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Development aid and illicit capital flight: Evidence from Nepal

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Sven Steinkamp and Frank Westermann

ABSTRACT

While illicit capital flight is a major concern of policy makers in developing countries, there is only little research on the possible link between capital flight and development aid. In this paper, we address the issue for Nepal, a stereotypical financially-closed developing economy that is highly dependent on resources from abroad. Distinguishing features of our approach are the use of a narrowly defined proxy of capital flight, based on trade-cost adjusted mirror trade statistics, and the focus on the foreign-exchange cash component of development aid. We document a robust partial correlation between aid and outward capital flight that is economically and statistically significant. Based on three comparisons, we consider this correlation to be indicative of a causal link. First, we compare aid to remittances, an alternative form of foreign-exchange inflows where the capital flight motivation is absent. Second, we compare the FX-cash component to broader aid definitions that include in-kind transfers. Finally, we compare the subcomponents of export underinvoicing and import overinvoicing and show that only the latter is driving our results.

JEL CODES: F24; F32; F35.

KEYWORDS: Capital Flight; Development Aid; Remittances; Trade Misinvoicing.

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1. Introduction

The (in)effectiveness of development aid has been analyzed from both macro and micro perspectives,¹ but surprisingly little research has looked directly at the balance of payments and the illicit capital in-and-outflows that remain unrecorded in the official statistics. Nepal provides an interesting case study in this context as sizable amounts of foreign-currency from aid and remittances are sent every year to a country with a tightly controlled capital account.² In this paper, we show that development aid—unlike remittances or other official inflow components—has the unwelcome side effect of triggering sizable illicit capital outflows. We analyze the mechanism behind this result and document that the overinvoicing of imported goods is the key driving factor.

The potential of development aid to cause private capital outflows was first recognized by Bauer (1981) and was theoretically motivated and empirically studied by Collier *et al.* (2001; 2004). So far, the empirical evidence on the aid-capital flight nexus is mixed and leans toward a positive effect; i.e., official inflows trigger further private capital inflows (see also Lensink *et al.*, 2000; Hermes and Lensink, 2001). Apart from Collier (2001), these empirical studies treat aid inflows as a relevant control variable but put little emphasis on it.

A distinguishing feature of our paper is the use of a narrower definition of development aid and a narrower definition of capital flight. For the aid variable, we consider only foreign-exchange (FX) cash transfers, by using a novel dataset from the central bank of Nepal (Nepal Rastra Bank). Regarding the capital flight measure, we consider the concept of trade misinvoicing, which is conceptually linked more closely to the potential outflow effect and is seen as most relevant by policymakers in Nepal.³ Earlier research has instead focused on the World Bank Residual measure of capital flight, a broad definition that also includes unrecorded portfolio flows, foreign direct investment, and general measurement errors in the balance of payments. Moreover, earlier studies have used the Organization for Economic Co-operation and Development's (OECD) broad definition of net official development assistance that includes in-kind transfers for which the capital flight motivation is weak. For Nepal, the FX cash component of aid makes up around half of total aid.

¹ A few contributions are Bourguignon and Sundberg (2007), Rajan and Subramanian (2008), Hansen and Tarp (2001), Doucouliagos and Paldam (2009), Dreher *et al.* (2015), and Minasyan *et al.* (2017).

² Nepalese are barred from making any foreign investments abroad through the *Act Restricting Investment Abroad*, 2021 (1964).

³ Policymakers in Nepal consider trade misinvoicing to be a main channel of capital flight; see, e.g., an interview with Maha Prasad Adhikari (former deputy governor of the Nepal Rastra Bank) in the *Kathmandu Post*, April 11, 2016.

We construct our proxy of illicit capital flight based on the concept of trade misinvoicing (TMI). In financially-closed economies like Nepal, capital is often moved across borders via exports or imports by manipulating the bills upwards or downwards.⁴ Using trade statistics recorded by the statistical offices of Nepal and its trading partners—for the same transactions—we construct a time series that illustrates how Nepal’s TMI index has evolved. We refine this proxy by taking into account the trading-partner and direction-specific transport costs, which in other studies have often been assumed to take a constant value of 10%. We mainly observe net capital outflows from Nepal, but interestingly the politically most stable period, after the Maoist insurgency and before the earthquake, also witnessed sizable illicit inflows. The largest illicit outflows are observed after the earthquake in 2015 (see Figure 1 below).

To explain the evolution of trade misinvoicing in Nepal, we set up a standard regression specification that explains the pattern by fundamental variables, such as interest rate spreads, real GDP growth rates, trade openness, and country-specific events, such as the 2015 earthquake or the subsequent India trade blockade. In particular, interest differentials appear to be a driving factor, consistent with standard portfolio theory. In the second part of the regression analysis, we add different definitions of aid flows. Among potential candidates, the development aid in the form of FX cash transfers, multilateral loans, and grants (including in-kind transfer), we find that only the former has a positive and significant impact on capital flight. Other forms of aid are statistically insignificant and have conflicting signs, thus confirming the lack of systematic evidence in the earlier literature.

Our findings are consistent with the view that the aid money transferred to help the country purchase critically needed goods, such as medical or construction equipment and IT hardware and software, is diverted, at least in part, to purchase investments assets abroad. These donated goods might be purchased at overpriced rates and thus might provide an opportunity for the buyer to circumvent capital controls and move capital out of the domestic economy. This behavior would explain the discrepancies in mirror-trade statistics, the disappointing track record of development aid, and the correlation of aid with our TMI measure.⁵

⁴ The leakage of the Panama papers, for instance, revealed substantial circumventions of Nepal’s capital controls; see, e.g., “Nepalis in tax havens, Swiss banks, money laundering,” *Nepali Times*, January 17, 2019, as well as “Nepalis parking wealth in Swiss banks,” *The Himalayan Times*, July 2, 2018.

⁵ Not only Nepalese recipients in donor countries may be involved but also companies. Nepal’s former finance minister, Madhukar SJB Rana, argued that “the German aided Marsyangdi project [...] was a case of ‘aid in reverse’ by implementing a project that was 5 times higher than the actual market price [...] 70–80 % of all aid flows back to the donor country and no more than 10% to the beneficiaries [...]” *Spotlight Nepal*, August 17, 2018. For empirical evidence on the link between aid and exports, see also Martínez-Zarzoso *et al.* (2014).

The remittances sent to Nepal by its working population abroad serve as a counterexample to this hypothesis. While aid from official donors abroad may be susceptible to being diverted by the recipient, a similar behavior is unlikely to be tolerated by foreign workers supporting their families back home. In this case, the money was initially earned in a foreign country and was thus out of reach for Nepalese capital controls and tax authorities. If capital flight was the objective, they might as well have kept the money abroad instead of first sending it home via official money transfer-companies and paying a sizable fee along the way. In our regressions, we find remittances to behave remarkably different from development aid, as an increase in remittances is associated with a further net *inflow* of illicit capital. If there is a desire to bring money into the country, the citizens working abroad apparently use both official and unofficial channels.

In a further attempt to identify the mechanism, we decompose the overall index of net TMI into its subcomponent of import overinvoicing (IOI) and export underinvoicing (EUI). We find that (i) the largest share of trade misinvoicing in Nepal is indeed occurring via import overinvoicing and (ii) only the IOI component reacts in response to inflows of development aid. This is plausible, as development aid is largely given to the recipients to finance imports. While in principle, EUI could be a vehicle for capital flight, it is not directly linked to the inflow of development aid.

