

ONLINE APPENDIX FOR
“REDRAWING THE MAP OF GLOBAL CAPITAL FLOWS:
THE ROLE OF CROSS-BORDER FINANCING AND TAX HAVENS”

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Section **A** of this appendix outlines various reasons why companies choose to raise capital using tax haven affiliates. Section **B** gives details on our security-level procedure that associates issuers with their ultimate parents and their corresponding place of nationality. Section **C** provides details underlying our calculations of the local currency share of external portfolio debts for large emerging markets. Section **D** discusses our methodology for estimating the share of China’s VIE equities that are owned by Chinese residents, which serves as an input to our restatement of China’s net foreign asset (NFA) position. The tables and figures include results for the United Kingdom and Canada, paralleling the ones for the United States and the EMU given in the main text. For analogous results for the remaining countries in our sample, we refer the reader to our website globalcapitalallocation.com, where they are available for download.

A Why Do Companies Issue in Tax Havens?

This paper describes how we restate data on bilateral investment positions so that holdings of securities issued by a company’s foreign affiliates are instead treated as holdings of that company. Whether one wishes to use such restated holdings depends on the application, of course, and on the rationale to issue through foreign affiliates. We discuss in this section how firms commonly choose to issue through affiliates in tax havens in order to reduce taxation, get around capital controls, avoid regulations, and access a different investor base. In all of these cases, data that are restated to reflect nationality seem more useful for nearly all economic analyses.

Reducing withholding taxes. Among the most common reason for companies to issue securities through subsidiaries in tax havens is that doing so allows them to reduce the withholding required on payments to foreigners of dividends and interest. Just as employers commonly withhold payments from their employees’ paychecks to ensure compliance with labor income taxes, corporate issuers may be required to withhold payments from their foreign bond and equity holders to ensure compliance with capital income taxes. Statutory withholding rates on dividend payments from Chilean, French, and Spanish companies to non-resident equity holders can be as high as 35, 30, and 19 percent, for example, while withholding rates on interest payments from Australian,

Canadian, and Italian companies to non-resident bond holders can reach 10, 25, and 26 percent.¹ By contrast, there is no withholding on dividends and interest payments to non-residents from companies in Bermuda, the Cayman Islands, Guernsey, or Jersey.

Consider the case of Petrobras International Finance (PIFCO), the Caymans-based financing subsidiary of Petrobras discussed in the paper. Since all interest payments made by Brazilian companies to non-residents are subject to a 15 percent withholding tax, U.S. mutual funds directly holding bonds issued by the Brazilian parent firm would have to subtract such withholdings from their returns since U.S. tax law prevents the funds from themselves claiming a foreign tax credit. The funds would send their investors the IRS form 1099-INT so that they may themselves claim the tax credit with the IRS. By contrast, if a U.S. fund earns interest payments from a bond issued by PIFCO, there is no withholding and the full interest payment is reflected on the funds' returns.²

Reducing corporate taxes. Tax havens also offer low corporate tax rates. Tax inversions, a common tactic in which a company acquires a foreign target in a lower-tax jurisdiction in order to relocate its headquarters and lower its tax rate, account for a large amount of equity positions that are Irish under residency but American under nationality.³ In fact, as noted in [Hines and Rice \(1994\)](#), companies may choose to finance themselves through tax haven subsidiaries, borrowing at a given interest rate, and transfer the funds to the parent company with an inter-company loan, offered at a higher rate, in order to shift after-interest corporate profits from high to low tax jurisdictions.

Getting around capital controls. China's IT and telecommunications sector offers the most important example of firms that issue through foreign affiliates in order to avoid capital controls. Foreign ownership in the sector is forbidden, so firms cannot directly issue securities on global markets. Instead, as discussed extensively in this paper, firms are organized following a "Variable Interest Entity" (VIE) structure, whereby they raise financing through an affiliate that is resident in the British Virgin Islands, the Cayman Islands, or Hong Kong (see also [Ziegler, 2016](#) and [Hopkins et al., 2017](#)). In Section 3 we review the VIE structure in detail and draw out the macro and policy implications stemming from its use. Here we note that VIEs, designed to avoid capital controls, constitute an important share of cross-border investment in tax haven issuances. Foreign

¹The details can be complicated and bilateral investment treaties between the investor's and the issuer's countries leave many (and, often, most) foreign investors exempt. For details, see [taxsummaries.pwc.com/ID/Withholding-tax-\(WHT\)-rates](https://taxsummaries.pwc.com/ID/Withholding-tax-(WHT)-rates).

²The prospectus for PIFCO bonds with CUSIPs 71645WAT8, 71645WAR2, and 71645WAS0 states: "*Except as provided below, PIFCO will make all payments of amounts due under the notes and the indenture [...] without withholding or deducting any present or future taxes, levies, deductions or other government charges of any nature imposed by Brazil [...]*".

³As an example, consider Medtronic, one of the world's largest medical technology firm that in 2015 purchased the Irish firm Covidien. Despite having 57 percent of its net sales in the United States and retaining its main operational offices and the bulk of its employment in the United States, Medtronic shifted its headquarters to Ireland, which accounts for less than half of one percent of its net sales. More generally, see [Zucman \(2013\)](#) and [Desai et al. \(2006\)](#) for helpful overviews of the demand for tax haven services.

investment in China’s corporate giants Alibaba, Baidu, JD.com, and Tencent all, by residency, flows through the Cayman Islands.

Avoiding regulation. Some firms issue through subsidiaries in tax havens to avoid various regulations such as requirements on the number of outside directors, on the frequency with which the board must meet, or on what must be disclosed. For example, in July 2016, the European Union (EU) introduced the Market Abuse Regulation (MAR), which enhances companies’ obligations to disclose inside information as well as any trades made by persons acting in a managerial capacity. The MAR applies to all companies issuing securities registered on any EU trading venue, but does not apply to the Channel Islands (Guernsey and Jersey). The regulation caused an immediate and sizable shift in the issuance of high yield bonds, which are more informationally sensitive than investment grade bonds, toward trading venues in the Channel Islands.⁴ Some of this shift reflected the establishment of new subsidiaries in the Channel Islands that benefited from proximity to the exchanges. Whereas a total of less than \$1.5 billion in high yield bonds were issued by Channel Islands subsidiaries during the six years prior to the introduction of the MAR, nearly \$6 billion in high yield bonds were issued in the two years thereafter.⁵

Accessing foreign investors. Issuing abroad, including through subsidiaries located in tax havens, appears to enable emerging market firms to access capital from developed market investors. Even though Petrobras itself has more than \$3 billion of bonds outstanding, our data on developed market fund positions suggest that advanced economy investors hold essentially none of it. U.S. and EMU funds instead get all their exposure to Petrobras through tax haven subsidiaries like PIFCO. In fact, aggregating over the entire Brazilian corporate sector, we find that 58 percent of the value of total bond issuance is done by the Brazilian parent company, with 35 percent issued through subsidiaries in tax havens and 7 percent through affiliates in other countries. Developed market mutual fund and ETF holdings of these bonds, however, are significantly skewed away from the parent’s issuances and toward those of foreign affiliates, with tax havens issuances accounting for 70 percent. In fact, nearly 90 percent of developed market holdings of bonds that are Brazilian by nationality are issued by entities whose residency is outside of Brazil.

⁴Far less than 1 percent of Europe-resident high-yield bonds were issued on Channel Islands trading venues in any year prior to the introduction of the MAR. In the 12 months following the new regulation, however, these venues accounted for 5 percent of all Europe-resident high-yield bond issuances, and this percentage climbed above 10 percent by the end of 2017. The International Stock Exchange (TISE) in Guernsey, the largest exchange in the Channel Islands, advertised that: *“TISE is becoming an increasingly popular listing venue for high yield bonds as issuers discover how the onerous nature of MAR contrasts with the robust and proportionate rules of our recognized exchange.”*

⁵For example, the automaker Aston Martin set up a Channel Islands subsidiary called Aston Martin Capital Holdings Ltd. in March 2017 and, in April, issued a \$400 million bond. Our procedure reallocates this bond from the Channel Islands under residency to the United Kingdom under nationality.

B Methodological Details

This section provides details on the methodology used to estimate issuers' ultimate parents and their associated countries of nationality. Our code is available at globalcapitalallocation.com, and we encourage the interested reader to refer to our website for the full implementation of our procedure.⁶ Section B.1 also provides additional details on the construction of our list of tax havens.

