POLICY BRIEF

PB 16-17 What Does Measured FDI Actually Measure?

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Foreign direct investment (FDI)—whether mergers and acquisitions or "greenfield" ventures built from the ground up—is generally thought of as reflecting brick and mortar decisions, i.e., decisions based on long-run factors. Conventional wisdom on capital flows holds that FDI inflows are "good flows," while assessments of portfolio and other flows are more ambiguous. When considering restrictions on capital flows, the first reaction of researchers and policymakers is to want to exclude FDI inflows.

In looking, however, at measured[1] FDI flows to emerging markets (in the course of a larger project on capital flows), we have found three facts that suggest that measured FDI is actually quite different from the depiction of FDI above.

The first is a surprisingly high correlation between quarterly FDI inflows and outflows. A reasonable prior would be that this correlation should be close to zero or even negative: If a country is for some reason more attractive to foreign in-

vestors, it is not obvious why domestic investors would want to invest more abroad, especially within the same quarter.

The second is an increase in quarterly FDI inflows to emerging-market countries in response to decreases in the US monetary policy rate. Again, a reasonable prior would be that FDI flows do not respond much, if at all, to changes in the policy rate within a quarter—i.e., the effect should be close to zero. To the extent that a decrease in the US policy rate leads to larger overall capital inflows to emerging-market countries, one would expect the flows most affected to be portfolio flows, especially portfolio debt flows. Yet, FDI inflows often show a strong and significant response to the US policy rate (actually, even more so than portfolio flows, but this is a different story).

The third fact, closely related to the first two, is an increase in quarterly FDI outflows from emerging-market countries in response to decreases in the US monetary policy rate. Again, a reasonable prior would be that FDI outflows do not respond much, and, if they did, they would decrease in response to a decrease in the US policy rate. This is not the case.

These facts suggest two conclusions.

The first is that, in many countries, a large proportion of measured FDI inflows are just flows going in and out of the country on their way to their final destination, with the stop due in part to favorable corporate tax conditions. This fact is not new, and, as discussed below, countries have tried to improve their measures of FDI to reflect it. But the magnitude of such flows came to us as a surprise.

The second is that some of these measured FDI flows are much closer to portfolio debt flows, responding to short-run movements in US monetary policy conditions rather than to medium-run fundamentals of the country.

Both have implications for how one should think about capital controls and the exclusion of measured FDI from such controls.

CORRELATION BETWEEN FDI INFLOWS AND OUTFLOWS

Figure 1 shows the correlation between quarterly FDI inflows and outflows for 25 emerging-market countries, for the period 1990Q1 to 2015Q4, using data from the International Monetary Fund's sixth edition of the Balance of Payments

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1. By "measured" FDI, we mean FDI as measured in the balance of payments.

