Globalization and Female Labor Force Participation in Developing Countries: An Empirical (Re-)Assessment

Konstantin M. Wacker*, *University of Mainz, kwacker@uni-mainz.de*
ArushaCooray, *Nottingham University Business School Malaysia, Arusha.Cooray@nottingham.edu.my*
Isis Gaddis, *World Bank and University of Göttingen, igaddis@uni-goettingen.de*

Abstract

We investigate the impact of foreign direct investment (FDI) and trade, as two measures of globalization, on female labor force participation rate in a sample of 80 developing countries over the time period 1980 - 2005. Contrary to the mainstream view in the literature, which is mainly based on country-case studies or simple cross-country variation, we find that both, FDI and trade have a generally negative impact on female labor force participation. While the impact is generally of negligible economic size, it is stronger for younger cohorts, possibly reflecting a higher return to education in open economies. We further find a large degree of cross-regional heterogeneity and that the direction of the effect of globalization on female labor force participation depends on the industrial structure, with more positive effects in economies with a higher share of industry in value added. We can thereby explain why country studies find other effects and question the generalization of their results into an overarching globalization tale concerning female labor force participation.

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* Corresponding author.
Jakob-Welder-Weg 4, Room 01-145
D-55128 Mainz,
Germany

+49 6131 - 39 20770

"The End of Labor is to Gain Leisure" (Aristotle)

1. Introduction

The increase in female labor force participation (FLFP) is one of the most significant global developments of the last decades. There is broad consensus that this is in general a welcome trend since it may contribute to women's economic empowerment and reduce economic costs associated with the underutilization of women's skills and labor (Klasen and Lamanna, 2009; World Bank, 2011). However, the determinants of this development are more controversial.

Most contributions to the applied labor economics literature in this context have focused on the United States and some European countries (e.g. Killingsworth and Heckman, 1986; Blundell and MaCurdy 1999; Blau and Kahn 2007). Concerning developing countries, one strand in the field argues that there would be a U-shaped relationship between development and the labor force participation of married women (e.g. Goldin 1990 and 1995, Mammen and Paxson, 2000): At very low levels of income, agriculture dominates and a large proportion of females are in (often unpaid) agricultural employment. With rising incomes, the introduction of new production technology, and transition to a formal-sector based industrial economy, the income effect (from higher earnings of the spouse) dominates the substitution effect in the labor force participation decision of married women, leading to a fall in the FLFP rate (FLFPR). Women face negative biases against female industrial workers and incompatibility of formal sector employment with traditional care-giving activities at this stage of the development process. As development continues, female education increases and the substitution effect begins to outweigh the income effect, leading to an increase in the FLFPR (Goldin, 1990 and 1995). However, Gaddis and Klasen (2014) show that empirical support for the U-shaped relationship between FLFPR and aggregate GDP is not robust across different data sources and specifications, and is particularly weak in non-OECD countries. They also show that agriculture, mining, manufacturing and services generate different dynamics for female employment.

Another line in the literature has argued that increased openness has led to an increase in the FLFPR in developing countries. There are several interconnected channels through which globalization could lead to a feminization of the labor force. Due to existing gender discrepancies, women might be prepared to work long for a low wage and without joining a union. Therefore, exporting and multinational firms are more likely to employ women, especially since most tasks of the industries where developing countries have a comparative advantage are less skill-intensive or a priori expected to be female-intensive (Çağaty and Berik, 1990; Anderson, 2005). Even if male-intensive sectors benefit most from increased openness, FLFP may rise in equilibrium since men might leave female-intensive industries to take up new jobs in the export sector, thereby opening up employment opportunities for women (Sauré and Zoabi, 2014).[1]The process might be accelerated by structural adjustment programs which were often implemented in the course of increased openness, since the accompanied increase in labor market flexibility would make it easier for firms to substitute women for men (Standing, 1989; Çağaty and Özler, 1995).

Evidence suggests that the initial phase of globalization led to a significant rise in female employment with women accounting for more than a third of the manufacturing labor force in the developing economies and approximately half in some Asian nations. For example, in Sri Lanka, women's share in manufacturing increased from 32% in 1975 to 61% in 1992 and in Mauritius from 19% in 1970 to 60% in 1992. In Mauritius, where women accounted for 70% of the labor force in textiles and garments in 1990, employment increased by 344% since 1980 (Mehra and Gammage, 1999). In Morocco and Tunisia, similarly, women’s employment in the textile and clothing industry has tripled since 1980 (Mehra and Gammage, 1999). In Bangladesh, the number of garment factories increased from four in 1978 to 2,400 in 1995; and of the 1.2 million workers employed, 90% were women below 25. The garment industry represents around three-quarters of female wage occupations in Bangladesh (Sen, 1999).

More recently however, some evidence points to a de-feminization of the labor force with an increase in demand for male labor due to technological progress and restructuring of export industries brought about by globalization. In Korea, for example, female employment in manufacturing increased in the early 1980s and then fell over the 1989-1993 period due to the need for specific skills (Mehra and Gammage, 1999). Pradan (2006) finds that in India, technology and capital intensive production have negatively affected female and unskilled workers, but positively affected contract workers (Pradan, 2006). The FLFPR has similarly fallen over the 2000 -2009 period from 26.6% to 23.5% in Turkey due to structural change (Yenilmez and Isikli, 2010). There has also been a trend towards greater “flexibilization” of the

[1]Similarly, arguments in line with the agricultural linkages literature (Lele and Mellor, 1981; Mellor and Lele, 1973, 1975) can be built where the openness-induced surge in the male-intensive sector also spills over to the female-intensive sector through production and consumption linkages.

labor force with more women working from home (Sen, 1999). In Palestine, 90% of home-based employees in the textile and garment industry are women of which 35% are unwaged (Mehra and Gammage, 1999). The evidence on the relation between globalization and the FLFPR therefore is not clear-cut. Additionally, the effects of globalization on the FLFPR seem to differ across regions. This is also highlighted by the World Bank (2012: box 1, p. 30 and 2011: 11/12), which emphasizes the role of changing social norms and regulations as well as improved public service provisioning as a main driver of increased FLFP.

The main contribution of this chapter is to put the relationship between FLFP and globalization into perspective by showing that the observed increase in FLFP in developing countries over the last decades cannot be attributed to globalization, as most of the previous literature has suggested. Our results rather suggest that globalization has a negative effect on FLFP, which is more pronounced among younger age cohorts. There also appears to be a large degree of regional heterogeneity in the results and the effect apparently depends on the industrial structure of the economy. Our contribution hence highlights the need to take more country-specifics into account when explaining the economic and social effects of globalization on FLFP.

The remainder of this chapter is structured as follows: We review previous empirical contributions in section 2 (and also summarize them in Table B.1 in Appendix B). They have mainly found support for a positive relationship between globalization and FLFP but are mostly based on individual country-studies or simple pooled cross-country OLS regressions. We therefore introduce our data and methodology in section 3 and improve on previous studies in a number of ways. First, we estimate separate coefficients by region to allow for regional heterogeneity. Second, we accommodate the sectoral structure of the investigated economies by allowing for interactions of FDI with industrial / agricultural value added and considering overall trade, overall exports and exports in services separately. Third, we investigate heterogeneity of effects across age cohorts. Finally, we reduce potential parameter biases due to unobserved cross-country heterogeneity by basing identification exclusively on over-time variation. We present our results in section 4 and show in section 5 that even under alternative specifications and when replicating previous results in the literature with slight modifications, no evidence of a positive impact of globalization on FLFP can be found. We discuss the results and conclude the paper in section 6.

2. Review of the Empirical Literature[2]

Based on rather descriptive and anecdotal evidence, early case studies such as Cho and Koo (1983), Hein (1984), ILO (1985), or, later on, by Kabeer and Mahmu (2004) suggest that aspects related to globalization, such as export-led industrialization, export processing zones and higher employment in multinational firms have had a positive impact on FLFP. According to Kabeer and Mahmu (2004), the percentage of females in manufacturing in Bangladesh increased from about 4 per cent in 1974 to 55 per cent in 1985–86, and urban female labor force participation rates from 12 per cent in 1983–84 to 20.5 per cent in 1995–96. Similarly, Cagary and Berik (1990) state that export orientation led to an increase in urban female labor force participation in Turkey from 11.2% to 16.9% between 1982 and 1988. Using a fairly simple OLS regression for 3-digit SIC Turkish manufacturing industries in 1966 and 1982, Çağaty and Berik (1990) show that export orientation had a statistically significant positive impact on the female share of wage workers in private sector manufacturing, however, not public sector manufacturing. Their results also indicate that the switch to export orientation does not lead to a feminization of the labor force in large scale manufacturing. Export orientation in Turkey was accompanied by structural adjustment policies which included lowering of labor standards, wages and relaxation of union activity. A similar empirical strategy is applied to Indian industry data from the late 1990s and early 2000s by Pradhan (2006), who finds that trade has led to an increase in employment of women and unskilled workers while it has had a neutral effect on contract and regular workers and that exports have a significant and positive (though economically small) impact on the female/male working-days ratio. FDI is found to have a negative effect on contract and unskilled workers.

Özler (2000) builds upon this strand of the literature by using plant-level data for the period 1983-1985 from the Turkish manufacturing sector and shows that the female share of employment in a plant increases with the export to total output ratio of its sector. In line with the arguments above, she notes that women are often employed in low-skill and low-paid jobs and especially among those establishments where investment in machinery and equipment leads to a decline in the female employment share, thus pointing to dynamic long-run effects disadvantageous to a feminization of the labor force (in this context, see also Wood, 1998, and Seguino, 2000). This suggests, globalization may first lead to an expansion of female-intensive

[2]We also provide an overview of the related empirical literature in Table B.1 in Appendix B.

sectors which then rationalize production by investment and technological progress. However, while the plant-level perspective of the study has certain advantages, it fails to convincingly resolve the problem of an unobserved heterogeneity bias and cannot reveal any spill-over effects on non-manufacturing sectors. Such spill-over effects are documented in Gaddis and Pieters (2012), who argue that trade liberalization reforms in Brazil in the late 1980s and early 1990s were associated with a decrease in male and female labor force but still contributed to a narrowing of the gender gap in labor force participation and employment.