B.1 Tax Haven Classification

Table A.1 reports the list of countries that are treated as tax havens in this paper for the purpose of securities issuance. This list serves as an input both to our analysis in the paper, and to the parent-assignment algorithm detailed in this section. Our classification is based on the European Council's grey and black lists of non-cooperative tax jurisdictions, as of May 2018 (European Council, 2019). The main modifications are that we remove Switzerland and add Luxembourg, the Netherlands, and Ireland to the list. As explained in Section 1, we do this because of our focus on securities issuance by local subsidiaries of multinational corporations. For the same reason, we exclude Switzerland from the list because issuance there is dominated by domestic firms.

We also make minor modifications by excluding a number of countries that have a significant non-financial domestic sector and are not destinations of offshore securities issuance: Albania, Armenia, Bahrain, Bosnia and Herzegovina, Botswana, Jamaica, Jordan, Macedonia, Malaysia, Morocco, Mongolia, Namibia, Oman, Peru, Qatar, Serbia, South Korea, Swaziland, Taiwan, Thailand, Tunisia, Turkey, the United Arab Emirates, Uruguay, and Vietnam. Further, we include in our list a number of offshore centers that, while very small, are routinely classified as tax havens (see for example Ernst & Young, 2016 and Figuera & Lima Advogados, 2019). These are: Andorra, the Netherlands Antilles, Ascension, the Cocos Islands, Natal Island, the Falkland Islands, Gibraltar, Kiribati, the Northern Mariana Islands, Montserrat, Norfolk Island, the Pitcairn Islands, French Polynesia, Saint Helena, the Solomon Islands, Saint Pierre and Miquelon, Seychelles, Tokelau Island, Tonga, Tuvalu, and Wallis and Futuna.

B.2 Overview of Data Sources

As outlined in Section 1, the units of observation in our analysis are security-issuing entities, such as governments and firms, and the securities that they issue. We uniquely identify issuers using CUSIP codes, which are issued and managed by CUSIP Global Services (CGS).⁷ CGS assigns a

⁶Other papers that look at ownership chains around the world include Fuertes and Serena (2016) and Aminadav and Papaioannou (2020).

⁷For securities by issuers resident outside of the U.S. and Canada, the security codes assigned by CGS are formally known as CGS International Numbering System (CINS) codes, and follow the same structure as the CUSIP codes issued in the U.S. and Canada. For simplicity, we refer to both the North American CUSIP codes and the CINS codes as CUSIP codes. Our analysis excludes securities that do not have a CUSIP, but might have an alternative identifier such as an ISIN or a FIGI.

9-digit CUSIP identifier to the vast majority of securities issued globally. We take the universe of relevant securities to be the 26,027,455 securities present in the CUSIP master file.⁸ These include various types of securities: equity, sovereign bonds, corporate bonds, structured finance products, commercial paper, exchange traded funds, and so forth. The first 6 digits of a CUSIP 9-digit code identify the issuing entity; we refer to this issuer number as the CUSIP6 code, and to the full security identifier as the CUSIP9 code. Six-digit issuer CUSIP codes do not correspond one-to-one to firms or other legal entities such as sovereigns, since frequent issuers are assigned multiple CUSIP6 codes. In order to aggregate the CUSIP6 codes to unique entities, we use the CGS associated issuers (AI) master file, which records all CUSIP6 codes assigned to a single entity.

The SDC, Capital IQ, and Dealogic databases focus on worldwide securities issuance, but they also record details of the corporate ownership chains of the firms involved in the transactions that they cover. Our procedure makes use of these latter data. The Orbis and Factset databases record analogous data on corporate ownership chains. These five datasets cover overlapping but differentiated sets of issuers.

The Morningstar holdings data are self-reported to Morningstar by the funds and include for each security an identifier, most often the CUSIP (but ISINs are also used), as well as the name and country of the issuer. The latter two entries are not standardized by Morningstar (see [Maggiori et al., 2019a](#) for a full description). Consider the case of two U.S. mutual funds buying the same security, a bond issued in the Cayman Islands by PIFCO, the subsidiary of the Brazilian oil firm Petrobras. Most funds might report Brazil as the country of the issuer, because the ultimate exposure is to the parent company located there. We found that in practice this human input is quite valuable, since each fund reveals what its managers think is the true underlying exposure.

For the Morningstar holdings data we develop an algorithm to extract from the universe of security holdings by all funds the best prediction of the ultimate parent country of operation for each CUSIP6 code. We proceed in two steps. First, for each fund we extract the modal country assignment for each CUSIP6 code that ever appears in its holdings. Second, across funds we extract the modal country assignment for each CUSIP6 code obtained from the first step. In each step we penalize entries that assign a tax haven as the country of operation. If the modal assignment is a tax haven but a less frequent assignment is not, we resort to the latter. The logic behind this choice, as well as other choices related to the treatment of tax haven countries that we make throughout our procedure, is that little or no economic activity takes place in tax havens compared to the size of security issuance. If a security has been issued in a tax haven, we presume that the true country of operation is different – in this case, we presume it is most likely to be another country reported by funds in the Morningstar data.

All datasets are ultimately matched to one another using CUSIP codes as the primary identifier. In certain instances, some datasets identify issuing entities and securities via ISIN or LEI codes,

⁸We consolidate the CGS ISIN_db issues master file, the CUSIP/CINS_db issues master file, the CGS mortgage backed securities issues master file, and the CGS 144A issues data files. The resulting consolidated file contains entries for 26,027,455 individual CUSIPs as of October 2018.

without reporting a CUSIP. In these cases, we translate these identifiers to CUSIP codes using the CUSIP-to-ISIN mapping data contained in the consolidated CGS issue master files and in the CGS LEI Plus master file.

B.3 Our Security-Level Procedure: Algorithm Specification

Here we describe the algorithm that we use to build our mapping from issuer CUSIP6 codes to the CUSIP6 codes of their ultimate parents, and their corresponding places of nationality.

Phase 1: Building ultimate-parent matches within each data source.

1. We start by constructing tables that map subsidiary CUSIP6 codes to ultimate parent CUSIP6 codes, separately for each of the five ownership data sources (CIQ, SDC, Orbis, Dealogic, and Factset). The common general definition of a controlling parent is a shareholder owning more than 50 percent of a subsidiary's equity: we apply this criterion consistently across our data sources in order to establish subsidiary-to-parent links.⁹ Separately, we construct a table that maps each immediate issuer CUSIP6 to its associated issuers' CUSIP6 codes using the CGS AI master file.
2. Next, we ensure that all child-to-parent chains *within* the above tables are completely resolved: for example, if Dealogic identifies entity x as a subsidiary of y , and y in turn as a subsidiary of z , we ensure that within the Dealogic table we link entity x to entity z rather than to entity y . We perform this resolution procedure iteratively, until all ownership chains are completely resolved.¹⁰ In Phase 2, we perform the same ownership-chain resolution procedure *across* all of the five ownership data sources.

Phase 2: Building ultimate-parent matches across data sources and harmonizing country of nationality field.

1. Occasionally, the five ownership data sources may report different country codes for the same issuer. This happens particularly often in the case of companies with multiple headquarters or countries of incorporation, one of which may serve a merely tax-related function. In these cases, we harmonize the country codes and hence establish an ultimate place of nationality as follows:

⁹Our data sources vary in the extent to which they provide granular ownership information. While some sources (for example, Orbis) provide the exact percentage ownership figures for many corporate ownership chains, other sources only indicate whether certain ownership stakes exceed the 50 percent threshold. Regardless, we apply the common 50 percent ownership criterion to all subsidiary-to-parent links that we establish.

¹⁰In case any cycles arise, we break these at random.

- (a) For a given ultimate parent CUSIP6, if three or more out of the ownership data sources agree on a non-tax haven (non-TH) ultimate parent country assignment, we adopt it.¹¹
- (b) For a given ultimate parent CUSIP6, if two out of the ownership data sources agree on a non-TH ultimate parent country, with no competing majority (which could happen if two groups of two sources independently agree on two distinct non-TH country codes), we use it.
- (c) Else, if only one out of the ownership data sources reports a non-TH country code, we use it.
- (d) Else, if multiple ownership data sources report a non-TH country code, the sources disagree, and there is no decisive majority as in points (a) and (b), we use in descending order of preference: (i) the source that agrees with the modal country code reported in the Morningstar holdings data, if any; (ii) the source that appears first in the preference ordering

$$\text{Dealogic} \succ \text{Factset} \succ \text{SDC} \succ \text{Orbis} \succ \text{Capital IQ}. \quad (\text{A.1})$$

This preference ordering gives priority to sources that explicitly attempt to resolve the principal place of operations of each firm. The country codes reported in Capital IQ and Orbis correspond to the place of incorporation that each firm reports in its regulatory filings or local firm registry, and hence will often miss the effective place of operations in the cases of companies that maintain dual headquarters or countries of incorporation, such as in the “tax inversion” cases that we discuss in the main text. On the other hand, all of Dealogic, Factset, and SDC assign firms to a place of operations using operational data – most commonly, and for all three sources, this corresponds to the location of the firm’s senior management. For this reason, these latter three sources come before the rest in our preference ordering. The rest of the preference ordering above reflects our assessment of the relative quality of the five data sources.

