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Gender Discrimination and Emigration : Push Factor versus Screening Process Hypothesis

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Abstract:

This article aims at providing an empirical test in order to choose between two theories. The first theory is that gender discrimination in origin countries can be a push factor for women and therefore that a reduction in discrimination can reduce the flow of female migrants. The other theory is that gender discrimination may create a « gender bias » in the selection of migrants by a collective entity like the family or the village. We show that in the latter case, a reduction in discrimination leads to an increase of skilled women migration. The paper also provides an original index of gender discrimination based on principal component analysis. Finally the empirical analysis enables us to reject the « push factor » theory and to accept the « screening process » hypothesis. All things being equal, improving gender equality at the workplace is positively correlated with the migration of women (especially the high-skilled) and negatively correlated with the migration of men (especially the low-skilled). This result is robust to several specifications and several measurements of gender equality.

Key words:gender discrimination, labor discrimination, core labor standards, migration

JEL code:F22, J61, J71

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Résumé:

Cet article propose un test empirique pour choisir parmi deux théories. La première théorie est que la discrimination de genre peut être perçue comme un facteur d'émigration (push factor) pour les femmes. Une réduction de la discrimination entraînera donc une réduction du nombre de femmes migrantes. La deuxième théorie est que la discrimination peut créer un “biais de genre” dans la sélection des migrants par une entité collective (famille ou village). Nous montrons dans le dernier cas qu'une réduction de la discrimination augmenterait la migration des femmes qualifiées. Le papier propose aussi un indicateur original de discrimination de genre basé sur l'analyse en composante principale. L'analyse empirique nous permet de rejetter la théorie de la discrimination comme source d'émigration et d'accepter l'hypothèse de sélection liée au genre. Toutes choses égales par ailleurs, améliorer l'égalité de genre au travail est positivement corrélé avec la migration des femmes (et plus précisément les femmes qualifiées) et négativement corrélé avec la migration d'hommes (et plus précisément les hommes faiblement qualifiés). Ce résultat est robuste à plusieurs spécifications et mesures d'égalité de genre.

I. Introduction

New economics of migration (Stark, 1991) have shown that migration is not only determined by wage differentials and an individual decision but can also be seen as a collective behavior decided by a larger group such as the family or the village. When considering non-wage motivations for migration, little attention has been given to working conditions (in a broad sense, including social security, unemployment insurance...), and when it has been done, the interest has been focused on destination countries, considered as a pull factors. Nevertheless, poor working conditions in source countries can also be considered as push factors. More precisely, violations of core labor standards recognized by ILO (1998) could be one potential motivation for migration.

Baudassé and Bazillier (2010) have studied the effect of freedom of association and collective bargaining on migration. They find a negative impact of these labor standards on emigration rates for high-skilled and low-skilled workers. However, other core labor standards such as non-discrimination at the workplace may also have an impact. If the literature largely explores the linkages between gender and migration, few attention has been given to the specific effect of gender *discrimination*. This paper proposes to address this issue.

The first author who mentions a link between gender and migration is Ravenstein who edicted in 1885 and 1889 seven "laws of migration". The fifth law of Ravenstein as enumerated by Lee (1966) states that "females appear to predominate among short journey migrants" (Ravenstein, 1889, p. 288 and Lee, 1966, p. 48). Ironically, in the same paper, Lee describes female migrants as mostly dependant movers: "not all persons who migrate reach that decision themselves. Children are carried along by their parents, willy-nilly, and wives accompany their husbands though it tears them away from environments they love" (p. 51). This explains that for a long time migration studies have been "focused on the movement of men on the assumption either that men are the decision makers in the migration process and women are tied movers, or, if women migrate alone, that they follow the same routes, are motivated by the same considerations, and experience the same consequences as do male migrants" (Lauby and Stark, 1988, p. 473).

