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van Treeck, Katharina; Wacker, Konstantin

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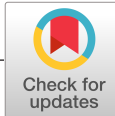
Financial globalisation and the labour share in developing countries: The type of capital matters

Katharina van Treeck[1] | **Konstantin M. Wacker**[2]

[1]University of Göttingen, Göttingen, Germany

[2]University of Groningen, Groningen, The Netherlands

1 | INTRODUCTION

The post-1990 wave of globalisation generated a vivid dispute about its distributional consequences among researchers, policymakers and the public. The "anti-globalisation" movement of the late 1990s and the current backlash against globalisation in the United States and Europe, a broad literature on distributional effects of globalisation in developing and advanced economies (Bourguignon, 2015; Furceri & Loungani, 2018; Goldberg & Pavcnik, 2007; Lang & Tavares, 2018; Slaughter, 2001) and the recent debate around Piketty (2014) demonstrate the wide interest in this issue.

International capital flows have been a characteristic feature of this globalisation process, and their effects on developing countries and distributional aspects have attracted the attention of previous research, as we review in more detail below. "Capital" has mostly been considered as a pretty homogenous concept in this specific context.[1] This aggregate view is sometimes helpful, as it keeps the exposition clear. However, it can be misleading in cases where very different modes of production are associated with specific capital flows.

The effect of foreign investment on developing countries' functional income distribution is such a case.[2] While certain types of these investments (most notably portfolio investment) might represent capital in a

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[1]An example is the debate between Piketty (2014) and Summers (2014) about the elasticity of substitution between capital and labour. Kanbur and Stiglitz (2015) have emphasized the difference between wealth and capital in this context, an argument loosely related to our argument of heterogeneous types of (foreign) capital. For completeness, we mention that a strand in the literature has focused specifically on the social effects of FDI but—to our knowledge—has not paid attention to its differing impact compared to other capital flows.

[2]We focus on the *functional* income distribution because of its macroeconomic and political economy relevance (see Atkinson, 2009; Karabarbounis & Neiman, 2014) and because most standard trade and open economy models suggest distributional effects of openness for production *factors*.
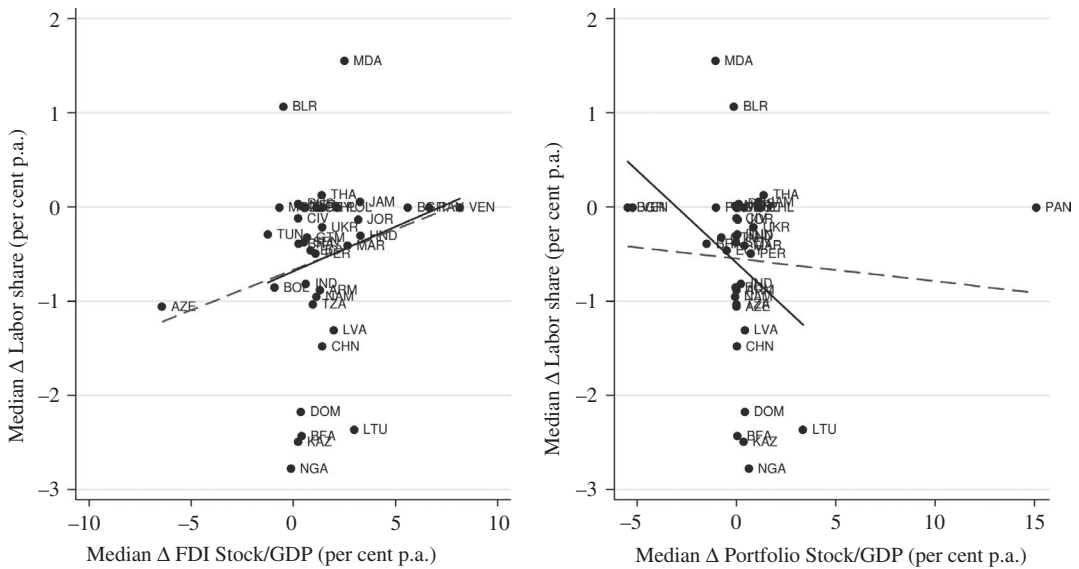
FIGURE 1 Correlations between foreign investment and labour share

general sense, the effect of foreign direct investment (FDI) on local capital accumulation is unclear (Agosin & Machado, 2005) and FDI is further associated with transferring certain production technologies, management techniques and other features that by themselves will alter factor demand and associated income shares in host developing countries.[3] This leads us to hypothesise that foreign portfolio investment (FPI) will have a different impact on developing countries' labour share than foreign direct investment (FDI). Taking a first descriptive glance at the data supports the reasonability of this hypothesis: Figure 1 shows the unconditional correlations between median annual changes of foreign investment and of the labour share (taken from Penn World Tables) in our sample of ~40 developing and transition countries after 1992.[4] FDI and FPI are depicted in the left and right panel, respectively. Without claiming any causation at that stage, three observations are worth noticing: first, there have been substantial changes in the labour share over the last two decades in several developing countries, mostly to the downside.[5] Second, de facto financial globalisation is an unlikely candidate to explain the main part of this dynamic. This can be inferred from the low correlation, especially for portfolio investment, and from the fact that the more relevant correlation between FDI and the labour share seems to be positive. Thus, FDI might have been an important force moderating the decline in the labour share in developing countries but other explanations may be needed to explain this decline, which we discuss in Section 6 of this paper. And third, correlations with the labour share in Figure 1 seem to be quite different for FDI and portfolio investment: by and large, the correlation of FDI with the labour share seems to be positive while, if anything, it is rather negative for portfolio investment, although the latter does not seem to explain much cross-country difference and is much more susceptible to the potential outlier of Panama in this unconditional, descriptive setting.

In this paper, we empirically elaborate on the impact of those two key types of foreign investment on the labour share in developing countries and substantiate their heterogeneous effects. Our empirical

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[3]While this is generally true for advanced host economies as well, the technology distance and its associated effects are expected to be larger for developing countries (see the knowledge-capital model of FDI, e.g. Markusen et al., 1996, for the impact of skill and related factor differences on FDI).

[4]The sample corresponds to the set of observations used for estimation.

[5]The only countries with notable increases, Bulgaria and Moldova, are economies recovering from the post-transition shock.

> **Highlights**
> - We investigate the impact of foreign investment on the labour share in developing countries.
> - Foreign direct investment has a positive impact on the labour share.
> - Foreign portfolio investment exercises a negative impact on the labour share.
> - We provide a new time-varying instrument for foreign investment in developing countries.

analysis relies on the recently published PWT labour share data and additionally on a new data set on labour shares in ~40 developing and transition countries that we constructed in the context of this study. To estimate the impact of foreign investment, we rely on several panel data techniques, including a distributed lag first-difference model and a novel IV identification strategy that is motivated by the observation that "push factors" in financial centres matter for capital flows to developing countries and, following the general idea of Nunn and Qian (2014), hence uses the interaction of global financial conditions and distance from the world's financial centres for identification. While this provides us with an identification strategy that credibly meets the exogeneity and exclusion restriction despite controlling for unobserved cross-country heterogeneity, we have to rely on weak-instrument techniques to draw conservative inference.

Across the board, our results confirm the different impact of FDI compared to FPI. More precisely, we find a positive impact of FDI on developing countries' labour share, while the impact of FPI tends to be negative but is often not statistically different from 0. This general result is robust to various estimation techniques and data set variations. Quantitatively, our results over the period 1992–2009 show that an increase of the FDI stock (as a percentage of GDP) by 10 percentage points increases the labour share by about 2%. An increase of FPI of the same size would result in a decline of the labour share by a similar magnitude (but less statistical reliability). Economically, this is a relevant magnitude, leading us to the conclusion that foreign capital matters for developing countries' labour share. Furthermore, we find some evidence that this effect depends on a country's capital-to-labour ratio. However, despite the economically significant effects of foreign capital on developing countries' labour share, other factors were more important for its dynamics: as the increase of FPI was rather modest compared to FDI, one can conclude that de facto financial globalisation by itself cannot explain the decline of the labour share in developing countries over the last decades. Our macro-level results suggest that especially trade might be a potential candidate.

Our results provide a number of broader relevant insights and contributions. First and foremost, we contribute to a larger debate and literature on the overall distributional consequences of globalisation in developing countries (Dollar & Kraay, 2004; Prasad, Rogoff, Wei, & Kose, 2003; Verhoogen, 2008), showing that the popular view that increasing capital mobility came at the expense of labour income in these countries is generally not defensible, at least for de facto capital mobility. This has several policy implications for developing countries integrating into the world economy. Second, and relatedly, we add to a more focused debate about global developments of the labour share and its macroeconomic determinants and consequences (Harrison, 2005; Hutchinson & Persyn, 2012; Karabarbounis & Neiman, 2014).[6] Third, we add to a literature that emphasises the differences be-

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[6]Maarek and Decreuse (2015) provide an analysis focusing exclusively on FDI and its effect on developing countries' labour share. We discuss our relation to this study in Section 2. For studies focusing on OECD countries, see Bentolila and Saint-Pau (2003); Guscina (2006); Hutchinson and Persyn (2012); Jaumotte and Tytell (2007); Richardson and Khripounova (1998). Furceri and Loungani (2018) look at the more general effect of financial account liberalization on inequality, including a section on labour share effects, but do not focus on developing countries.

tween types of international capital flows, their determinants and effects (Daude & Fratzscher, 2008). This also relates to the debate about the elasticity of substitution between capital and labour and raises the question to what extent an abstract notion of "capital" will provide us deep insights into distributional effects on the global level. Last but not least, we provide some methodological innovations by proposing a new identification strategy for the effects of foreign investment in developing countries and providing a new data set on labour shares in developing countries that covers the whole economy (as opposed to only the manufacturing sector) and uses country-specific information to correct for self-employment.