Finally, robustness tests include different treatments of residual autocorrelation, extended sets of control variables, and different trade cost assumptions in the calculation of our TMI measure. We also formally confirm that aid is an exogenous variable in our regression specification. We nevertheless illustrate that our key findings are robust to instrumental variable (IV) estimates, where we exploit heteroscedasticity in the data to form a set of valid internal instruments in the absence of convincing external instruments (Lewbel, 2012). Overall, we find a robust positive effect of FX aid inflows on illicit capital flight that is statistically significant and economically sizable.

The rest of the paper is organized as follows: The data are shown in Section 2, in particular the construction of our index on trade misinvoicing. In Section 3, we provide a preliminary statistical analysis and establish the main results based on a multivariate regression analysis. Sensitivity tests and further analyses are reported in Sections 4 and 5, respectively. Section 6 concludes the paper with some policy implications.

2. Data and descriptive statistics

Trade misinvoicing is a well-established phenomenon that has been used to analyze capital flight patterns in many studies (e.g., Bhagwati, 1964, 1981; Cardoso and Dornbusch, 1989; De Wulf, 1981; Fisman and Wei (2004); Ferrantino *et al.* (2012); Cheung *et al.* 2016, 2020). The value of merchandise traded between two economies is recorded independently by two different statistical agencies, in the domestic and the foreign country. By overinvoicing imports, the cross-border payment exceeds the true value of the corresponding good and thus provides the resources to invest abroad, even when any official foreign investment is forbidden or subject to strict rules. Analogously, exports could be underinvoiced to move capital out of the country. To quantify the total level of trade misinvoicing, we thus compare the trade data reported by Nepal and its trading partners, both taken from the International Monetary Fund (IMF) Directions of Trade Statistics.

One practical limitation of the proxy is that export data are reported at free on board (FOB) prices and imports at cost, insurance, and freight (CIF) prices. Thus, there already exists a wedge between the two values, even in the absence of any fraudulent behavior. To capture this institutional aspect, we incorporate a variable *CIF* to correct the CIF effect in calculating Nepal's export underinvoicing, *EUI*:

$$EUI = \sum_i^p [XW_{i,t} - XC_{i,t}*(1+CIF)], \quad (1)$$

where $XW_{i,t}$ is economy i 's reported value of imports from Nepal, $XC_{i,t}$ is Nepal's reported value of exports to country i , p is the number of economies importing from Nepal, and *CIF* facilitates a fair comparison of the reported values of exports and imports. Similarly, we calculate Nepal's import overinvoicing, *IOI* as

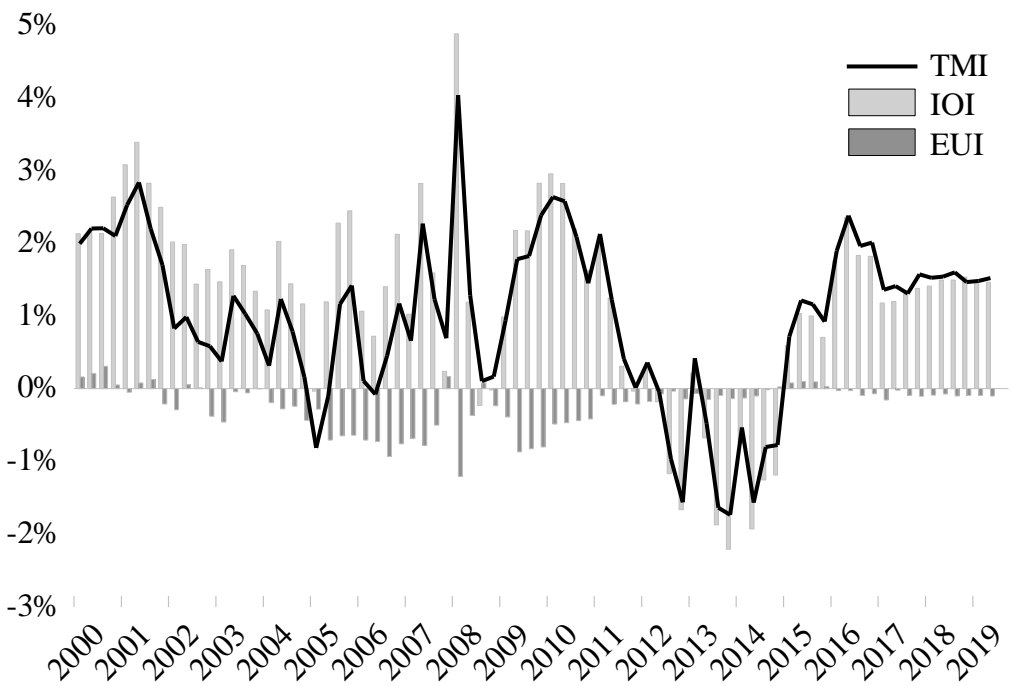
$$IOI = \sum_i^q [MC_{i,t} - MW_{i,t}*(1+CIF)], \quad (2)$$

where $MC_{i,t}$ is Nepal's reported value of imports from country i , $MW_{i,t}$ is economy i 's reported value of exports to Nepal, and q is the number of economies exporting to Nepal. The total amount of Nepal's capital flight via trade misinvoicing is the sum of export underinvoicing and import overinvoicing. Henceforth, the sum is our TMI measure of capital flight:

$$TMI = EUI + IOI. \quad (3)$$

Early papers analyzing trade misinvoicing typically assume that $CIF = 10\%$.⁶ This approach neglects any differences in trade costs across countries that are caused (e.g., by the distance of trading partners or other geographical features, as in the case of Nepal) by the absence of direct access to any major trade port. Only very seldom have trade costs been taken into account that have been estimated based on actual observed data. In our paper, we follow the approach of Cheung *et al.* (2020), who exploit a new dataset by the OECD (International Transport and Insurance Costs of Merchandise Trade, ITIC) to infer and back out the CIF estimate, that is not only country-specific but also varies with trading partners and trade direction.⁷

Figure 1: TMI and Components



Note: The solid line shows our estimate of trade misinvoicing (TMI) and, as bars, the two components—import overinvoicing (IOI) and export underinvoicing (EUI). All values are expressed as a percentage of annual nominal GDP. See equations (1) to (3) and Appendix A for definitions.

Figure 1 displays the historical evolution of net TMI standardized by nominal GDP for the period from 2000Q1 to 2019Q3. Positive values indicate outflows and negative values indicate inflows. For most of the period, Nepal has experienced illicit capital outflows, which

