Apparel jobs: ladder up or poverty trap?

Darryl McLeod*

Rosendo Ramirez**

Maria Davalos**

William Gruben***

May 30, 2005

Revised September 28th 2005

Paper presented at the eighth meeting of the
LACEA/IDB/WB Network on Inequality and Poverty (NIP)
México, Universidad de las Américas, Puebla July 8th and 9th 2005.

JEL Classifications: F1, D1, O15

Abstract: Quotas allocated under the 1974 Multi-Fiber Agreement sent low wage apparel manufactures into some of the world's poorest countries. These factories often employ large numbers of young women in low wage jobs. Two views of these jobs have emerged: one is that they are a "poverty traps" that perpetuate gender bias in educational attainment and domestic responsibilities. Vijaya (2003) for example, argues that labor intensive exports boost unskilled wages and lower skilled wages discouraging school attendance by young women without relieving them of domestic responsibilities. Others argue that these sweatshops jobs empower poor young women and often provide "first rung" on a ladder out of severe poverty. This paper uses a panel of fifty major apparel and footwear exporting countries to test these competing views of how apparel jobs affect educational attainment and fertility. To the extent that MFA quotas created arbitrary shifts in the pattern of trade over the past 30 years, apparel exports to OECD countries have a substantial exogenous component and provide a natural experiment for testing the impact of expanded trade on the status of poor women workers.

Corresponding author: Darryl McLeod, Economics, Fordham University mcleod@fordham.edu

**Associate Professor of Economics, Fordham University Department of Economics,
mcleod@fordham.edu, 718 817-4063 www.fordham.edu/economics/mcleod
** PhD. Candidate, Fordham University Department of Economics rramirez@fordham.edu
***Vice President and Senior Economist, Federal Reserve Bank of Dallas

Apparel jobs for Women: ladder up or poverty trap?

"…economists with a feminist perspective have long questioned the very nature of the growth that could result from trade.…as trade related expansion of opportunities in low-wage, labor-intensive production are mostly taken up by women, [they] experience short-run employment gains, [but have] less incentive or opportunity …to invest in human capital." Ramya Vijaya (2003) p.6, "Trade, Skills and Persistence of Gender Gap: a theoretical framework for policy evaluation" Working Paper, International Gender and Trade Network, Washington. D.C.

"The Bangladeshi women told how they were able to save some small surplus from their meager pay, manage their own income, have their own rooms, choose when and how to date and marry, choose to have children when they felt ready, and use their savings to improve their living conditions and especially go back to school to enhance their literacy and job-market skills… Some rich-country protestors argue Dhaka's apparel firms should either pay higher wages or be closed, but … for these young women these factories offer not only opportunities for personal freedom, but also the first rung on ladder of rising skills for themselves.. and their children." Jeffrey Sachs (2005) page 12, *The End of Poverty* (Penguin Press, NY),

Economists, like the general public, hold sharply divergent views of how low wage apparel and footwear factory jobs affect poor workers in developing countries. All agree, however, that the decisions of young women are at the center of this debate. In many apparel factories 70-80% of the workers are women. Most are under 25. Despite working long hours at low wages, most of these young women manage to send a portion of their modest earnings back to families in rural villages. Along the way, they and their parents make pivotal decisions regarding marriage, child bearing and schooling. Most development economists argue that garment factory jobs provide young women a source of much needed income and what Kabeer (2000) calls the "power to choose." Others argue, as Sachs (2005) does above, that these jobs are the first step up "ladder of rising skills." Other economists fear greater availability of low wage jobs causes girls to leave school early, trading higher income today for a lifetime of unreliable and unsafe low wage jobs.

Vijaya (2003) for example argues expanding low wage exports raises unskilled relative to skilled wage rates, a la Stolper-Samuelson, thereby reducing the return to education. Since women

are particularly vulnerable to the pressures of poverty and family, they are the first to take low wage export jobs now, forgoing the higher future earnings additional schooling can provide. Leamer (1998) and Ridao-Cano and Wood (1999) express similar, less gender specific concerns that trade has widened the North-South "skills gap." Vijaya (2003) provides cross country evidence that increases in trade failed to close the gender gap in school enrollments, except where gender disparties were not wide to begin with. Similarly Ridao-Cano and Wood (1999) and Baslevent and Onaran (2004) find trade does little to close gender or skill gaps in developing country exporters.[1]

While these studies focus on total trade, tariffs or openness and schooling, this paper keys in on a particular type of exports: apparel and footwear. One reason for focusing on this sector is that it employs large numbers of poor young women. A second reason involves special opportunities for testing hypotheses about trade, education and income. Starting in 1974 the Multi-Fiber Agreement (MFA) allocated apparel export quotas somewhat arbitrarily but particularly to poor countries such as Bangladesh, Honduras, Vietnam and El Salvador. Generous MFA quotas "treated" some of the world's poorest and most gender-biased countries with big increases in low-wage jobs. How families and these poor economies responded to these export surges represents a natural experiment in trade expansion, one less prone to the endogeneity problems that plague many studies of trade and economic performance (see Rodriguez and Rodrik (2000)).

Like most cross-country studies in this area, we use school enrollment and fertility rates as proxies for changes in women's status and welfare. If apparel manufactures trap and exploit women workers in dead-end jobs, leaving their domestic obligations unchanged (Vijaya, 2003) generous doses of apparel export quotas won't do much to raise enrollment or reduce birth rates, apart from the effects of higher per capita income. Vijaya (2003) argues that countries start with

[1] Wei and Wu (2002) and Harrison (2005), on the other hand, find trade openness and low tariffs to be generally correlated with lower infant mortality and poverty rates, and longer life expectancy—though both studies are "forthcoming".

large gender enrollment gaps generally end with large gender gaps. Hence, female enrollment catch up only occurs where there was little gender bias to begin with. Vijaya concludes gender gaps are impervious to trade expansion, despite widespread claims to the contrary..

This paper focuses Vijaya's (2003) "poverty perpetuating gender disparities" hypothesis: do labor intensive exports such as apparel and footwear discourage or encourage school attendance and family formation by young women in poor countries. The next section of the paper explores alternative "poverty trap" models of apparel export expansion. Section 3 provides several tests of the impact of expanded exports of apparel and footwear to OECD countries (shipments regulated by the MFA) on women's status as indicated by changes in school enrollment and fertility rates. We present empirical evidence on gender bias and the impact of apparel and footwear exports on fertility, child labor and female enrollment rates. Male and female primary and secondary enrollments are predicted using per capita income, total exports and apparel exports we predict rates using panel regressions. The fixed-effects coefficients from these panel regressions are used to estimate unobserved gender bias among these fifty countries. Countries are then classified into high-and-low-bias country groups. A second round of panel estimates offers insights into how apparel exports affect fertility and school enrollment in high bias countries.

Section 4 of the paper examines whether Latin America is different. Most studies of apparel export growth focus on big Asian exporters such as Bangladesh, China and Indonesia. However, during the 1990s apparel exports grew rapidly in some of the poorest regions of Latin America: Honduras, El Salvador, and Nicaragua for example. The impact of apparel exports on these countries is particularly important as with the end of the MFA in these countries now face open competition with Asia as the MFA is phased out. The final section of the paper summarizes the key findings and policy implications, while an appendix details data sources and estimation methods.

2. Low-Wage exports and the return to education

The question of how sectoral wages and human capital investment respond to trade expansion depends on how one models expanding trade. Focusing on the Stolper-Samuelson arguments of skilled and unskilled wage rates, Leamer (1998) Ridao-Cano and Wood (1999) argue that the expansion of trade in textiles and footwear could well be a lose-lose proposition. In the Leamer (1998) and Ridao-Cano and Wood (1999) worlds, both sectors produce a tradable products. As trade opens, unskilled workers in the rich-nations lose as their wages fall and skilled-unskilled wage inequality increases. Unskilled wages rise in poor labor abundant countries, but the skill premium falls. The premium decline reduces the incentive to invest in human capital, especially among women. Vijaya (2003) argues that poor women in developing countries forego schooling for work, and therefore slip farther behind men in education.

The Stolper-Samuelson effect on relative wages is neatly summarized in Leamer's (1998) diagram reproduced here as Figure 1. The opening of trade, here resulting from a jump in apparel export quotas, increases the demand for unskilled labor. The increase drives up wages in the labor-intensive export sector even as imports of skill-intensive goods reduce the demand for skilled labor. The skill premium falls and with it school attendance. Vijaya (2003) argues further that the lower skills wage premium has especially strong implications for poor women workers who find themselves pressured by the demands of poverty and family to drop out of school.[2] Vijaya (2003) also cites survey evidence that the household responsibilities of women remain undiminished. With education sacrificed to the demands of family and poverty, these women and their children find themselves in a poverty trap especially where gender bias limits school attendance already.

[2] Vijaya's (2003, page 21) concern is that in "...in low-skilled developing countries where a gender gap in education exists, trade related employment trends have the potential to establish an employment structure that lowers women's incentives to invest in higher education."

A more favorable view of low-wage export jobs emerges from the the following stylized facts, gleaned from surveys of garment workers in Bangladesh, Vietnam and Indonesia, and from reports by NGOs hired to monitor clothing and footwear factories:

1. *Poor young women in rural villages find low-wage apparel jobs relatively attractive* because other employment opportunities in rural areas are even more limited than those of their male siblings. Cunningham and Ramos (2004) find, for example that: female home-based workers in Brazil, Ecuador and Mexico earn 25-60% less per hour than non-home-based women while men earn 0-17%, whether they have children at home or not.