Our paper is structured as follows: Section 2 provides the economic motivation for our analysis and reviews the relevant literature related to our study. We present the data and estimation methodology in Section 3 and the empirical results in Section 4. Section 5 demonstrates the robustness of our results and provides some additional findings. Section 6 discusses potential policy implications and remaining issues for future research. Section 7 concludes.

2 | THEORETICAL MOTIVATION AND RELATED LITERATURE

In this section, we provide some theoretical motivation why it is important to distinguish foreign direct investment (FDI) from foreign portfolio investment (FPI) when assessing the impact of capital flows on developing countries' labour share. We support those arguments with previous empirical evidence to develop our key research hypothesis.

By definition, the labour share LS is the part of national income Y that is not acquired by capital, which allows us to focus on our research question from the viewpoint of capital K. The standard neoclassical framework assumes that output, which equates equal national income, is produced according to the Cobb–Douglas production function:

$$Y = AK^{\alpha}L^{1-\alpha}, \tag{1}$$

where L is total labour and A is total factor productivity (TFP). Because factors are assumed to be remunerated by their marginal product, it can be shown (see Section 1.1 in Appendix S1) that the labour share in this framework equates $LS = (1 - \alpha)$.

A specificity of the Cobb–Douglas production function is that it implies an elasticity of substitution between capital and labour equals 1. This substitution elasticity relates changes in relative factor prices to changes in relative factor inputs. In the context of our study, financial globalisation will lead to a drop in the rental rate of capital, r, relative to wages, w, in developing countries because of their relative capital scarcity. The unity substitution elasticity implies that the associated increase of capital in production is just equal to keep the capital–income ratio $\alpha = r \times K/Y$, and hence the labour share $(1 - \alpha)$, constant. This framework is consistent with Kaldor's stylised facts that despite capital accumulation, the labour and capital–income shares in an economy remain constant.

A key controversy about recent trends in the labour share concerns this substitution elasticity. Piketty (2014) and Karabarbounis and Neiman (2014) argue in favour of an elasticity larger 1, which implies that there are many different uses of capital in the long run.[7] For example, one could assume that capital accumulation takes place by creating new varieties of imperfectly competitive capital

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[7] For alternative viewpoints, see Summers (2014); Rognlie (2015); Kanbur and Stiglitz (2015), among others.
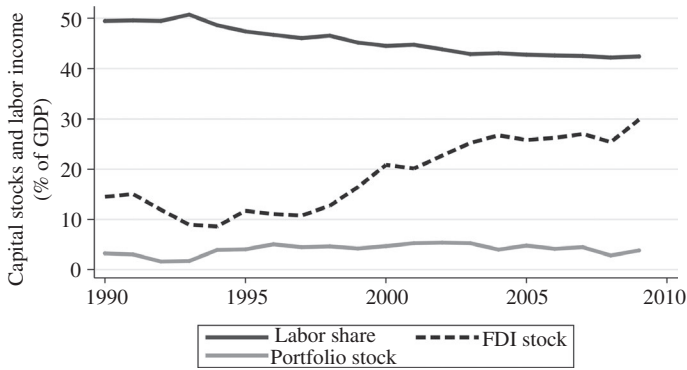
FIGURE 2 Labour shares and capital stocks in developing countries

goods, for example: $K = \left(\int_0^z x_j^\alpha dj \right)^{1/\alpha}$, where each variety of capital goods is denoted by x_j and the total number of varieties is z.[8] Since the development of one new capital variety does not affect the return to other varieties in this setup, capital accumulation will be accompanied by a fall of the labour share as the growth in K does not (or less proportionally) affect r. For example, the inflow of financial portfolio capital to developing countries in the context of globalisation could find various uses for fixed capital formation which do not perfectly substitute for each other in aggregate production. Capital could thus smoothly replace workers in production.

As Figure 2 illustrates, the bulk of capital flows to developing countries arrives in the form of FDI. This type of foreign investment, usually conducted by multinational firms, is assumed to have specific effects on the host economy beyond mere capital accumulation. Notably, FDI is attributed positive productivity effects in the host economy. A simple way to model this is to separate FDI from other forms of capital in Equation (1), $K \equiv K_{FDI} + K_{other}$, and to assume that FDI produces positive externalities for TFP: $A = a + K_{FDI}^\chi$, where $a \geq 0$ and $\chi > 0$.[9] These positive productivity effects cannot (fully) be appropriated by foreign investors and can be motivated by positive productivity spillovers to domestic firms (Fons-Rosen, Kalemli-Ozcan, Sorensen, Villegas-Sanchez, & Volosovych, 2017; Havranek & Irsova, 2011; Javorcik, 2004) or diffusion of management knowledge by labour market churning (Görg & Strobl, 2005).

A key implication of such an FDI externality is that the private return to FDI equals α and is thus smaller than the social return to FDI, $\alpha + \chi$. The labour share in such an economy can thus be larger than $(1 - \alpha)$. To what extent foreign direct investors can appropriate the social returns to their investment is subject to redistribution and hence bargaining power. Even though de jure financial globalisation may have increased capital's bargaining power vis-à-vis labour due to higher capital mobility (Furceri & Loungani, 2018; Harrison, 2005; Jayadev, 2007; Rodrik, 1997), de facto FDI may thus have positive effects on the labour share. Moreover, there are several limitations to the bargaining power of foreign *direct* investors. For example, in several models of FDI, foreign plants are integrated into complex multinational production networks (Alfaro & Chen, 2014; Badinger & Egger, 2010; Blonigen, Davies, Waddell, & Naughton, 2007; Yeaple, 2003). Detaching a single plant from this

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[8]This process of "capital deepening" is a key building block of the Romer (1990) growth model and has been extended to study the growth effects of FDI by Borensztein et al. (1998).

[9]This production framework is similar to the "AK model" of economic growth Romer (1986).

network might thus disrupt the whole multinational production process and create severe holdup problems. It is also difficult to sell stakes in an FDI enterprise in many developing countries. By definition, foreign investors hold a share of over 10% in those enterprises (and often much more, see Fons-Rosen, Kalemli-Ozcan, Sorensen, Villegas-Sanchez, & Volosovych, 2013). Such amounts of equity are difficult to place in financially shallow developing economies. On top of this, standard models often assume a strong skill complementarity of FDI (Borensztein, Gregorio, & Lee, 1998). Foreign-owned firms may have particular difficulty to find adequately skilled workers because they are unfamiliar with local labour markets. FDI firms thus often pay a wage premium to avoid hiring costs. This wage premium has been extensively documented in the empirical literature (Hijzen, Martins, Schank, & Upward, 2013; Lipsey, 2002; Setzler & Tintelnot, 2019) and may be particularly prevalent in developing economies, which are less skill abundant.[10]

This shortage of skilled labour in developing countries is also a key argument for an earlier study by Maarek and Decreuse (2015). They suggest (based on a search-theoretical model with firm heterogeneity and labour market frictions) that in a developing country with few foreign firms, FDI would lower the labour share via technology effects, but as the proportion of foreign enterprises passes a certain threshold, FDI starts exercising a positive impact on the labour share because of competition for labourers between firms. They find some evidence of the associated U-shaped pattern in 98 developing countries over the period 1980 to 2000, although the large majority of countries lies in the part where a negative relationship is present since the estimated threshold of over 150% (of FDI stock to GDP) is very high. While related to our paper, their study differs from ours in several aspects. First, we focus on different types of foreign investment in a broader perspective, instead of only looking at FDI. Second, we use country-wide labour shares instead of only focusing on manufacturing labour shares. While Maarek and Decreuse (2015) argue that FDI in developing countries is most relevant in the manufacturing sector, it is also well-known that FDI induces considerable vertical spillovers (Havranek & Irsova, 2011). Furthermore, although labour markets in developing countries are far from perfect, it is unlikely that wage developments in the manufacturing sector have no effects on wages in services, agriculture and primaries. In that sense, our approach is more appropriate to capture general equilibrium effects.[11]

Recent contributions to model labour share dynamics allow for a role of firms' bargaining and market power. The model of Karabarbounis and Neiman (2014) nests the traditional Cobb–Douglas framework as a special case and predicts a negative effect of firms' markup on the labour share for most realistic parameter values (see Section 1.2 in Appendix S1 for a more detailed exposition). In the "superstar firm" model of Autor et al. (forthcoming), firms' share of labour costs in value-added directly (and negatively) depends on the markup. This emphasises that firm distribution and competition matter for the labour share. Evidence by Fons-Rosen et al. (2013) suggests that FDI increases horizontal market competition in host countries. This effect appears stronger for their subsample of 15 emerging economies when compared to high-income countries. Since the authors also document higher market concentration in emerging economies in the first place, it is reasonable to assume that FDI increases competition in developing host economies and hence lowers markups of domestic firms, with positive effects on the aggregate labour share.

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[10]In a recent contribution for France, Orefice et al. (forthcoming) motivate their econometric analysis of the issue with a "fair wage" mechanism, consistent with the viewpoint that not all gains of FDI are appropriated by the foreign direct investor.

[11]Moreover, the key point of a U-shaped relationship in the Maarek and Decreuse (2015) paper is suspicious of suffering from a spurious regression problem of interaction terms in fixed effect models (see Balli and Sorensen, 2013). This might also explain why their quadratic term is unidentified in the IV regressions.

This review of theoretical arguments and previous studies highlights that there are several reasons to assume that FDI and FPI have different effects on developing countries' labour share. The traditional neoclassical reasoning may be more appropriate for portfolio investment, which may even have a negative effect on the labour share if one assumes an elasticity of substitution larger 1. Conversely, we have outlined several reasons why the role of FDI goes beyond this purely financial effect and why FDI could thus positively affect the labour share in developing countries. Denoting foreign investments' effect on the labour share by β, our most important hypothesis can thus formally be denoted as testing $H_0 : \beta_{FDI} = \beta_{FPI}$ versus the alternative $H_1 : \beta_{FDI} \neq \beta_{FPI}$ (see Section 3.2.1).