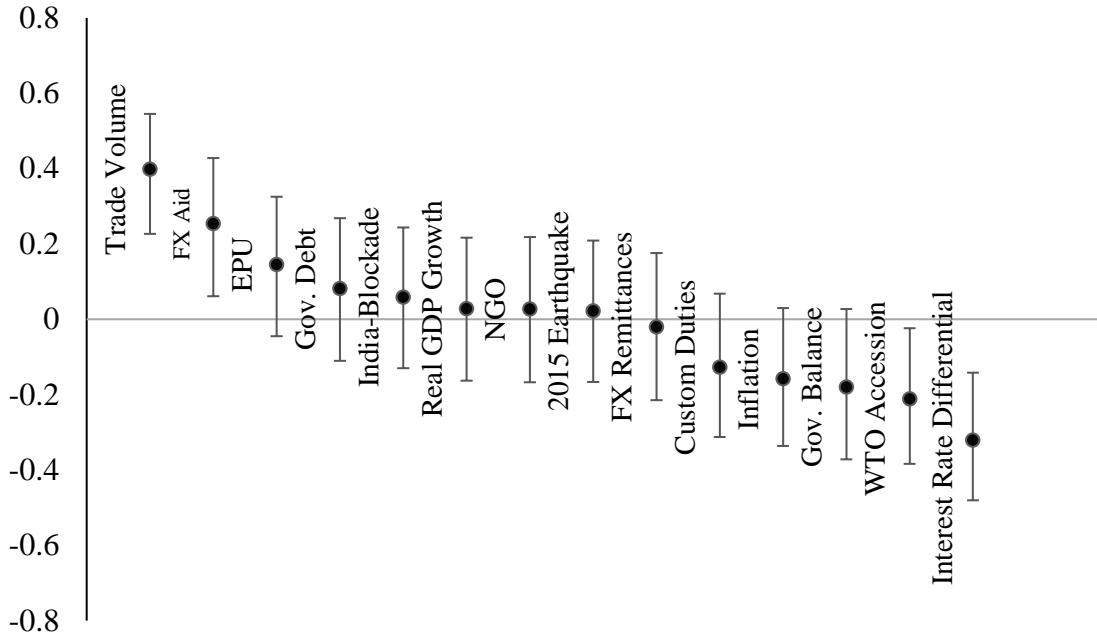
⁶ See, e.g., Beja (2008), Buehn and Eichler (2011), Patnaik *et al.* (2012), and Kar and Freitas (2012). The $CIF = 10\%$ assumption is often justified by referring to the IMF. The IMF (2015) argues that “the 10 percent c.i.f./f.o.b. factor represents a simplified estimate of these costs, which vary widely across countries and transactions.” For evidence on the variation of trade costs along several dimensions, see, e.g., Hummels (2007), Jacks *et al.* (2008), or Wei *et al.* (2020).

⁷ A subset of countries reports their imports in both CIF and FOB, which allows the OECD to estimate the missing values from a gravity-type equation model (Miao and Fortanier, 2017).

in absolute terms have been particularly high in the period after the 2015 earthquake. When standardized by GDP, remarkable periods of capital outflows are also visible in the early part of our sample, which declined after the tragic events of the royal family and the subsequent Maoist insurgency in mid-2001. While there have been individual quarters with large net outflows in the following years, a more continuous outflow pattern only emerged after Nepal became a republic in 2008 and lasted until about 2011. From 2011 until the earthquake in 2015, the picture substantially changed, and Nepal experienced net capital inflows rather than outflows. Since the earthquake, the illicit outflows have again been quite sizable and continuously positive.

Before formally analyzing the partial impact of development aid on trade misinvoicing, we first highlight the unconditional correlations, which already indicate the pattern: The seasonally adjusted ratio of FX development aid to GDP has a positive correlation with capital flight of 0.25 and is statistically significant at the 5% level, with a p -value of 0.03. It is among the strongest correlations, next to trade volume, and the interest rate differential, the most often used explanatory variable in the literature. Interestingly, and in contrast to aid flows, we do not find remittances to be correlated with capital flight—a first revealing indication that aid flows indeed stand out among the official capital flow variables.

Figure 2: Bivariate Correlations with TMI



Note: Dots represent bivariate Pearson correlation coefficients between our capital flight trade misinvoicing (TMI) measure and the respective variables. Bars indicate 90% confidence intervals calculated using Fisher’s z transform. See Appendix A for variable definitions and sources.

3. A baseline specification

3.1. Preliminary analysis: Forming a benchmark regression

We start our empirical analysis by developing a benchmark regression that takes standard variables in the literature into account. In equation (4), these variables include three sets of controls:

$$Y_{i,TMI} = \alpha + \lambda'X_t + \theta'C_t + \delta'N_t + \varepsilon_t. \quad (4)$$

The first group, captured by the vector X_t , includes several theoretically motivated control variables. Most prominently, it includes the interest differential between Nepal and the United States, which is intended to capture portfolio effects (Dornbusch, 1984),⁸ a variable of de facto trade openness, as suggested by Aizenman (2008); a measure of economic policy uncertainty (EPU) (Hermes and Lensink, 2001; Le and Zak, 2006); and customs duties (Slemrod and Yitzhaki, 2002). The second vector of variables, C_t , includes canonical macroeconomic control variables commonly used in the empirical capital flight literature (see, for instance, Cheung *et al.*, 2016, 2020), i.e., government debt, the government budget balance, real GDP growth, and inflation. Finally, we include a set of Nepal-specific factors, N_t : a dummy variable capturing the trade blockade from India, the earthquake in 2015, and the World Trade Organization (WTO) accession of Nepal; and another variable to capture aid fragmentation proxied by the change in the number of active non-governmental organizations (NGOs).

Table 1 reports the results of this preliminary regression. The negative coefficient on the interest rate differential in Column (1) reflects that an increase (decrease) in returns on capital in Nepal, vis-à-vis the United States, is associated with a net inflow (outflow) of capital, consistent with standard portfolio theory. Furthermore, higher trade openness leads to more (outward) capital flight, a result that is particularly plausible, as trade is the vehicle of capital flight captured by our TMI measure. The more trade there is, the more bills can be overinvoiced/underinvoiced. Greater trade openness may also result in more blind spots at customs, as it increases the effective costs of enforcing financial repression (see Aizenman, 2008).

Economic policy uncertainty (EPU), another likely factor for capital flight, is insignificant in Column (1) of Table 1 but is significant at 10% after the recursive estimation in Column (4). In this regression, we follow a stepwise regression procedure to derive an

⁸ See also Cuddington (1986, 1987) and Diwan (1989).

efficiently estimable model free of substantial omitted variables bias. Starting from the full specification, we drop the variable yielding the coefficient with the lowest t -statistic and re-estimate the model. We repeat these steps until all remaining variables are statistically significant at the 10% level at least. Last, starting from the parsimonious specification, we re-add previously dropped variables one by one and keep them in the specification if they turn out to be statistically significant.

Table 1: Baseline Specification

| Dependent Variable: TMI [% GDP] | | | | |
|---------------------------------|---------------------|--------------------|--------------------|---------------------|
| Variables | (1) | (2) | (3) | (4) |
| Interest Rate Differential | -0.193*** (3.56) | -0.148* (1.95) | -0.106 (1.12) | -0.225*** (4.14) |
| Trade Openness | 0.335*** (3.89) | 0.360*** (2.96) | 0.432*** (4.23) | 0.372*** (6.62) |
| EPU Nepal | 0.785 (1.34) | 1.019 (1.61) | 1.053 (1.58) | 0.920* (1.73) |
| Custom Duties | 0.001 (0.02) | -0.009 (0.12) | -0.002 (0.03) | |
| Gov. Debt | | -0.007 (0.42) | 0.033 (1.32) | |
| Gov. Balance | | -0.120 (0.81) | -0.100 (0.69) | |
| Real GDP Growth | | -0.224 (0.67) | 0.221 (0.51) | |
| Inflation | | -0.022 (0.38) | -0.040 (0.68) | |
| India-Blockade | | | 2.459*** (3.12) | 1.616*** (4.83) |
| 2015 Earthquake | | | 1.662** (2.63) | 1.073*** (4.21) |
| WTO Accession | | | -0.214 (0.49) | |
| NGO | | | 0.003 (1.65) | |
| Constant | -1.433 (1.11) | -1.467 (0.80) | -5.830** (2.37) | -1.725*** (2.71) |
| Adj. R2 | 0.29 | 0.24 | 0.33 | 0.37 |
| Observations | 73 | 63 | 63 | 77 |

Notes: The table shows OLS estimates with robust t -statistics in parentheses. *, **, *** indicate variables significant at the 10%, 5%, and 1% level, respectively.