A new interest for this question emerged in the early 80's, with two special issues of scientific journals dedicated to women in migration (*International Migration,* Jan.-Apr. 1981; *International*

Migration Review, Winter 1984).[3] From the mid-80's on, an increasing number of scientific contributions are dedicated to the question of gender and migration, be it rural to urban (see for instance Lauby and Stark, 1988, for the rural-urban migration by young women in the Philippines) or international (see Pedraza, 1991 for a review of the literature in the 80's). One reason for this increasing interest is the so-called "feminization of international labor migration".[4]

The first hypothesis concerning a link between gender discrimination and migration is the *push factor* hypothesis. This hypothesis may be valid either if migration is an individualistic decision or a collective one. If women are unable to find a job in their homeland, or if the jobs are poorly paid for women, they have more motivation to go abroad if gender discrimination is assumed less important in destination countries. If we accept the reasonable hypothesis that source countries are discriminating women more than destination countries, then this can explain female migration. Kanaiaupuni (2000) states that « educated women experience great gender discrimination and few occupational rewards in Mexico and, therefore, may be more likely to migrate across the border where they will earn greater wages than they would otherwise » (p. 1337). This is confirmed by Pedraza (1991) who mentions that, for the women of Dominican Republic, « the act of emigrating also became a way of escaping total dependence on their husbands » (p. 309).

It is also rational for the family as a whole to send female rather than male inasmuch as their opportunity cost is lower. In this regard Lauby and Stark (1988) recall that "in many cultures, the family is a specially strong unit that exerts influence over a daughter or a son even after they have become adults" (Lauby and Stark, 1988, p. 485). They state that consequently "a family will decide to send a migrant if there is a need for additional or more steady income, if the expectation that migration will confer such benefits is reasonably high, and if the opportunity cost associated with migration is low" (ibid., p 485). As a consequence, female migration could be preferred to male migration if at least one of these hypothesis is adopted:

- females are more reliable than males for the family stayed home, for example they would be more responsible and would send more money to the family[5]

3 Obviously there are contributions regarding women and migration before the 80's: see for example Abadan-Unat (1977) on the implications of migration on emancipation of Turkish women.

4 The term of "feminization" is however contentious as noted by Jolly and Reeves (2005) because women already made up almost half the migrants several decades ago. For example by 1960 female migrants accounted for 47% of the total, while in 2000 this figure was 49% (Jolly and Reeves, 2005, p. 7). However the feminization consists also in a qualitative change in female migration patterns, including "both young single women and female family breadwinners, who move both independently and under the authority of older relatives" (Sorensen, p. 2). Thus the so-called feminization means in fact that "women are increasingly moving as independent migrants, for example in search of jobs, rather than to rejoin male family members" (Jolly and Reeves, 2005, p. 8).

5 Many authors advocates that in some culture women are indeed more reliable for the family and that they send more

- female migrants earn steadier income than men
- opportunity cost is low for women because of poor labor perspectives in the source country.

The question of women earning steadier income than male and the consideration of what is the demand for female migrants in the global market has led to deeper studies on jobs taken by migrating women. Pedraza (1991) mentions that immigrant women generally cluster in a few occupations: domestic service, garment industry, "ethnic enterprises" (i.e. the concentration of certain immigrants in small businesses, as it is often the case for Chinese or Koreans), health professionals (doctors and nurses) or teachers. These activities have two characteristics: on the one hand, they have generally a better dynamic than other "male-type" activities like industry or agriculture. This can explain the feminization of migration, inasmuch as the "female-type" activities like services have been growing and the male-type have been declining. On the other hand, most of these occupations are steadier than more seasonal jobs like construction or agriculture, more frequent among male migrants. This can explains the rationale for sending women abroad, because although women earn less, they have a more stable income. According to these views, gender equality can be seen as a *push* and a *pull factor*. If the opportunity cost is low in source countries (push factor) or if female migrants would earn steadier income than men (pull factor), then the family or the community may be tempted to send more women abroad.

Of course, gender discrimination may influence many other factors that should have an impact on migration. For instance, the predominant social norms within a society may affect negatively the position of women in the labour market if these social norms are clearly discriminatory against women. In this case, the community may decide to not send women abroad for the same reasons. In this regard Jolly and Reeves (2005) note that cultural norms can play a role in favor of or against female migration. On one hand "it may be less acceptable for women to move about and travel on their own, so women can find it more difficult to migrate, or migrate on shorter distances than men" (p. 13). But on the other hand, "it may be the norm for women to move to husbands' families upon marriage" (ibidem) and consequently in some context it may be more natural to send a daughter than a son, because the son must work on the family farm while as a father said of his daughter's migration (quoted by Jolly and Reeves, p. 13): "I approved because she is a girl and so has to

remittances, in particular in the Philippines (Lauby and Stark, 1988, Jolly and Reeves, 2005). Nevertheless, Semyonov and Gorodzeisky (2005) show that in the case of overseas workers from the Philippines, and contrary to popular belief, men send actually more money back home than do women, even in proportion of their income. The reason for this gender gap in remittances is that men are making more money in overseas markets than women, and, under the assumption that expenses are roughly equal for the two gender groups, male migrants are able to save a larger portion of their earning and hence to remit more, even in proportion of their income.