3 | DATA, INFERENCE AND IDENTIFICATION

In this section, we first describe our data set—most notably which measures we use for the labour share and how we obtain foreign investment data—and show simple correlations in the data, including fixed effect (FE) and random effects (RE) regressions. We then present our econometric model, including the relevant testing hypothesis and identification strategy.

3.1 | Data

We focus on the labour share as our dependent variable because of its macroeconomic and political economy relevance (Atkinson, 2009; Karabarbounis & Neiman, 2014) and because most standard trade and open economy models suggest distributional effects of openness for production *factors*. Accordingly, we look at the functional income distribution which is distinct from (but related to) other studies that look at the personal income distribution or poverty effects of globalisation (Arestis & Caner, 2010; Dollar & Kraay, 2004).[12]

3.1.1 | Labour share

Simply speaking, the labour share is the fraction of an economy's income that accrues to labour (as opposed to capital). Recently, Inklaar and Timmer (2013) provided estimates of the labour share for up to 127 countries in the Penn World Tables (PWT) 8.0, which we take as the dependent variable for our baseline estimates.

A relevant contribution of our study, which initiated before the PWT 8.0 data were released, is that we develop an alternative measure for the labour share in developing countries. van Treeck (forthcoming) provides a detailed discussion of our method and the differences to the PWT data but the key difference concerns the adjustment for labour income of the self-employed.[13] Our approach mainly

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[12]However, the functional income distribution generally allows making a link between personal income distribution on the microlevel and a macroeconomic national accounts perspective (Checchi & Garcia-Penalosa, 2010; Daudey & Garcia-Penalosa, 2007; Glyn, 2011; Ray, 1998). This is particularly true in developing countries where most people (especially poor households) only have their labour to earn a living and do not have relevant capital income, so the labour share directly relates to the personal income distribution (Ray, 1998).

[13]One may argue that correcting for self-employment is not important altogether, as the self-employed are usually not working for foreign companies. This neglects that especially FDI can set in motion social mobility towards the formal sector which increases labour compensation and thus the (unadjusted) labour share, even though labour income has effectively changed little.

relies on Gollin's (2002) third suggestion which assumes that the self-employed earn the same wage as employees and corrects for the fact that this tends to overestimate the labour share in the more backward economies (where many of the self-employed engage in low-productive subsistence farming).[14] By contrast, the PWT data in almost equal parts are based on Gollin's second suggestion, which assumes that the labour share of self-employed income is the same as for the rest of the economy, and Gollin's first adjustment, which adds self-employed income (proxied by total agricultural value-added) to the labour income of employees.[15] Furthermore, our data use more micro-founded information (e.g., from Social Accounting Matrices) about trends in self-employment in developing countries to substantiate the assumptions made. We thus think our data provide a more accurate measure of the labour share for the specific sample of low- and middle-income countries because it incorporates more country-specific information about self-employment and does not build on as many assumptions as the PWT (interpolation, constant labour shares at start and end points). However, to refuse any concerns our labour share measure was constructed in a way to support our hypothesis, we rely on the PWT data for our baseline estimates and use the measure of van Treeck (forthcoming) only to check for robustness.

Compared to previous studies about the effect of globalisation in developing countries, it is finally worth highlighting that both our labour share measures adjust for the problem of labour income of the self-employed (as opposed to Diwan, 2001; Furceri & Loungani, 2018; Harrison, 2005; Jayadev, 2007; Karabarbounis & Neiman, 2014) and cover the whole economy, instead of only relying on the manufacturing or corporate sector (such as Karabarbounis & Neiman, 2014; Maarek & Decreuse, 2015, respectively).

The measures for the labour share in our relevant sample range from 21.2% in Azerbaijan (2008) to 78.1% in Armenia (1998) for the PWT series, and from 18.7% in Azerbaijan (2008) to 64.3% in Bolivia (2000) for our newly constructed measure. For the econometric estimation, we log-transform the data.[16] To avoid potential spurious regression problems to inference that can also arise in standard panel data models if series are integrated of order one (Kao, 1999), we test for unit roots using Fisher-type panel data tests based on Phillips and Perron and augmented Dickey–Fuller tests, including also drifts and trends up to three lags. Of the 15 different tests conducted, 14 (13, 12) allow to reject the null hypothesis of a unit root in our newly constructed log labour share on the 10 (5, 1)% level of statistical significance, while the same is only true for 5 (5, 5) of the PWT data.[17] Because this casts some doubt on the PWT series, we emphasise that our key results are robust to using our newly constructed labour share data which are less suspicious to suffer from unit-root-induced inference issues and to estimation in first differences.

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[14]As data on the share of self-employment in total employment are rare, we use the agricultural employment share as a proxy. Where data on self-employed income are available, the first and second adjustment suggestions of Gollin (2002) serve as upper and lower bounds, respectively. No further adjustment is undertaken in countries that seemingly already accounted for self-employed labour income.

[15]In the PWT data, no further adjustment is undertaken in countries where the naive labour share exceeds 0.7. Gollin's third adjustment using the self-employment share in total employment is used when employment data are available and the resulting labour share is lower than that resulting from Gollin's first adjustment using agricultural value added as a proxy.

[16]This ensures that the model only predicts over a positive labour share range.

[17]This might partly be due to the PWT method of filling missing values with interpolation and keeping labour shares constant.

3.1.2 | Foreign investment

Our main explanatory variables of interest are foreign direct investment (FDI) and foreign portfolio investment (FPI), both measured in stocks (taken from the International Investment Position, IIP, of the IMF's International Financial Statistics, IFS) relative to GDP (as reported by the UN SNA) in order to arrive at a good measure of the relative importance of foreign investment in the host economy (IMF, 2009, and Wacker, 2013, for more information on these measures). The key distinction between these two types of foreign investment in the IIP is their degree of ownership which is reflected in different equity stakes in the host enterprises.

Note that this is a de facto measure of capital stocks or financial globalisation (cf. Edinson, Klein, Ricci, & Sloek, 2002). De jure measures, which are based on legal restrictions on international capital flows, may have some advantages but they do not always indicate the actual degree of investors presence in the country (Kose, Prasad, & Terrones, 2009, who use an equivalent benchmark measure for de facto financial openness). For example, many countries in Sub-Saharan Africa have loosened their capital controls but are only experiencing small inflows of foreign investment. Furthermore, actual legislation does not tell much about the investment that has accumulated in the past and hence currently exercises economic effects in the host economy, which is captured more appropriately by our stock measures. Finally, we are mainly interested in the heterogenous effects of different types of capital flows which would be hard to compile from de jure data.

The according measures for FDI and FPI in our sample range from 0 (Ivory Coast, 1994–97) to 132.3% (Azerbaijan, 2004) and from −0.04 (Tanzania, 2008) to 65.2% of GDP (Jordan, 2005), respectively.

3.1.3 | Control variables

To obtain the ceteris paribus effect of FDI and FPI stocks on the labour share, we control for a set of variables that have been found to influence the labour share in previous research and which are also likely to correlate with capital stocks, so that parameter estimates would be biased when omitting these variables. In the baseline regressions, we limit the control variables to those we consider most relevant and which still allow us to rely on a comprehensive sample. In Section 5, we will demonstrate that our results are also robust to the inclusion of additional control variables.

To accommodate the possibility that the labour share is systematically different at higher development levels, we control for *GDP p.c.*, transformed into logs. Note that most of our panel estimations remove time-invariant unobserved cross-country heterogeneity, so this variable will to some extent also capture cyclical effects. As an even more cyclical variable that is easily available, we control for the *inflation rate* which might influence the labour share in the short run since wages react to price fluctuations with some delay, as pointed out by Marterbauer and Walterskirchen (2003). To control for the fact that countries that produce more capital intensive should earn more interests and hence experience a lower labour share, we include the *capital-to-labour (K/L) ratio* (with labour taken from WDI and capital stocks estimated from PWT 7.0 with the perpetual inventory method).

Furthermore, we control for *government consumption/GDP*, taken from PWT 7.0, since Harrison (2005) and Jayadev (2007) find that government inference positively influences the labour share. The reason is that governments in general pursue redistribution policies in favour of labour. Government policies, however, change with the opening up of capital markets and the resulting "discipline effect" (Prasad et al., 2003, 2), leaving it a priori unclear whether government consumption correlates

positively or negatively with the labour share. National governments in open economies may be prompted to adopt policies that disproportionally serve the interests of capital (Stiglitz, 2000).

Another standard control variable, especially with regard to developing countries, is *institutional quality*. We hence experiment with a composite risk rating and an index for financial risk from the International Country Risk Guide (ICRG), where higher values indicate lower risk. The baseline results will focus on the composite risk rating.

Furthermore, *trade/GDP* is a control variable of particular interest to us because the standard Heckscher–Ohlin–Samuelson model predicts that trade opening increases the labour share of developing countries. Other arguments instead suggest that trade may negatively influence the labour share because the bargaining power of labour can be weakened with increased international competition as labour at home indirectly competes with labour abroad (cf. Dube & Reddy, 2014; Ortega & Rodriguez, 2002). In any case, it is important to control for trade in our setting, as it might not only influence the labour share but also be correlated with foreign investment.

Finally, to control for the important effect of education, we use an *education* index compiled by the United Nations Development Programme (UNDP) as our last baseline control variable. It combines mean years of schooling with expected years of schooling and has the advantage of wide availability. Again, this is a potentially important control variable in our setting, as a more educated labour force may acquire a higher labour share while at the same time influencing foreign investment (as e.g., the knowledge-capital model for FDI points out; cf. Blonigen, Davies, & Head, 2003).

As a mere statistical control, we further include an (unreported) dummy variable SNA which indicates if a country's system of national accounts follows the 1993 convention (or the 1968 convention otherwise).

