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The Importance of Education for the Relationship between Economic Integration and Female Labor Market Outcomes

A Developing Country Analysis

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Abstract

Women in developing countries have been and are still suffering from various disadvantages on the labor market. We use a fixed effects model with a hierarchical structure to assess the empirical relationship between economic integration, measured by trade, exports and imports, and the female labor force participation rate (FLFPR). The relationship between economic integration and the female employment shares in the agriculture, industry and service sector is also analyzed. Additionally, this investigation is extended by looking at how these relationships are affected by the level of various measures of female education. The research is conducted for 87 developing countries between the years 1980 and 2010. Contrary to most previous research that has used aggregate country-level data for FLFPR, the hierarchical structure of our model allows our data to vary across time, countries as well as age-cohorts. The results show that trade has a positive effect on FLFPR but this effect only appears when average years of education for women is included together with trade as an interaction term in our regression analysis. When disaggregating trade into exports and imports, these measures of economic integration have a significant effect on FLFPR. Likewise there is an effect of export and imports when different measures of education are included as part in the interaction term, indicating the importance of female education for the relationship. While exports have a positive effect, imports have a negative effect on FLFPR. For the female employment shares an effect of trade as well as exports and imports can be seen in some cases, mostly when education is part of the regressions in the interaction term.

Keywords: *Female labor market outcomes, female education, developing countries, interaction term, cohort-specific data*

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1. Introduction

It is widely accepted that economic integration generally leads to benefits for a country on an aggregate level (e.g. Klasen, 2002; Yanikkaya, 2003). Specialization according to comparative advantages, by exporting the good at which the country has a relative cost advantage while importing the good a country produces at a relatively higher cost, leads to these overall benefits. Countries are further assumed to be able to exploit economies of scale, allocate resources more efficiently and gain from positive spillovers from technology and expertise transfers. The latter is of particular importance for developing countries (Bussmann, 2009). However, when discussing the implications from economic integration for economic growth, welfare and labor market outcomes, it should be noted that mainstream economic theories do generally not distinct between men and women per se. A distinction is rather made between agents according to, for instance, education and skills. This implies that certain issues exist when such theories address gender related economic relationships (Elson et al., 2007).

Economic integration and economic development are taking place all around the world, affecting both developed and developing countries. In the latter, women's absolute participation in economic activities as well as their wage is increasing. However, the shifts from lower-waged and low-skilled employment lags behind the global trends. As production moves toward more high-skilled sectors, women tend to be left behind and absorbed in lower-paying and less secure work. Women often experience a high rate of displacement, as more skilled labor is needed (Mehra & Gammage, 1999). With this in mind, investigating the effects of economic integration on female labor market outcomes is therefore of great importance to gain further insights into how to enhance women's opportunities on the labor market.

The purpose of this study is to analyze the relationship between economic integration and female labor market outcomes in developing countries.[1] Throughout this paper we will be using the terms 'economic integration' and 'globalization' interchangeably. The terms refer to cross-border movements of goods and services, such as exports and imports. We moreover define female labor market outcomes as (1) the female labor force participation rate (FLFPR)

[1] Developing countries in this paper are defined according to the World Banks historical classification in 1991 and include low and low-middle income countries (World Bank, 2014).

in an economy on the one hand and (2) the female employment shares in the agriculture, industry and service sector on the other hand.[2] The measures of economic integration used in this research are primarily the total trade/GDP ratio as well as its components, the import/GDP and export/GDP ratios. Disaggregating trade enables us to catch more specific effects of economic integration. The above-mentioned relationship has been studied quite extensively (e.g. Gaddis & Pieters, 2012; Cooray et al., 2012) and therefore our particular contribution to the existing literature is twofold.

Firstly, we make an extension of the existing literature by examining how the level of various female educational measures affects the impact of economic integration on FLFPR and the employment shares. This is carried out by including a term, from now on referred to as the 'interaction term', consisting of a female educational measure and a globalization measure in our regression analysis. It is important to note that we do not analyze the direct effect of female education on female labor market outcomes since education enters our regressions only as part of the interaction term. Rather, the indirect effect of female education through economic integration on female labor market outcomes will be looked at. Hence, in this study we are investigating the direct effect of economic integration on female labor market outcomes and an indirect effect of education on female labor market outcomes.

Secondly, we use age-cohort specific data instead of aggregate data for the investigation of the FLFPR. The main advantage of using age-cohorts is that it enables us to take into account the unobserved heterogeneity of the effects across different age-cohorts within countries. This is a strong improvement compared to other studies in the field. A fixed effects (FE) model is used throughout this paper in order to run the regressions, and the method together with the use of age-cohorts builds on the research by Cooray et al. (2012).

When examining the impact of economic integration on FLFPR we look at what happens to this impact when the level of (1) average years of education for women, (2) the share of women with secondary education in 1980 and (3) the total share of women with secondary education differ across developing countries. When looking at the effects of economic integration on female employment shares we instead use the level of average years of education for women of age 15 and more (15+). Throughout this extension of the current

[2] The sectors are defined in accordance with the World Bank's definition (World Bank, 2014).

literature our study will illustrate the impact of economic integration on female labor market outcomes at different levels of the mentioned educational measures across countries and to what extent these effects exist. To our knowledge, including education into the analysis in this way is rather novel to this area of research and only very little empirical findings and theories have been provided.

The aim of the research is to primarily investigate the female labor force participation rate and our analysis then deepens and investigates the effects on the female employment shares. In light of the mentioned considerations, the research question we aim to answer in this text is:

What are the effects of economic integration on female labor market outcomes across developing countries and how do these effects look when the level of various female educational measures differs across developing countries?

Although the relationship between economic integration and female labor market outcomes has been studied extensively in previous research, it is important to utilize this as a starting point. The main reason for this is that most previous research has focused on country case or simple cross-country studies, while it has focused less on studies across both time and countries in a panel setting, as we aim to do. Both economic theory and empirical findings suggest that economic integration is an important factor for the economy in general, and for female labor market outcomes in particular (Gaddis & Pieters, 2012; Mehra & Gammage, 1999; Sauré & Zoabi, 2009). By looking at the relationship with updated data as well as by using age-cohort specific data, we hope to shed new light on this relationship. Furthermore, it is widely recognized that female education in developing countries is an important factor in itself, leading to overall benefits for a country in economic, socioeconomic and human capital terms (King & Hill, 1993; Patrinos, 2008; Subbaro & Raney, 1995). Therefore an investigation of the research question stated above is of great value to the overall research on this subject and can in addition contribute to our understanding of the importance of female education when economic integration takes place. Ideally, our investigation could provide less developed countries today and in the future with knowledge and policy implications on how and to what extent economic integration affects female labor market outcomes as well as how education matters for this relationship. Our study could thus enlighten elements that have to be considered when integrating women on labor markets in developing countries.

Our main results show that trade has a positive effect on FLFPR but that this effect appears when average years of education for women is included together with trade as an interaction term in our regression analysis. Furthermore, when disaggregating trade into export and import, these globalization variables have a significant effect on FLFPR. Likewise there is a significant effect of exports and imports when the three educational measures are included as part in the interaction term, indicating the importance of female education for this relationship. While exports have a positive effect, imports have a negative effect on FLFPR. The results for the female employment shares are more mixed. Both for trade, as well as for exports and imports an effect is mostly seen when female education is part of the regressions in the interaction term. This indicates that different sectors of the economy are affected differently by globalization, depending on the measure of globalization and if education is included.

The rest of this paper is structured as follows: In section 2, we will present background research regarding the importance of investigating the situation for women on the labor market in developing countries. In section 3, we will provide an overview of empirical research conducted on our topic so far, which supports the idea of a relationship between globalization and female labor market outcomes as well as the importance of education in this relationship. In section 4, a theoretical background sets a cornerstone for our hypothesis and a discussion is presented about what we can expect according to theory. In section 5, the data for our research is presented and in section 6 we present the method and describe the use of age-cohorts. Section 7 shortly gives an overview of the actual mean development of the main variables between the years 1980-2010. Section 8 lays out the empirical results of our study while section 9 discusses the findings. Conclusions are provided in section 10.

2. Background

Mainstream economic theories and empirical findings agree that economic integration and free capital flows have positive effects on the aggregate economy (Klasen, 2002; Sachs & Warner, 1995). However disagreement prevails on whether all agents, including for example the poorest in the economy, are gaining from a growing economy as a result of economic integration (Bussmann, 2009). Meyer (2006) argues that, for instance, ethnical, class and

cultural considerations can shed light on why economic integration might benefit certain groups while not others.

Several reasons can be found for why there might be an interest in investigating outcomes for women in particular, rather than for any other type of economic agent. It becomes clear that women have been and are suffering from disadvantages in the labor market as well as from underlying sex imbalances around the world. For instance, in 1995, the *Human Development Report* investigated the role of women in particular and concluded that around the world the major part of the poor and illiterate people are women. Women also tend to have low access to managerial and administrative positions as well as various political positions. No economy provides women with the same opportunities as men (UNDP, 1995). In a research conducted in China by Quian (2008), she looks at various outcomes when increasing female income while holding the income of men constant. She finds an increased survival rate for girls and higher educational attainment for both boys and girls. Conversely, when increasing the income for men while holding female income constant, both the survival rate and educational attainment of girls decreases while the educational attainment for boys remain unchanged. Her findings emphasize the great importance of investigating the role of women and of further looking into the existing sex imbalances and its consequences. Gray et al. (2006) argue that there are various forms of inequalities with social, cultural, political and economic dimensions for gender around the world. Although there most likely has been progress for women around the world in past decades, by assessing the conditions for women the absence in theoretical and empirical work considering gender and the distortions this brings about, can be enlightened. Our particular investigation about the effects of globalization on female labor market outcomes and the role of female education for this relationship contributes to the possibility of finding future opportunities that could prevent continuous disadvantages for women.

Although the focus of this research is not on the direct effects of female education and its benefits for women, it will still be shortly reviewed since it highlights the overall importance of education. The indirect effects of education therefore ought to be of importance as well. There is an extensive literature examining the gains of educating women in developing countries, and the benefits of it that are seen in the formal labor market in terms of better employment opportunities and higher income for women (e.g. King & Hill, 1993; Patrinos, 2008). One widely recognized fact is that education in general, and for women in particular,

comes alongside several gains for the economy. For instance, more female education results not only in GDP benefits for a country, but also in higher female labor productivity and wages, increased bargaining power for women and lower fertility rates. It further leads to increased female social well-being, child health and poverty reduction (Chaaban & Cunningham, 2011; Hill & King, 1995; Subbarao & Raney, 1995). Still, in many countries around the world, the female labor force participation is at a low level, a fact that is particularly apparent in many less developed countries. At the same time it has been argued that women's professional work, which can be enhanced through education, is one of the most important factors when fighting poverty in a developing country (Elborgh-Woytek et al., 2013). Hence the importance of examining the role of female education in general, and when economic integration occurs in particular, should be emphasized and considered from a wide range of economic and social perspectives.

3. Related research

3.1. The U-hypothesis

The literature investigating female labor force participation can be divided into several lines. One of the more investigated lines recognizes a U-shaped relationship between economic development and the female labor force participation. The relationship is called the 'feminization U-hypothesis'. It can be traced back to the 1960s and has been studied in a great extent ever since (e.g. Gaddis & Klasen, 2012; Goldin, 1995; Mammen & Paxon, 2000; Sinha, 1967; Schultz, 1999).

The feminization U-hypothesis can be explained as follows. In the early phase of a country's economic development, usually proxied by a country's GDP per capita, the majority of the population works in the agricultural sector and has a low wage income. In this phase women participate in the labor force, mostly working on family farms or in household enterprises. This allows them to tend for their children under high fertility rates, while still being economically active (Gaddis & Klasen, 2012). As economic development moves towards higher levels and the society becomes wealthier the agricultural production tends to shift towards industrial production and leads eventually to a formal sector-based economy. Since many women in developing countries work within the informal sector, their labor market

participation rate decreases during this phase (Bussmann, 2009). While still experiencing high fertility rates, women are unable to combine childcare with economic activities, which would be required in this phase. As the economic development continues, the educational level for the male population will increase and push household income levels upwards. From a higher household income, an income effect emerges that will further reduce women's participation rate on the labor market. The eventual rise of the female labor force participation rate comes at a much more advanced stage of economic development when women have acquired higher levels of education, and acquired, for instance, transferable skills needed for the formal sector (Goldin, 1995).

Most evidence of such a relationship has been found in simple cross-country studies such as in those by Cagatay and Özler (1995) and Mammen and Paxon (2000). Evidence from panel regressions is on the other hand more mixed. Tam (2011) uses panel data for 134 countries and runs a pooled ordinary least square (OLS) to investigate the relationship. He concludes that the U-shaped relationship can appear in this setting. On the contrary, Gaddis and Klasen (2011) argue that the relationship is more complex than the literature suggests. They, by using a panel regression, do not find any evidence for the U-hypothesis. Instead they criticize the methodology and data used in many earlier studies and argue that there is new data available on female labor force participation. Moreover, Gaddis and Klasen argue that more advanced panel data techniques make it possible to get updated and more accurate results. They further argue that the level of GDP per capita as a proxy of economic development is not capturing the real economic development and that it is too general to be used for all countries. Instead they investigate the structural changes in the economy and use data on value added in the agriculture and industry sector respectively, rather than on GDP per capita. They conclude that different sectors have different effects on the structural changes of an economy and that the U-shaped pattern in the female labor force participation might or might not appear in a country, depending on the relative weight of these sectors.

In conclusion, the different arguments indicate that there is mixed evidence of the U-hypothesis. This short review also shows that various studies have been conducted in this field and that the results, in particular for panel studies, are not clear-cut. Moreover, different dynamics of female labor market outcomes in different sectors call for more research, which disaggregates the economy into various sectors. Although this line in the literature is not of primary relevance for our research, the discussion still provides us with useful information

about female labor market outcomes and the impact on it from economic growth and development, which for instance could be a result of economic integration.