2. *Young apparel workers adjust to the demands of full-time factory work by delaying marriage*. Lower birth rates reduce demands on parents and community infrastructure (schools) especially in regions where fertility rates are already high. In Bangladesh for example, the average age of marriage rose from 16 to 20 for women working in apparel factories while the average age of first child birth rose to 21 from 17, see Paul-Majumber and Begum (2000).

3. *Garment exporting factories hire more educated workers*, even though many apparel jobs are unskilled, employers find educated women easier to train and manage.[3] As a result, workers garment and footwear factories tend to better educated and better paid than those in local firms or cottage industries.[4]

4. Despite low wages, most young women workers send part of their earnings home: these remittances often constitute a significant fraction of their family's income. Workers frequently report their wages help pay the school fees of younger siblings.[5]

5. Jobs outside the home can help boost the status of women. This point is emphasized by Kabeer (2000) and is reflected in surveys answers as well.[6] Very low wages (and the availability of quotas) attract factories countries were gender discrimination is high and female wages are low, as critics are quick to point out, but it is precisely in these countries that women benefit most from the autonomy employment outside the home and village can provide.

These stylized facts about low-wage or "sweatshop" jobs are frequently expressed, but attempts to model and quantify the impacts of these factories are rare. The next section of this

[3] A 1993 survey of Bangladesh garment workers "shows that the literacy rate of garment workers is much higher than that of workers employed in nonexport industries….The survey of 1997 did not find any uneducated workers in the DEPZ factories. The average years of schooling attained by female garment workers increased over time, from 4.1 years in 1993 to 6.3 years in 1997. The survey of 1997 indicates that in the DEPZ [Dhaka Export Processing Zones] garment factories, on average, a female worker has more than eight years of formal schooling." see Paul-Majumder and Begum (1997) p. 7. The share of Bangladeshi workers with some secondary education rose from 27% in 1990 to 38% in 1997, see Paul-Majumber and Begum (2000) Table 5.

[4] Education may be serving as a screening device, given the intense competition for relatively few jobs is part of the, however employers also report finding educated workers more flexible and easier to train.

[5] Some Bangladeshi workers report their parents pressure them to delay marriage until the family can afford to do without remittances see Paul-Majumber and Begum (2000).

[6] Kabeer (2000) describes Bangadeshi women walking a gauntlet of taunting Mullahs on their way to work. As the factories became more established, harassment of young workers diminished.

paper develops a model in which workers do face the Stolper-Samuelson choice between skilled and unskilled traded sector jobs. Instead they choose between working in informal, often rural non-traded goods industries and taking a job in an often urban traded goods industries (perhaps in an EPZ). These models reflect the choices facing poor rural women deciding whether to work in the informal sector or get marry or to seek a job in an urban or EPZ garment or footwear factory.

Over time, families and women workers choose levels of remittances, schooling and child rearing consistent with multiple objectives of their household(s) over a generational cycle. This process is can be modeled in an "overlapping generations" model in which young workers send remittances home, but later become parents who receive remittances. However, to fix ideas we begin with a simple traded-nontraded goods model. One sector produces non-traded goods and services in a domestic or informal setting. The other sector produces a traded good (apparel) in a formal factory setting.[7] Export controls imposed by trading partners limit opportunities to export labor intensive traded goods (apparel). These quotas and tariffs act as a tax on local production lowering the local price of trade goods.

In the simplest version of the model traded goods require human capital H, while production of domestic non-traded services requires none. The production functions for the two sectors hence can be written as,

$$P_N Q_N = a_N L_N \qquad (1.1)$$

$$Q_T = aH^{\alpha} L^{1-\alpha} \qquad (1.2)$$

where L_N and a_N labor and labor productivity in the non-traded goods sector. The effect of a quota or tariff on exports is to reduce the local price of tradables, P_T

$$(1+\tau)P_T = eP^* \qquad (1.3)$$

where P* is the price of tradables in the importing country and e is the nominal exchange rate. This implies that the return to investment in human capital depends on the marginal revenue product of H in the traded goods sector and hence directly on the quota or tariff,

$$\varphi = (1-\alpha)a_T \left(\frac{H}{L}\right)^{\alpha} (1+\tau)^{-1} eP^* = (1-\alpha)a_T h^{\alpha} (1+\tau)^{-1} eP^* \qquad (1.4)$$

where φ is the return to education and h is human capital per worker. Hence a reduction in apparel quotas or tariffs raises the return to education, albeit due to our assumption that the only traded goods production requires human capital. Of course similar results are obtained if the traded goods sector is merely more education intensive than the non-traded sector.

Figure 2 illustrates the impact of quota increases (tariff reductions) on the local price of tradables relative to non-tradables, as workers leave the non-traded or informal domestic activities in favor of export-factories. A higher return to schooling should also increase school enrollment. In more elaborate model in which households (women) choose between work, school and marriage (child bearing) improved employment prospects and returns to education tend to delay marriage thereby reducing the birth rate. Another scenario has the extended family using remittances to increase primary enrollment among younger siblings. Previously poverty and credit constrained households may also use remittances to increase investment in schooling, housing or small businesses.

Generations of workers and parents

The above model can be extended to include key decisions regarding work and marriage. Consider a model in which workers make work and schooling decisions over two periods: as young adults in first phase of their lives, they work. In the second phase, they become parents, perhaps

returning to the village to marry and raise their children. The duration of the first period depends on how many children they plan to have: larger families require leaving full time work sooner rather than later. To the extent that full time work impinges upon domestic obligations of women more than men, as Vijaya (2004) suggests, this model focuses on the decisions of young women.

An new feature of this second model is that traded goods (shoes and clothing for example) can be produced using two technologies, both of which require human capital (as in the previous traded goods sector). The change is that home production requires labor and human capital as captured by the production function in equation (1.2), whereas factory production requires some outlay of fixed capital, F,

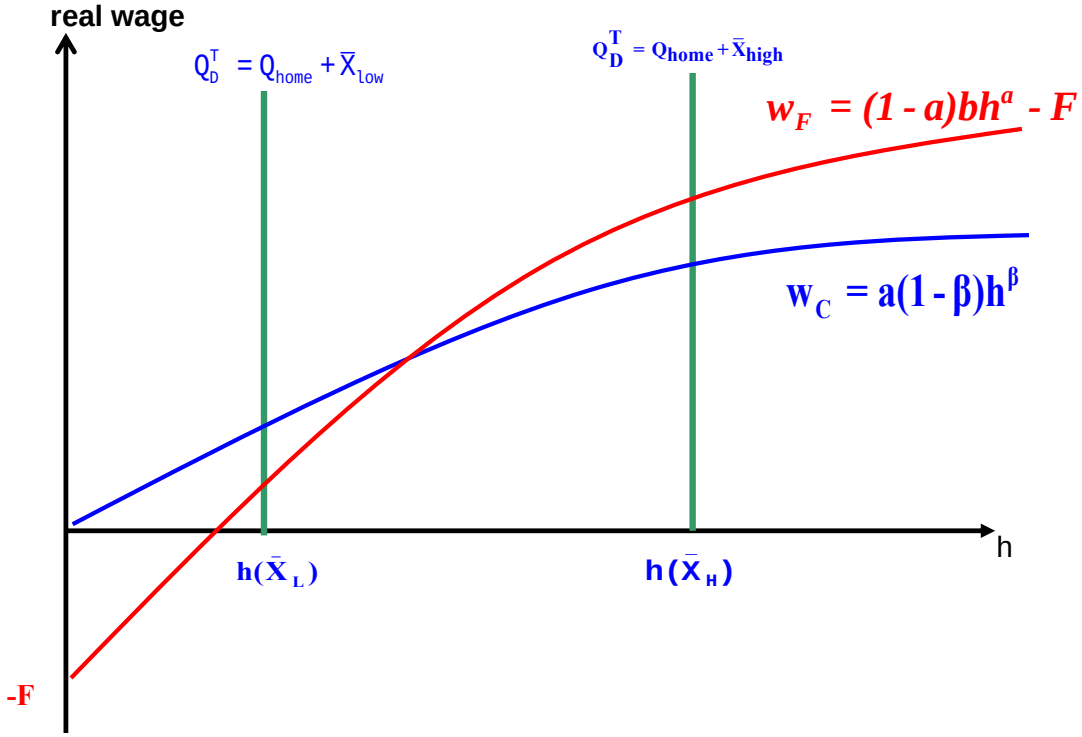
$$Q_T^F = F + bH^{\alpha}L^{1-\alpha} \qquad (1.5)$$

The reward for outlays of fixed capital, is higher productivity, so that b > a. The real wage implied by (1.5) can be written as a function of human capital per worker, h = H/L,

$$\boldsymbol{w}_1 = (1-\alpha)\boldsymbol{bh}^{\alpha} - \boldsymbol{rF} \qquad (1.6)$$

where investors expect a return of r on fixed costs F. Hence factories exhibit increasing returns to scale, as fixed costs rF are spread over more and more units. These alternative technique sets up a classic "market size" poverty trap, as shown in figure 7 below. Low levels of demand, perhaps due to export quotas, allows cottage production to dominate, as shown at for the vertical line over X_{low} in figure 7. However an increase in overall demand, due for example to an expansion in export quotas to X_{high} makes factory production more profitable than home production, and real wages increase.