In Section 5, we demonstrate the robustness of our results to including additional/alternative control variables that we do not include in the baseline regression (mostly due to data availability and according sampling issues). Including gross fixed *capital formation* (GFCF/GDP) helps taking into account different aggregate production technologies. For a similar reason, we also control for *labour productivity*, defined as GDP per worker from PWT 7.0, although it is highly correlated with GDP. Furthermore, we control for *crisis* periods, identified by swift changes in the nominal exchange rate, which also tend to depress the labour share (cf. Arseneau & Leduc, 2011; Diwan, 2001; Harrison, 2005; Jayadev, 2007; Onaran, 2009). Theoretical considerations further suggest to also control for the *real interest rate* (WDI) because the government may be encouraged to pursue a high interest rate policy once the capital markets have been liberalised in order to attract foreign investors. This, however, can depress domestic investment and may have a negative effect on the labour share. We also consider the PPP-implied *exchange rate* (IMF WEO) because appreciations may adversely affect employment in the export sector and hence the labour share and because the exchange rate can also be considered as a proxy for the fixed costs for capital of relocating abroad (Harrison, 2005), with an appreciation decreasing the costs of relocating.[18] Finally, we also test for robustness to including an *employment vulnerability* measure: the fraction of paid family workers and own-account workers (as a percentage of total employment, from WDI).

3.1.4 | Descriptive statistics and correlations

Table A1 in Appendix provides summary statistics of each variable used (based on the sample for our baseline model (2) in Table 1). The same Appendix also provides a list of included countries.

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[18]Since we note price notation, an appreciation of the currency is associated with a decrease in the exchange rate.

TABLE 1 Panel correlations (FE and RE)

Variables	(1) ln (LS_{PWT})	(2) ln (LS_{PWT})	(3) ln (LS_{PWT})	(4) ln (LS_{PWT})
FDI stock/GDP	0.00167	0.00178***	0.00148	0.00170**
	[0.00122]	[0.000419]	[0.00106]	[0.000789]
Portfolio stock/GDP	−0.00145	−0.00234***	−0.00166	−0.00177
	[0.00146]	[0.000789]	[0.00126]	[0.00112]
ln (GDP p.c.)		−0.359***		−0.280***
		[0.0465]		[0.0687]
ln (inflation) (−1)		0.000225		−0.000633
		[0.00504]		[0.00524]
risk		0.00174		0.00104
		[0.00130]		[0.00168]
ln (government share)		−0.0655***		−0.0490
		[0.0173]		[0.0329]
Education Index		0.887***		1.210***
		[0.268]		[0.191]
K/L		−3.03e−06***		−7.30e−07
		[9.58e−07]		[1.15e−06]
Trade		−0.00153***		−0.00127**
		[0.000391]		[0.000580]
Observations	433	309	433	309
Number of countries	51	38	51	38
R^2 (within)	0.27	0.57	0.27	0.55
Estimation	FE	FE	RE	RE
Test statistic	1.84	16.55***	2.55	5.79**

Notes: Cluster–robust standard errors in brackets, ***$p < .01$; ** $p < .05$; *$p < .1$ time dummies, constant, SNA not reported.

Figure 2 shows the developments of our key variables of interest over time. As one can see, the labour share shows a significant downturn since the early 1990s, a trend which prevails in most developing regions. Regressing the log labour share on time (using fixed effects and limited to observations in the baseline sample) shows a negative trend of −0.008*** and −0.009** for the PWT and our newly constructed series, respectively. The figure further shows that FDI plays a much more important role than FPI in developing countries and saw a much more dynamic development through the sample period.

Table A2 in Appendix provides pairwise variable correlations. Three observations seem worth highlighting. First, pairwise correlations in our baseline variables seem small, so multicollinearity is unlikely to be an issue. Second, the low correlation between our two labour share measures is remarkable and possibly highlights the degree to which the different adjustment methods suggested by Gollin (2002) might matter. Third, for both labour share measures, the (unconditional) correlation with portfolio stocks is more negative than with FDI stocks.

Conditional correlations can be inferred from Table 1 that provides simple panel data results from fixed effect (FE) and random effect (RE) estimation. For both estimation techniques, correlations of the labour share with FDI stocks are positive, while those with portfolio stocks are negative. While they

are individually insignificantly different from 0 without controlling for other factors, their difference is statistically significant once one controls for other macroeconomic variables (at the 5% level, at least), as indicated by the test statistic in the last line (and discussed in more detail in Section 3.2.1). With those baseline controls, the positive correlation of the labour share with FDI itself also turns statistically significant, while the negative correlation with the portfolio stock is only significant in the FE estimation.

3.2 | Econometric model and inference

While those first results are already indicative of our key hypothesis, they are potentially prone to several sources of endogeneity bias. We thus move to a more causal identification concerning the effect of foreign capital investments on the labour share in developing countries. As in the simple FE and RE results above, we start by modelling our labour share variable, $\ln(LS)$, as a log-linear function of the foreign capital stock variables (FDI, FPI) conditional on a set of control variables, Ψ (some of which are log-transformed as well):

$$\ln(LS)_{it} = \beta_{FDI} \frac{FDI_{it}}{GDP_{it}} + \beta_{FPI} \frac{FPI_{it}}{GDP_{it}} + \Psi_{it}\theta + u_{it}, \qquad (2)$$

where $u_{it} := \alpha_i + \gamma_t + \varepsilon_{it}$ with α_i being country dummy variables, γ_t representing year dummy variables,[19] and ε_{it} is an error term with $\mathbb{E}(\varepsilon_{it}) = 0$ and existing second moment. As discussed below, this model is estimated in first differences and using instrumental variable techniques, respectively.[20] With respect to statistical inference, all estimated standard errors of these models are robust to any pattern of heteroskedasticity and autocorrelation within countries.

3.2.1 | Inference and null hypothesis

At this point, it is important to stress that our main argument (Section 2) and related null hypothesis is not about a parameter being statistically indifferent from zero, as in most empirical studies. As discussed in Section 2, a parameter estimate of zero would even be a reasonable a priori expectation under most conventional neoclassical assumptions. Our main hypothesis is a different impact between FDI and FPI on the labour share in developing countries: $\beta_{FDI} > \beta_{FPI}$. We therefore test for equality of parameters in our null hypothesis:

$$H_0 : \beta_{FDI} = \beta_{FPI}, \qquad (3)$$

against the alternative:[21]

$$H_1 : \beta_{FDI} \neq \beta_{FPI}. \qquad (4)$$

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[19]Note that the included time dummies also nest a time trend, even with a structural break and that they also account for any "global" factors and shocks (such as oil prices).

[20]For the RE model presented above, it is assumed that $\alpha_i \stackrel{!}{=} \alpha \forall i$ and parameters are estimated via generalized least squares in this case.

[21]Although we assume $\beta_{FDI} > \beta_{FPI}$, we still test against a two-sided alternative given the absence of a formal model deriving this (alternative) hypothesis. Our inference is hence rather conservative.

Under the null hypothesis and conventional least squares estimation (especially first differences and FE), the according test statistic $t := \frac{\hat{\beta}_{FDI} - \hat{\beta}_{FPI}}{\hat{se}(\hat{\beta}_{FDI})}$ follows a t-distribution with $k - 1$ degrees of freedom, where k is the number of estimated parameters.[22]

When using instrumental variable methods, we have to rely on other test statistics that are robust to weak instruments. In that case, the distribution of the IV estimator and according test statistics are not well-approximated by standard asymptotic limits. Therefore, we rely on the conditional likelihood ratio (CLR) test proposed by Moreira (2003) and on the Anderson and Rubin (1949) AR test, both of which are robust to weak instruments and can also be inverted to produce a confidence region for our parameters of interest. This allows a visual inspection to infer where the true parameter is likely to lie and hence overcomes the problem of potentially biased point estimates in the presence of weak instruments. Moreover, the AR test includes a test for the exogeneity condition $\mathbb{E}(Zu) = 0$. That is, the null is also rejected if exogeneity is not supported by the correlation of residuals with the instrument(s). Conversely, the CLR test assumes the exogeneity condition to be satisfied. While it has more power than the AR test, it can only accommodate a single endogenous regressor.

3.2.2 | Identification

Against the background of our relevant hypothesis, a discussion of potential problems that may cause a bias to our parameters of interest, β_{FDI} and β_{FPI}, seems at order. It is important to stress that, given our hypothesis, the relevant problem we should be concerned about is a potential endogeneity problem that causes an upward bias in β_{FDI} relative to β_{FPI}. Conversely, anything that will bias β_{FDI} and β_{FPI} upward (or downward) at the same order is unfortunate for the precision of our point estimates (which we still care about) but does not affect inference concerning our relevant null hypothesis.

In our view, there is only one relevant economic problem that might cause such a bias, which is reverse causality from wages (which proxy for workers' skill) to types of foreign investment. It is widely accepted that multinational firms tend to pay higher wages and hire more skilled workers (Hijzen et al., 2013). To the extent that wages reflect skills, a higher labour share might attract multinationals' FDI, which is also less sensitive to a higher wage bill than FPI, and bias our estimated effect for the causal effect of FDI on the labour share upward relative to the effect of FPI.

Our distributed lag first-difference strategy takes care of this (and any other potential) source of reverse causality and additionally addresses concerns about non-stationarity. The model can be written as:

$$\Delta \ln (LS)_{it} = \beta_{FDI}^{FD} \Delta \left(\frac{FDI_{i,t-1}}{GDP_{i,t-1}} \right) + \beta_{FPI}^{FD} \Delta \left(\frac{FPI_{i,t-1}}{GDP_{i,t-1}} \right) + \Delta \Psi_{it} \theta^{FD} + \gamma_t^{FD} + \varepsilon_{it}^{FD}, \tag{5}$$

where Δ is the first-difference operator, that is $\Delta x_t = x_t - x_{t-1}$ (and $\Delta \Psi$ might also include lagged differences). Note that this transformation cancels out the (time-invariant) country fixed effects while still accounting for unobserved cross-country heterogeneity.