3.2. Empirical evidence of globalization and female labor market outcomes

The research examining the effects of economic integration on outcomes for women in developing countries has become of vital importance in the past years. The field is broad and covers a diverse range of related topics and outcomes. One of the main lines in this literature looks at how economic integration affects female labor market outcomes in particular. Overall these studies tend to confirm the existence of a positive relationship between economic integration and female labor market outcomes (e.g. Aguayo-Tellez et al., 2013; Bussmann, 2009; Cagatay & Berik, 1990; Ederington et al., 2009; Gaddis & Pieters, 2012). However, there is still a variation in the results and the consensus about the effects of economic integration on female labor market outcomes is not always present. A review of this literature is relevant for our study as it provides us with crucial information about the different effects, methods and implications that exist across studies.[3]

In the research conducted by Bussmann (2009), the common assumption in mainstream economic theory that globalization leads to increased welfare benefits for countries is investigated. She finds no consistent results that the welfare of women would increase from globalization. She looks at both the absolute effects for women (i.e. welfare in terms of health and education) and the relative effects for women compared to men. Furthermore, she looks at the effects of trade openness (trade/GDP, export/GDP and import/GDP) on female labor force participation on the one hand and employment shares in the agriculture, industry and service sector on the other hand. Bussmann applies GMM and FE methods for data covering the years from 1970 to 2000 for 134 countries. Her findings seem to point in the direction that trade openness does not directly improve women's absolute welfare outcomes nor does their welfare relative to men. However, she does find some evidence indicating higher enrollment rates for girls in primary and secondary schooling. Moreover she presents evidence of trade openness leading to increased female labor force participation and that it increases the female employment shares in the industry and agricultural sector, in less developed countries.

[3] An additional overview over the literature covering related research is given in the appendix in Cooray et al. (2012).

In the research by Cooray et al. (2012), the relationship between globalization, as measured by trade and FDI, and the FLFPR in 80 developing countries between 1980 and 2005 is investigated. The scholars provide some critique to the existing literature regarding the impacts of globalization on female labor market outcomes, and argue that most studies conducted in this field are simple cross-country or country-case studies. In general these studies find a positive impact of globalization on female labor market outcomes in developing countries. However, the implications from such studies do not have to hold in more dynamic settings. Cooray et al. are using a FE estimator in their panel setting and they control for age-cohort specific effects within countries. They find that the effect on FLFPR coming from FDI and trade is negative and that there is big variation across different regions. Their results are opposing the common finding in the literature that there are positive effects of economic integration on FLFPR. As an extension of their study, they examine the effects of economic integration on FLFPR for different age-cohorts and find that these effects are especially strong for younger cohorts. This could be explained by a higher variability in the labor market for younger women. They also argue that the direction of the effects and impacts of globalization on FLFPR depends on the industrial structure of a country's economy.

Similar to Cooray et al. (2012), Meyer (2006) also criticizes the simplicity and generalization of many cross-sectional and country-case studies conducted on the effects of economic integration on female labor market outcomes. In her study she investigates the effects of trade openness and transnational corporate penetration (foreign investment) on women's integration on national labor markets, such as the female labor force participation. Applying a standard linear OLS on several regressions with data for 120 countries from 1970 to 1995, Meyer finds two conflicting results. The first one implies that trade openness contributes to more women achieving paid employment, while the second one indicates that trade openness leads to a decline in the national female labor force. She therefore argues that no meaningful conclusion can be drawn about the effects from economic integration on women's integration on national labor markets. Nevertheless, she does conclude that a linear conception of globalization and female labor force participation is too simplistic to analyze this relationship.

Alternatively, Gray et al. (2006) apply cross-sectional-time-series fixed effect regression techniques on data between 1975 and 2000 for 180 countries in order to analyze the relationship between trade and life expectancy, as well as literacy rates for women. They further study the effects of trade openness and FDI on women's participation in the economy.

In particular, Gray et al. find that as trade and openness towards international influences increases, so does life expectancy and literacy rates for women. However, as their study investigates a total of 180 countries, including both less developed as well as industrialized countries, the effects of trade and FDI on the female labor market outcomes show a rather heterogeneous picture. This results in overall insignificant estimates for their measures of trade and FDI.

Aguayo-Tellez et al. (2013) look at the effects on female labor market outcomes from trade liberalization, which in this case is the signing of the North American Free Trade Agreement (NAFTA) in Mexico in 1994. By using an OLS model on data for household expenditure between 1984 and 2004 and population data between 1990 and 2000, they find that trade liberalization improved the female labor market outcomes in Mexico. They contribute to the existing literature by disaggregating the overall increase in female employment and wage bill shares into 'between' and 'within' industry components. Aguayo-Tellez et al. findings suggest that as a result of signing the NAFTA, relative female wages seem to increase even though employment rates increase. This finding was especially pronounced during the trade liberalization period of 1990 to 2000. They also find evidence of labor reallocation. Regarding between-industry shifts there was an existing trend of moving employment towards initially female-intensive sectors. For within-industry shifts, there was an increased hiring of women for skilled blue-collar occupations. Finally, Aguayo-Tellez et al. find evidence of improved bargaining power for women within the household. This shifts expenditures from goods associated with male preferences, such as tobacco and alcohol, to goods associated with female preferences, such as women's clothing and education.

Pradhan (2006) looks at how trade, FDI and technology affect three different employment patterns in India. He investigates the effect on the patterns of female versus male workers, contract versus regular workers, and skilled versus unskilled workers by using a pooled OLS for the years 1999/2000 to 2001/2002. Pradhan finds evidence that trade is employment promoting for women relative to men and for unskilled workers relative to skilled, but neutral between contract and regular workers. According to him, exports seem to be the cause of increased female employment, while imports seem to be driving unskilled employment. Pradhan's final conclusions are that trade has been an important factor in general, and in particular for two vulnerable groups in the Indian labor market - women and unskilled workers - by creating new employment opportunities.

Finally, in a study by Cagatay and Özler (1995) a pooled OLS is used on cross-country data for 96 less developed as well as industrialized countries for the years 1985 and 1990. They examine the relationship between the female labor force participation, and long-term economic development as well as macroeconomic changes such as structural adjustment programs that are transmitted through changes in income distribution and exports. Although their article's prime focus is on investigating the U-hypothesis, Cagatay and Özler also conclude that structural adjustment programs through increased outward orientation of a country increases the female labor force.

3.3. Relating education to empirical evidence of globalization and female labor outcomes

As mentioned earlier, it is not difficult to find studies analyzing the importance of female education as such, and what the direct effects on the economy are in general and for the labor market in particular. However, there is only very limited research considering the importance of female education for the effect of economic integration on female labor market outcomes across developing countries. Thus, in addition to the case study by Klasen and Pieters (2012) below, which is the closest we come to our field of research, studying the effects of globalization on female labor market outcomes when female education varies across countries is a rather undiscovered field.

Klasen and Pieters (2012) look at the determinants driving the female labor force participation in India during the economic boom. They investigate the period from 1987 to 2004, by using an OLS model on unit-level data. They use 'push' and 'pull' factors in order to explain their findings. These factors are defined as either an unfavorable or an attractive factor or cause pushing or pulling individuals from a certain location or in this case the labor force. Under push factors people tend to be pushed away from labor due to, for instance, low demand or discrimination. While under pull factors people are attracted to join the labor force due to, for instance, high wages or attractive employment conditions. Klasen and Pieters claim that economic pull factors seen in earning opportunities only attract those women with higher levels of education. Their result shows that there is no effect from market wages on the participation in paid employment for women with education levels less than secondary schooling. The labor force participation of women with lower levels of education is thus

determined by economic push factors, showing that their participation is rather driven by necessity than economic opportunities, while for women with higher education levels, attractive employment and pay conditions are available.

3.4. Methodological challenges and endogeneity

Most literature regarding globalization and female labor market outcomes is based on either individual country-case studies or simple cross-country variation. Various scholars have studied this literature during the last decades and we are aware of its broad coverage. However, little focus has been put on studying the time - and cross-country effects in a panel setting. Moreover, based on our literature review prior to conducting this research, no study has reviewed the relationship of how the level of female education affects the relationship between globalization and female labor market outcomes. Due to the novelty of this particular topic, the method and theories used by us in this research are based on similar studies, while taking into account our own specific relationship.

As mentioned, the majority of the results in the literature show a positive relationship between economic integration and female labor market outcomes. The applied method is mainly the Ordinary Least Square (OLS) model but a Generalized Method of Moments (GMM) model is also used in some cases. While country-case studies ought to give a good picture of the relationship within a country, there is always the risk of generalization from such studies (Cooray et al., 2012). Investigating effects of economic integration and applying individual country-case results to an overall setting, could be misleading and might not apply to all countries. On the other hand, many of the cross-country studies seem to suffer from potentially biased estimates since unobserved heterogeneity across countries is a common phenomenon. In the latter case, the FE estimator could be of great use since it is controlling for the unobserved heterogeneity across countries (Tzannatos, 1999). When using this method however, the results vary among different studies in the literature.

Cooray et al. (2012) provide findings opposing the majority of results in the literature, when controlling for unobserved effects by using FE estimation in their study. They find a negative relationship between globalization and female labor force participation and conclude that there is unobserved cross-country heterogeneity in this relationship. Bussmann (2009)

conducts her study with both FE as well as GMM estimation. However, when specifically looking at the effects of trade openness on female labor market outcomes, Bussmann runs the regressions using the GMM in order to take endogeneity into account. When using this method, her finding is that the relationship is positive. Cooray et al. (2012) made an attempt to replicate the study made by Bussmann (2009) and got the same positive relationship on female labor force participation rate as Bussmann when the estimations were run without time-fixed effects and country-fixed effects using GMM. However when Cooray et al. control for these fixed effects by using an FE model, the results change direction. The relationship becomes negative, indicating the existence of unobserved heterogeneity across time and countries. It therefore shows the great importance of catching unobserved heterogeneity by using fixed effects in order to obtain correct estimates. Gray et al. (2006) also use cross-sectional-time-series fixed effects in their study of 180 countries. Their results regarding the effect of trade and FDI on female labor force participation come out as insignificant. Gaddis and Pieters (2012) likewise use FE estimation in their study of Brazil and find that the effect on female labor market outcomes is greater in states with more trade liberalization. This indicates a positive relationship. Overall the use of FE thus leads to some conflicting results, depending on for instance time spells and country coverage.

Across various studies different techniques and methods show different results and there is no real consensus of how to approach this field of research. The FE estimator is a good method for conducting cross-country studies when the unobserved heterogeneity is constant over time and correlated with the independent variables. The FE also accounts for variables that are specific to individual countries. For instance, the time-fixed effects absorb time-invariant variables such as culture or religion (Tzannatos, 1999). Should the unobserved heterogeneity be uncorrelated with the independent variables, one should instead use the Random Effects (RE) estimation. However, even when RE models are plausible, the use of FE models would still provide consistent parameter estimates (Johnston & DiNardo, 1997). The FE estimator also makes it possible to hold constant the time-invariant factors that would be underspecified in RE models. The main benefit from this procedure is that it enables us to focus on the changes over time within countries, while the disadvantage is the loss of the ability to understand potential factors that vary only across countries (Gray et al., 2006). Overall, this methodological review shows that the FE estimator clearly is a plausible method to use for our study, especially when age-cohorts are used in the investigation of the FLFPR. Unobserved heterogeneity across age-cohorts, as well as across countries, is likely. By using

the FE estimator, it allows us to have country-specific cohort fixed effects, which are fixed effects over time for every cohort that varies by country (more details about the method and these effects are provided in section 6).

With this in mind, we still have to consider the issue of endogeneity, which can be a potential drawback when using FE estimation. Instead of the female labor market outcomes being affected by economic integration, as assumed throughout this study, increased integration of women on the labor market might influence a country's competitiveness on the international markets. This could imply a higher economic integration. Furthermore, the female labor market outcomes could have an impact on other control variables. Thus the relationship between economic integration and our various female labor outcome variables might suffer from reverse causation.[4] Bussmann (2009) for instance considers the problem of causality by using GMM instead of FE estimation for her data, thereby taking endogeneity into account. Despite the risks of endogeneity, this has been given little consideration in the literature conducted on this subject. This, alongside with the benefits of using the FE estimation for cross-country studies, leaves us to conclude that FE estimation is an appropriate estimation for our study.

4. Theoretical background

To be able to connect our empirical findings to theoretical cornerstones we in this section present an underlying hypothesis regarding the effects of economic integration on the FLFPR. We further provide a theoretical discussion about the implications and expected results of economic integration on the female employment shares in the agriculture, industry and service sector. A theoretical foundation is thus provided for the direct effects of economic integration on female labor market outcomes in developing countries. It is important to remember that throughout this research, the focus is not only on analyzing the direct impact of economic integration, but also on how this impact is affected by the level of various female educational measures. However, it is more difficult to find clear-cut theoretical arguments and predictions about the latter relationship. It is therefore essential to relate the hypothesis and theoretical reasoning's to cases when female education is interacted with our globalization

[4] For a deeper econometric review of endogeneity and the issues related to it, see Verbeek (2012).

variables. Consequently, this study not only seeks to analyze the stated hypothesis about the FLFPR and the theoretical discussion about the female employment shares, but also how female education affects the impact of economic integration on these female labor market outcomes. With our empirical results, we in particular hope to shed light on this latter effect.

One should be aware that theoretical approaches are generally not fully comprehensive and do not take all factors from reality into account. Our approach below is not an exception to this, but is widely used in the literature on this field of research and will hence give us a good theoretical foundation to base our research on.