The EPU coefficient indicates that higher uncertainty about policies in Nepal drives capital out of the country. The average level of customs duties, a variable that could potentially have an impact, as it constitutes a motive to move capital across borders illegally, has the

expected sign but is statistically insignificant.⁹

A bit surprisingly, none of the additional macro variables are statistically significant. They are neither significant when added as a block of variables, nor do they resurface when dropping insignificant variables in the recursive estimation to enhance the regression's efficiency in Column (4). Finally, the two country-specific dummy variables, capturing the 2015 earthquake and the India trade blockade, turn out to be significant, both exhibiting a plausible positive impact on net outflows. Nepal's date of WTO accession, as well as the number of NGOs operating in Nepal, are statistically insignificant.¹⁰

3.2. Identifying the Mechanism

As a next step, we add a set of official inflow variables, captured by the variable *FX aid* and vector *R* in equation (5). They include foreign aid, specifically the cash component of foreign aid that is entering the country in foreign currency. Furthermore, subsumed in the vector *R*, we include FX remittances, multilateral loans, and grants (including in-kind). Among the loans, we also consider the subset of loans provided by the IMF.

$$Y_{i,TMI} = \alpha + \lambda'X_t + \theta'C_t + \delta'N_t + \beta'Aid_t + \mu'R_t + \varepsilon_t. \quad (5)$$

Table 2 illustrates that several of these variables have a significant partial correlation with capital flight. Regarding the FX aid variable, the multivariate regression confirms the impression from the simple correlation; i.e., we find it to be positive and statistically significant at the 1% level. The same is also the case for the remittances but interestingly with the opposite sign. While an increase in foreign aid is associated with (outward) capital flight, an increase in remittances is associated with further inflows. This remarkable difference is a key finding of our paper. It is consistent with the view that development aid that enters Nepal in foreign currency is used to import goods at feigned overpriced rates, intending to move capital abroad. Remittances, in contrast, do not have this feature and instead signal the citizens' preference to move money into the country.¹¹

The other variables, multilateral loans and grants, either have a much smaller coefficient

⁹ The positive coefficient is in line with country case studies for China, India, and Germany (see Fisman and Wei, 2004; Javorcik and Narciso, 2008; Mishra *et al.*, 2008; Ferrantino *et al.*, 2012; Cheung *et al.*, 2016, 2019).

¹⁰ This does not constitute a puzzle, as both variables capture opposing effects. While the accession to the World Trade Organization came with improvements in customs practices, it also reduced incentives to misinvoice as average tariffs declined. Further, it is known from the aid effectiveness literature that the effect of aid fragmentation, captured by the NGO variable, is sector- and country-specific (Gehring *et al.*, 2017).

¹¹ This observation is consistent with the poverty reducing effect of remittances in Nepal (see, e.g., Wagle and Devkota, 2018).

or are statistically insignificant, but they generally have the same sign as the FX aid variable. The only exceptions are the IMF loans that, although statistically insignificant, have a dampening effect on capital outflows reminiscent of the catalytic effect of IMF lending (Corsetti *et al.*, 2006; Morris and Shin, 2006).

In the last column of Table 2, we again go through the stepwise regression routine. When considering the size of the coefficient in this last column, not only the significance level but also the magnitude of the coefficient of FX aid flows is striking: Our estimates imply that for every US dollar worth of FX aid inflows, 92 cents are moved out of the country. The following robustness test and further refinements are intended to both validate the impact's statistical significance as well as the magnitude of the point estimate.¹²

As an alternative way to pin down the identification analysis, we considered different variants of the definition of trade misinvoicing. So far, following the bulk of the literature, we have considered the net concept of trade misinvoicing, which is the sum of export underinvoicing and import overinvoicing. However, outward capital flight is much easier to implement via import overinvoicing, as illustrated by the example given in the introduction.

We follow up on this idea in Table 3. For easy reference, we first repeat the estimates with our TMI measure as the endogenous variable. Then, in Columns (2) and (3), we estimate the regressions for IOI and EUI separately. The striking finding is that the results for the TMI series are indeed driven by IOI, which does not come as a surprise given the time-series dynamics displayed in Figure 1 earlier. The FX Aid coefficient on EUI is slightly negative and close to zero. Statistically, it is insignificant. By contrast, the aid coefficient on IOI is close to one and significant at the 5% level.

We also address a typical shortcoming in the capital flight literature, as the TMI series is often based on the ad-hoc assumption of 10% trade cost. This assumption is inadequate, and thus we choose to compute the trade cost for each trading partner separately in our baseline regression. Columns (4) and (5) illustrate that this fine-tuning of the capital flight index is not driving our main results, as the impact of FX aid on TMI is also present when using either the standard 10% assumption or, alternatively, an average trade cost assumption across all countries.

¹² In a passing, we note that Table B4 of Appendix B confirms the included variables to be stationary, except for the interest rate differential where we cannot reject the null of a unit root.

Table 2: FX Aid vs. Remittances and in-kind Transfers

| Dependent Variable: TMI [% GDP] | | | | | | | |
|---------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| Variables | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| Interest Rate Differential | -0.150*** (2.77) | -0.103* (1.85) | -0.218*** (4.04) | -0.234*** (4.19) | -0.163*** (3.10) | -0.099* (1.87) | -0.095* (1.90) |
| Trade Openness | 0.390*** (7.37) | 0.474*** (6.57) | 0.372*** (6.54) | 0.374*** (6.40) | 0.396*** (6.55) | 0.447*** (6.08) | 0.461*** (6.58) |
| EPU Nepal | 0.954* (1.94) | 0.957* (1.92) | 0.899* (1.69) | 0.946* (1.75) | 0.911* (1.70) | 0.948* (1.87) | 0.990** (2.11) |
| India-Blockade | 1.497*** (4.17) | 2.035*** (4.34) | 1.669*** (4.76) | 1.701*** (4.13) | 1.682*** (4.80) | 1.823*** (3.85) | 1.826*** (3.90) |
| 2015 Earthquake | 1.471*** (4.98) | 1.544*** (4.75) | 0.974*** (3.66) | 1.080*** (4.25) | 0.875*** (3.47) | 1.377*** (3.51) | 1.765*** (5.52) |
| FX Aid | 1.125*** (2.80) | | | | | 0.829* (1.82) | 0.928** (2.17) |
| FX Remittances | | -0.222*** (3.50) | | | | -0.101 (1.07) | -0.158** (2.17) |
| Multilateral Loans | | | -0.127 (0.87) | | | -0.151 (0.81) | |
| Of Which: IMF Loans | | | | -1.192 (0.82) | | 0.177 (0.15) | |
| Grants, Incl. in-Kind | | | | | 0.280 (1.17) | 0.187 (0.84) | |
| Constant | -3.189*** (4.52) | -2.368*** (3.62) | -1.801*** (2.69) | -1.707** (2.64) | -2.622*** (3.80) | -3.554*** (4.38) | -3.280*** (4.92) |
| Adj. R2 | 0.41 | 0.39 | 0.37 | 0.37 | 0.37 | 0.39 | 0.43 |
| Observations | 72 | 72 | 77 | 77 | 68 | 68 | 72 |

Notes: The table shows OLS estimates with robust *t*-statistics in parentheses. *, **, *** indicate variables significant at the 10%, 5%, and 1% level, respectively.