- (e) If none of the data sources in (A.1) report a non-TH country code, we then use, in descending order of preference: (i) the modal country report in Morningstar, if this is non-TH; (ii) the residency of the issuer reported in the CGS data, if this is non-TH; (iii) the country code reported by the source that appears first in (A.1).

¹¹For the purposes of our algorithm, we treat the four tax havens that have large local economies (Hong Kong, Ireland, Luxembourg, and the Netherlands) in a special way, since security issuance in these countries is particularly likely to also originate from firms that are truly headquartered and operating there. For Hong Kong and Luxembourg, we compiled and manually inspected lists of the largest firms headquartered and operating locally, based on the Factset database. These lists include companies such as Cathay Pacific, which is genuinely a Hong Kong company. Whenever a reallocation involves these firms or their subsidiaries we do not treat Hong Kong or Luxembourg as tax havens. For Ireland and the Netherlands, we found that in practice our procedure is by itself effective at identifying genuinely local issuance if we simply do not apply a tax haven penalty – we therefore treat Ireland and the Netherlands as “non-TH” countries throughout our algorithm.

- (f) If there is no other country information available, we lastly default to the residency information in the CGS data.¹²
2. One of the ownership data sources or the CGS associate issuers (AI) master file may also report a parent CUSIP6 code for which another of the sources reports, in turn, a further parent. In these cases, we update ultimate ownership in the former source to reflect this information, as long as we are not reassigning ownership away from a non-TH country and towards a TH country. In cases in which there are two or more valid further parents that we could in principle update towards, we prioritize the one that is supported by the largest number of sources.¹³

Phase 3: Final estimate of ultimate parent match. Finally, we estimate each issuer’s ultimate parent via the following procedure:

1. For a given CUSIP6, if three or more sources out of the ownership data sources agree on a CUSIP6 ultimate parent code that corresponds to an entity domiciled in a non-TH country (after the harmonization step in Phase 2), we use it.
2. Else, if two out of the ownership data sources agree on a CUSIP6 ultimate parent code that corresponds to an entity domiciled in a non-TH country and there is no competing majority, we use it.
3. Else, if only one out of the ownership data sources reports a non-TH ultimate parent CUSIP6 code, we use it.
4. Else, if multiple ownership data sources report a non-TH ultimate parent CUSIP6 code, the sources disagree, and there is no decisive majority as in point (1), we use the source that appears first in the following source preference ordering, which reflects our assessment of the relative data quality of each of the sources:

$$\text{Dealogic} \succ \text{Orbis} \succ \text{Factset} \succ \text{Capital IQ} \succ \text{SDC}. \quad (\text{A.2})$$

5. If none of the ownership data sources report a non-TH ultimate parent country code, we use in descending order of preference (as available):

¹²We make two exceptions to the country resolution procedure described here. First, if any of our sources report that an issuer is a sovranational entity then we use the sovranational designation (ISO3 code XSN) for that issuer. This is because we want to avoid assigning sovranational entities to any particular country. Second, if the set of countries from which we are choosing only contains Ireland in addition to countries that are commonly involved in tax inversions (USA, EMU, Switzerland), and the modal Morningstar report is not Ireland, we use the country code reported by Morningstar. This is because the Morningstar human reports are very effective in these cases in resolving the tax inversions.

¹³In the case of ties, we use the source preference ordering in (A.2). Any cycles that may arise are also broken according to the preference ordering in (A.2).

- (a) The CUSIP6 code of the company’s primary associated issuer from the CGS AI master file, if this corresponds to a non-TH entity.
- (b) The immediate issuer’s own CUSIP6 code, if the immediate issuer is not resident in a tax haven.
- (c) The (tax haven-resident) CUSIP6 code reported by the source that appears first in the preference ordering in (A.2).
- (d) The CUSIP6 code of the company’s associated issuer.
- (e) The immediate issuer’s own CUSIP6 code.

C Details on Currency Exposures Calculations

In this section we detail the calculations that underlie our results regarding the share of aggregate portfolio debt liabilities of large emerging markets that are denominated in local currency, which are presented in Figure 6 and Appendix Table A.9. We construct the local currency share LC_i^{Agg} in the aggregate portfolio debt liabilities of a given country i (for example, Brazil) as a weighted average of the local currency share LC_i^C in corporate debt liabilities and the local currency share LC_i^S in sovereign debt portfolio liabilities:

$$LC_i^{Agg} = \omega_i^C LC_i^C + (1 - \omega_i^C) LC_i^S,$$

where $\omega_i^C \in [0, 1]$ is the share of country i ’s portfolio debt liabilities issued by the corporate sector. We calculate all these quantities both on a nationality and on a residency basis, as we detail below.

We let $D_{i,j}$ denote the overall position of country j ’s investors in country i ’s bonds, where j is one of the nine developed countries in our sample. We let $\omega_{i,j}^C$ denote the share of $D_{i,j}$ accounted for by corporate rather than sovereign bonds, making total investment in country i ’s bonds as $D_i \equiv \sum_j D_{i,j}$. We then construct the weight on the corporate bond holdings in i , ω_i^C , as

$$\omega_i^C = \sum_j \omega_{i,j}^C \alpha_{i,j},$$

where $\alpha_{i,j} \equiv D_{i,j}/D_i$. Similarly, we construct the local currency shares within asset classes $k \in \{C, S\}$ as

$$LC_i^k = \sum_j LC_{i,j}^k \alpha_{i,j}^k,$$

where $LC_{i,j}^k$ is the local currency share of j ’s investments in i ’s bonds of type k , and the weights $\alpha_{i,j}^k$ are the shares of investment in country i ’s bonds of type k that originate from j :

$$\alpha_{i,j}^C = \frac{\omega_{i,j}^C D_{i,j}}{\omega_i^C D_i}, \quad \alpha_{i,j}^S = \frac{(1 - \omega_{i,j}^C) D_{i,j}}{(1 - \omega_i^C) D_i}.$$

To compute these statistics on a residency basis, we obtain data on bilateral holdings $D_{i,j}$ from TIC and CPIS. Data on the share of outward bond investments accounted for by the corporate sector, $\omega_{i,j}^C$, is available for U.S. outward investments from TIC and is taken from Morningstar for countries other than the United States, since CPIS does not separate corporate and sovereign bond positions for those countries. For all countries, we estimate the share of local currency in each bond type and for each bilateral, $LC_{i,j}^k$, using the Morningstar data, expressed on a residency basis.

When computing statistics on a nationality basis, we obtain bilateral holdings $D_{i,j}$ and the U.S. corporate share $\omega_{i,\text{USA}}^C$ from our restated TIC and CPIS tables. We estimate the non-U.S. corporate shares $\omega_{i,j}^C$ for $j \neq \text{USA}$, the corporate local currency shares $LC_{i,j}^C$, and the sovereign local currency shares $LC_{i,j}^S$ using the Morningstar data, expressed on a nationality basis.

D Additional Details for Section 3

In this section we document the methodology by which we estimated the ownership share of Chinese residents in Chinese companies listed offshore via VIE structures. We divide this share into direct holdings of traded equities by Chinese households and institutions via the Hong Kong Stock Exchange StockConnect program (1.1 percent of the outstanding market value of the VIEs), and holdings by Chinese residents via all other means (estimated at 18.4 percent of the outstanding market value of the VIEs). In our baseline restatement of China’s NFA in Figure 11, the latter type of holdings are assumed to be recorded in China’s external assets as equal to the cumulative value of equity offered by the VIEs.¹⁴

We obtained data from Bloomberg documenting ownership stakes (including individual ownership shares) in the largest 40 Chinese VIEs by market capitalization, which together account for approximately 90 percent of the market capitalization of all listed Chinese VIEs. Since Bloomberg only provides comprehensive ownership data as of the latest available reporting period, the holdings of various individuals and institutions are measured at different points in time – nearly always at the end of 2018 or in the middle of 2019. The Bloomberg data collate ownership stakes coming from 13-F filings (for large U.S. investors), other analogous international regulatory filings, shares disclosed in individual holder reports, and beneficial ownership shares disclosed in the Chinese firms’ SEC filings or company reports. Altogether, these known ownership shares account for more than 80 percent of the outstanding market value of the 40 largest VIEs.¹⁵ We express all positions in Bloomberg as shares of the total market value of the VIE firms, which includes all outstanding shares rather than just floating shares.