Figure 7
An export quota poverty trap



As discussed in the first paragraph, the expansion of export demand is important to the degree it influences decisions to invest in education, average age of marriage, family size etc. To get a handle on these issues we consider two overlapping generations of workers: young workers work full time at factory or home production. At some point, however, they stop working full time perhaps switching to home or part-time nontraded goods production (services) and raise n children. Since the young workers become parents, they send remittances home as young workers, and expect to receive the same when they are parents. To fix ideas, we use a simple linear utility function but explore more complex intertemporal decisions in an appendix. Workers who become parents maximize utility over the two phases of their lives,

$$\underset{h,n}{Max}\, V(c,n) = v_1 + \rho v_2 \qquad (1.7)$$

where $v_1 = c_1 = w_1L(1-\varphi n) - R$, where

$R = \pi(\cdot)\lambda (w_1*L)$ implying that, $v_1 = c_1 = [1 - \varphi n - \pi(\cdot)\lambda] w_1L$, and

$v_2 = n*(R - \varepsilon h) + \ln(n) + \varphi nLw_2$.

In the first period, young workers decide how to allocated their lifetime of labor, L. Having n children requires fraction φn of a workers L-year lifetime plus spending εh per child on education. Typically workers spend λL of their working lifetimes earning income to send back to their families in rural villages as remittances R. In this overlapping generations context workers expect to receive similar remittances as parents from their children.

However, not all children send remittances home: $\pi(w_2/w_1,g)$ is the probability that a given child will send remittances home. This probability depends in turn on the relative wage gap and the gender of the child, g. Female children are more likely to send remittances home. By sending remittances home, young workers obligate parents to help with their return, wedding costs, etc. Also as rural urban or home factor wage differential increase, the probability that workers sends remittances home may rise or fall π(.). Higher wages have an income effect on young workers, making them more likely to send remittances home. However, high factory wages may also reduce the likelihood that workers return to the village to raise their families. This may reduce remittances.

The key decision variables in this model are the number of children, n, and the investment in education per worker, h. Children require workers to devote fraction φ of their productive lives to child rearing. Hence, a large n impinges upon the amount of time that person can spending working

full time in the factory. However, children also add pleasure directly to the lives of their parents, as measured by ln(n).

As parents, in the second phase to their working life parents receive remittances R and spend nεh educating their children. Setting L = 1 and solving for the n that maximizes V in (1.7) we obtain,

$$\boldsymbol{n} = \frac{\rho}{(\varphi - \pi(\bullet)\lambda\rho)\boldsymbol{w}_1 - \rho(\varphi \boldsymbol{w}_2 - \varepsilon \boldsymbol{h})} \tag{1.8}$$

where w_2 is the home or nontraded sector wage earned by parents with children. Note that the effect of traded good wages w_1 on the number of children each family has depends on the net sacrifice ratio $\varphi - \pi(\bullet)\lambda\rho$ which is the time spent raising children minus the amount children work to return in the form of remittances at the same wage rate. We assume (plausibly) that children involve some sacrifice of income, So an increase in factory wages w_1 raises the opportunity cost of parent's time and therefore lowers n. The second term of in parentheses in the denominator is earnings per child, net of education expenses. An increase in the cost of education lowers n, while enhanced at home earnings opportunities for parents φw_2 increases n.

Our last task is to determine the effect of higher wages in period 1 on investment in human capital. Wages rise because workers move from cottage industries to factories, raising TFP from a to b. From the point of view of parents, higher wages for young workers both increases remittances λw_1 and, indirectly, reduced n. Both of these effects tend to increase h: education per worker. However, higher wage inequality may reduce the probability $\pi(\cdot)$ children send remittances home. To see how these effects play out, we write the first order condition for h as an implicit function of h and the other parameters in the model,

$$\{\alpha(1-\alpha)\boldsymbol{b}\boldsymbol{h}^{\alpha-1}\}\left[\frac{(1-\lambda-\varphi \boldsymbol{n})}{\boldsymbol{n}} + \pi(\bullet)\rho\lambda\right] = \rho\varepsilon\,. \tag{1.9}$$

The first term in (1.9) reflects is impact of higher h on the real wage, but the second term involves the secondary effects a rise in b or $w_1$on n and $\pi(\cdot)$. An increase in b may have offsetting effects on the term in brackets. A rise in period one real wages w_1 reduces fertility n increases $z(n,\pi)$ but the same rise in real wages may raise or lower $\pi(\cdot)$. It is possible that these effects offset one another, such that $\frac{\partial z(n,\pi)}{\partial w_1} = 0$ where $z(n,\pi)$ is the square bracket term from equation (1.9). Then solving explicitly for h yields,

$$\boldsymbol{h} = \left[\frac{\boldsymbol{z(n,\pi)}\alpha(1-\alpha)\boldsymbol{b}}{\rho\varepsilon} \right]^{\frac{1}{1-\alpha}} . \qquad (1.10)$$

In any case, a rise in real wages or b lowers n and raises $z(n,\pi)$ so this reinforces the positive effect of higher real wages on h. If the income effect of higher wages dominates the tendency to stay in the city, h rises with b, unambiguously. Finally, note that the impact of $\pi(\cdot)$ on the numerator of (1.10) is $\lambda\rho$, so unless the a higher w_1 reduces $\pi(\cdot)$ dramatically, the fall in $\pi(\cdot)$ is unlikely of offset the positive impacts of b and n on h.

The explicit solution for h in equation (1.10) reminds us that if $\pi(\cdot)$ is higher for women, an increase in real wages (a rise in b, or switch from a to b) has a larger impact on female education spending than men's. Higher wages increase parent's investment in education generally but their will be a bias toward educating girls, because the higher wages generated by that investment education are more likely to be sent back to the parents.

3. Empirical Evidence on Apparel Exports and Women's Status

These model yield testable hypotheses regarding the impact of garment jobs on fertility and schooling. If the Stopler-Samuelson models are correct, lower skill premiums could lower the

return to female schooling while leaving the demands of domestic life and child rearing unchanged. Alternatively, apparel export jobs may raise real wages, reduce fertility and encourage investment in schooling, particular for women who are more likely to send remittances home. Like most empirical studies in this area, including Vijaya (2003), our focus is on fertility rates and relative male and female primary and secondary enrollment rates: the most widely available gender specific indicators of social status. Both school enrollment and fertility are assumed to reflect the options and opportunities faced by women responding to relative wage rates and employment opportunities. But since neither wage nor employment data by industry are widely available, especially over the 30-year time horizon of the MFA, we are left with reflections of shifting opportunities rather than direct measures of the opportunities themselves. Ridao-Cano and Wood (1999) and Vijaya (2003) also use enrollment data to conclude that trade has not diminished the skill or gender enrollment gap and may have increased them – particularly in locales that began with high gaps.

The focus of these studies, and those of Wei and Wu (2002) and Harrison and Zane (2005), is on total trade or openness. Our focus is a particular type of export: namely apparel and clothing exports. We also use total trade as a conditioning variable accentuating our focus on the composition of trade. Table 1 displays the top fifty garment and footwear exporters to the high income OECD countries (Uzbekistan was originally in the group but was dropped for lack of data). We use exports to OECD countries because these are the shipments most likely to be regulated by MFA quotas, and hence have a large policy determined "exogenous" component. Note that the top ten exporters, ranked by apparel and footwear export share, include some of the poorest countries in Asia and Latin America—about five from each region. Though in some cases initial trade was small, the fastest growth in export volumes took place in El Salvador, Cambodia, Tanzania and Cote d' Ivoire. Larger countries such as China, India, Mexico and Hong Kong export substantial volumes but exports are less important as a share of GDP or total exports.

Note also that some of these countries are known for high levels of gender bias and a number are Sen's (1999, p. 104) list of countries with "missing women." One dimension of gender bias is under-enrollment of girls in primary and secondary school. The estimates reported in Tables 2 and 3 regress gross secondary and primary enrollment rates on per capita income, total trade and apparel trade. Some equations employ a partial adjustment structure with a lagged dependent variable. Lagged dependent variables create potential bias, but estimates of these equations with the dynamic panel techniques yield similar results (not reported here). All data are logs of five year averages. Though most of these variables apart from per capita income are percentages,[8] there is considerable variance in all of these series so all variables are estimated in natural logs. Export shares are computed as a share of $PPP GDP to avoid fluctuations in shares caused by real exchange rate changes. However, trade shares over GDP at market exchange rates or apparel and footwear's share of total exports also yield results very similar to those reported here.

The results reported in Tables 2 and 3 suggest that exports, apparel exports and per capita income are all associated with higher enrollments by males and females. Note that apparel exports appear to increase both male and female enrollment rates, but only female primary enrollment rates. This is not consistent with the hypothesis that remittances support the schooling of younger siblings, unless this support is biased toward sisters. Parents do seem to respond to increased employment opportunities outside the home by enrolling more girls in school (primary and especially secondary).

Somewhat surprisingly, the impact of apparel exports on secondary seems stronger that that of primary enrollments. Given that these low wage jobs might encourage girls to leave school for work, one might expect the impact on primary enrollment to be higher. However, in many

[8] Gross enrollment rates are the percentage of the appropriate age cohort enrolled in primary school. Since older children and adults often return to primary school these gross enrollment rates often exceed 100%, particularly in poor countries where education levels are rising.

countries primary enrollment is already high (or peaked earlier in these countries development) and is determined by other factors such as school quality and public policy. Overall, the impact of apparel exports on secondary enrollment is larger and consistently more significant though impacts on female enrollments in both levels of school appear to stronger than that of males.[9]

The literature on the educational requirements of the apparel industry shows much evidence that the equivalent of a U.S. junior high school education is greatly desired and that textile and shoe firms expect even more education. In developing countries, secondary school is defined as starting in the sixth grade. Not surprisingly, then, the impact of apparel exports on secondary school is stronger than on primary enrollments. In many countries, in fact, primary enrollment is already high (or peaked earlier in these countries' development. Primary school enrollment is more strongly determined by school quality and public policy than by apparel exports. Even so, apparel exports' effects on female enrollments in both primary and secondary school are stronger than for males.

