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Male vs. Female Guest-Worker Migration: Does it Matter for Fertility in the Source Country?*

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Abstract

Men's additional income from their guest-worker employment generates a pure income effect, which increases fertility. The timing of women's higher-wage employment relative to child bearing is crucial for its effect on fertility. If women work abroad during the same time period when they can bear children, their additional income generates a substitution effect, which reduces fertility. In contrast, if the time period when women work abroad does not coincide with the period when they bear children, their additional income generates the income effect on fertility, which is not different from that of men's additional income.

JEL classification: F22; J13; O15

Keywords: Guest-worker migration, Gender, Fertility

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1. Introduction

Although declared "dead" more than two decades ago, guest worker programs that admit migrant workers from low-income countries on a temporary basis to fill jobs in high-income countries are once again in vogue. The World Bank, the Global Commission on International Migration, the World Trade Organization's General Agreement on Trade in Services (GATS) Mode 4 negotiations, the International Organization for Migration, and voices in both high-income and lower-income countries are calling for more temporary labor migration from lower-wage to high-wage countries through new guest worker programs (see Ruhn and Martin (2008) for the discussion and references).

In many developing countries, export of labor has become an important part of these states' strategies for addressing poverty, easing the domestic unemployment pressure and fostering economic growth (World Bank, 2005). However, although beneficial for the source countries in the short run, through its income effect on fertility, temporary employment abroad may also lead to an expansion of the poor populations and thus discourage the long-term economic growth.¹ I believe that these demographic consequences should have been taken into consideration in the design of temporary migration programs as a mean of addressing the economic needs of the source countries.

Many guest-worker programs are gender-specific. Thus, for example, the Commonwealth Caribbean and Mexican Agricultural Seasonal Worker Program (ASWP) that has allowed Canadian farmers to import foreign workers for up to eighth months a year from the Caribbean since 1966, and from Mexico since 1974, is a notorious example of a "male-specific" temporary work program. Moreover, in the case of Mexican workers, for most of the period, only married men with children could participate, leaving their families behind and returning to Mexico with evaluations with a possibility to be rehired if their performance is considered satisfactory. In the US, agriculture has long been associated with the recruitment of unskilled temporary male foreign workers. Not surprisingly, until quite recently men made up the bulk of Mexican temporary migration for work in the US. In postwar Germany, the major demand for foreign labor came from factories, mines and

¹ The negative consequences of high fertility for economic growth have long been established in the literature on economic growth and development. See, for instance, Azarnert (2008) for a model and references.

construction sites. Therefore, men comprised the bulk of migration under the German guest worker program (1955 – 1973) as well.² More recent seasonal agricultural workers programs that have been currently in use, for instance, in Germany, France and the UK are also aimed at hiring mostly male labor.³ Several other programs, such as, for example, a pilot scheme in the UK for temporary employment of foreign workers in restaurants, hotels and food (fish and meat) processing, and bilateral agreements in Italy and Spain for temporary migration with North African and Latin American countries are also biased toward men (see Martin (2006) for further discussion and references).

In contrast, migration of care-givers and domestic workers is mostly feminine. Thus, movement of domestic workers in Southeast Asia alone currently involves at least two million women from Philippines, Indonesia, Sri Lanka and Thailand (Kaur, 2007). Large numbers of female care-givers and domestic workers from Philippines, Indonesia and Thailand also found their ways to Europe, US and the Middle East.

This work examines the effect of additional income from temporary guest-worker employment in a higher wage foreign country on fertility in the source economy. Building on the classical study by Galor and Weil (1996), I distinguish the effect of men's additional income on fertility from that of women's additional income.

Using a standard model with endogenous fertility, I first show that men's additional income from their guest-worker employment in a higher wage foreign economy generates a pure income effect, which increases fertility. This is a standard feature of any endogenous-fertility model that distinguishes between men and women. The main point of departure of the present work from the existing literature is to show that in the case of women's additional income, the timing of women's employment in a higher wage foreign economy relative to child bearing is crucial for its effect on fertility. Thus, if women work abroad during the same time period when they can bear children, women's additional income from their guest work abroad generates a substitution effect, which reduces fertility. In contrast, if the time period when women work for a higher wage does not coincide with the period when they bear children, the

² Germany's postwar guest worker program began in 1955, when Germany signed a labor recruitment agreement with Italy permitting German farmers to hire Italian workers. Soon, bilateral agreements were signed with 7 recruitment countries: Greece, Morocco, Portugal, Spain, Tunisia, Turkey, and Yugoslavia.