As has been mentioned in the introduction, overall benefits for an economy are assumed to occur under economic integration. The principal, yet basic underlying theory for this study is based on the Stolper-Samuelson theorem. When opening up a developing country to international trade, those agents holding the abundant factor of production in these economies will be the beneficiaries (Debraj, 1998). Closely related to this is the well-known Heckscher-Ohlin model which states that under economic integration, countries are expected to specialize in the production of goods or services requiring the country's abundant factor of production (Busse & Spielmann, 2006).[5] Hu et al. (2009), for instance, stress the usefulness of this framework when investigating less developed countries. In this framework it is further assumed that developing countries generally are abundant in labor, producing labor-intensive goods and requiring low-skilled labor, opposed by capital-intensive goods requiring high-skilled labor in more industrialized economies. Developing countries therefore ought to concentrate on the production of labor-intensive goods since this is where their comparative advantage lies (Caves et al., 1996; Debraj, 1998). According to the Heckscher-Ohlin model, economic integration will result in an increased demand in the factor of production, which is intensively used in the production. For less developed countries we therefore expect increased work opportunities for low-skilled labor. It is exactly here where the case for women in these countries becomes clear. Many women in developing countries are considered to be low-skilled, for instance because of their lack of labor market experience (Black & Brainerd, 2002). Tzannatos (1999) for example, argues that in the industry sector in developing

[5] The assumptions behind the Heckscher-Ohlin model are the following: (a) two countries, two goods and two factors of production (capital and labor) (b) each country being abundant in either capital or labor requiring either high-skilled or low-skilled labor, (c) identical technologies and homogenous consumer preferences across all countries, (d) constant returns to scale, (e) perfect factor mobility and (f) no market distortions (Busse & Spielmann, 2006).

countries, the majority of the employed women are found in low-skilled positions such as production workers and operators, while very few hold administrative and managerial positions. Women are thereby providing the factor of production required when producing the labor-intensive good in a developing country. The general lack of skills for women could hence be seen as their asset, and it is therefore expected that low-skilled women in developing countries are the beneficiaries of economic integration in terms of increased labor force participation (Bussmann, 2009).

Nevertheless, it should be remembered that ultimately, the effect of economic integration on female labor force participation depends specifically on the area that a developing country has its comparative advantage in and if women are over-represented in these areas. Thus, the reasoning does not have to apply to all cases and the existence of heterogeneity is likely across developing countries regarding their comparative advantages. Moreover, we have to be aware of the weaknesses of the Heckscher-Ohlin-Samuelson model. Firstly, as its assumptions are simplifications of reality it might have limited applicability on the circumstances in developing countries. Secondly, the use of this theory in a gender framework can be criticized since, among others, perfect competition and full employment is assumed (Ibid). Nonetheless, the overall assumptions in this framework can be used as a theoretical foundation for our analysis and enables us to state the following hypothesis regarding the FLFPR:

We expect the female labor force participation in developing countries to increase the more economically integrated the developing country gets.

Moreover, it is theoretically expected that economic integration bring about different effects for the female employment shares in various sectors in less developed countries. This theoretical approach, used by Bussmann (2009), regarding the effects of economic integration on female employment shares in various sectors, should also be applicable to our study. As an implication of economic integration women tend to be mainly working in the industry and agricultural sector. Assuming that agriculture and industry are intensive in low-skilled labor and that developing countries therefore have a comparative advantage in goods produced in these sectors, we expect developing countries to specialize in these goods under economic integration. Although there are some drawbacks with defining various sectors according to skills, we can make a statement about the expected effects for developing countries in

general.[6] We expect the female employment shares in agriculture and industry to increase under more economic integration. The reason for this is that women are the main part of the factors of production in these sectors in developing countries and the demand for this kind of labor will increase with more economic integration. While most jobs in the industry sector are newly created, providing new job opportunities for women, in the agricultural sector, there will be a shift away from informal farming towards formal work for women, thus making women appear in the statistics (Ibid.).

5. Data

In this section we will present the data used for our research, which is organized in five-year intervals, between 1980 and 2010 (1980, -85, -90, -95, -00, -05, -10).

For our main dependent variable, female labor force participation rate (FLFPR), we have used data from the International Labour Organization's (ILO) Estimates and Projections of the Economically Active Population (EPEAP) database, for which the ILO conducts continuous revisions (ILO, 2011). The EPEAP database contains data on the male and female economically active population based on country reports. Over the period from 1980 to 2010 (with projections until 2020), the ILO provides estimates for 191 countries. The economically active population covers all females and males who supply labor for the production of goods and services during a specific period of time. The production of goods and services is defined by the System of National Account version in 1993. It includes marketed goods and services supplied and intended to be supplied, goods and services used in the production process, as well as goods and services consumed within households (ILO, 2010).

The participation in the labor force is determined by both microeconomic and macroeconomic factors. In the microeconomic view, drawn from the neoclassical trade-off between work and leisure, an individual participates in the labor market if the market wage exceeds his or her reservation wage. At the macroeconomic level there are structural factors driving the long-term patterns in the data set and those factors could be legal or policy determinants. There can

[6] There is an issue of defining the different skill-levels representing the various sectors; for instance what defines the skills of labor working in the service contra industry and agricultural sector? Ideally we would like to capture and know the different skill levels of labor to be able to distinguish between various professions and in what sectors they are employed. This is however difficult to do in practice due to data limitations (Bussmann, 2009).

also be cyclical factors, for instance overall determinants such as labor demand being a driver of labor supply (ILO, 2011).

The EPEAP database does not take into account the non-marketed services such as domestic production, household choices in other words. This is important to have in mind, since many women are employed in the informal sector outside the labor force in domestic production. Differences in the definitions of the economically active population between countries will also have an effect but will be taken into account by our FE model. Activity rates for women are also difficult to compare internationally. This is due to the large number of women who in many countries in general, and in developing countries in particular, participate and assist on farms and family enterprises without payment. Countries therefore differ in the way they include them among the economically active. (ILO, 2010)

The definition of the FLFPR contains the number of economically active women (FLFP) divided by the total female population (FPOP) of the relevant age group *j*, in country *i*, at time *t*:

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

The observations for FLFPR will be organized in age-cohorts using a 5-year interval to avoid problems with serial correlation and to get the long-run effects.[7] It would have been possible to use yearly data from the 6th revision in the EPEAP database. However, in accordance with the control variables for which not all data is available for every year, as well as in accordance to earlier literature, a 5-year interval is more plausible (e.g. Gaddis & Klasen, 2011). The lack of year-by-year data reporting and collection for many small and/or developing nations also justify a 5-year interval.

The World Bank World Development Indicators (World Bank, 2014) provides data for the female employment shares in the agriculture, industry and service sectors of a country. This data is not available in age-cohorts. Adding together these three sector's employment shares corresponds to the aggregate female employment in an economy. These employment shares

[7] The age cohorts included are the following: 15-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59 and 60-64. Further cohorts will not be used because of possible factors differing significantly compared to those used here.

will be of interest at a later stage when investigating the impact of economic integration on these sectors as well as how education affects this impact.[8]

As the main explanatory variable, the trade/GDP ratio is used, but an investigation of the effects of export/GDP and import/GDP is also carried out. These variables are all widely used indicators of economic integration (e.g. Bussmann, 2009; Cooray et al., 2012). Trade is composed by exports and imports of goods and services and the data is also taken from the World Bank (2014). Our globalization variables all enter the regression with a one-year lag, since these effects are not expected to occur instantaneously.

For our female educational variables we are using data provided by Barro and Lee (2013). Three different education variables are used when investigating the effects on FLFPR; (1) average years of education for women, (2) the share of women with secondary education in 1980, and (3) the total share of women with secondary education. Only one educational measure is used when looking at the effects on female employment shares, namely average years of education for women of age 15 and more. The educational measures are age-cohort specific when looking at the effects of economic integration on the FLFPR, while not being age-cohort specific when looking at the effects on female employment shares. The choice of using cohort or not cohort specific female educational measures purely depend on the dependent variables being cohort specific (FLFPR) or not (female employment shares). Interacting the educational with the globalization variables enables us to investigate how the effect of globalization on female labor market outcomes is affected by a specific female education measure. The main aim is to use educational measures that are of great importance and relevance for the literature and policy purposes. For instance, average years of education for women is an interesting measure since it is widely comparable and differs across the countries investigated. Moreover, the share of women with secondary education in 1980 provides an indication about a country's 'initial competitiveness' in this type of education. Since our data begins in 1980, this educational measure presents information about how the initial share of women in secondary education affects the impact of globalization on FLFPR. By using total female share with secondary education, we want to investigate the importance of this type of higher education. Finally, average years of education for women of age 15 and

[8] As all our dependent variables are defined as fractions, all observations for these variables lie between 0 and 1. In order to make a linear functional form an adequate approximation it is required that no observations lie close to either 0 or 1. If this would be the case, a logistic functional form would be a more suitable way of estimation (Kennedy, 2008).

more, is used as the measure when looking at the effects on employment shares as it is also widely comparable and available for the countries and years investigated.

The female educational measures used in this paper enlighten several out of many potential effects education can have on the impact of economic integration on female labor market outcomes. Nonetheless, future research might find it useful to go even further and examine the effects of economic integration under other measures of female education.

Most of our control variables are provided by the World Bank (2014). The controls aim at holding further effects constant that potentially may bias the effect coming from globalization (Bussmann, 2009). GDP per capita (in constant 2005 international $ purchasing power parities) is one crucial control variable indicating the level of economic development of a country. By including this variable it will be possible to take into account the differences across countries associated with their level of economic development. The level of economic development could, for instance, be reflected in differences in country's tax incomes, the possibility of providing social services and giving access to the labor market for a country's citizens. Furthermore, there is evidence for a curvilinear relationship between FLFPR and economic development, where states with a very low and very high grade of economic development have a higher FLFPR (Ibid.). Therefore, GDP per capita is also included as a squared term in the regressions of the FLFPR in order to control for this nonlinear effect. However, when investigating the female employment shares in various sectors, the impact of economic development is expected to enter the regression only in a linear manner (Ibid.). Although GDP per capita is widely used as a measure of economic development, it has been questioned if it can measure the actual economic development of a country (Gaddis & Klasen, 2011).

The fertility rate (total births per woman) is a variable included in order to control for two different effects. On the one hand, it is aimed to catch the effect of population growth of a country. On the other hand, it is associated with catching the effect of women spending time with raising children, and hence their ability of participating in the official labor market. Yet another control is a country's total population in a given year. It is included since it is expected that countries with different populations also differ from each other on the labor market. Most importantly though, the population size of a country is included in order to

avoid biased results in economic integration, as smaller countries are assumed to be more open to trade in order to have access to a larger market (Bussmann, 2009).

Furthermore, the shares of agriculture and industry value added to GDP are included as controls. The aim of this is to control for differences regarding the sectoral structure across the investigated countries. This enables us to hold the economic impact on the economy from one sector constant in order to investigate the impact from the other sector (Cooray et al., 2012). When investigating the FLFPR we also include the percentage growth rate of real GDP per capita (in constant local currency). The idea of including the GDP per capita growth is that it accounts for short run fluctuations that would also be reflected in the unemployment rate, which clearly is linked to female labor force participation. It goes without saying that the best would be to use the actual unemployment rates as a control variable. However, the unemployment rate is often not available for the countries and years we investigate. Therefore GDP per capita growth is used as a proxy. As we are using a fixed effect specification, the fixed effect takes care of the average growth in the long run, and the interpretation of GDP per capita growth is that it catches the short run fluctuations in the model (Ibid.).

Finally, a political regime variable is included in the regressions investigating the FLFPR. The measure is taken from the Polity IV Project database, which contains data on political regime characteristics and transitions based on a combination of several institutional factors of a political regime. The measure consists of an index between -10 (hereditary monarchy) and +10 (consolidated democracy) (Polity IV, 2014). The aim of including this variable is related to the fact that women are able to express and influence both their everyday preferences and to organize their work depending on the political regime. Open democracies, for instance, are expected to involve better conditions for females in politics but also increase their access to the labor market (Bussmann, 2009). Although there clearly is a point in including such a control variable, it seems somewhat arbitrary to define countries into a 21-point index. The exact reasons for why a specific country receives a certain number (for instance, what is the difference between 6 and 7?) are rather vague to us.[9]

Some of the control variables (GDP per capita and total population) are included in its logarithmic form in order to smooth out effects, while GDP per capita, alongside our

[9] See Munk & Verkuilen (2002) for a further assessment of the Polity IV index.

globalization variables, is included with a one year lag. A spreadsheet containing more than 180 000 cells with data was created in order to run our regressions. A summary overview of the variables included in this paper can be found in Appendix D.

When creating our dataset it became clear that most data is available for the years after 1985. While there is data for the years 1980 and 1985, several variables have little data for these years. Additionally, the data for the female employment shares is more limited than that for the FLFPR.[10] This can be seen when looking at the number of observations that are included in the regressions in section 8, as the number of observations for the employment shares are fewer compared to those when investigating the FLFPR. Although much of this difference in number of observations is due to the fact that the regressions investigating the effects on the FLFPR are age-cohort specific, while those for the employment shares are not, there still is less data for female employment shares in general. Fewer observations imply a lower estimation power of our estimates and it also makes generalization of the results to other countries and years more difficult. These limitations should be considered for the sections below. Overall however, the data in this study relies heavily on well-known and widely used sources, we are therefore confident that problems regarding measurement issues are limited.

6. Methodology

The methodology builds on the research by Cooray et al. (2012) and hence we, at the initial stage of our research, replicated parts of their study in order to get an understanding of the underlying methodology and the use of age-cohorts. We concluded that with some further developments, mostly regarding the right-hand side variables, this method is highly relevant for our investigation.

When investigating the FLFPR, we use an FE model with a hierarchical structure as a result of using age-cohorts. In the case of female employment shares, we have a regular FE specification since this data is not age-cohort specific. Both of these econometric specifications are of linear form where our dependent variable is, on the one hand the FLFPR

[10] Due to the complete lack of data for certain countries, the actual number of countries when investigating female employment shares is lower compared to when investigating the FLFPR, see appendix A.

and on the other hand, the three different female employment shares. Our dependent variables are explained by several covariates.

The dataset consists of two different levels of cross-sections, one being the countries, $i=1,...,N$, and another being the age-cohorts, $j=1,...,10$. The use of a hierarchical structure allows certain variables to be organized at more than one level. The cohort-specific variables are organized at cohort-, year- and country-level. Using age-cohorts enables us to compare the same age groups within a country across time as we assume that different age groups have individual effects that are different from aggregated country-data, which is used in most other studies. This is a strong improvement compared to other studies in the field. We use country-specific cohort fixed effects in order to control for the possible unobserved heterogeneity that varies within cohorts across countries. This will moreover provide us with a more accurate picture of the FLFPR compared to when using aggregate data. These cohort-fixed effects are assumed to be country specific due to for instance different educational systems or cultural conditions across countries. If this unobserved heterogeneity is not controlled for and the heterogeneity is correlated with some of the explanatory variables, it will lead to biased and inconsistent results.

