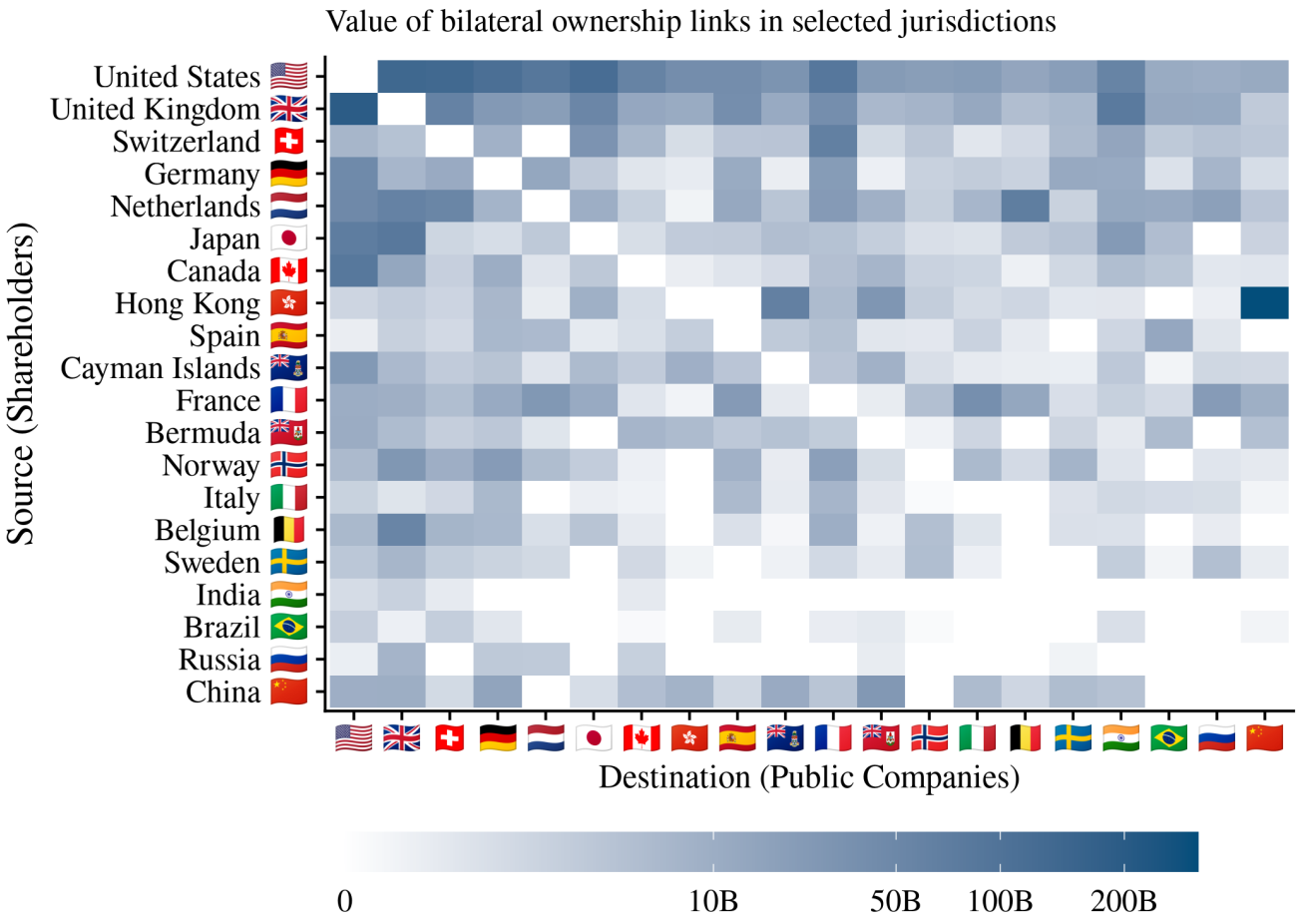


Figure 7: Heat map of the value in US Dollars of bilateral ownership stakes in 2019, measured by the market value of equity stakes. Darker squares indicate larger values of equity stakes held by entities from source jurisdictions (y-axis) in public firms from destination jurisdictions (x-axis). Own-country (home bias) links are not shown. Countries are ordered according to the similarity of their international ownership links. Countries closer to each other, especially at the extremes, have similar links.

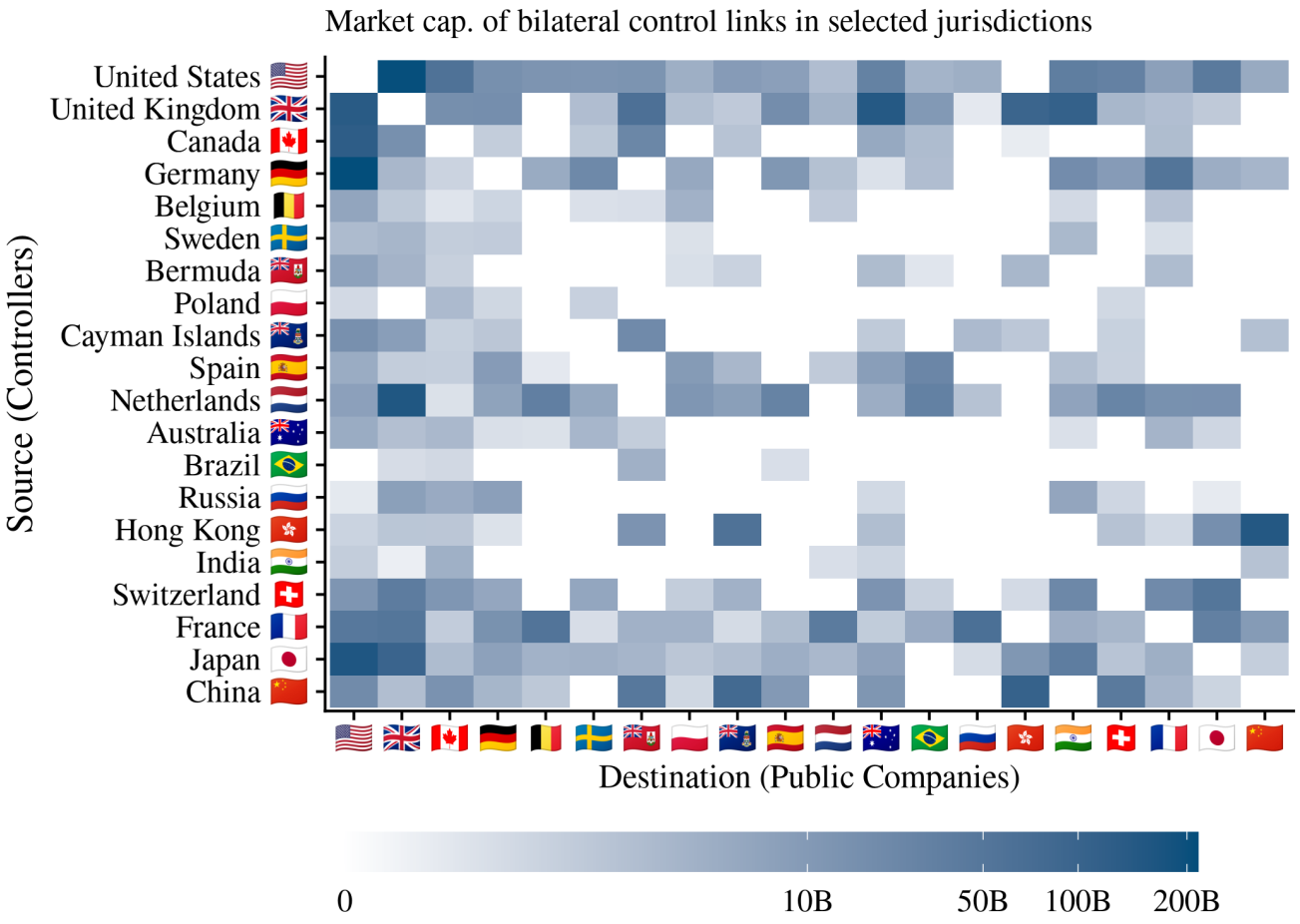


Figure 8: Heat map of the value in US Dollars of bilateral control stakes in 2019, measured by the total market capitalization of firms. Darker squares indicate larger market capitalization values of the firms controlled by entities from source jurisdictions (y-axis) in public firms from destination jurisdictions (x-axis). Own-country (home bias) links are not shown. Countries are ordered according to the similarity of their international ownership links. Countries closer to each other, especially at the extremes, have similar links.

held firms) and controlling shareholding positions (in controlled firms) with other jurisdictions. The figures distinguish connections with other countries between tax havens status.

The destination country (firm nationality) statistics (Figure 9) show that Canada and the United Kingdom are the most open countries by this measure. Besides, we observe foreign controllers from many different countries in large high-income countries such as the United States, France, Australia and Germany, but also Poland, Turkey, and India. An interesting contrast is between India and China. Foreign controlling shareholders of Chinese listed firms come from about 11 countries, but for Indian firms from 25.

The source country (shareholder nationality) tabulations (Figure 10) show that the shareholders in the UK, the US, France, Germany, and the Netherlands hold controlling equity stakes in dozens of countries. The China-India comparison now yields a different pattern. Chinese shareholders control listed firms in 33 countries, while Indian shareholders control in 21.

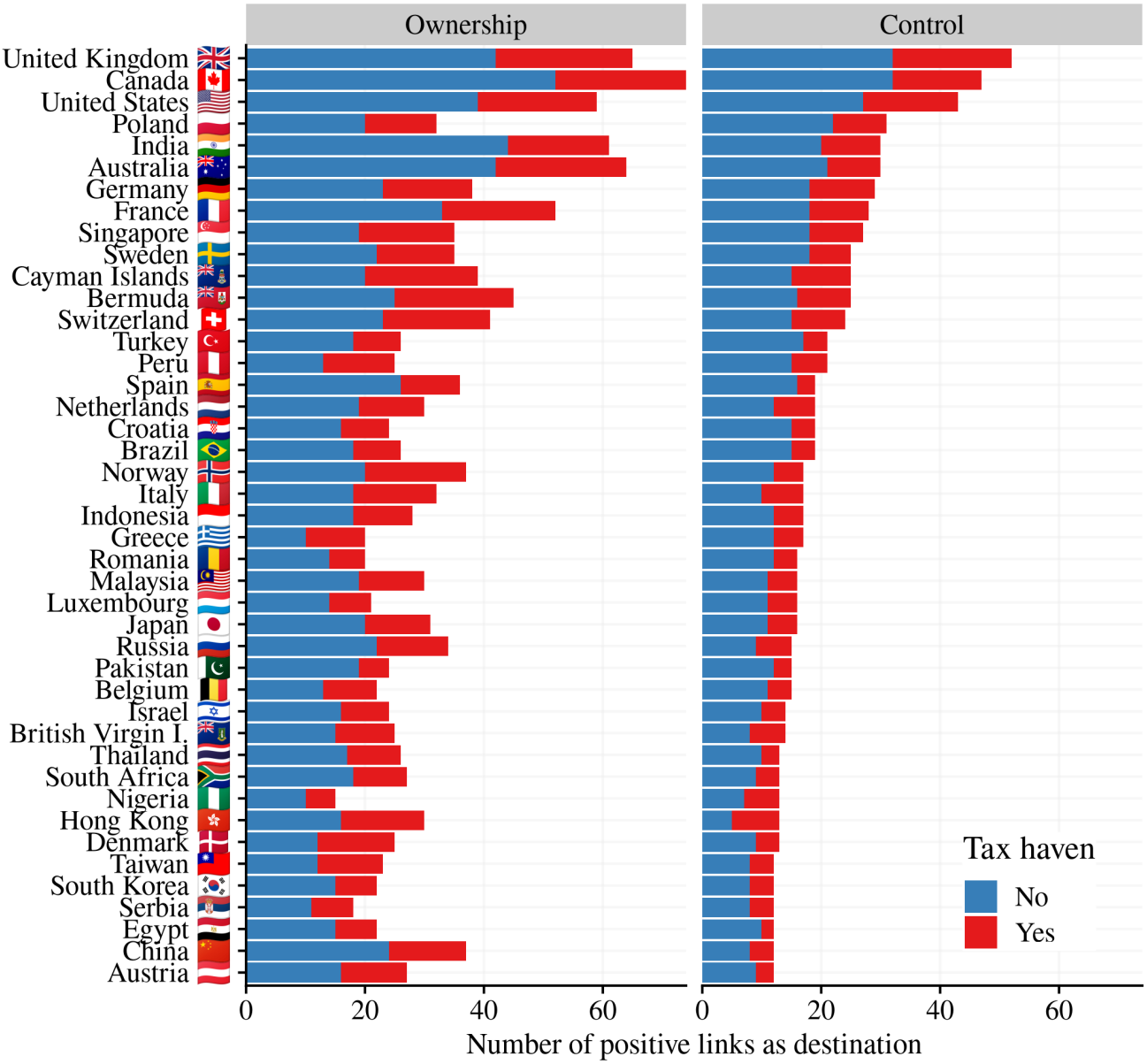


Figure 9: Number of strictly positive bilateral links with other countries from the perspective of each destination country, for ownership and control.

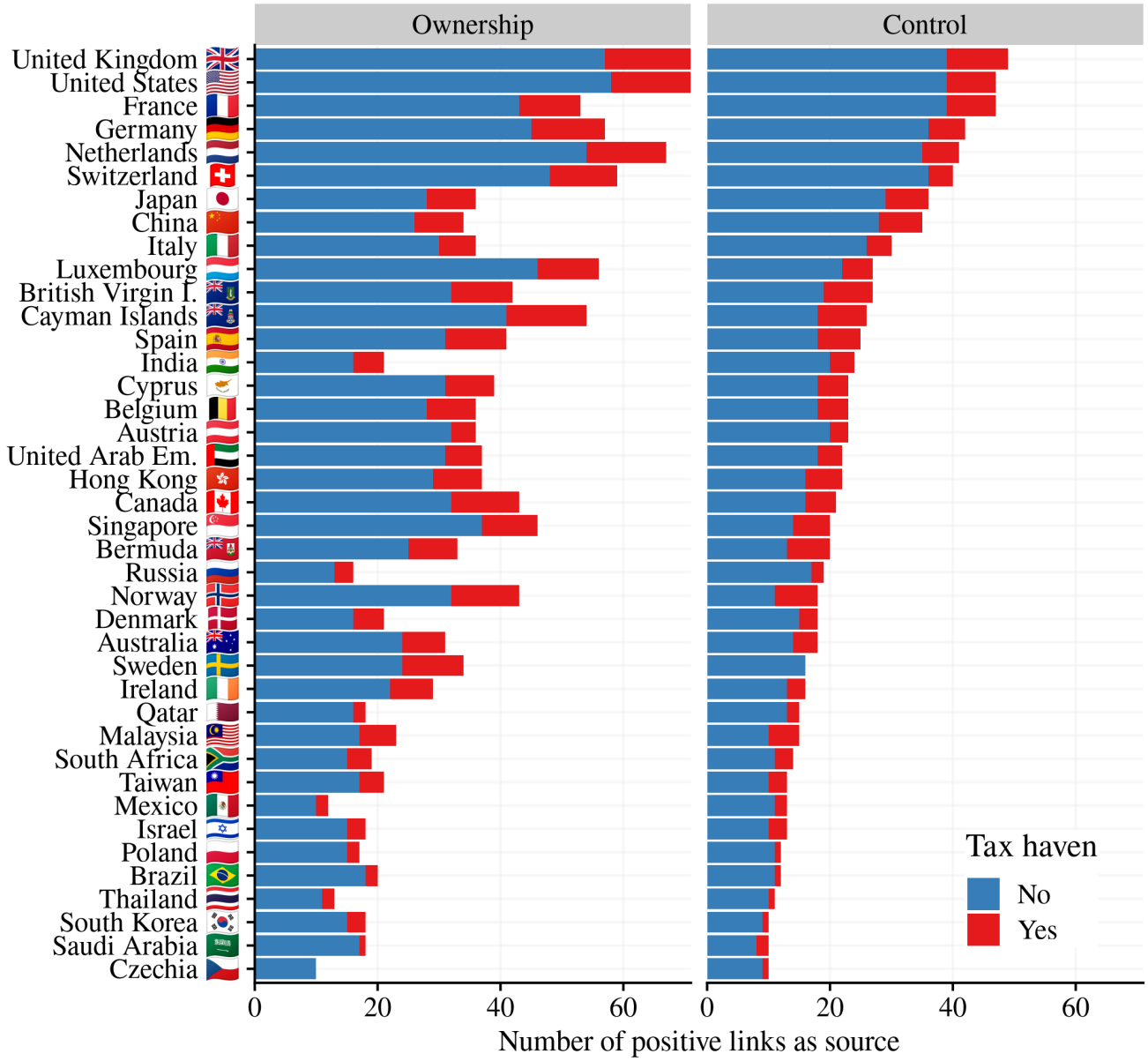


Figure 10: Number of strictly positive bilateral links with other countries from the perspective of each source country, for ownership and control.

4 Bilateral Patterns. Gravity Analysis

We now turn to the core of our empirical exploration of the globalization of corporate control that exploits the bilateral (country-pair) structure of our data-set. First, we lay down the empirical framework and discuss estimation. Second, we report the baseline estimates. Third, we examine the role of taxation and institutional quality at source and destination. Forth, we explore heterogeneity across shareholder type. Fifth, we examine the role of deep bilateral ties related to culture, history, and genetic similarities in corporate ownership and control.

4.1 Empirical Framework and Estimation

We estimate "gravity-style" models to study the internationalization of corporate control. The gravity specifications link cross-border flows/positions to the size of the two countries and (inversely) distance, which captures transaction costs (trading, transportation) and information asymmetries, among other aspects.[24] Despite its simplicity, the gravity model has proven quite powerful explaining cross-border trade in goods and services, as well as foreign direct investment, mergers and acquisitions, banking, debt, and equity capital flows.[25]

Our empirical specification associates corporate control of all firms listed in destination country, d, by residents (shareholder entities and individuals/families) in source country, s, $Y_{d,s}$, to countries' size, X_d and X_s, and their distance, $D_{d,s}$. We estimate cross-sectional specifications and regressions with source country s and country d fixed-effects to isolate the role of distance and other bilateral features (Anderson and van Wincoop, 2003). We estimate the gravity model in 2012, in 2019, and pool the two years. We employ the Poisson Pseudo Maximum Likelihood (PPML) estimator, proposed by Santos Silva and Tenreyro (2006), that is nowadays the core estimating method of gravity specifications, as it deals efficiently with the many zeros in bilateral observations.[26] The PPML is well-behaved and efficient, even when the conditional variance is not proportional to the conditional mean. Besides, Santos Silva and Tenreyro (2011) present simulation evidence showing that the estimator preserves its efficiency even in the presence of many zeros (see also Fally (2015), Santos Silva and Tenreyro (2022), and Correia et al. (2020)).

[24] See, for example the theoretical explorations in Anderson and van Wincoop (2003), Hau and Rey (2008), Rose and Spiegel (2004), Okawa and van Wincoop (2012).

[25] See, for example, Rossi and Volpin (2004), Portes and Rey (2005), Portes et al. (2001), Aviat and Coeurdacier (2007), among many others.

[26] The concern with OLS estimation of log-linearized parameters is that heteroskedasticity in the original multiplicative error term leads to biased estimates of the elasticities in the log-linear model. The PPML estimator addresses this and is also consistent under general conditions of heteroskedasticity (Gourieroux et al., 1984). The PPML estimator also deals naturally with zeros, a common occurrence in country-pair data of international integration, including ours. See Head and Mayer (2014) and Santos Silva and Tenreyro (2022) for a thorough review and analysis of the performance of the several gravity equations estimation methods. We estimate the PPML specifications using the routine developed by Correia et al. (2020).

Our baseline cross-sectional specifications reads:

$$Y_{d,s,t} = \exp[\beta^d \mathbf{X}_{d,t} + \beta^s \mathbf{X}_{s,t} + \beta^D \mathbf{D}_{d,s} + \beta^T \mathbf{T}_{d,s} + \phi_t + \eta_{d,s,t}]. \quad (1)$$

The fixed effects specification takes the following form:

$$Y_{d,s,t} = \exp[\beta^T \mathbf{D}_{d,s} + \beta^T \mathbf{T}_{d,s} + \phi_{d,(t)} + \phi_{s,(t)} + \eta_{d,s,t}]. \quad (2)$$

The key outcome $Y_{d,s,t}$ measures controlling shareholder links (in USD) in destination country d by residents in source country s in period/year t, taking into account both direct and indirect connections (via intermediate companies in other than the source and destination jurisdictions). We also run specifications using all ownership links, controlling and passive, across controlled and widely-held listed corporations. To enable comparability of the role of distance and size for international corporate control and ownership, we report specifications with trade in goods and services in the same sample.[27]

$\mathbf{X}_{d,t}$ and $\mathbf{X}_{s,t}$ are vectors of destination and source "size" variables, (log) GNI per capita and population (in 2012 or 2019); we also present specifications adding proxies of countries' corporate tax rate and institutional quality.[28] $\mathbf{D}_{d,s}$ denotes geographic but also cultural, linguistic, and genetic distance across country-pairs.[29] $\mathbf{T}_{d,s}$ is a vector of countries' similarities, colonial ties, having similar legal systems, etc. ϕ_t is a year constant in the pooled across 2012 and 2019 specifications. ϕ_d and ϕ_s denote destination- and source-country constants (in the pooled specifications interacted with a period constant to better account for period-specific country unobservables).[30]

4.2 Baseline Results

Table 3 reports the PPML estimates. Panel (A) reports the cross-sectional estimates, while panel (B) gives the specifications with country s and country d constants. Standard errors are double clustered at source and destination with the method of Cameron et al. (2011), which is suitable for bilateral specifications.[31] The table reports estimates with four outcomes: corporate control

[27] Bilateral trade flows data have been collected from the IMF (DOTS), the UN (Comtrade), the BACI database from CEPII, and the BaTis (WTO) dataset.