¹⁴Holdings via the StockConnect program are assumed to be accounted for at their market price in all scenarios of Figure 11, since they are unambiguously portfolio equity investments by Chinese residents. These holdings are directly observed via data from the StockConnect program.

¹⁵The Bloomberg data provide coverage for 82.3 percent of the outstanding value of the VIEs, and a further 2.3 percent is accounted for by holdings included in Morningstar data but not present in Bloomberg that we add to our analysis (see footnote 16). The total share that remains unaccounted for is therefore 15.4 percent.

We manually assigned a country of residency to the positions for which this field was missing. In most of these cases this procedure is necessary because the holder is an individual and the Bloomberg ownership data do not provide a country of residency for individuals. We performed manual searches aided by research assistants using Bloomberg, the SEC’s EDGAR platform, Factset, and web queries to gather information about the relevant individuals and establish a place of residency, defaulting to China when in doubt.

We also manually reassigned to China large positions by tax haven-resident offshore investment vehicles that are wholly owned by Chinese individuals. Large holders in the Cayman Islands and in the British Virgin Islands are usually companies entirely owned by founders or board members of the Chinese VIEs. For example, the ownership stake of Alibaba’s founder Jack Ma in Alibaba (6.4 percent in 2018) is held primarily via offshore vehicles resident in the British Virgin Islands (JSP Investment Limited, JC Properties Limited, Yun Capital Limited, and Ying Capital Limited, accounting for a total 5.1 percent stake in Alibaba) and in the Cayman Islands (APN Limited, accounting for a 1.3 percent stake in Alibaba), as detailed in Table A.10. We assigned to China any positions of a VIE company (such as Alibaba or Baidu) in other VIEs.

In order to confirm the validity of the Bloomberg ownership database, we cross-referenced it against the holdings data from Morningstar, covering the positions of funds domiciled in the nine developed economies that constitute our paper’s sample. Bloomberg reports holdings at the fund-family level as of the end of 2018 or the middle of 2019, while Morningstar provides fund-by-fund information and is only available to us through the end of 2017. Since these two datasets don’t share common identifiers, we performed a fuzzy match on fund family names and compared the resulting matched data in order to ensure the positions in Bloomberg align with the ones in Morningstar. Because of the differences in measurement periods, we do not expect an exact match between the positions reported in Bloomberg and in Morningstar. However, the correlation between the positions in Bloomberg and Morningstar was high at 72 percent. Dropping the positions with the five largest discrepancies, the correlation was 84 percent.

We confirmed that the positions in Morningstar and Bloomberg are similarly well-aligned in dollar levels. For example, total holdings in Tencent by Blackrock are \$9.2 billion in Bloomberg and \$8.5 billion in Morningstar. Similarly, holdings in Tencent by the Vanguard Group are \$13.6 billion in the Bloomberg database and \$11.2 billion in Morningstar, while holdings by the T. Rowe Price Group are \$5.8 billion in Bloomberg and \$4.2 billion in Morningstar. The alignment in dollar levels between the Bloomberg and Morningstar data also mitigates the potential concern that Bloomberg’s fund family-level data might include significant holdings by funds domiciled in China (or in offshore tax havens such as the Cayman Islands), since the Morningstar data that we use only include holdings by funds domiciled in the nine developed economies in our sample. The largest discrepancies for the two most significant VIEs, Alibaba and Tencent, were in the positions of JPMorgan Chase. While Bloomberg reports that JPMorgan holds about 2.5 percent and 3.7 percent of the outstanding market value of these two companies, holdings in Morningstar were significantly

lower (below 1 percent). Using both supplementary data from Bloomberg and (in the case of Tencent) Tencent’s June 2018 interim shareholder report, we confirmed that this discrepancy arises because Morningstar only takes into account shares held by funds within JPMorgan’s investment management arm, while Bloomberg includes positions that are held directly by JPMorgan on its own behalf and outside of its investment management business.¹⁶

The methodology laid out in this section implies that 1.1 percent of the outstanding value of the largest 40 VIEs is owned by Chinese residents directly via the Hong Kong Stock Exchange StockConnect program, while 18.4 percent of their value is owned by Chinese residents via other means, including shares held by founders and insiders outside of the StockConnect program, and shares held via offshore investment vehicles. In contrast, 65.2 percent of the value of the VIEs is held by non-Chinese individuals and institutions either directly or via investment funds domiciled outside of China.¹⁷ A residual 15.4 percent ownership share remains unaccounted for: in the scenario labeled “Upper Bound on Chinese Holdings” in Figure 11, we assign these holdings entirely to China.¹⁸ We take these numbers as our (time-invariant) estimates of the composition of the Chinese VIEs’ shareholder base. Table A.11 provides a list of the largest positions included in our analysis at the fund-family or individual-investor level.

References for Online Appendix

Aminadav, Gur and Elias Papaioannou, “Corporate control around the world,” *Forthcoming at the Journal of Finance*, 2020.

Desai, Mihir A, C Fritz Foley, and James R Hines Jr, “The demand for tax haven operations,” *Journal of Public Economics*, 2006, 90 (3), 513–531.

Ernst & Young, “Belgium updates tax haven blacklist,” *Technical Report*, 2016.

¹⁶After verifying the alignment between the Bloomberg and Morningstar reports, we also augmented the Bloomberg holdings data with the ownership shares of fund families that were present in Morningstar but not Bloomberg. We only added positions of fund families that were entirely absent in Bloomberg. In practice, this type of holdings is small (2.3 percent of the outstanding market value of the largest 40 VIEs).

¹⁷As in the rest of the paper, we maintain the assumption that investment positions domiciled outside of China belong to non-Chinese investors, other than for the special wholly-owned Caymans and British Virgin Island vehicles discussed above. For example, we consider the entire stake of Naspers in Tencent as owned by South Africans and we consider the entire stake of Softbank in Alibaba as owned by Japanese. It is of course possible that these firms manage assets on behalf of foreign investors. On the liabilities side, we assume that all claims from the Cayman Islands Listed Company are on operating assets located in China, such that it is appropriate to associate all investments in the VIEs’ Listed Companies to underlying activity in China. As shown in Figure A.2, this is an imperfect approximation. While the bulk of the operational activity is diagrammed to reside within China, there are two boxes on the top-left of the organization chart that allow for the possibility that Alibaba’s Listed Company also owns assets outside of China.

¹⁸An ownership share of 0.7 percent remains associated with investment funds domiciled in the Cayman Islands or in the British Virgin Islands that we cannot affirmatively confirm are wholly owned by Chinese individuals. The “Upper Bound on Chinese Holdings” scenario in Figure 11 also attributes these holdings to China for conservativeness.

- European Council**, “EU list of non-cooperative jurisdictions for tax purposes,” *Technical Report*, 2019.
- Figuera & Lima Advogados**, “Blacklisted jurisdictions in Portugal,” *Technical Report*, 2019.
- Fuertes, Alberto and José María Serena**, “How firms borrow in international bond markets: securities regulation and market segmentation,” *Bank of Spain Working Paper*, 2016.
- Hines, James R and Eric M Rice**, “Fiscal paradise: Foreign tax havens and American business,” *The Quarterly Journal of Economics*, 1994, 109 (1), 149–182.
- Hopkins, Justin, Mark Lang, and Donny Zhao**, “When Enron met Alibaba: The rise of VIEs in China,” *Working Paper*, 2017.
- Maggiori, Matteo, Brent Neiman, and Jesse Schreger**, “International currencies and capital allocation,” *Forthcoming at the Journal of Political Economy*, 2019.
- Ziegler, Samuel Farrell**, “China’s variable interest entity problem: How Americans have illegally invested billions in China and How to fix it,” *Geo. Wash. L. Rev.*, 2016, 84, 539.
- Zucman, Gabriel**, “The missing wealth of nations: Are Europe and the US net debtors or net creditors?,” *The Quarterly Journal of Economics*, 2013, 128 (3), 1321–1364.