The dataset moreover consists of data for 87 countries and 10 cohorts, giving us a total of 870 cross-section fixed effects for the FLFPR investigation and covers the years 1980 to 2010 in five-year intervals, t= 1980, 1985,...,2010.[11] The unobserved heterogeneity and the variability within cohorts are thus controlled for, making estimates unbiased and consistent. Moreover, we are controlling for time-fixed effects since there might be global effects correlated with our covariates and affecting our left-hand side variables. If this is not controlled for, our results may again be biased and this could also lead to cross-sectional dependence in the error term.

6.1. Model specification for FLFPR

The main extension to the existing literature made by us is that we have included an interaction term consisting of a globalization variable together with a measure of female

[11] As can be seen in the empirical results presented in section 8, missing values in practice reduce the number of cross-sections to less than 870 for some of the regressions.

education in some regressions. Formally, for the FLFPR, when investigating the individual effect of economic integration, the model specification we are looking at is:

$$FLFP_{ijt}/FPOP_{ijt} = FLFPR_{ijt} = G_{it}\theta + C_{it}\beta + u_{ijt} \quad (2)$$

When including an interaction term, the model specification looks as follows:

$$FLFPR_{ijt} = E_{ijt}G_{it}\theta + C_{it}\beta + u_{ijt} \quad (3)$$

G and C are *10N •T x m* matrices consisting of the *m* country-specific globalization and control variables respectively. Each column of G and C will contain 10 identical entries for each country, because of the non-cohort specific data. E is a *10N•T x k* matrix consisting of the *k* country- and cohort specific education covariables. The cohort specific variables are: (1) average years of education for women, (2) share of women with secondary education 1980 and (3) total share of women with secondary education, *k*=3. E together with G make up our interaction term. The error term, u, has the following structure:

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

where μ is the country-cohort fixed effect, γ the time fixed effect and ε an independently and identically distributed error-term.[12]

The regressions we aim to run including an interaction term can be exemplified as follows:

$$FLFPR_{ijt} = \beta_1(TRADE/GDP)_{it} + \beta_2(TRADE/GDP * AVG\ YRS\ EDU\ FOR\ WOMEN)_{ijt} + \beta_3 CONTROLS_{it} + u_{ijt} \quad (5)$$

When running these regressions, it should be noted that the globalization variable (trade/GDP in equation (5)) is part in both β_1 and β_2 and, multicollinearity is therefore a potential problem. Multicollinearity can affect our estimates by inflating standard errors, while the parameter estimates are left unbiased. The correlation between trade/GDP and the interaction

[12] The variance-covariance matrix for regression (1) in our empirical results is presented in Appendix C. For a further discussion about the error structure and the potential problems when using a hierarchical structure (the use of cohorts) see Cooray et al. (2012).

term consisting of trade/GDP and average years of education for women is, for instance 0.7366 and therefore low enough for the regression to be plausible to run. Additionally, it should be noted that it is often the case that an interaction term and its constituent variables have a high correlation in methodological specifications. However, this does not infer any problems for interpreting regression outputs as an interaction term describes a conditional relationship rather than a general relationship in an additive model (Friedrich, 1982). We additionally cannot exclude the potential problem of autocorrelated and/or heteroscedastic error terms in our model. We therefore conduct tests to find out if our error terms suffer from autocorrelation and heteroscedasticity. As we found both autocorrelation and heteroscedasticity in our main regressions, we conclude that it is necessary to use clustered robust standard errors throughout all regressions in this research in order to take care of these issues.[13]

6.2. Model specification for female employment shares

The main difference when investigating the effects of economic integration on the employment shares in agriculture, industry and service, is that we are not using age-cohort specific data. The specification now looks as follows:

$$FEMALE\ EMPLOYMENT\ SHARE_{it} = G_{it}\theta + C_{it}\beta + u_{it} \quad (6)$$

and when including the measure of education, E, as part of the interaction term, the specification looks as follows:

$$FEMALE\ EMPLOYMENT\ SHARE_{it} = E_{it}G_{it}\theta + C_{it}\beta + u_{it} \quad (7)$$

[13] Multicollinearity is a problem only if the correlation between two variables is 'too high'. Technically it is of concern if the error terms in a linear regression model are correlated or even dependent on one or several explanatory variables. In that case the estimates can be biased and unreliable. One potential solution here could be the use of instrumental variables. For further details about multicollinearity as well as heteroscedasticity and autocorrelation, see Verbeek (2012). Generally for our regressions, both with and without interaction term investigated throughout this research, the estimates might suffer from multicollinearity. An overview of additional correlation coefficients in this research can be found in Appendix C.

while the error term, u, has the following structure:

$$u_{it} = \mu_{ij} + \gamma_t + \varepsilon_{it} \quad (8)$$

where μ is the country fixed effect, γ the time fixed effect and ε an independently and identically distributed error-term.

The regressions for the female employment shares we aim to run, including an interaction term, can be exemplified as follows:

$$FEMALE\ EMPLOYMENT\ SHARE_{it} = \beta_1(TRADE/GDP)_{it} + \beta_2(TRADE/GDP * AVG\ YRS\ EDU\ FOR\ WOMEN\ 15+)_{it} + \beta_3 CONTROLS_{it} + u_{it}. \quad (9)$$

Finally, by investigating 87 developing countries in the described ways, we aim to investigate the above-mentioned relationships in a quantitative manner. This gives us the opportunity to understand the broad and general impact economic integration can have on female labor market outcomes, and the importance of female education in this relationship.

7. Descriptive statistics

In this section we present an overview of how our main variables have developed over time. The average development of trade/GDP together with the FLFPR as well as trade/GDP together with the female employment shares for the countries in our research are provided below.

Figure and chart 1 show the trend in FLFPR and trade/GDP across our countries between 1980 and 2010. There is a positive long-term pattern for the FLFPR between 1980 and 2010 and, while there is a larger increase in the earlier years, the FLFPR increases to a lesser extent in later years. Between 1980 and 2010 the increase is about 21 percentage points. Likewise the trend for trade/GDP is positive over time. Apart from the dip after 2005, the overall trend for this measure between 1980 and 2010 is positive.

Figure 1: Trade/GDP and FLFPR

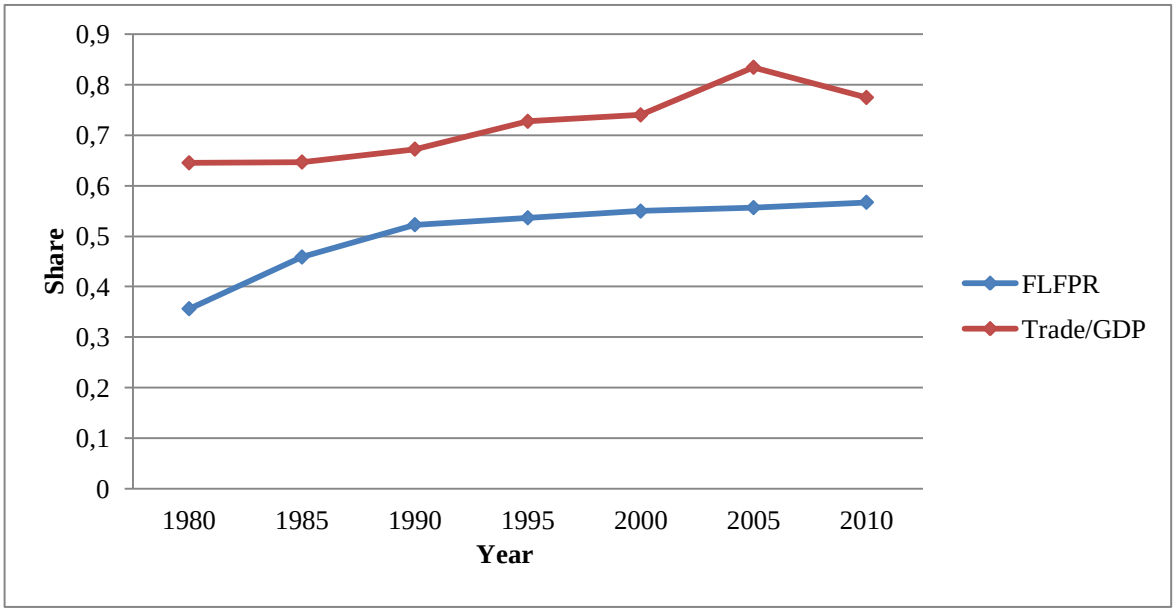

Chart 1: Statistics of trade/GDP and FLFPR

VARIABLES	Statistic	1980	1985	1990	1995	2000	2005	2010
FLFPR	Obs	72	271	870	870	870	870	870
	Mean	0.3562	0.4587	0.5227	0.5364	0.5496	0.5565	0.5671
	Std. Dev	0.2529	0.2455	0.2610	0.2553	0.2503	0.2496	0.2505
	Min	0.0106	0.032	0.0112	0.0129	0.0133	0.0085	0.009
	Max	0.8789	0.9640	0.9834	0.9784	0.9785	0.9777	0.9904
Trade/GDP	Obs	62	71	73	84	84	86	81
	Mean	0.6453	0.6470	0.6725	0.7276	0.7403	0.8347	0.7748
	Std. Dev	0.3409	0.3822	0.3904	0.3905	0.4098	0.4000	0.3186
	Min	0.0910	0.0911	0.0609	0.0291	0.0106	0.0031	0.3097
	Max	1.6212	1.7525	1.7100	2.2288	2.1757	2.1037	1.6256

In figure 2, 3 and 4 and chart 2 the trend for trade/GDP, together with the female employment shares is shown for the years 1980 - 2010. The trend in female employment shares is more heterogeneous than that of the FLFPR. The average female employment share in agriculture shows a small but overall negative pattern, particularly between 1980 and 1990 and after 2005. Regarding the average female employment share in industry, there seems to be an overall negative pattern as well, in particular after 1990. Finally, the average female employment share for the service sector shows an overall positive pattern. While the increase in service was rather modest between the years 1980 and 2005, it took off after 2005. Interesting is the

fact that the service sector takes up a considerable high share of the total female employment, representing between 50 and 60 percent.

