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Functional distribution of income as a determinant of importing behavior

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Functional distribution of income as a determinant of importing behavior

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The last few decades have been marked by significant changes in income distribution, both on personal and functional levels. In effect, top incomes have risen to unprecedented levels since the *Belle Époque*, especially in the US (Alvaredo et al., 2017; Piketty, 2014), whereas the wage share has been falling substantially (although heterogeneously) since the 1980s across most OECD countries and developing countries. Although changes in the former have had more prominence, as noted in Atkinson et al. (2011) and Stockhammer (2017), there has been an increasing interest in the behavior of the functional distribution of income and the macroeconomic implications of the falling trend in the wage share.

The empirical literature dealing with the effects of the functional distribution of income on aggregate demand has been following either an aggregative approach (by directly estimating the relation between the wage share and the rate of capacity utilization) or a structural one (by separately estimating the effects of wage share on each component of aggregate demand) (Blecker et al., 2020; Stockhammer & Wildauer, 2015). The former approach usually finds evidence of profit-led demand (that is, a rise in the profit share exerts a positive impact on aggregate demand) and a profit-squeeze in distribution in the short-run (Barbosa-Filho & Taylor, 2006; Carvalho & Rezai, 2016). Meanwhile, the latter approach usually finds evidence of wage-led demand (that is, an increase in the wage share exerts a positive impact on aggregate demand) in large and relatively more closed economies, whilst the results for smaller countries and more open economies tend to indicate a profit-led demand regime (Lavoie & Stockhammer, 2013; Onaran & Obst, 2016; Stockhammer & Wildauer, 2015)

One of the main channels through which the functional distribution of income can affect aggregate demand is the trade balance. The existing empirical evidence regarding this relationship is mostly related to price competitiveness. In general, the results indicate that

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an increase in the wage share (or unit labor cost (ULC)) negatively impact on the trade balance (net exports) in developed and developing countries (Blecker et al., 2020; Stockhammer & Wildauer, 2015). However, considerably much less attention has been given in the literature to non-price factors and whether and how the functional distribution of income can directly affect exports and imports. With the notable possible exception of the Latin American structuralists and Arestis and Driver (1987), the investigation of this channel has been almost restricted to a specific literature examining the effects of income inequality given the existence of non-homothetic preferences - in general, the more unequal the country (in terms of personal income distribution), the greater its expenditure in luxury goods (Bohman & Nilsson, 2006; Dalgin et al., 2008). Therefore, a timely issue in need of empirical addressing is whether international trade flows are affected by both the level and the functional distribution of income.

Given the prominent declining trend in national wage shares and such a noticeable gap in the literature, the main purpose of this policy note is to empirically explore the impact of a change in the functional distribution of income on a specific component of aggregate demand in different groups of countries, namely, imports. More precisely, this policy note explores the potentially distinct effects of a change in the wage share on imports in two heterogeneous groups of countries: developed and developing ones.

Empirical exercise

As detailed and elaborated in a companion working paper (Cícero & Lima, 2020), we estimate the import demand functions by taking into account not only the typical relative price and income effects but also the notion that to different functional forms of income correspond different patterns of demand for imports. Thus, we also include the functional distribution of income as an explanatory variable. We propose the following general specification:

$$\ln M_{i,t} = \beta_0 + \beta_1 \ln M_{i,t-1} + \beta_2 \ln \ln M_{i,t-2}$$
$$+ \beta_3 \ln P_{i,t} + \beta_4 \ln Y_{i,t} + \beta_5 \ln \sigma_{i,t} + \beta_6 X_{i,t} + \lambda_i + \delta_t + u_{i,t} \quad (1)$$

where β_0, β_1, β_2, β_3, β_4, β_5 and β_6 are parameters (the expected signs are: $\beta_0 \lessgtr 0$, $\beta_1 > 0$, $\beta_2 \lessgtr 0$, $\beta_3 < 0$, $\beta_4 > 0$, $\beta_5 \lessgtr 0$ and $\beta_6 \lessgtr 0$), $\ln M_{i,t-j}$ denotes the log of import volume, which

is considered an independent variable in the first and second lags, $\ln P_{i,t}$ denotes the log of import unit price, $\ln \sigma_{i,t}$ is the log of wage share, $X_{i,t}$ is a set of control regressors consisting of economic and political variables (all in log), λ_i is an unobserved country-specific effect, δ_t is a period-specific effect, and $u_{i,t}$ is the regression residual.