ISO3 Code	Country Name	ISO3 Code	Country Name
ABW	Aruba	LIE	Liechtenstein
AIA	Anguilla	LUX	Luxembourg
AND	Andorra	MAC	Macau
ANT	Netherlands Antilles	MCO	Monaco
ASC	Ascension	MDV	Maldives
ATG	Antigua and Barbuda	MHL	Marshall Islands
BHS	Bahamas	MLT	Malta
BLZ	Belize	MNE	Montenegro
BMU	Bermuda	MNP	The Northern Mariana Island
BRB	Barbados	MSR	Montserrat
BRN	Brunei Darussalam	NCL	New Caledonia
CCK	Cocos Islands	NFK	Norfolk Island
COK	Cook Islands	NIU	Niue
CPV	Cabo Verde	NLD	Netherlands
CUW	Curaçao	NRU	Nauru
CXR	Natal Island	PAN	Panama
CYM	Cayman Islands	PCN	Pitcairn Island
DJI	Djibuti	PLW	Palau
DMA	Dominica	PYF	French Polynesia
FJI	Fiji	SHN	Saint Helena
FLK	Falkland Islands	SLB	Solomon Islands
FRO	Faroe Islands	SMR	San Marino
GGY	Guernsey	SPM	Sain Pierre and Miquelon
GIB	Gibraltar	SYC	Seychelles
GRD	Grenada	TCA	Turks and Caicos Islands
GRL	Greenland	TKL	Tokelau Island
GUM	Guam	TON	Tonga
GUY	Guyana	TUV	Tuvalu
HKG	Hong Kong	VCT	Saint Vincent and the Grenadines
IMN	Isle of Man	VGB	Virgin Islands, British
IRL	Ireland	VIR	Virgin Islands, U.S.
JEY	Jersey	VUT	Vanuatu
KIR	Kiribati	WLF	Wallis and Futuna
KNA	Saint Kitts and Nevis	WSM	Samoa
LCA	Saint Lucia		

Table A.1: **List of countries classified as tax havens.** This classification is used both in our parent-assignment procedure and in all the analysis we perform in this paper. See Appendix Section B for details on the construction of our list.

Destination	ISO Code	CPIS	Tax Haven Only		Full Nationality	
			Position	Δ	Position	Δ
<i>A. Selected Non-Tax Haven Countries</i>						
Argentina	ARG	3	3	0	3	0
Australia	AUS	34	34	0	37	3
Brazil	BRA	10	16	6	18	8
Canada	CAN	28	29	1	37	9
China	CHN	8	15	7	16	8
France	FRA	104	107	3	103	-1
Germany	DEU	96	125	29	123	27
India	IND	7	7	0	10	3
Indonesia	IDN	3	4	0	4	0
Italy	ITA	16	20	4	22	6
Japan	JPN	44	47	3	53	9
Mexico	MEX	12	12	0	14	2
Russia	RUS	2	5	3	5	3
Saudi Arabia	SAU	1	1	0	1	0
Spain	ESP	15	24	9	40	25
South Africa	ZAF	6	6	0	7	2
South Korea	KOR	6	6	0	6	0
Turkey	TUR	5	5	0	5	0
United States	USA	422	456	34	470	48
<i>B. Selected Tax Havens</i>						
Bermuda	BMU	2	1	-2	1	-2
Cayman Islands	CYM	36	0	-35	0	-35
Curaçao	CUW	0	0	0	0	0
Guernsey	GGY	3	0	-3	0	-3
Hong Kong	HKG	7	2	-5	5	-2
Ireland	IRL	57	19	-38	21	-36
Jersey	JEY	22	0	-22	0	-22
Luxembourg	LUX	28	0	-28	0	-28
Netherlands	NLD	75	33	-42	40	-35
Panama	PAN	0	0	0	0	0
British Virgin Islands	VGB	2	0	-2	0	-2
<i>C. Domestic Reallocation</i>						
United Kingdom	GBR	940*	993	53	919	-21

Table A.2: **Estimated nationality-based outward U.K total debt portfolios.** This table presents estimates of restated outward U.K total debt portfolio positions using a nationality-based criterion, which we compare to CPIS data. We present our estimates which only reallocate holdings away from tax havens (*Tax Haven Only*), as well as estimates obtained under an alternative estimation treatment that also reallocates holdings between countries that are not tax havens (*Full Nationality*). Positions in the *CPIS* column with an asterisk (*) are our estimates. All data are as of December 2017.

Destination	ISO Code	CPIS	Tax Haven Only		Full Nationality	
			Position	Δ	Position	Δ
<i>A. Selected Non-Tax Haven Countries</i>						
Argentina	ARG	1	1	0	1	1
Australia	AUS	44	44	0	57	13
Brazil	BRA	15	15	0	13	-2
Canada	CAN	34	35	1	37	3
China	CHN	48	98	50	98	50
France	FRA	104	105	1	107	3
Germany	DEU	83	83	0	84	1
India	IND	28	28	0	28	0
Indonesia	IDN	7	7	0	6	-1
Italy	ITA	30	31	1	32	2
Japan	JPN	144	148	4	148	4
Mexico	MEX	7	7	0	10	3
Russia	RUS	11	12	1	12	1
Saudi Arabia	SAU	0	0	0	0	0
Spain	ESP	38	38	0	47	9
South Africa	ZAF	12	12	0	16	4
South Korea	KOR	40	40	0	40	0
Turkey	TUR	4	4	0	4	0
United States	USA	811	866	55	881	70
<i>B. Selected Tax Havens</i>						
Bermuda	BMU	10	0	-10	0	-10
Cayman Islands	CYM	41	0	-41	0	-41
Curaçao	CUW	0	0	0	0	0
Guernsey	GGY	16	0	-16	0	-16
Hong Kong	HKG	56	38	-18	39	-18
Ireland	IRL	199	138	-61	140	-60
Jersey	JEY	24	0	-24	0	-24
Luxembourg	LUX	85	85	0	85	0
Netherlands	NLD	54	41	-12	136	82
Panama	PAN	0	0	0	0	0
British Virgin Islands	VGB	0	0	0	0	0
<i>C. Domestic Reallocation</i>						
United Kingdom	GBR	1,557*	1,620	64	1,479	-78

Table A.3: **Estimated nationality-based outward U.K equity portfolios.** This table presents estimates of restated outward U.K equity portfolio positions using a nationality-based criterion, which we compare to CPIS data. We present our estimates which only reallocate holdings away from tax havens (*Tax Haven Only*), as well as estimates obtained under an alternative estimation treatment that also reallocates holdings between countries that are not tax havens (*Full Nationality*). Positions in the *CPIS* column with an asterisk (*) are our estimates. All data are as of December 2017. We do not reallocate equity investments in Luxembourg for non-U.S. countries since these include a significant fund shares component.

Destination	ISO Code	CPIS	Tax Haven Only		Full Nationality	
			Position	Δ	Position	Δ
<i>A. Selected Non-Tax Haven Countries</i>						
Argentina	ARG	1	1	0	1	0
Australia	AUS	9	9	0	8	0
Brazil	BRA	3	4	1	5	2
China	CHN	1	2	1	3	2
France	FRA	6	7	0	5	-1
Germany	DEU	7	9	1	19	12
India	IND	1	1	0	2	1
Indonesia	IDN	2	2	0	2	0
Italy	ITA	3	3	0	3	0
Japan	JPN	7	8	0	22	15
Mexico	MEX	4	4	0	4	0
Russia	RUS	1	1	1	1	1
Saudi Arabia	SAU	0	0	0	0	0
Spain	ESP	2	2	0	3	1
South Africa	ZAF	1	1	0	1	0
South Korea	KOR	1	1	0	1	0
Turkey	TUR	1	1	0	1	0
United Kingdom	GBR	16	18	2	29	13
United States	USA	251	255	4	278	27
<i>B. Selected Tax Havens</i>						
Bermuda	BMU	1	0	0	0	0
Cayman Islands	CYM	4	0	-4	0	-4
Curaçao	CUW	0	0	0	0	0
Guernsey	GGY	0	0	0	0	0
Hong Kong	HKG	0	0	0	0	0
Ireland	IRL	3	2	-1	2	0
Jersey	JEY	1	0	-1	0	-1
Luxembourg	LUX	5	0	-5	0	-5
Netherlands	NLD	5	4	-2	5	0
Panama	PAN	0	0	0	0	0
British Virgin Islands	VGB	0	0	0	0	0
<i>C. Domestic Reallocation</i>						
Canada	CAN	1,082*	1,082	0	1,013	-69

Table A.4: **Estimated nationality-based outward Canadian total debt portfolios.** This table presents estimates of restated outward Canadian total debt portfolio positions using a nationality-based criterion, which we compare to CPIS data. We present our estimates which only reallocate holdings away from tax havens (*Tax Haven Only*), as well as estimates obtained under an alternative estimation treatment that also reallocates holdings between countries that are not tax havens (*Full Nationality*). Positions in the *CPIS* column with an asterisk (*) are our estimates. All data are as of December 2017.