To see why this approach resolves reverse causality issues, first note that the model relates innovations in the labour share in year t to changes in foreign capital stocks in $t - 1$. Hence, reverse causality could only be an issue if foreign investors in t (differently) react to changes in wages or, precisely, the labour share in $t + 1$. This is very unlikely, especially since we look at capital stocks, not flows, which

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[22]In case of GLS estimation in the RE model presented above, the distribution follows a χ^2 distribution with one d.o.f., that is the distribution of a simple normal deviate squared.

to a large extent reflect past investment (and its revaluations).[23] An issue could only arise with high persistence of the (first-differenced) series, that is if wage (or labour share) developments in $t+1$ are largely echoing those in t. However, this is not the case as the correlations between current and lagged first differences of our labour share measures are only 0.05 (for the PWT series) and -0.07 (for our newly constructed series), and in neither case significant at the 10% level. Furthermore, first-order autoregressions of these (differenced) series produce an (insignificant) AR(1) parameter estimate of 0.003 and -0.021, respectively, indicating that persistence in differences of the labour share is not an issue.

However, the sceptical reader might come up with other sources for an endogeneity bias. Therefore, we propose a novel strategy to identify the effect of international capital flows using instrumental variables based on global financial conditions that credibly meet the exogeneity and exclusion restrictions, though suffer from a weak-instruments problem, for which we account in our inference techniques. In our view, this identification approach is an innovation to the literature that has to date failed to provide a time-varying instrument for international capital that is not only credibly exogenous but also convincingly meets the exclusion restriction.

Our instrumental variable identification strategy is based on the well-established fact that capital flows to emerging and developing countries can at least partially be driven by push factors in industrialised economies, most notably monetary and financial conditions (Calvo, Leiderman, & Reinhart, 1993; Dabla-Norris, Honda, Lahreche, & Verdier, 2010; Fernandez-Arias, 1996; Fratzscher, 2011; di Giovanni, 2005; Rey, 2013). To gauge those financial conditions, we use the US financial conditions index (FCI) developed by Wacker, Lodge, and Nicoletti (2014), which is defined as the first principal component of 39 US financial variables, each of which is cleaned from growth and inflation dynamics. This measure is credibly exogenous as US financial conditions and monetary policy are not influenced by events in developing countries in general and the labour share in particular. Furthermore, it meets the exclusion restriction as purging from growth and inflation dynamics makes the FCI conditional on the US business cycle, that is it captures developments in financial conditions that are exogenous to most important real developments. This avoids that real aspects in the FCI exercise a relevant impact on developing countries' labour share through other channels than foreign investment, especially since we control for time dummies and trade in the second stage regression. While the United States is by far the most important foreign investor in developing countries, we certainly also want to gauge financial conditions in Japan and the European Union (EU) to improve identification in the first-stage regression. Unfortunately, elaborated FCIs with the required time range are not available for these economies, so we construct proxy measures that are basically an average of equity prices, bond interest rates and the spread between long-term and short-term bond rates.[24] These measures should matter for capital flows to developing countries as they are crucial for the (re-)financing conditions of most relevant investors. The wave of capital flows to emerging economies in the aftermath of the US Fed easing after the financial crisis and its reversal amid the "Taper tantrum" are obvious examples. To make these ("global") measures country-specific, we interact them with the distance of the capital of the respective host country to Washington DC, Brussels and Tokyo, respectively, using CEPII's GeoDist database (Mayer & Zignago, 2011). Economically, this interaction captures the idea that once financial conditions tighten, capital flows will especially decline in more distant countries, where

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[23]Note in this context that capital flows are *not* simply the first difference of capital stocks. See Wacker (2016).

[24]We take OECD data for long-term interest rates, a spread between short-term and long-term rates, and a share price index. These three series are smoothed with a Hodrick–Prescott filter, Pearson transformed, and the first two are inverted so that a rise in each variable indicates finance becoming more easily available. For the EU, we take an average of the largest FDI economies, that is UK, Germany, France and Belgium.

informational frictions tend to matter more, with different magnitudes for FDI and FPI (cf. Daude & Fratzscher, 2008; Hashimoto & Wacker, 2016). Statistically, our identification strategy essentially builds on the idea of Nunn and Qian (2014) that only the interaction term of both variables needs to be exogenous (conditional on the baseline controls). To see a discussion of the correlation between our newly proposed instruments and foreign investment, including first-stage regression results, see Section 1.2 Appendix S1. Our results show that the model is identified (at least over the relevant parameter range) but that identification is weak (partly due to the fact that instruments are highly correlated, leaving little additional exogenous variation). While no issue for identification per se, this calls for the weak-instrument inference techniques we apply.

4 | ESTIMATION RESULTS

In this section, we report our baseline results of the first-difference and the IV model. In the following Section 5, we provide some residual diagnostics and show that our results are robust to alternative sets of control variables and to the changes in the sample that they induce. In addition, we provide results from using an alternative measure for the labour share as the dependent variable and on the marginal effect of foreign investment in dependence of the domestic capital stock.

4.1 | First-difference results

Table 2 starts with the first-difference results. The unconditional model in column (1) already confirms our basic intuition of opposing effects of FDI and FPI on the labour share in developing countries even though only the (positive) FDI variable is significant in a statistical sense, while the difference to FPI, our key statistic of interest, is slightly insignificant at the 10% level if no control variables are included (as indicated in the last row of the table). However, the opposing effects of FDI and FPI on the labour share in developing countries, with FDI exercising a positive effect, are clearly supported by our baseline model reported in the second column of Table 2. The results suggest that a 10 percentage point increase in the FDI stock relative to GDP will increase the labour share by slightly more than 1%, with a negative effect of similar magnitude for FPI. Both parameter estimates are statistically significant (at the 5% and 10% level, respectively), with their difference being significant at the 5% level. Interestingly, the only other two variables that exercise a statistically significant influence on the labour share in this specification are the capital-to-labour (K/L) ratio and trade intensity. As expected, but at odds with the standard neoclassical theory sketched in Section 2, a higher capital-to-labour ratio tends to lower the labour share. The negative effect of trade supports the notion that globalisation is indeed an important factor influencing the labour share in developing countries.[25]

In column (3), we check that the lag structure of our key explanatory variables is well-defined. Allowing for an additional lag of the differenced foreign investment stocks does not alter our main results and the additional lags are individually and jointly insignificant.[26] Column (4) shows different

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[26]The p-value of the *F*-statistics of the second lags of FDI and FPI is 0.78 and hence does not allow us to reject the null of joint insignificance.

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[25]The estimated magnitude is of similar order as for our foreign investment variables. Given that trade/GDP increased by a considerable magnitude in those countries over the last decades, this might add up to a relevant decline in the labour share.

TABLE 2 FD results

Variables	(1) Δln (LS_{PWT})	(2) Δln (LS_{PWT})	(3) Δln (LS_{PWT})	(4) Δln (LS_{PWT})
ΔFDI stock/GDP (−1)	0.00100*	0.00119**	0.00118**	0.00105**
	[0.000541]	[0.000490]	[0.000554]	[0.000475]
ΔFDI stock/GDP (−2)			−0.000288	
			[0.000418]	
ΔPortfolio stock/GDP (−1)	−0.000191	−0.00108*	−0.000907	−0.000866*
	[0.000636]	[0.000554]	[0.000759]	[0.000509]
ΔPortfolio stock/GDP (−2)			0.000523	
			[0.00144]	
Δln(GDP p.c.)		−0.185	−0.183	
		[0.154]	[0.158]	
Δln(inflation) (−1)		−0.00178	−0.00118	−0.000203
		[0.00337]	[0.00368]	[0.00244]
Δrisk		0.00276	0.00238	0.00237
		[0.00167]	[0.00188]	[0.00181]
Δln(government share)		0.0373	0.0401	0.0462
		[0.0745]	[0.0770]	[0.0734]
ΔEducation Index		0.0851	0.143	
		[0.651]	[0.698]	
ΔK/L		−3.26e−06*	−2.99e−06*	
		[1.83e−06]	[1.68e−06]	
Δtrade		−0.000958**	−0.00101**	−0.000830**
		[0.000424]	[0.000482]	[0.000408]
Δln(GDP p.c.) (−1)				−0.170*
				[0.0908]
Δln (government share) (−1)				0.0285
				[0.0253]
ΔEducation Index (−1)				0.403
				[0.523]
ΔK/L (−1)				−4.03e−06*
				[2.20e−06]
Δtrade (−1)				−0.000257
				[0.000495]
Observations	361	245	220	244
Number of countries	47	35	33	34
R^2	0.134	0.263	0.248	0.269
t-statistic	1.94	6.31**	–	5.72**

Notes: Cluster–robust standard errors in brackets. SNA and time dummies not reported. ***$p < .01$; **$p < .05$; *$p < .1$.