leave". Kanaiaupuni (2000) similarly notes that "in many societies, women's lesser status holds direct consequences for their migration for reasons apart from the household division of labor" (p. 1315). For example "women migrate less often in search of work opportunities if they are considered less virtuous as a result(…). Ethnographic evidences from Ghana finds that villagers discourage single women from migrating because they fear the possibility of immoral sexual conduct (…)." (ibidem, p. 1315). In addition to that, social networks don't play the same role for men and women. On one hand, female are supposed to be more dependant on migration networks than men. As Docquier et al. (2008) put it, women would benefit more than men from travelling accompanied or from information about safe routes" (Docquier et al., 2008, p. 34). That would explain that men are assumed to migrate more frequently to entirely new places, and that women supposedly use more intensively migration networks. On the other hand, "male-dominated networks (may) serve to exclude women from certain types of jobs and promotions (…) they encourage certain individuals to migrate and discourage others. Additionally, interviews with established U.S. Migrants reveal their reluctances to sponsor (informally) female friends or relatives because they imply more responsibility and obligation than men" (Kanaiaupuni, 2000, pp. 1315-1316). In other words, if the household or the community decide who is the more capable to migrate and if women are discriminated on the labour market for cultural reasons, the household would also decide to not send them abroad using similar arguments, even if their skill-level is higher than men. We can expect that improving gender equality will then have a positive effect on women migration. It is what we call the *screening process hypothesis*.

As we saw, the literature gives insights suggesting a link between gender discrimination and migration. However, to the best of our knowledge, our paper is one of the first attempts to test empirically how discrimination may affect migration by gender at the global level.

The first contribution of our paper is to build several original indexes measuring the level of gender equality at the work place. These indexes aggregate different dimensions such as the income differential, the level of women's participation to the labour market or the difference of unemployment rates. We also include variables related to the differences in education enrolment to take into account the cumulative effect of gender discrimination in education on the one in employment. Our indexes are built using principal component analysis. The second contribution is the empirical analysis of the linkages between gender equality at the work place in source countries and the level of emigration. Using a Heckman two-steps estimator, we can test empirically whether

the *push factor hypothesis* or the *gender screening hypothesis* is validated by the data. We found that gender equality tends to increase women migration, especially for the high-skilled. It has an adverse effect on emigration of men, especially the low-skilled. Improving gender equality thus increases the average skill level of migrants. These results are robust to different specifications and when using alternative indexes of gender equality. It confirms the *gender screening hypothesis* and rejects the *push factor* explanation of migration for gender discrimination.

Our article is structured as followed. In the second section, we will explain the building of our different indexes of gender equality. In the third part, we will detail the theoretical background of this work: we will explain the two theoretical hypothesis that can be used to explain the linkages between gender discrimination and emigration (the push factor and the gender screening), and we will remind the gravity model specification that will be used for the empirical strategy. The fourth part is dedicated to the empirical analysis. The fifth part concludes.

II. Measurement of Gender Equality

We focus in this paper on the gender discrimination[6] at the work place. The implication of this choice is that we do not look at the influence of other aspects of gender equality that may also have an influence on migration, such as the freedom of movement for women (OECD 2010). This choice does not mean that we do not recognize the multidimensional aspect of gender discrimination and the importance of factors such as family code, physical integrity, son preference, civil liberties or ownership rights, which are the dimensions studied for instance in the OECD SIGI (Social Institutions and Gender Index). Ferrant (2010) proposes a new index taking into consideration all these dimensions with an endogenous weight for each individual dimension. If these indexes may be useful for instance to study the influence of gender inequality on economic growth, we argue that a focus on gender inequality at the work place may give interesting insights. Of course, it does not mean that we exclude the influence of social norms on gender discrimination. As we will see, it is one of the main explanation of our *screening process* hypothesis. However, we focus our interest on its influence on the labor market and exclude from our analysis other factors such as physical integrity or son preference.