Destination	ISO Code	CPIS	Tax Haven Only		Full Nationality	
			Position	Δ	Position	Δ
<i>A. Selected Non-Tax Haven Countries</i>						
Argentina	ARG	0	0	0	1	0
Australia	AUS	18	18	0	18	0
Brazil	BRA	12	12	0	10	-1
China	CHN	34	63	29	62	28
France	FRA	38	38	0	40	2
Germany	DEU	31	31	0	32	1
India	IND	18	18	0	17	0
Indonesia	IDN	4	4	0	3	-1
Italy	ITA	6	7	0	7	1
Japan	JPN	63	64	0	63	0
Mexico	MEX	6	6	0	5	0
Russia	RUS	2	3	0	3	0
Saudi Arabia	SAU	0	0	0	0	0
Spain	ESP	8	8	0	9	1
South Africa	ZAF	6	6	0	6	0
South Korea	KOR	22	22	0	21	0
Turkey	TUR	2	2	0	2	0
United Kingdom	GBR	81	88	7	80	-2
United States	USA	774	792	18	813	38
<i>B. Selected Tax Havens</i>						
Bermuda	BMU	9	0	-9	0	-9
Cayman Islands	CYM	31	0	-31	0	-31
Curaçao	CUW	2	0	-2	0	-2
Guernsey	GGY	2	0	-2	0	-2
Hong Kong	HKG	11	11	0	11	0
Ireland	IRL	16	6	-10	6	-10
Jersey	JEY	3	0	-3	0	-3
Luxembourg	LUX	8	8	0	8	0
Netherlands	NLD	21	18	-3	24	2
Panama	PAN	1	0	-1	0	-1
British Virgin Islands	VGB	1	0	-1	0	-1
<i>C. Domestic Reallocation</i>						
Canada	CAN	1,009*	1,014	5	1,002	-7

Table A.5: **Estimated nationality-based outward Canadian equity portfolios.** This table presents estimates of restated outward Canadian equity portfolio positions using a nationality-based criterion, which we compare to CPIS data. We present our estimates which only reallocate holdings away from tax havens (*Tax Haven Only*), as well as estimates obtained under an alternative estimation treatment that also reallocates holdings between countries that are not tax havens (*Full Nationality*). Positions in the *CPIS* column with an asterisk (*) are our estimates. All data are as of December 2017. We do not reallocate equity investments in Luxembourg for non-U.S. countries since these include a significant fund shares component.

Destination	ISO Code	TIC	Tax Haven Only		Full Nationality	
			Position	Δ	Position	Δ
<i>A. Selected Non-Tax Haven Countries</i>						
Argentina	ARG	30	30	0	30	0
Australia	AUS	13	13	0	13	0
Brazil	BRA	26	26	0	26	0
Canada	CAN	76	76	0	76	0
China	CHN	2	2	0	2	0
France	FRA	45	45	0	45	0
Germany	DEU	34	34	0	34	0
India	IND	7	7	0	7	0
Indonesia	IDN	28	28	0	28	0
Italy	ITA	26	26	0	26	0
Japan	JPN	149	149	0	149	0
Mexico	MEX	37	37	0	37	0
Russia	RUS	13	13	0	13	0
Saudi Arabia	SAU	7	7	1	7	1
Spain	ESP	16	16	0	16	0
South Africa	ZAF	13	13	0	13	0
South Korea	KOR	11	11	0	11	0
Turkey	TUR	13	13	0	13	0
United Kingdom	GBR	56	56	0	56	0
<i>B. Selected Tax Havens</i>						
Bermuda	BMU	1	1	0	1	0
Cayman Islands	CYM	1	0	-1	0	-1
Curaçao	CUW	0	0	0	0	0
Guernsey	GGY	0	0	0	0	0
Hong Kong	HKG	0	0	0	0	0
Ireland	IRL	3	3	0	3	0
Jersey	JEY	0	0	0	0	0
Luxembourg	LUX	1	0	0	0	0
Netherlands	NLD	11	11	0	11	0
Panama	PAN	5	5	0	5	0
British Virgin Islands	VGB	0	0	0	0	0
<i>C. Domestic Reallocation</i>						
United States	USA	8,059*	8,059	0	8,059	0

Table A.6: **Estimated nationality-based outward U.S. government debt portfolios.** This table presents estimates of restated outward U.S. government debt portfolio positions on nationality basis, which we compare to TIC data. We present our estimates which only reallocate holdings away from tax havens (*Tax Haven Only*), as well as estimates obtained under an alternative treatment that also reallocates holdings in countries that are not tax havens (*Full Nationality*). Positions in the *TIC* column with an asterisk (*) are our estimates. All data are as of December 2017.

Destination	ISO Code	TIC	Tax Haven Only		Full Nationality	
			Position	Δ	Position	Δ
<i>A. Selected Non-Tax Haven Countries</i>						
Argentina	ARG	0	0	0	0	0
Australia	AUS	1	1	0	1	0
Brazil	BRA	0	0	0	0	0
Canada	CAN	18	23	6	38	20
China	CHN	0	1	1	6	6
France	FRA	0	3	3	6	6
Germany	DEU	0	3	3	71	71
India	IND	1	1	0	1	0
Indonesia	IDN	0	0	0	0	0
Italy	ITA	1	1	0	1	0
Japan	JPN	0	5	5	36	36
Mexico	MEX	1	1	0	1	0
Russia	RUS	0	0	0	0	0
Saudi Arabia	SAU	0	0	0	0	0
Spain	ESP	0	1	0	40	39
South Africa	ZAF	0	0	0	0	0
South Korea	KOR	0	0	0	6	6
Turkey	TUR	0	0	0	0	0
United Kingdom	GBR	18	30	11	61	43
<i>B. Selected Tax Havens</i>						
Bermuda	BMU	3	0	-3	0	-3
Cayman Islands	CYM	323	43	-280	43	-280
Curaçao	CUW	0	0	0	0	0
Guernsey	GGY	0	0	0	0	0
Hong Kong	HKG	0	1	1	1	1
Ireland	IRL	8	8	-1	8	-1
Jersey	JEY	2	0	-2	0	-2
Luxembourg	LUX	1	0	-1	0	-1
Netherlands	NLD	3	3	0	3	0
Panama	PAN	0	0	0	0	0
British Virgin Islands	VGB	0	0	0	0	0
<i>C. Domestic Reallocation</i>						
United States	USA	1,750*	1,993	243	1,713	-38

Table A.7: **Estimated nationality-based outward U.S. asset-backed security portfolios.** This table presents estimates of restated outward U.S. asset-backed security portfolio positions on nationality basis, which we compare to TIC data. We present our estimates which only reallocate holdings away from tax havens (*Tax Haven Only*), as well as estimates obtained under an alternative treatment that also reallocates holdings in countries that are not tax havens (*Full Nationality*). Positions in the *TIC* column with an asterisk (*) are our estimates. All data are as of December 2017.

Destination	ISO Code	Corporate Debt			Equities		
		TIC	Position	Δ	TIC	Position	Δ
<i>A. Selected Non-Tax Haven Countries</i>							
Argentina	ARG	5	5	0	9	10	0
Australia	AUS	144	145	1	181	184	3
Brazil	BRA	8	54	45	119	105	-14
Canada	CAN	390	375	-15	493	482	-11
China	CHN	3	51	48	154	689	535
France	FRA	118	103	-15	434	456	23
Germany	DEU	60	77	17	375	387	12
India	IND	6	14	8	179	173	-6
Indonesia	IDN	5	9	4	40	31	-8
Italy	ITA	16	33	17	96	115	19
Japan	JPN	80	97	17	895	900	6
Mexico	MEX	58	56	-2	64	60	-4
Russia	RUS	0	12	12	55	61	7
Saudi Arabia	SAU	1	2	1	0	0	0
Spain	ESP	16	38	22	123	126	4
South Africa	ZAF	1	6	5	100	101	1
South Korea	KOR	11	11	0	226	225	-2
Turkey	TUR	4	4	0	22	22	0
United Kingdom	GBR	308	292	-16	1019	1001	-18
<i>B. Selected Tax Havens</i>							
Bermuda	BMU	30	0	-30	195	1	-194
Cayman Islands	CYM	80	1	-79	547	0	-547
Curaçao	CUW	3	0	-3	68	0	-68
Guernsey	GGY	13	0	-13	14	0	-14
Hong Kong	HKG	8	9	0	147	134	-12
Ireland	IRL	63	24	-39	385	71	-314
Jersey	JEY	14	0	-14	94	0	-94
Luxembourg	LUX	72	3	-69	33	4	-29
Netherlands	NLD	179	109	-71	339	371	32
Panama	PAN	3	0	-3	26	0	-26
British Virgin Islands	VGB	14	0	-14	15	0	-15

Table A.8: **Estimated nationality-based outward U.S. portfolios, full nationality excluding domestic imputation.** This table presents estimates of restated outward U.S. corporate debt and equity portfolio positions, which we compare to TIC data. These positions are computed on a “full nationality” basis but exclude our the domestic investment imputation outlined in equation (4). Domestic U.S. positions are instead set to zero. All data are as of December 2017.