Tying in with the above-mentioned literature on the feminization-U, Çağaty and Özler (1995) use another approach by using pooled data from 1985 and 1990 for 165 countries to investigate the impact of long-term development on the female share of the labor force. They argue that structural adjustment policies have led to an increase in feminization of the labor force via worsening income distribution and increased openness.

Gray et al. (2006) use data for 180 countries at five-year intervals between 1975 and 2000 to estimate the impact of trade (measured as the log of total imports plus total exports to GDP), FDI (as a percentage of the gross fixed capital formation) and other globalization-related variables on the female percentage share of the workforce and other female-specific outcome variables. We think, their finding (p. 319ff) that none of the two former variables has a significant impact on (relative) FLFP may be due to the fact that they exert a converse impact in developing versus industrialized countries; a heterogeneity that results in overall insignificant estimates.

Similarly, Bussmann (2009) addresses the wider research question whether economic globalization (in particular, trade / GDP) improves certain aspects of women's welfare (especially health and education). Using fixed effects and generalized methods of moments (GMM) techniques for annual panel data in the period 1970 – 2000, she finds that trade / GDP increases overall FLFP in non-OECD countries.

While there are some opposite arguments highlighting that FDI in developing economies benefits male engineers or computer programmers more than female ones because they are likely to be better educated (Oostendorp, 2009), or pointing to occupational gender segregation

(Greenhalgh, 1985; Anker, 1998, Anker et al., 2003),[3] the large majority of empirical studies seems to suggest that globalization has raised FLFP in developing countries.

In our view, however, these supposed "stylized facts" suffer from certain methodological shortcomings that give rise to our empirical re-assessment. First, we find it risky to generalize from country-case studies to an overarching tale of globalization, feminization and development. On the other hand, most cross-country studies so far have suffered from the problem of potentially biased estimates due to unobserved heterogeneity across countries. Finally, rather short time dimensions have imposed certain restrictions on the equilibrium dynamics of the relationship between openness and FLFP. By using a comprehensive panel of 80 developing countries over almost three decades and applying a fixed-effects methodology, we can deal with all of these potential problems and show that this leads to quite contrary results than the ones obtained in the mainstream literature.

3. Data and Methodology

3.1 Data

We use data on FLFP from the 5th revision of the ILO's Estimates and Projections of the Economically Active Population (EAPEP) database (ILO, 2009). The EAPEP contains data on the male and female economically active population based on country reports and ILO staff estimates for 191 countries, which includes both industrialized and developing countries. The 5th revision data cover the period 1980 - 2008; the data thus have a high overlap with our FDI and trade data. In line with Gray et al. (2006) and Gaddis and Klasen (2014) and in order to minimize problems associated with serial correlation and to focus more on long-run effects, we consider the observations for every fifth year over the period 1980 - 2005 for estimation.[4] The FLFPR is defined as the number of economically active women divided by the total female population (FPOP) of the relevant age group *j* in country *i* at time *t*:

[3] Note that the effect of occupational gender segregation on female labor force participation in the context of globalization is not clear a priori and depends on the elasticity of substitution between female and male labor, the pattern of trade liberalization, and associated relative demand shifts.

[4] This should generally be similar to using 5-year averages. However, much data is only available for every 5th year (e.g. the Barro and Lee, 2010, dataset), or values between these observation points are interpolated (e.g. for certain values in the EAPEP database) so that the argument for using 5-year averages is rather weak.

$$FLFPR_{ijt} = \frac{FLFP_{ijt}}{FPOP_{ijt}}. \qquad (1)$$

The ILO definition of economic activity captures all persons (employed or unemployed) that supply labor for activities included in the United Nations System of National Accounts (SNA; cf. ILO, 1990). This includes self-employment for the production of marketed goods and services as well as the production of goods consumed within the household. It does, however, not include the production of non-marketed services (domestic tasks, nursing of own children), since they are not included in the SNA. This distinction is important to remember, as many women outside of the labor force are employed in producing such non-marketed services. It should also be noted that the EAPEP data only provide information on economic activity rates, but not on total hours worked. Hence, the data allows us to investigate changes in labor supply at the extensive margin (participation decision) but not at the intensive margin (hours worked).

One of our most relevant explanatory variables is the stock of inward foreign direct investment (FDI) relative to GDP, taken from UNCTAD, which a proxies for the activity of multinational firms in the economy under investigation. Financial stock data, as opposed to operational data (such as multinationals' sales, number of employees) reflects the effective share of foreign ownership in host country firms and is available for a large group of countries and years (cf. Wacker, 2013, for a discussion of measuring FDI and multinational firms). Furthermore, we use trade, imports and exports relative to GDP as other relevant measures for globalization. These data include trade in goods *and* services and come from the World Bank World Development Indicators (WDI). WDI also provide most of our control variables such as GDP per capita in constant 2005 international $ purchasing power parities, the total fertility rate (births per woman), and the shares of agriculture and industry value added in GDP. From WDI, we also construct the percentage growth rate of real GDP p.c. (in constant local currency). Since we use fixed effect models, the fixed effect takes out the long-run average growth so that this variable should be interpreted as the cyclical component of the model. For years of schooling we use the female measures of the corresponding cohorts provided by Barro and Lee (2010).[5] An overview over the variables and their summary statistics are provided in Table A.1 in the appendix.

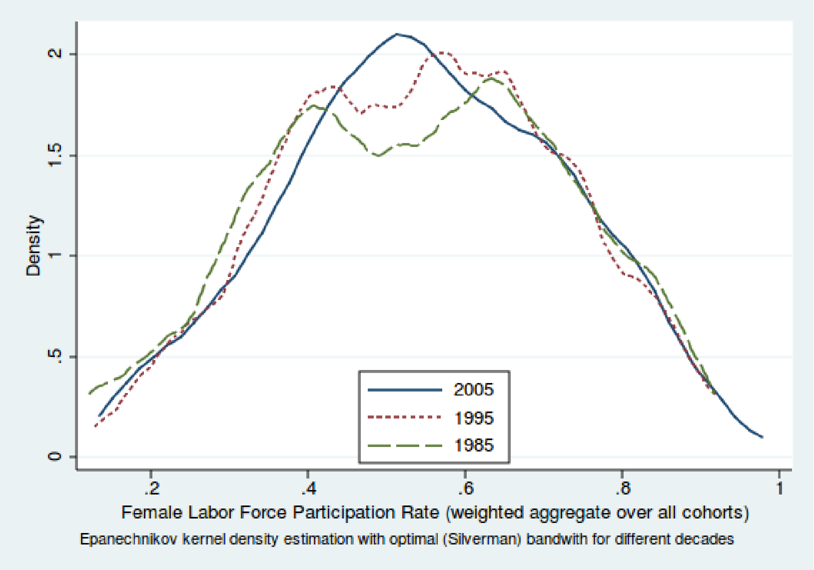
[5] If we aggregate their data over various cohorts, we use the ILO female population data as weights. Linear interpolation is used to obtain data points between the 5-year survey intervals. This is necessary since most explanatory variables are lagged by one year.

Since we focus on developing countries, we follow the convention in the literature to consider countries classified as "low income" or "lower middle income" by the World Bank (for 1987, the first year available). This gives us a sample of 80 developing countries in total.

3.2 Descriptive Analysis

Fig. 1 plots the distribution of the FLFPR across the developing world in 1985, in 1995 and in 2005.[6] As one can see, the distribution gets smoother in the center in 2005 when compared to the decades before, which is also reflected in a decreasing standard error in Table 1. The steadily increasing mean of the distribution in Table 1 also shows that FLFPR indeed increased over the period usually referred to as "globalization."[7]

Fig. 1 Distribution of Female Labor Force Participation Rate (weighted aggregate over cohorts). Epanechnikov kernel density estimation for different decades



[6]In order to make the data in and between Fig. 1 and Fig. 2 comparable, we only used countries which have no missing observations for FLFPR, FDI/GDP and trade/GDP in 1985, 1995 and 2005 for both graphs. We end up with 77 (developing) countries.

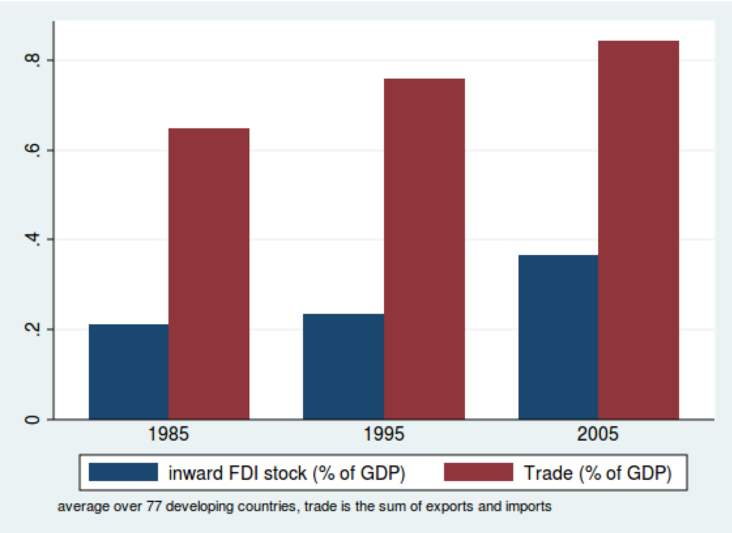
[7] For summary statistics of all other variables, see Table A.1 in the appendix.