Figure 1   Correlation between quarterly FDI inflows and outflows, 1990Q1 to 2015Q4
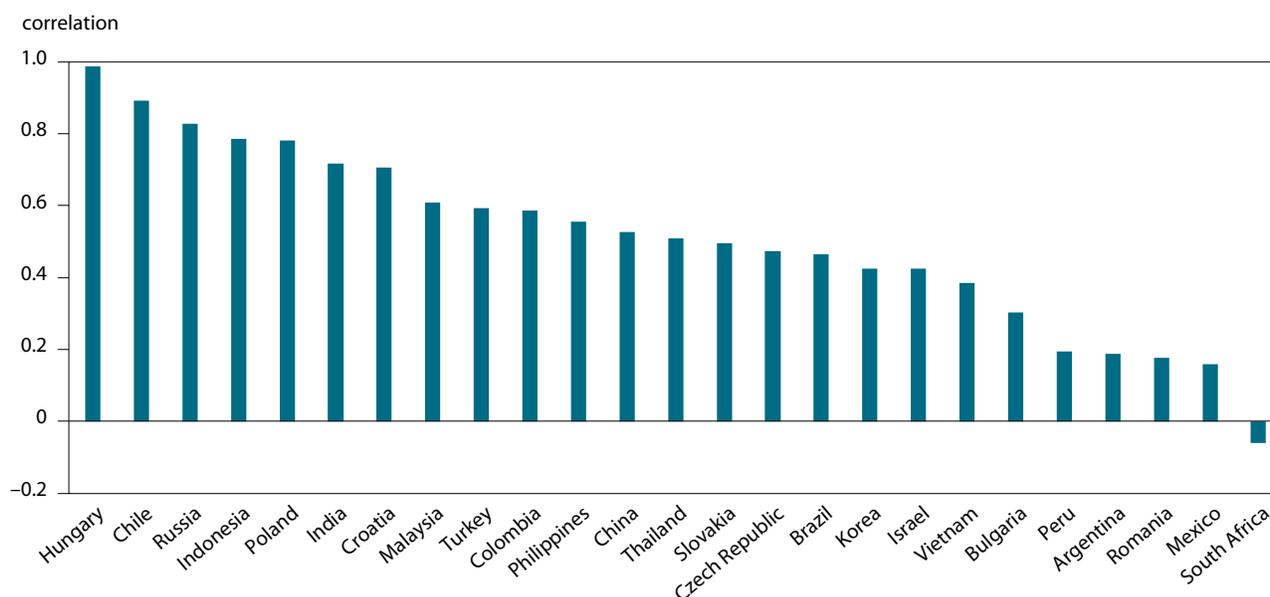
correlation

Source: Authors' computations, based on data from IMF BPM6. Balance of payments analytic presentation by country.

and International Investment Position Manual (IMF BPM6) database.

The 25 countries were chosen from the list of emerging-market countries on the basis of quarterly data availability over that period. They are Argentina, Brazil, Bulgaria, Chile, China, Colombia, Croatia, the Czech Republic, Hungary, India, Indonesia, Israel, Korea, Malaysia, Mexico, Peru, the Philippines, Poland, Romania, Russia, Slovakia, South Africa, Thailand, Turkey, and Vietnam.

The average correlation between FDI inflows and outflows across countries is 0.51. Eighteen of the countries have a correlation exceeding 0.4, and eight countries have a correlation exceeding 0.6. The case of Hungary is particularly striking, with a correlation equal to 0.99.

Four potential explanations come to mind.

The first is that the correlation reflects a common trend for the two series. This plays a minor role: The average correlation between FDI inflows and outflows, with each one now measured as a ratio to trend GDP (estimated as a quadratic trend for log GDP), is 0.33. Six countries still have a correlation exceeding 0.6.

The second is that seasonal factors are at play, such as the payments of dividends bunched in a particular quarter. This also does not seem important. The average correlation between FDI inflows and outflows, with each one measured as the residual from a regression including a quadratic trend and a set of seasonal dummies, is 0.33. Five countries still have a correlation exceeding 0.6.

The third is that the correlation is the implication of equilibrium in the foreign exchange market. In the absence

of foreign exchange intervention, and assuming that the current account moves slowly, changes in gross inflows during the quarter must roughly equal changes in gross outflows for the foreign exchange market to clear. Thus, if FDI was literally the only source of gross inflows and gross outflows, the correlation would have to be close to one. In our sample, FDI flows account for 52 percent of total gross flows—48 percent if total gross flows do not include financial derivative flows (this ratio is lower because financial derivatives flows are on average negative). It appears unlikely, however, that the flows associated with true FDI decisions can adjust within a quarter. The adjustment is more likely to come from portfolio flows, in particular, portfolio debt.

Over longer intervals, the adjustment of the exchange rate may, however, lead to a positive correlation between FDI inflows and outflows: For example, an increase in FDI inflows, for reasons unrelated to the recipient economy, may lead to an appreciation of the currency, making it more attractive, everything else equal, for domestic investors to invest abroad, and thus leading to an increase in FDI outflows. This effect may be partly at work: The average correlation between annual changes in FDI inflows and outflows is 0.65, thus a bit higher than the quarterly correlation of 0.51.