Figure 2: Trade/GDP and female employment share in agriculture

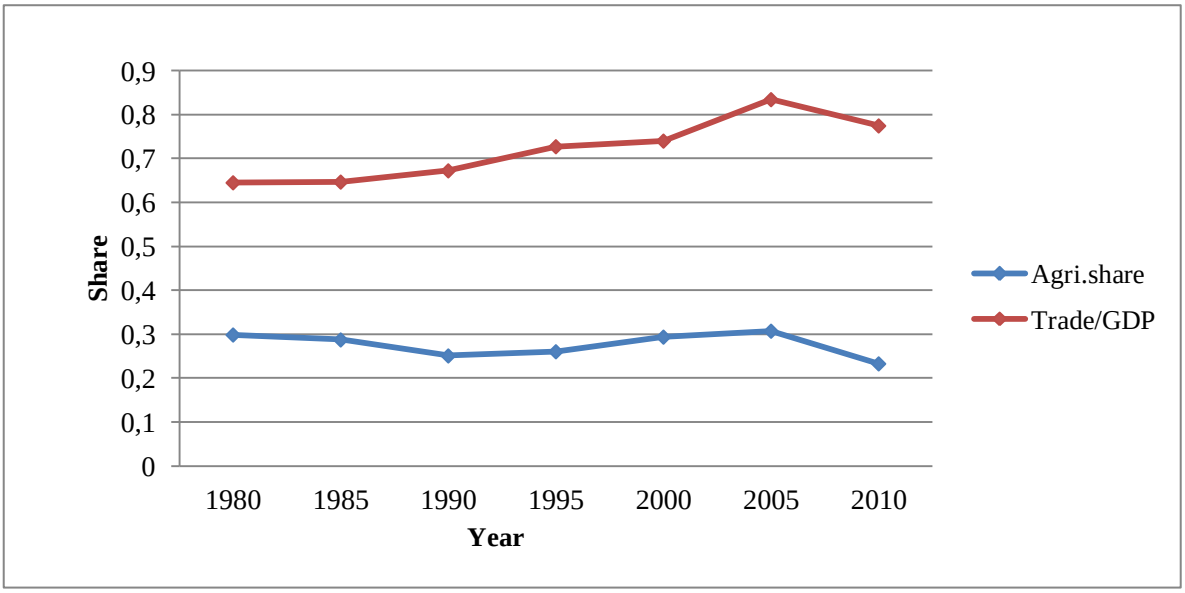

Figure 3: Trade/GDP and female employment share in industry

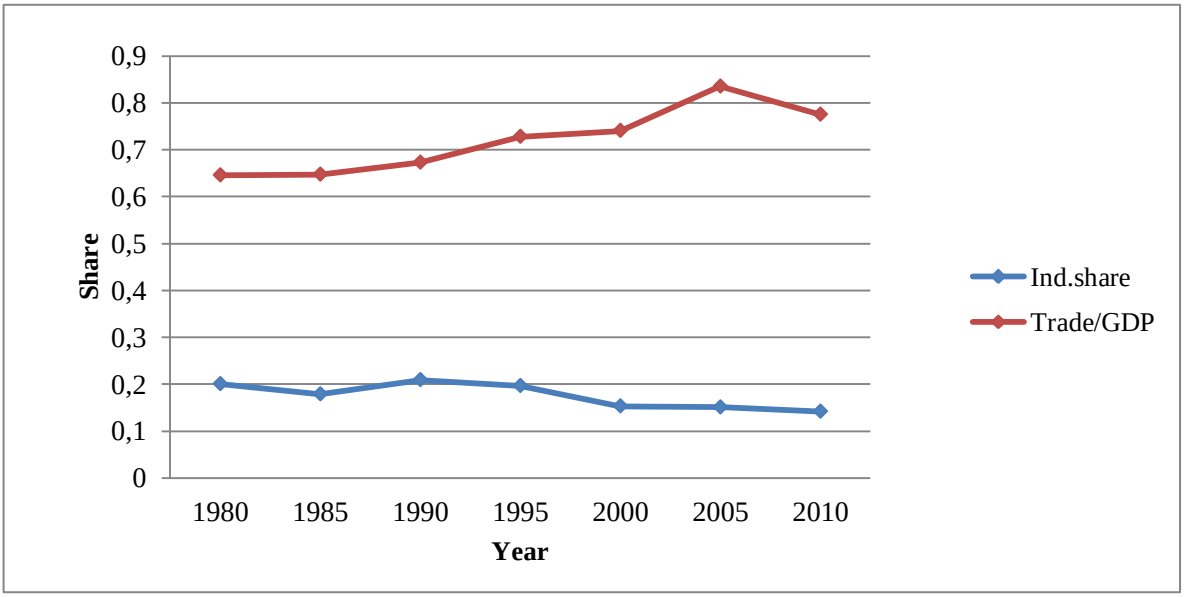

Figure 4: Trade/GDP and female employment share in service

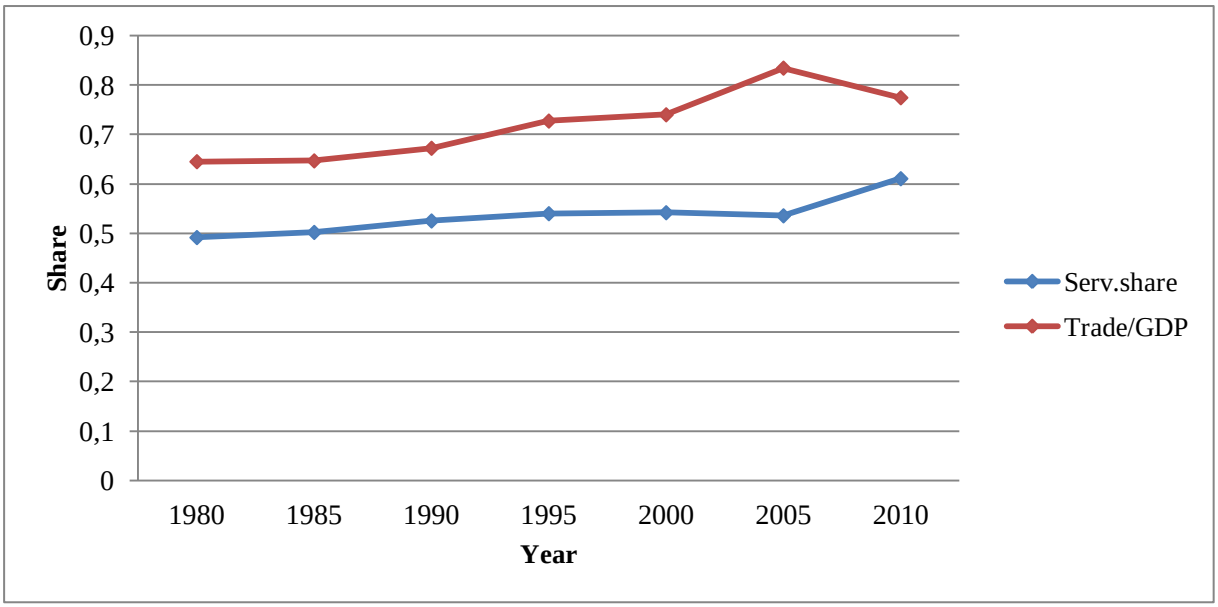

Chart 2: Statistics of trade/GDP and female employment shares

VARIABLES	Statistic	1980	1985	1990	1995	2000	2005	2010
Empl. Share Agriculture	Obs	13	15	23	29	37	40	37
	Mean	0.2988	0.2875	0.2510	0.2606	0.2939	0.3074	0.233
	Std. Dev	0.2310	0.2684	0.2653	0.2524	0.2576	0.2218	0.1880
	Min	0.005	0.005	0.002	0.004	0.002	0.02	0.01
	Max	0.741	0.79	0.758	0.893	0.796	0.789	0.709
Empl. Share Industry	Obs	13	15	23	29	37	40	37
	Mean	0.2003	0.1785	0.2090	0.1963	0.1529	0.1507	0.1416
	Std. Dev	0.1095	0.0727	0.1257	0.1053	0.0889	0.0689	0.0607
	Min	0.078	0.081	0.033	0.027	0.02	0.023	0.048
	Max	0.478	0.364	0.502	0.446	0.431	0.288	0.297
Empl. Share Service	Obs	13	15	23	29	37	40	37
	Mean	0.4918	0.5022	0.5253	0.5401	0.5421	0.5358	0.6109
	Std. Dev	0.2206	0.2671	0.2489	0.2249	0.2297	0.2132	0.1849
	Min	0.181	0.129	0.135	0.079	0.121	0.137	0.147
	Max	0.808	0.8430	0.88	0.856	0.892	0.867	0.897
Trade/GDP	Obs	62	71	73	84	84	86	81
	Mean	0.6453	0.6470	0.6725	0.7276	0.7403	0.8347	0.7748
	Std. Dev	0.3384	0.3797	0.3880	0.3929	0.4076	0.3979	0.3168
	Min	0.0910	0.0911	0.0609	0.0291	0.0106	0.0031	0.3097
	Max	1.6212	1.7525	1.7100	2.2288	2.1757	2.1037	1.6256

8. Empirical results

This section turns to the regression results from our empirical investigation. The interpretation of a certain coefficient in this section will be carried out by holding all other effects constant, the ceteris paribus condition. We begin this section by presenting the results from our main regressions in table 1 and 2 regarding the effects of economic integration on the FLFPR. Thereafter, we continue to table 3 and 4 where the effects on the employment shares are presented.

8.1. Empirical results for trade/GDP and FLFPR

Table 1: Regression results for trade/GDP and FLFPR

VARIABLES	(1) FLFPR	(2) FLFPR	(3) FLFPR	(4) FLFPR
Trade/GDP (-1)	-0.00989	-0.09872***	-0.01465	-0.01974
	(0.02127)	(0.03060)	(0.02276)	(0.02563)
Trade/GDP(-1)* Avg yrs of education		0.01260***		
		(0.00330)		
Trade/GDP(-1)* Share of women with secondary education 1980			0.02673	
			(0.05400)	
Trade/GDP(-1)* Total share of women with secondary education				0.02739
				(0.04008)
ln(GDP p.c.) (-1)	-0.91217***	-0.86741***	-0.91063***	-0.90968***
	(0.13799)	(0.13602)	(0.13776)	(0.13765)
ln(GDP p.c.)² (-1)	0.04603***	0.04296***	0.04595***	0.04586***
	(0.00869)	(0.00855)	(0.00868)	(0.00867)
Total fertility rate	-0.03596***	-0.02566***	-0.03452***	-0.03419***
	(0.00716)	(0.00757)	(0.00754)	(0.00761)
Agriculture value added	0.02271	0.01227	0.01971	0.01674
	(0.08785)	(0.08867)	(0.08855)	(0.08900)
Industry value added	0.36835***	0.37559***	0.36793***	0.36473***
	(0.09242)	(0.09292)	(0.09270)	(0.09268)
GDP p.c growth	-0.00106	-0.00072	-0.00103	-0.00100
	(0.00082)	(0.00083)	(0.00083)	(0.00082)
Political regime	0.00237**	0.00213*	0.00236**	0.00239**
	(0.00120)	(0.00118)	(0.00130)	(0.00120)
ln(total population)	-0.02121***	-0.02014***	-0.02088***	-0.02068***
	(0.00648)	(0.00645)	(0.00654)	(0.00658)
Constant	5.2065***	5.0005***	5.1887***	5.1852***
	(0.58631)	(0.58026)	(0.58467)	(0.58546)
Year dummies	Yes	Yes	Yes	Yes
Number of observations	3801	3772	3801	3801
Number of cross-sections	770	770	770	770
R-square	0.2585	0.2696	0.2584	0.2592

Fixed effects regression (time fixed, country-cohort fixed) taking every 5th year. Cluster robust standard error in parentheses.
***, **, * represent the statistical significance at the 1%, 5% and 10% level, respectively.

In regression (1) in table 1, FLFPR is explained by trade/GDP and several control variables. This is important to investigate, as it will be an indication of the economic relationship between trade and FLFPR without any impact from education. In addition, it will relate to the hypothesis stated in section 4. As can be seen from the reported coefficient in regression (1), the impact of trade on FLFPR is negative and not statistically significant.[14] This rather surprising "zero-effect" implies that there is no evidence for an economic relationship between this globalization variable and FLFPR. Moreover, this result is not in line with our hypothesis, which states that economic integration increases the FLFPR. Nevertheless, it does correspond to the findings of Cooray et al. (2012), regarding the size, sign and significance of the variable, as they also find a zero effect. All the control variables in regression (1) are also significant at either 1% or 5%, except for agriculture value added and GDP per capita growth, which are not statistically significant. The comparison and discrepancy between the results from regression (1) to the actual increase in FLFPR and trade/GDP ratio that are presented in figure and chart 1 is interesting. According to our regression results, a 10 percentage point increase in the trade/GDP ratio (compared to an actual increase of roughly 12 percentage points over 30 years) leads to a decrease of 0.098 percentage points in FLFPR, while the actual FLFPR increased by roughly 20 percentage points over 30 years. The effect we find of trade/GDP on FLFPR is therefore both negative and very small in economic terms, opposing the actual development in figure and chart 1. Moreover, the effect is insignificant and indications about the economic impact of it on FLFPR are therefore of little importance.

Continuing to regression (2), (3) and (4) in table 1, we present the results for the regressions that include one of our educational measures in each regression respectively. The regressions are the same as regression (1) but include an interaction term consisting of trade/GDP and average years of education for women, share of women with secondary education in 1980 and total share of women with secondary education respectively. The impact of the mere trade/GDP term on FLFPR in regression (2) is strongly significant compared to being insignificant in regression (1). The fact that it is significant in regression (2) could be explained by an existing relationship between trade and education seen in the coefficient of the interaction term, and that trade/GDP is picking up some of the effects from both trade and education in regression (1). Hence, education could be an omitted variable in regression (1). The economic implication of the individual trade coefficient in regression (2) is that when the

[14] We refer to 1% significance as 'strongly significant', 10% significance as 'weakly significant' and 5% significance as 'statistical significant'.

trade/GDP ratio increases by one percentage point and average years of education for women is zero, the FLFPR decreases by 0.099 percentage points. Yet, the scenario of having zero average years of education is unlikely and this coefficient should therefore not be given too much importance.[15] The impact from the mere trade/GDP coefficient in regression (3) and (4) is negative but insignificant thus implying a zero effect on the FLFPR.

Continuing to the actual interaction terms in regression (2), (3) and (4), these illustrate the importance of different levels of various educational measures in the relationship between economic integration and FLFPR. As can be seen in these regressions, only the coefficient of the interaction term in regression (2) proves the existence of an economic relationship between trade/GDP and FLFPR. Thus, only when average years of education for women differ across countries the effect of economic integration on FLFPR is significant. The coefficient is positive and strongly significant and the economic interpretation is that when average years of education for women increases by one year the effect of trade on FLFPR goes up by 1.3 percentage points. When trade increases, developing countries with higher average years of education for women will experience a higher FLFPR than developing countries with lower average years of education for women. Average years of education for women therefore becomes more important for the FLFPR as a country experiences increased economic integration. The economic size of the interaction term in regression (2) is slightly larger in absolute terms than the mere trade/GDP coefficient in this regression. However, it is still rather small and has an opposite sign. We can also see that when this measure of education is included in the regressions, the relationship between economic integration and FLFPR is in line with our hypothesis. In this case trade has a positive impact on FLFPR and this relationship *only* appears when average years of education for women is included in the regression.

Although the interaction term in both (3) and (4) is positive, it is not significant. Accordingly, it appears that there is no economic relationship between trade and FLFPR when the educational measures for secondary education differ across countries. The interaction terms for these regressions thus show a zero effect on FLFPR.

[15] In our data set the only country that has zero for any measure of education is Afghanistan for the share of women with secondary education in 1980 for the age cohorts 55-59 and 60-64.

The control variables in regression (2) in table 1 may stand as an example of how to interpret the controls in this and the remaining regressions. As can be seen, the controls are mostly strongly significant. Once more agriculture value added and GDP per capita growth are insignificant, while the coefficient of political regime only is weakly significant. The economic implication of the GDP per capita coefficient is that when GDP per capita increases by one percentage point, the FLFPR decreases by 0.867 percentage points. The higher the economic development a country experiences, the lower will the FLFPR be according to this result. The coefficient of the squared GDP per capita is positive and strongly significant, implying that a non-linear relationship between the GDP per capita and the FLFPR exists. The coefficient for fertility rate implies that with a one-percentage point increase, the FLFPR will decrease by 0.026 percentage points. This seems plausible as countries where women give birth to more children, the FLFPR decreases more than in countries where women give birth to fewer children.

When looking at the impact of agriculture and industry value added to GDP, the following can be said. Firstly, we can see that there is a zero effect of agriculture value added on the FLFPR. Secondly, there will be a positive effect on FLFPR in countries that increase their industry sector. A one percentage point increase in industry value added to GDP will lead to a 0.376 percentage point increase in the FLFPR. For the GDP per capita growth the coefficient is not statistically significant implying a zero effect on the FLFPR. The political regime coefficient is positive and weakly significant implying that when a country becomes more democratic, the effect on FLFPR will be positive. In this case, when the Polity IV index increases by one index point, the FLFPR will increase by 0.002 percentage points. Finally, the total population coefficient implies that as the population increases by one percentage point the FLFPR will decrease by 0.020 percentage points. This indicates that, as countries become more populated, their FLFPR decreases.

The control variables in regression (3) and (4), their overall size, sign and significance does not change in any particular way as can be seen by comparing them with those in regression (1) and (2).

Overall, table 1 shows how trade/GDP, and an interaction between trade/GDP and different educational measures, affects the FLFPR. Only in regression (2) a statistical significant impact coming from both trade/GDP individually and the interaction term can be seen. This

implies that only for average years of education for women we are able to show an economic relationship between trade and FLFPR. Thus, only this measure of education is of importance for the relationship between trade and FLFPR. For the share of women with secondary education in 1980 and the total share of women with secondary education we are unable to draw conclusions about an economic relationship.