[28] Data on GDP, GNI, and population are retrieved from UN National Accounts - Analysis of Main Aggregates database.

[29] Geodesic distance, adjusted for population location in the two countries, and other geographic and historical data, come from CEPII's Gravity database (Head et al., 2010; Head and Mayer, 2014; Mayer and Zignago, 2011; Head et al., 2002; Conte et al., 2021).

[30] Fernández-Val and Weidner (2016), Weidner and Zylkin (2021), and Santos Silva and Tenreyro (2022) show that the PPML with two way fixed-effects remains asymptotically unbiased, maintaining its efficiency properties.

[31] Double clustering yields more conservative inference than no clustering or clustering only at source or only at destination.

(in USD), factoring in potential indirect links (columns (1), (5), and (9)); all shareholder (not necessarily controlling) stakes owned by entities and individuals in the source country in public companies in destination (columns (2), (6), and (10)); US dollar amounts of international trade in goods (columns (3), (7), and (11)) and services (columns (4), (8), and (12)). As we want to compare the estimates and the model fit for corporate control and ownership to international trade, we include observations where we have data for all outcomes. For each outcome, the table gives the estimates in 2012 (columns (1)-(4)), in 2019 (in (5)-(8)), and pooling the two years (in (9)-(12)); in these, we add a year constant in the cross-sectional estimates or interactions of the year constant with source and destination fixed-effects.

Panel *A* gives the cross-sectional estimates. The gravity model does a decent job of explaining cross-border ownership and control. However, the role of distance, population, and income per capita are much weaker for control and ownership compared to international trade, explaining a much lower share of the variation. First, the elasticity on distance in the control specifications is much closer to zero; in the pooled specifications, the distance elasticity for corporate control is -0.24, compared to-0.87 and -0.64 for international trade goods and services, respectively. Distance enters with an attenuated estimate in both the control and ownership specifications; the coefficient in 2019 and in the pooled sample appears statistically indistinguishable from zero, telling of distance's smaller impact on the globalization of ownership and control compared to international trade. Second, countries' income per capita, especially at the source, is strongly positively correlated with corporate control and ownership, as it is for goods and services trade. Third, the population appears less relevant for ownership and control, as small tax-haven jurisdictions play a disproportionate role.

The economic effect of the gravity model for ownership and control is considerably weaker compared to international goods and services trade. The pseudo R^2 in the control specifications is 0.329,0.281, and 0.288, much lower than the statistic for international goods and service trade, which hovers around $0.82 - 0.86$.[32] A comparison of Root Mean Squared Errors (RMSE) paints a similar picture. The RMSE of the corporate control specification lies between 20 and 24, strikingly larger than the RMSE for goods and services trade, which stand at around 1.2 to 2.6. The model fit for corporate ownership is also weaker, when compared to international trade, with $pseudo - R^2$ about 0.4. Similarly, the RSME is between 22 and 30, indicating the worse fit for ownership vis-à-vis international trade.

Panel (*B*) adds source and destination country fixed-effects (in columns (9)-(12) interacted

[32]McFadden et al. (1973)'s pseudo-R^2 equals one minus the ratio of the log-likelihood of the fitted selected model (numerator) to the log-likelihood for the intercept-only model (denominator); See Correia et al. (2020) and Santos Silva and Tenreyro (2006). Namely:

$$R^2 = 1 - \frac{\hat{L}_{M_{\text{full}}}}{\hat{L}_{M_{\text{intercept}}}} \tag{3}$$

with a year dummy). This is useful for two reasons. First, it allows showing how much of the variability in globalization across country-pairs, source and destination country features explain. The $pseudo - R^2$ increases considerably to $0.67 - 0.7$ for international corporate control and $0.76 - 0.79$ for ownership. The doubling of the in-sample fit suggests that features other than size source and destination country shape cross-border control and ownership of listed companies. As a comparison, adding the source and destination constants increases only slightly the fit for international trade (the R^2 goes from about 0.85 to around 0.92 for the pooled sample). Second, the source and destination fixed-effects specifications isolate the role of distance, allowing us to grasp its relative importance across the four aspects of globalization. The estimate on distance is at least two standard errors below zero for international corporate control and ownership across all periods. However, the economic magnitude of distance is smaller for international ownership and control than for trade. First, the elasticity is smaller in absolute value, -0.64 (for ownership) compared to -0.95 for international goods trade in the pooled sample. Second, the increase in the $pseudo - R^2$ when adding distance in the specifications with source and destination fixed-effects is considerably smaller in the corporate control (and ownership) specification, compared to international goods trade in all years. For example, the increase in the $pseudo - R^2$ when we add log distance in the corporate control specification is 0.06 and 0.025 in 2012 and in 2019, while for trade in goods it is 0.1.

Appendix Table C.5 gives the corresponding linear probability model estimates that zoom into the extensive margin of corporate control and ownership. While all size terms and geodesic distance are significant correlates of cross-border corporate control (and ownership), the economic impact of the gravity model is considerably worse than with international trade.

Table 3: Baseline Results

Panel A: Cross Sectional Estimates

	2012				2019				Pooled			
	Control	Ownership	Trade		Control	Ownership	Trade		Control	Ownership	Trade	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	For. Ctrl.	All	Goods	Services	For. Ctrl.	All	Goods	Services	For. Ctrl.	All	Goods	Services
Log Pop-Wght distance	-0.482**	-0.250	-0.881***	-0.665***	-0.134	-0.280	-0.876***	-0.626***	-0.245	-0.268	-0.878***	-0.642***
	(0.199)	(0.194)	(0.051)	(0.060)	(0.160)	(0.172)	(0.055)	(0.051)	(0.150)	(0.180)	(0.052)	(0.053)
D Log GNI per cap.	0.577***	0.866***	0.824***	0.981***	1.113***	1.054***	0.877***	1.053***	0.883***	0.967***	0.849***	1.020***
	(0.142)	(0.124)	(0.060)	(0.060)	(0.241)	(0.201)	(0.065)	(0.053)	(0.196)	(0.151)	(0.062)	(0.052)
S Log GNI per cap.	1.029***	1.519***	0.806***	1.065***	1.175***	1.639***	0.840***	1.161***	1.118***	1.590***	0.823***	1.118***
	(0.157)	(0.296)	(0.041)	(0.097)	(0.251)	(0.366)	(0.052)	(0.087)	(0.197)	(0.322)	(0.045)	(0.090)
D Log Pop.	0.226	0.465**	0.880***	0.706***	0.243	0.430*	0.849***	0.678***	0.232	0.444*	0.863***	0.689***
	(0.197)	(0.195)	(0.050)	(0.049)	(0.259)	(0.250)	(0.043)	(0.044)	(0.242)	(0.229)	(0.046)	(0.044)
S Log Pop.	0.681***	0.431*	0.878***	0.714***	0.350*	0.369*	0.871***	0.673***	0.438**	0.389*	0.874***	0.689***
	(0.183)	(0.234)	(0.047)	(0.067)	(0.201)	(0.212)	(0.040)	(0.049)	(0.185)	(0.216)	(0.043)	(0.056)
Observations	13202	13202	13202	13202	13202	13202	13202	13202	26404	26404	26404	26404
Num. countries (D/S)	82/162	82/162	82/162	82/162	82/162	82/162	82/162	82/162	82/162	82/162	82/162	82/162
RMSE	23.571	29.593	1.267	1.849	20.606	26.235	1.464	2.627	21.976	27.801	1.382	2.369
Pseudo-R^2	0.329	0.401	0.843	0.825	0.281	0.401	0.857	0.828	0.288	0.401	0.850	0.826
Fixed Effects	None	None	None	None	None	None	None	None	Year FE	Year FE	Year FE	Year FE

Panel B: Source and Destination Country Fixed-Effects Estimates

	2012				2019				Pooled			
	Control	Ownership	Trade		Control	Ownership	Trade		Control	Ownership	Trade	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	For. Ctrl.	All	Goods	Services	For. Ctrl.	All	Goods	Services	For. Ctrl.	All	Goods	Services
Log Pop-Wght distance	-0.872***	-0.565***	-0.963***	-0.803***	-0.576***	-0.678***	-0.931***	-0.757***	-0.675***	-0.636***	-0.946***	-0.776***
	(0.163)	(0.141)	(0.070)	(0.046)	(0.101)	(0.143)	(0.065)	(0.049)	(0.057)	(0.140)	(0.067)	(0.047)
Observations	7768	10826	12008	12160	8008	11644	12008	12160	15776	22470	24016	24320
Num. countries (D/S)	82/162	82/162	82/162	82/162	82/162	82/162	82/162	82/162	82/162	82/162	82/162	82/162
RMSE	2.957	2.328	0.790	0.669	2.796	2.146	0.751	0.749	2.828	2.228	0.771	0.716
Pseudo-R^2	0.675	0.756	0.917	0.938	0.696	0.786	0.928	0.933	0.690	0.774	0.923	0.935
Marginal-R^2	0.057	0.021	0.105	0.074	0.025	0.035	0.100	0.066	0.035	0.029	0.102	0.069
Fixed Effects	S&D	S&D	S&D	S&D	S&D	S&D	S&D	S&D	S&D-Y	S&D-Y	S&D-Y	S&D-Y

Notes: The table reports Poisson Pseudo Maximum Likelihood (PPML) estimates. The outcomes are various forms of international integration across pairs of countries in 2012 (columns (1)-(4)), in 2019 (in columns (5)-(8)), and in 2012 and 2019 (in columns (9)-(12)). In columns (1), (5), and (9), the dependent variable denotes the logarithm of controlled listed firms' market capitalization in destination by shareholder entities in source country. In (2), (6), and (10), the dependent variable is the market value of ownership (voting rights) from shareholding entities in source and destination country in both widely-held and controlled firms, irrespective on whether the shareholder controls the company. In (3), (7), and (11), the dependent variable denotes international goods exports and imports from source to destination, while in columns (4), (8), and (12) the dependent variable denotes international services trade between origin and destination. The explanatory variables are the logarithm of population-weighted distance between origin and destination, the log of Gross National Income (GNI) per capita and log population at source and destination. The specifications in Panel (B) include source country and destination country constants, in columns (9)-(12) interacted with a year dummy variable. Double-clustered at source and destination country standard errors are reported below the estimates. *, **, and *** denote statistical significance at the 10%, 5%, and 1% confidence level, respectively.

4.2.0.1 Human Capital, Institutions, and Taxes The significant increase in the model fit of the international corporate ownership and control specifications when we add source and destination country constants, raises a question: Which features, besides size, correlate with the internationalization of control and ownership? While there are potentially many country characteristics shaping the globalization of control, we focus on taxes, human capital, and institutional quality at source and destination, as these features have received most attentions from the vast research on cross-border capital flows (e.g., Alfaro et al. (2008)). Table 4 gives the PPML estimates. For brevity we report the pooled across the two years specifications.[33]

4.2.1 Education

We commence the analysis examining the role of human capital that features prominently in the related research on why capital does not flow from rich to poor countries (e.g.,Lucas (1990)). In columns (1)-(4), we augment the baseline specification withe means years of schooling at source and destination, using data from Barro and Lee (2013). The human capital proxies enter with small and statistically indistinguishable from zero estimates, suggesting a small -if any role.[34]

4.2.1.1 Institutions We then turn to the role of institutional quality, augmenting the specification with a composite rule of law index for source and destination. The index, retrieved from the World Bank's Governance Indicators project, aggregates via principal components dozens of institutional capacity measures provided by NGOs, international agencies, and risk assessment firms.[35] The estimates in columns (5)-(8) show that sound institutions tend to attract foreigners to the local stock-market. Corporate ownership and control from foreign shareholding entities appear, on average, higher in destination countries with stronger and more efficient institutions. The estimate in column (5), though significant only at the 10% level, implies that corporate control almost doubles when the rule of law, ranging from -2.5 to 2.5, increases by one unit in the destination. A good example is the comparison between Italy and France that differ in the rule of law index by one unit in 2019 and 2012 ($0.3 - 0.4$ vs 1.4). Cross-border corporate control is about double for France than Italy. Countries with efficient institutions appear, on average, more open to international trade (Nunn (2007); Levchenko (2007)), but the correlation with the rule of law is weaker. The same holds true for the complete specifications reported on Table 5

[33]The Appendix (Section C.3) reports the estimates in 2012 and in 2019.

[34]When we omit GNI per capita that correlates strongly with human capital, education enters with significant estimates.

[35]Earlier studies show that differences in institutional quality explain a non-negligible portion of Lucas' paradox on why capital does not flow from rich to poor countries (Alfaro et al., 2008), while Wei (2000) shows that FDI correlates much stronger with corruption as compared to (mismeasured) tax rate. Aviat and Coeurdacier (2007) and Papaioannou (2009) show that institutions explain a sizable portion of cross-border banking flows. The World Bank measures have wide coverage, but we lose some tiny jurisdictions, Curaçao, BVI, Gibraltar, Jersey, Monaco, and New Caledonia.

referring to the 2012, 2019 and pooled samples. The source country's rule of law index enters with a (marginally significant) positive estimate in the control and ownership specification; investors (individuals/families, banks and other financial institutions, etc.) from high institutional quality countries exert a disproportionate control of foreign listed firms.

4.2.1.2 Taxation We then turn to the role of taxation, which is a first-order consideration for all types of investors both when investing passively and when exercising control abroad. We augment the cross-sectional specifications with indicators of tax-haven status, recently complied by Bachas et al. (2022) effective tax rate on capital and labour. Both the source country and the destination tax haven indicators enter with significantly positive estimates in the international trade in goods and services specifications, telling of their role in trade globalization. The coefficients on the tax haven variables are also significantly positive in the ownership specification, which looks at immediate links in listed firms, independently of control. The significantly positive estimate reflects the sizable portion of international equity investment in listed corporations passing via conduits in financial off-shore centers (discussed in detail in Section 3. The estimate in column (10) suggests that cross-border ownership is 170% higher when the source is a tax haven jurisdiction ($[exp(0.98) - 1]$). As we see a lot of equity positions between tax haven jurisdictions (see Table 1), the coefficient on the destination tax haven is also highly significant, implying an increase of ownership stakes of about 86% ($[exp(0.62) - 1]$). As in the corporate control specification we trace ultimate controlling shareholders, the role of tax havens at destination falls and the estimate is much smaller and statistically indistinguishable from zero. The identifier for tax havens at source, however, retains significance.

Turning to the effective tax rates on capital and labour, the estimates are small, unstable, and statistically indistinguishable from zero.[36] The insignificance may reflect various mechanisms. First, tax rates, rarely capture the actual levy on typically large firms operating in many jurisdictions that often shift profits (Alstadsæter et al., 2018). Second, tax codes are esoteric, provisions on loss carryovers vary, depreciation and amortization calculations differ, and there are dozens of exemptions. And if anything, the tax code has become more complex. Third, quite often there are specific exemptions for foreign investors that the rates miss. Fourth, the use of intermediate shell companies reflect (controlling) shareholder's efforts to bypass hefty taxation.

[36]We experimented with alternative statutory corporate income tax rates finding similarly weak and unstable estimates. We are thankful to Pierre Bachas, Gabe Zucman, Matthew Fisher-Post, and Anders Jensen for generously sharing the data from their ongoing work.

Table 4: Augmented Cross-Sectional Gravity Specifications
Taxation and Institutions (2012 and 2019 pooled sample)

	Control	Ownership	Trade		Control	Ownership	Trade		Control	Ownership	Trade	
	(1) For. Ctrl.	(2) All	(3) Goods	(4) Services	(5) For. Ctrl.	(6) All	(7) Goods	(8) Services	(9) For. Ctrl.	(10) All	(11) Goods	(12) Services
Log Pop-Wght distance	-0.576***	-0.560***	-0.878***	-0.657***	-0.542***	-0.519***	-0.881***	-0.633***	-0.573***	-0.522***	-0.917***	-0.647***
	(0.147)	(0.090)	(0.061)	(0.052)	(0.151)	(0.094)	(0.060)	(0.056)	(0.110)	(0.084)	(0.078)	(0.038)
D Log GNI per cap.	0.697***	0.919***	0.780***	1.013***	0.414*	0.618**	0.791***	0.854***	0.923***	1.015***	0.937***	1.089***
	(0.146)	(0.195)	(0.081)	(0.060)	(0.224)	(0.263)	(0.100)	(0.089)	(0.193)	(0.151)	(0.090)	(0.048)
D Log Pop.	0.798***	0.812***	0.893***	0.703***	0.818***	0.830***	0.894***	0.710***	0.764***	0.834***	0.903***	0.758***
	(0.098)	(0.070)	(0.044)	(0.043)	(0.091)	(0.065)	(0.044)	(0.044)	(0.119)	(0.091)	(0.039)	(0.019)
S Log GNI per cap.	1.611***	1.860***	0.778***	1.002***	1.252***	1.391***	0.930***	0.713***	1.399***	1.879***	0.936***	1.106***
	(0.197)	(0.255)	(0.082)	(0.086)	(0.259)	(0.340)	(0.095)	(0.109)	(0.160)	(0.184)	(0.067)	(0.117)
S Log Pop.	0.704***	0.697***	0.848***	0.708***	0.704***	0.728***	0.837***	0.727***	0.777***	0.811***	0.848***	0.774***
	(0.064)	(0.115)	(0.040)	(0.059)	(0.066)	(0.126)	(0.036)	(0.061)	(0.064)	(0.089)	(0.042)	(0.055)
D. Mean Yrs of School.	1.071	0.715	0.412	0.114								
	(0.881)	(0.825)	(0.361)	(0.257)								
S. Mean Yrs of School.	-0.523	0.661	0.154	0.439								
	(0.919)	(0.974)	(0.355)	(0.420)								
D Rule of law WB indicator					0.657*	0.558	0.083	0.225**				
					(0.343)	(0.383)	(0.106)	(0.097)				
S Rule of law WB indicator					0.319	0.686**	-0.171*	0.477***				
					(0.298)	(0.329)	(0.099)	(0.110)				
S is tax haven									0.856***	0.983***	0.238	0.731***
									(0.283)	(0.259)	(0.158)	(0.188)
D is tax haven									0.329	0.624**	0.383*	0.709***
									(0.312)	(0.256)	(0.199)	(0.201)
D Eff. tax rate on K									0.011	0.010**	-0.004	-0.004
									(0.009)	(0.005)	(0.004)	(0.004)
S Eff. tax rate on K									0.007	-0.005	-0.004	-0.008
									(0.008)	(0.009)	(0.004)	(0.006)
D Eff. tax rate on L									-0.020**	-0.009	-0.008	-0.010**
									(0.010)	(0.006)	(0.007)	(0.005)
S Eff. tax rate on L									-0.001	-0.005	-0.014**	-0.002
									(0.008)	(0.010)	(0.006)	(0.006)
Observations	15478	15478	15478	15478	15478	15478	15478	15478	15478	15478	15478	15478
Pseudo-R^2	0.542	0.641	0.857	0.847	0.550	0.651	0.858	0.856	0.559	0.664	0.868	0.877
Fixed Effects	Year	Year	Year	Year	Year	Year	Year	Year	Year	Year	Year	Year

Notes: The explanatory variables are the logarithm of population-weighted distance between origin and destination, the log of Gross National Income (GNI) per capita and log population at source and destination and, depending on each column, the mean years of schooling at source and destination, the level of the rule of law World Bank indicator, dummies whether the source or destination country is a tax heaven, and the level of the effective tax rates on capital and labour at source and destination countries. Double-clustered at source and destination country standard errors are reported below the estimates. *, **, and *** denote statistical significance at the 10%, 5%, and 1% confidence level, respectively.