The fourth explanation is that the correlation reflects hedging of currency and country risks. One obvious hedge for a company investing in an emerging market is to borrow from local credit markets through its affiliate and reinvest the funds at home, thus hedging the currency risk coming from the initial investment (Dooley 1996). In this case, an FDI inflow into an emerging market will be matched by an equal

FDI outflow from this country. Some evidence supports this hypothesis for a few countries, such as India. We come back to it later.

The most likely explanation, however, is that a substantial proportion of the inflows and outflows are not independent decisions, that they are flows through rather than to the recipient country, with another country as the ultimate destination.

> **A lot of measured FDI reflects flows through rather than to the country and the suggested corrections—from separate treatment of SPEs, to measures of capital in transit, to the use of directional flows measures—reduce but do not eliminate the problem.**

The problem is well recognized by statisticians working on FDI. The way to handle it conceptually is to rely on the "directional flows" approach rather than the "asset/liability" approach used in the IMF BPM6. Think of a parent company in country A with two affiliates in countries B and C. Under the directional flows approach, FDI inflows to country B are defined as gross FDI inflows coming from either the parent company or the other affiliate minus the gross outflows from the affiliate in country B, which go back either to the parent company in country A (round tripping) or to the parent company's affiliate in country C (pass-through).

The Organization for Economic Cooperation and Development (OECD)[2] publishes data using the directional flows principle, at a quarterly frequency, only from 2013Q1 to 2015Q4, for five countries in our sample: Chile, Hungary, Turkey, Indonesia, and Russia. Using the flows constructed from this alternative definition does not decrease the correlation very much: The average correlation for the five countries, using quarterly data, decreases from 0.59 using the asset/liability definition to 0.54 using the directional flows definition.

The UN Conference on Trade and Development (UNCTAD)[3] also publishes data using the directional flows

principle, but at an annual frequency, from 1990 to 2014, for all countries in our sample. FDI data using the asset/liability principle are in most cases equal or very close to data using the directional flows approach. Again, using the alternative approach does not decrease the correlation very much: The average annual correlation for all countries decreases from 0.65 to 0.63.[4]

This suggests either that our tentative explanation is false, or, more likely, that it is difficult to identify and measure the round tripping and pass-through flows accurately.[5] One can make some progress by looking at further work done by the central bank of Hungary (the country with the highest correlation between the two flows).

Hungarian authorities identify special purpose entities (SPEs) as resident subsidiaries that are mostly engaged in financial transactions. They identify SPEs in the data as firms with a low ratio of nonfinancial assets to total assets and with a very small staff and activity in the host economy.[6] For the period 2008Q1 to 2015Q4 (the period for which quarterly data are available), the estimated share of flows to and from SPEs is a substantial 52 percent of total FDI inflows and outflows computed using the directional flows approach.[7] The correlation between FDI inflows and outflows excluding flows in and out of SPEs, however, remains very high for Hungary, decreasing from 0.99 to 0.87.

The central bank also constructs measures of "capital in transit," i.e., flows that go through a few identified subsidiaries that perform real economic activity, and therefore cannot be classified as SPEs, but also take part in intermediary financial activities.[8] The estimated "capital in transit" flows also account for a substantial share of total FDI flows, equal to 25 percent in our sample.[9] Still, using the "cleanest data," i.e.,

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2. OECD, Benchmark definition, 4th edition (BMD4)—Foreign Direct Investment: financial flows, main aggregates.

3. UNCTAD, Division on Investment and Enterprise, *World Investment Report*, Statistical Annex.

4. This approach is more effective at decreasing the average correlation for advanced economies. The average annual correlation decreases from 0.82 using the asset/liability definition to 0.54 using the directional flows principle for a group of nine advanced economies (Austria, France, Germany, Iceland, Ireland, Luxembourg, the Netherlands, the United Kingdom, and the United States).

5. The residency of the ultimate controlling parent (country A in our example) is important to identify in order to correctly apply the directional principle methodology. However, funds can pass through more than one link and more than one economy before reaching their final destination, which makes the identification of the ultimate controlling parent more difficult, even impossible. If the ultimate controlling parent is unknown, then there is no difference in the way FDI flows are recorded under both asset/liability and directional flow principles.