Table 1 Descriptive Statistics of Main Variables

Variable	**Statistic**	**1985**	**1995**	**2005**
FLFPR	Mean	0.507	0.524	0.549
	Std. Dev.	0.199	0.185	0.173
	Min	0.121	0.129	0.199
	Max	0.917	0.918	0.913
FDI stock / GDP	Mean	0.211	0.236	0.365
	Std. Dev.	0.339	0.275	0.355
	Min	$8x10^{-6}$	0.001	0.002
	Max	1.650	1.399	1.606
Trade / GDP	Mean	0.648	0.760	0.844
	Std. Dev.	0.376	0.408	0.401
	Min	0.130	0.025	0.003
	Max	1.517	2.133	2.121

Fig. 2 depicts the development of our two variables measuring globalization, FDI stock / GDP and trade / GDP, for the same years. As one can see, trade to GDP increased relatively steadily throughout the three decades while FDI / GDP experienced its main surge only in the last decade.

Fig. 2: Development of Main Explanatory Variables. Average over 77 developing countries, trade is the sum of exports and imports



3.3 Econometric Model

Following the literature of determinants of FLFP (Bloom et al., 2009; Çağaty and Özler, 1995; Gaddis and Klasen, 2014; Mammen and Paxson, 2000), we estimate a linear model, where the dependent variable is the female labor force participation rate (FLFPR) in levels and is explained by a number of covariates *x*:

$$\frac{FLFP}{FPOP} = FLFPR = x_1\theta_1 + \ldots + x_k\theta_k + u, \qquad (2)$$

where *u* is an error term discussed below.

Our dataset thus has two levels of cross-sections: countries $i=1,\ldots,N$ and age cohorts[8] $j=1,\ldots,10$. In our model, which hence can be considered as "hierarchical," we use country-specific cohort fixed effects, i.e. fixed effects for every cohort which are allowed to vary by country. The reason is, first, that unobserved heterogeneity across countries is likely and the same holds for age cohorts. For example, the age cohort 15-19 years is less likely to join the labor force than the age cohort 35-39 if the former has a higher probability of being in education. Furthermore, we assume that these cohort-fixed effects are country-specific due to different educational systems and differing conceptions of life across countries. Note that not controlling for this unobserved heterogeneity will result in biased and inconsistent results if the heterogeneity is correlated with some right-hand side variables. This is a clear advantage over previous cross-section studies in the field. In our sample of 80 countries with 10 age cohorts, this leads to 80×10 = 800 cross-section fixed effects.

Furthermore, we control for time-fixed effects. This is motivated by the consideration that there may be global effects influencing FLFP which are correlated with our covariables. This may lead to both, biased results and cross-sectional dependence in the structure of the error term. Formally,

$$\frac{FLFP_{ijt}}{FPOP_{ijt}} = Z_{ijt}\theta + X_{it}\beta + u_{ijt}, \qquad (3)$$

[8] The age cohorts are 15-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, and 60-64. We excluded the cohort of 65+ years from our analysis because labor force participation in this cohort is driven by factors that might be very different from other cohorts.

where Z is a $10N \cdot T \times k$ matrix collecting the *k* country *and* cohort-specific covariables (in our case education), *X* is a $10N \cdot T \times m$ matrix collecting the *m* country-specific covariables and *u* has the structure

$$u_{ijt} = \mu_{ij} + \gamma_t + \varepsilon_{ijt}, \qquad (4)$$

where μ and γ are the country-cohort and time fixed effects, respectively, which are estimated and ε is an i.i.d. error term.[9] Note that we only take every fifth observation in time, i.e. *t*=1980, 1985, …, 2005 and that the only cohort-specific covariable in *Z* is the educational data (hence, *k=1*). In each of the columns of *X*, there will be 10 identical entries.

In summary, our identification strategy exclusively uses the data variation *within the country-specific cohorts* as a response of FLFPR to data variation *within the country-specific cohorts* (education) or *within the country-specific* variables (all other covariables) over 5-year intervals, accounting for global shocks at every point in time. We generally assume that the response to changes in the country-specific variables is homogenous across cohorts but also allow for cohort-heterogeneity in response to country-wide changes in globalization.

We consider the errors of our model to be correlated at the country level across the time and cohort dimension for reasons explained in Appendix C, which also explains how we econometrically tackle this issue. In short, we simply cluster the errors at the country level (instead of the country-cohort level for which the fixed effects are estimated).

[9] A potential shortfall of the FE estimator is the fact that the process we explore is likely to have a complex dynamic structure while FE can be seen as a 'short-run' estimator. An alternative dynamic estimator, however, is difficult to specify depending on the complexity of the dynamic process and will potentially suffer severely from parameter heterogeneity (cf. e.g. Pesaran and Smith, 1995; Phillips and Sul, 2003) which is in fact present as we show in later parts of this study. The FE estimator, in our view, has the advantage that its properties are studied extensively and well-known. Furthermore, our main explanatory variables, FDI stocks and trade (or, exports) relative to GDP are very persistent variables. Under such circumstances the static fixed-effects estimator can be biased from a (consistent) short-run estimator towards the long-run impact. More explanations and evidence are given in Baltagi and Griffin (1984), Egger and Pfaffermayer (2005), and Wacker (2013) but the main intuition is the fact that in the presence of an omitted lag structure, the high correlation between the included variable and its own lags causes an omitted variable bias by incorporating the impacts of deeper lags. We hence think that our FE estimates come at a relatively low risk, especially as we are using only every 5th observation year (hence looking at longer time periods), and will give a good intuition about the underlying economic forces at work. We discuss potential extensions for future research in the concluding section of this paper.

4. Empirical Results

We start with a very simple model specification including only our main globalization variables (and fixed effects for country-cohorts and years) as explanatory variables. Although omitted variables such as GDP p.c. might bias the precise results, we think it is interesting to see how much scope there is for globalization to affect FLFPR via different channels (such as income effects). The results, presented in the first four columns of Table 2, show that the impact is negative throughout and statistically significant[10] only in two specifications for trade and exports. Note that trade and FDI are highly correlated,[11] so multicollinearity inflates standard errors (while parameter estimates are still consistent) and we therefore report specifications with both variables together and separately. The negative impact of trade is driven by exports, so we focus on exports for the remainder of the analysis. The most striking fact besides from lacking statistical significance and the negative sign of the estimated coefficient is the notably small economic relevance of both effects. The highest parameter is -0.064 for exports in column (4), implying that a 10 percentage points increase in exports / GDP ratio, roughly the increase observed over the 20 years 1985 – 2005, leads to a 0.64 percentage points decrease of FLFPR. Considering that the actual increase in FLFPR during the 20 years between 1985 and 2005 was 4.2 percentage points, this is a rather small magnitude.

[10] Unless stated otherwise we refer to statistical significance as significance at the 5 % level and call significance at the 10 % and 1 % level as weakly and strongly statistically significant, respectively.

[11] Regressing FDI stock / GDP on the other covariables of model (7) using the same subsample and each 5th yearly observation leads to a highly significant estimator of 0.267 for trade / GDP (t-statistic 2.58).

Table 2 Main Regression Results. Fixed effects regression taking every 5th year. Cluster-robust standard errors in parentheses. ***, **, * denote statistical significance at the 1 %, 5 %, and 10 % level, respectively

VARIABLES	(1) FLFPR	(2) FLFPR	(3) FLFPR	(4) FLFPR	(5) FLFPR	(6) FLFPR	(7) FLFPR	(8) FLFPR
Trade / GDP	-0.0215*		-0.0277**				-0.0142	
(-1)	(0.0127)		(0.0131)				(0.0169)	
FDI stock / GDP	-0.00424	-0.00120			-0.0116*	-0.00573**	-0.0115*	
(-1)	(0.00601)	(0.000950)			(0.00669)	(0.00236)	(0.00637)	
Exports / GDP				-0.0641**	-0.0370			-0.0698**
(-1)				(0.0260)	(0.0316)			(0.0325)
ln(GDP p.c. PPP)					-0.120	-0.154*	-0.127	-0.0433
(-1)					(0.0900)	(0.0918)	(0.0904)	(0.0901)
ln(GDP p.c. PPP)^2					0.00901	0.0115	0.00939	0.00506
(-1)					(0.00684)	(0.00701)	(0.00688)	(0.00675)
fertility rate					-0.00508	-0.00707	-0.00499	-0.00247
					(0.00751)	(0.00753)	(0.00746)	(0.00709)
years of schooling					0.00612	0.00290	0.00558	0.00612
					(0.00751)	(0.00780)	(0.00747)	(0.00737)
agricultural value added					0.0530	0.0448	0.0511	0.0869*
					(0.0523)	(0.0537)	(0.0525)	(0.0512)
industry value added					-0.0320	-0.0349	-0.0401	0.0152
					(0.0435)	(0.0446)	(0.0431)	(0.0413)
GDP growth rate					-0.0510	-0.0461	-0.0521	-0.0630*
					(0.0406)	(0.0305)	(0.0428)	(0.0378)
Constant	0.551***	0.536***	0.560***	0.560***	0.954***	1.084***	0.987***	0.600*
	(0.0100)	(0.00244)	(0.00992)	(0.00847)	(0.328)	(0.332)	(0.329)	(0.323)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,860	5,240	5,020	5,020	3,470	3,530	3,470	3,580
R-squared	0.190	0.141	0.171	0.176	0.221	0.200	0.219	0.199
Number of cross-sections	1,120	1,150	1,120	1,120	800	800	800	800

The remaining models in Table 2 include our seven control variables. While there is some change in the levels of statistical significance, our overall result remains rather stable: There is no evidence so far, that globalization had an economically relevant impact on female labor market participation. With the control variables included, it is the FDI stock that seems to be more robust statistically, however, the magnitude is negligible since the estimated parameter, -0.0116 in the “best” case, implies that a 10 percentage points increase in FDI stock / GDP leads to a 0.12 percentage points decrease of FLFPR. Exports are only statistically significant when FDI stock is excluded (though standard errors are reasonable in model (5) as well), the economic relevance is barely higher than in the unconditional model (4), however.