TABLE 3 IV results

Variables	(1) ln (LS_{PWT})	(2) ln(LS_{PWT})	(3) ln$((LS_{PWT})$
FDI stock/GDP	0.00318**	0.00188***	0.00312**
	[0.00138]	[0.000639]	[0.00125]
Portfolio stock/GDP	−0.00263**	−0.00422	−0.00419
	[0.00111]	[0.00354]	[0.00362]
ln (GDP p.c.)	−0.333***	−0.360***	−0.336***
	[0.0613]	[0.0747]	[0.0614]
ln (inflation) (−1)	0.00201	0.00103	0.00252
	[0.00528]	[0.00455]	[0.00541]
Risk	0.00173	0.00205	0.00202
	[0.00160]	[0.00168]	[0.00170]
ln (government share)	−0.0765***	−0.0685***	−0.0782***
	[0.0202]	[0.0222]	[0.0219]
Trade	−0.00186***	−0.00140***	−0.00169***
	[0.000555]	[0.000519]	[0.000474]
Education Index	0.655	0.896**	0.676
	[0.586]	[0.400]	[0.557]
K/L	−2.67e−06**	−3.56e−06**	−3.17e−06*
	[1.33e−06]	[1.69e−06]	[1.63e−06]
Instrumented	FDI	FPI	FDI & FPI
Observations	308	308	308
Number of countries	37	37	37
R^2	0.406	0.433	0.399
CLR/ ARχ_4^2	6.63*	1.85	8.18*

Notes: Cluster–robust standard errors in brackets; ***$p < .01$; **$p < .05$; *$p < .1$. Time dummies partialled out, SNA not reported. CLR test for single parameter equality in columns (1) & (2), AR test for joint equality of both endogenous regressors in column (3).

lags for the control variables, again with our main results concerning the opposing effect of FDI and FPI on the labour share in developing countries unchanged.[27]

4.2 | IV results

As an alternative identification strategy, we rely on the instrumental variable approach discussed above to estimate our baseline model, with second stage results presented in Table 3. As already indicated, first-stage identification is weak (a presentation and discussion is provided in Section 1.2 in

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[27]We decided to lag the differences of the more structural (as opposed to cyclical) variables education and capital-labour ratio by one year as we assume that they might take more time to materialize, whereas we allow for the contemporaneous and one-year lagged difference of short-term variables (such as inflation), which might affect the labour share quickly ß.
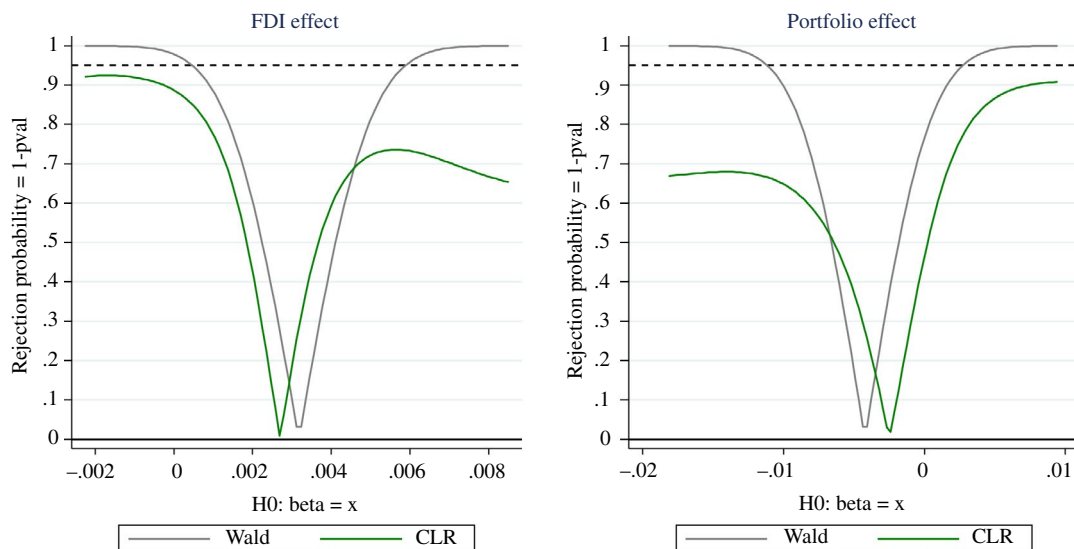
FIGURE 3 IV results (1 endogenous variable): CLR confidence area [Colour figure can be viewed at wileyonlinelibrary.com]

Appendix S1), so while the exogeneity assumption of our approach is economically credible, statistically we have to rely on weak-identification techniques.

In the first and second column of Table 3, FDI and FPI are only individually instrumented, respectively. For both cases, the respective CLR statistics of the relevant parameters are depicted in Figure 3 (together with the Wald statistics that are not robust to weak instruments). The vertical axes of the graphs show a statistical rejection probability for the null hypothesis that the true parameter is equal to the corresponding value on the horizontal axes. For example, from the left panel we can infer that one can reject that the true FDI parameter equals −0.002 at a 90% (but not a 95%) statistical significance level, as the depicted CLR function exceeds the 0.9 (but not the 0.95) threshold. More generally, despite weak identification, we can reject a negative value of the FDI parameter at the 90% level of statistical significance. Accordingly, we can reject (at the 10% level at least) the hypothesis that the true FDI parameter is equal to the point estimate of the FPI parameter in column (1) (not instrumented) or 2 (instrumented). This is also visible from the CLR statistic in the last line of column (1). Conversely, an according statement cannot be made for the FPI parameter estimate from IV identification (depicted in column (2) of Table 3 and in the right panel of Figure 3). While the results suggest that a negative effect of FPI on the labour share in developing countries is more likely, weak identification only allows us to reject a parameter of rather high size (approximately above 0.01) which is clearly above the estimated FDI effect (of 0.002). However, it is worth emphasising that rejection of a larger FPI parameter is much more probable than of a more negative one, while the opposite is true (with more confidence) for the FDI parameter.[28]

For a joint IV assessment of both our parameter estimates of interest, we also instrument them simultaneously, with results provided in column (3) of Table 3. The point estimates, which may potentially suffer weak-identification bias, are close to those obtained from individual IV estimates in the first two columns. For inference with respect to our key hypothesis, we work with the AR statistic,

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[28]Careful observers might have noticed that the point estimates in Table 3 are not equal to the parameter values where the CLR function reaches its minimum in Figure 3. By construction, this does not need to be the case. Rather, the fact that both are quite close suggests that the model is supported by the data.
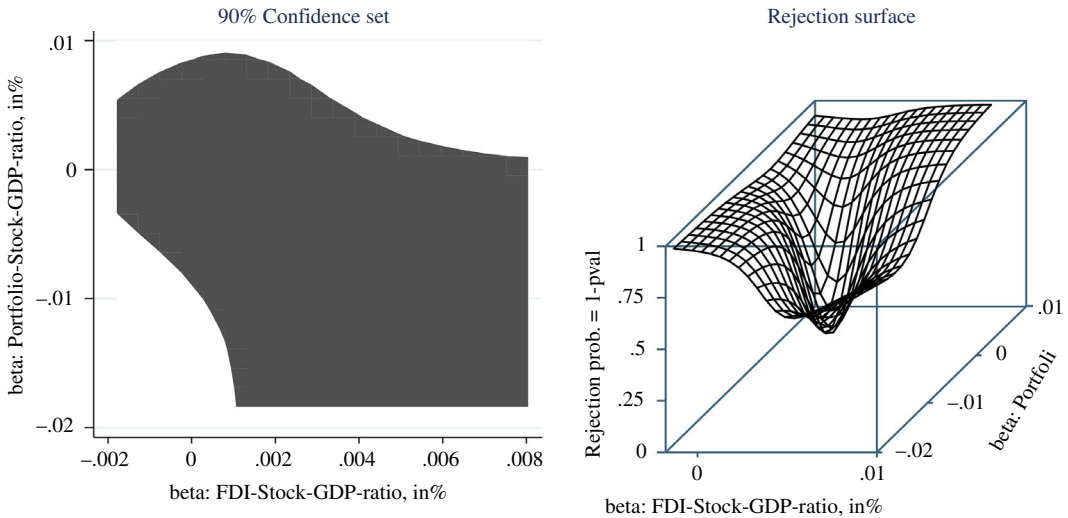
AR

FIGURE 4   IV results (2 endogenous variables): Rejection area [Colour figure can be viewed at wileyonlinelibrary.com]

which is available for the case of 2 potentially endogenous regressors, and can reject (on a 10% level) the joint hypothesis that the true parameter values are equal to their respective other foreign capital estimates. That is, we can reject the null $H_0: \beta_{FDI} = \hat{\beta}_{FPI} \wedge \beta_{FPI} = \hat{\beta}_{FDI}$ in favour of the alternative that both parameters are unequal. Figure 4 plots a 90% confidence set and a more detailed rejection surface of parameter combinations. The latter is a 3-dimensional extension of the previous CLR confidence area, reflecting that there are now 2 instead of 1 endogenous regressors. Since visual inspection is difficult, the left panel displays the area of parameter combinations where the surface in the right panel does not surpass the 90% rejection probability.

Looking at the left panel, one could imagine a line where $\beta_{FDI} = \beta_{FPI}$, that would cross the 90% confidence set, thus not allowing us to reject our relevant null hypothesis at those specific points. However, as is clearly visible, the confidence set is not symmetrically distributed around these parameter combinations of equality but extends much more to the lower right into the area where the effect of FDI on the labour share is positive, while the effect of FPI is negative, in line with our discussion and previous results.

It is interesting to note that IV estimates suggest a larger effect (in absolute terms) of both foreign investment parameters than the first-difference results. For the most part, however, this does not seem to be driven by an estimation bias but by the difference between estimation in levels and first differences,[29] with the former possibly capturing more long-run effects.

Looking at other control variables, we can confirm the previous result that trade and a higher K/L ratio negatively correlate with the labour share. The positive correlation of the education index with the labour share turns statistically significant in the second column, with reasonable standard errors in the other two specifications. The negative correlation with GDP turns significant and government consumption also exhibits a negative effect. Taken at face value, both latter results are somewhat surprising and at odds with most findings in previous studies. However, a negative effect of *GDP p.c.* on

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[29]This can be seen when comparing the FD results with level results in Table 1. Additionally, non-instrumented foreign capital variables in IV Table 3 are still larger (in absolute size) than the FD results.