6. The exact definition is available at www.bis.org/ifc/events/sat_semi_rio_jul15/2_montvai_paper.pdf.

7. We exclude 2015Q4, which is clearly an outlier.

8. See footnote 6 for the source of the exact definition.

9. We again exclude 2015Q4, which is clearly an outlier.

Figure 2   FDI inflows on 3-month US treasury rate, 1990Q1 to 2015Q4
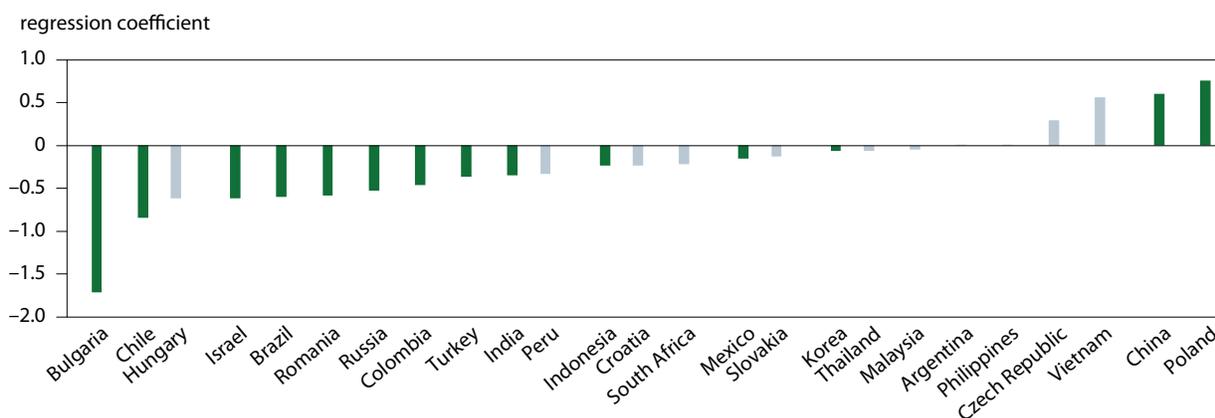
regression coefficient

Note: Green bars indicate significant coefficients (at the 5 percent level).
Source: Haver Analytics and authors' computations, based on data from IMF BPM6. Balance of payments analytic presentation by country.

directional flows excluding SPE flows and capital in transit, yields a correlation of 0.56.

We conclude from these observations that a lot of measured FDI reflects flows through rather than to the country and that the suggested corrections—from separate treatment of SPEs, to measures of capital in transit, to the use of directional flows measures—reduce but do not eliminate the problem. The message to researchers is clear: Measured FDI is not entirely true FDI. (Indeed, this conclusion has led the central bank of Hungary to mostly focus on net flows rather than gross flows as the best measure of FDI, from the point of view of its contribution to the Hungarian economy.)

FDI AND THE US MONETARY POLICY RATE

It is taken more or less as a given that capital flows respond to the US policy rate, and a large number of papers have looked at that relation in detail.[10] In looking at this relation, we have found a surprising fact, which is relevant here: namely, that FDI inflows to emerging markets often have a significant positive response to a decrease in the US policy rate.

The evidence is shown in figure 2, which plots estimated coefficients on the US monetary policy rate from a set of country regressions, using quarterly data over 1990Q1-2015Q or the longest available sample if data start after 1990Q1:

$$F_{it} = d_i + a_i * R_t + b_i * Slope_t + c_i * VIX_t + e_{it}$$

where i denotes the country, t denotes time. The dependent variable F is equal to gross FDI inflows divided by trend GDP, R is the 3-month treasury rate, *Slope* is the difference between the US 10-year and US 3-month rates. The *Slope* variable is intended to capture the effects of quantitative easing in the later part of the sample. The VIX index[11] is included because it has been shown to be highly significant in explaining gross flows in general.