These first results do not necessarily mean that our measures for globalization have no impact on women in their decision to join the labor force – they are aggregate effects and capture a wide range of different activities. In the remainder of this section, we therefore allow the effect to differ across regions, to depend on the industrial structure of the economy and to vary by age cohort.

We start with allowing for heterogeneity of the impacts across regions, i.e. model (5) from Table 2 above is re-estimated for six regions into which the World Bank classifies (developing) countries. This should reflect that certain effects on FLFP which we explicitly capture in our covariables, interact with certain norms, cultures, and regulations that are assumed to be largely homogeneous within these regions. Furthermore, if one thinks within a standard trade framework, countries will develop those sectors of their economy after trade-liberalization, where they have a comparative advantage. For least developed countries these are lower-skilled labor intensive industries. While women may have a “natural” advantage in some of these industries (for example, certain tasks in the textile sector), most other tasks may benefit from physical strength and hence primarily demand male labor (cf. World Bank, 2012: 33). Accordingly, we would expect that the impact depends on the country's comparative advantage and this would suggest that the impact should generally be different between regions and depend on the country’s competitive advantage. These considerations are supported by a view at Table 3. For example, we find significant negative impacts of exports on female labor force participation in South and East Asia, and of FDI in Sub-Saharan Africa. Conversely we find a positive effect of FDI on women’s economic activity in Eastern Europe/Central Asia. Generally, the table shows a considerable degree of variety between the different regions. It is also noteworthy that the primary sector exhibits a strong positive (and statistically highly significant) impact on FLFP in the MENA countries, whereas industry value added implies a negative and relevant (highly significant) impact in this region. This probably reflects the high share of mining (particularly from oil exploitation) in industrial value added in the region, a sector which traditionally employs few women (see also Gaddis and Klasen, 2014). Sectoral movements also seem to play an important role in the Eastern European/Central Asian countries.

It should be noted that this region-specific estimation dramatically reduces the number of observations, thereby negatively affecting statistical levels of significance. We hence also follow a different approach to capture heterogeneity across countries by allowing our globalization variables to interact with the industrial structure of the economy for reasons similar to those discussed above. Due to unavailability of comprehensive sectoral FDI data, we literally interact FDI with the value added in the industry sector and the primary sector, respectively, while trade data is indeed available for the different sectors of the economy.

Table 3 Effects by Region. Fixed effects regression taking every 5th year. Cluster-robust standard errors in parentheses. ***, **, * denote statistical significance at the 1 %, 5 %, and 10 % level, respectively. EE & CA = Eastern Europe and Central Asia, MENA = Middle East and North Africa, SSA = Sub-Saharan Africa

	(1)	(2)	(3)	(4)	(5)	(6)
REGION	E. Asia	EE & CA	Latin Am.	MENA	S. Asia	SSA
VARIABLES	FLFPR	FLFPR	FLFPR	FLFPR	FLFPR	FLFPR
Exports / GDP	**-0.156****	**-0.131***	**0.0272**	**-0.0181**	**-0.629****	**0.00111**
(-1)	**(0.0591)**	**(0.0650)**	**(0.0394)**	**(0.0273)**	**(0.160)**	**(0.0328)**
FDI stock / GP	**-0.00584**	**0.0949****	**0.0365**	**-0.0295**	**0.851**	**-0.0118****
(-1)	**(0.0670)**	**(0.0410)**	**(0.0358)**	**(0.0182)**	**(0.480)**	**(0.00445)**
ln(GDP p.c. PPP)	0.170	-0.137	-0.172	-1.209***	0.535	-0.153*
(-1)	(0.225)	(0.0989)	(0.488)	(0.241)	(0.463)	(0.0763)
ln(GDP p.c. PPP)^2	-0.0188	0.0217**	0.0131	0.0839***	-0.0729*	0.0120**
(-1)	(0.0199)	(0.00660)	(0.0316)	(0.0160)	(0.0360)	(0.00573)
fertility rate	0.0167	-0.0361*	0.0186	-0.0846***	0.0582*	-0.0156*
	(0.0132)	(0.0184)	(0.0181)	(0.00745)	(0.0252)	(0.00873)
years of schooling	0.0371	0.00421	-0.0229**	-0.00210	-0.0349	0.00459
	(0.0242)	(0.00873)	(0.00878)	(0.00399)	(0.0225)	(0.00849)
agricultural value	-0.0329	-0.178*	0.129	0.359***	-0.422	0.0439

added	(0.121)	(0.0833)	(0.125)	(0.0703)	(0.356)	(0.0550)
industry value added	-0.170	-0.264**	-0.0337	-0.133***	0.624**	-0.0327
	(0.132)	(0.0949)	(0.0713)	(0.0203)	(0.243)	(0.0444)
GDP growth rate	0.0606	0.363***	-0.0447	-0.147***	0.130	-0.0387
	(0.110)	(0.0759)	(0.0396)	(0.0358)	(0.321)	(0.0506)
Constant	0.161	0.744*	0.958	4.866***	0.00351	1.188***
	(0.701)	(0.375)	(1.837)	(0.912)	(1.718)	(0.282)
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	550	290	680	270	270	1,410
R-squared	0.290	0.238	0.602	0.512	0.485	0.300
Number of cross-sections	120	90	170	60	60	300

The results, presented in Table 4 (first column) show that FDI stock is highly significant and negative with a similar magnitude as in model (5) of Table 2, while the interaction is about 3.5 times the size of the mere FDI parameter and positive.[12] This means that once the industrial sector is developed, more FDI will have a positive impact on the FLFPR. More precisely, once the industrial sector accounts for at least 28 % of value added of the developing country's economy, additional FDI will have a positive impact.[13] The magnitude is still low: Assuming that the whole economy is producing half or all of its output in the industrial goods sector, a 10 percentage point increase in FDI stock / GDP will cause a 0.14 or 0.46 percentage point increase in FLFPR, respectively. This relationship is depicted in the left panel of Fig. 3. It shows that the higher the share of industry value added, the more favorable the marginal impact of FDI on FLFPR. The right panel does the same with agriculture, which basically is the mirrored image of the left panel. In order to get an impression for the economic magnitudes, we added some country examples to the graph. We included China in 1985, 1995 and 2005 because it serves as an example of a developing country that has gone through an enormous structural change over the last decades and is well-known to the profession. From the right panel we see that the share of agriculture in China's value added has decreased from 1985 to 2005. This led to expansion of the industrial sector in the first decade and of the service sector in the second decade (the data point in 1995 and 2005 is almost identical in the left panel). This change has brought China into a more favorable/positive condition concerning the impact of FDI on FLFPR: Our model predicts that the effect of FDI on FLFPR was more positive in later years than in 1985.

[12] The parameter itself is not statistically significant (t-statistic 1.34). The relevant test statistic, however, is an F-test for joint significance of FDI and the interaction term. Here, we can reject that they jointly have no impact on FLFPR on the 1 % level of statistical significance.

[13] A 10 percentage point increase in FDI will have a 0.10 x (-0.0179) + 0.10x0.28x0.0642 = 0.0000076 percentage points impact in an economy where industry accounts for exactly 28% of value added.

Nepal in 1980 serves as an example of a very agrarian economy, the impact of FDI is accordingly negative. Finally, South Africa in 2005 was a fairly modern economy; the model would hence suggest a positive impact of FDI on FLFPR.

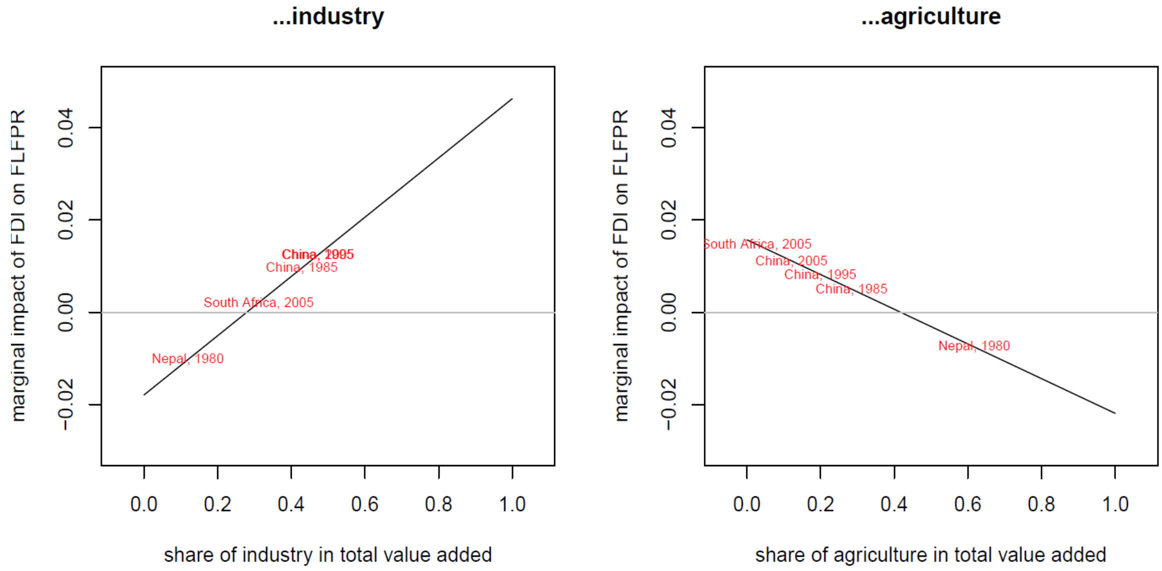
These results imply that the factor demand of multinational firms does not necessarily have a (conditional) anti-female bias since the above mentioned negative impact of FDI appears to be mainly driven by changes in the industry structure. This is supported by column (2) in Table 4 where we allow FDI to interact with the primary sector. The negative impact of FDI now vanishes; it becomes insignificant and positive while the interaction with the primary sector is negative and insignificant.[14]

[14] They are jointly significant on the 1 % level using an F-test but the magnitude of the effect is again small.