TABLE 4   Standardised beta coefficients

	(1)	(2)
	Difference model	**IV model**
FDI Stock GDP	0.207**	0.357**
	(2.43)	(2.49)
Portfolio stock/GDP	−0.096*	−0.199
	(−1.94)	(−1.16)
Ln (*GDP p.c.*)	−0.196	−1.336***
	(−1.20)	(−5.47)
ln(*inflation*) (−1)	−0.033	0.018
	(−0.53)	(0.47)
Risk	0.160	0.062
	(1.65)	(1.19)
ln (government share)	0.080	−0.169***
	(0.50)	(−3.57)
Education Index	0.008	0.566
	(0.13)	(1.21)
K/L	−0.086*	−0.451*
	(−1.78)	(−1.94)
Trade	−0.167**	−0.298***
	(−2.26)	(−3.56)
N	245	308

Notes: t statistics in parentheses; *p < .10; **p < .05; ***p < .01. Results correspond to column (2) of Table 2 and (3) of Table 3, respectively.

the labour share was also found in Harrison (2005) and the conventional rationale that higher GDP (growth) leads to more scope for trade unions to redistribute to workers seems problematic in the context of developing countries that are often characterised by surplus labour, leaving little bargaining power to unions (at least in the broad economy). The negative correlation of the labour share with government expenses is an artefact of the PWT data and not robust to our alternative labour share measure, as demonstrated in the next section.[30]

The relative economic relevance of different explanatory variables can be inferred from the standardised beta coefficients in Table 4. As one can see, foreign investment (and also trade) does matter for the labour share in developing countries from an economic perspective, although FDI and FPI seem to cancel each other out for the most part. No clear picture that is robust across specifications emerges for the other variables, though the more structural (as opposed to cyclical) variables—education, K/L ratio, and development level—seem to matter in the IV regression, which captures more long-run effects (with the education effect being potentially economically relevant but insignificant from a statistical perspective).

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[30]A negative correlation could also arise if governments increasingly moved away from public job-creating investment programmes to social benefits. In this likely case, social benefits would no longer be reflected in wages.

5 | ROBUSTNESS AND FURTHER RESULTS

In this section, we provide several specification and robustness checks as well as some further results.

5.1 | Diagnostic checks

We start with a diagnostic check on the functional (linear) form of the first-difference model.[31] The upper panel of Figure 1 in Section 1.2 in Appendix S1 therefore provides a plot of the model residuals against fitted values and a leverage-to-residual plot. As one can see, the only truly worrisome residuals concern Azerbaijan (2006) and Moldova (1999). Column (5) of Table 5 thus re-estimates our model without these two observations. This somewhat lowers (in absolute terms) the point estimates of our two foreign investment variables of interest, without changing the qualitative implications of our results (as both individually and their difference remain statistically significant).

The lower panel of Figure 5 provides a component-plus-residual plot for the FDI and FPI variable, respectively. One can see that there is no reason to believe that the linear functional relationship would be inappropriate.

5.2 | Alternative specifications and labour share measure

Column (1) of Table 5 adds a crisis dummy and gross fixed capital formation (GFCF) as additional controls to the baseline first-difference model. Column (2) further adds labour productivity and the interest rate. Note that this also leads to a relevant decrease in the sample size. However, in neither of the two alternative specifications our key result is affected: our foreign capital stock variables are both individually significantly different from zero and significantly different from each other (in a statistical sense). The same is true for the point estimates of the IV model when adding the crisis dummy and GFCF (column (6)), although weak-instrument robust inference does not allow us to reject parameter equality at the margin (*p*-value .108). Notably, our results with respect to the *K/L* ratio and the negative effect of trade remain robust to the inclusion of further controls.

We also add an index for employment vulnerability, the implied PPP exchange rate and mean years of schooling (as an alternative education measure) as control variables, respectively.[32] Neither of those variables turn out significant. With respect to our key hypothesis, results remain unaffected in the first-difference model, with parameter equality rejected at the 5% level in all three cases and individual FDI (and FPI) parameters being positive (negative) and statistically significant at least at the 5 (10)% level in all cases. For the IV model, our key result does no longer hold when including the employment vulnerability index, which most likely is driven by the enormous decline in sample size to 170 observations. Key results hold, however, when including the exchange rate or years of schooling.

Columns (3) and (7) of Table 5 use the alternative labour share measure calculated by van Treeck (forthcoming) as the dependent variable in our baseline first-difference and IV model, respectively. Even with this alternative labour share measure, which differs considerably from the PWT measure (as demonstrated in the correlation matrix of Appendix Table A2), our qualitative results remain

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[31]An indirect assessment of the functional specification of the IV model can be inferred from the fact that the point estimate is close to the minimum of the rejection probability function of the CLR and AR tests.

[32]Results not reported but available upon request.

TABLE 5 Robustness checks

Variables	(1) $\Delta\ln (LS_{PWT})$	(2) $\Delta\ln (LS_{PWT})$	(3) $\Delta\ln (LS_{Treeck})$	(4) $\Delta\ln (LS_{Treeck})$	(5) $\Delta\ln(LS_{PWT})$	(6) $\ln (LS_{PWT})$	(7) $\ln (LS_{Treeck})$	(8) $\Delta\ln (LS_{PWT})$
FDI stock/GDP	0.00130**	0.00141***	0.00242**	0.00305**	0.000817***	0.00365***	0.00307**	0.00209***
	[0.000479]	[0.000425]	[0.00114]	[0.00122]	[0.000299]	[0.00125]	[0.00146]	[0.000663]
Portfolio stock/GDP	−0.00135**	−0.00144*	−0.00201*	−0.00279***	−0.000937*	−0.00678**	−0.00736	−0.00186*
	[0.000503]	[0.000719]	[0.00112]	[0.000971]	[0.000511]	[0.00333]	[0.00599]	[0.00102]
FDI Stock × K/L								−3.34e−08**
								[1.55e−08]
Portfolio Stock × K/L								2.94e−08*
								[1.69e−08]
ln (GDP p.c.)	−0.318***	−0.375*	−0.240*	−0.350***	−0.162*	−0.275***	0.00530	−0.171
	[0.107]	[0.186]	[0.133]	[0.123]	[0.0869]	[0.0590]	[0.0984]	[0.152]
ln (inflation) (−1)	−0.00767**	−0.00726**	0.00703	0.00245	−0.000848	0.00236	0.0117	−0.00177
	[0.00313]	[0.00344]	[0.00508]	[0.00525]	[0.00303]	[0.00648]	[0.00795]	[0.00326]
Risk	−0.000442	0.00120	0.00558***	0.00428*	0.00168	0.000826	0.00607**	0.00259
	[0.00140]	[0.00128]	[0.00191]	[0.00227]	[0.00145]	[0.00183]	[0.00263]	[0.00168]
ln (government share)	−0.0432	−0.0256	0.0916	0.0196	−0.0189	−0.0871***	0.232***	0.0393
	[0.0387]	[0.0365]	[0.0737]	[0.0419]	[0.0332]	[0.0168]	[0.0450]	[0.0757]
Education Index	0.606	1.229*	0.821	1.889**	−0.174	0.614	1.069	0.00689
	[0.563]	[0.686]	[0.964]	[0.915]	[0.614]	[0.645]	[0.783]	[0.675]
K/L	−5.80e−06***	−5.72e−06***	−8.36e−07	5.15e−07	−3.53e−06*	−5.08e−06***	−3.07e−06	−3.93e−06*
	[1.95e−06]	[1.75e−06]	[1.68e−06]	[2.60e−06]	[2.00e−06]	[1.93e−06]	[1.92e−06]	[2.29e−06]
Trade	−0.00102**	−0.000998**	−0.000943*	−0.00106*	−0.000933**	−0.00112***	−0.000884	−0.000983**
	[0.000454]	[0.000459]	[0.000498]	[0.000607]	[0.000444]	[0.000389]	[0.000574]	[0.000415]

(Continues)

TABLE 5 (Continued)

Variables	(1) $\Delta\ln (LS_{PWT})$	(2) $\Delta\ln (LS_{PWT})$	(3) $\Delta\ln (LS_{Treeck})$	(4) $\Delta\ln (LS_{Treeck})$	(5) $\Delta\ln(LS_{PWT})$	(6) $\ln (LS_{PWT})$	(7) $\ln (LS_{Treeck})$	(8) $\Delta\ln (LS_{PWT})$
Crisis	−0.0353** [0.0153]	−0.0336 [0.0219]		−0.107* [0.0635]		−0.00883 [0.0537]		
FCF/GDP	−0.000594 [0.000639]	−0.000560 [0.000505]		−0.00233* [0.00116]		−0.00134 [0.000988]		
Labour productivity		−2.78e−06 [1.13e−05]						
Interest rate		0.000296 [0.000478]						
Observations	197	144	251	203	243	261	316	245
Number of countries	34	27	37	36	35	35	39	35
R^2	0.406	0.551	0.221	0.289	0.235	0.459	0.342	0.275
Estimation	FD	FD	FD	FD	FD	IV	IV	FD
Test statistic	8.52***	7.45**	5.14**	8.24***	6.30**	7.59 (AR)	7.62 (AR)	N/A

Notes: Robust standard errors in brackets, ***$p < .01$; **$p < .05$; *$p < .1$.

Differences and lag structures not indicated in explanatory variables. IV instruments for both types of foreign investment.

unaffected. If anything, the (absolute) magnitude of the effects increase (especially in the first-difference model). Column (4) further adds the crisis dummy and GFCF to the first-difference model using the alternative labour share measure by van Treeck (forthcoming), with results still remaining robust.

5.3 | Additional results: K/L interactions

We further experimented with different interaction terms. Column (8) of Table 5 shows the results of the first-difference model when our two key foreign investment variables are interacted with the capital-to-labour ratio. Note that we principally estimate the model in first differences to control for unobserved heterogeneity, but interact the (first-differenced) foreign investment stocks with the *level* of the K/L ratio to obtain marginal effects of foreign investment on the labour share conditional on differences in the K/L ratio *across* (and not within) countries.