³ Males also comprised the bulk of workers recruited from the Pacific Islands for seasonal work in horticulture and viticulture in New Zealand under the new Recognized Seasonal Employer (RSE) program that was launched in 2007.

women's additional income generates the income effect on fertility, which is not different from that of men's income. This observation is novel for the large and growing literature on endogenous fertility and growth.⁴ The results of the present analysis can also be easily generalized for any intertemporal change of the relative income within the household.

Finally, the present framework also allows us to take into consideration a possible transfer of fertility norms from the countries of destination to the countries of origin of the migrants. Thus, Fargues (2007) and Beine, Docquier, and Schiff (2009) provide some preliminary evidence in support of their hypothesis that migration results in some decrease (increase) in the home country fertility rates if they are higher (lower) than the host country rates. On the other hand, it has also been broadly argued that not only the first generation permanent immigrants, but also the second generation immigrants who were already born in their host country are still strongly influenced by the fertility preferences in their parents' home countries (Fernandez and Fogli, 2009). Therefore, the transfer of behavioral norms regarding fertility from the host countries to the origin countries of temporary migrants is not likely to be very strong.

In the present paper I discuss this potential effect of the transfers of the fertility norms to the origin countries of temporary migrants, which can reduce the strength of the income effect on fertility. I also compute the threshold level of the transfer of lower-fertility norms, which potentially can outweigh the positive effect of the additional income from the temporary guest-worker employment abroad on fertility.

2. The Model

I consider an economy in which people live for two periods. In the first period of life, people are children: each consumes a fixed fraction of their parents' resources. In the second period of life, people raise children, supply labor to the market, and consume their earning. In this period each individual is endowed with one unit of time.

The economy is made up of two kinds of people: men and women. In childhood the men and women are identical. In adulthood they differ in terms of their

⁴ For a survey of a recent literature on endogenous fertility and growth see Galor (2005); cf. also Azarnert (2009, 2010).

labor market behavior: men always supply the whole unit of their time to the labor market, while women allocate their unit of time between labor market participation and child rearing. As in Galor and Weil (1996), the basic unit of analysis is the couple, which is composed of one man and one woman. Couples are supposed to have joint consumption and joint utility. There is no heterogeneity within a generation. I also abstract from matching of men and women and take the couples as given.

I start from the benchmark case of the closed economy. Next, I proceed to the open economy and present the main theme of the paper.

2.1. Utility

Couples derive utility from the number of their children and from their joint consumption. There is no uncertainty and no bequest motive. The per-couple utility function is:

$$U_t = \gamma \ln(N_t^j) + (1 - \gamma) \ln(C_t^j), \quad (1)$$

where N_t^j is the number of children that the couple has in the case j and C_t^j is the corresponding couple's joint consumption with weights $\gamma \in (0, 1)$ and $(1 - \gamma)$ associated with the two components of utility.

2.2. The benchmark case: the closed economy

Suppose that per one unit of time in any period t in the home country's labor market men and women can earn $W_t^{m,H}$ and $W_t^{f,H}$, respectively. Suppose also that men's and women's wages can be different, so that the wedge between $W_t^{m,H}$ and $W_t^{f,H}$ measures the gender gap in wages in the home country. Therefore, if the family does not have any children, the household's full potential income is $W_t^{m,H} + W_t^{f,H}$. Recall that men supply their whole unit of time to the labor market, while women allocate their unit of time between labor market participation and child rearing. Let $Z \in (0, 1)$ be the cost of rearing one child measured in terms of a woman's forgone earning, so that the marginal cost of a child is $ZW_t^{f,H}$.