Table 4 Interaction with Industrial Structure. Fixed effects regression taking every 5th year. Cluster-robust standard errors in parentheses. ***, **, * denote statistical significance at the 1 %, 5 %, and 10 % level, respectively

VARIABLES	(1) FLFPR	(2) FLFPR	(3) FLFPR
ln(GDP p.c. PPP)	-0.132	-0.133	-0.144
(-1)	(0.0893)	(0.0885)	(0.0991)
ln(GDP p.c. PPP)^2	0.00987	0.00990	0.0100
(-1)	(0.00681)	(0.00676)	(0.00763)
fertility rate	-0.00500	-0.00498	-0.00302
	(0.00746)	(0.00756)	(0.00749)
years of schooling	0.00529	0.00494	0.00604
	(0.00746)	(0.00755)	(0.00814)
agricultural value	0.0484	0.0537	0.0523
added	(0.0529)	(0.0542)	(0.0565)
industry value added	-0.0674	-0.0487	-0.00549
	(0.0494)	(0.0444)	(0.0411)
GDP growth rate	-0.0423	-0.0451	-0.113**
	(0.0425)	(0.0421)	(0.0488)
Trade / GDP	**-0.0217**	**-0.0215**	
(-1)	**(0.0162)**	**(0.0163)**	
FDI stock / GDP	**-0.0179*** **	**0.0157**	
(-1)	**(0.00507)**	**(0.0246)**	
Industry v.a. × FDI	**0.0642**		
(-1)	**(0.0480)**		
Agricultural v.a. × FDI		**-0.0376**	
(-1)		**(0.0294)**	
Trade in Services / GDP			**-0.0473*** **
(-1)			**(0.0160)**
Exports / GDP			**-0.0251**
(-1)			**(0.0338)**
Constant	1.012***	1.013***	1.007***
	(0.322)	(0.319)	(0.349)
Year Dummies	Yes	Yes	Yes
Observations	3,450	3,450	3,280
R-squared	0.216	0.217	0.244
Number of cross-sections	800	800	790

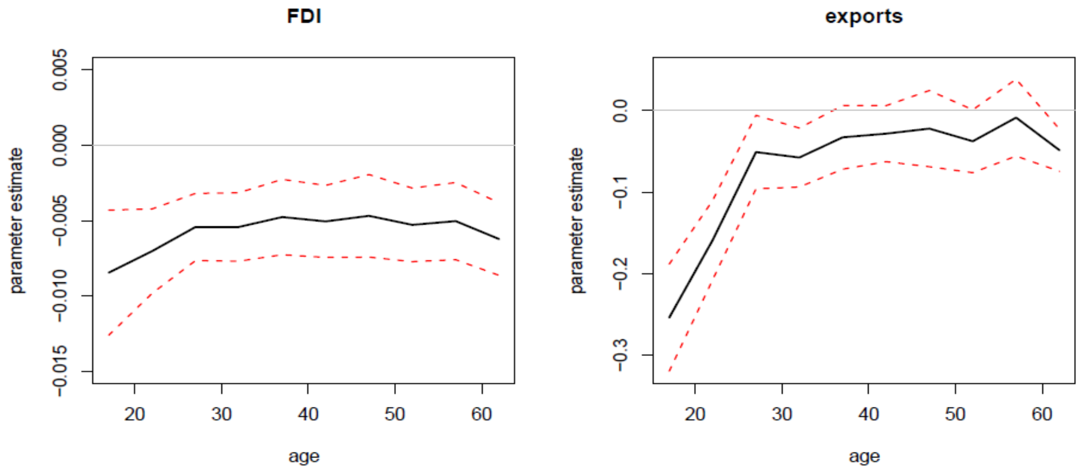
Fig. 3: Impact of FDI depending on the Sectoral Structure of the Economy



Similarly, for trade in column (3) of Table 4 we find that its negative impact is, somewhat surprisingly, driven by trade in services – including trade in services into the model turns the overall export parameter estimate statistically insignificant, whereas trade in services is negative and highly significant but of small magnitude. This result is rather surprising on a first view because one would expect that women are very likely to work in the service sector. However, especially in the tradable service sector, the skill-premium might be high, hence inducing young women to invest more into education and therefore stay off the labor market in younger cohorts. Furthermore, these results are in line with the findings of Oostendorp (2009) that globalization may benefit male engineers or computer programmers more than female ones because they are likely to be better educated, and with an aspect of the results of Bussmann (2009: 1035), that globalization is related to a lower percentage of women employed in the service sector in non-OECD countries.

Finally, we also show the impact of our globalization measures on different cohorts in Table 5 and Fig. 3. (Note that the vertical axis is differently scaled for the two panels in Fig. 3.) This means that we allow the parameter for the impact of our globalization variables to vary between age cohorts. The overall picture that emerges shows that the impact is stronger for younger cohorts. This corresponds to the rationale that more labor market variability in going on at younger age levels and that the income effect might be particularly strong at these cohorts when compared to the substitution effect: A potential rise in wages due to a globalization boost might increase household income via the father's or spouse's wage bill whereas the substitution effect between staying out of the labor force or joining it may even become negative in the short run since the skill-premia might have risen and this creates supplementary incentives to currently stay out of the labor force and invest in education, especially for young women where the premium pays off over a longer lifetime.

Fig. 4: Impact of globalization variables (+/- 2 standard errors) by cohort



While the impact is still very small for FDI, the impact of exports is now considerable for young females' labor decision: The parameters are 0.254 and 0.159 for the age groups 15-19 and 20-24, respectively. A parameter of 0.2 would imply that a 10 percentage point increase in exports would result in a 2 percentage point decrease in the FLFPR, a non-negligible effect.[15] Note that the estimated impact is negative for all cohorts for both measures of globalization but not for all of them statistically significant in case of exports (the interval of +/- 2 standard errors roughly approximates a pointwise 95 % confidence interval).

[15] Remember from Table 1 that FLFPR increased by roughly 2 percentage points per decade.

Table 5 Cohort-Specific Effects. Fixed effects regression taking every 5th year. Cluster-robust standard errors in parentheses. ***, **, * denote statistical significance at the 1 %, 5 %, and 10 % level, respectively

VARIABLES	(1) FLFPR	(2) FLFPR
ln(GDP p.c. PPP)	-0.154*	-0.0433
(-1)	(0.0920)	(0.0902)
$\ln(\text{GDP p.c. PPP})^2$	0.0115	0.00506
(-1)	(0.00701)	(0.00676)
fertility rate	-0.00707	-0.00247
	(0.00753)	(0.00710)
years of schooling	0.00290	0.00612
	(0.00781)	(0.00738)
agricultural value added	0.0448	0.0869*
	(0.0537)	(0.0512)
industry value added	-0.0349	0.0152
	(0.0447)	(0.0413)
GDP growth rate	-0.0461	-0.0630*
	(0.0305)	(0.0378)
	Effect of FDI…	**Effect of Exports…**
…at age 15-19	-0.00845**	-0.254***
(-1)	(0.00415)	(0.0657)
…at age 20-24	-0.00702**	-0.159***
(-1)	(0.00280)	(0.0487)
…at age 25-29	-0.00542**	-0.0508
(-1)	(0.00223)	(0.0451)
…at age 30-34	-0.00542**	-0.0575
(-1)	(0.00227)	(0.0362)
…at age 35-39	-0.00476*	-0.0327
(-1)	(0.00250)	(0.0391)
…at age 40-44	-0.00505**	-0.0282
(-1)	(0.00239)	(0.0344)
…at age 45-49	-0.00468*	-0.0220
(-1)	(0.00274)	(0.0468)
…at age 50-54	-0.00528**	-0.0375
(-1)	(0.00244)	(0.0386)
…at age 55-59	-0.00503*	-0.00847
(-1)	(0.00256)	(0.0472)
…at age 60-64	-0.00622**	-0.0485*
(-1)	(0.00241)	(0.0259)
Constant	1.084***	0.600*
	(0.333)	(0.323)
Year dummies	Yes	Yes
Observations	3,530	3,580
R-squared	0.201	0.225
Number of cross-sections	800	800

As a robustness check, we investigate to what extent the obtained results change, when specifying another functional form of the model, namely a logarithmic model of the form

$$\log(FLFP)_{ijt} = Z_{ijt}\theta + X_{it}\beta + \alpha \log(FPOP)_{\mathrm{ijt}} + u. \qquad (6)$$

In our view, this functional form has the advantage that it is economically more appealing than the standard models in the literature because it allows for interactions of covariables and does not force the response to be linear in the latter. Second, the model in equation (6) is more flexible because it does not pose the implicit restriction $\alpha = 1$.[16] Third, the model in equation(6) avoids meaningless predictions of the response variable.[17] Finally, the model in equation (6) is not necessarily more difficult to interpret because changes in any covariable can be interpreted as elasticity of FLFP (if the covariable is itself in logs) or as a percentage change in FLFP if the covariable changes by one unit (if it is not in logs).