6 More precisely, we focus on gender inequality rather than gender discrimination. Busse and Spielman (2005) argue that it is not possible to determine if differences between men and women in participation rates are voluntary or not. Because of this, they prefer talking about gender inequality rather than gender discrimination.

Even if we do not retain all dimensions of gender inequality, we consider that discrimination in education has strong links with discrimination at the work place and should be taken into account. More precisely, discrimination in education will reinforce discrimination in the labor market . Discrimination in education can be seen as *ex-ante* discrimination. Durlauf (1996), Benabou (1996), Lundberg and Startz (1998) shows that these *ex-ante* discrimination may have negative effects on human capital of next generations and thus lead to persistent differences between those who are discriminated and those who are not. Current discrimination on labor market may also influence the *ex-ante* discrimination (Altonji and Blank 1999). If women considers they will have more difficulties to be accepted for certain jobs, they will have less incentives to invest in getting the skills for these jobs (Coate and Loury 1993). Because of the correlation between *ex-ante* discrimination and discrimination at the work place, several authors (Jolliffe and Campos 2003) observe a strong correlation between the unexplained component of the Oaxaca (1973) decomposition (which is seen as the component measuring discrimination in employment) and discrimination in education.

We then choose to aggregate different measures taking into account these two aspects. Education variables are: (1) Primary education ratio, (2) secondary education ratio, (3) tertiary education ratio. Labor market variables are: (1) difference of unemployment rates, (2) income ratio, (3) employment rate for women.

The choice of these variables is based on the literature about the measurement of decent work. Ghai (2003) proposes to use four indexes: labor force participation for women, differences of income, unemployment rate and distribution of skilled jobs. We make the same choice except for the last variable. Concerning the distribution of skilled jobs, it is very difficult to get consistent estimates of this distribution for a large number of countries and international comparisons are very difficult due to heterogeneous definitions of jobs[7]. Education variables are similar to the Millenium Goals Indicators[8]. We however do not include literacy rates due to the lack of data by gender for too many countries. All data comes from the *World Development Indicators* except the income ratio which comes from UNDP. We use data for 1991 and 2001[9].

We make a principal component analysis (PCA) on all these variables, which will allow us to build

7 This point is acknowledged by Ghai in his paper.

8 See: http://unstats.un.org/unsd/mdg/Home.aspx

9 In order to increase the coverage of our index, we build a second set of indexes where each variables are the average value respectively between 1981 and 1991, and between 1992 and 2001. If the evolution of these variables during 10 years may be large, we assume that the gender *ratio* is relatively stable.

an aggregate index of gender discrimination. The goal of a PCA is to isolate common factors between different variables (here the effective level of gender discrimination at the work place), by reducing total information in order to get an easier economic description of the variables. Graphically, we can represent the *n* countries in a *p* dimensional space (the *p* different initial conditions variables, here our 7 variables of gender discrimination). The distances[10] between the *n* row points in the *p* dimensional space is a perfect representation of similarities between the row in the matrix *X* (the matrix with *n* rows, the countries, and *p* columns, the variables). The PCA allows to find a lower dimensional space in which we project the row points and which retains the highest level of distances between rows. The best space which maximizes the dispersion of the row points projected is defined as follow:

$$Max_H \sum_i \sum_{i'} d_H^2(i,i')$$

This is equivalent to maximize $\sum_i d_H^2(i,G)$ with H the space of projection and G the centroïd. The mass is p_i (with $\sum p_i = 1$) and we maximize $\sum_i p_i d_H^2(i,G)$ which is the projected inertia (variance). The lower dimensional space is a one dimension graph. If we define it by a vector *u,* the projection of a row point on the direction defined by *u* is:

$$\psi_i = \sum_{j=1}^{p} x_{i,j} u_j$$

The inertia of each point projected on *u* is:

$$\sum_{i=1}^{n} p_i \left(\sum_{j=1}^{p} x_{ij} u_j \right)^2 = \lambda$$

We need to find the vector *u* (the eigenvector) which maximizes λ (the eigenvalue). The first vector lets unexplained a given part of variability. Therefore, a second vector can be built which maximizes this remaining variability. The process continues until we can explain all variability with a given number of vectors. Each vector is orthogonal with the previous one and the remaining variability decreases with the number of vectors.