Therefore, in the benchmark case (denoted by $j = 0$) the couple faces the budget constraint:

$$W_t^{f,H} Z N_t^0 + C_t^0 = W_t^{f,H} + W_t^{m,H}. \quad (2)$$

Maximizing (1) with respect to N_t^0 subject to (2), the number of children the couple has in the benchmark case of the closed economy is:

$$N_t^0 = \frac{\gamma}{Z} \left(1 + \frac{W_t^{m,H}}{W_t^{f,H}} \right). \quad (3)$$

From Eq. (3), it is clear that an increase in the gender wage gap increases the couple's optimal fertility.

Given the log-linear utility function, the couple's consumption is the fraction $(1 - \gamma)$ of the couple's full potential income, which in this case is:

$$C_t^0 = (1 - \gamma)(W_t^{f,H} + W_t^{m,H}). \quad (4)$$

In other cases, the couple's consumption can be easily computed in a similar manner (not shown).

2.3. Open economy

Now suppose that the economy operates in a global world. To model the guest-worker-type employment abroad, suppose that individuals can work a fraction $F \in [0, 1)$ of their time in the second period in a higher wage foreign country, earning there $W_t^{j,H}$ per one unit of time, where $\forall t, W_t^{j,F} > W_t^{j,H}$; $j = m, f$. Suppose also that guest workers work in the foreign country in the early part of their adulthood and then return to their home country, where they spend the rest of their time $(1 - F)$. This assumption is based on the fact that guest workers are mostly young individuals in the prime of their working age.

I present and analyze the following 4 cases:

- (1) Only men can work abroad,
- (2) Only women can work abroad,
- (3) Both men and women can work abroad,
- (4) Only women can work abroad, but they bear children after they finish their guest-worker employment.

To demonstrate different consequences of male and female guest-worker migration for fertility, in Cases (1) to (3) I assume that women are fecund only in the early part of their second period. I relax this assumption in Case 4.

To ensure that in Cases (2) and (3) females' temporary migration for work is optimal for a couple, I also make a technical assumption that, when women work abroad and bear children during the same sub-period, as in Cases (2) and (3), the share of a woman's time abroad F is sufficiently high to exceed the time costs of bearing children: $F > ZN$.

Case 1: Only men can work abroad

In this case ($j = 1$), if only men can work a fraction F of their time abroad, earning there $W_t^{m,F}$, the men's income is $FW_t^{m,F} + (1-F)W_t^{m,H}$, while women's full potential income is, as in the benchmark case ($j = 0$), $W_t^{f,H}$, and the marginal cost of a child is thus $ZW_t^{f,H}$.

Therefore, the couple faces the budget constraint:

$$W_t^{f,H}ZN_t^1 + C_t^1 = FW_t^{m,F} + (1-F)W_t^{m,H} + W_t^{f,H}. \quad (5)$$

Maximizing (1) with respect to N_t^1 subject to (5), the number of children in this case is:

$$N_t^1 = \frac{\gamma}{Z} \left(1 + \frac{W_t^{m,H}}{W_t^{f,H}} + \frac{W_t^{m,F} - W_t^{m,H}}{W_t^{f,H}} \right). \quad (6)$$

Given that $W_t^{m,F} > W_t^{m,H}$, it is clear that for any fixed γ , $N_t^1 > N_t^0$.

The current formulation also allows us to take into consideration a possible transfer of fertility norms from the countries of destination to the countries of origin of the migrants. Thus, if migration to a low-fertility country is likely to reduce fertility in the country of origin of the migrants, as suggested by Fergus (2007) and Beine, Docquier and Schiff (2009), the easiest way to capture this effect is to suppose that the exposition to the lower-fertility norms of the countries of destination reduces the relative weight given to children (γ) in the utility function (equation 1) to γ^1 . Clearly, for any $\gamma^1 < \gamma$, the number of children, as shown in equation (6) will be reduced. However, if the effect of the transfer of lower fertility norms is not too strong, the number of children in equation (6) will still be higher than in the

benchmark case of the closed economy, as shown in equation (3). Comparing the equation (6) with the reduced γ^1 to equation (3) with the original γ , it is easy to show that for any $\gamma^1 < \gamma$, $N_t^1 > N_t^0$ as long as the following inequality holds:

$$\frac{\gamma}{\gamma^1} < 1 + F \frac{W_t^{m,F} - W_t^{m,H}}{W_t^{m,H} + W_t^{f,H}}. \quad (7)$$

In other case, if the effect of the transfer of the lower fertility norms is very strong, so as $\frac{\gamma}{\gamma^1} > 1 + F \frac{W_t^{m,F} - W_t^{m,H}}{W_t^{m,H} + W_t^{f,H}}$, the effect of the transfer of the lower fertility norms might probably outweigh the positive income effect of the additional income from the temporary guest-worker employment on fertility.