The results from this exercise, reported in Table A.2 in the appendix, are qualitatively similar to the ones obtained above. Parameter estimates for the interaction of FDI with industry value added and for FDI are statistically significant and highly significant, respectively, and are jointly highly significant (F-statistic of 5.53 with 2 and 79 degrees of freedom). While the prefix of the parameter estimates are the same as in Table 4, the positive impact of the interaction is more dominant over the negative impact of the FDI stock: A positive impact of FDI on FLFP occurs at a level of industrial value added above 16.2 % of GDP. More precisely, for an economy producing half or all of its output in the industrial goods sector, a 10 % increase in FDI will cause a 0.8 or 2.1 % increase in FLFP, respectively. For this functional form, we also find that trade in services absorbs the negative impact of exports.

5. Comparison to Other Results in the Literature

To understand more clearly, why we come to other results in this study than the previous literature, we perform a series of functional re-specifications and replicate the results of Bussmann (2009), which we consider to be the study closest related to our investigation in terms of scope and methodology.

[16] Note that if the restriction α= 1 is indeed true, a restricted estimator will be more efficient than the model in equation (6). However, in the context of a sample as large as the present one, we find this to be of minor relevance though it may be important for policy making and evaluation on the country level when facing a much smaller sample.

[17] Note that a linear model like in equation (2) may lead to predictions of the FLFPR that are smaller than 0 or larger than 100 % which does not make sense economically. Since in the model $\mathbf{E}[\ln(FLFP)] = X\theta$, the predictor for FLFP is $e^{X\theta}$, which is a positive number for any value of $X\theta$, a meaningful prediction of FLFP is ensured.

Diverging estimates might result, inter alia, from the fact that we use only every 5th observation year while other studies use annual data and hence rather capture short-run effects, from different panel data estimators, or from the fact that previous studies used FLFP data on the aggregated country level, while we use the country-cohorts as cross section.

The use of annual data leaves our main results qualitatively and quantitatively largely unchanged, although exports are no longer significant at the 10 % level. A change in the sampling period also does not seem to explain the difference, though there is some evidence of a (very small and statistically insignificant) positive impact of trade on FLFPR when we truncate the sample in year 2000.[18]

Furthermore, we added different weights to our cross-sections to rely more on observations representing larger cohorts and aggregated the data at the country level to be more in line with the methodology applied in previous studies. When using female population as analytical weightings and dummy variables for countries and cohorts,[19] most of the explanatory variables are insignificant, trade is negative (-0.11**) and significant on the 5 % level, FDI turns positive (0.014) but is very small and far from being significant. More generally, there is no evidence whatsoever that FDI would have a positive impact on FLFPR in different settings; the results are generally of the same magnitude as those reported above and mostly statistically significant (at least at the 10 % level). For trade/exports, the results suggest that the less one accounts for fixed effects at different levels, the more likely is the indication of a positive impact on FLFPR. The export coefficient gets as large as 0.12, still not an overwhelming magnitude, but is statistically insignificant throughout. This generally supports our claim that unobserved cross-country (and/or cross-region) heterogeneity is present in the relationship between globalization and FLFP and failing to account for this fact can lead to misleading inference about the economic causation in this regard.

This is also strongly supported by our intention to replicate the results of Bussmann (2009; see there for a detailed data description). Her dataset is somewhat different from ours, e.g. it ranges

[18]It is well-known that the pre-2000 era of the "Washington Consensus" was a period of considerable big-bang liberalization in many developing countries. It might hence be the case that this led to a big push in input demand in many countries which was satisfied by female labor. However, such a possibility would have to be investigated in more detail (and possibly only holds for a small set of specific countries) and should then rather be seen as a singularity instead of a general relationship between globalization and FLFP.

[19] Estimation of country-cohort fixed effects is infeasible in this setting.

from 19960 to 2002, mainly comes from the World Bank WDI, and does not include FDI data. However, this difference in data does also allow us to check the robustness our finding that the country context matters for the impact of globalization on FLFPR.

We focus on the estimation reported in Table 3, column (5), of her paper, addressing the determinants of FLFPR in non-OECD economies.[20] We were perfectly able to replicate her results which are reported in Table 6, column (1) of this chapter.[21] As can be seen, she finds a positive impact of exports on FLFPR. However, her GMM estimation is run without time fixed effects[22] and, more importantly, without country fixed effects, hence giving space for unobserved heterogeneity as described throughout this chapter.[23] After simply introducing these two-way fixed effects into her specification, we find that the effect of exports turns negative and insignificant, see column (2).

In order to be more in line with our framework, we then estimate the equation using FE with a one-year lagged export/GDP covariable, first on a yearly basis, and then for every fifth year available in the sample. Again, the results (reported in columns (3) and (4)) show a negative effect of similar magnitude which is statistically insignificant. However, the magnitude of the effect would imply that a 10 % increase in the export/GDP ratio (e.g. from 30 % to 33 %, this is another difference in the model to our specification) reduces FLFPR by 4 percentage points (considering a parameter of -0.4). This is a rather large magnitude compared to the results we obtained above; however, it is clearly more credible than the original result of the study, implying that the same change in the export/GDP ratio leads to a 24.5 percentage point increase in the FLFPR.

Finally, we also show the results for other panel data estimation techniques in the last columns of the table. Random effects (column (5)) and simple pooled OLS (column (6)) both identify over within-country and cross-country variation, whereas between-effects (column (7)) identifies purely over cross-country variation. In line with previous studies, we also find a

[20] For simplicity, we followed Bussmann's classification of countries into OECD and non-OECD countries and assume that the second category captures well what we consider as "developing countries."
[21] There is a minor difference in the constant but this can happen, for example, due to different versions of STATA.
[22]Including those year dummies is important, for example, to capture an underlying time trend in FLFPR that might be correlated with a "globalization trend" and to mitigate the simplest form of cross-sectional correlation (i.e. global shocks) that would plague statistical inference.
[23] In fact, a Hausman test on the difference between the FE and RE estimates as reported in columns 3 and 5 of Table 6 clearly rejects that these differences are random (on a 1 % level), providing very strong arguments in favour of including country FE.

positive impact when using simple OLS, similar to the GMM results of Bussmann (2009), which also identifies over both within-country and cross-country variation. Since random effects and pooled OLS can be interpreted as an average of FE and between-effects (cf. Maddala, 1971), it is also clear from our table, where the positive effect of trade or exports previously found in the cross-country literature stems from: It is the variation *across* countries which drives this result. This clearly supports our point that omitted country characteristics, that influence both FLFP and globalization measures, drive the results in the previous literature and that if one starts controlling for these unobserved cross-country heterogeneity, one ends up, if anything, with a negative impact of globalization on FLFPR for most developing countries. This is also supported by the results from a dynamic System GMM estimation, reported in column (8). Despite some worrisome aspects of this specification, this framework has some advantages, such as allowing for dynamic effects and more convincing instruments,[24] and the results also indicate a statistically significant (but in the long run unconvincingly large) negative effect of exports on FLFPR.

[24] Bussmann (2009) uses lags of the *levels* series as instruments which is not convincing if the series is weakly dependent, as is the case for trade/GDP data. This is also indicated by a worrisome Hansen J statistic (neither reported here nor in her paper). Instead, System GMM uses lagged *differences* of the series as instruments for current levels which can be shown to be valid instruments under certain assumptions (Arellano and Bover, 1995; Blundell and Bond , 1998). We instrumented the lagged dependent variable in a collapsed form and the export/GDP ratio with difference lags 2-4, also in collapsed form. The number of instruments (81) clearly outnumbers the number of cross-sections (119), as necessary; the (robust) Hansen statistic does not allow rejecting the null hypothesis that the whole set of instruments is valid (on the 10 % level). The z-statistics of the AR(1) and AR(2) tests are 0.49 and 0.65, respectively.

Table 6 Replication and Modification of Bussmann (2009). Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

VARIABLES	(1) FLFPR	(2) FLFPR	(3) FLFPR	(4) FLFPR	(5) FLFPR	(6) FLFPR	(7) FLFPR	(8) FLFPR
LFPR(-1)								0.962***
								(0.00475)
log(exports/GDP)	**2.452****	**-0.467**						**-0.0967****
	(1.056)	**(0.447)**						**(0.0424)**
log(exports/GDP) (-1)			**-0.350**	**-0.477**	**-0.335**	**1.825***	**2.816***	
			(0.341)	**(0.420)**	**(0.360)**	**(1.005)**	**(1.604)**	
log(GDP p.c.)	-61.36***	-3.612	-3.870	-6.451	-4.420	-56.81***	-38.99***	-0.969
	(13.63)	(6.376)	(6.491)	(7.114)	(6.845)	(13.37)	(13.18)	(0.627)
log(GDP p.c.)²	3.348***	0.174	0.189	0.347	0.229	3.118***	1.792**	0.0486
	(0.866)	(0.422)	(0.430)	(0.469)	(0.440)	(0.846)	(0.808)	(0.0386)
Political Regime Type	0.0341	0.00630	0.00687	0.00471	0.0146	-0.00107	0.153	0.00160
	(0.0973)	(0.0313)	(0.0317)	(0.0334)	(0.0337)	(0.106)	(0.134)	(0.00328)
Fertility	-2.116***	-0.875***	-0.866***	-1.054***	-0.634*	-1.740**	-3.289***	-0.0729***
	(0.718)	(0.307)	(0.312)	(0.331)	(0.339)	(0.806)	(0.899)	(0.0276)
Female Secondary Schooling	-0.0167	0.0302	0.0304	0.0302*	0.0399*	-0.0301	-0.00779	0.00186
	(0.0511)	(0.0190)	(0.0192)	(0.0158)	(0.0208)	(0.0514)	(0.0556)	(0.00164)
log(population)	-0.348	-11.08***	-11.03***	-10.21***	-3.820***	-0.460	-0.200	-0.0411**
	(0.557)	(3.126)	(3.155)	(3.292)	(1.285)	(0.528)	(0.601)	(0.0208)
Constant	316.5***		154.5***	168.6***	96.59***	294.0***	241.4***	7.165***
	(53.34)		(34.84)	(37.56)	(27.86)	(53.44)	(52.93)	(2.666)
Estimation Method	**GMM**	**GMM**	**FE**	**5-yr FE**	**RE**	**POLS**	**BE**	**System GMM**
Year dummies	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	**No**	**Yes**	**Yes**	**Yes**	**No**	**No**	**No**	**Yes**
Observations	2,419	2,419	2,421	527	2,421	2,421	2,421	2,443
R-squared	0.377	0.204	0.480	0.494		0.397	0.447	
Number of cross-sections			119	107	119		119	119