Table 5: Augmented Cross-Sectional Gravity Specifications
Taxation and Institutions (2012, 2019 and pooled sample)

	2012				2019				Pooled			
	Control	Ownership	Trade		Control	Ownership	Trade		Control	Ownership	Trade	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	For. Ctrl.	All	Goods	Services	For. Ctrl.	All	Goods	Services	For. Ctrl.	All	Goods	Services
Log Pop-Wght distance	-0.595***	-0.504***	-0.945***	-0.667***	-0.536***	-0.495***	-0.901***	-0.616***	-0.550***	-0.491***	-0.918***	-0.629***
	(0.102)	(0.086)	(0.078)	(0.042)	(0.137)	(0.098)	(0.079)	(0.036)	(0.117)	(0.087)	(0.079)	(0.037)
D Log GNI per cap.	0.291*	0.557***	0.712***	0.761***	0.192	0.187	0.868***	0.958***	0.290	0.407*	0.774***	0.863***
	(0.173)	(0.147)	(0.101)	(0.055)	(0.353)	(0.360)	(0.140)	(0.077)	(0.272)	(0.226)	(0.105)	(0.054)
D Log Pop.	0.674***	0.820***	0.928***	0.768***	0.935***	0.955***	0.897***	0.764***	0.820***	0.880***	0.915***	0.766***
	(0.078)	(0.073)	(0.033)	(0.019)	(0.102)	(0.067)	(0.040)	(0.021)	(0.092)	(0.065)	(0.037)	(0.019)
S Log GNI per cap.	0.860**	1.102***	1.010***	0.500***	1.514***	1.442***	0.974***	0.768***	1.226***	1.255***	0.988***	0.652***
	(0.380)	(0.397)	(0.087)	(0.094)	(0.397)	(0.479)	(0.125)	(0.122)	(0.354)	(0.344)	(0.095)	(0.104)
S Log Pop.	0.828***	0.935***	0.855***	0.790***	0.766***	0.764***	0.831***	0.796***	0.794***	0.838***	0.841***	0.793***
	(0.068)	(0.145)	(0.039)	(0.050)	(0.087)	(0.101)	(0.044)	(0.044)	(0.064)	(0.110)	(0.041)	(0.048)
D. Mean Yrs of School.	0.367	1.158	0.663**	0.525**	1.938	1.409	0.289	0.025	1.224	1.205	0.533*	0.295
	(0.662)	(0.863)	(0.321)	(0.234)	(1.494)	(1.407)	(0.363)	(0.252)	(0.990)	(1.117)	(0.320)	(0.233)
S. Mean Yrs of School.	-1.108	-1.735	0.300	0.702**	-0.265	0.725	0.215	0.338	-0.521	-0.256	0.264	0.543
	(1.023)	(1.694)	(0.295)	(0.330)	(1.107)	(1.453)	(0.235)	(0.357)	(1.037)	(1.354)	(0.248)	(0.340)
D Rule of law WB indicator	0.487**	0.275	0.152	0.323***	0.763*	0.814*	0.024	0.221**	0.587*	0.498	0.085	0.252***
	(0.230)	(0.304)	(0.098)	(0.059)	(0.445)	(0.471)	(0.121)	(0.087)	(0.342)	(0.389)	(0.104)	(0.062)
S Rule of law WB indicator	0.695*	1.291***	-0.106	0.623***	0.147	0.580	-0.176	0.457***	0.370	0.884***	-0.145	0.505***
	(0.414)	(0.400)	(0.087)	(0.097)	(0.318)	(0.417)	(0.118)	(0.118)	(0.307)	(0.332)	(0.091)	(0.098)
D is tax haven	0.292	0.601**	0.455**	0.592***	0.601	0.893***	0.375*	0.763***	0.459	0.752***	0.432**	0.706***
	(0.243)	(0.242)	(0.198)	(0.153)	(0.467)	(0.305)	(0.203)	(0.217)	(0.327)	(0.247)	(0.198)	(0.197)
S is tax haven	0.862**	0.918***	0.242	0.611***	0.775***	0.967***	0.255*	0.816***	0.834***	0.967***	0.260*	0.740***
	(0.336)	(0.246)	(0.177)	(0.166)	(0.285)	(0.234)	(0.143)	(0.177)	(0.295)	(0.232)	(0.154)	(0.179)
D Eff. tax rate on K	0.016**	0.017***	-0.002	-0.001	0.004	0.004	-0.005	-0.008*	0.008	0.010	-0.004	-0.005
	(0.007)	(0.006)	(0.003)	(0.003)	(0.011)	(0.007)	(0.005)	(0.005)	(0.009)	(0.006)	(0.004)	(0.004)
S Eff. tax rate on K	0.012	-0.002	-0.006	-0.003	0.001	-0.010	-0.001	-0.015**	0.004	-0.008	-0.004	-0.010*
	(0.011)	(0.009)	(0.004)	(0.005)	(0.007)	(0.008)	(0.004)	(0.006)	(0.008)	(0.009)	(0.004)	(0.006)
D Eff. tax rate on L	-0.032**	-0.018**	-0.012	-0.017***	-0.009	0.003	-0.005	-0.009*	-0.018*	-0.006	-0.007	-0.011**
	(0.013)	(0.009)	(0.008)	(0.004)	(0.012)	(0.008)	(0.007)	(0.005)	(0.010)	(0.007)	(0.007)	(0.005)
S Eff. tax rate on L	-0.000	-0.011	-0.020***	-0.009	-0.004	-0.010	-0.011	0.000	-0.001	-0.009	-0.014**	-0.003
	(0.014)	(0.013)	(0.008)	(0.006)	(0.007)	(0.009)	(0.007)	(0.006)	(0.009)	(0.009)	(0.007)	(0.006)
Observations	7739	7739	7739	7739	7739	7739	7739	7739	15478	15478	15478	15478
Pseudo-R^2	0.521	0.667	0.873	0.897	0.607	0.699	0.871	0.888	0.570	0.679	0.870	0.888
Fixed Effects	No	No	No	No	No	No	No	No	Year	Year	Year	Year

Notes: See below on C.9. The explanatory variables are the logarithm of population-weighted distance between origin and destination, the log of Gross National Income (GNI) per capita and log population at source and destination and, depending on each column, the mean years of schooling at source and destination, the level of the rule of law World Bank indicator, dummies whether the source or destination country is a tax heaven, the level of the effective tax rates on capital and labour at source and destination countries. Double-clustered at source and destination country standard errors are reported below the estimates. *, **, and *** denote statistical significance at the 10%, 5%, and 1% confidence level, respectively.

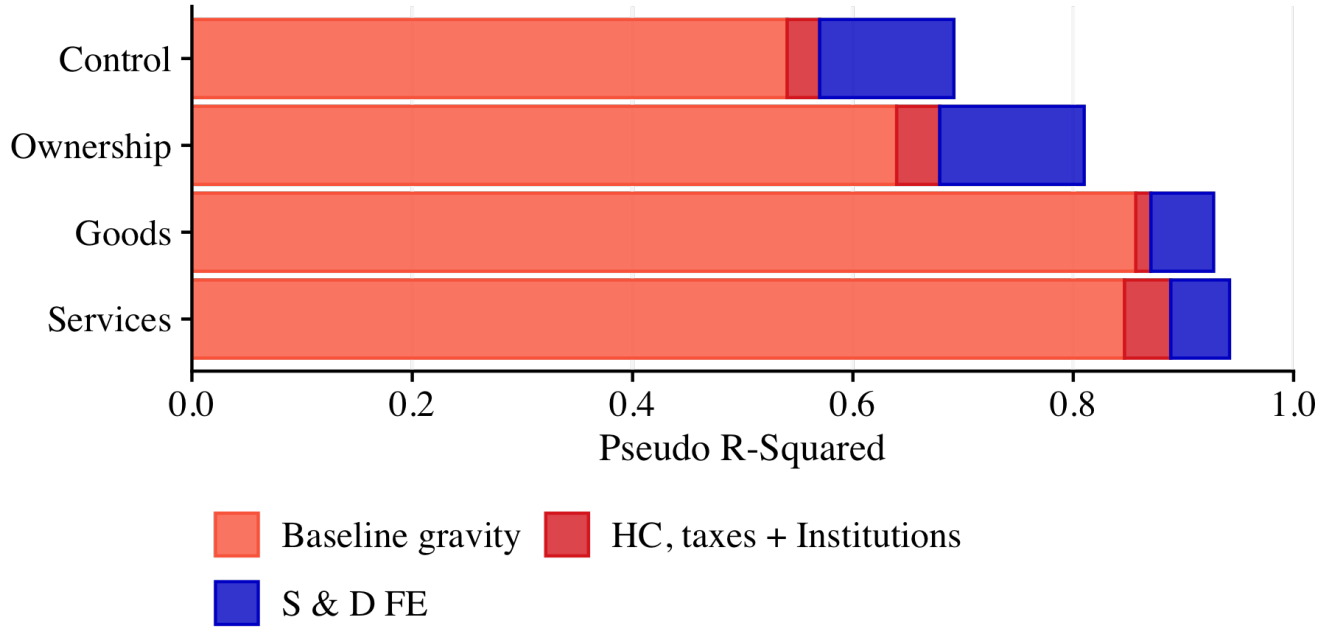
4.2.1.3 Taking Stock Figure 11 summarizes our results on the role of distance, country size, taxation, education, and institutions on the internationalization of corporate ownership and control, as compared to international trade in goods and services. [37] To ensure full comparability, we have imposed the same sample for the estimations of the plotted specifications.[38] First, distance and size explain a significant –more than half– portion of the variance in cross-border corporate ownership. Further, the $pseudo - R^2$ for international corporate control is lower, around 0.5. For both corporate control and cross-border corporate ownership, the role of income, population, and geodesic distance is considerably smaller than in international trade, as the model fit for international goods and services is around 8.5. Second, augmenting the baseline gravity with human capital, institutions and tax-haven status improves the fit for the specifications, though modestly.[39] Third, the gravity model fit with source and recipient country constants improves model fit considerably, especially for global corporate control and cross-border corporate ownership, suggesting that other bilateral (country-pair) aspects may play a role, an issue that we examine below.

[37] Appendix Figures C.1-C.2 report the corresponding statistics for 2012 and 2019.

[38] We do so to ensure that the nine specifications stem from the same sample of countries. The number of observations is, therefore, smaller, $15,478$ (as on Table 4 and the R^2 for e.g. corporate control is 0.54. The baseline gravity specifications, shown on Table 3, are estimated on $26,404$

[39] We are currently exploring the role of other country features, related to investor protection, courts and capital markets regulation.

Figure 11: Corporate Control, Augmented Gravity, and Country Features
pseudo R^2 across Cross-Sectional and Country Fixed Effects Specifications



The Figure plots the cumulative $pseudo - R^2$ (Mc Fadden's) in Poisson Pseudo Maximum Likelihood (PPML) specifications in the pooled across 2012 and 2019 sample. The dependent variable in the three specifications in bar (1) is market capitalization of controlled firms in destination country from shareholding entities in source. The dependent variable in bar (2) is the market value of all ownership links from shareholding entities in source country in listed companies in destination country. The dependent variable in columns (3) and (4) is the total number of exports and imports from source to destination in goods and services, respectively. Each bar gives the R^2 for three specifications: (a) A cross-sectional specification with the logarithm of population-weighted distance between origin and destination, the log of Gross National Income (GNI) per capita and log population at source and destination ((*light coral*)). (b) A cross-sectional specification that add indicators for tax haven status, measures of statutory corporate income tax rate, and rule of law proxies, at source and destination country (*red*). (c) A fixed-effects specification with the logarithm of population-weighted distance between origin and destination, alongside vectors of source country constants and destination country constants interacted with a year indicator (*blue*).

5 Bilateral Features

The lower fit of the international control model with source and destination country constants, as compared to international trade, raises the question of which *bilateral* features matter for the internationalization of corporate ownership and control. In this section, we first examine the role of bilateral economic policy aspects and then turn to the impact of deeper country-pair links.

5.1 International Policy

First, we examine the role international economic policies and investment treaties on the globalization of corporate ownership and control, contrasting them with trade in goods and services. We augment the gravity specification with a set of indicator variables that take the value of one when the two countries (source and destination) are part a customs union, have signed bilateral Economic Integration Agreements, Free Trade Agreements, and investment treaties. We also examine

the role of the European Integration with indicators that switch to one when the two countries are part of the European Union and the Euro Area.[40]

Table 6 reports the estimates. The existence of an Economic Integration Agreement between source and destination countries seems to play an important role as a determinant of corporate control. The same is true, even more so, for cross-border ownership stakes. These estimates are significant at all levels of significance. The effects on international trade are also economically and statistically significant. As a result, the reported pseudo-R^2 is now considerably higher compared to the previously examined specifications. For corporate control and cross-border ownership, the model fit ranges from $0.70 - 0.78$, while for trade it is around $0.92 - 0.94$.[41]

We the augment the baseline PPML specification with indicators that take on the value of one when both countries are mambers of European Union and Euroarea. The EU indicator enters with a highly significant estimates across all globalization aspects, telling of the role of European integration on trade and cross-border ownership and control. When both countries in the pair are members of the European Union, cross-border controlling shareholding increase threefold. At the same time, distance continues to play an economically and statistically significant role across all specifications. As shown on Figure 12, including the international policy controls increases modestly the PPML model fit for cross-border corporate ownership and control. In contrast, while the EU indicator and international economic agreement variables enter with highly significant estimates in the goods and services trade specifications, the increase in the model fit is tiny, as the baseline gravity terms explain most of the variation in interntional trade.

[40]Starting with Aviat and Coeurdacier (2007); Kalemli-Ozcan et al. (2010); Baldwin (2006); Rose (2008); Rose and OneMoney (2000) there is a voluminous literature on the effect of the EU and the euro on trade, foreign direct investment, banking, and other forms of financial integration (e.g., (Lane and Milesi-Ferretti, 2021), (Baldwin, 2006)). However this research has not looked closely at the impact of cross-border corporate control.

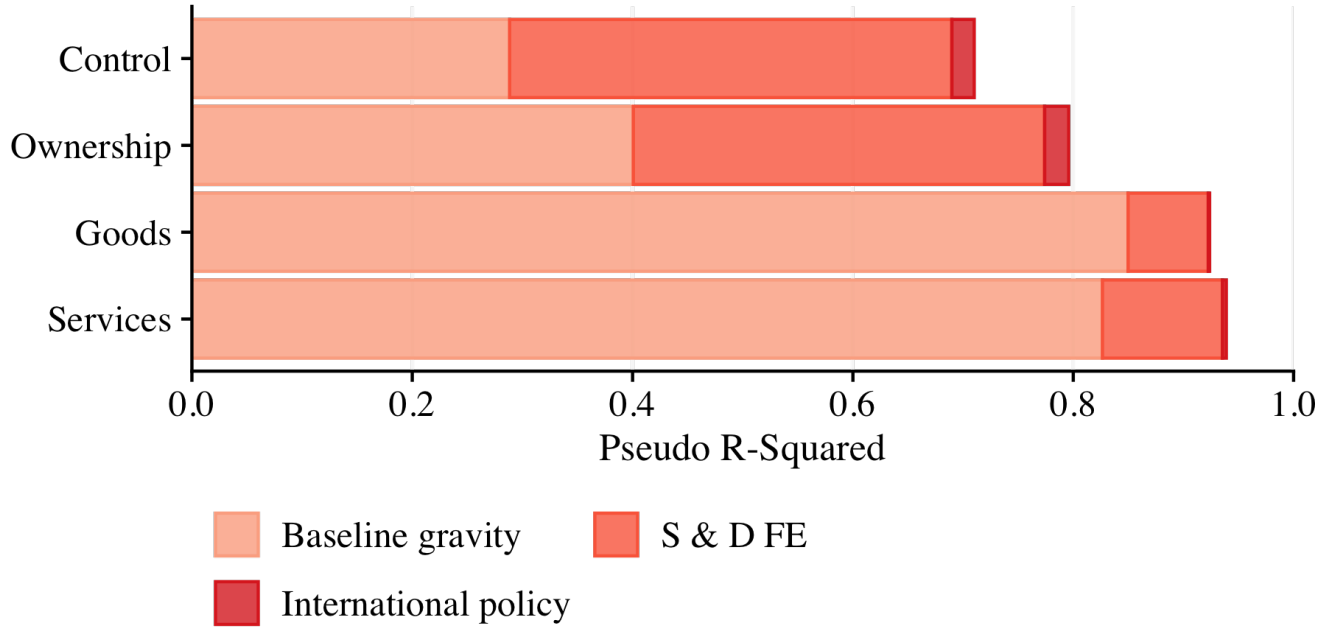
[41]Examples of regional Economic Integration Agreements are the North American Free Trade Agreement (NAFTA), signed among the United States, Canada and Mexico and the Asian Pacific Economic Cooperation Forum (APEC), which includes NAFTA members, Japan and China. U.S.A., Canada, and Mexico. An example of a Free Trade Agreement is SAFTA (South Asian Free Trade Area), signed among Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka. Another example is CAFTA (Central America Free Trade Agreement) comprising the United States and the Central American countries of Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua. Examples of currency unions include the Southern African Customs Union, the Central American Common Market, the Gulf Cooperation Council etc. Bilateral investment treaties can be signed and in force, or signed and inactive. Examples for investment treaties currently in force are EFTA (European Free Trade Association), and the Philippines, Argentina and the United States, Korea and Turkey and approximately 2,000 more.

Table 6: Augmented Cross-Sectional Gravity Specifications
International Policy Controls (pooled 2012 and 2019 sample)

	Control	Ownership	Trade		Control	Ownership	Trade		Control	Ownership	Trade	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	For. Ctrl.	All	Goods	Services	For. Ctrl.	All	Goods	Services	For. Ctrl.	All	Goods	Services
Log Pop-Wght distance	-0.587***	-0.570***	-0.936***	-0.761***	-0.597***	-0.600***	-0.878***	-0.736***	-0.506***	-0.536***	-0.851***	-0.709***
	(0.087)	(0.124)	(0.067)	(0.044)	(0.012)	(0.137)	(0.070)	(0.047)	(0.067)	(0.117)	(0.068)	(0.039)
Customs union	1.013	0.910	-0.041	0.035					1.160	1.015	0.112	0.147
	(0.824)	(0.648)	(0.247)	(0.089)					(0.762)	(0.632)	(0.272)	(0.119)
Econ. int. agreem.	1.427**	1.043***	0.344*	0.227					1.280**	0.971***	0.237	0.145
	(0.632)	(0.297)	(0.200)	(0.190)					(0.608)	(0.287)	(0.169)	(0.166)
FTA	-0.507	-0.183***	-0.151	0.120					-0.313	-0.095	0.008	0.230
	(0.409)	(0.057)	(0.194)	(0.208)					(0.386)	(0.074)	(0.155)	(0.183)
Inv. treaty	-0.287	-0.481*	-0.017	0.022					-0.260	-0.467*	0.021	0.045
	(0.192)	(0.250)	(0.087)	(0.061)					(0.201)	(0.250)	(0.076)	(0.060)
Both EU					1.230*	0.700	0.833***	0.444**	1.303**	0.768	0.884***	0.518***
					(0.687)	(0.542)	(0.183)	(0.181)	(0.522)	(0.557)	(0.171)	(0.160)
Both Euro Area					0.276	-0.222	-0.294*	-0.028	0.186	-0.309	-0.286*	-0.021
					(0.480)	(0.431)	(0.151)	(0.142)	(0.472)	(0.439)	(0.151)	(0.140)
Observations	15776	22470	24016	24320	15776	22470	24016	24320	15776	22470	24016	24320
Pseudo-R^2	0.701	0.782	0.923	0.937	0.698	0.775	0.925	0.937	0.708	0.783	0.926	0.939
Fixed Effects	S&D-Y	S&D-Y	S&D-Y	S&D-Y	S&D-Y	S&D-Y	S&D-Y	S&D-Y	S&D-Y	S&D-Y	S&D-Y	S&D-Y

Notes: The table reports Poisson Pseudo Maximum Likelihood (PPML) estimates. The outcomes are various forms of international integration across pairs of countries in the pooled sample for 2012 and 2019 based on various specifications. In columns (1), (5), and (9), the dependent variable denotes the share of controlled listed firms' market capitalization in destination by shareholder entities in source country. In (2), (6), and (10), the dependent variable is the market value of ownership (voting rights) from shareholding entities in destination country in both widely-held and controlled firms, irrespective on whether the shareholder controls the company. In (3), (7), and (11), the dependent variable denotes international goods exports and imports from source to destination, while in columns (4), (8), and (12) the dependent variable denotes international services trade between origin and destination. The explanatory variables are the logarithm of population-weighted distance between origin and destination, dummies taking the value of one if the two countries are in a customs union, have signed of an economic international agreement or a free trade agreement, have signed an investment treaty, the European Union and Euro Area. Double-clustered at source and destination country standard errors are reported below the estimates. *, **, and *** denote statistical significance at the 10%, 5%, and 1% confidence level, respectively.

Figure 12: Corporate Control, International Policy, and Country Features
Pseudo R^2 across Cross-Sectional and Country Fixed Effects Specifications



The Figure plots the cumulative $pseudo - R^2$ (Mc Fadden's) in Poisson Pseudo Maximum Likelihood (PPML) specifications in the pooled across 2012 and 2019 sample. The dependent variable in the three specifications in bar (1) is the natural logarithm of the market capitalization of controlled firms in destination country from shareholding entities in source. The dependent variable in bar (2) is the market value of all ownership links from shareholding entities in source country in listed companies in destination country. The dependent variable in columns (3) and (4) is the total number of exports and imports from source to destination in goods and services, respectively. Each bar gives the R^2 for three specifications: (a) A cross-sectional specification with the logarithm of population-weighted distance between origin and destination, the log of Gross National Income (GNI) per capita and log population at source and destination ((*light coral*)). (b) A fixed-effects specification with the logarithm of population-weighted distance distance between origin and destination alongside vectors of source country constants and destination country constants interacted with a year indicator in (*red*). (c) An international policy controls specification, with dummies taking the value of one if the two countries are in a customs union, have signed of an economic international agreement or a free trade agreement, have signed an investment treaty, the European Union and Euro Area (*dark red*).

5.2 Deep Bilateral Ties and Differences

Motivated by recent works uncovering deep, geographic, cultural, and historical origins of comparative development and integration, we examine their role in cross-border corporate control and ownership (see for reviews Spolaore and Wacziarg (2018); Alesina and Giuliano (2015)).[42] We augment the source and destination fixed-effects specification with various historical ties/distance measures incrementally and jointly, examining their role in explaining the globalization of ownership and control. Table 7 gives the estimates.

[42]Guiso et al. (2009) show that foreign direct investment and trade are higher between countries with stronger bilateral trust, in turn reflecting deep genetic similarities. Spolaore and Wacziarg (2009) and Spolaore and Wacziarg (2018) show that technology adoption (industry, agriculture, mining, communications) is strongly related to genetic similarities in the country population with the frontier economies. Pellegrino et al. (2021) develop a model of international capital allocation with informational and policy frictions, where deep historical, genetic, religious, and other differences affect signal extraction, higher in different countries, and, in turn, the network of cross-border investment. They also show that geographic, cultural, and linguistic differences explain a sizable portion of foreign direct and cross-border portfolio flows.