Table 3: Import Overinvoicing versus Export Underinvoicing

Dependent Variable: TMI [% GDP]

| | (1) | (2) | (3) | (4) | (5) |
|----------------------------|---------------------|---------------------|--------------------|---------------------|------------------------------|
| | Benchmark | TMI Components | | CIF Assumption | |
| Variables | TMI | IOI | EUI | Ad-hoc 10% CIF | ØCIF (7.9% Imp; 9.8% Exp) |
| Interest Rate Differential | -0.095* (1.90) | -0.177*** (2.92) | 0.078*** (3.96) | -0.096* (1.92) | -0.096* (1.90) |
| Trade Openness | 0.461*** (6.58) | 0.475*** (6.41) | -0.011 (0.31) | 0.421*** (5.97) | 0.440*** (6.24) |
| EPU Nepal | 0.990** (2.11) | 0.953* (1.94) | 0.045 (0.47) | 0.984** (2.13) | 0.984** (2.12) |
| India-Blockade | 1.765*** (5.52) | 2.186*** (6.36) | 0.259*** (2.78) | 1.792*** (5.63) | 1.774*** (5.56) |
| 2015 Earthquake | 1.826*** (3.90) | 1.846*** (3.91) | 0.207** (2.12) | 1.802*** (3.83) | 1.808*** (3.85) |
| FX Aid | 0.928** (2.17) | 0.987** (2.13) | -0.005 (0.05) | 0.940** (2.19) | 0.936** (2.18) |
| FX Remittances | -0.158** (2.17) | -0.338*** (4.52) | -0.028 (1.03) | -0.175** (2.40) | -0.163** (2.24) |
| Constant | -3.280*** (4.92) | -1.915** (2.55) | -0.431 (1.30) | -3.121*** (4.63) | -3.220*** (4.79) |
| Adj. R2 | 0.43 | 0.49 | 0.21 | 0.40 | 0.41 |
| Observations | 72 | 72 | 72 | 72 | 72 |

Notes: The table shows OLS estimates with robust *t*-statistics in parentheses. *, **, *** indicate variables significant at the 10%, 5%, and 1% level, respectively.

4. Specification issues and estimation methodology

We start the sensitivity analysis by focusing on technical aspects of the regression equation. In Table 4, the first three columns address possible autocorrelation in the residuals of our regression. In Column (1), we report the regression results based on Newey-West adjusted standard errors (including four lags), while in our baseline regression we applied the more common White-adjustment to the standard errors. In the second column, we use the Prais-Winston transformation to iteratively estimate a quasi-differenced model, taking into account potentially first-order serially correlated residuals. Finally, in Column (3), we explicitly include an autoregressive term of order one in the regression specification.

Using maximum likelihood (rather than OLS, ordinary least squares), we jointly estimate the autocorrelation coefficient and explanatory variables' coefficients. In all three specifications, the FX aid variable remains statistically significant, at least at the 10% level. The coefficient, however, is substantially smaller in Columns (2) and (3), falling to 0.504 and 0.560, respectively. Theoretically, it is not clear which one of the two approaches is more reasonable. While our benchmark specification might include an upward bias, the estimates in Columns (2) and (3) constitute an underestimation of the true impact, as the lagged errors terms also include shocks emanating from the FX aid variable. As our dataset is too small to estimate a full VAR specification, we choose to report the coefficient size as an interval, ranging from about 0.5 to 0.9.

A further technical issue is the potential endogeneity of our main variables, TMI and FX Aid. Although a reverse causality does not follow from an obvious mechanism, it could be the case that both variables are driven by third variables and are thus jointly determined. For example, aid donors may either increase or decrease their contributions in response to changes in the country's economic policy uncertainty. To rule out this possibility, Column (4) shows partial correlations (in the narrow sense) of each variable with the TMI series; i.e., before the correlation is computed, the effect of all other variables is partialled out from both variables. Put differently, displayed values are identical to the bivariate correlation between the two residual series of regressing TMI and the respective variable on all other explanatory variables. Again, the FX aid variable remains highly significant, with a correlation coefficient that roughly resembles the estimate reported earlier in the descriptive statistics.

Finally, we employ an IV strategy that enables us to identify structural parameters in the presence of potential endogeneity. To generate statistically valid internal instruments, we take advantage of recent advancements in time-series econometrics that exploit the

heteroscedasticity in our dataset. By imposing higher-moment restrictions, this approach yields consistent estimates even when valid external instruments are unavailable or weak (Lewbel, 2012).¹³ Column 5 shows that when using the instruments in a two-stage GMM estimation, the FX aid coefficient remains highly statistically significant. Also, our original benchmark estimate still falls within the somewhat wider confidence interval of the IV point estimate. Our instruments are statistically valid in the sense that we can reject the null of underidentification and do not need to reject the null of overidentification.

Further, when re-estimating the IV regression using a weak-instrument robust inference approach, the coefficient is still positive at the 5% level of statistical significance (Column 6).¹⁴ We also report the results because as weak-instrument test statistics yield conflicting results. While the instruments clearly fulfill the common rule of thumb of an F-statistic exceeding 10, in contrast, a Kleibergen-Paap rk-statistic of 2.29 casts doubt on the strength of the instruments. However, even with the strict yardstick of weak-instrument robust inference, the regression results confirm a positive point estimate. Interestingly, the IV estimates of both yield coefficients larger than one. Note, however, that due to the loss of estimation precision in comparison to OLS, the standard errors are larger and the IV estimates are not significantly different from our baseline estimations. This finding is confirmed by a C-test (i.e., based on the difference in Sargan-Hansen statistics between the IV model where aid is treated endogenously versus the OLS model where aid is modeled to be exogenous), where we do not find evidence for substantial endogeneity. We thus do not draw inference from the magnitude of IV parameters here. It seems feasible in principle, however, that there might even be a full crowding out of FX aid by capital flight.

To summarize, when using various alternative technical approaches, the FX aid variable is always positive, statistically significant, and sizable.¹⁵ This is also true for the control variables trade openness, economic policy uncertainty, and the earthquake dummy but only to a lesser extent for FX remittances, the interest differential, and the India trade blockade.

¹³ Specifically, we use $(Z - \bar{Z})\hat{\varepsilon}_1$ as the identifying instrument, where Z is a vector of exogenous variables excluding the aid variable, \bar{Z} is the vector of means of the Z variables, and $\hat{\varepsilon}_1$ is the residual of the first-stage regression explaining the aid variable with the Z variables. Key to this identification strategy is having regressors that are not correlated with the product of heteroscedastic errors, a common feature of models where error correlations are caused by an unobserved common factor. A Breusch-Pagan test confirms that this assumption is indeed valid in our case. The null of homoscedasticity is rejected with a $\chi^2(1) = 5.30$ at a p -value = 0.021.

¹⁴ Based on the conditional likelihood ratio approach developed by Moreira (2003). See also Andrews *et al.* (2006).

¹⁵ We further tested the sensitivity of our results to the inclusion of a deterministic time trend and seasonal effect dummy variables. In both cases, the results remain remarkable robust, and none of these additional control variables turns out to be statistically significant. Results are available upon request.