Finally, following the same intuition as consistent with the hypothesis of Fargues (2007) and Beine, Docquier and Schiff (2009), temporary work in the economies with high fertility norms, such as, for example, the Persian Gulf countries, is likely to further increase fertility in the countries of origin of the migrants.

Case 2: Only women can work abroad

In this case ($j = 2$), if only women can work a fraction F of their time abroad, the women's full potential income is $FW_t^{f,F} + (1-F)W_t^{f,H}$, while the men's income is, as in the benchmark case, $W_t^{m,H}$. Under assumption that women are fecund only in the early part of their adulthood, which is the same time when they can work abroad for a higher wage $W_t^{f,F}$, and given $F > ZN$, as previously assumed, the marginal cost of a child is thus $ZW_t^{f,F}$.

Therefore, the couple's the budget constraint is:

$$W_t^{f,F} ZN_t^2 + C_t^2 = FW_t^{f,F} + (1-F)W_t^{f,H} + W_t^{m,H}, \quad (8)$$

and, therefore, the number of children is:

$$N_t^2 = \frac{\gamma}{Z} \left(\frac{W_t^{m,H}}{W_t^{f,F}} + F + (1-F) \frac{W_t^{f,H}}{W_t^{f,F}} \right). \quad (9)$$

Since $W_t^{f,F} > W_t^{f,H}$, $(W_t^{m,H} / W_t^{f,F}) < (W_t^{m,H} / W_t^{f,H})$ and

$F + (1-F)(W_t^{f,H} / W_t^{f,F}) < 1$. Therefore, for any fixed γ , $N_t^2 < N_t^0 < N_t^1$.

This allows us to establish the major difference between male and female guest-worker employment abroad with respect to fertility: Men's additional income from their guest work abroad generates a pure income effect, which increases fertility. In contrast, if women work abroad during the same period when they can bear children, women's additional income from their guest work abroad generates the substitution affect, which reduces fertility.

Clearly, if female temporary employment in a lower-fertility foreign country also directly reduces the household preferences with respect to children (γ), the negative effect of females' guest work abroad on fertility is further reinforced.

Case 3: Both men and women can work abroad

Suppose now that both men and women can work a fraction F of their time abroad and that a male guest worker's wage abroad is different from that of a female guest worker; $W_t^{m,F} \neq W_t^{f,F}$. In this case ($j = 3$), men earn $FW_t^{m,F} + (1-F)W_t^{m,H}$, while women's full potential income is $FW_t^{f,F} + (1-F)W_t^{f,H}$. Here, as in Case 2, the marginal cost of a child is $ZW_t^{f,F}$.

The couple faces the budget constraint:

$$W_t^{f,F}ZN_t^3 + C_t^3 = F(W_t^{f,F} + W_t^{m,F}) + (1-F)(W_t^{f,H} + W_t^{m,H}), \quad (10)$$

and the number of children is:

$$N_t^3 = \frac{\gamma}{Z} \left(F \left(1 + \frac{W_t^{m,F}}{W_t^{f,F}} \right) + (1-F) \frac{W_t^{f,H} + W_t^{m,H}}{W_t^{f,F}} \right). \quad (11)$$

In this case, the outcome is uncertain and the income effect of men's additional guest-worker income can dominate the substitution effect of women's additional guest-worker income if:

$$1 + F \left(\frac{W_t^{f,F} + W_t^{m,F}}{W_t^{f,H} + W_t^{m,H}} - 1 \right) > \frac{W_t^{f,F}}{W_t^{f,H}}. \quad (12)$$