First, we broaden the concept of distance and consider linguistic and religious distances to capture deeper differences that may affect international control.[43] Linguistic differences may capture information asymmetries that affect international diversification (e.g., Coeurdacier and Rey (2013), Gârleanu et al. (2019)), while religion proxies for broader cultural differences. Both distance terms enter with significant estimates in both the global corporate control and cross-border corporate ownership specifications (in (1)-(2) and (7)-(8)), suggesting that cultural differences matter conditional on geodesic distance.[45] Both linguistic and religious distance enter with highly significant estimates in the control and ownership specifications. The estimate on linguistic distance retains significance even when we include all distance-ties measures in (6) and (12), suggesting that a one-unit increase in the linguistic distance leads to approximately a 69% drop in cross-border corporate control ($exp(-1.162) - 1$), and to a.on religious distance is also highly significant, with one-unit increase in religious distance leading to a 52% drop in ownership. Across all specification, the model fit fares quite well, with a $pseudo - R^2$ around 0.7 for control and 0.8 for ownership.

Second, to capture historical ties, we use binary variables identifying country-pairs with similar colonial history, as many global firms originate from the colonial times (e.g., Unilever, Anglo-American) and colonization was to a great extent a private enterprise endeavor. The idicator enters with a small and insignificant estimate in the ownership specification; this reflects the fact that most tax haven jurisdictions, especially the smallest ones, that are connected with many countries, are (former) UK oversees territories (Cayman Islands, Hong Kong, Bermuda, British Virgin Island). However, when we trace ultimate controlling shareholders, the coefficient on common colonial history increases considerably, implying a spur in international control of about 87% ($exp(0.628) - 1$) in Column (3).

Third, we examine the role of legal system similarities, adding an indicator for countries whose legal system follows the common law tradition and an indicator for pairs with civil-law systems; the omitted category consists of pairs of countries with different legal systems (common-civil law or vice versa).[46] As shown on Columns (4) and (10), the estimates on the variable on a dummy taking the value of one for pairs with common civil law origins are large and highly significant. The corporate control links between country pairs of the same legal family, when that legal family is civil law, are significantly higher than dyads with different legal systems. These estimates are not much affected when we add as a control a binary index identifying dyads between tax-

[43]The underlying data come from *The Research page for Douglas Dow: Distance and Diversity Scales for International Business Research*. We use a simple measure which quantifies the difference between the dominant religions of any source and destination countries, and between 0 and 1. [44] The primary sources of our chosen dataset are Grimes (1978), Gordon (2005), and Paul et al. (2016) for linguistic distance, and Barrett et al. (2000), Harris (1992), O'Brien and Palmer (1993), and Glasse (1989) for religious distance.

[45]The correlation of linguistic and religious distance with geodesic distance is small to modest, 0.06 and 0.07. See Appendix Table C.4.

[46]Starting with La Porta et al. (1999a) a large literature links ownership concentration and control to the legal tradition. However, earlier studies have not explored the role of legal origin on the internationalization of ownership and control.

haven jurisdictions (results not shown). Corporate control is around four times larger between countries with a civil law system than pairs with different legal families. Cross-border ownership is around two times larger. The dummy on pairs of common law origins is not, however, statistically significant.

In the full specifications reported on Columbs (6) and (12), the two variables enter with the opposite sign. This discrepancy reflects the importance of many small tax-haven jurisdictions that are former British oversees territories and colonies (Hong Kong, Cayman Islands, British Virgin Islands, Singapore, Bermuda).

Fourth, we consider a genetic distance proxy reflecting the allele frequency differences for about 120 gene loci. The heterozygosity index (FST) measures the probability that two genes at a given locus, selected at random from the populations of sourse and destination, will be different (see Spolaore and Wacziarg (2009) for details).[47] Genetic distance enters with a highly significant estimate both in the control and the ownership specifications; besides, the inclusion of the genetic distance lowers the magnitude of the geodesic distance estimate. The genetic distance elasticity is about -0.26, suggesting that a one-unit increase in the weighted genetic distance between a pair of countries leads to a 23% decrease in cross-border corporate control. However, this significance is not retained when looking at the full specification in Column (6), and does not seem to play a role for any of the cross-border corporate ownership specifications.

Figure 13 illustrates the improvement in the model fit (in terms of PPML pseudo R^2) in the ownership and control specifications, as well as trade in goods and services. While deep gravity terms matter for the internationalization of corporate control and ownership, even if modestly, the contribution to the model fit for international trade is negligible. Finally, the model fit for control is still much lower than for goods and services trade.

[47] The underlying data come from Cavalli-Sforza et al. (1994) and Pemberton et al. (2012) and the aggregation of ethnic data to the country follows the shares provided in Alesina et al. (2003). We employ the (weighted) FST measure, also known as co-ancestor coefficients, based on heterozygosity indices. Weighted genetic distances correlate strongly with unweighted ones, so this does not affect the results.

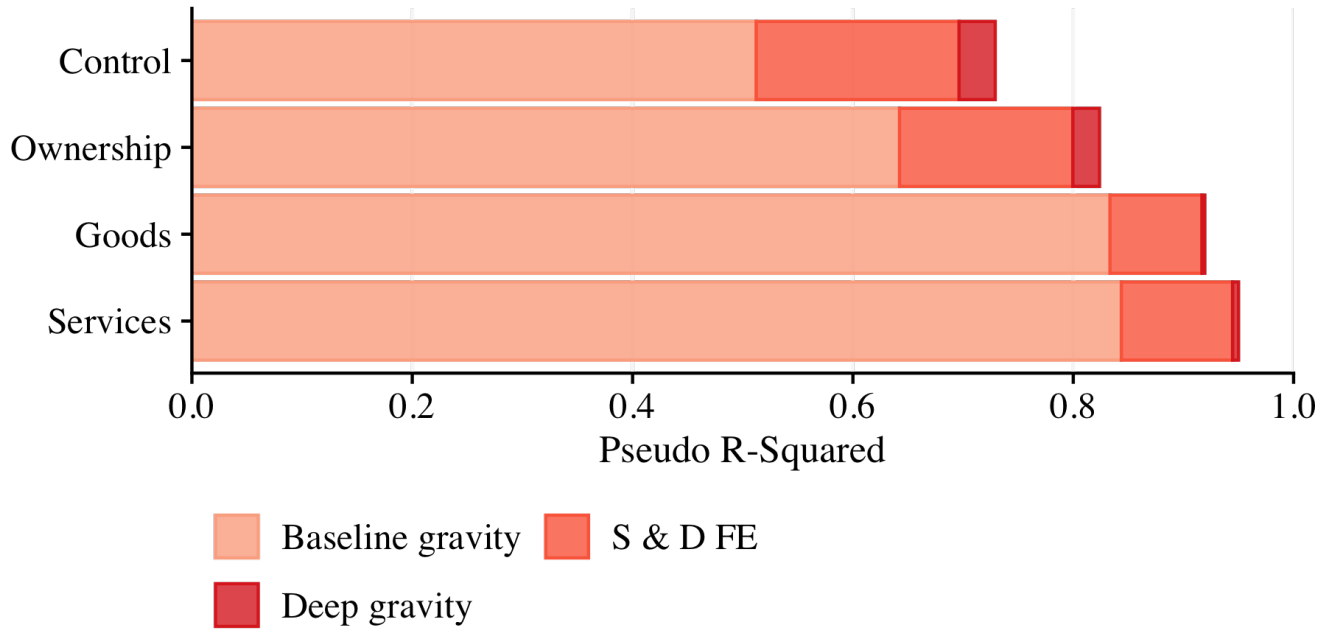
Table 7: Cross-Border Corporate Control and Ownership and Deep Bilateral Links
Religious, Linguistic, Genetic Differences and Historical Ties

	Control						Ownership					
	(1) For. Ctrl.	(2) For. Ctrl.	(3) For. Ctrl.	(4) For. Ctrl.	(5) For. Ctrl.	(6) For. Ctrl.	(7) All	(8) All	(9) All	(10) All	(11) All	(12) All
Log Pop-Wght distance	-0.720***	-0.629***	-0.812***	-0.797***	-0.573***	-0.538***	-0.606***	-0.574***	-0.711***	-0.717***	-0.571***	-0.529***
	(0.158)	(0.148)	(0.160)	(0.143)	(0.217)	(0.187)	(0.173)	(0.145)	(0.196)	(0.198)	(0.191)	(0.147)
Religious. Dist.	-0.765**					-0.375	-1.121***					-0.742***
	(0.323)					(0.252)	(0.265)					(0.233)
Linguistic. Dist.		-1.703***				-1.162***		-1.550***				-1.467***
		(0.316)				(0.274)		(0.348)				(0.385)
Colonial ties			0.628			0.407			0.489			0.392
			(0.460)			(0.429)			(0.405)			(0.406)
Same common law				0.340		-0.151				-0.258		-0.790**
				(0.492)		(0.478)				(0.336)		(0.317)
Same civil law				1.634***		1.328***				1.128***		0.786***
				(0.319)		(0.326)				(0.154)		(0.190)
Genetic. dist.					-0.260**	-0.122					-0.164	-0.001
					(0.128)	(0.101)					(0.211)	(0.150)
Observations	11076	11076	11076	11076	11076	11076	15777	15777	15777	15777	15777	15777
Pseudo-R^2	0.701	0.719	0.698	0.716	0.700	0.729	0.807	0.815	0.800	0.806	0.801	0.824
Fixed Effects	S&D-Y	S&D-Y	S&D-Y	S&D-Y	S&D-Y	S&D-Y	S&D-Y	S&D-Y	S&D-Y	S&D-Y	S&D-Y	S&D-Y

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: The table reports Poisson Pseudo Maximum Likelihood (PPML) estimates. The outcomes are two forms of international integration across pairs of countries in the pooled sample across 2012 and 2019 based on various specifications. In columns (1) to (6), the dependent variable denotes the share of controlled listed firms' market capitalization in destination by shareholder entities in source country. In columns (7)-(12), the dependent variable is the market value of ownership (voting rights) from shareholding entities in destination country in both widely-held and controlled firms, irrespective on whether the shareholder controls the company. The explanatory variables in the various specification are the logarithm of population-weighted distance between origin and destination, a measure of religious and linguistic distance, a dummy whether source country and destination country have shared a common colonizer or engaged in a colonial relationship, a dummy on whether source and destination country both ascribe to common law or both ascribe to civil law, and last, a (weighted) measure of genetic distance. Double-clustered at source and destination country standard errors are reported below the estimates. *, **, and *** denote statistical significance at the 10%, 5%, and 1% confidence level, respectively.

Figure 13: Corporate Control, Deeper Gravity Flows, and Country Features
Pseudo R^2 across Cross-Sectional and Country Fixed Effects Specifications



The Figure plots the cumulative $pseudo - R^2$ (Mc Fadden's) in Poisson Pseudo Maximum Likelihood (PPML) specifications in the pooled across 2012 and 2019 sample. The dependent variable in the three specifications in bar (1) is the natural logarithm of the market capitalization of controlled firms in destination country from shareholding entities in source. The dependent variable in bar (2) is the market value of all ownership links from shareholding entities in source country in listed companies in destination country. The dependent variable in columns (3) and (4) is the total number of exports and imports from source to destination in goods and services, respectively. Each bar gives the R^2 for three specifications: (a) A cross-sectional specification with the logarithm of population-weighted distance between origin and destination, the log of Gross National Income (GNI) per capita and log population at source and destination ((*light coral*)). (b) A fixed-effects specification with the logarithm of population-weighted distance distance between origin and destination alongside vectors of source country constants and destination country constants interacted with a year indicator in (*red*). (c) A fixed-effects specification with the logarithm of population-weighted distance between origin and destination, alongside vectors of source country constants and destination country constants interacted with a year indicator and augmented with measures of religious distance, linguistic distance, genetic distance and dummies for colonial ties and common legal origins (separately for common law and civil law) in (*dark red*).

6 Investor Type Heterogeneity

We also examined heterogeneity of the role of size, distance, international policy and deep gravity on cross-border corporate control and ownership across investor types as this may shed light on the underlying forces at play. BvD classifies shareholder entities into 19 types, which we aggregate into five major categories:

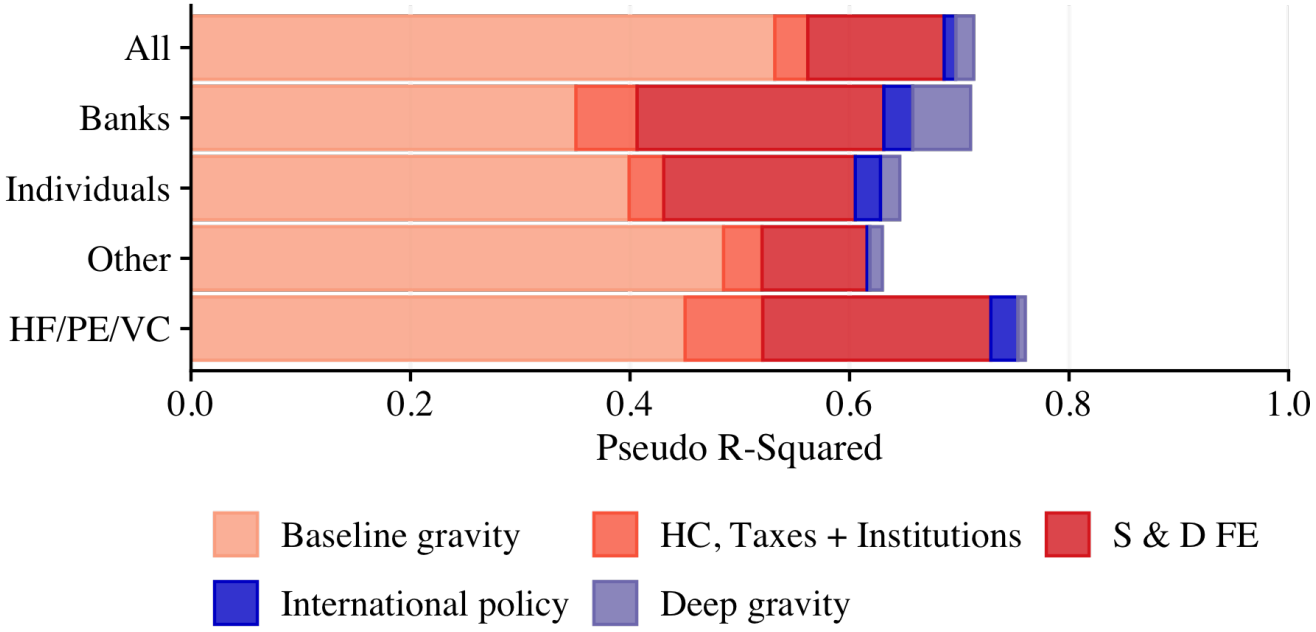
- *Bank*: Bank
- *Non-bank Finance*: Financial company; Insurance company; Mutual & Pension Fund / Nominee / Trust / Trustee; Private equity firms; Venture capital; Hedge fund
- *Industry*: Industrial companies, which mainly consists of private companies that BvD could not trace ultimate controller

- *Public and Other*: Foundation / Research Institute; Public; Other unnamed shareholders, aggregated; Branch; Marine Vessels
- *Individuals / Families*: Individuals; Employees / Managers / Directors; Self ownership; Unnamed private shareholders

Figure 14 plots the PPML $pseudo - R^2$ of the corporate control gravity specifications for the pooled sample, estimated separately for each shareholder type.[48] For each investor type, and the aggregate reported for comparability in the top bar, the figure gives the $pseudo - R^2$ from five specifications: (i) Cross-sectional gravity with the logarithms of distance, GNI per capita, and population at both source and destination countries on the RHS. (ii) Cross-sectional gravity adding to size and distance indicators for tax-haven status at source and destination, human capital, and rule of law at the at both source and destination countries. (iii) Specification with source and destination country fixed-effects, alongside logged distance. (iv) Augmenting the source and destination country fixed-effects specification not only with distance but also with the international policy variables (EU, Euro-area, investment treaties, Economic Integration Agreements, Free Trade Agreement). (v) Also adding the deep gravity terms of linguistic, religious, genetic, and historical similarities. While there is not much heterogeneity, at least at this -arguably coarse- level of aggregation by investor type, the estimates hint that bilateral economic policy and historical aspects matter relatively more for cross-border corporate control by banks and other financial institutions, relatively to families/individuals and other type of investors.

[48] Please note that the categories reported here are not exhaustive and thus the disaggregated model fits do not fully account for the model fit for all investors, as government is not reported as one of the categories.

Figure 14: Corporate Control, Augmented Gravity, and Country Features by Investor
Pseudo R^2 across Cross-Sectional and Country Fixed Effects Specifications



The Figure plots the cumulative $pseudo - R^2$ (Mc Fadden's) in Poisson Pseudo Maximum Likelihood (PPML) specifications in the pooled across 2012 and 2019 sample. The dependent variable in the specifications is the natural logarithm of the market capitalization of controlled firms in destination country from shareholding entities in source. The estimation has been disaggregated by investor type. Each bar gives the R^2 for three specifications: (a) A cross-sectional specification with the logarithm of population-weighted distance between origin and destination, the log of Gross National Income (GNI) per capita and log population at source and destination ((*light coral*)). (b) A cross-sectional specification that add indicators for tax haven status, measures of statutory corporate income tax rate, and rule of law proxies, at source and destination country (*orange*). (c) A fixed-effects specification with the logarithm of population-weighted distance between origin and destination, alongside vectors of source country constants and destination country constants interacted with a year indicator (*dark red*). (d) An augmented fixed-effects specification not only with distance but also with the international policy variables (EU, Euro-area, investment treaties) (in *blue*). (e) A deep gravity specification including measures of linguistic, religious, genetic, and historical similarities (in *lilac*).

7 Conclusion

Summary We provide new mappings of the internationalization of corporate control identifying controlling shareholder entities from the often obscure, esoteric, pyramidal ownership network for about 22,000 public companies in 82 countries after the global financial crisis, in 2012, and just before the pandemic, in 2019. Our mappings of corporate ownership and control distinguish between domestic, foreign, and tax-haven ultimate controlling and immediate shareholders. We commence the analysis illustrating the main patterns of international cross-border ownership and control. Home bias in corporate control is considerable. Besides, the network structure of corporate control is very sparse, with few links across country pairs and even fewer significant connections. In contrast, the ownership network in both widely-held and controlled firms entails more and more prominent links. Our work highlights the prominence of financial off-shore centers. While their role appears on average small to moderate, it is sizable in many countries and regions, especially in Eastern and Southern Europe, and some large Asian emerging markets. Locals control domestic firms using tax-haven incorporated shells in some countries, like Ukraine, Russia, Greece, and Portugal.

We then estimate gravity specifications to characterize control (and ownership) internationalization. First, as with other types of cross-border investment, size matters; international controlling (and passive) shareholder links are, on average, higher for more developed and more populous countries. Second, the gravity model fares considerably worse for corporate control and ownership than international trade. Third, other than population and income per capita, country features explain a non-negligible portion of the internationalization of control (and ownership). Fourth, while distance enters with a significantly negative elasticity, its implied magnitude is weaker than trade. Fifth, compared to goods and services trade, the gravity model fit fares markedly worse for corporate control (less for ownership), even when augmenting it with source and destination country fixed effects. Sixth, historical, linguistic, and genetic ties play a significant role, telling of deep barriers to the global integration of corporate control markets.

7.0.0.1 Future Research Our mapping of cross-border corporate control calls for future research. First, updating the data backward will allow examining dynamics in ownership and control. Second, it is interesting expanding the analysis across private firms, at least for some regions. Third, more work on the taxation of foreign investors, especially those with controlling equity stakes, will shed light on their decisions. Fourth, it is worthwhile to combine our statistics of ultimate controlling links with other recently-compiled international capital flows to understand financial liberalization episodes. Fifth, the new mappings of control allow re-examining the propagation of idiosyncratic and country-specific financial and productivity shocks in the increasingly interconnected world economy. Sixth, it is intriguing examining the interplay between corporate

control and the diffusion of managerial practices across borders.

Appendix

The Appendix reports summary statistics, descriptive patterns, mappings, and additional gravity model estimates complementing the analysis in the main paper.

A Data and Methodology

The figures below complement the data and methodology section of the main paper (Section 2). We plan adding tables with summary statistics and descriptives by source and destination country. We also plan adding company examples.