Table 4: Specification Issues and Estimation Methodology

Dependent Variable: TMI [% GDP]

| Variables | (1) | (2) | (3) | (4) | (5) | (6) |
|-------------------------------------|--------------------|--------------------|--------------------|----------------------|-------------------------------------|------------------------------------|
| | AUTOCORRELATION | | | SIMULTANEITY | ENDOGENEITY (LEWBEL IV REGRESSIONS) | |
| | Newey-West | Prais-Winston | AR1 | Partial Correlations | 2S-GMM | LIML with weak IV robust inference |
| Interest Rate Differential | -0.095 (1.22) | -0.105 (0.95) | -0.116 (0.94) | -0.197 (1.61) | -0.088* (1.85) | -0.085 (1.70) |
| Trade Openness | 0.461*** (5.54) | 0.343*** (6.06) | 0.346*** (7.70) | 0.614*** (6.23) | 0.448*** (6.65) | 0.441*** (6.16) |
| EPU Nepal | 0.990*** (3.57) | 0.657*** (3.00) | 0.671*** (3.53) | 0.308** (2.59) | 1.023** (2.44) | 1.040** (2.50) |
| 2015 Earthquake | 1.765*** (3.36) | 0.768 (1.24) | 0.878 (0.55) | 0.242** (2.00) | 1.987*** (6.49) | 2.102*** (6.21) |
| India-Blockade | 1.826*** (3.95) | 0.706 (1.23) | 0.701 (1.00) | 0.381*** (3.30) | (partialled out) | |
| FX Aid | 0.928** (2.29) | 0.504* (1.77) | 0.560** (2.44) | 0.287** (2.39) | 1.860*** (2.99) | 2.344** (2.54) |
| FX Remittances | -0.158* (1.74) | 0.024 (0.20) | -0.031 (0.26) | (2.00) (1.73) | -0.093 (0.26) | -0.060 (0.57) |
| R2 | 0.43 | 0.37 | 0.66 | – | 0.44 | 0.37 |
| Observations | 72 | 71 | 72 | 72 | 72 | 72 |
| IV Diagnostics | | | | | | |
| First-Stage F-Stat. | | | | | 46.25*** | |
| Kleibergen-Paap Wald rk F-Stat. | | | | | 2.29 | |
| H ₀ : Underidentified | | | | | 12.83** | |
| H ₀ : Not Overidentified | | | | | 7.776 | 6.965 |
| H ₀ : Aid Exogenous | | | | | 1.061 | 1.061 |
| 95% CI of FX Aid | | | | | [0.64, 3.08] | [0.57, 5.46] |

Notes: Column (1) uses Newey-West adjusted standard errors accounting for autocorrelated residuals up to 4 quarters. Column (2) uses the Prais-Winston variant of the Orchardt transformation. Column (3) includes an AR(1) term, estimated using maximum likelihood. Column (4) shows partial correlations (i.e., the bivariate correlation between the two residual series of regressing TMI and the respective variable on all other explanatory variables). Column (5) and (6) both report IV regressions using $(Z - \bar{Z})\hat{\varepsilon}_1$ as the identifying instrument (see Lewbel, 2012), where Z is a vector of exogenous variables excluding the aid variable, \bar{Z} is the vector of means of the Z variables, and $\hat{\varepsilon}_1$ is the residual of the first-stage regression explaining the aid variable with the Z variables. Whereas Column (5) is estimated using two-step generalized method of moments (2S-GMM) with heteroscedasticity-robust inference, Column (6) is estimated using limited information maximum likelihood (LIML) weak-IV robust inference; i.e., confidence interval and test statistics of the aid coefficient are based on the conditional likelihood ratio approach developed by Moreira (2003). To achieve full rank of the estimated covariance matrix of moment conditions, the variable *India-Blockade* has been partialled out without affecting other coefficients (Frisch-Waugh-Lovell). Regarding IV diagnostics, as a test of underidentification, we used the Kleibergen-Paap rk LM statistics. For overidentification, we used Hansen's J statistic, and the endogeneity test is based on the difference of Sargan-Hansen statistics. *, **, *** indicate test significance at the 10%, 5%, and 1% level, respectively.

5. Further analyses

Having established our main finding, we also report additional analyses in Appendix C, including, for instance, different definitions of economic policy uncertainty. While the policy uncertainty in Nepal seems to be an obvious candidate, we also have data for those countries in which most of the foreign workers of Nepal are employed. While there is no direct link to FX aid, the control variable remittances might be influenced by uncertainty in the host countries as much as by uncertainty in Nepal itself. Table C1 shows that this is not the case, however, and the uncertainty in Nepal is the only significant control variable. The FX remittances variable also remains nearly unchanged when including these additional controls.

Furthermore, we explore several alternative risk indicators in Table C2. We add stock market volatility and exchange rate volatility, as they have been included in other studies on TMI (e.g., Cheung *et al.*, 2016, 2020). We also add to the regression the geopolitical risk index by Caldara and Iacoviello (2019) for the relevant host countries for Nepalese workers abroad. None of these variables, however, turn out to be statistically significant or improve the fit of the regression in terms of the R-squared.

Finally, we analyze different ways of standardizing the data. Table C3 reports the baseline regression where FX aid is standardized by GDP (Column 1) and is given in million US dollars (Column 2), in logs (Column 3), relative to remittances (Column 4), as a percentage of total FX inflows (Column 5), and without seasonal adjustment (Column 6). Also, instead of standardizing the TMI variable by GDP, we standardize it by trade volume in Column (7). The impact of FX aid on TMI remains statistically significant in all variations

6. Conclusions

In this paper, we have shown substantial capital inflows and outflows via trade misinvoicing in Nepal and have analyzed the determinants of this type of illicit capital flight. Our findings are relevant for several debates in the literature: First, they contribute to the understanding of development aid's ineffectiveness, which has spurred intensive academic debates and has been documented, for example, by Rajan and Subramanian (2008) and Dreher and Lohmann (2015). Furthermore, our findings add to the understanding of capital flight patterns in developing countries, suggesting that official inflows, such as aid and remittances, are an important explanatory variable not typically considered in the literature. Finally, our findings may re-open the debate on cash transfers versus in-kind development aid (see, for instance, Hidrobo *et al.*, 2014; Lei *et al.*, 2007). Also, budget aid has recently been considered superior to project aid,

as it does not ignore the recipient countries' preferences and avoids welfare losses from large-scale prestige projects (see Cordella and Dell'Araccia, 2007).¹⁶ When tied to specific purposes such as schools or water wells, the FX inflows may be easily diverted for other purposes, not only for other forms of domestic consumption but also for capital flight abroad. A donation for a school in Nepal—in particular when well endowed—may end up not only financing the school, but also the recipients' house abroad.

Of course, caution is always in order when interpreting evidence on illicit capital flight. There is a long dispute between the trade literature and international finance literature on the interpretation of mirror-trade statistics. While we address some of the issues in this paper, in particular the country-specific trade cost estimation, not all problems are solved, such as the time-varying nature of trade costs and the issue of entre-port trade. Furthermore, data quality issues cannot be ignored despite our efforts to control for them. When no hard data are available, the reliance on proxies is always a second-best approach in empirical research.

Despite the potential shortcomings, the empirical finding of our analysis may be considered useful by policy makers as well as academics contributing to the ongoing capital flight and aid debate, as it uncovers a new channel of capital flight and substantiates the concerns of earlier researchers whose evidence has so far remained inconclusive.

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¹⁶ See also Koeberle *et al.* (2006).