8.2. Empirical results for export/GDP, import/GDP and FLFPR

Table 2: Regression results for export/GDP, import/GDP and FLFPR

VARIABLES	(1) FLFPR	(2) FLFPR	(3) FLFPR	(4) FLFPR
Export/GDP (-1)	0.21069***	0.00071	0.12524**	0.10610
	(0.05056)	(0.09822)	(0.06277)	(0.07159)
Import/GDP (-1)	-0.22752***	-0.20815**	-0.17546***	-0.16273***
	(0.04702)	(0.08103)	(0.05084)	(0.05520)
Export/GDP(-1)* Avg yrs of education		0.03179**		
		(0.01472)		
Import/GDP(-1)* Avg yrs of education		-0.00531		
		(0.01274)		
Export/GDP(-1)* Share of women with secondary education 1980			0.59584**	
			(0.29163)	
Import/GDP(-1)* Share of women with secondary education 1980			-0.47624**	
			(0.22412)	
Export/GDP(-1)* Total share of women with secondary education				0.38250*
				(0.19538)
Import/GDP(-1)* Total share of women with secondary education				-0.30103*
				(0.15713)
ln(GDP p.c.) (-1)	-0.95837***	-0.86539***	-0.90017***	-0.89075***
	(0.13928)	(0.14475)	(0.14007)	(0.14289)
ln(GDP p.c.)² (-1)	0.04675***	0.04063***	0.04305***	0.04240***
	(0.00875)	(0.00909)	(0.00878)	(0.00897)
Total fertility rate	-0.04290***	-0.03423***	-0.04381***	-0.04419***
	(0.00723)	(0.00779)	(0.00772(	(0.00779)
Agriculture value added	-0.08571	-0.09043	-0.06425	-0.07647
	(0.09116)	(0.09145)	(0.09199)	(0.09171)
Industry value added	0.31324***	0.33398***	0.33142***	0.31038***
	(0.08853)	(0.08824)	(0.08992)	(0.08842)
GDP p.c growth	-0.00004	-0.000004	-0.00008	-0.00021
	(0.00083)	(0.00083)	(0.00082)	(0.00082)
Political regime	0.00249**	0.00226**	0.00252**	0.00255**
	(0.00118)	(0.00115)	(0.00117)	(0.00117)
ln(total population)	-0.02934***	-0.02892***	-0.03079***	-0.03051***
	(0.00660)	(0.00665)	(0.00669)	(0.00672)
Constant	5.73717***	5.35484***	5.5328***	5.50610***
	(0.59827)	(0.61377)	(0.60006)	(0.60998)
Year dummies	Yes	Yes	Yes	Yes
Number of observations	3772	3772	3801	3801
Number of cross-sections	770	770	770	770
R-square	0.2676	0.2786	0.2692	0.2690

Fixed effects regression (time fixed, country-cohort fixed) taking every 5th year. Cluster robust standard error in parentheses.
***, **, * represent the statistical significance at the 1%, 5% and 10% level, respectively.

In table 2 we start by looking at the impact of export/GDP and import/GDP on FLFPR in regression (1) and then continue by including education in the interaction term in regression (2), (3) and (4), similarly as in table 1. This enables us to investigate these effects when trade is disaggregated into exports and imports. In regression (1), the coefficients of exports and imports are strongly significant, and while exports have a positive impact, imports have a negative impact on FLFPR. Since the trade coefficient in regression (1) in table 1 is insignificant, the results from regression (1) in table 2 indicate that when disaggregating trade into exports and imports, these disaggregated measures have a significant impact on the FLFPR and therefore ought to catch more specific effects of trade. Furthermore, the results from regression (1) in table 2 imply that the hypothesis about more economic integration having a positive impact on FLFPR coincides with our findings for the export term. More exports increases the FLFPR implying that the theoretical positive effect of economic integration on FLFPR seems to go through exports. Imports on the other hand reduce the FLFPR, which is not entirely unexpected if we consider imports competing with the domestic production where women are employed. The absolute size of the effects of imports and exports respectively are also larger than that of the individual trade parameter in table 1.

Regression (2), (3) and (4) in table 2 are the same as regression (1) but here, every regression includes two interaction terms consisting of average years of education for women, share of women with secondary education in 1980, and total share of women with secondary education together with exports and imports respectively. In all these regressions, the coefficients of the mere export/GDP variables are positive. However, only in regression (3) the coefficient is statistically significant. The coefficients of the mere import variable are all negative while being statistically significant for regression (2) and strongly significant for (3) and (4). These coefficients show the impact, from export and import on FLFPR for cases when the educational measures are zero. However, once again, this is not a very likely scenario. Comparing the results from table 2 to those in table 1, one can see that by disaggregating trade into exports and imports, the export interaction coefficient is significant throughout all regressions and the import interaction term is significant in regression (3) and (4). The trade interaction coefficient in table 1 is significant only in the case of average years of education for women (regression (2)). This indicates that the female educational measures are important when looking at the effect of economic integration on FLFPR and that this effect is seen in particular when disaggregating trade into exports and imports.

Regarding the interaction terms in table 2 more specifically, the export interaction coefficient is positive and statistically significant in regression (2) and (3), while for regression (4) it is positive and weakly significant. Overall the significance of the export interaction terms shows that there is a positive economic relationship between export/GDP and FLFPR when education is included. The effect of exports increases FLFPR in countries where women's education is higher. For instance in regression (2), when there is a one year increase in average years of education for women, the effect of exports increases the FLFPR by 3.2 percentage points. The size is about 2.5 times larger than that for the trade interaction term in regression (2) in table 1. The export interaction coefficients show that education plays an important economic role for women on labor markets in developing countries. It also confirms that investigating the export part of trade is relevant. Furthermore, all export interaction terms are in accordance with our hypothesis in section 4, as exports have a positive impact on FLFPR when it is interacted with education.

For the import interaction terms the coefficients are all negative. However, only in regression (3) and (4) they are statistically significant and weakly significant respectively. This indicates that there is a negative economic relationship between import/GDP and FLFPR when the two educational measures for secondary schooling are included. The effect of imports decreases FLFPR in countries where women's education is higher. Exemplifying with regression (4); if the total share of women with secondary education would increase by one unit, imports would decrease the FLFPR by 30 percentage points, a rather large economic effect. The import interaction terms show that certain types of female education are important for the relationship between imports and FLFPR. This also confirms the relevance of disaggregating trade into its components. Hence, for some measures of education, imports work as a channel affecting the FLFPR. Nevertheless, in the opposite direction than exports and thereby also oppose our hypothesis.

The control variables in the eight regressions of table 1 and 2 are all rather similar to each other regarding their sign, size and significance. Two coefficients, agriculture value added and GDP per capita growth, are insignificant throughout all regressions and thereby stand out. Keeping in mind that GDP per capita growth is a proxy for the unemployment rate, its insignificance could be related to the fact that GDP per capita growth is unable to catch these effects. This raises the question regarding the model specification due to the risk of GDP per capita growth and agricultural value added being irrelevant variables. Estimated coefficients

in a specification that includes irrelevant variables have a higher variance and are less reliable than if the correct specification is used. However, while omitted variables can lead to bias, including irrelevant variables is fortunately less of an issue.[16] Moreover, agriculture value added to GDP seems to be of no economic relevance for the relationship between economic integration and FLFPR. Another variable that can be questioned is the GDP per capita coefficient. It is negative and strongly significant, which is surprising. Although we have not stated any theoretical argument for this relationship, the size and sign of this coefficient is a bit surprising, stating a rather large negative effect. It would seem more plausible for it to have a positive impact on FLFPR. Yet, by remembering the discussion about the U-hypothesis in section 3.1, it is empirically not impossible that economic development under a limited period of time has a negative impact on FLFPR.

8.3. Empirical results for trade/GDP and female employment shares

We now turn to the empirical results from the investigation of how the female employment shares in three sectors of the economy are affected by economic integration. We will look at both the individual effects of economic integration as well as how this relationship is affected by the level of average years of education for women of age 15 and more. While the results in the previous section give an overview of the overall effects on the FLFPR in an economy, the results in this section aim to illustrate the female employment in specific sectors of a developing country.

[16] Further econometric explanations regarding these issues can be found in Verbeek (2012).

Table 3: Regression results for trade/GDP and female employment shares

VARIABLES	(1) Female employment share in agriculture	(2) Female employment share in agriculture	(3) Female employment share in industry	(4) Female employment share in industry	(5) Female employment share in service	(6) Female employment share in service
Trade/GDP (-1)	0.03533	0.22791	0.02774**	0.17154**	-0.05512	-0.33382*
	(0.04373)	(0.14585)	(0.00838)	(0.04772)	(0.04644)	(0.16333)
Trade/GDP(-1)* Avg yrs of education for women 15+		-0.02331		-0.01743**		0.03379*
		(0.01349)		(0.00538)		(0.01514)
ln(GDP p.c.) (-1)	-0.19198***	-0.17787***	0.01309	0.02374	0.19389***	0.17331***
	(0.02667)	(0.02833)	(0.01087)	(0.01330)	(0.01435)	(0.01070)
Total fertility rate	-0.02398*	-0.03254***	-0.01590**	-0.02211**	0.04180***	0.05394***
	(0.01058)	(0.00681)	(0.00561)	(0.00608)	(0.01046)	(0.01017)
ln(total population)	0.06790***	0.06488***	-0.00319	-0.00505	-0.06308***	-0.05912***
	(0.01061)	(0.00991)	(0.00492)	(0.00492)	(0.00686)	(0.00652)
Constant	0.81424	0.75319	0.13563	0.08268	-0.12398	-0.02772
	(0.36373)	(0.38153)	(0.16680)	(0.16389)	(0.20390)	(0.20213)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	165	163	165	163	165	163
Number of cross-sections	6	6	6	6	6	6
R-square	0.4398	0.4495	0.0640	0.1396	0.4540	0.4907

Fixed effects regression (time fixed) taking every 5th year. Cluster robust standard error in parentheses.
***, **, * represent the statistical significance at the 1%, 5% and 10% level, respectively.

Table 4: Regression results for export/GDP, import/GDP and female employment shares

VARIABLES	(1) Female employment share in agriculture	(2) Female employment share in agriculture	(3) Female employment share in industry	(4) Female employment share in industry	(5) Female employment share in service	(6) Female employment share in service
Export/GDP (-1)	0.07146	1.11107***	0.02709	0.04898	-0.08678	-1.09236**
	(0.21721)	(0.20629)	(0.03500)	(0.20090)	(0.19886)	(0.35488)
Import/GDP (-1)	-0.00698	-0.52013	0.02850	0.27400	-0.01803	0.30919
	(0.33022)	(0.44796)	(0.03373)	(0.17145)	(0.30300)	(0.58792)
Export/GDP(-1)*Avg yrs of education for women 15+		-0.14132***		-0.00051		0.13493**
		(0.02395)		(0.02339)		(0.03744)
Import/GDP(-1)*Avg yrs of education for women 15+		0.08076*		-0.03235		-0.05540
		(0.03290)		(0.02015)		(0.05355)
ln(GDP p.c.) (-1)	-0.19580***	-0.17516**	0.01316	0.02292	0.19724***	0.17116***
	(0.04422)	(0.04647)	(0.01123)	(0.01345)	(0.02675)	(0.02695)
Total fertility rate	-0.02501	-0.02243	-0.01588**	-0.02368**	0.04270**	0.04532**
	(0.01453)	(0.01266)	(0.00530)	(0.00605)	(0.01354)	(0.01271)
ln(total population)	0.06654**	0.06746***	-0.00317	-0.00558	-0.06189***	-0.06128***
	(0.01819)	(0.01661)	(0.00474)	(0.00503)	(0.01405)	(0.01225)
Constant	0.87594	0.64817	0.13453	0.10467	-0.17805	0.05951
	(0.71967)	(0.72291)	(0.16384)	(0.16752)	(0.51680)	(0.49189)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	165	163	165	163	165	163
Number of cross-sections	6	6	6	6	6	6
R-square	0.4398	0.4599	0.0639	0.1395	0.4544	0.5018

Fixed effects regression (time fixe) taking every 5th year. Cluster robust standard error in parentheses.
***, **, * represent the statistical significance at the 1%, 5% and 10% level, respectively.

In regression (1), (3) and (5) in table 3, we look at the impact of trade/GDP on the female employment share in the agriculture, industry and service sector. When looking at these regressions, the effect of trade/GDP on the female employment shares is significant only for the industry sector. This indicates that only in the industry sector an economic relationship between trade and the female employment share can be shown. Moreover, this relationship is positive. Hence, the results for the industry sector are as expected and in line with the theoretical discussion in section 4, which states that more trade in a developing country will have a positive impact on the female employment in the industry sector.

Nonetheless, the zero effect for the agricultural sector is not as theoretically expected. As this sector also is expected to be intensive in low-skilled labor, the effect of trade on the agricultural employment share should be positive and significant as well. This is not the case. Furthermore, only the significant findings in regression (3) are plausible to compare to the descriptive statistics of the actual development of the female employment shares in section 7. While the actual trade/GDP increased over the 30-year period investigated, the actual employment share in industry experienced an overall decrease. As seen in regression (3), our findings are not in line with this actual trend since the trade/GDP coefficient is positive, implying that the industry employment share increases with more trade.

Regarding the control variables in regression (1), (3) and (5), the GDP per capita coefficient is negative for the agricultural sector, positive for the service sector while being strongly significant for both. A higher economic development for a developing country decreases the female employment share in the agricultural sector. This can be the case as a developing economy moves away from an agrarian society when it develops. The service sector is positively affected by economic development and is likely to absorb some of the female labor coming from the agricultural sector.

For all sectors we find a significant coefficient for the fertility rate. It is negative for the agriculture and industry sector, implying that as total births per women increases, the female employment share in these sectors will decrease. Conversely, it is positive for the service sector indicating that as total births per women increase; the female employment share in the service sector also increases. This could be explained by more job opportunities for women due to, for instance, childcare, which is needed when the number of children increases. The coefficient of total population is positive and strongly significant for agriculture but negative

and strongly significant for service. In more populous countries, the female employment share in agriculture increases while it decreases in service.