B Mappings and Descriptive Pattern

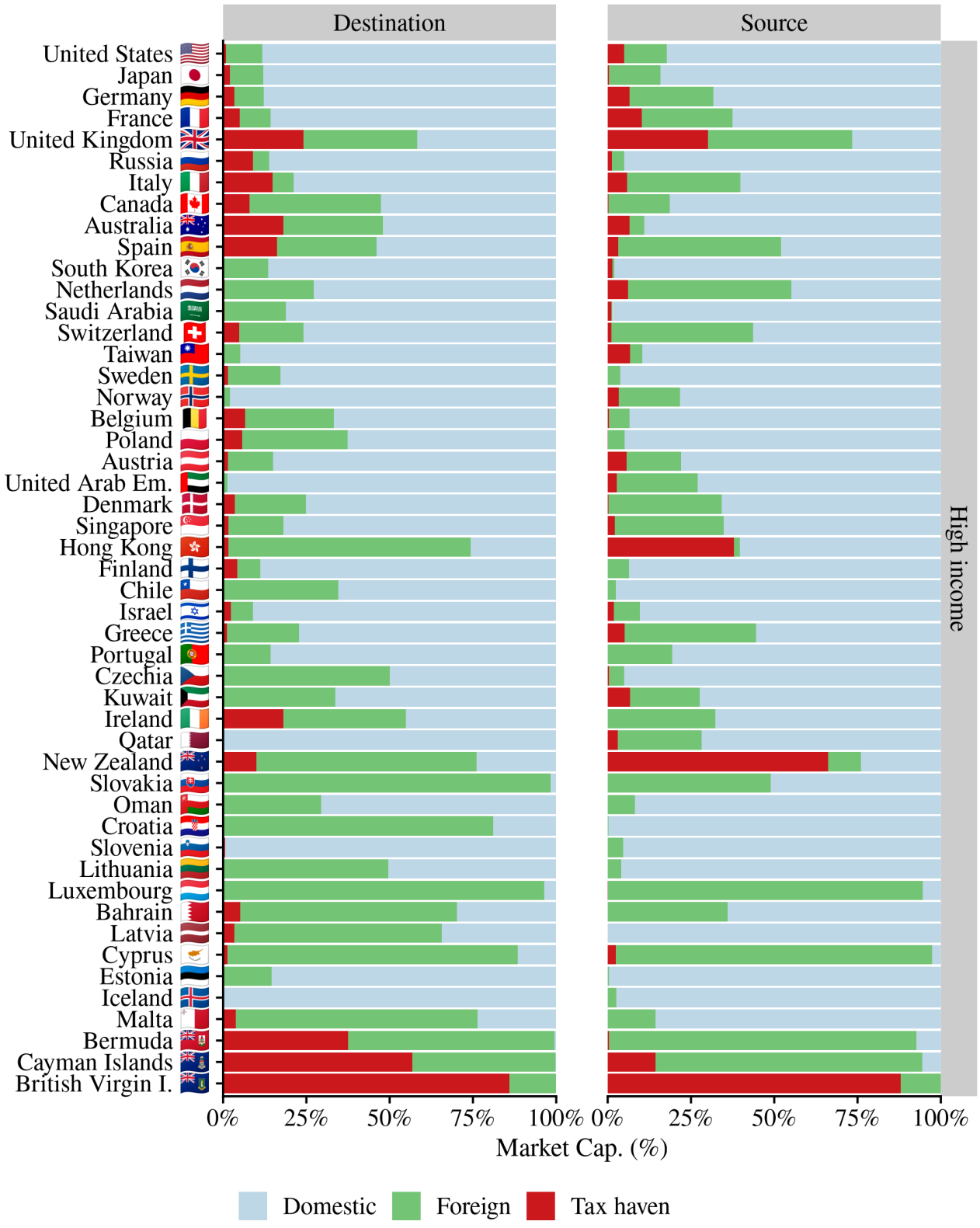
The figures below complement the descriptive analysis in Section 3.

Appendix Figures B.1-B.2 plot the share of total market capitalization of controlled firms for high-income and middle and low-income countries, respectively in 2012, complementing the analogous figures in the main part of the paper where we reported the 2019 statistics. The figures distinguish by the three nationality types of the ultimate controlling entity: (i) domestic, (ii) foreign, and (iii) tax-haven. The left panel takes a destination viewpoint, while the right panel a source country viewpoint. Within income groups, countries are ordered by the size of their economy (GNI).

Appendix Figure B.3 examines the role of tax-havens in corporate control in 2012. The figure plots the percentage of the total market capitalization of controlled firms at the destination where tax-haven shareholding entities appear either as ultimate controlling shareholders or as immediate controllers (or both).

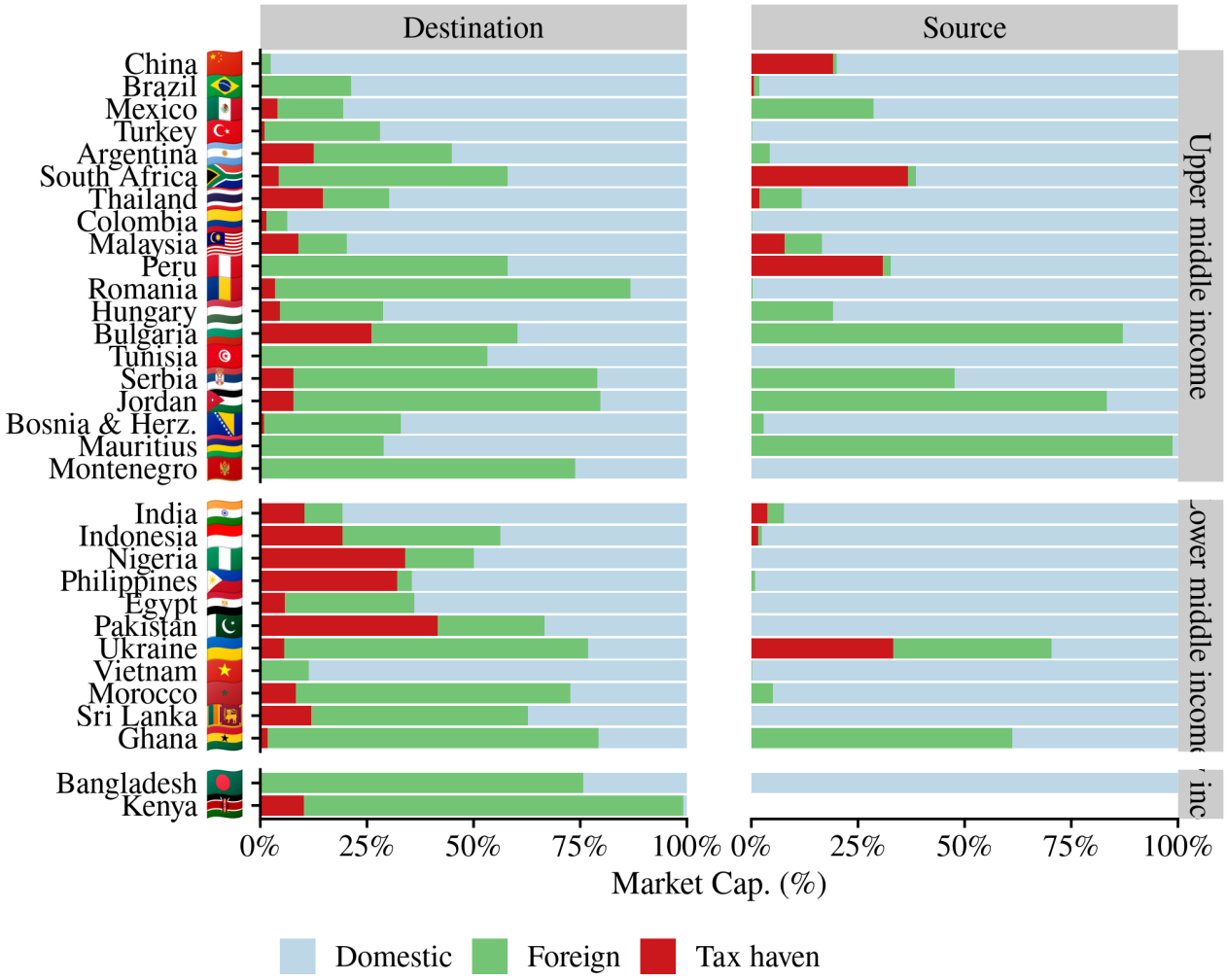
Appendix Figure B.4 illustrates the network structure of corporate ownership in 2012, rather than in 2019 that we report in the main paper. In the horizontal axis, the figure gives listed firms' jurisdictions (destination) and on the vertical axis, the figure plots the nationality of shareholding entities (controlling or passive) from source countries. Dark(er) squares indicate larger equity stakes held by entities from the source country in public firms at the destination in 2012. The chart orders countries according to the similarity of their international ownership links. Countries closer to each other, especially at the extremes, have similar bilateral ownership linkages.

Appendix Figure B.5 performs the exercise by looking at country-pair links on listed corporations at destination countries controlled by ultimate controlling shareholders from source jurisdictions in 2012, adding to the analogous plot in the main paper that zoomed in 2019.



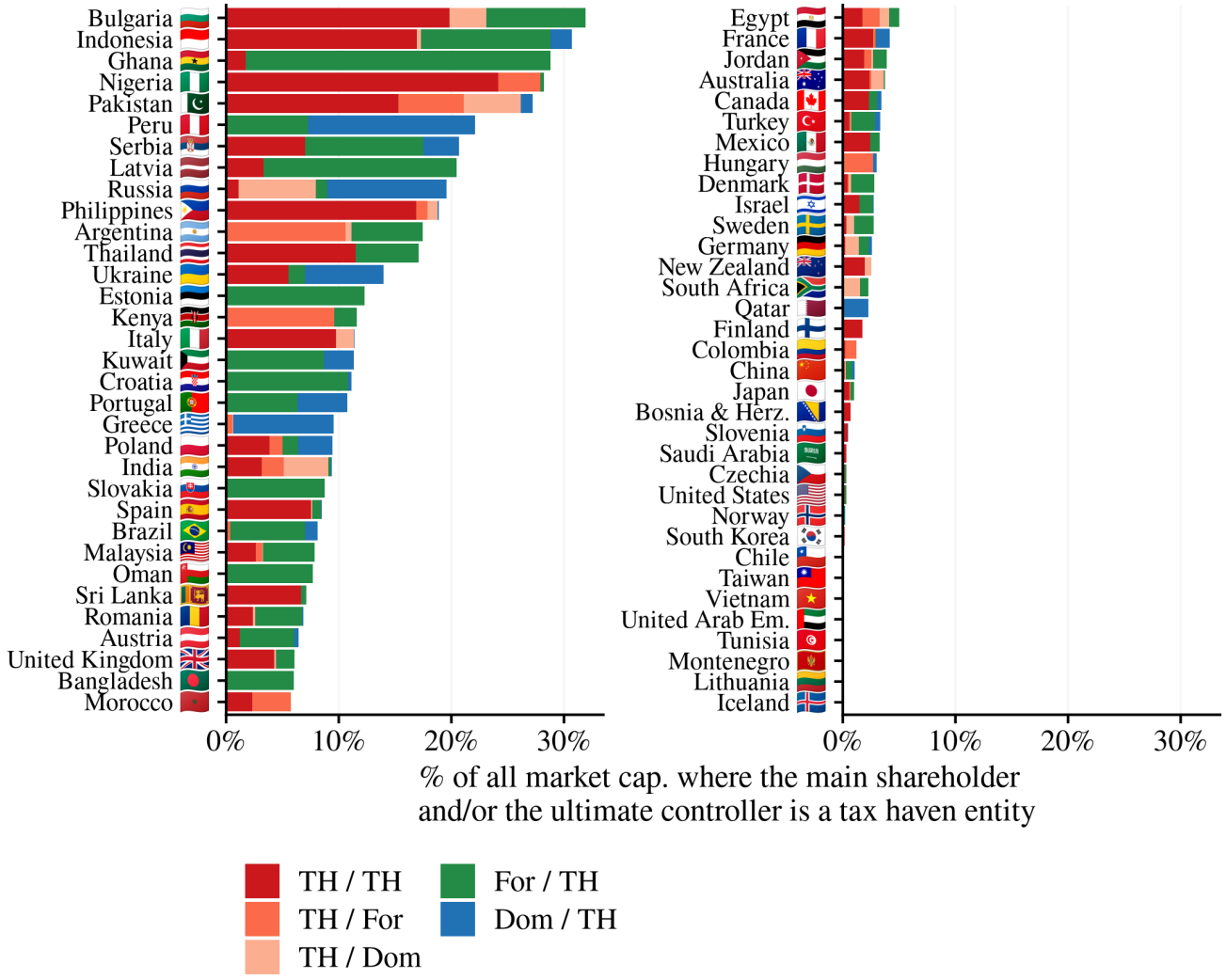
Only jurisdictions with at least 5 controlled companies are shown.

Figure B.1: Nationality of controllers in high-income countries in 2012.



Only jurisdictions with at least 5 controlled companies are shown.

Figure B.2: Nationality of controllers in middle-income countries in 2012.



Dom indicates a domestic shareholder or controlled. For indicates a foreign non-tax haven. TH indicates a foreign tax haven. E.g., Dom / TH indicates that the controller is domestic, and the main shareholder is from a foreign tax haven.

Figure B.3: Tax Haven Incorporated Vehicles in Corporate Control Chain across countries (Destination)

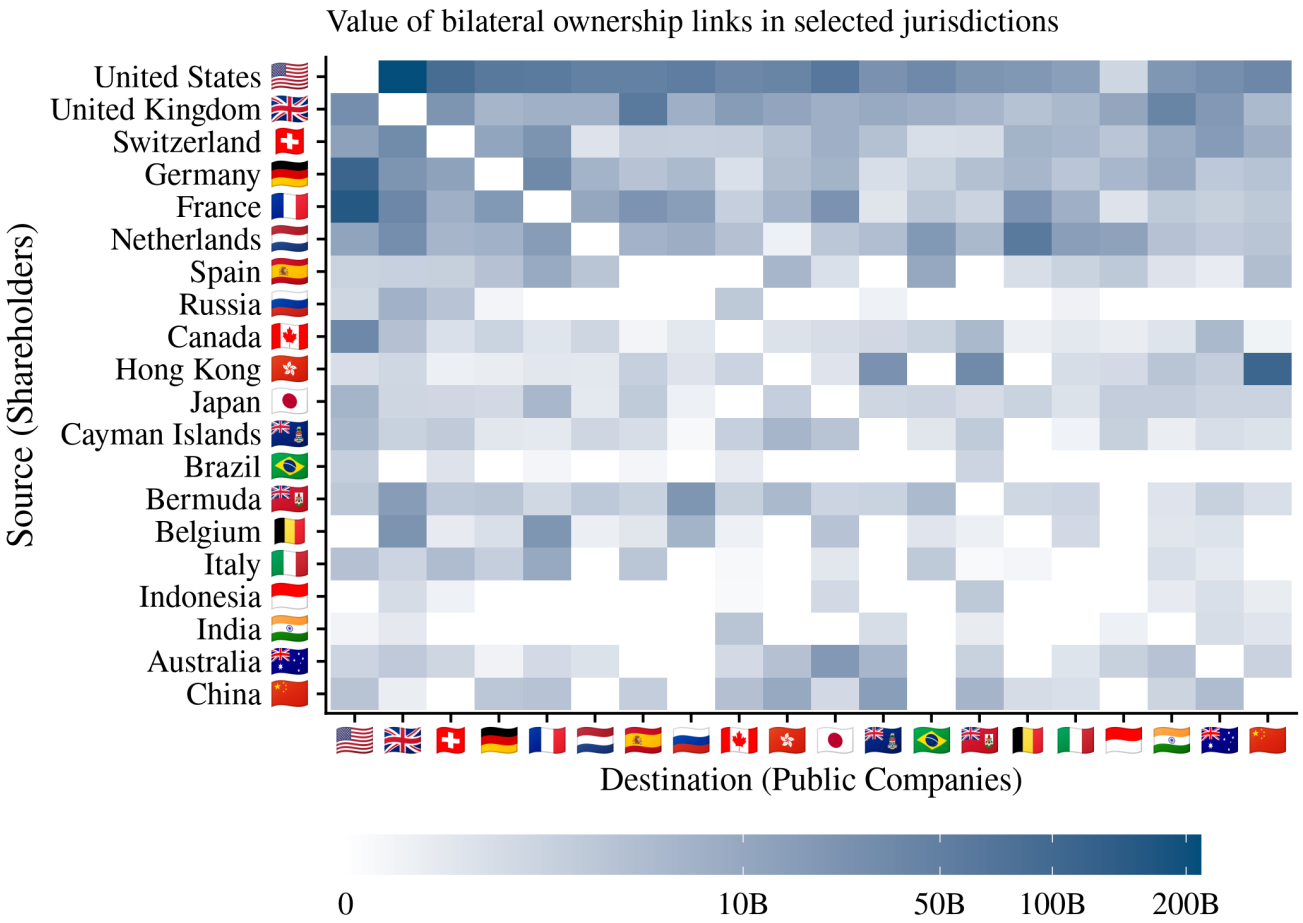


Figure B.4: Heat map of the value of bilateral ownership stakes, measured by the market value of equity stakes, held by entities from source countries (y-axis) in public firms from destination countries (x-axis) in 2012.

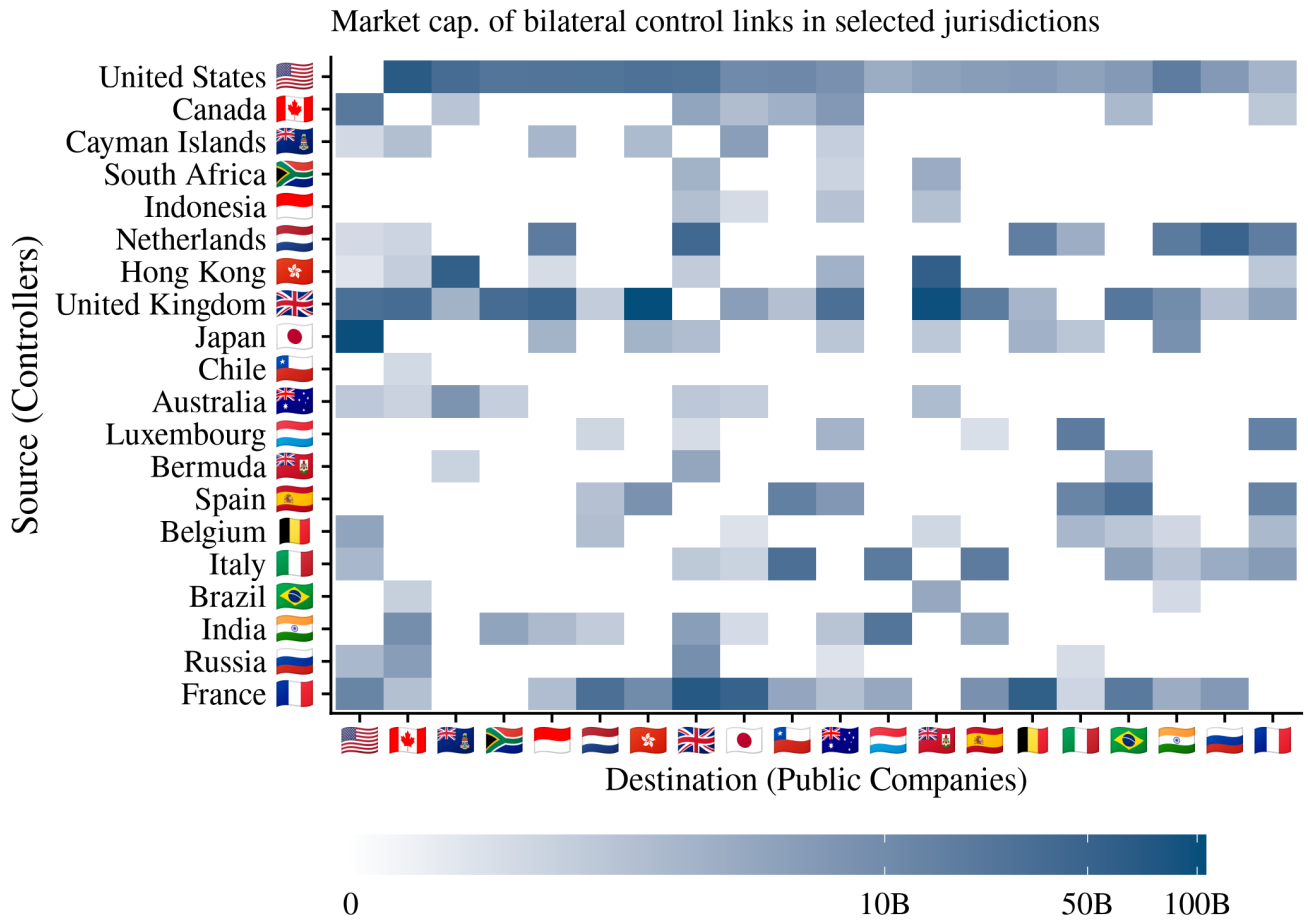


Figure B.5: Heat map of the value of bilateral control stakes, measure by total market capitalization, held by entities from source countries (y-axis) in public firms from destination countries (x-axis) in 2012.

C Bilateral Patterns. Gravity Analysis

Below we report additional results that complement the gravity specifications in Section 4 of the paper.

C.1 Summary Statistics

Appendix Table C.1 gives summary statistics of the main explanatory variables of the regression analysis (Section 4.1). Panels A and B report summary statistics for GNI per capita, population, effective tax rates on capital and labor, and rule of law World Bank indicator from a source and destination country viewpoint, respectively. Panel C reports summary statistics for the four distance terms we employ in the gravity specifications.

Appendix Tables C.2 and C.3 show the correlation structure of variables for the destination country and source country respectively. Appendix Table C.4 gives the correlation structure of the bilateral (country-pair) proxies of religious, linguistic, genetic, and geodesic differences.