The literature on the educational requirements of the apparel industry shows much evidence that the equivalent of a U.S. junior high school education is greatly desired and that textile and shoe firms expect even more education. In developing countries, secondary school is defined as starting in the sixth grade. Not surprisingly, then, the impact of apparel exports on secondary school is stronger than on primary enrollments. In many countries, in fact, primary enrollment is already high (or peaked earlier in these countries' development. Primary school enrollment is more strongly determined by school quality and public policy than by apparel exports. Even so, apparel exports' effects on female enrollments in both primary and secondary school are stronger than for males.

That apparel and footwear exports seem to have a stronger impact on female than male enrollments suggests an interesting possibility. Is the growth of the apparel sector itself enough to

trigger a shift in attitudes towards women's education, or does increased availability of these jobs simply reinforce trends already underway. The influence of large arbitrary quota allocations for these particular exports undermines the argument that firms seek out countries with more educated women.

These fixed effects can be interpreted as indicators of "unobserved," or more accurately unmeasured bias against girls. The fixed effects from equation 2.2 in Table 2 are reported in Table 4. These are individual country deviations from the enrollments predicted by equation 2.2—under-enrollment by females may reflect gender bias, especially if male under or over-enrollment is not pronounced. Under-enrollment of both boys and girls, on the other hand, may simply reflect poverty or low quality schools rather than gender bias. Hence the relevant measure of gender bias is the female under/over enrollment minus the same fixed-effect for male students, reported in column three. To the extent that this difference reflects gender bias, we can sort countries into the two groups shown in Table 2. The group on the right exhibits high gender bias—there is a big difference between the "unobserved" enrollment rate for men and women. The countries exhibiting the highest degree of bias against female enrollment in secondary education are Cote d'Ivoire, Pakistan, Cambodia, India and Bangladesh. Apart from Jordan, the mainly Muslim countries are in the high gender bias group. These nations include Pakistan, Bangladesh, Tunisia, Morocco, Egypt, Oman and Indonesia. With the exception of Peru, Mexico and Bolivia, Latin American countries are among the least gender-biased. Venezuela, Nicaragua, and Honduras exhibit the very least gender bias.

However, the question at hand is how growth in apparel and footwear exports interacts with the bias with respect to school attendance by women. The regressions in Table 5 re-estimate equation 2.2 using the split sample. Note that the impact of garment exports in high gender bias countries is substantially greater than (.082) than in low bias countries (.027) though it remains

significant in both groups of countries. The Wald Tests reported at the bottom of Table 5 strongly reject the null hypothesis that female enrollment coefficients are equal for these two equations.

Male enrollment exhibits a similar but less pronounced pattern. In low bias countries, apparel exports no longer have a significant on male enrollment. But in high bias countries the impact of apparel exports on male secondary enrollment is about twice as large (.025 compared to .013) than it is for the whole sample of countries (see the third column of equation 2.2 in Table 2).

The fact that apparel exports have a greater impact on enrollments in high-gender-bias countries than in low-gender- bias countries reflects in part the low enrollment rates for girls to begin with. However, notice that in Table 5 not all variables show this pattern. Neither total exports nor real per capita income have significantly greater impacts on enrollments in high-bias countries. Moreover, it is possible and even consistent with arguments and evidence presented by Ridao-Cano and Wood (1999) and Vijaya (2003) that apparel export jobs would simply reinforce patterns of gender bias and school under enrollment already present in these countries.

However, we find the opposite result: garment factory jobs have the greatest positive impact on school attendance when gender bias is highest. These results are consistent with anecdotal and survey evidence that apparel and footwear jobs have a positive impact on the status of girls in poor countries with a history of gender bias. Tables A-3 and A-4 include similar results for primary education. The pattern of results is similar but less pronounced. Similar countries appear in the two groups of high and low gender bias countries, and the impact of garment and footwear exports is greater. The results of the Wald Tests are a bit weaker however. We can reject the null that the high-bias country coefficient equals the low bias coefficient, but not the reverse.

Apparel Jobs and Fertility

A common finding of surveys of women in Indonesia and Bangladesh is that garment employment is linked to the postponement of marriage and child bearing. In Bangladesh for example, the average age of marriage rose from 16 to 20 for women working in apparel factories while the age of first child birth rose to 21 from 17. Higher incomes and secondary education also reduce fertility rates. To the extent that apparel jobs increase secondary enrollment rates, as results of the previous period suggest, they may affect fertility rates directly via delayed marriage and indirectly via higher school attendance. The results shown in Table 7 suggest both channels are at work. Secondary enrollments have a strong negative effect on fertility rates, but apparel and footwear exports exert an additional influence. Again, using the fixed effects from equation 7.1, we split countries into two groups—unexplained-low-and-high fertility. The coefficient on apparel-footwear exports is again higher, but the difference in the two coefficients is not statistically significant.

Apparel Exports and Child Labor

The flip side of school attendance is child labor force participation. Recently the World Bank and ILO began to collect labor force participation rates for children 11-14. While this data is not gender specific, girls do leave school to work as domestic helpers. They also may forgo secondary school for work in the garment factories as discussed in the poverty trap model above. Table 9 provides estimates of how apparel and total exports affect child labor force participation in our sample of countries. Again this experiment holds total exports constant, and increases garment exports (both as shares of GDP). This is a test of what happens when a country increases apparel's share of total exports, given that countries' real incomes per capita remain constant. Though the results are not as robust as for enrollment rates and fertility, exports of apparel are associated with

reduced child labor force participation. Also note that apparel exports have a more significant impact on child labor force participation in Latin America at the aggregate level (see Table 10).

These results are not surprising in light of our results above for secondary school attendance, but it is somewhat surprising in light the attention this issue has received by some NGO groups. This result is consistent with detailed survey data from Vietnam (World Bank, *Globalization Growth and Poverty*, Chapter 4) where child labor incidence declined as income grew and even as clothing and footwear exports grew very rapidly.

If girls are put in school in preparation for work in factories, this might explain the results in Table 9. However another factor is simply rising incomes. Though the equations in Table 9 are conditioned on real per capita income (lagged) we also check to see how clothing exports affect economic growth—here all variables except per capita income are differenced but otherwise the equation is largely the same. The proxy for human capital we found most correlated with economic growth is female primary enrollment—though this is largely an Asian and African phenomenon. Both apparel and total exports are associated with more rapid GDP growth per capita, though the effect is small. These equations mix random and fixed effects estimates as dictated by the results of Hausman tests, but the coefficient estimates for both estimators were generally very similar.

Finally, Table 10 splits child labor reduction among high and low child labor countries. Surprisingly, apparel exports have a greater impact on child labor in countries where child labor force participation is already low. This suggests the drivers of child labor reduction in the poorest countries are somewhat immune to apparel factory effects but are likely rooted in poor rural and informal sectors of the economic which are still large. This helps explain why apparel exports have a greater impact in reducing child labor in Latin America than Asia (see the last two columns of Table 10) though these coefficients are not significantly larger in a statistical sense.

4. Apparel Jobs and Gender Status: Is Latin America Different?

As discussed above, our sample includes 19 Latin and Caribbean countries along with a larger number of countries from Asia, Africa and the Middle East. Much of the literature on apparel factories and gender has focused on Asia, in part due its rapid growth as a textile export sector. Latin America not only has higher incomes (and wages) on average that most Asian and African countries, but historically has had less gender bias (as measured by "missing women" for example). Note that Table 4 only places three Latin countries on the high secondary enrollment gender bias list: Peru, Bolivia and Mexico. One the other hand, several Latin Apparel exporters, including El Salvador, Honduras and Nicaragua are poor and have rapid growth in apparel exports. In fact, five of the top 10 garment exporters, measured as apparel export share, are Latin American countries, see Table 1. This section reruns selected regressions from Tables 1-7 above.

We also look more closely at the status of women in several exporting countries using the excellent CEDLAS-World Bank and CEPAL databases on wage differentials, educational attainment by gender and trends in inequality and poverty. Figure 3 shows CEDLAS survey data on women's vs. men's educational attainment by age group and total average years of education in three major Latin garment exporters. Note that the educational attainment of women 41-50 is just 74-86% of men's, but by the mid 1990s, women age 10-20 had as much or more education than men. The factors at work in these countries include government policy and higher incomes generally, but there is no evidence of a fixed educational gender gap in these apparel exporting economies. In fact, in Honduras and El Salvador women overtake men in educational attainment in the 1990s (albeit overall educational attainment remains low). Whether or not this is mainly a product of female employment opportunities or government policy is a topic for further study (in

many other Latin countries women have closed the education attainment gap, but few so quickly as Honduras, Bolivia and El Salvador).[10]

5. Conclusions

The somewhat arbitrary allocation of MFA apparel quotas to many of the poorest countries in Africa, Asia and Latin America provides a natural experiment for assessing the impact of export led growth on the status of women. The January 2005 official end of MFA quotas and China's entrance to the WTO imply many of these apparel exporters may soon relocate. The response of policy-makers to the closing of these plants depends on how one assesses the cost and benefits of these low-wage jobs. To the extent that one views these jobs as exploitive dead end jobs for young women, the loss of apparel export quota may not be such a bad thing. Ridao-Cano and Wood (1999) and Vijaya (2003) both argue labor intensive exports are a lose-lose proposition: displacing low wage workers and increasing inequality in OECD nations and perpetuating the skills-education gap between North and South and between men and women.