Results

The sample is comprised of 124 countries (98 developing and 26 developed ones) and covers seventeen years, from 2001 to 2017, which are represented by two-year time windows, totaling 9 periods. We first estimate the import demand function for the group of developed countries (according to the IMF's definition).[1] These results are reported in Table 1.

The first two columns show the results of both GMM estimations for the baseline model, considering only one lag of the dependent variable and without control variables. The third and fourth columns present the GMM estimations - that is, the difference GMM and the system GMM, respectively - for the model that considers the set of control variables and one lag of the explained variable. The fifth and sixth columns present, respectively, the results of the GMM difference and system for the complete model, considering two lags of the import volume and the set of control variables.

Although the log of the wage share has a statistically significant positive effect on the import volume in all difference GMM estimations, when we consider the columns representing the system GMM estimations, the coefficients associated with the wage share are negative but only statistically significant in the "intermediate" model. Notwithstanding, the system GMM estimations for the three models suffer from problems due to a large number of instruments (compared to the number of cross-section groups). This proliferation of instruments is directly related to a certain "misleading" result of the rejection of the null hypothesis of both AR(2) and Hansen tests in those estimations. Also, the coefficients associated with the log of real GDP and log of import unit price do not seem to be relevant, and the signs of the coefficients representing the income elasticity of imports are different from the expected ones. Moreover, the difference GMM estimations for the baseline and the complete model suffer from problems related to the non-rejection of the null hypothesis of the AR(2) and Hansen

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[1]We refer to all the other countries in the sample (both less developed countries (LDCs) and emerging ones) as developing countries.

	Baseline model		Intermediate model		Complete model	
	Diff GMM	System GMM	Diff GMM	System GMM	Diff GMM	System GMM
Log of import volume, lag 1	0.218***	0.975***	0.335***	1.054***	0.191***	1.157***
	(0.05)	(0.05)	(0.09)	(0.07)	(0.06)	(0.09)
Log of import volume, lag 2					0.037	-0.109
					(0.04)	(0.06)
Log of import price	-0.469***	-0.181	-1.138***	-0.196	-1.211***	-0.042
	(0.09)	(0.18)	(0.15)	(0.13)	(0.20)	(0.10)
Log of real GDP	1.001***	-0.018	0.820	-0.084	0.625	-0.056
	(0.09)	(0.02)	(0.52)	(0.15)	(0.34)	(0.08)
Log of wage share	0.719***	-0.040	0.609***	-0.515**	0.755***	-0.291
	(0.08)	(0.20)	(0.15)	(0.18)	(0.20)	(0.20)
Constant						-0.387
						(0.84)
Time-specific effects	Yes	Yes	Yes	Yes	Yes	Yes
Control variables	No	No	Yes	Yes	Yes	Yes
Number of lags (instruments)	4	4	2	2	2	2
AR(2) test - p value	0.020	0.285	0.142	0.239	0.003	0.073
Hansen "J" test - p value	0.036	0.201	0.096	0.266	0.008	0.314
Instruments	24	29	24	33	23	32
Observations	182	208	182	208	156	182
Groups	26	26	26	26	26	26

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Standard errors in parentheses.

Table 1: Estimations for developed countries

test (as show by the associated p-values). These results indicate that both estimations are not correctly specified, and more lags of the explanatory variables are needed as instruments. In this case, the problem is that we have only a few developed countries and not that many periods, so that the number of instruments is already quite near the number of groups. Thus, these results do not seem to be sufficiently conclusive and statistically robust.

Nevertheless, the difference GMM estimation for the intermediate model does not suffer from the previously discussed problems. This result seems to be statistically robust: the number of instruments used in the estimation is lower than the number of cross-section groups, and we can reject the null hypothesis of both the AR(2) and Hansen tests. The positive sign of the coefficient associated with the wage share and its statistical significance indicates a very interesting result: a rise in the wage share tends to boost the volume of

imports in developed countries. In fact, a 1% increase in the growth rate of the wage share is related, *ceteris paribus*, to a 0.6% increase in the growth rate of the import volume in developed countries.