	Corporate Share		Local Currency Share					
			All Bonds		Corporate Bonds		Sovereign Bonds	
	Residency	Nationality	Residency	Nationality	Residency	Nationality	Residency	Nationality
ARG	0.16	0.15	0.26	0.26	0.06	0.07	0.30	0.30
BRA	0.18	0.60	0.70	0.34	0.01	0.00	0.85	0.85
CHL	0.62	0.59	0.21	0.22	0.01	0.01	0.53	0.53
CHN	0.63	0.92	0.07	0.01	0.01	0.00	0.15	0.09
IDN	0.17	0.23	0.55	0.51	0.02	0.00	0.66	0.66
IND	0.54	0.73	0.64	0.37	0.41	0.18	0.90	0.89
ISR	0.26	0.71	0.37	0.14	0.00	0.00	0.48	0.48
MEX	0.51	0.52	0.36	0.36	0.03	0.02	0.71	0.71
MYS	0.30	0.34	0.68	0.65	0.02	0.02	0.97	0.97
RUS	0.01	0.43	0.71	0.41	0.05	0.01	0.71	0.71
THA	0.17	0.26	0.89	0.78	0.12	0.05	1.00	1.00
TUR	0.23	0.21	0.34	0.35	0.02	0.02	0.44	0.44
ZAF	0.09	0.25	0.71	0.58	0.08	0.02	0.77	0.77

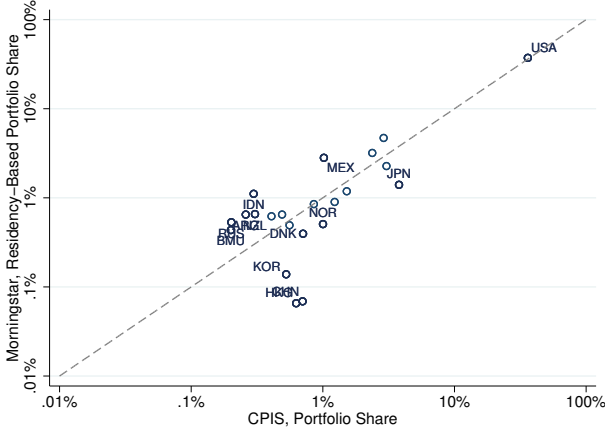
Table A.9: **Currency composition of external portfolio debt, residency vs. nationality, across countries.** The first two columns, “Corporate Share,” report the shares of corporate bonds in total external portfolio debt under residency and nationality for selected large emerging markets. The next six columns show the shares of external debt that are denominated in local currency for “Overall Bonds”, “Corporate Bonds”, and “Sovereign Bonds” issued by each country, under residency and nationality. All data are for 2017. See Appendix Section C for additional details.

Company	Beneficial Owner	Holdings Structure	Country of Registration of Holdings Structure	Share Held via Structure (%)
Alibaba	Jack Yun Ma	Direct Holdings	—	0.0
		APN Limited	Cayman Islands	1.3
		Yun Capital Limited	British Virgin Islands	0.5
		Ying Capital Limited	British Virgin Islands	0.5
		JC Properties Limited	British Virgin Islands	2.1
		JSP Investment Limited	British Virgin Islands	2.0
		<i>Total</i>	—	<i>6.4</i>
Alibaba	Joseph C. Tsai	Direct Holdings	—	0.1
		APN Limited	Cayman Islands	0.6
		Joe and Clara Tsai Foundation Limited	Guernsey	0.2
		Parufam Limited	Bahamas	0.8
		PMH Holding Limited	British Virgin Islands	0.7
		<i>Total</i>	—	<i>2.3</i>
Tencent	Ma Huateng	Advance Data Services Limited	British Virgin Islands	7.6
		Ma Huateng Global Foundation	Cayman Islands	1.0
		<i>Total</i>	—	<i>8.6</i>
Tencent	Lau Chi Ping	Unknown	—	0.5
		<i>Total</i>	—	<i>0.5</i>

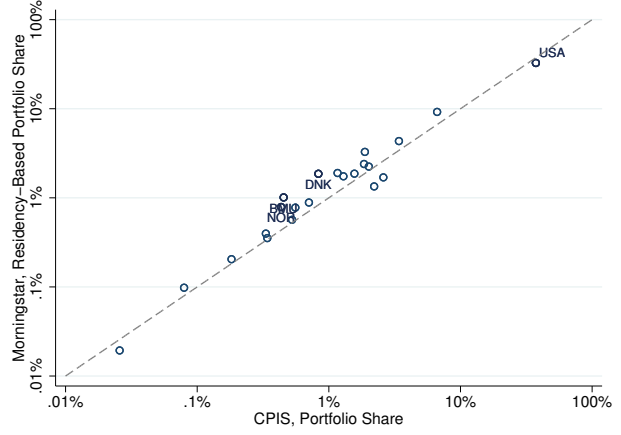
Table A.10: **Holdings structures for largest Chinese VIE insider ownership stakes.** This table shows the detailed structure of the insider ownership shares in the two largest listed Chinese VIEs: Alibaba and Tencent. These insider shares are mostly held through offshore special-purpose vehicles rather than as direct portfolio investment. For example, the 6.4 percent ownership share in Alibaba of founder Jack Yun Ma is primarily held through offshore vehicles in the British Virgin Islands (5.1 percent) and in the Cayman Islands (1.3 percent). Ownership data is as of the end of 2018 and was collected from the companies' 20-F SEC filings (for Alibaba) and annual shareholder reports (for Tencent). We show all reported insider shares greater than 0.1 percent.

Fund Family or Individual Investor	Chinese Investor?	Position in Top 40 VIEs (\$bn)	Share of Top 40 VIEs Owned
Naspers Ltd.	No	153	10.1%
SoftBank Group	No	83	5.5%
Ma Huateng	Yes	42	2.8%
Altaba Inc.	No	40	2.7%
JPMorgan Chase	No	38	2.5%
BlackRock Inc.	No	36	2.4%
Xin Xin (BVI) Ltd.	Yes	33	2.2%
Vanguard Group	No	31	2.1%
Ma Jack Yun	Yes	21	1.9%
Skywalk Finance GK	No	28	1.8%
Yang Huiyan	Yes	23	1.5%
T Rowe Price Group	No	21	1.4%
Lei Ding	Yes	21	1.4%
Capital Group Companies	No	20	1.3%
Baillie Gifford & Co	No	15	1.0%
Invesco Ltd.	No	15	1.0%
Yanhong Li	Yes	13	0.9%
State Street Corp.	No	13	0.8%

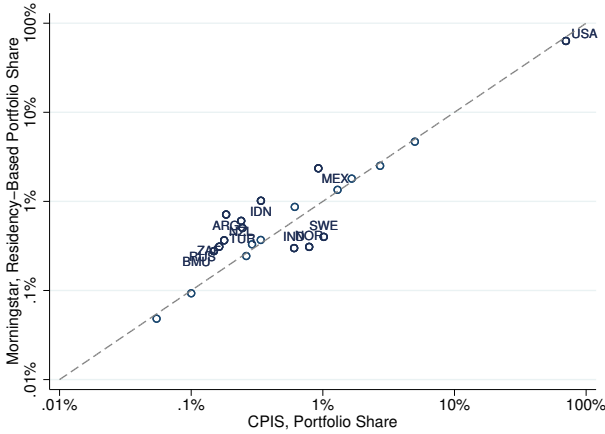
Table A.11: **Largest ownership stakes in largest 40 VIEs at the fund-family or individual-investor level.** This table shows largest ownership stakes that underlie our analysis of the ownership compositions of the largest 40 Chinese VIEs, discussed in Appendix Section D. As outlined in Appendix Section D, the ownership data come from Bloomberg and report holdings of fund families or individuals who are company insiders, and are collected at staggered points in time (nearly always the end of 2018 or the middle of 2019). We augmented the Bloomberg data with data from Morningstar for fund families not covered in Bloomberg. Jack Yun Ma’s and Ma Huateng’s positions are inclusive of all the shares held via offshore vehicles, as reported in Table A.10.