6. Discussion and Conclusion

We have investigated the influence of globalization as measured by trade and FDI on the FLFPR in a panel of 80 developing economies over the time period 1980 – 2005. The results suggest that openness generally has a negative but small impact on the FLFPR – which is in contrast to most previous studies that have generally found a positive effect. The main driver of these diverging results comes from the fact that previous studies failed to account for (potentially unobserved) cross-country heterogeneity which generates a positive correlation between openness and FLFPR *across* countries that does not exist *within* countries. As an additional improvement over the previous literature, we have shown that the effect is stronger for young women. We think this is driven by the flexibility in younger years and by the fact that the potential rise in the skill premium due to globalization creates a particularly strong incentive for younger women to invest in education (and to hence not join the labor force immediately) because the returns will be realized over a longer (expected) remaining lifetime. This has been evidenced for Turkey where the LFPR of illiterate women fell from 25.2% in 2000 to 12.9% in 2008 (Yenilmez and Isikli, 2010). Both theoretical models and micro-econometric studies might help address this channel in the future.

A main takeaway from our study is that one should be very cautious in generalizing results from country-level studies to an overarching tale about the female labor market effects of globalization. First, we have shown that the effect, though being statistically significant, is negligible in economic terms. Also, the results presented in Table 3 show a large degree of regional heterogeneity. Our finding of a statistically significant positive effect of FDI on the FLFPR in Eastern Europe and Central Asia compared with a significant negative effect in Africa further supports our notion that the potentially increased skill-premium due to globalization/FDI creates incentives to build up human capital before joining the labor force: A high human capital stock (with relatively low gender inequality) was a heritage from the past in former centrally planned economies and would allow women to join the labor force and reap the benefits from an increased skill-premium right away, whereas female educational attainment is much lower in Africa (cf. Barro and Lee, 2010: Table 3).

Since we show that the direction of the FDI impact on FLFPR depends on the size of the industrial/primary sector, our results strongly suggest that any economic explanation about the impact of globalization on FLFP has to take into account the industrial structure of the economy under consideration. Potential arguments could be built along the lines of a Lewis (1954) type labor market: In agrarian economies, a large pool of laborers is available. Since comparative advantages of these economies lies in sectors intensively using physical labor and surplus labor keeps wages low, multinational and exporting firms might be more likely to go for the "low hanging fruits" by drawing from the pool of male laborers. By still paying a somewhat higher wage (cf. Lipsey, 2002), the income effect on the household level might then have a small negative impact on FLFP and the mainstream argument of a female-intensive comparative-advantage sector does not hold for these countries. The more industrialized a country becomes, the smaller the pool of (male) surplus labor becomes and multinational and exporting firms might hence demand more female labor, especially since the process of industrial development and the division of labor will create linkages with the service sector where female labor is not "physically disadvantaged" and gender wage gaps might even provide an incentive to employ women, so that the mainstream arguments come into force at this development stage.

Our results can be seen in the context of the finding of Gaddis and Klasen (2014) that different industrial structures of the economy generate different dynamics for female employment. They also do not necessarily conflict with the results of previous case studies since they have been conducted in countries where industrial development was rather high compared with other developing economies which might have driven the results of these country-case studies.[25]

In terms of welfare and policy, our results of a generally negative effect of globalization on FLFPR is not necessarily bad news for women since their decrease in labor force participation might simply be the optimal response to benefit from an increased skill premium or because household income is sufficiently high and allows women to stay home if they want to. Indeed, Gray et al. (2006, pp. 317ff) find that trade (but not FDI) decreases female illiteracy rates for 180 countries (although the elasticity is rather small) and Bussmann (2009, p. 1032) also finds some evidence that women in non-OECD countries get more access to education when trade/GDP is growing, at least in primary and secondary schools. We show in simple regressions

[25] The sampling period of Cagaty and Berik (1990) coincides with the time when Turkey reached the threshold level of industrial development of 28 % that we find in our study. Özler (2000) uses data from the mid-1980s when the size of the industrial sector in Turkey was about 27 % and hence close to our threshold of 28 % and clearly above the threshold of 16 % found in the multiplicative model. The data of Kabeer and Mahmu (2004) come from a 2001 survey when the industrial share made up for 26 % of the Bangladeshi economy. For Pradahn's (2006) study on India around 2000, industrial value added was always over 25 % of GDP (all sector data: WDI).

of female years of schooling on the globalization measures (reported in Table A.3 in the appendix) that increased exports (for which we find a stronger impact on FLFPR than for FDI) are also positively correlated with female educational attainments in our sample. The parameter of 0.78 in the first column of the table would mean that women respond to a 10 % increase in exports/GDP by staying 7.8 years longer in school – years they are generally absent from the labor force.[26]

Therefore, while our aggregate results challenge the viewpoint of a large fraction of the literature arguing that globalization generally has a positive impact on FLFP in developing countries, this does not mean that a negative relationship necessarily exercises an adverse impact on female well-being or empowerment, as we try to suggest with Aristotle's opening quote at the beginning of this chapter. However, problems may arise under bounded rationality, e.g. if women do not enter the labor force because family income is sufficient, but do neither engage in educational programs even though this will decrease their probability of finding a job in the future. If a shock occurs in the future (as is likely to be the case in open developing countries), and household income declines, females will find it more difficult to make up for this income decrease because of forgone job-market experience.

An important policy implication stemming from this study is that countries that open up for globalization should tightly monitor developments on their female labor market. Long-term employability of women who leave the labor force because of sufficiently increased household earnings should be ensured. This may include continued education programs or offering more flexible working schedules.

[26] We also include a Random Effects specification in column (2) to take into account variation *between* countries and hence a longer-run perspective.

Appendix A

Countries Included:

Albania, Armenia, Bangladesh, Belize, Benin, Bolivia, Botswana, Burundi, Cambodia, Cameroon, Central African Republic, Chile, China, Colombia, Congo, Rep., Costa Rica, Cote d'Ivoire, Cuba, Dominican Republic, Ecuador, Egypt, Arab Rep., El Salvador, Fiji, Gambia, Ghana, Guatemala, Guyana, Honduras, India, Indonesia, Jamaica, Jordan, Kazakhstan, Kenya, Kyrgyz Republic, Lao PDR, Lesotho, Liberia, Malawi, Malaysia, Maldives, Mali, Mauritania, Mauritius, Mexico, Mongolia, Morocco, Mozambique, Namibia, Nepal, Nicaragua, Niger, Pakistan, Papua New Guinea, Paraguay, Peru, Philippines, Poland, Rwanda, Senegal, Sierra Leone, Slovak Republic, South Africa, Sri Lanka, Sudan, Swaziland, Syrian Arab Republic, Tajikistan, Tanzania, Thailand, Togo, Tonga, Tunisia, Turkey, Uganda, Ukraine, Vietnam, Yemen, Rep., Zambia, Zimbabwe

Table A.1 Summary Statistics based on those observations included in model (5) of Table 2. Trade and Exports include goods *and* services

Name	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**
FLFPR	3470	0,54	0,23	0,01	0,98
ln(GDP p.c. PPP)	3470	6,67	1,02	4,69	8,82
fertility rate	3470	4.21	1,61	1,10	7,813
years of schooling	3470	4,79	2,85	0,26	11,53
agricultural value added	3470	0,24	0,14	0,02	0,72
industry value added	3470	0,29	0,10	0,10	0,72
GDP growth rate	3470	0,02	0,05	-0,14	0,37
FDI stock / GDP	3470	0,26	0,52	8,09e-06	6,91
Trade / GDP	3470	0,77	0,39	0,11	2,20
Exports / GDP	3470	0,34	0,20	,03	1,12
Trade in Services / GDP	3220	0,18	0,15	0,02	2,06

Table A.2 Multiplicative Model. Fixed effects regression taking every 5th year. Cluster-robust standard errors in parentheses. ***, **, * denote statistical significance at the 1 %, 5 %, and 10 % level, respectively

VARIABLES	(1) ln(FLFP)	(2) ln(FLFP)	(3) ln(FLFP)
Trade / GDP	**-0.00833**	**-0.0417**	
(-1)	**(0.0472)**	**(0.0444)**	
FDI stock / GDP	**-0.0164**	**-0.0402*** **	
(-1)	**(0.0183)**	**(0.0124)**	
Industry v.a. × FDI		**0.248***	
(-1)		**(0.131)**	
Trade in Services / GDP			**-0.0757***
(-1)			**(0.0436)**
Exports / GDP			**-0.000931**
(-1)			**(0.0961)**
ln(GDP p.c. PPP)	-0.343	-0.363	-0.363
(-1)	(0.251)	(0.245)	(0.273)
ln(GDP p.c. PPP)^2	0.0271	0.0289	0.0281
(-1)	(0.0192)	(0.0186)	(0.0209)
fertility rate	-0.0142	-0.00740	-0.0123
	(0.0266)	(0.0248)	(0.0265)
years of schooling	0.0114	0.0121	0.00674
	(0.0237)	(0.0234)	(0.0263)
agricultural value	0.152	0.108	0.170
added	(0.147)	(0.136)	(0.160)
industry value added	-0.0672	-0.192	-0.0667
	(0.104)	(0.122)	(0.104)
GDP growth rate	-0.0799	-0.0367	-0.225*
	(0.110)	(0.107)	(0.128)
ln(FPOP)	1.208***	1.210***	1.232***
(-1)	(0.0494)	(0.0491)	(0.0535)
Constant	-2.276**	-2.223**	-2.474**
	(0.905)	(0.887)	(0.962)
Year Dummies	Yes	Yes	Yes
Observations	3,470	3,450	3,280
R-squared	0.864	0.864	0.867
Number of cross-sections	800	800	790