We attempt to bring evidence to bear on these arguments by using apparel and footwear export growth to OECD countries over the period 1970 to 2003 as proxies for quota allocation. Our focus is on the impact of these factories on women's status. Male and female primary and secondary enrollment rates and birth rates (fertility) are regressed on apparel exports, total exports and per capita income. The fixed effects from these panel regressions are used both to control for unobserved, country specific factors affecting enrollment and birthrates, and to classify countries, somewhat arbitrarily, as low and high gender bias countries.

[10] According to the World Bank-CEDLAS data, comparing women 10-19 years old with their mothers age 41-50 the relative gains in educational status are over 30% in these three countries, much higher than similar differentials in any other Latin country—see Figure 3.

Apparel and footwear exports had a strong positive impact on secondary education. Evidently, apparel and footwear jobs are not a substitute for secondary school attendance (where secondary means 6th grade or above). Moreover, the effects on secondary education are strongest in countries where gender bias is highest. These industries may "exploit" the disadvantages of women workers in these countries, but they also boost school attendance and reduce birth rates in countries with high gender bias (though the differences in fertility rates and child labor are not as significant). These results are consistent with industry surveys showing garment workers delay marriage and have higher than average and increasing years of schooling.

These findings do not support the fears of Ridao-Cano and Wood (1999) that expanded low-wage exports discourage human capital investment in low income countries. We also find no support for Vijaya's(2003) argument that trade does not close gender gaps in countries where those gaps are large to begin with. In fact, we find the opposite: the impact of apparel exports is greatest in countries where gender bias is greatest. It true that both of these papers focus on total exports, but there arguments focus on the impact of labor intensive, low wage exports of which apparel and footwear are examples par excellence. Their key theoretical arguments and empirical findings should be evident for apparel and footwear exports, but they are not.

Finally, using fixed effects estimates of gender bias, we classify countries into high and low bias groups and re-estimate same equations. We find the effect of apparel exports is greater in countries with high gender bias. This pattern is replicated for primary enrollments and fertility, but the difference in the effects is only statistically significant for secondary enrollment (in the sense that we can reject the hypothesis of equal coefficients for both groups of countries with a high degree of confidence).

Certainly, Asia has most of the largest garment and footwear exporters – including Bangladesh, India, China, Indonesia and more recently Vietnam and Cambodia. However, a

number of Latin American countries including El Salvador, Mexico, Honduras and Nicaragua have seen rapid expansion of garment exports during the waning years of the MFA. Part of the reason Latin exporters fear competition from Asia post-MFA is that they tend to have higher incomes and pay higher wages. Using the nineteen Latin American countries in our sample we re-estimate the core equations for school enrollment and fertility. While the effects on fertility are less pronounced, as on might expect, the impacts on school enrollments and child labor are stronger. In particular, survey data on educational attainment (see Figure 3) suggest gender convergence proceeded apace during the 1990s in even the poorest Latin exporters (Honduras, El Salvador and Nicaragua).

If Latin countries lose export share to China and other Asian exporters during the post MFA era, alternative employment opportunities for women should become a priority for policy makers and trade negotiators. Latin countries have a strong geographic advantage vis-à-vis the U.S. market, which some factory owners in Honduras and Nicaragua seem to be exploiting to keep their factories open. To the extent that policy makers in these countries are concerned with gender bias, they should work to keep these factories operating as well.

REFERENCES

Artecona, R. and W. Cunningham. (2002) "Effects of Trade Liberalization on the Gender Gap in Mexico" Policy Research Report on Gender and Development, Working Paper 21. World Bank, Washington, D.C.

Cunningham, Wendy and Carlos Ramos Gomez (2004) "The Home as Factory Floor Employment and Remuneration of Home-based Workers" World Bank Working Paper 3295, Wash. D.C.

Baslevent, Cem And Ozlem Onaran (2004), "The Effect of Export-Oriented Growth on Female Labor Market Outcomes in Turkey," *World Development* Vol. 32, No. 8, pp. 1375–1393.

Behrman, Jere R., A. R. Foster, M. Rosenzweig, and P. Vashishtha (1999), "Women's Schooling, Teaching, and Economic Growth," *Journal of Political Economy*,107:4, 682-714.

Davis, Don and Prachi Mishra (2005), "Stolper-Samuelson is Dead and Other Crimes of Both Theory and Data," Columbia University, NBER and IMF.

Galor, Oded and David Weil (1996) The Gender gap, Fertility and Economic Growth, *The American Economic Review*, 86:3,374-87.

Harrison, Ann (2005) "Globalization and Poverty: Introduction" January draft, NBER conference volumes, Boston MA, University of Chicago Press, forthcoming.

Kabeer, Naila (2000) *The Power to Choose: Bangladeshi Women and the Labour Market Decisions in London and Dhaka* (Verso, London).

Kremer, M. and D. Chen (1999) "Income Distribution Dynamics with Endogenous Fertility" A*merican Economic Review*, 89:2, 155-160.

Leamer, Edward E. (1998), "In Search of Stolper-Samuelson Linkages," in *Imports, Exports, and the American Worker*, edited by Susan M. Collins, Washington, D.C.: Brookings Institution.

Mammen, Kristin and Christina Paxson (2000), "Women's Work and Economic Development, "*The Journal of Economic Perspectives*, vol. 14, No. 4, (autumn), 141-164.

Nicita, A., and S. Razzaz.(2003) "Who Benefits and How Much? How Gender Affects Welfare Impacts of a Booming Textile Industry." Policy Research Working Paper 3029. World Bank, Washington, D.C.

Pangestu, Mari and Medellina Hendytio (1997), "Survey Responses from Women Workers in Indonesia's Textile, Garment, and Footwear Industries," Policy Research WP 1755, The World Bank East Asia Country Department, Indonesia Policy and Operations Division.

Paul-Majumber, Pratima and Anwara Begum (2000), "The Gender Imbalances in the Export Oriented Garment Industry in Bangladesh," Policy Research Report on Gender and Development, Working Paper Series No. 12.

Prasad, Eswar S., Kenneth Rogoff, Shang-Jin Wei, and M. Ayhan Kose (2004), "Effects of Financial Globalization on Developing Countries: Some Empirical Evidence" NBER forthcoming in Ann Harrison, ed., *Globalization and Poverty*, University of Chicago Press.

Ridao-Cano, Cristobal and Adrian Wood (1999), "Skill, Trade and International Inequality," Oxford Economic Papers 51 (1999), 89-119. Oxford University Press.

Sachs, Jeffrey (2005) *The End of Poverty: Economic Possibilities for our Time*, Penguin Press, NY.

Sen, Amartya (1999) *Development as Freedom* (Anchor Books, NY).

Vijaya, Ramya (2003), "Trade, Skills and Persistence of Gender Gap: A Theoretical Framework for Policy Discussion," Working Paper, 2003, International Gender and Trade Network, Washington DC

Wei, Shang-Jin, and Yi Wu (2002) "The Life-and-Death Implications of Globalization," forthcoming IMF Working Paper (Washington: International Monetary Fund).

World Bank (2004) The Impact of International Trade on Gender Inequality" *PREMnotes* 86, May.

Table 1: Major Exporters of Footwear and Apparel (ranked by share of total exports)

		Exports of Apparel plus Footwear 1995-2003				Exports of Apparel 1995-2003		
	Country	Exports 1/ Billions $US	Change 95-99 to 00-03	% of Exports	% PPP GDP	Exports Billions $US	% of Exports	% PPP GDP
1	Honduras	$18.5	46%	92%	13.2%	$18.5	92%	13.2%
2	Bangladesh	$37.5	46%	70%	2.2%	$37.1	69%	2.1%
3	Cambodia	$8.4	142%	55%	4.4%	$7.8	51%	4.1%
4	Haiti	$1.9	43%	52%	1.6%	$1.9	52%	1.6%
5	El Salvador	$12.0	54%	43%	4.8%	$11.9	43%	4.8%
6	Sri Lanka	$20.5	20%	40%	3.9%	$20.2	40%	3.8%
7	Guatemala	$11.9	53%	38%	3.1%	$11.9	38%	3.1%
8	Nicaragua	$2.6	81%	35%	1.9%	$2.6	35%	1.9%
9	Tunisia	$26.5	15%	33%	5.3%	$25.1	31%	5.0%
10	Mauritius	$8.1	3%	33%	8.4%	$8.1	33%	8.4%
11	Dominican Republic	$20.9	7%	33%	5.0%	$20.1	31%	4.8%
12	Macao, China	$15.9	14%	31%	21.9%	$14.9	29%	20.5%
13	Madagascar	$2.4	54%	28%	2.3%	$2.4	28%	2.3%
14	Morocco	$24.0	15%	25%	2.7%	$22.8	24%	2.6%
15	Vietnam	$30.2	72%	23%	2.2%	$14.4	11%	1.1%
16	Singapore	$5	16%	22%	0.6%	$5	21%	0.6%
17	Pakistan	$17.3	27%	18%	0.8%	$17.1	18%	0.8%
18	China	$398.5	33%	17%	1.0%	$282.4	12%	0.7%
19	Jamaica	$3.6	-75%	13%	4.3%	$3.6	13%	4.2%
20	Costa Rica	$7.2	-11%	12%	2.7%	$7.2	12.3%	2.6%
21	Indonesia	$52.8	7%	10%	1.0%	$36.3	7.0%	0.7%
22	India	$47.7	21%	9%	0.2%	$44.15	8.7%	0.21%
23	Philippines	$22.8	2%	7%	0.9%	$21.49	6.6%	0.83%
24	Thailand	$37.5	18%	6%	1.1%	$30.3	4.4%	0.9%
25	Mexico	$62.8	39%	5%	0.9%	$60.3	4.7%	0.8%
26	Peru	$3.5	52%	5%	0.3%	$3.5	4.7%	0.3%
27	Jordan	$1.4	263%	4%	0.8%	$1.4	4.4%	0.8%

1/ Exports are total exports of Apparel (STIC 84) plus Footwear (STIC 85) to the largest OECD countries as reported by SourceOECD.org June 2005 (U.S., Germany, Japan, UK, France, Italy, Canada, Spain, Ireland, Canada, Australia, Netherlands Sweden, Belguim-Lux, Austria, Norway, Denmark, and Switzerland. Exports are measured as a share of current $PPP GDP to mitigate the impact of real exchange rate fluctuations. The GDP $PPP estimates are from the PWT 6.1 updated using similar estimates World Bank WDI 2005 online (the source of the total exports of goods and services and real per capital GDP $PPP).