Table C.1: Summary Statistics

	Mean	50^{th} perc.	St. Dev.	Min	10^{th} perc.	90^{th} perc.	Max
S Log GNI per cap.	20154.12	8640.79	27484.13	355.99	1064.82	53458.77	189506.77
S Log Pop.	43.56	8.09	154.82	0.01	0.19	83.43	1433.78
S Eff. tax rate on K	19.70	16.07	12.96	0.10	6.85	36.01	67.02
S Eff. tax rate on L	17.07	12.40	13.90	0.34	2.65	37.65	52.03
S Rule of law WB indicator	0.13	-0.02	0.98	-2.32	-1.02	1.68	2.06
Observations	26404						

	Mean	50^{th} perc.	St. Dev.	Min	10^{th} perc.	90^{th} perc.	Max
D Log GNI per cap.	26864.87	19043.86	24300.61	925.85	3046.49	59622.56	118179.07
D Log Pop.	73.92	11.31	213.12	0.03	0.86	145.87	1433.78
D Eff. tax rate on K	22.43	20.45	13.13	0.10	7.80	39.83	60.81
D Eff. tax rate on L	22.31	24.53	15.01	0.34	2.56	42.25	52.03
D Rule of law WB indicator	0.61	0.55	0.86	-1.15	-0.54	1.80	2.06
Observations	26404						

	Mean	50^{th} perc.	St. Dev.	Min	10^{th} perc.	90^{th} perc.	Max
Geodesic. dist.	0.37	0.36	0.23	0.00	0.08	0.70	1.00
Linguistic. Dist.	0.68	0.75	0.34	0.00	0.00	1.00	1.00
Religious. Dist.	0.49	0.50	0.37	0.00	0.00	1.00	1.00
Genetic. dist.	0.36	0.41	0.21	0.00	0.09	0.61	1.00
Observations	26404						

The table reports summary statistics for the main explanatory variables in the source country (Panel A), the destination country (Panel B), and the country pairs (Panel C) in the sample without missing values for any of the variables [number of observations in Table 3].

Table C.2: Correlation Matrix. Destination country

	D Log GNI per cap.	D Log Pop.	D Eff. tax rate on K	D Eff. tax rate on L	D Rule of law WB indicator
D Log GNI per cap.	1				
D Log Pop.	-0.202***	1			
D Eff. tax rate on K	0.538***	-0.0191**	1		
D Eff. tax rate on L	0.482***	-0.243***	0.505***	1	
D Rule of law WB indicator	0.828***	-0.255***	0.537***	0.576***	1
Observations	23667				

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Notes: Table reports the correlations between the variables used for the specification on augmented gravity and institutions in Table 4 for the destination country.

Table C.3: Correlation Matrix. Source country

	S Log GNI per cap.	S Log Pop.	S Eff. tax rate on K	S Eff. tax rate on L	S Rule of law WB indicator
S Log GNI per cap.	1				
S Log Pop.	-0.0795***	1			
S Eff. tax rate on K	0.504***	0.0221**	1		
S Eff. tax rate on L	0.585***	-0.122***	0.499***	1	
S Rule of law WB indicator	0.827***	-0.0849***	0.502***	0.670***	1
Observations	20435				

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Notes: Table reports the correlations between the variables used for the specification on augmented gravity and institutions in Table 4 for the source country.

Table C.4: Correlation Matrix. Country-Pair Features

	Std. Geodesic. dist.	Linguistic. Dist.	Religious. Dist.	Std. Genetic. dist.
Std. Geodesic. dist.	1			
Linguistic. Dist.	0.0565***	1		
Religious. Dist.	0.0678***	0.336***	1	
Std. Genetic. dist.	0.542***	0.0667***	0.0619***	1
Observations	18300			

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Notes: Table reports the correlations between the variables used for the specification on deeper gravity flows in Table 7.

C.2 Baseline Gravity Estimates

The results complement the baseline PPML gravity specifications in Section 4.2 of the main paper.

C.2.1 Extensive Margin Analysis Appendix Table C.5 reports linear probability model estimates (LPM) exploring the role of geodesic distance, source and destination countries population and income per capita on the extensive margin of cross-border corporate control, ownership, and trade in goods and services. The dependent variable takes the value of one if there is a link between source and destination country in any of the four aspects of globalization and zero otherwise.

C.2.2 Summary Appendix Figures C.1-C.2 illustrate the role of distance, country size, taxation, and institutions on the internationalization of corporate ownership and control, as compared to international trade in goods and services in 2012 and in 2019, complementing the analysis in the main paper where we report the analogous graph pooling across the two years. The figures plot the evolution of the $pseudo - R^2$ of the baseline gravity (in light coral), adding indicators for tax-haven status, human capital indicators, effective tax rates on capital and labour, and institutional quality at source and destination (in red), absorbing all country features with source and destination country fixed-effects (in dark red), adding international policy controls (in blue), and deeper gravity flows (in lilac). McFadden et al. (1973)'s pseudo-R^2 equals one minus the ratio of the log likelihood of the fitted selected model (numerator) to the log likelihood for the intercept-only model (denominator).

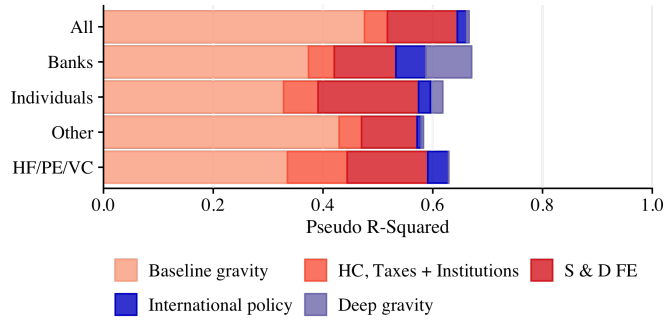


Figure C.1: pseudo-R^2 plot in 2012

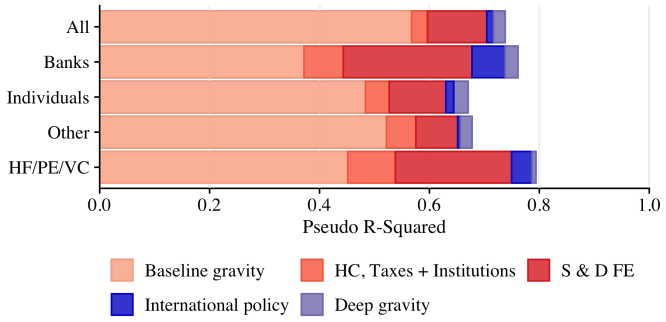


Figure C.2: pseudo-R^2 plot in 2019

The figures plot the cumulative pseudo R^2 in Poisson Pseudo Maximum Likelihood (PPML) specification in 2012 and 2019. The explanatory variables for the first bars (in light coral) are the logarithm of population-weighted distance between origin and destination, the log of Gross National Income (GNI) per capita and log population at source and destination. The explanatory variables for the second bar (in red) add indicators that equal one if the source or destination country is a tax haven, the effective tax rates on capital and labor in the source and destination, and rule of law for the source and destination country. The explanatory variables for the third bar (in dark red) are the logarithm of population-weighted distance between origin and destination, source country and destination country constants. In blue, the fixed effects specification is augmented with international policy controls, and in lilac, with deep gravity determinants.

Table C.5: Linear Probability Model Estimates. Pooled 2012 and 2019 Sample
Panel A. Cross-Sectional Estimates

	2012			2019			Pooled		
	Control	Ownership	Trade	Control	Ownership	Trade	Control	Ownership	Trade
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	For. Ctrl.	All	Goods	For. Ctrl.	All	Goods	For. Ctrl.	All	Goods
Log Pop-Wght distance	-0.030***	-0.050***	-0.052***	-0.034***	-0.045***	-0.046***	-0.032***	-0.048***	-0.049***
	(0.007)	(0.010)	(0.015)	(0.008)	(0.011)	(0.015)	(0.007)	(0.010)	(0.015)
D Log GNI per cap.	0.014***	0.038***	0.054***	0.028***	0.043***	0.044***	0.021***	0.041***	0.049***
	(0.005)	(0.008)	(0.013)	(0.008)	(0.010)	(0.013)	(0.006)	(0.009)	(0.013)
D Log Pop.	0.012***	0.020***	0.060***	0.015***	0.025***	0.055***	0.013***	0.022***	0.058***
	(0.003)	(0.005)	(0.013)	(0.005)	(0.007)	(0.014)	(0.004)	(0.006)	(0.013)
S Log GNI per cap.	0.047***	0.088***	0.019*	0.062***	0.098***	0.016	0.054***	0.093***	0.018*
	(0.007)	(0.011)	(0.010)	(0.008)	(0.011)	(0.011)	(0.007)	(0.011)	(0.010)
S Log Pop.	0.025***	0.032***	0.076***	0.027***	0.032***	0.068***	0.026***	0.032***	0.072***
	(0.005)	(0.007)	(0.009)	(0.005)	(0.007)	(0.009)	(0.005)	(0.007)	(0.009)
Observations	13202	13202	13202	13202	13202	13202	26404	26404	26404
Num. countries (D/S)	82/162	82/162	82/162	82/162	82/162	82/162	82/162	82/162	82/162
RMSE	0.226	0.302	0.337	0.252	0.316	0.334	0.240	0.309	0.336
R^2	0.123	0.193	0.277	0.142	0.192	0.237	0.132	0.192	0.257
Fixed Effects	None	None	None	None	None	None	Year FE	Year FE	Year FE

Panel B. Source Country and Destination Country Fixed-Effects Estimates

	2012			2019			Pooled		
	Control	Ownership	Trade	Control	Ownership	Trade	Control	Ownership	Trade
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	For. Ctrl.	All	Goods	For. Ctrl.	All	Goods	For. Ctrl.	All	Goods
Log Pop-Wght distance	-0.061***	-0.101***	-0.026***	-0.072***	-0.107***	-0.023***	-0.067***	-0.104***	-0.025***
	(0.008)	(0.011)	(0.008)	(0.009)	(0.011)	(0.007)	(0.008)	(0.011)	(0.007)
Observations	13202	13202	13202	13202	13202	13202	26404	26404	26404
Num. countries (D/S)	82/162	82/162	82/162	82/162	82/162	82/162	82/162	82/162	82/162
RMSE	0.208	0.262	0.242	0.229	0.272	0.235	0.219	0.267	0.238
R^2	0.273	0.403	0.636	0.306	0.412	0.630	0.292	0.408	0.633
Fixed Effects	S&D	S&D	S&D	S&D	S&D	S&D	S&D-Y	S&D-Y	S&D-Y

C.3 Taxation and Institutions

Appendix Tables C.6-C.7 report cross-sectional gravity specifications that associate cross-border corporate control, ownership, and international goods and service trade with gravity features at source and destination countries in 2012 and in 2019, respectively. The results complement our analysis in the paper (Section 4.2.0.1), where we report pooled across 2012 and 2019 specifications. The explanatory variables are:

- Bilateral geodesic distance between the two countries, weighted by population.
- The logarithm of Gross National Income per capita (GNI p.c.).
- The logarithm of population.
- Human capital indicators from Barro-Lee Educational Attainment Dataset (Barro and Lee (2013)).
- Rule of law indicators on institutional quality from the World Bank.
- Indicators that take on the value of one when the country is classified as a tax-haven jurisdiction (OECD (2000) and Tørsløv et al. (2018)).
- A measure of effective tax rates on capital and labour, retrieved from Bachas et al. (2022).

Table C.6: Taxation and Institutions (2012)

	Control	Ownership	Trade		Control	Ownership	Trade		Control	Ownership	Trade	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	For. Ctrl.	All	Goods	Services	For. Ctrl.	All	Goods	Services	For. Ctrl.	All	Goods	Services
Log Pop-Wght distance	-0.608***	-0.550***	-0.883***	-0.676***	-0.561***	-0.497***	-0.885***	-0.636***	-0.607***	-0.517***	-0.947***	-0.682***
	(0.139)	(0.101)	(0.061)	(0.057)	(0.142)	(0.100)	(0.059)	(0.058)	(0.098)	(0.082)	(0.077)	(0.046)
D Log GNI per cap.	0.534***	0.848***	0.735***	0.921***	0.247**	0.716***	0.723***	0.747***	0.647***	0.972***	0.938***	1.071***
	(0.140)	(0.151)	(0.079)	(0.065)	(0.125)	(0.233)	(0.083)	(0.078)	(0.118)	(0.114)	(0.089)	(0.054)
D Log Pop.	0.689***	0.797***	0.908***	0.722***	0.702***	0.805***	0.910***	0.731***	0.654***	0.807***	0.923***	0.769***
	(0.091)	(0.063)	(0.045)	(0.045)	(0.080)	(0.062)	(0.045)	(0.043)	(0.096)	(0.080)	(0.041)	(0.026)
S Log GNI per cap.	1.459***	1.798***	0.769***	0.906***	0.827***	0.919**	0.923***	0.545***	1.157***	1.765***	0.986***	1.058***
	(0.249)	(0.334)	(0.091)	(0.085)	(0.312)	(0.365)	(0.088)	(0.070)	(0.184)	(0.277)	(0.069)	(0.137)
S Log Pop.	0.735***	0.791***	0.854***	0.731***	0.728***	0.798***	0.848***	0.750***	0.805***	0.903***	0.858***	0.787***
	(0.090)	(0.156)	(0.044)	(0.066)	(0.074)	(0.138)	(0.040)	(0.063)	(0.068)	(0.125)	(0.040)	(0.067)
D. Mean Yrs of School.	0.283	0.755	0.553	0.485*								
	(0.564)	(0.614)	(0.370)	(0.282)								
S. Mean Yrs of School.	-0.713	0.126	0.162	0.763								
	(1.135)	(1.241)	(0.440)	(0.468)								
D Rule of law WB indicator					0.487**	0.325	0.145	0.316***				
					(0.222)	(0.320)	(0.094)	(0.083)				
S Rule of law WB indicator					0.633*	1.075***	-0.171*	0.638***				
					(0.367)	(0.332)	(0.097)	(0.089)				
S is tax haven									0.936**	1.038***	0.220	0.657***
									(0.390)	(0.275)	(0.173)	(0.195)
D is tax haven									0.327	0.548**	0.428**	0.625***
									(0.231)	(0.245)	(0.203)	(0.173)
D Eff. tax rate on K									0.018**	0.016***	-0.003	-0.000
									(0.007)	(0.005)	(0.003)	(0.003)
S Eff. tax rate on K									0.013	-0.004	-0.006	-0.003
									(0.013)	(0.012)	(0.004)	(0.005)
D Eff. tax rate on L									-0.029**	-0.018*	-0.011	-0.014***
									(0.013)	(0.009)	(0.008)	(0.005)
S Eff. tax rate on L									0.004	-0.001	-0.021***	-0.005
									(0.012)	(0.013)	(0.007)	(0.006)
Observations	7739	7739	7739	7739	7739	7739	7739	7739	7739	7739	7739	7739
RMSE	7.632	9.905	1.090	1.074	6.186	7.783	1.070	1.013	5.939	8.090	0.918	0.904
Pseudo-R^2	0.478	0.621	0.852	0.851	0.491	0.637	0.854	0.867	0.507	0.647	0.870	0.875
Fixed Effect	Year	Year	Year	Year	Year	Year	Year	Year	Year	Year	Year	Year

Notes:The table reports Poisson Pseudo Maximum Likelihood (PPML) estimates. The outcomes are various forms of international integration across pairs of countries in the sample for 2012 based on various specifications. In columns (1), (5), and (9), the dependent variable denotes the share of controlled listed firms' market capitalization in destination by shareholder entities in source country. In (2), (6), and (10), the dependent variable is the market value of ownership (voting rights) from shareholding entities in destination country in both widely-held and controlled firms, irrespective on whether the shareholder controls the company. In (3), (7), and (11), the dependent variable denotes international goods exports and imports from source to destination, while in columns (4), (8), and (12) the dependent variable denotes international services trade between origin and destination. The explanatory variables are the logarithm of population-weighted distance between origin and destination, the log of Gross National Income (GNI) per capita and log population at source and destination and, depending on each column, human capital indicators, dummies whether the source or destination country is a tax heaven, the level of the effective tax rates on capital and labour, and World Bank governance indicators on the rule of law for the source and destination country. Double-clustered at source and destination country standard errors are reported below the estimates. *, **, and *** denote statistical significance at the 10%, 5%, and 1% confidence level, respectively.

Table C.7: Taxation and Institutions (2019)

	Control	Ownership	Trade		Control	Ownership	Trade		Control	Ownership	Trade	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	For. Ctrl.	All	Goods	Services	For. Ctrl.	All	Goods	Services	For. Ctrl.	All	Goods	Services
Log Pop-Wght distance	-0.567***	-0.568***	-0.872***	-0.640***	-0.538***	-0.539***	-0.877***	-0.629***	-0.565***	-0.537***	-0.897***	-0.632***
	(0.155)	(0.088)	(0.063)	(0.050)	(0.158)	(0.092)	(0.062)	(0.053)	(0.126)	(0.090)	(0.080)	(0.035)
D Log GNI per cap.	0.814***	0.983***	0.842***	1.109***	0.503*	0.500*	0.869***	0.954***	1.127***	1.064***	0.947***	1.112***
	(0.151)	(0.262)	(0.092)	(0.070)	(0.284)	(0.303)	(0.126)	(0.143)	(0.235)	(0.204)	(0.094)	(0.048)
D Log Pop.	0.858***	0.822***	0.877***	0.689***	0.898***	0.870***	0.877***	0.694***	0.827***	0.855***	0.888***	0.752***
	(0.099)	(0.079)	(0.044)	(0.041)	(0.101)	(0.074)	(0.043)	(0.047)	(0.127)	(0.105)	(0.037)	(0.019)
S Log GNI per cap.	1.760***	2.004***	0.794***	1.101***	1.604***	1.897***	0.935***	0.869***	1.567***	2.023***	0.899***	1.150***
	(0.196)	(0.305)	(0.086)	(0.096)	(0.261)	(0.455)	(0.115)	(0.175)	(0.167)	(0.186)	(0.071)	(0.103)
S Log Pop.	0.694***	0.638***	0.842***	0.691***	0.682***	0.661***	0.831***	0.707***	0.761***	0.743***	0.842***	0.768***
	(0.071)	(0.100)	(0.037)	(0.055)	(0.081)	(0.108)	(0.035)	(0.059)	(0.079)	(0.075)	(0.045)	(0.048)
D. Mean Yrs of School.	1.532	0.644	0.190	-0.273								
	(1.138)	(1.006)	(0.387)	(0.280)								
S. Mean Yrs of School.	-0.559	0.891	0.113	0.093								
	(1.009)	(1.240)	(0.324)	(0.398)								
D Rule of law WB indicator					0.819*	0.819*	0.009	0.135				
					(0.450)	(0.461)	(0.133)	(0.156)				
S Rule of law WB indicator					0.056	0.282	-0.168	0.324*				
					(0.317)	(0.431)	(0.116)	(0.175)				
S is tax haven									0.793***	0.906***	0.243	0.779***
									(0.253)	(0.276)	(0.153)	(0.179)
D is tax haven									0.306	0.661**	0.334*	0.762***
									(0.400)	(0.295)	(0.202)	(0.215)
D Eff. tax rate on K									0.007	0.007	-0.005	-0.006
									(0.010)	(0.007)	(0.005)	(0.005)
S Eff. tax rate on K									0.002	-0.006	-0.002	-0.011**
									(0.007)	(0.008)	(0.004)	(0.006)
D Eff. tax rate on L									-0.015	-0.004	-0.005	-0.009*
									(0.010)	(0.006)	(0.007)	(0.005)
S Eff. tax rate on L									-0.004	-0.010	-0.010	-0.000
									(0.007)	(0.009)	(0.006)	(0.006)
Observations	7739	7739	7739	7739	7739	7739	7739	7739	7739	7739	7739	7739
RMSE	4.532	8.982	1.001	1.819	5.337	7.517	1.001	1.682	4.233	6.213	0.936	1.465
Pseudo-R^2	0.583	0.660	0.863	0.846	0.590	0.671	0.864	0.849	0.594	0.683	0.870	0.880
Fixed Effect	Year	Year	Year	Year	Year	Year	Year	Year	Year	Year	Year	Year

Notes: The table reports Poisson Pseudo Maximum Likelihood (PPML) estimates. The outcomes are various forms of international integration across pairs of countries in the sample for 2019 based on various specifications. In columns (1), (5), and (9), the dependent variable denotes the share of controlled listed firms' market capitalization in destination by shareholder entities in source country. In (2), (6), and (10), the dependent variable is the market value of ownership (voting rights) from shareholding entities in destination country in both widely-held and controlled firms, irrespective on whether the shareholder controls the company. In (3), (7), and (11), the dependent variable denotes international goods exports and imports from source to destination, while in columns (4), (8), and (12) the dependent variable denotes international services trade between origin and destination. The explanatory variables are the logarithm of population-weighted distance between origin and destination, the log of Gross National Income (GNI) per capita and log population at source and destination and, depending on each column, human capital indicators, dummies whether the source or destination country is a tax heaven, the level of the effective tax rates on capital and labour, and World Bank governance indicators on the rule of law for the source and destination country. Double-clustered at source and destination country standard errors are reported below the estimates. *, **, and *** denote statistical significance at the 10%, 5%, and 1% confidence level, respectively.