To choose the optimal number of factors (or vectors) needed to get a satisfying description of the phenomena, we can use the criterion proposed by Kaiser. As the sum of eigenvalues is equal to the number of variables, unless a factor extracts at least as much as the equivalent of one original variable, we drop it. According to this criterion, we can keep only the two first factors. The first axis gives a global overview of the level of gender equality while the second axis gives an estimation of

10 We use the Euclidean distance. Between countries *i* and *i'*, it can be defined as follow:

$$d^2(i,i') = \sum_{j=1}^{p} (x_{i,j} - x_{i',j})^2$$

the type of discrimination. A positive coordinate on the second axis will indicate a higher discrimination in the labor market and a negative coordinate will characterize a higher level of discrimination in education. These two factors explain 66% of all information included in our data. We will use the coordinates on the first factor as a proxy of the global level of discrimination at the work place. The index is then transformed in order to be included between 0 (high discrimination) and 100 (low discrimination). This factor explains 41% of all information contained in the data. This low correlation between different dimensions of gender discrimination justifies the use of PCA which retains the common information between different variables.

Table 1: PCA results for *index_genderequality1*

Component	Eigenvalue	Difference	Proportion	Cumulative
Factor 1	2.48895	0.98798	0.4148	0.4148
Factor 2	1.50097	.690552	0.2502	0.6650
Factor 3	.810416	.12657	0.1351	0.8001
Factor 4	.683846	.395497	0.1140	0.9140
Factor 5	0.28835	.0608784	0.0481	0.9621
Factor 6	.227471		0.0379	1

Table 2: Variables coordinates on main factors

Variable	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Female Labor force participation	0.4545	0.4478	-0.2848	0.0708	-0.0867
Ratio of female to male primary enrollment	0.4813	-0.2802	0.0897	-0.5111	-0.6327
Ratio of female to male secondary enrollment (%)	0.4187	-0.4986	0.1288	-0.2144	0.6968
Ratio of female to male tertiary enrollment (%)	0.3288	-0.4163	-0.0557	0.8144	-0.2147
Ratio of male to female unemployment (%)	0.2407	0.3754	0.8795	0.1565	0.0248
Income ratio	0.4694	0.3977	-0.3431	-0.0039	0.2619

The main limit of such index is the low number of countries for which it is possible to compute the index, due to data availability (102 observations for 51 countries). We thus propose three alternative indexes, both to increase the geographical coverage of our study and to test the robustness of our results (see table 3). The second index includes all variables except ratio of male to female unemployment and ratio of female to male tertiary enrollment. The third index only includes labor market variables. We also propose a set of indexes including the average value of each variable in order to increase the coverage. When the first factor gives information on the type of discrimination (discrimination in employment versus discrimination in education), we use the coordinates on the second factor. Nevertheless, the eigenvalue of the factor retained is always higher than one and the factor explains at least 30% of the information. When we do not mention which index we use, we assume that it is the first one (index_genderequality1).

Table 3: Alternative indexes of Gender Equality

Indexgenderequality	1	2	3	1 (average)	2 (average)	3 (average)
Number of observations	102	243	166	176	302	224
Factor	1	1	1	2	1	1
Proportion explained by the factor	0.4148	0.4638	0.6555	0.3155	0.4685	0.6581
Variables						
Female Labor force participation	0.4545	0.1776	0.6539	0.6214	0.1389	0.6504
Ratio of female to male primary enrollment	0.4813	0.6927	NA	0.2931	0.6930	NA
Ratio of female to male secondary enrollment (%)	0.4187	0.6647	NA	0.2445	0.6739	NA
Ratio of female to male tertiary enrollment (%)	0.3288	NA	NA	0.1547	NA	NA
Ratio of male to female unemployment (%)	0.2407	NA	0.3903	0.2210	NA	0.4209
Income ratio	0.4694	0.2165	0.6481	0.6288	0.2151	0.6323

III. Theoretical background and empirical strategy

Our goal in this paper will be to choose between two hypothesis concerning the way in which gender discrimination in source countries can affect international migration. We present in section II.1 the two hypothesis and our assumptions about the consequences of each one. In order to test empirically our two options we will then use a gravity model that we present in section II.2.

1. Migration and Gender: theoretical hypothesis

In order to identify how gender discrimination in source countries could influence labor migration, we will consider two hypothesis:

Hypothesis 1 (**push factor hypothesis**): gender discrimination is a push factor in an individualistic behavior context where men and women decide whether they want to migrate or not according to the prevalent working conditions in their origin country. In a collective behavior context, gender discrimination may also be a push factor because of a lower opportunity cost for women.