	Baseline model		Intermediate model		Complete model	
	Diff GMM	System GMM	Diff GMM	System GMM	Diff GMM	System GMM
Log of import volume, lag 1	0.232*	0.980***	0.286***	0.849***	0.466***	0.922***
	(0.09)	(0.06)	(0.06)	(0.06)	(0.05)	(0.09)
Log of import volume, lag 2					-0.034	-0.094
					(0.02)	(0.08)
Log of import price	-0.500***	-0.075	-0.677***	-0.162	-0.424***	-0.186
	(0.15)	(0.06)	(0.14)	(0.12)	(0.11)	(0.12)
Log of real GDP	1.046***	-0.002	1.039***	0.012	0.745***	0.068
	(0.29)	(0.05)	(0.23)	(0.10)	(0.17)	(0.12)
Log of wage share	-0.059	-0.365*	-0.922***	-0.574*	-0.379**	-0.520
	(0.31)	(0.18)	(0.24)	(0.23)	(0.14)	(0.27)
Constant		0.382				1.060
		(0.56)				(1.26)
Time-specific effects	Yes	Yes	Yes	Yes	Yes	Yes
Control variables	No	No	Yes	Yes	Yes	Yes
Number of lags (instruments)	8	8	5	5	7	7
AR(2) test - p value	0.663	0.529	0.316	0.597	0.294	0.121
Hansen "J" test - p value	0.029	0.061	0.083	0.269	0.192	0.047
Instruments	36	41	48	57	63	72
Observations	686	784	686	784	588	686
Groups	98	98	98	98	98	98

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Standard errors in parentheses.

Table 2: Estimations for developing countries

Table 2 reports the results for the group of developing countries. Our results show that an increase in the wage share has a negative impact on the volume of imports in developing countries, given that the coefficients associated with the log of wage share are negative and statistically significant for almost all estimations and models. The coefficients associated with the log of real GDP and the log of import price have the expected signs for almost all of the four "robust" estimations (in terms of the AR(2) and the Hansen test), although not significant for both system GMM estimations (baseline and intermediate models). Thus, considering the two remaining difference GMM estimations (given that these results, besides

being statistically robust, also present general economic significance), the growth rate of the wage share is negatively related to the growth rate of the volume of imports in developing countries. For the intermediate (complete) model, the coefficient can be interpreted as follows: a 1% increase in the growth rate of the wage share has, all else constant, a negative 0.92% (0.38%) impact on the growth rate of the volume of imports.

Conclusions

First, the statistical significance of the coefficients associated with the functional distribution of income in the estimates for developed and developing countries shows that the non-inclusion of such a distributional measure represents the omission of a relevant variable and, therefore, raises some doubt about the consistency of the estimators. Moreover, the different results for the group of developed and developing countries indicate that a more detailed treatment should be given to structurally different countries, since changes in the functional distribution of income have different effects on the import demand function of each group.

Second, our results contribute to the ongoing empirical and theoretical discussions on the effect that changes in the functional income distribution have in the context of the price competitiveness of different economies, and more so in the case of developing countries (the results for which are more consistent, as mentioned earlier). Considering that increases in the wage share are positively related to increases in the unit labor cost, our results indicate that, although such a price effect may deteriorate the competitive conditions of domestic goods abroad (possibly reducing net exports), the effect of such a distributional variation on the volume of imports is negative. This implies that, depending on the relative strength of these effects, a rise in the wage share may, in fact, improve the country's trade balance and thereby alleviate the balance-of-payments constraint on output growth. However, the result may be the opposite in developed countries: the effect of an increase in the wage share on the volume of imports seem to operate in the same direction as the likely deterioration of the competitive conditions of exports due to the higher unit labor costs, which would tighten the balance-of-payments constraint on output growth.