This provides an interesting result as the interaction has a different prefix for FDI as opposed to FPI, meaning that an increasing K/L ratio shrinks the effect of foreign investment towards 0, and eventually leads to a change in the prefix (though the latter is not significant).[33] Without over-emphasising these results, they potentially have a relevant economic implication that could be explored further in future research: as we argued in Section 2, financial capital (and hence FPI) might materialise in new varieties of capital. For economies at lower stages of capital accumulation, it may be easier to develop new varieties of capital that do not substitute for existing ones.[34] This implies a high substitution elasticity between capital and labour, hence a more relationship between FPI and the labour share at lower K/L ratios.[35] Conversely, foreign direct investors will find it more difficult to withdraw their establishment at low K/L ratios because capital markets tend to be less developed. As capital markets deepen, it becomes easier to sell FDI assets to local investors and allow multinationals to become increasingly "footlose."[36]

Consistent with this reasoning, we also find squared terms of FDI and FPI to be negative (and significant) and positive (but insignificant), respectively. The former is at odds with the findings of Maarek and Decreuse (2015), who find a negative FDI effect but a positive squared term, with the labour share only covering the manufacturing sector. Quantitatively, the effect of our squared FDI term is negligible: it only leads to a negative effect on developing countries' labour share if the first-differenced FDI stock reaches more than 40% of GDP, which is only true for one observation in the sample. Interacting the FDI stock with the FPI stock leads to a positive (and significant) interaction term. Most importantly, in all those specifications, our main conclusions about the opposing effect of FDI and FPI on developing countries' labour share hold (for the main part of the sample). Furthermore, trade and the K/L ratio remain negative and significant (at the 1% level) in all of those specifications.

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[33]For both effects, the threshold is slightly above a *K/L* ratio of 60,000, which is only the case for 5 countries in the sample. Also, the (interactive) effect does not turn significant at such high levels of the *K/L* ratio within the sample range. Plots of the marginal conditional effects are available upon request.

[34]This is consistent with the second part of Equation (5) in the endogenous growth model in Borensztein et al. (1998).

[35]Note that Furceri and Loungani (2018) also find the effects of financial account liberalization on inequality to be stronger for financially less developed countries.

[36]An alternative explanation is that FDI at low levels of *K/L* actually increases competition but that "superstar firms" increasingly dominate the labour market at higher *K/L* ratios (see Autor et al., forthcoming; Krueger, 2018).

6 | POLICY DISCUSSION AND FURTHER RESEARCH

Our results have shown that de facto financial globalisation, measured by the level of foreign portfolio and direct investment, cannot explain the decline in the labour share in developing countries over the last two decades. Rather, FDI seems to have mitigated this trend by exercising a positive effect on the labour share in those countries. Quantitatively, the FDI stock (relative to GDP) in the sample developing countries increased from 16 to about 35% over the last two decades, while FPI only rose from about 4.2% to 5.5% of GDP. Meanwhile, the log of the labour share fell from 3.77 to 3.72. This implies that FPI can explain very little of the labour share decline (about 5% of the overall decline) while the actually observed increase of FDI countered the labour share decline by about three quarters.[37] By and large, the effects of FDI are thus not only statistically significant but also economically very relevant, while the potential negative effects of FPI (if any) are relatively modest.

This calls for alternative explanations for the fall of the labour share in developing countries. Particularly, it raises the question, how our results can be reconciled with recent findings by Autor et al. (forthcoming) that the rise of "superstar firms" contributed to the declining US wage share, given that high-productivity firms are also most likely to conduct FDI (Helpman, Melitz, & Yeaple, 2004).

A first candidate for explaining the fall of developing countries' labour share is the broader set of globalisation policies pursued over recent decades, particularly in the 1990s. This includes, for example, privatisation (Azmat, Manning, & Reenen, 2012) and tax policies that often came along with financial globalisation and may have adverse effects on the labour share.[38] Moreover, it should be stressed that our analysis focused on de facto financial globalisation. That means, we analyse the effects of investment projects already realised. Conversely, the effect of having several outside options for investment, and hence of de jure financial globalisation, may indeed be detrimental to labour's share of income (Arseneau & Leduc, 2011).[39] Future empirical work may look closer into those channels. Particularly, the last aspect seems important to reconcile our findings with those in Furceri and Loungani (2018).

Another obvious candidate is trade, which has been the focus of several recent studies on labour developments in high-income countries (Autor, Dorn, & Hanson, 2013; Cabral, Martins, dos Santos, & Tavares, 2018). A more detailed analysis of this channel for developing countries is a promising and relevant area for future research, especially since our estimates in this paper suggest a large negative aggregate relationship.[40]

From a policy perspective, it finally also seems advisable to not prematurely rely on evidence from high-income countries to gauge the distributional effects of policies in developing economies. Notably, Autor et al. (forthcoming) have shown that a key factor for the decline of the labour share in the United States was the rise of "superstar firms." Since those lead firms tend to produce with a low share of labour in firm value-added and sales, their increased market power depresses the aggregate labour share. In developing countries, however, the global rise of "superstar firms" will

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[37]We assume parameters of −0.002 (FPI) and 0.002 (FDI). The contributions are then calculated as $(\Delta FI \times \beta) / -0.05$, where ΔFI is the change in foreign investment, β is the respective parameter, and −0.05 is the change in the log of the labour share.

[38]In this context, it is also informative that we find a robust negative correlation between the labour share and the capital-to-labour ratio, which could reflect that policies that promote capital formation have detrimental effects on the labour share.

[39]Conversely, evidence by Görg et al. (2009) for OECD countries indicates that multinationals might favour redistributive welfare states for stability considerations, creating an argument against unbounded "race to the bottom" wage competition.

[40]Assuming a parameter of −0.0015, as suggested by several of our results, a 12 percentage point increase in the trade/GDP ratio, as roughly observed in our sample between the pre-2000 and post-2000 period, is associated with a decline of the labour share of 1.8%.

have a different effect because expansion of those firms into developing economies, all else equal, can be expected to *increase* employment and labour demand in the host country, particularly for high-skilled workers. Moreover, it will increase competition in product markets, lowering markups of domestic firms. Recent work by the IMF (2019) for Sub-Saharan Africa suggests that firms facing higher competition and with lower markups exhibit higher labour shares. This suggests that higher market concentration in industrialised FDI source countries and increased competition in host countries may be two sides of the phenomenon of global "superstar firms," with opposing effects on respective labour shares.

7 | CONCLUSION

Our study has highlighted that foreign portfolio and direct investment have opposing effects on the labour share in developing countries. We argue that only portfolio investors are globally flexible enough to exercise a relevant bargaining power that keeps wages low, while FDI is more bound to the host market and tends to pay a wage premium to attract well-educated and reliable employees. The key contribution of this paper is to show these opposing effects empirically for a sample of ~40 developing and transition economies after 1992, using different estimation strategies and labour share data from the Penn World Tables and from a recent data set by van Treeck (forthcoming).

Our results contribute to a wider debate concerning the macroeconomic determinants and implications of the labour share (Autor et al., forthcoming; Karabarbounis & Neiman, 2014) and the role and effects of financial globalisation in developing countries (Jeanne, Subramanian, & Williamson, 2012; Kose, Prasad, Rogoff, & Wei, 2009; Prasad et al., 2003). The relationship with some recent contributions in this literature and possible extensions for future research were discussed in the previous section. Moreover, it may seem promising to analyse more disaggregated FDI effects on the labour share to capture different FDI entry modes (Harms & Méon, 2018) and modes of world market integration with differing socioeconomic effects (Wacker, Großkurth, & Lakemann, 2016).

Finally, our results about the functional income distribution between capital and labour do not preclude the possibility that de facto financial globalisation has contributed to the increase in personal inequality between households (i.e., within labour) in developing countries, as suggested by the results of Furceri and Loungani (2018).

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section.

APPENDIX

TABLE A1 Summary statistics

Variable	Mean	Std. Dev.	*N*	Source
ln (LS_{PWT})	3.883	0.197	309	PWT 8.0
ln (LS_{Treeck})	3.756	0.241	307	Own calculation
FDI stock/GDP	26.376	22.488	309	IFS, UN SNA
Portfolio stock/GDP	6.4	9.351	309	IFS, UN SNA
ln (*GDP p.c.*)	8.129	0.783	309	PWT 7.0
ln (*inflation*) (−1)	1.948	1.371	309	WDI
Risk	66.52	6.076	309	ICRG
ln (government share)	2.035	0.425	309	PWT 7.0
Education Index	0.526	0.165	309	UNDP
K/L	30,504	28,043	309	Own calculation
Trade	77.471	34.781	309	PWT 7.0
Crisis	0.03	0.172	263	Own calculation
GFCF/GDP	21.226	7.411	309	WEO, UN SNA

TABLE A2 Variable correlation matrix

	ln(LS_{PWT})	ln(LS_{Treeck})	FDI	FPI	ln(GDP)	Inflation	risk	ln(G/GDP)	Educ	K/L	Trade
ln(LS_{PWT})	1										
ln(LS_{Treeck})	0.462	1									
FDI stock/GDP	−0.149	0.0558	1								
Portfolio stock/GDP	−0.198	−0.198	0.193	1							
ln(GDP p.c.)	−0.141	−0.0273	0.222	0.369	1						
ln(inflation) (−1)	0.159	0.119	−0.309	−0.0768	0.140	1					
Risk	−0.221	−0.0854	0.373	0.273	0.446	−0.356	1				
ln(government share)	0.241	0.0764	−0.151	0.0379	−0.121	0.0216	−0.0861	1			
Education Index	0.0523	0.0724	0.403	0.330	0.805	0.191	0.303	−0.149	1		
K/L	0.0520	−0.000133	0.178	0.417	0.595	0.141	0.314	−0.0326	0.524	1	
Trade	0.0609	0.168	0.431	0.244	0.311	−0.116	0.293	−0.0117	0.430	0.349	1
N	309										

Countries included (in baseline estimation of Table 1), incl. no. of observations: Armenia (11), Azerbaijan (8), Belarus (9), Bolivia (13), Brazil (3), Bulgaria (8), Burkina Faso (6), China (5), Colombia (17), Dominican Republic (4), Egypt (6), Guatemala (5), Honduras (6), India (14), Ivoty Coast (7),Jamaica (2), Jordan (10), Kazakhstan (8), Latvia (3), Lithuania (2), Moldova (12), Morocco (8), Mozambique (6), Namibia (3), Niger (11), Nigeria (5), Panama (3), Paraguay (15), Peru (18), Philippines (1), Poland (2), Russian Federation (9), Senegal (12), Tanzania (16), Thailand (15), Tunisia (15), Ukraine (9), Venezuela (2).