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Appendix A: Variable Definitions and Data Sources

TMI (Trade Misinvoicing). The net trade misinvoicing measure is given by the sum of export underinvoicing and import overinvoicing; i.e., $TMI = [XW_{i,t} - X_{C_{i,t}}(1+CIF)] + [MC_{i,t} - MW_{i,t}(1+CIF)]$, where $XW_{i,t}$ is economy i 's reported value of imports from Nepal, $X_{C_{i,t}}$ is Nepal's reported value of exports to country i , $MC_{i,t}$ is Nepal's reported value of imports from country i , $MW_{i,t}$ is economy i 's reported value of exports to Nepal, p is the number of trading partners, and CIF is the country- and direction-specific estimate of the CIF/FOB rate by the OECD. TMI is expressed as a percentage of nominal GDP. Positive values indicate outward capital flight. Data sources: Directions of Trade Statistics (IMF) and International Transport and Insurance Costs of Merchandise Trade (OECD) by Miao and Fortanier (2017).

OTHER VARIABLES (IN ALPHABETICAL ORDER):

2015 Earthquake. Dummy variable given by the indicator function $I(t = 2015Q2)$, capturing the 7.8 M_w earthquake of April 25, 2015, and its aftershocks.

Customs Duties. Average customs duties on imports (i.e., the sum of government revenue from tariffs and import VAT relative to the total value of imports). Data source: Nepal Rastra Bank (Code: GRCCUS) via NepStat.

EPU (Economic Policy Uncertainty). Change in the global- or country-level index of economic policy uncertainty, based on the relative frequency counts of the term "uncertainty" in country reports of the Economist Intelligence Unit. Source and description: Ahir *et al.* (2018), Baker *et al.* (2016).

Exchange Rate Volatility. The empirical standard deviation of daily logged levels of the Nepalese Rupee exchange rate against the US dollar (NRB buy rate). Data source: CEIC (Code: SR4381242).

FX Aid. Received foreign aid payments in convertible foreign currency (i.e., all except Indian rupees). If not specified otherwise (e.g., Table C3), it is expressed as a percentage of nominal GDP. It is seasonally adjusted using X-13-ARIMA. Data source: NRB Quarterly Economic Bulletin (Table "Receipts and Expenditures of Convertible Foreign Exchange").

FX Remittances. Received remittances payments in convertible foreign currency (i.e., all except India Rupees), expressed as a percentage of nominal GDP. Data source: NRB Quarterly Economic Bulletin (Table "Receipts and Expenditures of Convertible Foreign Exchange").

Gov. Balance. General government's operational balance as a percentage of nominal GDP. Positive/negative values indicate surpluses/deficits. It is seasonally adjusted using X-13-ARIMA. Data are misaligned by one month (the fourth quarter, e.g., refers to the period ending January 31). Data sources: CEIC (Codes: SR127545177, SR4376056).

Gov. Debt. General government debt as a percentage of nominal GDP. Linearly interpolated from annual to a quarterly frequency. Data source: NRB Quarterly Economic Bulletin.

GPR (Geopolitical Risk). Change in the normalized number of newspaper articles related to geopolitical risk in 11 large US and international newspapers. Source and detailed description: Caldara and Iacoviello (2019).

Grants. Investments grants (all currencies, including value-in-kind) as a percentage of GDP. Data source: NRB Quarterly Economic Bulletin (Table “Balance of Payments”).

IMF Loans. Change in outstanding IMF loans (all currencies) as a percentage of GDP. Data source: Joint External Debt Hub via World Bank (Code A1.07).

India-Blockade. Dummy variable given by the indicator function $I(2015Q3 \leq t \leq 2016Q1)$, capturing the India–Nepal Trade blockade.

Inflation. Nepalese inflation rate (p.a.) in percentage points. Based on the quarter-to-quarter relative change in the consumer price index. Data source: IMF’s International Financial Statistics (Code: PCPI_IX), Nepal Rastra Bank.

Interest Rate Differential. Quarterly average of the interest rate differential given by the difference of Nepal’s central bank policy rate and the US federal funds rate, both in monthly frequency. Data source: IMF International Financial Statistics (Code: FPOLM_PA).

Multilateral Loans. Change in outstanding multilateral loans (all currencies) as a percentage of GDP. Data source: Joint External Debt Hub via World Bank (Code A1.06).

NGO (Non-Governmental Organization). New registrations of non-governmental organizations at the Nepal Social Welfare Council. It is linearly interpolated from an annual to a quarterly frequency. Data source: Social Welfare Council Website.

Nominal GDP. Gross domestic product at current prices. It is linearly interpolated from an annual to a quarterly frequency. Data source: Datastream.

Real GDP Growth. The quarter-to-quarter growth rate of Nepal’s real GDP. Data source: Datastream (Code: NPXGDSA%R).

Stock Market Volatility. The empirical standard deviation of daily logged levels of the Nepal Stock Exchange (NEPSE) index in daily frequency. The NEPSE index is a value-weighted index of companies listed on the Nepal Stock Exchange and is calculated using the last trading price of the included stocks (02/121994 = 100). Data source: Nepal Stock Exchange (via NepStat).

Trade Openness. A measure of de facto trade openness, given by the value of the total trade volume (exports plus imports) as a percentage of nominal GDP. Data source: IMF International Financial Statistics (Code: TXG_FOB_USD, TMG_CIF_USD).

WTO Accession. Dummy variable given by the indicator function $I(t \geq 2004Q2)$, capturing Nepal’s accession to the WTO on April 23, 2004.

Appendix B: Time-Series Properties

Table B4: Unit Root Tests

| | <u>H0: SERIES HAS UNIT ROOT</u> | |
|--|---------------------------------|--------------------------------|
| | <u>ADF (<i>t</i>-stat)</u> | <u>PP (Adj. <i>t</i>-stat)</u> |
| <u>MAIN VARIABLES</u> | | |
| TMI | -3.5171** | -3.453** |
| FX Aid | -5.984*** | -5.984*** |
| <u>CONTROL VARIABLES (EXCL. INDICATOR VARIABLES)</u> | | |
| Interest Rate Differential | -2.500 | -1.430 |
| EPU Nepal | -9.973*** | -10.723*** |
| Trade Openness | -4.500*** | -3.453** |
| FX Remittances | -3.863*** | -2.940** |
| <u>JOINT TEST OF ALL SERIES</u> | <u>86.53***</u> | <u>75.4675***</u> |

Notes: The table shows (adjusted) *t*-statistics of Augmented Dickey Fuller (ADF) and Phillips-Perron (PP) unit root tests with the null of the series having a unit root. All tests include a constant but no deterministic trend. Lag length selection is based on Schwarz Criterion. Bandwidth is chosen using Bartlett Kernel (Andrews).