Therefore, without transfers of the low-fertility norms from abroad, if

$$1 + F \left(\frac{W_t^{f,F} + W_t^{m,F}}{W_t^{f,H} + W_t^{m,H}} - 1 \right) > \frac{W_t^{f,F}}{W_t^{f,H}}, \quad N_t^3 > N_t^0,$$

while if

$$1 + F \left(\frac{W_t^{f,F} + W_t^{m,F}}{W_t^{f,H} + W_t^{m,H}} - 1 \right) > \frac{W_t^{f,F}}{W_t^{f,H}}, \quad N_t^3 < N_t^0.$$

In presence of the transfer of the low-fertility norms associated with a reduced γ^1 , following the same steps as in Case 1, the effect on fertility will be positive as long as:

$$\frac{\gamma}{\gamma^1} < \left(1 + F \frac{W_t^{f,F} + W_t^{m,F}}{W_t^{f,H} + W_t^{m,F}} - 1 \right) / \left(\frac{W_t^{f,F}}{W_t^{f,H}} \right). \quad (13)$$

In any case, from equation (12), it is clear that an increase in the gender wage gap in the destination country, associated with a greater difference between $W_t^{m,F}$ and $W_t^{f,F}$, generates a pure income effect of men's additional income, which increases fertility.

Case 4: Only women can work abroad, but they bear children after they finish their guest-worker employment

In this case ($j = 4$), if only women can work a fraction F of their time abroad, the women's full potential income is $FW_t^{f,F} + (1-F)W_t^{f,H}$, while the men's income is, as in the benchmark case, $W_t^{m,H}$. However, under assumption that women can bear children after they finish their guest-worker employment abroad, the marginal cost of a child is, as in the benchmark case, $ZW_t^{f,H}$.

Therefore, the couple faces the budget constraint:

$$W_t^{f,H} ZN_t^4 + C_t^4 = FW_t^{f,F} + (1-F)W_t^{f,H} + W_t^{m,H}, \quad (14)$$

and with the benchmark γ the number of children is:

$$N_t^4 = \frac{\gamma}{Z} \left(1 + \frac{W_t^{m,H}}{W_t^{m,H}} + F \frac{W_t^{f,F} - W_t^{f,H}}{W_t^{f,H}} \right). \quad (15)$$

Therefore, if the time period when women work abroad does not coincide with the period when they bear children, the women's additional income from their guest-worker employment abroad generates the income effect on fertility, which is not qualitatively different from that of men's guest-worker income.⁵

⁵ Formally, following the same steps as previously, with the reduced γ^1 , $N_t^4 > N_t^0$ as long as:

Moreover, in the case of the gender wage equality in the origin and the destination countries the effect of women's additional income on fertility is not different from that of men's guest-worker additional income even quantitatively. In this particular case, when $W_t^{f,H} = W_t^{m,H} \equiv W_t^H$ and $W_t^{f,F} = W_t^{m,F} \equiv W_t^F$, regardless of whether a man works abroad as in Case 1, or a woman works abroad as in Case 4, the number of children is exactly the same:

$$N_t^1 = N_t^4 = \frac{\gamma}{Z} \left(2 + F \frac{W_t^F - W_t^H}{W_t^H} \right). \quad (16)$$

3. Conclusion

I have used a standard model with endogenous fertility to examine the effect of additional income from temporary guest-worker employment in a higher wage foreign economy on fertility in the source country. In the model, the basic unit of analysis is a couple, which consists of one man and one woman. I show that men's additional income from their work abroad generates a pure income effect, which increases fertility. In the case of women's additional income from their temporary work in a higher wage foreign economy, the timing of women's employment relative to child bearing is crucial for its effect on fertility. Thus, if women work abroad during the same time period when they can bear children, women's additional income from their guest work abroad generates a substitution effect, which reduces fertility. In contrast, if the time period when women work abroad does not coincide with the period when they bear children, the women's additional guest-worker income generates the income effect on fertility, which is not different from that of men's guest-worker income.

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$$\frac{\gamma}{\gamma^1} < F \frac{W_t^{f,F} - W_t^{f,H}}{W_t^{f,H} + W_t^{m,H}} + 1.$$

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