Third, the negative or positive effect that an increase in the wage share has on the volume of imports of different countries is likely to be directly related to a composition effect in the demand for foreign goods. In countries featuring higher levels of income inequality,

an increase in the profit share in income (and thus a decrease in the wage share), in addition to increasing the volume of imports, tends to increase the import of more luxurious goods to the detriment of more necessity (basic) goods (which, incidentally, are mainly exported by developing countries). Moreover, another plausible explanation is that the propensity to import out of wage income tends to be lower than out of profit income. This is especially the case in many developing countries, where workers typically consume all their surplus income in meeting relatively more basic needs, so that a fall in the volume of imports (in addition to the composition effect) occurs in response to an increase in the profit share in income. In fact, this seems to be mostly the case for our group of developing countries. Nevertheless, this rationale may not apply (or may apply much less) to developed economies, where workers tend to have a greater propensity to spend their marginal income on imported commodities.

Finally, by showing the importance of the functional distribution of income for the determination of the volume of imports, this paper offers an empirical contribution that speaks to a considerable (and sometimes overlapping) literature on demand-led growth regimes in open economies, balance-of-payments-constrained growth, and the growth-enhancing potential of a competitive real exchange rate. In the case of the latter, recall that a currency devaluation typically lowers the wage share, while we found that such a fall in the wage share has a statistically significant positive impact on the volume of imports in developing countries. Therefore, our results imply that a currency devaluation, despite possibly boosting exports, may ultimately tighten the balance-of-payments constraint on output growth in developing countries by raising their volume of imports.

All in all, the neglect of functional income distribution effects in import demand functions represents the omission of both an empirically relevant variable and a theoretically significant channel through which the functional distribution of income affects output growth under conditions of balance-of-payments constraints and a competitive real exchange rate. Moreover, the different effects that a change in the functional distribution of income has on the volume of imports in different groups of countries indicate that the structural specificities of developed and developing countries do matter for the macroeconomic implications of the recent global declining trend in national wage shares.

References

Alvaredo, F., Chancel, L., Piketty, T., Saez, E., & Zucman, G. (2017). Global inequality dynamics: New findings from WID.world. *American Economic Review, 107*(5), 404–09.

Arestis, P., & Driver, C. (1987). The effects of income distribution on consumer imports. *Journal of Macroeconomics, 9*(1), 83–94.

Atkinson, A. B., Piketty, T., & Saez, E. (2011). Top incomes in the long run of history. *Journal of Economic Literature, 49*(1), 3–71.

Barbosa-Filho, N. H., & Taylor, L. (2006). Distributive and demand cycles in the US economy—a structuralist Goodwin model. *Metroeconomica, 57*(3), 389–411.

Blecker, R. A., Cauvel, M., & Kim, Y. (2020). *Systems estimation of a structural model of distribution and demand in the us economy* (Working Paper No. 2012). Post-Keynesian Economics Society.

Bohman, H., & Nilsson, D. (2006). Income inequality as a determinant of trade flows. *International Journal of Applied Economics, 4*(1), 40–59.

Carvalho, L., & Rezai, A. (2016). Personal income inequality and aggregate demand. *Cambridge Journal of Economics, 40*(2), 491–505.

Cícero, V. C., & Lima, G. T. (2020). *Functional distribution of income as a determinant of importing behavior: An empirical analysis* (Working Paper tbd). MADE/USP.

Dalgin, M., Trindade, V., & Mitra, D. (2008). Inequality, nonhomothetic preferences, and trade: A gravity approach. *Southern Economic Journal, 74*(3), 747–774.

Lavoie, M., & Stockhammer, E. (2013). Wage-led growth: Concept, theories and policies. *Wage-led growth* (pp. 13–39). Springer.

Onaran, Ö., & Obst, T. (2016). Wage-led growth in the EU15 member-states: The effects of income distribution on growth, investment, trade balance and inflation. *Cambridge Journal of Economics, 40*(6), 1517–1551.

Piketty, T. (2014). *Capital in the twenty-first century*. Harvard University Press.

Stockhammer, E. (2017). Determinants of the wage share: A panel analysis of advanced and developing economies. *British Journal of Industrial Relations, 55*(1), 3–33.

Stockhammer, E., & Wildauer, R. (2015). Debt-driven growth? Wealth, distribution and demand in OECD countries. *Cambridge Journal of Economics, 40*(6), 1609–1634.