Table 2: Exports and Gross Secondary Enrollment by Gender (5 yr Averages 1975-2003)

Dependent Variable: (t-statistics in parentheses)	2.1 Secondary Enrollment			2.2 Secondary Enrollment			2.3	
	Total	Female	Male	Total	Female	Male	Female	Male
Apparel/footwear export share[1/] (previous five year period)	**0.10** *(5.8)*	**0.13** *(5.7)*	**0.08** *(5.3)*	**0.05** *(3.6)*	**0.06** *(3.9)*	**0.03** *(2.7)*	**0.06** *(3.9)*	**0.03** *(2.7)*
Real Per Capital Income $PPP (log level)	**0.35** *(4.7)*	**0.44** *(5.7)*	**0.29** *(4.1)*	**0.02** *(0.6)*	**0.07** *(2.0)*	**-0.03** *-(0.9)*	**0.07** *(2.0)*	**-0.03** *-(0.9)*
Total $PPP GDP Export Share (previous five year period)				**0.15** *(4.0)*	**0.11** *(3.7)*	**0.17** *(3.9)*	**0.11** *(3.7)*	**0.17** *(3.9)*
Gross Secondary Enrollment [2/] (previous five year period)							**0.76** *(10.1)*	**0.60** *(5.5)*
Constant	**1.55** *(2.6)*	**0.98** *(1.5)*	**2.00** *(3.6)*	**1.87** *(5.7)*	**0.98** *(2.3)*	**2.47** *(9.7)*	**0.98** *(2.3)*	**2.47** *(9.7)*
Number of Observations	228	228	228	226	226	226	226	226
Number of Countries	48	48	48	48	48	48	48	48
Estimation Method [3/]	FE	FE	FE	FE	FE	FE	FE	FE
Hausman Test Random Effects [3/]	8.1	10.4	5.5	56.6	40.5	35.8	40.5	35.8
Hausman Test Prob value	1.8%	0.6%	6.5%	0.0%	0.0%	0.0%	0.0%	0.0%
Adjusted R^2	0.90	0.91	0.88	0.96	0.96	0.94	0.96	0.94
Mean of the dependent variable [4/]	3.84	3.79	3.87	3.84	3.79	3.87	3.79	3.87
Std Error of Regression	*0.19*	*0.21*	*0.19*	*0.12*	*0.13*	*0.14*	*0.13*	*0.14*

1/ Exports are total exports of Apparel (STIC 84) plus Footwear (STIC 85) to the largest OECD ctys (see Table 1).

2/ Lagged gross secondary enrollment was used for all equations.

3/ Cross section fixed effects ("fixed") tested against the alternative random effects specification. The chi-square statistic for rejecting the null of random effects is reported here, which may be significant at the 1% (**) or 5% (*) level.

4/ All variables were transformed to natural logs for estimation purposes.

Table 3: Apparel Exports and Gross Primary Enrollment (5 yr Avgs 1975-2003)

Dependent Variable:	3.1			3.2			3.3	
Log Gross primary enrollment	Total	Female	Male	Total	Female	Male	Female	Male
Apparel/footwear export share[1/]	**0.02**	**0.02**	**0.01**	**0.02**	**0.02**	**0.013**	**0.01**	**0.004**
(previous five year period)	*(4.0)*	*(4.5)*	*(2.7)*	*(3.9)*	*(4.2)*	*(3.4)*	*(3.1)*	*(1.0)*
Real Per Capital Income $PPP	**0.06**	**0.09**	**0.03**	**0.07**	**0.11**	**0.00**	**0.011**	**-0.05**
(t-statistics in parentheses)	*(2.6)*	*(3.3)*	*(1.8)*	*(2.7)*	*(3.4)*	*(0.2)*	*(0.5)*	*-(2.4)*
Total Export Share of GDP				**-0.02**	**-0.03**	**0.04**	**0.05**	**0.07**
(previous five year period)				*-(0.8)*	*-(1.1)*	*(5.1)*	*(2.8)*	*(6.2)*
Gross Primary Enrollment [2/]							**0.83**	**0.49**
(previous five year period)							*(8.0)*	*(7.9)*
Constant	**4.2**	**4.0**	**4.4**	**4.1**	**3.8**	**4.7**	**0.9**	**2.9**
	(23)	*(17)*	*(27)*	*(17.7)*	*(12.9)*	*(26.8)*	*(1.4)*	*(7.6)*
Number of Observations	235	234	234	234	234	233	234	233
Number of Countries	49	49	49	49	49	49	49	49
Estimation Method 3/	RE	RE	RE	RE	RE	FE	FE	FE
Hausman F-Test for RE null[4/]	0.8	1.6	0.5	5.1	2.5	9.5	19.8	30.0
Hausman Prob. Value	68%	45%	80%	16%	47%	2%	0%	0%
Adjusted R^2	0.53	0.46	0.60	0.54	0.46	0.71	0.89	0.79
Dependent variable mean [5/]	1.19	1.10	1.36	1.23	1.11	4.61	4.55	4.61
Std Error of Regression	*0.09*	*0.11*	*0.08*	*0.09*	*0.11*	*0.08*	*0.08*	*0.07*

1/ Exports are average annual exports of Apparel (ISIC 84) plus Footwear (ISIC 85) as a share of current $PPP GDP (see Table 2 footnote 1 for more details).

2/ The log of the prior five year interval's total gross primary enrollment (not gender specific).

3/ Cross section fixed effects (FE) or random effects (RE) selected using a 5% critical value for the Hausman Test.

4/ The null of this Hausman test is that the random effects are uncorrelated with the error term.

5/ All variables were transformed to natural logs for estimation purposes.

Table 4: "Unobserved" Gender Bias Estimates (fixed effects from eqs. 2.3 in Table 2)

Male Secondary Enrollment bias				Female Secondary Enrollment bias			
Cty -Rank [1/]	F: Female Enrollment	M: Male Enrollment	Difference F-M 2/	Cty -Rank [1/]	F: Female Enrollment	M: Male Enrollment	Difference F-M 2/
Pakistan	-0.43	0.00	-0.43	Thailand	0.01	-0.01	0.03
Cambodia	-0.57	-0.17	-0.41	Uruguay	0.12	0.09	0.03
India	0.00	0.40	-0.40	Trinidad and Tobago	0.07	0.02	0.05
Cote d'Ivoire	-0.57	-0.17	-0.40	South Africa	0.35	0.28	0.06
Bangladesh	-0.08	0.24	-0.32	Sri Lanka	0.11	0.05	0.06
Morocco	-0.24	0.00	-0.24	Uzbekistan	0.38	0.31	0.07
Tunisia	-0.18	0.03	-0.21	Malaysia	-0.17	-0.24	0.07
Korea, South	-0.12	0.05	-0.17	Jamaica	-0.10	-0.17	0.07
Oman	0.10	0.27	-0.17	Kenya	-0.06	-0.14	0.09
China	0.03	0.20	-0.17	Colombia	0.23	0.14	0.09
Egypt	0.17	0.33	-0.17	Costa Rica	-0.12	-0.21	0.09
Senegal	-0.40	-0.26	-0.14	Chile	0.24	0.13	0.10
Peru	0.21	0.33	-0.12	El Salvador	0.01	-0.10	0.11
Mauritius	-0.24	-0.13	-0.10	Ecuador	0.16	0.03	0.12
Hong Kong	-0.43	-0.33	-0.10	Haiti	0.08	-0.06	0.14
Israel	-0.10	-0.01	-0.09	Jordan	0.17	0.01	0.16
Macao, China	-0.36	-0.27	-0.08	Panama	-0.09	-0.25	0.16
Mexico	0.08	0.14	-0.06	Brazil	0.35	0.18	0.17
Indonesia	0.01	0.07	-0.06	Paraguay	0.25	0.07	0.19
Bolivia	0.13	0.14	-0.01	Dominican Republic	0.08	-0.21	0.29
Argentina	0.36	0.37	-0.01	Honduras	-0.04	-0.37	0.33
Philippines	0.13	0.12	0.01	Tanzania	-0.36	-0.71	0.35
Vietnam	0.22	0.21	0.01	Nicaragua	0.35	-0.03	0.38
Guatemala	-0.08	-0.11	0.02	Venezuela	0.28	-0.18	0.46

1/ Countries are listed from high to low bias, based on the definition of bias discussed in the next note. Cote d Ivoire exhibits the most gender underperformance in secondary enrollment, while Venezuela exhibited the least bias.
2/ These are the fixed effects from equation 2.2 in Table 2. A negative sign indicates a lower than expected enrollment in secondary education given that countries per capita income and export performance. This "unobserved" effect may also reflect factors other than discrimination. However these factors should also affect male enrollment, so bias is measured as female underenfollment minus male underenrollment (the third column). Note that is median bias country, Jamaica, was dropped to make each group the same size.