The results are quite striking (Warning: Regressions of capital flows on potential determinants typically give poor results. By this standard, the results above are strong). The green bars indicate significant coefficients. For the 25 countries in the figure, 19 show a negative effect of the US policy rate on flows, and 12 show a significant negative effect. (Two countries show, however, a positive significant effect, China and Poland.) Again, this negative elasticity to the policy rate within a quarter does not fit the image of FDI as brick and mortar decisions, suggesting that FDI flows are more akin to portfolio flows.

Indeed, the effect of the interest rate is actually stronger on FDI flows than on portfolio flows! This is shown in figure 3, which plots the estimated coefficients on the US monetary policy rate, using the same specification as above, but with the dependent variable now being portfolio debt flows divided by trend GDP. The red bars denote significant coefficients. As is visually clear, the results are weaker than in figure 2, with few significant coefficients, and a roughly equal number of positive and negative coefficients. [12]

The last result we report is the set of estimated coefficients of FDI outflows on the US policy rate. The specification is the same as for FDI inflows above, but with the dependent

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10. For a (nonsystematic) review of this evidence, see Blanchard (2016, section 3).

11. The Chicago Board Options Exchange (CBOE) Volatility Index.

12. A number of countries, China, India, Malaysia, and Vietnam, have fewer than 35 observations, so results for those countries may simply reflect small sample sizes. The others have between 60 and 104 observations.

Figure 3   Portfolio debt inflows on 3-month US treasury rate, 1990Q1 to 2015Q4
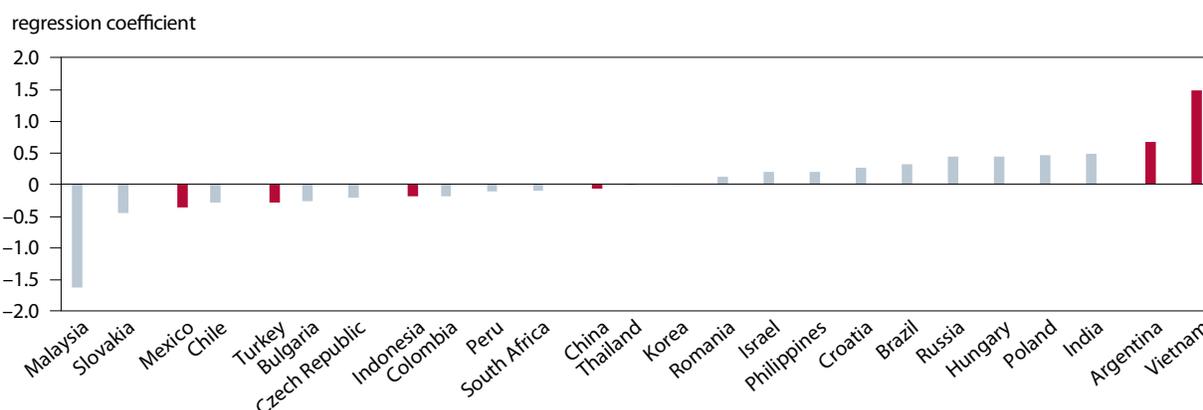
Note: Red bars indicate significant coefficients (at the 5 percent level).
Source: Haver Analytics and authors' computations, based on data from IMF BPM6. Balance of payments analytic presentation by country.