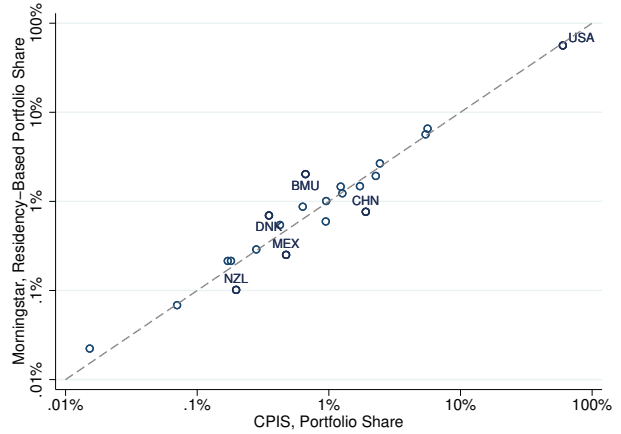
(a) United Kingdom: All Bonds



(b) United Kingdom: Equities



(c) Canada: All Bonds



(d) Canada: Equities

Figure A.1: **Alignment between official bilateral external portfolio composition and residency-based Morningstar data: United Kingdom and Canada.** Panels (a) and (b) show the shares that each foreign destination country represents in U.K. outward portfolio holdings, both as computed in the Morningstar 2017 end-of-year sample using a residency criterion (*horizontal axis*), and as reported in the 2017 CPIS data (*vertical axis*). Panel (a) includes all debt securities; panel (b) includes all equity securities. Panels (c) and (d) repeat the same exercise for the positions reported by Canada in CPIS. Panel (c) includes all debt securities; panel (d) includes all equity securities.

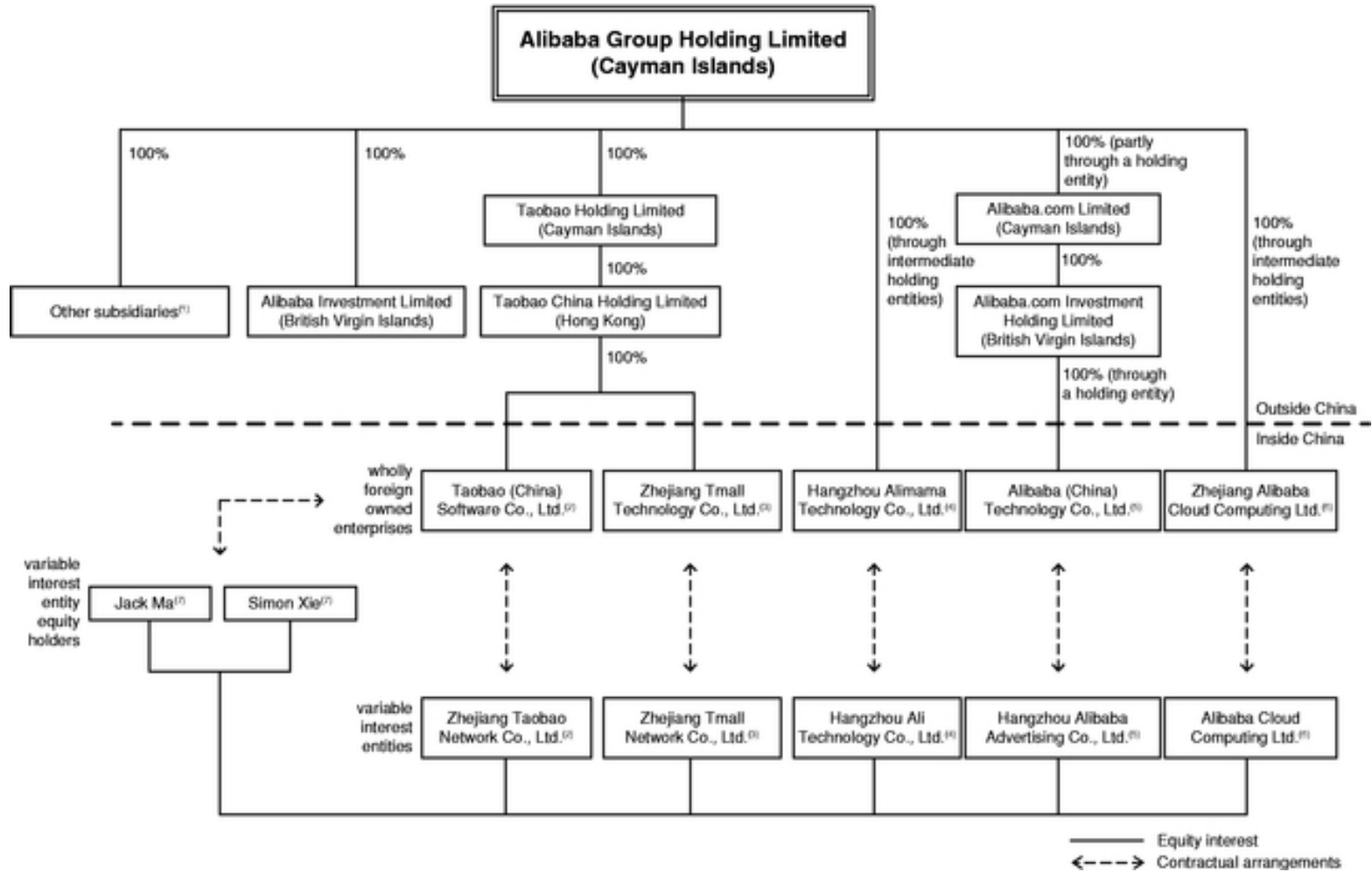
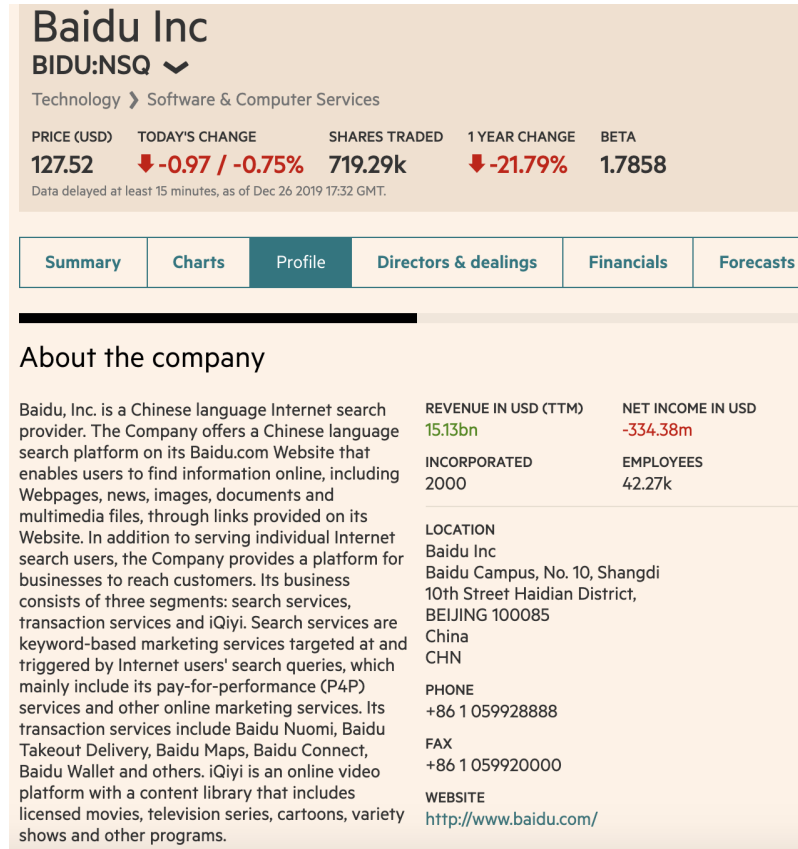


Figure A.2: **Alibaba’s corporate structure.** This figure shows the corporate structure diagram reported by Alibaba in its SEC filings.



(a) Alibaba



(b) Baidu

Figure A.3: **Financial Times profiles of Chinese companies using VIE structures.** This figure displays the online profiles for the equities of Alibaba and Baidu on the website of the Financial Times.