Table 5: Exports and Gross Secondary Enrollment by Gender (5 yr Averages 1970-2003)

	5.1 Low Gender Bias Ctys			5.2 High Gender Bias Ctys		
Dependent Variable:	Total	Female	Male	Total	Female	Male
(t-statistics in parentheses)	Enrollment	Enrollment	Enrollment	Enrollment	Enrollment	Enrollment
	A	B	C	A	B	C
Apparel/footwear export share[1/]	**0.034**	**0.038**	**0.027**	**0.057**	**0.088**	**0.034**
(previous five year period)	*(1.9)*	*(2.4)*	*(1.4)*	*(6.6)*	*(5.7)*	*(3.8)*
Real Per Capital Income $PPP	**0.02**	**0.06**	**-0.05**	**0.04**	**0.08**	**0.01**
	(0.3)	*(0.7)*	*-(0.6)*	*(1.8)*	*(3.6)*	*(0.7)*
Total Export Share of GDP	**0.14**	**0.09**	**0.19**	**0.13**	**0.09**	**0.14**
(previous five year period)	*(3.0)*	*(1.8)*	*(4.0)*	*(3.5)*	*(2.1)*	*(3.8)*
Gross Secondary Enrollment [2/]	**0.88**	**0.88**	**0.90**	**0.53**	**0.67**	**0.44**
(previous five year period)	*(7.6)*	*(9.6)*	*(6.6)*	*(10.5)*	*(10.2)*	*(10.9)*
Constant	**0.9**	**0.5**	**1.4**	**2.2**	**1.3**	**2.7**
	(1.0)	*(0.6)*	*(1.4)*	*(12.0)*	*(4.3)*	*(15.0)*
Number of Observations	104	104	104	108	108	108
Number of Countries	22	22	22	23	23	23
Estimation Method 3/	FE	FE	FE	FE	FE	FE
Adjusted R^2	0.96	0.97	0.94	0.96	0.96	0.95
Mean of the Dependent Variable	3.81	3.83	3.78	3.88	3.75	3.96
Std Error of Regression	0.13	0.13	0.15	0.10	0.13	0.10
Mean Secondary Enrollment (%)	45%	46%	44%	48%	43%	53%
Wald Test for Equal Coefs (F-test)	1.76	10.2	0.12	7.11	10.6	0.55
Prob. Value	19%	0%	73%	1%	0%	46%
Difference	-0.02	-0.05	-0.01	0.02	0.05	0.01
Std Error	*(0.02)*	*(0.02)*	*(0.02)*	*(0.01)*	*(0.02)*	*(0.01)*

1/ Exports of Apparel ISIC 84) plus Footwear (ISIC 85) to the major OECD countries and total exports are measured as a share U.S. dollar GDP in international prices ($PPP). See Table 2 note 1 for more details.

2/ The log of the previous five year averagegross secondary enrollment was used for all equations.

3/ Cross section fixed effects estimates with White Heteroscedasticity consistent cross-section std. errors.

Table 6: Fertility Decline Random effects from eq. 7.1

Lower than expected Fertility Rates				Higher than expected Fertility Rates			
	Random	Fertility Rate			Random	Fertility Rate	
Country [1/]	Effect	1985-94	1995-2003	**Country** [1/]	Effect	1985-94	1995-2003
Tanzania	-0.55	6.2	5.3	Uruguay	0.04	2.5	2.3
China	-0.47	2.2	1.9	Mexico	0.06	3.4	2.5
Bangladesh	-0.38	4.3	3.1	Haiti	0.06	5.4	4.5
Vietnam	-0.36	3.6	2.1	Costa Rica	0.06	3.2	2.5
Thailand	-0.36	2.4	1.9	Ecuador	0.07	3.8	2.9
Hong Kong	-0.36	1.3	1.0	Madagascar	0.07	6.3	5.5
Macao, China	-0.32	1.8	1.2	South Africa	0.09	3.4	2.9
Brazil	-0.18	2.8	2.2	Paraguay	0.09	4.7	4.0
Chile	-0.18	2.6	2.2	Kenya	0.10	5.8	4.8
Korea, South	-0.17	1.8	1.5	Peru	0.10	3.7	2.9
Indonesia	-0.17	3.1	2.6	Cote d'Ivoire	0.11	6.3	4.9
India	-0.16	3.9	3.1	Panama	0.12	3.0	2.5
Trinidad and Tobago	-0.16	2.4	1.8	Egypt	0.15	4.1	3.4
Venezuela	-0.15	3.5	2.9	Dominican Republic	0.16	3.4	2.9
Mauritius	-0.09	2.2	2.0	Jamaica	0.17	3.0	2.5
Cambodia	-0.08	5.6	4.2	Bolivia	0.20	4.9	4.0
Colombia	-0.08	3.1	2.6	Guatemala	0.20	5.4	4.6
Sri Lanka	-0.07	2.6	2.1	Nicaragua	0.21	4.8	3.6
Senegal	-0.06	6.2	5.2	Israel	0.31	2.9	2.8
Argentina	-0.04	2.9	2.5	Malaysia	0.33	3.8	3.1
El Salvador	0.01	3.9	3.2	Honduras	0.35	5.2	4.3
Morocco	0.02	4.1	3.0	Philippines	0.37	4.2	3.5
Pakistan	0.03	5.9	4.8	Jordan	0.41	5.4	3.8
Tunisia	0.03	3.6	2.2	Oman	0.47	7.5	4.5
Average	-0.18	3.4	2.7	Average	0.18	4.4	3.5

1/ Countries are listed from lower to higher than expected fertility rates using randoem effects estimates from eq. 7.1.

2/ These are the random effects from equation 7.1 in **Table 7.1** A negative sign indicates a lower than expected fertility rate given that countries per capita income and export performance (as measured in this equation).

Table 7: Exports and Fertility Rates (5 yr Averages 1975-2003)

Dependent Variable: (t-statistics in parentheses)	**7.1 All Countries**	**7.2 Lower Fertility Ctys**	**7.3 Higher Fertility ctys**
Apparel/footwear export GDP share[1/]	**-0.05**	**-0.04**	**-0.05**
(previous five year period)	*-(7.9)*	*-(4.4)*	*-(6.8)*
Real Per Capital Income $PPP	**-0.08**	**-0.08**	**-0.005**
(previous five year period)	*-(2.1)*	*-(1.7)*	*-(0.1)*
Female Gross Secondary Enrollment	**-0.34**	**-0.39**	**-0.33**
(previous five year period)	*-(12.0)*	*-(9.3)*	*-(10.2)*
Export Share of GDP $PPP	**-0.04**	**-0.06**	**-0.04**
(previous five year period)	*-(1.6)*	*-(1.8)*	*-(1.1)*
Constant	**2.7**	**2.8**	**2.3**
	(9.2)	*(7.7)*	*(6.6)*
Number of Observations	230	113	117
Number of Countries	48	24	24
Estimation Method 3/	RE	RE	RE
Hausman F-test Random Effects Null [4/]	5.48	8.80	4.69
Hausman Test Prob Value	24%	6.6%	32%
Adjusted R^2	0.71	0.78	0.73
Mean of the dependent variable [5/]	0.22	0.25	0.45
Std Error of Regression	0.10	0.09	0.09
Wald F- Test of for equal coefficients 3/		2.8	3.5
prob value		9.9%	6.5%
Difference		0.013	-0.013
Std Error		0.008	0.007

1/ Exports are total exports of Apparel ISIC 84) plus Footwear (ISIC 85) to major OECD countries as a share of current dollar GDP in international prices ($PPP). See Table 1 footnote 1 for more details.

2/ Random effects from eq. 7.1 (see Table 6) are used to sort countries into two equal groups, one with higher than predicted fertility rates (eq 7.2) and another group with lower than expected fertility rates (eq. 7.3).

3/ We cannot reject the hypothesis of equal apparel exports impacts on fertility between eqs. 7.2 and 7.3, but . using a 10% confidence level we would reject the null of equal coefficients.

4/ The Hausman test null is the random effects (RE) assumption of no correlation between the fixed effects and the error term

5/ All variables are in natural logs, this is the transformed mean fertility rate.