Table C.8: Augmented Cross-Sectional Gravity Specifications
International Policy Controls (2012 sample)

	Control	Ownership	Trade		Control	Ownership	Trade		Control	Ownership	Trade	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	For. Ctrl.	All	Goods	Services	For. Ctrl.	All	Goods	Services	For. Ctrl.	All	Goods	Services
Log Pop-Wght distance	-0.726***	-0.453***	-0.942***	-0.769***	-0.810***	-0.524***	-0.901***	-0.765***	-0.649***	-0.419***	-0.871***	-0.724***
	(0.137)	(0.127)	(0.067)	(0.043)	(0.170)	(0.140)	(0.075)	(0.046)	(0.137)	(0.123)	(0.069)	(0.039)
Customs union	1.775**	1.921***	-0.117	0.097					1.846***	2.027***	-0.001	0.190*
	(0.800)	(0.646)	(0.268)	(0.091)					(0.712)	(0.605)	(0.299)	(0.110)
Econ. int. agreem.	1.008*	1.258***	0.382*	0.310*					0.826	1.184***	0.289*	0.225
	(0.564)	(0.374)	(0.209)	(0.162)					(0.526)	(0.399)	(0.175)	(0.145)
FTA	-0.071	-0.375***	-0.114	0.097					0.127	-0.301***	0.007	0.189
	(0.370)	(0.037)	(0.218)	(0.170)					(0.329)	(0.068)	(0.180)	(0.145)
Inv. treaty	-0.111	-0.356	-0.072	0.013					-0.065	-0.343	-0.032	0.038
	(0.359)	(0.314)	(0.103)	(0.065)					(0.368)	(0.323)	(0.093)	(0.062)
Both EU					1.048	0.885	0.756***	0.431**	1.318**	0.951*	0.781***	0.474***
					(0.812)	(0.610)	(0.215)	(0.179)	(0.638)	(0.525)	(0.196)	(0.163)
Both Euro Area					0.523	-0.440	-0.252	-0.040	0.324	-0.599	-0.259	-0.031
					(0.646)	(0.486)	(0.165)	(0.142)	(0.495)	(0.418)	(0.170)	(0.141)
Observations	7768	10826	12008	12160	7768	10826	12008	12160	7768	10826	12008	12160
Pseudo-R^2	0.685	0.764	0.918	0.940	0.683	0.758	0.919	0.940	0.694	0.766	0.920	0.942
Fixed Effects	S&D	S&D	S&D	S&D	S&D	S&D	S&D	S&D	S&D	S&D	S&D	S&D

Notes: The table reports Poisson Pseudo Maximum Likelihood (PPML) estimates. The outcomes are various forms of international integration across pairs of countries in the 2012 sample based on various specifications. In columns (1), (5), and (9), the dependent variable denotes the share of controlled listed firms' market capitalization in destination by shareholder entities in source country. In (2), (6), and (10), the dependent variable is the market value of ownership (voting rights) from shareholding entities in destination country in both widely-held and controlled firms, irrespective on whether the shareholder controls the company. In (3), (7), and (11), the dependent variable denotes international goods exports and imports from source to destination, while in columns (4), (8), and (12) the dependent variable denotes international services trade between origin and destination. The explanatory variables are the logarithm of population-weighted distance between origin and destination, whether the two countries are in a customs union, whether they form part of an economic international agreement or a free trade agreement, a dummy whether they have signed an investment treaty, the European Union and Euro Area. Double-clustered at source and destination country standard errors are reported below the estimates. *, **, and *** denote statistical significance at the 10%, 5%, and 1% confidence level, respectively.

Table C.9: Augmented Cross-Sectional Gravity Specifications
International Policy Controls (2019 sample)

	Control	Ownership	Trade		Control	Ownership	Trade		Control	Ownership	Trade	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	For. Ctrl.	All	Goods	Services	For. Ctrl.	All	Goods	Services	For. Ctrl.	All	Goods	Services
Log Pop-Wght distance	-0.522***	-0.641***	-0.928***	-0.753***	-0.488***	-0.644***	-0.855***	-0.714***	-0.441***	-0.604***	-0.830***	-0.696***
	(0.115)	(0.129)	(0.067)	(0.046)	(0.084)	(0.140)	(0.066)	(0.049)	(0.102)	(0.119)	(0.067)	(0.040)
Customs union	-0.089	0.047	0.046	0.008					0.054	0.151	0.243	0.132
	(0.947)	(0.689)	(0.240)	(0.102)					(0.896)	(0.671)	(0.251)	(0.128)
Econ. int. agreem.	1.618**	0.948***	0.326	0.172					1.497**	0.874***	0.193	0.091
	(0.744)	(0.303)	(0.211)	(0.233)					(0.731)	(0.280)	(0.183)	(0.207)
FTA	-0.729	-0.062	-0.191	0.134					-0.542	0.040	0.014	0.260
	(0.470)	(0.070)	(0.185)	(0.257)					(0.460)	(0.094)	(0.149)	(0.233)
Inv. treaty	-0.388*	-0.606**	0.031	0.027					-0.373*	-0.593**	0.067	0.048
	(0.208)	(0.259)	(0.083)	(0.063)					(0.216)	(0.261)	(0.070)	(0.063)
Both EU					1.399***	0.591	0.907***	0.454**	1.369***	0.701	0.978***	0.548***
					(0.539)	(0.576)	(0.159)	(0.185)	(0.529)	(0.620)	(0.156)	(0.160)
Both Euro Area					0.101	-0.072	-0.332**	-0.019	0.033	-0.135	-0.313**	-0.015
					(0.540)	(0.485)	(0.143)	(0.151)	(0.580)	(0.521)	(0.140)	(0.149)
Observations	8008	11644	12008	12160	8008	11644	12008	12160	8008	11644	12008	12160
Pseudo-R^2	0.708	0.796	0.929	0.934	0.704	0.787	0.931	0.935	0.715	0.797	0.932	0.937
Fixed Effects	S&D	S&D	S&D	S&D	S&D	S&D	S&D	S&D	S&D	S&D	S&D	S&D

Notes: The table reports Poisson Pseudo Maximum Likelihood (PPML) estimates. The outcomes are various forms of international integration across pairs of countries in the 2019 sample based on various specifications. In columns (1), (5), and (9), the dependent variable denotes the share of controlled listed firms' market capitalization in destination by shareholder entities in source country. In (2), (6), and (10), the dependent variable is the market value of ownership (voting rights) from shareholding entities in destination country in both widely-held and controlled firms, irrespective on whether the shareholder controls the company. In (3), (7), and (11), the dependent variable denotes international goods exports and imports from source to destination, while in columns (4), (8), and (12) the dependent variable denotes international services trade between origin and destination. The explanatory variables are the logarithm of population-weighted distance between origin and destination, whether the two countries are in a customs union, whether they form part of an economic international agreement or a free trade agreement, a dummy whether they have signed an investment treaty, the European Union and Euro Area. Double-clustered at source and destination country standard errors are reported below the estimates. *, **, and *** denote statistical significance at the 10%, 5%, and 1% confidence level, respectively.

C.4 Investor Type Heterogeneity

Below we report some further evidence on heterogeneity of the role of distance and size on cross-border corporate control and ownership across investor type. The results complement the ones in Section 6 of the main paper.

Appendix Figures C.3-C.4 explore heterogeneity on the role of baseline gravity factors, size and distance, on cross-border corporate control in 2012 and 2019 across investor type. There are no major differences across investor type in the fit of the model with source and destination constants. The pseudo R^2 hovers around 0.6 in 2012 and around 0.7 in 2019 for all major types of investors.[49]

When we look at the baseline cross-sectional gravity specifications it seems that non-bank financial institutions (hedge funds, mutual funds, venture capital, private equity) appear the least sensitive to size and geodesic distance. On the other end, size and distance appear to load more prominently to individuals and families, hinting that informational asymmetries may be more relevant for families as compared to sophisticated financial sector investors. Appendix Figure C.6 gives the corresponding plot of the evolution of PPML pseudo-R^2 looking at cross-border ownership links. Two patterns emerge: First, international investment (passive and controlling) by individuals/families is less sensitive to country size and geodesic distance, compared to banks and other financial institutions. Second, there is not much heterogeneity in the augmented with source and destination country fixed-effects gravity model.

Appendix Figure C.5 plots the coefficient on log distance of the pooled across 2012 and 2019 specifications of international corporate control (orange) and ownership (blue) across the main investor types. There is some heterogeneity on the elasticity of distance across investor types. The estimate is not statistically significant for banks, while it's highly significant and the lowest across all investor types for hedge funds, private equity and venture capital. [50]

[49] Please note that the categories reported here are not exhaustive and thus the disaggregated model fits do not fully account for the model fit for all investors, as government is not reported as one of the categories.

[50] Similarly, please note that the categories reported here are not exhaustive and thus the disaggregated estimations do not fully account for the estimated coefficient for all investors reported on the first market, as government is not reported as one of the categories.

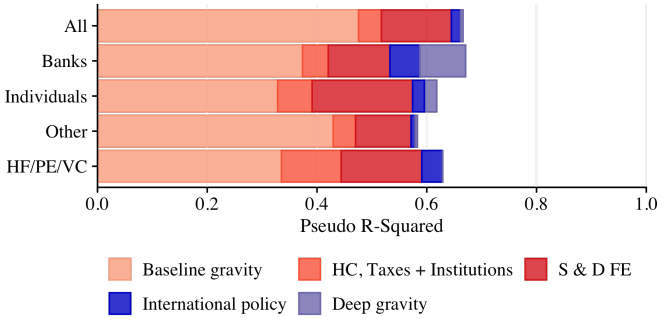


Figure C.3: pseudo R^2 plot in 2012

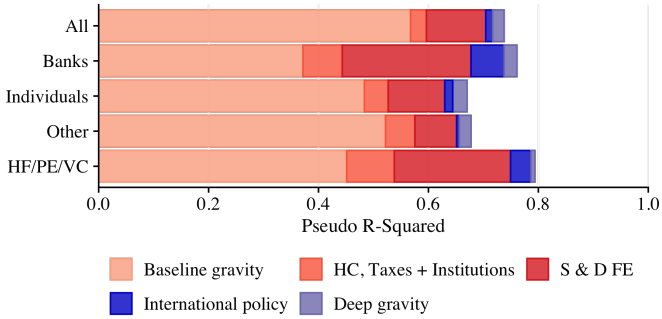


Figure C.4: pseudo R^2 plot in 2019

The figures plot the cumulative pseudo R^2 in Poisson Pseudo Maximum Likelihood (PPML) specifications of cross-border corporate control in 2012 and 2019, distinguishing across the main investor types. The explanatory variables for the first bars (in light coral) are the logarithm of population-weighted distance between origin and destination, the log of Gross National Income (GNI) per capita and log population at source and destination. The explanatory variables for the second bar (in orange) add indicators that equal one if the source or destination country is a tax haven, the statutory corporate income tax rate in the source and destination, and rule of law for the source and destination country. The explanatory variables for the third bar (in dark red) are the logarithm of population-weighted distance between origin and destination, source country and destination country constants. The fourth bar (in blue) refers to fixed effects specification augmented with the international policy controls, and in lilac, with the deeper bilateral flows.

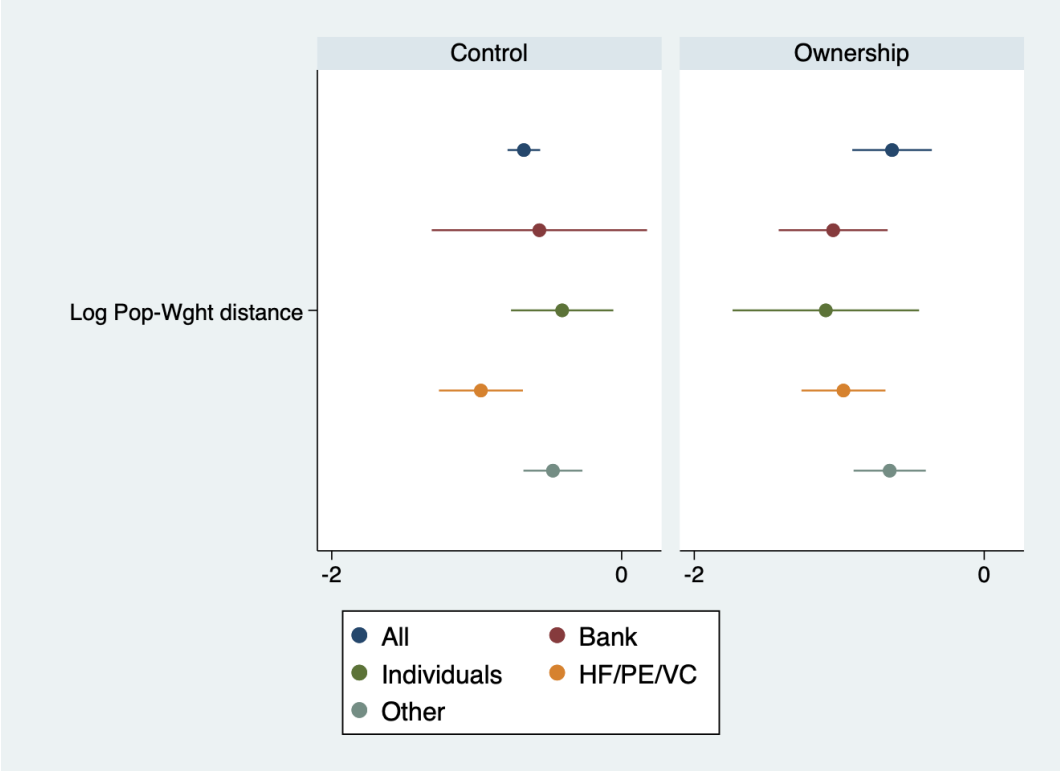
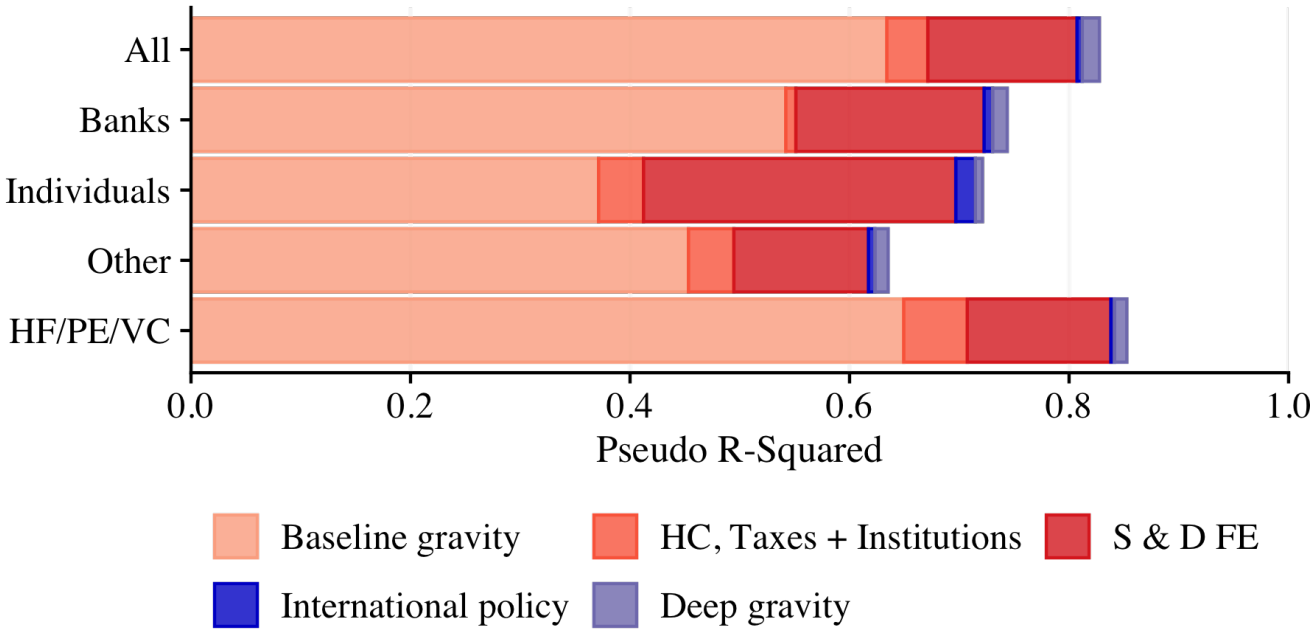


Figure C.5: Cross-Border Corporate Control and Ownership. Distance Elasticity: Pooled Sample

The figure plots the coefficient on the logarithm of population-weighted distance in the baseline gravity specification for the pooled across 2012 and 2019 sample estimated using Poisson Pseudo Maximum Likelihood (PPML) and disaggregating the sample by investor. Markers in the column on Control denote the coefficient on the logarithm of population-weighted distance when the dependent variable is the share of controlled listed firms' market capitalization in destination by shareholder entities in source country. Markers in the column on Ownership denote the coefficient when the dependent variable is the market value of ownership (voting rights) from shareholding entities in destination country in both widely-held and controlled firms, irrespective on whether the shareholder controls the company. The specification includes source country and destination country constants interacted with a year dummy. The 95% confidence bands are based on double-clustered at source and destination country standard errors.

Figure C.6: Cross-border Ownership, Augmented Gravity, and Country Features by Investor

Pseudo R^2 across Cross-Sectional and Country Fixed Effects Specifications



The Figure plots the cumulative $pseudo - R^2$ (Mc Fadden's) in Poisson Pseudo Maximum Likelihood (PPML) specifications in the pooled across 2012 and 2019 sample. The dependent variable in the specifications is ownership stakes, measured by the market value of equity stakes. The estimation has been disaggregated by investor type. Each bar gives the R^2 for three specifications: (a) A cross-sectional specification with the logarithm of population-weighted distance between origin and destination, the log of Gross National Income (GNI) per capita and log population at source and destination (*light coral*). (b) A cross-sectional specification that add indicators for tax haven status, measures of statutory corporate income tax rate, and rule of law proxies, at source and destination country (*orange*). (c) A fixed-effects specification with the logarithm of population-weighted distance between origin and destination, alongside vectors of source country constants and destination country constants interacted with a year indicator (*red*).

C.5 Deeper Bilateral Factors. Sensitivity and Further Evidence

The results below complement the analysis in Section 5.2 of the paper, where we explore the role of deep bilateral factors on the internationalization of corporate control and ownership.

C.5.1 Cross-Border Ownership and Control in 2012 and 2019 Appendix Table C.10 gives gravity PPML estimates linking cross-border corporate control and ownership with bilateral features reflecting deep historical, cultural, and genetic similarities in 2012, while Appendix Table C.10 does the same for 2019. All specifications include source country fixed-effects and destination country fixed-effects to isolate the role of country-pair factors. These results complement the analysis in the main paper that reports pooled across the two years specifications.

C.5.2 International Trade Appendix Table C.12 reports gravity specifications with source and destination constants interacted with a year indicator that allow isolating the role of bilateral factors on international trade in goods. Grasping the role of religious, linguistic, and genetic distance, alongside colonial ties and legal system similarities on trade, enables comparability with the analogous specifications in the main paper zooming on cross-border corporate control.

C.5.3 Heterogeneity Appendix Figure C.6 explores heterogeneity across investor types on the role of deep historical, cultural, linguistic, and genetic ties on the globalization of corporate control. Once we augment the source and destination country fixed-effects specifications with all deep ties/differences terms, the model fit is similar for all types of investors, but individuals/families where the baseline gravity terms and geodesic distance have a much larger influence.

Table C.10: Cross-Border Corporate Control and Ownership and Deep Linkages in 2012

	Control						Ownership					
	(1) For. Ctrl.	(2) For. Ctrl.	(3) For. Ctrl.	(4) For. Ctrl.	(5) For. Ctrl.	(6) For. Ctrl.	(7) All	(8) All	(9) All	(10) All	(11) All	(12) All
Log Pop-Wght distance	-0.857***	-0.782***	-0.992***	-0.977***	-0.735***	-0.681***	-0.561***	-0.550***	-0.652***	-0.668***	-0.566***	-0.536***
	(0.186)	(0.153)	(0.232)	(0.207)	(0.196)	(0.154)	(0.183)	(0.169)	(0.202)	(0.203)	(0.198)	(0.120)
Religious. Dist.	-0.926*					-0.445	-1.021**					-0.610*
	(0.535)					(0.458)	(0.402)					(0.355)
Linguistic. Dist.		-1.744***				-1.379***		-1.338***				-1.288***
		(0.404)				(0.360)		(0.444)				(0.354)
Colonial ties			0.638*			0.488			0.573			0.485
			(0.327)			(0.328)			(0.438)			(0.454)
Same common law				0.052		-0.543				-0.405		-0.887**
				(0.560)		(0.469)				(0.422)		(0.396)
Same civil law				1.416***		1.012***				1.160***		0.766***
				(0.390)		(0.363)				(0.276)		(0.280)
Genetic. dist.					-0.255	-0.091					-0.112	0.020
					(0.179)	(0.103)					(0.206)	(0.120)
Observations	5541	5541	5541	5541	5541	5541	7478	7478	7478	7478	7478	7478
Pseudo-R^2	0.700	0.718	0.696	0.707	0.698	0.725	0.791	0.799	0.787	0.793	0.787	0.807
Fixed Effects	S&D	S&D	S&D	S&D	S&D	S&D	S&D	S&D	S&D	S&D	S&D	S&D

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: The table reports Poisson Pseudo Maximum Likelihood (PPML) estimates. The outcomes are two forms of international integration across pairs of countries in the 2012 sample based on various specifications. In columns (1) to (6), the dependent variable denotes the share of controlled listed firms' market capitalization in destination by shareholder entities in source country. In columns (7)-(12), the dependent variable is the market value of ownership (voting rights) from shareholding entities in destination country in both widely-held and controlled firms, irrespective on whether the shareholder controls the company. The explanatory variables in the various specification are the logarithm of population-weighted distance between origin and destination, a measure of religious and linguistic distance, a dummy whether source country and destination country have shared a common colonizer or engaged in a colonial relationship, a dummy on whether source and destination country both ascribe to common law or both ascribe to civil law, and last, a (weighted) measure of genetic distance. Double-clustered at source and destination country standard errors are reported below the estimates. *, **, and *** denote statistical significance at the 10%, 5%, and 1% confidence level, respectively.