Table A.3 Correlation between Globalization and Female Education. Cluster-robust standard errors in parentheses. ***, **, * denote statistical significance at the 1 %, 5 %, and 10 % level, respectively

VARIABLES	(1) yrs of schooling	(2) yrs of schooling
Exports / GDP	0.779**	0.918**
(-1)	(0.375)	(0.363)
FDI stock / GDP	-0.111*	-0.119*
(-1)	(0.0638)	(0.0625)
Constant	3.925***	0
	(0.121)	(0)
Time Dummies	Yes	Yes
Estimation	Fixed Effects	Random Effects
Observations	3,750	3,750
Number of cross-sections	830	830

Appendix B

Table B.1 Overview of related literature

Study	Data and coverage	Dependent variable	Globalization-related variables	Methodology	Disaggre gations	Impact
Aguayo-Tellez, Airola and Juhn (2010)	Mexico, census, household and establishment surveys data (manufacturing), 1990-2000	Female employment rate, gender wage gap and female wage bill share (industry level)	Effective tariff rates and trade flows (industry-level), exports and FDI (plant-level)	Decomposition (between and within industry shifts)	--	Trade liberalization under NAFTA and FDI deregulation led to rising female employment
Baslevent and Onaran (2004)	Turkey, labor force survey data, 1988-1994	Women's labor force participation and employment decision (individual and plant level)	Overall and female-intensive export-orientation (share of (female) export-oriented sectors in manufacturing) (province-level)	Probit (with lagged macro-economic variables as regressors)	Short- vs. long-term, single vs. married women	Positive effect of export orientation on female labor force participation in the long-run (esp. young/single women), effect vanishes if one controls for GDP
Bussmann (2009)	134 countries (high income and developing), 1970-2000	FLFP and female employment by sector	Trade/GDP, Export/GDP, Import penetration (country-level)	GMM	Sector	Positive effect of trade on FLFP in developing countries (particularly via employment in agriculture and industry) but negative effect in OECD countries
Cagatay and Berik (1990)	Turkey, plant-level data (manufacturing), 1966-1982/85	Female share of employment (industry level)	Export-orientation, skill-intensity, labor-intensity (plant-level)	Pooled OLS	Economic policy regime	Export orientation increases female employment
Cagatay and Özler (1995)	96 countries, 1985-1990	Female share of the labor force	Exports/GDP, Participation in structural adjustment programs (country-level)	Pooled OLS	--	Exports have a negative effect on FLFP (but sometimes insignificant), interaction between structural adjustment and exports has a positive effect on FLFP
Chamarbagwala (2006)	India, household survey data, 1983/94-1999/2000	Employment rate (at the level of demographic groups)	Net imports/Output (industry-level)	Decomposition (between and within industry shifts)	Sector and education	Trade liberalization increased the demand for skilled labor; trade in manufacturing has a negative impact on demand for female labor, but trade in services generated demand for female college graduates
Dell (2005)	Mexico, employment survey, 1987-1999	FLFP (state level)	Imports, Exports, FDI (industry-level)	Difference-in-difference	--	Trade liberalization increased FLFP in Central Mexico, no separate effect of FDI (but difficult to disentangle)
Ederington, Minier and Troske (2010)	Colombia, plant-level data (manufacturing), 1984-1991	Female share of employment (plant-level)	Tariffs (industry-level)	OLS, logit (with tariff reductions as regressors)	Plant characteristics	Trade liberalization increased female employment

Gaddis and Pieters (2014)	Brazil, labor force survey data, 1987-1996	Women's labor force participation and employment decision	Tariffs (industry-level)	Fixed effects, pooled OLS	Education, ethnic group, sector	Trade liberalization reduces female and male labor force participation and narrows the gender gap in labor force participation and employment
Gray, Kittilson and Sandholtz (2006)	180 countries (high income and developing), 1975-2000	Female share of the labor force	Trade/GDP, FDI/GFCF* (country-level)	FE	--	Trade and FDI come out insignificant
Hyder and Behrman (2011)	Pakistan, historical census data and labor force survey data, 1951-2008	LFP gap (f-m)	Trade/GDP		--	Trade openness reduced the gap between male and female LFP
Meyer (2006)	120 countries, 1971-1995	FLFP	Trade/GDP, Exports/GDP, Trade volatility (in TOT), Commodity concentration, and a trade openness index (based on factor analysis), FDI/GDP	OLS (static and dynamic)	Income level and region	Positive effects of trade openness on FLFP in the static model and negative effects in the dynamic model, results differ by region and income-level (pos. effect in MICS), FDI is insignificant in the static model but has a positive effect in the dynamic model
Özler (2000)	Turkey, plant-level data, 1983-1985	Decision to employ females and female share of employment (plant level)	Export-orientation, skill-intensity (plant-level)	OLS (on averages)	Plant characterist ics	Export-orientation increases the likelihood to employ females and the female share of employment
Pradhan (2006)	India, plant-level data (manufacturing), 1999/2000-2001/2002	Employment gap (f-m)	Imports, Exports, In-house R&D, Foreign technology imports, Capital-intensity, FDI (plant-level)	Pooled OLS	--	Trade (via exports) increases female employment, technology upgrades are linked to lower female employment, FDI has an insignificant effect
Siddiqui (2009)	Pakistan, 1990	FLFP	Average tariffs (industry-level)	CGE Model	Skilled vs. unskilled	Trade liberalization leads to higher FLFP (mainly unskilled women)
Siegmann (2007)	Indonesia, household and plant survey data, 1999-2002	Female employment share	Foreign capital in a firm's total capital stock	OLS and qual. focus group discussions	Sector	Qualitative interviews show positive effects of FDI on female employment, quantitative analyses show mixed results (negative effects in manufacturing/hotels)
Terra, Bucheli, Estrades (2007)	Uruguay, 2000	Female employment	Tariffs (by sector)	CGE Model	Skilled vs. unskilled	Trade liberalization has a positive effect on female employment (skilled women faring better)
Wood (1991)	52 countries (high income and developing), 1960-1985	Female share in manufacturing employment	Manufacturing export ration, Import penetration	Descriptive statistics, scatter plots (first differences)	High income vs. developing	North-South trade has increased the demand for female labor in the manufacturing sector in developing countries

* GFCF=gross fixed capital formation

Appendix C: Error Structure of the Model

A concern of our model is the correlation structure of the idiosyncratic error ε in equation (4). Despite using a 5-year interval, autocorrelation is one potential issue. Together with potential heteroscedasticity, this can easily be accommodated by using the heteroscedasticity and autocorrelation (HAC) robust approach of Huber (1967) and White (1980) to estimate the variance-covariance (VCV) matrix. However, the hierarchical structure of our model (cf. Wooldridge, 2003 and 2010: ch. 20 for an introductory treatment to such models) poses additional problems since, for example, the error ε_{ijt} is likely to be correlated with the error $\varepsilon_{i,j+1,t+1}$ because the individuals in cohort j in period t will be in cohort $j+1$ in period $t+1$. Furthermore, there might be correlation between all errors $\varepsilon_{.jt}$ within country i if there is a systematic measurement error on the country level. All these potential problems with standard inference in linear models point to different forms of error correlation *within* countries. In line with the conventional panel data literature and given the dimension of our data set, we can assume that $N \rightarrow \infty$ and hence the number of countries, which are considered to be the "clusters," is large while the size of these clusters (i.e. the cohorts by country) is small. As discussed in Wooldridge (2003: 134, see also 2010: 864ff) a robust estimate for the VCV matrix is obtained by clustering the errors on the country level. Assuming that the matrix W_i contains all fixed effects and explanatory variables, classified as X and Z above, for country i and that the corresponding parameter vector δ contains β, θ, μ, and γ, a robust VCV estimator for δ is given by

$$\widehat{VCV}(\hat{\delta}) = \left(\sum_{i=1}^{N} W_i{}'W_i\right)^{-1} \left(\sum_{i=1}^{N} W_i{}'\hat{\varepsilon}_i\hat{\varepsilon}_i{}'W_i\right) \left(\sum_{i=1}^{N} W_i{}'W_i\right)^{-1}, \tag{5}$$

where $\hat{\varepsilon}_i$ is the $10T \times 1$ vector of residuals for country (i.e. cluster) i.[27] Using time-fixed effects is important in this context because it prevents the most likely form of cross-section, i.e. contemporaneous, correlation of the error term. We want to emphasize that clustering the errors at the country level has a tremendous impact on inference, as one would expect (cf. Wooldridge, 2010: 865). If one would (wrongly) cluster on the country-specific cohort level instead, which would be the standard option in most econometric packages, standard errors would be severely underestimated (cf. Table A.2 in the appendix to the Working Paper version of this chapter).

[27] An alternative approach would be using some feasible generalized least squares (FGLS) model. Depending on the assumptions, this might provide statistically more efficient results; it is, however, computationally less efficient. We hence prefer our approach because we find the assumptions less demanding and in the worst case, our framework will provide conservative inference compared with potentially efficient FGLS results.

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