Table 8: Asia vs. Latin America School Enrollment (5 yr Averages 1970-2003)

	Asia & Africa Only				Latin Countries Only			
	Primary		Secondary		Primary		Secondary	
Dependent Variable:	**8.1**	**8.2**	**8.3**	**8.4**	**8.5**	**8.6**	**8.7**	**8.8**
(Robust SE t-statistics)	Male	Female	Male	Female	Male	Female	Male	Female
Apparel/footwear export share[1/]	**0.01**	**0.03**	**0.06**	**0.12**	**0.02**	**0.02**	**0.09**	**0.10**
(previous five year period)	*(3.1)*	*(6.5)*	*(6.9)*	*(9.2)*	*(2.9)*	*(3.2)*	*(3.3)*	*(4.1)*
Real Per Capital Income $PPP	**0.02**	**0.11**	**0.38**	**0.56**	**-0.07**	**-0.07**	**-0.04**	**0.02**
(previous five year period)	*(0.8)*	*(4.3)*	*(24.9)*	*(42.0)*	*-(0.7)*	*-(0.7)*	*-(0.2)*	*(0.1)*
Total Exports $PPP GDP share	**0.04**	**-0.01**	**-0.04**	**-0.18**	**0.03**	**0.04**	**0.11**	**0.12**
(previous five year period)	*(3.0)*	*-(0.3)*	*-(0.6)*	*-(1.8)*	*(1.4)*	*(1.7)*	*(1.3)*	*(1.7)*
Constant	**4.5**	**3.73**	**1.0**	**-0.57**	**5.4**	**5.4**	**5.0**	**4.67**
	(17.5)	*(14.9)*	*(3.4)*	*-(2.1)*	*(6.7)*	*(6.2)*	*(2.9)*	*(2.7)*
Number of Observations	129	130	129	129	89	89	88	88
Number of Countries	27	27	27	27	18	18	18	18
Estimation Method 3/	FE	FE	FE	FE	FE	FE[5/]	FE	FE
Adjusted R^2	0.76	0.81	0.95	0.94	0.51	0.58	0.68	0.73
Mean of the Dependent Variable	4.58	4.48	3.81	3.62	4.65	4.63	3.85	3.92
Std Error of Regression	0.08	0.12	0.15	0.21	0.09	0.09	0.24	0.22
Wald Test: Male vs. Female		0.00%		0.00%		94%		86%
Wald Test: LatAm vs. Asia & Africa		0.28%		5%		1%		28%
Hausman F-Testl[4/]	10	0.6	8	3	4.5	4.7	7.1	8.3
Hausman Test Prob Value	1.9%	90%	5.1%	35.5%	22%	19%	7%	4%

1/ Exports are total exports of Apparel ISIC 84) plus Footwear (ISIC 85) to the major OECD countries as a share of current dollar GDP in international prices ($PPP). See Table 2 note 1 for more details.

2/ The log of the previous five year averagegross secondary enrollment was used for all equations.

3/ Cross section fixed effects (FE) or random effects (RE) estimates selected using the Hausman test reported here

4/ This null hypothesis of this Hausman test is that Random Effects are not correleated with the error term.

5/ All equations are reported with fixed effects (FE) even though the Hausman F-test does not reject the null of random effects. To make comparison easier and because RE estimates were very close to FE estimates, only FE are reported here.

Table 9: Child Labor Force Participation Rate and Overall Growth Impacts (1975-2003)

	Child Labor[4/]			Real GDP growth per capita		
Dependent Variable: (t-statistics in parentheses)	All Countries	Latin America	Asia-Africa	All Countries	Latin America	Asia-Africa
Apparel/footwear export share[1/]	**-0.13**	**-0.15**	**-0.12**	**0.005**	**0.006**	**0.003**
(previous five year period)	*-(4.2)*	*-(3.6)*	*-(3.3)*	*(3.2)*	*(2.8)*	*(2.4)*
Real Per Capital Income $PPP	**-0.76**	**-0.23**	**-0.92**	**-0.04**	**-0.002**	**-0.04**
(previous five year period)	*-(5.6)*	*-(1.1)*	*-(5.6)*	*(2.6)*	*-(0.2)*	*(3.4)*
Total Export Share of GDP	**-0.07**	**-0.06**	**-0.04**	**-0.01**	**0.03**	**0.003**
(previous five year period)	*-(0.1)*	*(0.2)*	*-(0.3)*	*-(0.8)*	*(3.1)*	*(2.6)*
Female Gross Primary Enrollment				**0.034**	**0.031**	**0.035**
(previous five year period)				*(2.1)*	*(1.3)*	*(3.4)*
Constant	**7.1**	**2.7**	**8.5**	**0.2**	**-0.1**	**1.2**
	(6.6)	*(1.7)*	*(6.0)*	*(2.6)*	*-(1.4)*	*(1.1)*
Number of Observations	198	84	103	180	89	101
Number of Countries	47	18	26	48	18	22
Estimation Method 3/	Fixed 3/	Fixed 3/	Fixed 3/	Fixed 3/	Random	Fixed 3/
Adjusted R^2	0.90	0.93	0.90	0.63	0.22	0.51
Std Error of Regression	0.42	0.33	0.48	0.02	*0.02*	0.02
Hausman Test Random vs. Fixed effects	11.9			25.1	5.2	12.2
(prob value reject null of Random effects)	1%			0%	27%	2%

1/ Exports are total exports of Apparel ISIC 84) plus Footwear (ISIC 85) to the major OECD countries as a share of current dollar GDP in international prices ($PPP). See Table 2 note 1 for more details.

2/ Among the enrollment variables, gross primary female enrollment was the most correlated with per capita GDP growth It serves as a proxy for the growth of the human capital stock in these growth equations.

3/ Cross section or random fixed effects estimates as suggested by Hausman test.

4/ Log 5 yr. average labor force participation by children age 11-14 (source: WDI 2005 Online database).

Table 10: Asia vs. Latin America Child Labor (5 yr Averages 1970-2003)

	Higher Child Labor		Low Child Labor		Asia-Africa Only		Latin America	
Dependent Variable:	Highest	Highest	Lowest	Lowest	Asia	Asia	Latam	Latam
(t-statistics in parentheses)	CL share	CL share	CL share	CL share	CL share	CL share	CL share	CL share
Apparel/footwear export share[1/]	**-0.048**	**-0.049**	**-0.24**	**-0.21**	**-0.12**	**-0.08**	**-0.15**	**-0.13**
(previous five year period)	*-(3.2)*	*-(3.4)*	*-(3.9)*	*-(3.3)*	*-(3.3)*	*-(2.8)*	*-(4.8)*	*-(4.3)*
Real Per Capital Income $PPP	**-0.26**	**-0.50**	**-2.75**	**-1.75**	**-0.92**	**-1.22**	**-0.23**	**-0.35**
	-(1.8)	*-(5.8)*	*-(2.6)*	*-(3.5)*	*-(5.6)*	*-(5.5)*	*-(0.7)*	*-(1.3)*
Total Export Share of GDP	**-0.07**	**-0.01**	**-0.02**	**0.06**	**-0.04**	**-0.07**	**-0.06**	**-0.24**
(previous five year period)	*-(0.8)*	*-(0.1)*	*(0.0)*	*(0.2)*	*-(0.2)*	*-(0.5)*	*-(0.3)*	*-(1.5)*
Constant	**4.5**	**6.5**	**22.0**	**13.8**	**8.5**	**10.9**	**2.7**	**3.2**
	(3.6)	*(8.3)*	*(2.5)*	*(3.1)*	*(6.0)*	*(5.7)*	*(1.0)*	*(1.3)*
Number of Observations	82	82	59	59	104	104	84	84
Number of Countries	17	17	17	17	28	27	18	18
Estimation Method 3/	Fixed 3/	Random	Fixed 3/	Random	Fixed 3/	Random	Fixed 3/	Random
Adjusted R^2	0.90	0.48	0.78	0.26	0.90	0.37	0.93	0.12
Std Error of Regression	0.17	0.18	0.64	0.67	0.48	0.50	0.33	0.36
Hausman Test of Random effects 4/		6.7		21		16		15.3 **

1/ Exports are total exports of Apparel ISIC 84) plus Footwear (ISIC 85) to the major OECD countries as a share of current dollar GDP in international prices ($PPP). See Table 2 note 1 for more details.

2/ The log of the previous five year averagegross secondary enrollment was used for all equations.

3/ Both cross section fixed and Random effects estimates reported for these equations.

4/ Chi -Square Statistic - Correlated Random Effects - Hausman Test. * significant at 1%, ** significant at 5%

Table 14: Return to Schooling by Gender

	Return to Primary School			Return to Secondary School		
	Men	Women	Women's excess	Men	Women	Women's excess
Dominican Republic				**Dominican Republic**		
1995	22%	39%	18%	11%	49%	37%
1997	25%	28%	3%	11%	55%	45%
Change	3%	-11%	-14%	-1%	7%	7%
El Salvador				**El Salvador**		
1991	23%	19%	-5%	35%	54%	19%
1995	16%	16%	0%	43%	74%	30%
2000	14%	23%	9%	35%	22%	-13%
Change	-9%	5%	14%	0%	-32%	-32%
Honduras				**Honduras**		
1990	37%	35%	-2%	62%	118%	56%
1995	24%	38%	14%	62%	89%	28%
1999	33%	41%	8%	65%	80%	14%
Change	-4%	6%	10%	3%	-38%	-41%
Mexico			-	**Mexico**		
1992	33%	22%	-11%	50%	105%	55%
1996	30%	28%	-2%	69%	86%	17%
2000	35%	19%	-15%	45%	66%	21%
Change	2%	-2%	-4%	-5%	-39%	-33%
Nicaragua				**Nicaragua**		+
1993	19%	7%	-12%	29%	19%	-11%
1998	35%	13%	-21%	29%	24%	-5%
Change	16%	6%	-9%	0%	5%	6%
Costa Rica				**Costa Rica**		
1990	14%	21%	7%	44%	51%	7%
1995	16%	20%	4%	37%	43%	6%
2000	8%	2%	-5%	38%	46%	8%
Change	-7%	-19%	-12%	-6%	-4%	2%