Table C.11: Cross-Border Corporate Control and Ownership and Deep Linkages in 2019

	Control						Ownership					
	(1) For. Ctrl.	(2) For. Ctrl.	(3) For. Ctrl.	(4) For. Ctrl.	(5) For. Ctrl.	(6) For. Ctrl.	(7) All	(8) All	(9) All	(10) All	(11) All	(12) All
Log Pop-Wght distance	-0.638***	-0.546***	-0.706***	-0.688***	-0.496**	-0.465***	-0.638***	-0.584***	-0.750***	-0.750***	-0.577***	-0.526***
	(0.174)	(0.174)	(0.166)	(0.153)	(0.230)	(0.148)	(0.171)	(0.133)	(0.196)	(0.200)	(0.191)	(0.097)
Religious. Dist.	-0.642**					-0.308	-1.178***					-0.824***
	(0.290)					(0.283)	(0.241)					(0.169)
Linguistic. Dist.		-1.667***				-1.012***		-1.727***				-1.627***
		(0.375)				(0.335)		(0.378)				(0.326)
Colonial ties			0.646			0.403			0.433			0.325
			(0.665)			(0.527)			(0.416)			(0.407)
Same common law				0.535		0.093				-0.155		-0.726***
				(0.555)		(0.445)				(0.384)		(0.255)
Same civil law				1.811***		1.574***				1.113***		0.838***
				(0.363)		(0.364)				(0.291)		(0.281)
Genetic. dist.					-0.249	-0.132					-0.192	-0.005
					(0.152)	(0.116)					(0.218)	(0.118)
Observations	5535	5535	5535	5535	5535	5535	8299	8299	8299	8299	8299	8299
Pseudo-R^2	0.700	0.717	0.698	0.722	0.700	0.732	0.818	0.827	0.810	0.815	0.811	0.836
Fixed Effects	S&D	S&D	S&D	S&D	S&D	S&D	S&D	S&D	S&D	S&D	S&D	S&D

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: The table reports Poisson Pseudo Maximum Likelihood (PPML) estimates. The outcomes are two forms of international integration across pairs of countries in the 2019 sample based on various specifications. In columns (1) to (6), the dependent variable denotes the share of controlled listed firms' market capitalization in destination by shareholder entities in source country. In columns (7)-(12), the dependent variable is the market value of ownership (voting rights) from shareholding entities in destination country in both widely-held and controlled firms, irrespective on whether the shareholder controls the company. The explanatory variables in the various specification are the logarithm of population-weighted distance between origin and destination, a measure of religious and linguistic distance, a dummy whether source country and destination country have shared a common colonizer or engaged in a colonial relationship, a dummy on whether source and destination country both ascribe to common law or both ascribe to civil law, and last, a (weighted) measure of genetic distance. Double-clustered at source and destination country standard errors are reported below the estimates. *, **, and *** denote statistical significance at the 10%, 5%, and 1% confidence level, respectively.

Table C.12: Deeper Bilateral Flows for Trade (Pooled Sample)

	Goods						Services					
	(1) Goods	(2) Goods	(3) Goods	(4) Goods	(5) Goods	(6) Goods	(7) Services	(8) Services	(9) Services	(10) Services	(11) Services	(12) Services
Log Pop-Wght distance	-0.959***	-0.933***	-0.949***	-0.942***	-1.003***	-0.979***	-0.771***	-0.737***	-0.791***	-0.783***	-0.768***	-0.724***
	(0.076)	(0.069)	(0.068)	(0.067)	(0.074)	(0.078)	(0.046)	(0.043)	(0.045)	(0.044)	(0.061)	(0.055)
Religious. Dist.	0.013					0.048	-0.227***					-0.131*
	(0.125)					(0.130)	(0.068)					(0.077)
Linguistic. Dist.		-0.203				-0.143		-0.576***				-0.432***
		(0.127)				(0.115)		(0.087)				(0.092)
Colonial ties			0.414**			0.318*			0.328***			0.224***
			(0.199)			(0.172)			(0.125)			(0.080)
Same common law				0.310**		0.200				0.234**		0.066
				(0.126)		(0.128)				(0.109)		(0.109)
Same civil law				0.261**		0.234*				0.415***		0.297***
				(0.131)		(0.130)				(0.084)		(0.091)
Genetic. dist.					0.056	0.060					-0.036	-0.005
					(0.052)	(0.051)					(0.041)	(0.034)
Observations	18000	18000	18000	18000	18000	18000	18244	18244	18244	18244	18244	18244
Pseudo-R^2	0.917	0.917	0.918	0.919	0.917	0.919	0.945	0.949	0.945	0.947	0.945	0.950
Fixed Effects	S&D-Y	S&D-Y	S&D-Y	S&D-Y	S&D-Y	S&D-Y	S&D-Y	S&D-Y	S&D-Y	S&D-Y	S&D-Y	S&D-Y

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: The table reports Poisson Pseudo Maximum Likelihood (PPML) estimates in the pooled across 2012 and 2019 sample. The outcomes are two forms of international integration across pairs of countries in the pooled sample across 2012 and 2019 based on various specifications. In columns (1) to (6), the dependent variable denotes international goods exports and imports from source to destination. In columns (7) to (12), the dependent variable denotes international services trade between origin and destination. The explanatory variables in the various specification are the logarithm of population-weighted distance between origin and destination, a measure of religious and linguistic distance, a dummy whether source country and destination country have shared a common colonizer or engaged in a colonial relationship, a dummy on whether source and destination country both ascribe to common law or both ascribe to civil law, and last, a (weighted) measure of genetic distance. The specifications include source country and destination fixed effects interacted with a year dummy. Double-clustered at source and destination country standard errors are reported below the estimates. *, **, and *** denote statistical significance at the 10%, 5%, and 1% confidence level, respectively.

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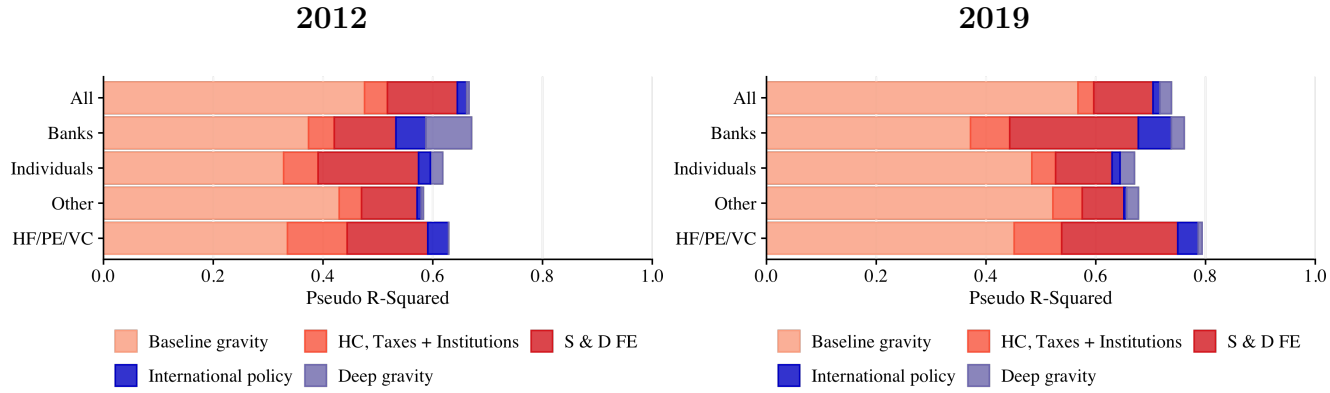
Figure C.7: Cross-border Control, Deeper Gravity Flows, and Country Features in 2012 and 2019

Pseudo R^2 across Cross-Sectional and Country Fixed Effects Specifications



The Figure plots the cumulative $pseudo - R^2$ (Mc Fadden's) in Poisson Pseudo Maximum Likelihood (PPML) specifications in the pooled across 2012 and 2019 sample. The dependent variable in bar (2) is the market value of all ownership links from shareholding entities in source country in listed companies in destination country. The estimation has been disaggregated by investor type. Each bar gives the R^2 for three specifications: (a) A cross-sectional specification with the logarithm of population-weighted distance between origin and destination, the log of Gross National Income (GNI) per capita and log population at source and destination ((*light coral*)), (b) A fixed-effects specification with the logarithm of population-weighted distance between origin and destination, alongside vectors of source country constants and destination country constants interacted with a year indicator (*red*). (c) A fixed effects specification that, on top of (a) adds religious distance, linguistic distance, colonial ties, a dummy for civil and common law, and genetic distance between source and destination country, and fixed effects (*dark red*), d) An augmented fixed-effects specification not only with distance but also with the international policy variables (EU, Euro-area, investment treaties) (in *blue*). (e) A deep gravity specification including measures of linguistic, religious, genetic, and historical similarities (in *lilac*).

References

Alesina, A., Devleeschauwer, A., Easterly, W., Kurlat, S., and Wacziarg, R. (2003). Fractionalization. *Journal of Economic growth*, 8(2):155–194.

Alesina, A. and Giuliano, P. (2015). Culture and institutions. *Journal of economic literature*, 53(4):898–944.

Alfaro, L., Faia, E., Judson, R. A., and Schmidt-Eisenlohr, T. (2020). Elusive safety: The new geography of capital flows and risk. Technical report, National Bureau of Economic Research.

Alfaro, L., Kalemli-Ozcan, S., and Volosovych, V. (2008). Why doesn't capital flow from rich to poor countries? an empirical investigation. *The Review of Economics and Statistics*, 90(2):347–368.

Alstadsæter, A., Johannesen, N., and Zucman, G. (2018). Who owns the wealth in tax havens? macro evidence and implications for global inequality. *Journal of Public Economics*, 162:89 – 100. In Honor of Sir Tony Atkinson (1944-2017).

Aminadav, G., Fonseca, L., and Papaioannou, E. (2022). Cross-border corporate control. *Openness*

and Tax Havens, proceedings, XXIV Annual Conference of the Central Bank of Chile. Emerging Markets Credibility, Foreign Investors Risk Perceptions and Capital Flows.

Aminadav, G. and Papaioannou, E. (2020). Corporate control around the world. *The Journal of Finance*, 75(3):1191–1246.

Andersen, J. J., Johannesen, N., and Rijkers, B. (2020). Elite Capture of Foreign Aid : Evidence from Offshore Bank Accounts. Policy Research Working Paper Series 9150, The World Bank.

Anderson, J. E. and van Wincoop, E. (2003). Gravity with gravitas: A solution to the border puzzle. *American Economic Review*, 93(1):170–192.

Aviat, A. and Coeurdacier, N. (2007). The geography of trade in goods and asset holdings. *Journal of International Economics*, 71(1):22–51.

Bachas, P., Fisher-Post, M. H., Jensen, A., and Zucman, G. (2022). Globalization and factor income taxation. Technical report, National Bureau of Economic Research.

Baldwin, R. E. (2006). The euro's trade effects.

Barrett, D. B., Kurian, G. T., and Johnson, T. M. (2000). *World christian encyclopedia*, volume 3. Oxford University Press Oxford.

Barro, R. J. and Lee, J. W. (2013). A new data set of educational attainment in the world, 1950–2010. *Journal of development economics*, 104:184–198.

Burchardi, K. B., Chaney, T., and Hassan, T. A. (2018). Migrants, ancestors, and foreign investments. *The Review of Economic Studies*, 86(4):1448–1486.

Cameron, A. C., Gelbach, J. B., and Miller, D. L. (2011). Robust inference with multiway clustering. *Journal of Business & Economic Statistics*, 29(2):238–249.

Cavalli-Sforza, L. L., Cavalli-Sforza, L., Menozzi, P., and Piazza, A. (1994). *The history and geography of human genes*. Princeton University Press.

Claessens, S., Djankov, S., and Lang, L. H. (2000). The separation of ownership and control in east asian corporations. *Journal of Financial Economics*, 58(1):81 – 112. Special Issue on International Corporate Governance.

Coeurdacier, N. and Rey, H. (2013). Home bias in open economy financial macroeconomics. *Journal of Economic Literature*, 51(1):63–115.

Conte, M., Cotterlaz, P., and Mayer, T. (2021). The cepii gravity database. *CEPII: Paris, France*.

Coppola, A., Maggiori, M., Neiman, B., and Schreger, J. (2021). Redrawing the Map of Global Capital Flows: The Role of Cross-Border Financing and Tax Havens*. *The Quarterly Journal of Economics*, 136(3):1499–1556.

Correia, S., Guimarães, P., and Zylkin, T. (2020). Fast poisson estimation with high-dimensional fixed effects. *The Stata Journal: Promoting communications on statistics and Stata*, 20(1):95–115.

Damgaard, J., Elkjaer, T., and Johannesen, N. (2019). What Is Real and What Is Not in the Global FDI Network? IMF Working Papers 2019/274, International Monetary Fund.

De La Cruz, A., Medina, A., and Tang, Y. (2019). Owners of the world's listed companies. Technical report, OECD Capital Market Series, Paris.

di Giovanni, J. (2005). What drives capital flows? The case of cross-border M&A activity and financial deepening. *Journal of International Economics*, 65(1):127 – 149.

Erel, I., Liao, R. C., and Weisbach, M. S. (2012). Determinants of cross-border mergers and acquisitions. *The Journal of finance*, 67(3):1045–1082.

Faccio, M. and Lang, L. H. (2002). The ultimate ownership of western european corporations. *Journal of Financial Economics*, 65(3):365 – 395.

Fally, T. (2015). Structural gravity and fixed effects. *Journal of International Economics*, 97(1):76–85.

Fernández-Val, I. and Weidner, M. (2016). Individual and time effects in nonlinear panel models with large n,t. *Journal of Econometrics*, 192(1):291–312.

Franks, J., Mayer, C., and Miyajima, H. (2014). The Ownership of Japanese Corporations in the 20th Century. *The Review of Financial Studies*, 27(9):2580–2625.

Franks, J., Mayer, C., Volpin, P., and Wagner, H. F. (2012). The life cycle of family ownership: International evidence. *Review of Financial Studies*, 25(6):1675–1712.

Gârleanu, N., Panageas, S., and Yu, J. (2019). Impediments to financial trade: Theory and applications. *The Review of Financial Studies*, 33(6):2697–2727.

Glasse, C. (1989). *The concise encyclopaedia of Islam*. Stacey International.

Gordon, R. (2005). Ethnologue: Languages of the world: 15^{th} edition. *Dallas, TX: Sil International*.

Gourieroux, C., Monfort, A., and Trognon, A. (1984). Pseudo maximum likelihood methods: Applications to poisson models. *Econometrica: Journal of the Econometric Society*, pages 701–720.

Grimes, B. F. (1978). *Ethnologue*. Wycliffe Bible Translators, Inc.

Guiso, L., Sapienza, P., and Zingales, L. (2009). Cultural biases in economic exchange?*. *The Quarterly Journal of Economics*, 124(3):1095–1131.

Guvenen, F., Mataloni Jr., R. J., Rassier, D. G., and Ruhl, K. J. (2018). Offshore Profit Shifting and Domestic Productivity Measurement. Working Papers 751, Federal Reserve Bank of Minneapolis.

Harris, I. C. (1992). *Contemporary religions: a world guide*. Longman.

Hassan, T. A. (2013). Country size, currency unions, and international asset returns. *The Journal of Finance*, 68(6):2269–2308.

Hau, H. and Rey, H. (2008). Home bias at the fund level. *American Economic Review*, 98(2):333–338.

Head, K. and Mayer, T. (2014). Chapter 3 - gravity equations: Workhorse,toolkit, and cookbook. In Gopinath, G., Helpman, E., and Rogoff, K., editors, *Handbook of International Economics*, volume 4 of *Handbook of International Economics*, pages 131 – 195. Elsevier.

Head, K., Mayer, T., et al. (2002). *Illusory border effects: Distance mismeasurement inflates estimates of home bias in trade*, volume 1. Citeseer.

Head, K., Mayer, T., and Ries, J. (2010). The erosion of colonial trade linkages after independence. *Journal of international Economics*, 81(1):1–14.

Hines, James R., J. and Rice, E. M. (1994). Fiscal Paradise: Foreign Tax Havens and American Business*. *The Quarterly Journal of Economics*, 109(1):149–182.

Johannesen, N., Tørsløv, T., and Wier, L. (2019). Are Less Developed Countries More Exposed to Multinational Tax Avoidance? Method and Evidence from Micro-Data. *The World Bank Economic Review*.

Kalemli-Ozcan, S., Papaioannou, E., and Peydró, J.-L. (2010). What lies beneath the euro's effect on financial integration? currency risk, legal harmonization, or trade? *Journal of International Economics*, 81(1):75–88.

La Porta, R., Lopez-De-Silanes, F., and Shleifer, A. (1999a). Corporate ownership around the world. *The Journal of Finance*, 54(2):471–517.

La Porta, R., Lopez-de Silanes, F., Shleifer, A., and Vishny, R. (1999b). The quality of government. *The Journal of Law, Economics, and Organization*, 15(1):222–279.

Laeven, L. and Levine, R. (2008). Complex ownership structures and corporate valuations. *The Review of Financial Studies*, 21(2):579–604.

Lane, P. R. and Milesi-Ferretti, G. M. (2008). The drivers of financial globalization. *American Economic Review*, 98(2):327–332.

Lane, P. R. and Milesi-Ferretti, G. M. (2018). The external wealth of nations revisited: international financial integration in the aftermath of the global financial crisis. *IMF Economic Review*, 66(1):189–222.

Lane, P. R. and Milesi-Ferretti, G. M. (2021). External wealth of nations database. (based on Lane, Philip R. and Gian Maria Milesi-Ferretti, 2018, "The External Wealth of Nations Revisited: International Financial Integration in the Aftermath of the Global Financial Crisis," IMF Economic Review 66, 189-222.).

Levchenko, A. A. (2007). Institutional quality and international trade. *The Review of Economic Studies*, 74(3):791–819.

Lins, K. V., Volpin, P., and Wagner, H. F. (2013). Does Family Control Matter? International Evidence from the 2008–2009 Financial Crisis. *The Review of Financial Studies*, 26(10):2583–2619.

Lucas, R. E. (1990). Why doesn't capital flow from rich to poor countries? *The American economic review*, 80(2):92–96.

Mayer, T. and Zignago, S. (2011). Notes on CEPII's distances measures: The GeoDist database.

McFadden, D. et al. (1973). Conditional logit analysis of qualitative choice behavior.

Meier, J.-M. and Smith, J. (2022). Tax avoidance through cross-border mergers and acquisitions. *Mimeo*.

Nunn, N. (2007). Relationship-specificity, incomplete contracts, and the pattern of trade. *The Quarterly Journal of Economics*, 122(2):569–600.

O'Brien, J. and Palmer, M. (1993). *The state of religion atlas*. Simon & Schuster.

OECD (2000). Towards global tax cooperation: Progress in identifying and eliminating harmful tax practices. Technical report, OECD, Paris.

Okawa, Y. and van Wincoop, E. (2012). Gravity in international finance. *Journal of International Economics*, 87(2):205 – 215.

Pagano, M. and Volpin, P. F. (2005). The political economy of corporate governance. *American Economic Review*, 95(4):1005–1030.

Papaioannou, E. (2009). What drives international financial flows? Politics, institutions and other determinants. *Journal of Development Economics*, 88(2):269 – 281.

Paul, L., Gary, F., and Simons, G. (2016). Fennig cd (eds.): Ethnologue: languages of the world.

Pellegrino, B., Spolaore, E., and Wacziarg, R. (2021). Barriers to global capital allocation. Technical report, National Bureau of Economic Research.

Pemberton, T. J., Absher, D., Feldman, M. W., Myers, R. M., Rosenberg, N. A., and Li, J. Z. (2012). Genomic patterns of homozygosity in worldwide human populations. *The American Journal of Human Genetics*, 91(2):275–292.

Portes, R. and Rey, H. (2005). The determinants of cross-border equity flows. *Journal of International Economics*, 65(2):269–296.

Portes, R., Rey, H., and Oh, Y. (2001). Information and capital flows: The determinants of transactions in financial assets. *European Economic Review*, 45(4-6):783–796.

Rajan, R. G. and Zingales, L. (1995). What Do We Know about Capital Structure? Some Evidence from International Data. *The Journal of Finance*, 50(5):1421–1460.

Rose, A. and OneMoney, O. M. (2000). Estimating the effect of common currency on trade. *Econ. Policy*, 15:7–46.

Rose, A. K. (2008). Is emu becoming an optimum currency area? the evidence on trade and business cycle synchronization.

Rose, A. K. and Spiegel, M. M. (2004). A gravity model of sovereign lending: Trade, default, and credit. *IMF Staff Papers*, 51:50–63.

Rossi, S. and Volpin, P. F. (2004). Cross-country determinants of mergers and acquisitions. *Journal of Financial Economics*, 74(2):277 – 304.

Santos Silva, J. and Tenreyro, S. (2011). Further simulation evidence on the performance of the poisson pseudo-maximum likelihood estimator. *Economics Letters*, 112(2):220–222.

Santos Silva, J. M. C. and Tenreyro, S. (2006). The log of gravity. *The Review of Economics and Statistics*, 88(4):641–658.

Santos Silva, J. M. C. and Tenreyro, S. (2022). The log of gravity at 15. *Portuguese Economic Journal*.

Spolaore, E. and Wacziarg, R. (2009). The diffusion of development*. *The Quarterly Journal of Economics*, 124(2):469–529.

Spolaore, E. and Wacziarg, R. (2018). Ancestry and development: New evidence. *Journal of Applied Econometrics*, 33(5):748–762.

Tørsløv, T. R., Wier, L. S., and Zucman, G. (2018). The missing profits of nations. Working Paper 24701, National Bureau of Economic Research.

Unal, B. (2022). Global common ownership, control and market power. *London Business School mimeo*.

Wei, S.-J. (2000). How taxing is corruption on international investors? *The Review of Economics and Statistics*, 82(1):1–11.

Weidner, M. and Zylkin, T. (2021). Bias and consistency in three-way gravity models. *Journal of International Economics*, 132:103513.

Zucman, G. (2015). *The Hidden Wealth of Nations: The Scourge of Tax Havens*. University of Chicago Books.