Appendix C: Further Analyses

Table C1: Global and Regional EPU

| Dependent Variable: TMI [% GDP] | | | | | | | |
|---------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| Variables | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| Interest Rate Differential | -0.095* (1.72) | -0.095* (1.90) | -0.097* (1.72) | -0.095* (1.74) | -0.095* (1.74) | -0.095* (1.74) | -0.095* (1.81) |
| Trade Openness | 0.438*** (6.42) | 0.461*** (6.58) | 0.439*** (6.57) | 0.438*** (6.99) | 0.447*** (6.53) | 0.438*** (6.50) | 0.458*** (6.28) |
| India-Blockade | 1.677*** (4.20) | 1.826*** (3.90) | 1.679*** (4.07) | 1.675*** (4.28) | 1.694*** (4.03) | 1.667*** (4.19) | 1.826*** (3.40) |
| 2015 Earthquake | 1.548*** (5.25) | 1.765*** (5.52) | 1.681*** (4.47) | 1.537*** (5.00) | 1.538*** (4.93) | 1.555*** (4.32) | 1.953*** (5.15) |
| FX Aid | 0.895** (2.08) | 0.928** (2.17) | 0.931** (2.18) | 0.894** (2.07) | 0.879** (2.02) | 0.893** (2.05) | 0.979** (2.23) |
| FX Remittances | -0.144* (1.93) | -0.158** (2.17) | -0.142* (1.87) | -0.144** (2.01) | -0.152** (2.02) | -0.144* (1.95) | -0.154* (1.98) |
| EPU Global | 0.000 (0.16) | | | | | | 0.002 (0.77) |
| EPU Nepal | | 0.990** (2.11) | | | | | 1.035** (2.25) |
| EPU India | | | 0.498 (0.65) | | | | 0.379 (0.46) |
| EPU Malaysia | | | | 0.039 (0.07) | | | 0.080 (0.12) |
| EPU Saudi Arabia | | | | | -0.409 (0.50) | | -0.244 (0.31) |
| EPU Qatar | | | | | | -0.205 (0.19) | -0.210 (0.23) |
| Constant | -3.084*** (4.91) | -3.280*** (4.92) | -3.126*** (4.97) | -3.086*** (4.96) | -3.126*** (4.91) | -3.080*** (4.91) | -3.312*** (4.76) |
| Adj. R2 | 0.37 | 0.43 | 0.37 | 0.37 | 0.37 | 0.37 | 0.39 |
| Observations | 72 | 72 | 72 | 72 | 72 | 72 | 72 |

Notes: The table shows OLS estimates with robust *t*-statistics in parentheses. *, **, *** indicate variables significant at 10%, 5%, and 1% level, respectively.

Table C2: Other Risk and Uncertainty Exposures

| Dependent Variable: TMI [% GDP] | | | | | | | |
|---------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Variables | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| Interest Rate Differential | -0.098* | -0.095* | -0.096* | -0.093* | -0.095* | -0.098* | -0.093* |
| | (1.94) | (1.86) | (1.89) | (1.83) | (1.90) | (1.96) | (1.75) |
| Trade Openness | 0.463*** | 0.447*** | 0.461*** | 0.465*** | 0.465*** | 0.462*** | 0.462*** |
| | (6.56) | (6.36) | (6.57) | (6.81) | (6.66) | (6.68) | (6.39) |
| EPU Nepal | 0.954** | 1.006** | 0.992** | 1.004** | 1.037** | 0.988** | 1.067** |
| | (2.14) | (2.17) | (2.11) | (2.09) | (2.19) | (2.14) | (2.26) |
| India-Blockade | 1.838*** | 1.761*** | 1.818*** | 1.829*** | 1.851*** | 1.839*** | 1.809*** |
| | (3.91) | (3.96) | (3.95) | (3.89) | (4.24) | (4.05) | (4.37) |
| 2015 Earthquake | 1.738*** | 1.676*** | 1.790*** | 1.805*** | 1.720*** | 1.741*** | 1.675*** |
| | (5.64) | (4.64) | (5.42) | (5.56) | (5.16) | (5.42) | (4.27) |
| FX Aid | 0.942** | 0.963** | 0.959** | 0.964** | 1.021** | 0.959** | 1.144** |
| | (2.12) | (2.34) | (2.11) | (2.15) | (2.30) | (2.00) | (2.26) |
| FX Remittances | -0.153** | -0.131 | -0.155** | -0.163** | -0.152** | -0.149* | -0.130 |
| | (2.02) | (1.66) | (2.06) | (2.20) | (2.10) | (1.81) | (1.48) |
| Stock Market Volatility | -1.339 | | | | | | -0.507 |
| | (0.45) | | | | | | (0.13) |
| Exchange Rate Volatility | | -6.624 | | | | | -5.975 |
| | | (0.48) | | | | | (0.37) |
| GPR Global | | | 0.001 | | | | 0.000 |
| | | | (0.48) | | | | (0.04) |
| GPR India | | | | -0.003 | | | -0.005 |
| | | | | (0.76) | | | (0.90) |
| GPR Malaysia | | | | | 0.003 | | 0.004 |
| | | | | | (0.73) | | (0.69) |
| GPR Saudi Arabia | | | | | | 0.003 | 0.001 |
| | | | | | | (0.47) | (0.13) |
| Constant | -3.260*** | -3.220*** | -3.319*** | -3.341*** | -3.424*** | -3.339*** | -3.507*** |
| | (4.90) | (4.59) | (4.92) | (5.16) | (5.10) | (4.85) | (4.73) |
| Adj. R2 | 0.42 | 0.42 | 0.42 | 0.42 | 0.43 | 0.42 | 0.39 |
| Observations | 72 | 72 | 72 | 72 | 72 | 72 | 72 |

Notes: The table shows OLS estimates with robust *t*-statistics in parentheses. *, **, *** indicate variables significant at the 10%, 5%, and 1% level, respectively.

Table C3: Different Standardizations of FX Aid and TMI

| Dependent Variable: | TMI [% GDP] | TMI [% GDP] | TMI [% GDP] | TMI [% GDP] | TMI [% GDP] | TMI [% GDP] | TMI [% TV] |
|-----------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| Variables | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| Interest Rate Differential | -0.095* (1.90) | -0.110** (2.11) | -0.108** (2.10) | -0.126** (2.18) | -0.125** (2.22) | -0.100* (1.93) | -0.177 (1.45) |
| Trade Openness | 0.461*** (6.58) | 0.453*** (6.01) | 0.454*** (6.26) | 0.450*** (5.97) | 0.447*** (5.95) | 0.467*** (6.78) | 0.849*** (4.64) |
| EPU Nepal | 0.990** (2.11) | 1.010** (2.19) | 0.986** (2.09) | 0.919* (1.81) | 0.917* (1.82) | 0.973* (1.98) | 2.039* (1.75) |
| India-Blockade | 1.826*** (3.90) | 1.788*** (3.81) | 1.770*** (3.86) | 1.897*** (4.13) | 1.843*** (4.01) | 1.937*** (4.74) | 4.768*** (3.81) |
| 2015 Earthquake | 1.765*** (5.52) | 1.988*** (4.82) | 2.057*** (5.26) | 1.319*** (3.71) | 1.299*** (3.73) | 1.689*** (5.14) | 4.262*** (5.45) |
| FX Remittances (% GDP) | -0.158** (2.17) | -0.282*** (4.37) | -0.294*** (4.76) | -0.096 (0.96) | -0.038 (0.32) | -0.183*** (2.76) | -0.434** (2.33) |
| FX Aid [% GDP] | 0.928** (2.17) | | | | | | 1.992* (1.95) |
| FX Aid [Mio. USD] | | 0.004* (1.86) | | | | | |
| Ln(FX Aid) | | | 0.516** (2.23) | | | | |
| FX Aid [% FX Remittances] | | | | 0.007** (2.44) | | | |
| FX Aid [% Total FX] | | | | | 0.025** (2.38) | | |
| FX Aid [% GDP], w/o Seasonal Adj. | | | | | | 0.630* (1.93) | |
| Constant | -3.280*** (4.92) | -2.280*** (3.44) | -4.085*** (4.69) | -2.782*** (4.23) | -3.281*** (4.63) | -2.983*** (4.53) | -5.165*** (2.97) |
| Adj. R2 | 0.43 | 0.42 | 0.43 | 0.40 | 0.41 | 0.41 | 0.32 |
| Observations | 72 | 72 | 72 | 72 | 72 | 72 | 72 |

Notes: The table shows OLS estimates with robust *t*-statistics in parentheses. *, **, *** indicate variables significant at the 10%, 5%, and 1% level, respectively.