Figure 4   FDI outflows on 3-month US treasury rate, 1990Q1 to 2015Q4
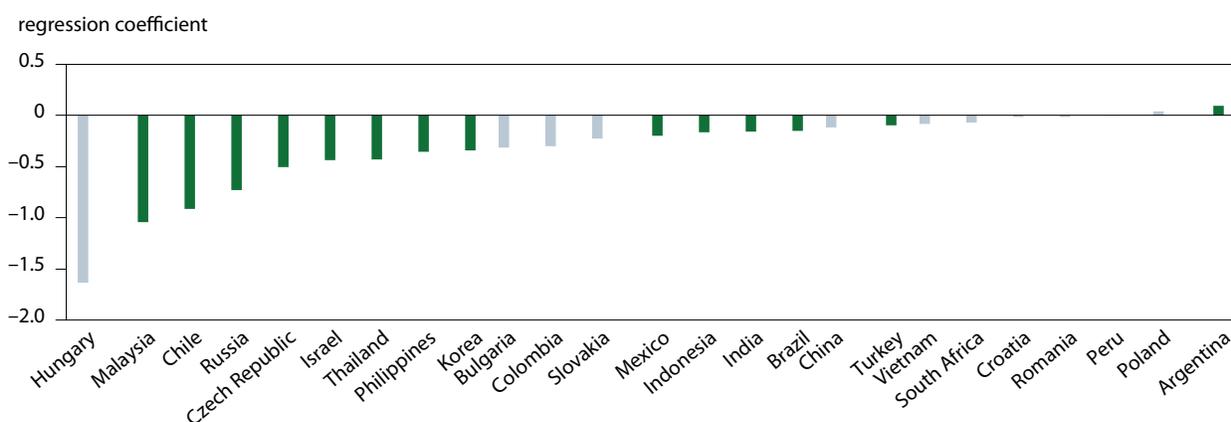
Note: Green bars indicate significant coefficients (at the 5 percent level).
Source: Haver Analytics and authors' computations, based on data from IMF BPM6. Balance of payments analytic presentation by country.

variable now being FDI outflows divided by trend GDP. If we thought of these flows as going to the United States, or to countries whose policy rates move closely with the United States, we would expect these coefficients to be positive. A higher US policy rate would lead to stronger FDI outflows from emerging-market countries. But the coefficient is negative in 22 countries, and significantly negative in 13 of them (indicated by green bars in figure 4). These results are again quite striking, indeed perhaps even more striking than the results for FDI inflows. They are consistent with the finding of high correlation between inflows and outflows in figure 1 and the negative estimated elasticities of inflows to the policy rate in figure 2.[13] It is still a surprising finding.

ROLE OF TAXATION AND CONTROLS

One question is whether we can explain cross-country differences, either in the correlations or in the regression coefficients presented above: Why, for example, do Hungary and India have such high correlations while South Africa has a small negative correlation? The evidence suggests that corporate taxation and capital controls on non-FDI flows are likely to be the main factors, but the devil is in the details.

Take again the case of Hungary. One of the reasons why Hungary has such a high correlation between FDI inflows

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13. To be clear, this result does not automatically follow from the first two results. The correlation between inflows and outflows

could reflect a correlation between the components of flows that do not depend on the US policy rate. In that case, we could find a high correlation between inflows and outflows, a negative elasticity of inflows to the policy rate, but a positive elasticity of outflows to the policy rate.

Table 1   Impact of taxation and capital controls on FDI correlation

Variable	(1) imfq	(2) imfa	(3) un
inflowscontrols	0.347 [0.217]	0.799** [0.316]	0.979*** [0.324]
taxrate	−0.022* [0.011]	−0.044** [0.016]	−0.052*** [0.016]
Constant	0.214* [0.110]	0.037 [0.160]	−0.055 [0.164]
Observations	22	22	22
R-squared	0.189	0.332	0.402

Notes: Standard errors in brackets.

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

Source: Authors' computations, based on data from Fernández et al. (2015), KPMG, and IMF BPM6. Balance of payments analytic presentation by country.

and outflows is because not only does it have a bilateral tax treaty with the United States but also that treaty is one of only seven US income tax treaties to not include any "limitation-on-benefits" rules.[14] This means that third-country residents can take advantage of these treaties, which usually grant benefits only to residents of the two treaty countries. This practice is commonly referred to as "treaty shopping" and enables many companies to use Hungary as a way station for funds going to the United States.

The specifics are equally important for capital controls. In general, capital controls on portfolio and debt flows are likely to lead firms to relabel some portfolio and debt flows as FDI flows, but the details again greatly matter.

Despite these caveats, we have nevertheless explored some simple relations between the correlations between FDI inflows and outflows, a capital control variable, and a corporate tax rate variable. Due to data availability, we focus on the period from 2005 to 2015.