Continuing to regression (2), (4) and (6), we analyze the effect of trade/GDP on the employment shares when the female educational measure differs across countries by including an interaction term in the regressions. It can be seen that for all three sectors the mere trade/GDP coefficient increases in absolute size compared to regression (1), (3) and (5). Nevertheless, only for the industry and service sector significant trade/GDP coefficients are found. The interpretation of the mere trade/GDP coefficients in regression (2), (4) and (6) should however not be given too much consideration since it only applies to countries where the level of the educational measure is zero. Instead we concentrate on the term where trade/GDP is interacted with our measure of education.

A significant coefficient is obtained for the interaction term in the industry and service sector. The coefficient is negative and statistically significant for industry, while positive and weakly significant for service. When average years of education for women of age 15 and more increases with one year, the employment share of women in the industry sector decreases with 1.7 percentage points while it increases with 3.4 percentage points in the service sector. These results imply that average years of education for women of age 15 and more has an effect on the impact of trade/GDP on the female employment share in industry and service. This measure of education therefore is of importance in these cases. Moreover, this effect is larger in absolute terms for the service than the industry sector. According to the theoretical discussion in section 4, in the rather low-skilled agriculture and industry sector, economic integration should increase the employment share in these sectors. However this effect cannot be seen in any of our results for the interaction terms, as there is a zero effect in the agriculture sector and a negative effect for the industry sector. Finally, the control variables in regression (2), (4) and (6) do not change in any particular way regarding their sign, size and significance compared to regression (1), (3) and (5).

8.4. Empirical results for export/GDP, import/GDP and female employment shares

To gain more insight into the effects of trade flows, we investigate the same regressions in table 4, as we did in table 3. This time however, as in the case of the FLFPR, we disaggregate trade/GDP into export/GDP and import/GDP.

When regressing exports and imports together with controls on the female employment share in various sectors, we get no significant results for the mere globalization variables in regression (1), (3) and (5). These insignificant results are surprising, as the disaggregation should catch more specific effects of trade. In the case of the FLFPR we were able to show a significant effect from exports and imports when disaggregating the trade variable in table 2. The insignificance of the export and import coefficients in table 4 also makes it unfeasible to relate the findings from regression (1), (3) and (5) in any meaningful way to the theoretical discussion of section 4.

In regression (2), (4) and (6) in table 4, where the interaction terms are included, the mere export/GDP parameters become strongly and statistically significant for the agriculture and service sector respectively. The mere export coefficient for industry in regression (4) is however insignificant. While the effect is positive for agriculture, it is negative for the service sector, and the effect is surprisingly big in absolute size. The parameter is also similar between them. Thus, when including education in the regressions, the mere export coefficient becomes significant in regression (2) and (6) compared to (1) and (5). This could indicate that in regression (1) and (5), the coefficient of exports picks up the effects from average years of education for women of age 15 and more. This measure of education can hence be seen as an omitted variable for these regressions and this is ‘taken care of’ when this measure of education is included.

The mere import/GDP coefficients are insignificant throughout all three regressions, (2), (4) and (6). Again, in regressions where interaction terms are included, these individual coefficients of export and import show the effect on female employment shares when the education measure is zero and are therefore economically not very important coefficients.

Regarding the actual interaction terms in regression (2), (4) and (6), the effect of the export interaction term on the female employment share in the agriculture and service sector is

strongly and statistically significant respectively. The export interaction term for the industrial sector is insignificant. This indicates that average years of education for women of age 15 and more affects the impact of exports on the female employment share in agriculture and service. Hence, there exists a relationship between these variables. On the contrary, no such relationship exists for the industry sector. While the coefficient of the export interaction term is negative for the agriculture sector, it is positive for the service sector. Hence, with higher female education, export decreases the female employment share in agriculture but increases the female employment share in service. For instance, when average years of education for women increases by one year, the effect of exports decreases the female employment share with 14.1 percentage points in agriculture and increases with 13.5 percentage points in service. This illustrates that both effects are rather large in economic terms.

On the other hand, the import interaction coefficient is only significant for agriculture, implying that in industry and service there is a zero effect of imports on female employment shares when the level of female education differs across countries. Overall, the interaction terms show that if there is an effect of economic integration on the employment shares, this effect mainly goes through exports. Therefore, exports, in some cases, are a channel through which education has an effect on the female employment shares in the three sectors analyzed by us. As for the control variables, these do not change in any particular way in either sign, size or significance in table 4 compared to table 3.

Due to the drawbacks with generally low significance, the results in table 4 are somewhat difficult to investigate any further. The lack of theoretical and previous empirical implications about the effects of exports and imports on female labor market outcomes in various sectors also obstruct this. Nonetheless, we are able to show that there *is* an effect of female education through, in particular, exports on the female employment shares in the agriculture and service sector in some cases. However, these findings are not in line with what we expected for the agriculture and industry sector in section 4.

8.5. Robustness

Coming up with a robust model that is able to determine the relationship between the female labor market outcomes, and our main explanatory variables, is not the goal of this study.

Instead we are investigating *what* the effects of economic integration on female labor market outcomes are and *how* female education affects this relationship. Nevertheless, it is interesting to investigate the robustness of our findings. One option is to test for a different functional form of the model. We run a logarithmic specification for chosen regressions, corresponding to regression (1) and (2) in table 1 and 2 in order to see if any large changes occur to our results compared to when using our linear version. The results for the logarithmic model can be found in appendix B. In general, the coefficients in the logarithmic regressions are somewhat larger in absolute size, while the significance is similar to those in our linear regressions. The logarithmic outputs are therefore qualitatively similar to those in the linear specification used by us in this paper.

The point of using a logarithmic model is that the covariables are able to interact with each other and that the result is not forced to be linear. Furthermore, interpreting a logarithmic model does not impose any additional difficulties. This is so, since changes in a logarithmic explanatory variable can be interpreted as an elasticity of FLFPR, and when not being logarithmic, as a percentage change in the FLFPR. With this, and the outputs of the logarithmic specification in mind, nevertheless leaves us to conclude that our linear specification is reasonable.

It additionally seems plausible to check the robustness of our specifications by dropping individual control variables for the regressions in table 1 - 4 in order to find out if our findings change in any particular way (tests are not reported). When performing these tests for our main regressions our overall findings do not change in any relevant way. Significance levels do change when dropping certain individual variables but these changes are negligible. Moreover, coefficients remain very similar in size and the sign likewise remains the same.

While conducting this study we were aware of the potential problems regarding multicollinearity, endogeneity and other issues. We are also aware of the potential issue of bias regarding our estimates due to omitted variables or measurement problems. There is for instance the possibility of upward bias in our coefficients if an included variable is positively correlated with an omitted variable. Likewise, a downward bias can occur when an omitted variable is negatively correlated with an included variable. However, we are unable to make any indication about the correlation between included and potentially omitted variables as earlier empirical work indicates that the variables we include in the regressions are of most

relevance. As we are confident of having data that does not suffer from any systematic measurement problems, biased estimates due to this should also be a negligible problem.

The potential problem of omitted and irrelevant variables also has to be considered when discussing R-square values, since the goodness of fit of a model also depends on what variables are included. Regarding the R-square values for our regressions, for table 1 and 2 these lie at approximately 25 percent and in table 3 and 4 they are generally at approximately 40 - 50 percent. This implies that for table 1 and 2, 25 percent of the variation in FLFPR can be explained by variables included in the model. The same argument holds for table 3 and 4, where 40-50 percent of the variation in the female employment shares can be explained by the included variables. Two R-square values worth mentioning are the values for regression (3) and (4) in table 3 and 4, where economic integration is regressed on the female employment share in the industry sector. Here, the R-square value is rather low - at about 6.4 percent and 14 percent - indicating that the goodness of fit of our model is low in these regressions. Yet, realizing that almost all coefficients in regression (3) and (4) are insignificant, this low R-square is not too surprising.

The R-square measure is an indicator of how well the independent variables can explain the variation in FLFPR and female employment shares. However, it should be remembered that this measure is generally not able to give an absolute benchmark of the goodness of fit of a model. Typically, the R-square is an aspect in estimation results on which one should not put too much emphasis.

9. Discussion

Our results provide several insights about the effects of globalization on female labor market outcomes in developing countries. In the case of FLFPR, no significant effect of trade on FLFPR was found when education was excluded from the regression, while many other studies in this field have found a positive and significant relationship (e.g. Aguayo-Tellez et al., 2013; Bussmann, 2009; Pradhan, 2006). Nonetheless, this finding by us is in line with the results by Cooray et al. (2012), and could thus depend on the setup of the method. Moreover, there was a positive and significant effect of trade on FLFPR when average years of education for women was interacted with trade. On the contrary, there was a zero effect, and thus no

economic relationship, between trade and FLFPR when the share of women with secondary education in 1980 and the total share of women with secondary education were interacted with trade. These measures of secondary education were therefore unable to make the relationship between trade and FLFPR appear. A disaggregation of trade into exports and imports further showed that these globalization measures had an individual significant impact on FLFPR, as well as that this impact was still present when education was included. This primarily shows the importance of disaggregating trade into its components.

Those results indicating that economic integration had a negative impact on the FLFPR do not necessarily indicate that economic integration makes situations worse for women. The decrease in the labor force could be explained by a higher household income, making it more attractive for women to stay at home. It could also imply that women chose to obtain an education instead. Indeed, Bussmann (2009) finds some evidence that educational attainment in primary and secondary schooling increases with increased trade/GDP, illustrating that women choose education before joining the labor force. This reasoning indicates that income and substitution effects are at work, affecting women's choices.

Our findings for the female employment share were in some case in line with the theoretical discussion, as certain of our results showed that more economic integration had a positive effect on the female employment share in agriculture and industry. They also correspond to the findings by Gaddis and Klasen (2011), in the way that they imply that different sectoral structures of the economy account for different outcomes in the female employment. In several cases we also found an effect of economic integration on female employment shares when our education measure was interacted with the globalization variable. However, the number of observations in the investigation of the female employment shares was reduced compared to the investigation of the FLFPR. Keeping in mind that our investigation includes 87 countries for seven different time points we only had between 163 and 165 observations in the regressions in table 3 and 4. This had a severe impact on the statistical significance of our estimates. For instance, the regressions in table 4 for female employment share in industry both with and without education had only one significant coefficient respectively, which was the total fertility rate. Thus, our findings for the female employment shares were more mixed.

Since we used interaction terms in some of our regressions, we obtained the indirect effects of female education on female labor market outcomes. One obvious option and addition to our

study would have been to include our educational measures as control variables to see their individual direct effects on female labor market outcomes. Yet, our aim was not to investigate this direct effect but rather the indirect effect of how female education affects the impact of economic integration on female labor market outcomes. In most cases, when including the interaction term in the regression compared to when not, the globalization variable either remained significant or moved from being insignificant to significant. Thus, including education in the regressions in the way we have done seems to be of importance for the model specification. Moreover, it further enlightened the relationship between economic integration and female labor market outcomes.

Regarding the globalization variables used in this study, these are well known and based on previous empirical findings. Nevertheless, our analysis could be extended by, for instance, including FDI as another measure of economic integration (Bussmann, 2009; Cooray et al., 2012; Gray et al., 2006; Meyer, 2006), or the use of certain trade policies as proxies for the exposure to global flows of capital, goods and services (Aguayo-Tellez et al., 2013).

As previously mentioned, the female educational measures included in this paper are not exhaustive. For instance, it should be noted that the share of women with secondary education in 1980 is a measure of rather historical interest and its contribution to current or future policy knowledge is limited. The impact of education on the relationship between economic integration and female labor market outcomes could be extended in future research by including many other measures of education. Examples are the share of women with primary education and the share of women with a university degree. However, due to both space limitations and data availability, restrictions on the use of certain educational measures had to be made in this research.

The control variables included in the regressions are also based on previous empirical research, but we are aware of the many other potential effects that are not caught by the variables included in our regressions. It is likely that for instance, religion and culture, as well as membership in the European Union, the World Trade Organization or other organizations, could have an impact on female labor market outcomes in developing countries. However, the controls we included in our regressions are the most relevant according to research conducted by scholars in this field. Moreover, there are difficulties of how to measure and catch the effects of variables like religion and culture, thereby obstructing their use.

The method applied in this study is rather new in the literature as it enabled us to consider age-cohort specific effects when looking at the FLFPR. Since the effect of economic integration is likely to have different effects across different age-cohorts within a country, the method catches this unobserved heterogeneity leading to unbiased and consistent estimates. Using age-cohorts also means that the number of observations naturally increases compared to when not using cohorts. In addition, the method with cohorts is only used when investigating the FLFPR, while when looking at the female employment shares we use a regular FE model. It would be highly interesting to investigate the actual usefulness of having age cohorts by comparing aggregate data with cohort specific data and evaluate the outcomes. Such a comparison would however extend the scope of this research and shift away from the focus of the empirical investigation. It is therefore not considered. Nonetheless, these differences have to be kept in mind when comparing the results of the FLFPR and the female employment shares.

Applying mainstream trade theory on gender issues also has its difficulties. Based on the theory that was established in this paper, we hypothesized that economic integration leads to positive impacts for the FLFPR. We also expected the female employment in agriculture and industry to increase as a result of economic integration. Our empirical findings though, were not always in line with this theoretical framework. The field of research analyzing the effects of economic integration in the context of gender is still rather new, which implies that the theoretical background used by us, in addition to being a simple framework, is not fully applicable to the empirical setting we investigate. This is a drawback, discussed by for instance Elson et al. (2007). For the Heckscher-Ohlin-Samuelson model to hold, full employment, perfect competition and factor mobility between sectors has to be assumed (Debraj, 1998). In this setting, all owners of the respective factor are expected to gain whether they are employed in the export-oriented or the import-oriented part of the economy. These assumptions are somewhat stylized and do not necessarily hold in reality, particularly in a gender setting for developing countries. The fact that not everyone is gaining from economic integration according to our findings could highlight the simplicity of this model. The simplicity of the theoretical background and the difficulties associated with its application on a gender framework means that it is not entirely unexpected that the theoretical arguments not always coincide with our empirical results. It is of great importance for this field of research that more gender oriented theories are developed, which can be linked more clearly to

empirical findings. Additionally, scholars focusing more on the effects for the service sector could also contribute to further improvements to the existing theory, since this sector is rapidly gaining in importance around the world.