The capital control variable is constructed as the average restriction on all inflows other than FDI inflows over the relevant period, using the dataset from Fernández et al. (2015).[15] This variable can take values between 0 (no restriction) and 1 (restrictions on all categories of inflows except FDI).[16] The corporate tax rate variable is defined as the average rate over the same period minus the average rate for all countries in the

sample, using data from KPMG.[17,18] A positive value means that the country has a relatively high tax rate compared with other countries in the sample, while a negative value means that the country has a relatively low tax rate compared with other countries in the sample.

One would expect the coefficient on the tax variable to be negative: A lower tax rate triggers more flows through the country, thus increasing the correlation between FDI inflows and outflows.[19] Conversely, one would expect the coefficient on the capital control variable to be positive: The tighter the capital controls on non-FDI flows, the more FDI is likely to reflect flows through rather than to the country, and the higher the correlation.

Results are reported in table 1 for three sets of correlations, using quarterly and annual data from the IMF (asset/liability methodology) and annual data from the UNCTAD (directional flows principle).

The coefficients on inflow restrictions and tax rate variables are significant in both cases using annual data, but not in the specification using quarterly data. Surprisingly, results are more significant if using directional flows data (which are supposed to deal with round tripping and pass-through operations). However, as previously noted, FDI data from the UNCTAD (using the directional flows approach) are in most cases equal or very close to data from the IMF (using the asset/liability principle), suggesting that it is difficult to identify the ultimate controlling parent and measure the round tripping and pass-through flows accurately.

In all three cases, a lower relative corporate tax rate and higher capital controls on non-FDI inflows tend to increase the correlation between FDI inflows and outflows. (Results are roughly similar if using the same measure of capital controls on all, not only inward, flows.)

A number of other statistical facts are also intriguing and suggest the need for a granular look at tax treaties, specific tax rates, treatment of FDI debt versus FDI equity flows, capital controls, and the details of tax optimization. For example, in a few countries (in particular, India), there is a high cor-

14. This is also the case for Poland, another country with a very high correlation in our sample. The Joint Committee on Taxation (2015) has proposed a revision of the treaties with Hungary, Poland, and other countries.

15. This dataset covers all emerging-market economies in our sample, except Croatia, Poland, and Slovakia.

16. Data are available only until 2013. For more details on this dataset, see Fernández et al. (2015).

17. Data are available only from 2006 on. (*Source*: home.kpmg.com/xx/en/home/services/tax/tax-tools-and-resources/tax-rates-online/corporate-tax-rates-table.html.)

18. An alternative and presumably better measure is to use the ratio of foreign income tax payments to foreign pretax income from benchmark survey data reported by the US Bureau of Economic Analysis (U.S. Direct Investment Abroad (USDIA): Revised 2009 Benchmark Data—Income Statement, Table D1, www.bea.gov/international/usdia2009r.htm). Unfortunately, the information is available only for 10 countries in our sample.

19. Using a different methodological approach and data on German firms, Gumpert, Hines, and Schnitzer (2016) find that the higher the average tax rate in the countries where a firm's affiliates are located, the more likely it will shift profits to its tax haven affiliate.

relation between FDI equity inflows and debt outflows. This correlation is consistent with the hypothesis that some of the high correlations in figure 1 reflect in part hedging of currency and country risks by foreign investors. We leave more detailed explanation of these patterns to further research.

CONCLUSIONS

FDI inflows and outflows are highly correlated, even at high frequency and using different methodologies. FDI flows to emerging-market economies appear to respond to the US policy rate, even at high frequency. This suggests that "measured" FDI gross flows are quite different from true FDI flows and may reflect flows through rather than to the country, with stops due in part to (legal) tax optimization. This must be a warning to both researchers and policymakers.[20]

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20. Obviously, this is not to deny that some of the measured FDI is true FDI and has a significant impact on growth in both developed and developing countries. See, for example, Oldenski and Moran (2015).

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