As already mentioned, it is problematic to say anything about the actual causality between variables included in our regressions. Do women become part of the labor force or become employed in certain sectors due to more economic integration and does education contribute to this effect? Or is it the increased female labor market outcomes and more educated women that lead to a higher economic integration of a country? A mixture of effects together with other explanations is likely and calls for a deeper assessment of the combined effects as well as the actual causality in these relationships.

10. Concluding remarks

Most economists agree on the overall positive effects of economic integration for an economy. Meanwhile, all around the world women have seen - and still see - disadvantages on labor markets, a phenomenon that is especially clear in many less developed countries. The aim of this paper was to investigate the effects for an empirically neglected agent; women in developing countries. This was carried out by enlightening the empirical relationship between economic integration and female labor market outcomes across developing countries. We used panel data for 87 developing countries between the years 1980 and 2010. Our contribution to the existing literature was to extend this investigation by looking at how this empirical relationship is affected by the level of various female educational measures. Including education was done by incorporating an interaction term, consisting of an educational and globalization measure in our regression analysis. A FE model was used, and for the analysis of FLFPR in particular, the use of age-cohort specific data enabled us to further improve regression results compared to many other studies in the field. The question of this research was:

What are the effects of economic integration on female labor market outcomes across developing countries and how do these effects look when the level of various female educational measures differ across developing countries?

We hypothesized that economic integration increases the FLFPR. This relationship appeared for the trade/GDP measure only when average years of education for women was interacted with trade/GDP in the regression. It showed that the effect of trade/GDP on FLFPR is larger when a country's average years of education for women is higher. This indicates that this measure of education is important, even crucial, for the relationship between trade and FLFPR to exist. We also found that disaggregating trade/GDP into export/GDP and import/GDP is relevant as it sheds further light on the relationship between globalization and FLFPR. In line with our hypothesis, export/GDP had a positive impact on FLFPR. Import/GDP on the other hand had a negative impact. The disaggregation also showed that for the effect of export/GDP on FLFPR all measures of education are of importance since the export interaction terms were all significant. The relationship between import/GDP and FLFPR was however only affected by the two measures of secondary education, as only these import interaction terms were significant. Overall we found evidence in favor of our hypothesis, as trade and exports had a positive impact on FLFPR.

In our theoretical discussion we further argued that the female employment share in agriculture and industry would increase as a result of economic integration. Although this particular effect was more difficult to prove, a relationship between economic integration and the female employment share in agriculture, industry and service did exist in several cases. Likewise average years of education for women of age 15 and more, had a significant impact on this effect in some regressions. Nonetheless, several difficulties such as not using age-cohorts, the reduced number of observations and many missing values implied that the results for the female employment shares were more mixed and should be interpreted with caution.

Overall, a significant impact of female education on these relationships could be seen in several regressions and in some cases education was even crucial for the relationship between economic integration and female labor market outcomes to appear. Thus, including education in the regressions highlights the impact that education can have on the investigated relationships.

If a developing country aims at positively affecting the FLFPR through economic integration, it should consider investing in female education to increase average years of education for women. Also, according to our results, a country that promotes economic integration with a larger export sector will experience a larger gain in FLFPR. Promoting trade mainly through

exports to achieve this gain might however stand in conflict with other economic goals and international guidelines on trade promotion for an economy. Similarly, it should be remembered that there is no 'one size fits all' recommendation. If a country on the other hand wants to affect the employment share in a particular sector of the economy, our results were more mixed and therefore less clear policy recommendations can be made for these cases.

Future research could gain from more complete data, in particular when investigating female employment shares. Having the data for the employment shares in age-cohorts could also lead to further insights and potentially improve estimation results. Additional insights into the impact of economic integration on female labor market outcomes could also be found by differentiating between various regions of the world. By running regional specific regressions, heterogeneous effects that are common to countries in different regions can be taken care of.

The results we obtained in this research regarding the importance of female education for the relationship between economic integration and female labor market outcomes in developing countries are of great value. The importance of education appeared in many of the investigated relationships, and it cannot be stressed enough that education is a factor with great potential for how to enhance women's opportunities on the labor market in today's globalized world.

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Appendix A: Countries included in this research

Countries included when investigating FLFPR:

Afghanistan, Albania, Algeria, Armenia, Bangladesh, Belize, Benin, Bolivia, Burundi, Bulgaria, Cambodia, Cameroon, Central African Republic, Chile, China, Colombia, Democratic Republic of Congo, Congo Republic, Costa Rica, Cuba, Côte d'Ivoire, Dominican Republic, Ecuador, Egypt, El Salvador, Fiji, Gambia, Ghana, Guatemala, Guyana, Haiti, Honduras, India, Indonesia, Islamic Republic of Iran, Iraq, Jamaica, Jordan, Kazakhstan, Kenya, Kyrgyzstan, Lao People´s Democratic Republic, Lesotho, Liberia, Malawi, Malaysia, Maldives, Mali, Mauritania, Mauritius, Mongolia, Morocco, Mozambique, Myanmar, Namibia, Nepal, Nicaragua, Niger, Pakistan, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Poland, Republic of Moldova, Romania, Rwanda, Senegal, Sierra Leone, Sri Lanka, Sudan, Swaziland, Syrian Arab Republic, Tajikistan, United Republic of Tanzania, Thailand, Togo, Tonga, Tunisia, Turkey, Uganda, Ukraine, Vietnam, Yemen, Zambia, Zimbabwe.

Countries included when investigating female employment shares:

Albania, Algeria, Armenia, Bangladesh, Belize, Bolivia, Bulgaria, Cambodia, Cameroon, Chile, Colombia, Congo Republic, Costa Rica, Cuba, Dominican Republic, Ecuador, Egypt, El Salvador, Ghana, Guatemala, Haiti, Honduras, India, Indonesia, Islamic Republic of Iran, Jamaica, Jordan, Kazakhstan, Kenya, Kyrgyzstan, Lao People´s Democratic Republic, Liberia, Malaysia, Maldives, Mauritius, Mongolia, Morocco, Namibia, Nicaragua, Niger, Pakistan, Panama, Paraguay, Peru, Philippines, Poland, Republic of Moldova, Romania, Sri Lanka, Syrian Arab Republic, Thailand, Tunisia, Turkey, Vietnam, Yemen, Zambia.

Appendix B: Logarithmic regression results

VARIABLES	(1) FLFPR	(2) FLFPR
Trade as share of GDP	-0.00744	-0.31177***
(-1)	(0.06162)	(0.09611)
Trade*Average years of schooling		0.04297***
(-1)		(0.01088)
ln(GDP p.c.)	-1.57700***	-1.43413***
(-1)	(0.32961)	(0.32520)
ln(GDP p.c.)²	0.07234***	0.06248***
(-1)	(0.02099)	(0.02067)
Total fertility rate	-0.09098***	-0.05542***
	(0.01700)	(0.01878)
Agriculture value added	0.25901	0.22653
	(0.27018)	(0.26853)
Industry value added	0.85796***	0.88721***
	(0.29434)	(0.29040)
GDP p.c growth	-0.00248	-0.00111
	(0.00179)	(0.00187)
Political regime	0.01532***	0.01458***
	(0.00334)	(0.00321)
ln(total population)	-0.05340***	-0.04999***
	(0.01648)	(0.01640)
Constant	7.98757***	7.32305***
	(0.58631)	(1.41427)
Year dummies	Yes	Yes
Number of observations	3801	3772
Number of cross-sections	770	770
R-square	0.2222	0.2428

Table B.1. Logarithmic results for FLFPR and trade/GDP

VARIABLES	(1) FLFPR	(2) FLFPR
Export as share of GDP	0.70823***	0.27712
(-1)	(0.14268)	(0.26784)
Import as share of GDP	-0.79815***	-0.88627***
(-1)	(0.15206)	(0.27418)
Export*Average years of schooling		0.06361
(-1)		(0.04027)
Import*Average years of schooling		-0.02104
(-1)		(0.04020)
ln(GDP p.c.)	-1.61113***	-1.53537***
(-1)	(0.32498)	(0.34686)
ln(GDP p.c.)²	0.06597***	0.06174***
(-1)	(0.02061)	(0.02202)
Total fertility rate	-0.04571**	-0.08111***
	(0.01917)	(0.01968)
Agriculture value added	-0.07514	-0.12106
	(0.25373)	(0.25632)
Industry value added	0.55156**	0.72157***
	(0.27085)	(0.27710)
GDP p.c growth	-0.00176	-0.00177
	(0.00190)	(0.00202)
Political regime	0.01354***	0.01500***
	(0.00305)	(0.00314)
ln(total population)	-0.06038***	-0.07737***
	(0.01689)	(0.01706)
Constant	8.51503***	8.8786***
	(1.40795)	(1.49072)
Year dummies	Yes	Yes
Number of observations	3772	3772
Number of cross-sections	770	770
R-square	0.2876	0.2575

Table B.2. Logarithmic results for FLFPR and export/GDP and import/GDP

Appendix C: Correlation and variance-covariance matrices

	lag_trade	trade_eduijt	trade_secijt	trade_edu80	lag_export	exp_eduijt	exp_secijt	exp_edu80	lag_import	imp_eduijt	imp_secijt	imp_edu80
lag_trade	1											
trade_eduijt	***0.7366***	1										
trade_secijt	***0.6077***	0.9144	1									
trade_edu80	***0.4947***	0.7551	0.8143	1								
lag_export	0.9137	0.7083	0.6015	0.4820	1							
exp_eduijt	0.7025	0.9685	0.8877	0.7223	***0.7644***	1						
exp_secijt	0.6056	0.9020	0.9775	0.7799	***0.6576***	0.9228	1					
exp_edu80	0.5026	0.7565	0.8032	0.9770	***0.5408***	0.7659	0.8093	1				
lag_import	0.9370	0.6598	0.5297	0.4379	0.7143	0.5529	0.4778	0.4009	1			
imp_eduijt	0.7284	0.9760	0.8906	0.7448	0.6228	0.8910	0.8372	0.7093	***0.7193***	1		
imp_secijt	0.5877	0.8922	0.9834	0.8145	0.5317	0.8257	0.9230	0.7690	***0.5552***	0.9044	1	
imp_edu80	0.4714	0.7281	0.7955	0.9846	0.4173	0.6619	0.7292	0.9248	***0.4532***	0.7484	0.8239	1

Table C.1. Correlation for FLFPR

	lag_trade	trade_edu15	lag_export	exp_edu15	lag_import	imp_edu15
lag_trade	1					
trade_edu15	0.8161	1				
lag_export	0.9123	0.7847	1			
exp_edu15	0.7721	0.9334	0.8440	1		
lag_import	0.9363	0.7295	0.7103	0.6032	1	
imp_edu15	0.8054	0.9719	0.6854	0.8731	0.7965	1

Table C.2. Correlation for employment shares

	FLFPR	***lag_trade***	***rade_eduij***	*n(GDP p.c*	*(GDP p.c)*	*fertility*	*agri.value*	*ind.value*	*GDPgrowth*	*political*	*ln(pop)*
FLFPR	0,06504										
lag_trade	-0,0041	0,169378									
trade_eduijt	-0,01086	1,202475	15,9906								
ln(GDP p.c)	-0,0914	0,09187	1,675666	0,784285							
ln(GDP p.c)^2	-1,38003	1,396109	25,89388	12,04888	185,9181						
fertility	0,04595	-0,146378	-3,76588	-1,07592	-16,5801	3,258051					
agri.value	0,01227	-0,018601	-0,23536	-0,10246	-1,55711	0,138044	0,019983				
ind.value	-0,0048	0,008397	0,106767	0,049813	0,752464	-0,06795	-0,00885	0,012143			
GDPgrowth	-0,0198	0,134654	2,5554	0,556707	8,790744	-2,33586	-0,10858	0,056803	29,71487		
political	0,04953	0,359253	7,714498	1,718997	27,28695	-4,82108	-0,24154	-0,01497	2,408256	43,7253	
ln(pop)	-0,00581	-0,342563	-2,17114	-0,07307	-1,03657	-0,45729	-0,00226	0,036452	1,302568	-0,34404	2,524225

Table C.3: Variance-covariance matrix for the variables in regression (1) of table 1.

Variable description for variables in Appendix C

lag_trade = Trade/GDP(-1)
trade_eduijt = Trade/GDP(-1)*Average years of education for women
trade_secijt =Trade/GDP(-1)*Total share of women with secondary education
trade_edu80 = Trade/GDP(-1)*Share of women with secondary education in 1980
lag_export = Export/GDP(-1)
exp_eduijt = Export/GDP(-1)*Average years of education for women
exp_secijt = Export/GDP(-1)*Total share of women with secondary education
exp_edu80 = Export/GDP(-1)*Share of women with secondary education in 1980
lag_import = Import/GDP(-1)
imp_eduijt = Import/GDP(-1)*Average years of education for women
imp_secijt = Import/GDP(-1)*Total share of women with secondary education
imp_edu80 = Import/GDP(-1)*Share of women with secondary education in 1980
trade_edu15 = Trade/GDP(-1)*Average years of education for women of age 15+
exp_edu15 = Export/GDP(-1)*Average years of education for women of age 15+
imp_edu15 = Import/GDP(-1)*Average years of education for women of age 15+

Appendix D: Variables included in this research

Dependent variables

- FLFPR (age-cohort specific)
- Female employment share in agriculture
- Female employment share in industry
- Female employment share in service

Independent variables
Globalization variables:

- Trade/GDP(-1)
- Export/GDP(-1)
- Import/GDP(-1)

Educational variables:

- Average years of education for women (age-cohort specific)
- Share of women with secondary education in 1980 (age-cohort specific)
- Total share of women with secondary education (age-cohort specific)
- Average years of education for women of age 15 and more

Control variables:

- ln(GDP p.c.) (-1)
- $\ln(\text{GDP p.c.})^2$ (-1)
- Total fertility rate
- Agriculture value added to GDP
- Industry value added to GDP
- GDP p.c. growth rate
- Political regime (Polity IV index)
- ln(population)