Hypothesis 2 (**screening process hypothesis**): gender discrimination is not a push factor but it is rather a gender bias in a collective process of screening in which a certain community (the family or the village) decides who is going to go abroad and who is going to stay. This bias would consist in preferring male population rather than female population when deciding the individuals that are going to migrate. Social norms concerning job-related issues may affect the migratory behavior.

Our assumption is that if hypothesis 1 is correct, then a diminution of discrimination would result in a decrease of female migration and would leave male migration unchanged while if hypothesis 2 is correct, then female migration would increase - especially for high-skilled women - while male migration could decrease especially for the low skilled.

Theoretically, the mechanisms behind this assumption are simple. Understanding how a decrease in gender discrimination can lower female migration is fairly simple using a "push factor" model. If working conditions are getting better for women in their source countries, they have less incentive to migrate. Here the assumption is that women are taking the migration decision individually and that they respond to the differential in their working conditions between the situation in their place of origin and in the destination country.

The "screening process" hypothesis is slightly more complicated. First we need to consider that, accordingly to various models of New economics of Migration (Stark and Levhari, 1982, Lucas and Stark, 1985) the decision unit is not the individual but a group, the family or the village. This group wants to reduce the risk by diversifying its source of income and therefore collectively decide to allocate some members to migration. Let us suppose that the decision group (the family or the village) is selecting the migrant by a scoring process. This scoring process depends both on the vision of the group about who will get the highest pay-off when migrating and the social norms related to job issues. Let us suppose they attribute to each individual i a score which is a function of two characteristics: i's gender and i's qualification. Let us suppose that x is the variable that represents i's gender, x=0 when i is a female and x=1 when i is a male, and let's suppose that y is a variable representing i's qualification, y varying between 0 (no qualifications) and 1 (highest qualification). The i's score would be:

$z = a.x+(1-a).y$ (with $0 \leq a \leq 1$)

and the individuals with higher score would be selected to migrate by the group. The score for a woman with qualification y_w would therefore be:

$z_w = (1-a).y_w$

and for a man of qualification y_m it would be:

$z_m = a+(1-a).y_m$.

In order for a woman to be preferred over a man, we need:

$z_w > z_m$ which implies:

$(y_w - y_m) > a/(1-a) = ES_{min}$

We note ES_{min} the minimum "education surplus" needed by a woman to be preferred over a man (ie the minimum number of supplementary years of formation that she needs to be preferred).

In this oversimplified model, a is a characteristic of the economy which indicates the level of gender discrimination: the higher is a (ie the closer to one) and the more discriminative is the society. A decrease in discrimination will be modelled as a decrease in a. Obviously:

$dES_{min} / da > 0$

When discrimination decreases the minimum "education supplement" ES_{min} also decreases and therefore more women (with relatively high skills) will be preferred to men (with relatively low skills). As a consequence, we can predict that if hypothesis 2 is correct, when discrimination lowers, there will be more skilled women among the migrants and less poorly qualified men, low-skilled men being replaced by high-skilled women in the screening process.

2. Gravity model specification

In order to test empirically if gender discrimination acts as a screening process or a push factor, we propose a migration gravity specification (see for instance Borjas 1999 or Clark, Hatton and Williamson 2007, for the theoretical foundations of such specification). Migration is driven by the maximization of utility taking into account the costs of migrations. Migrants choose their country of destination where the expected payoff is the highest, considering also the payoff in their origin country. Migration thus depends on *push* and *pull factors.* Here, we focus mainly on push factors as we only study the influence of discrimination in origin countries.

The general bilateral migration equation is the following:

$$Migration_{i,j} = a_0 X_i^{\alpha_1} X_j^{\alpha_2} / C_{i,j}^{\alpha_3}$$

With $Migration_{i,j}$ the total migration stock[11] between two countries. X_i is a matrix of variables affecting push factors. The level of discrimination is one of these factors. X_j is a matrix of control variables affecting pull factors, $C_{i,j}$ is a matrix of bilateral variables controlling

11 We estimate determinants of migrants' stocks and not flows. Brücker and Schroder (2006) showed that empirical migration models estimating net migration flows instead of stocks may be misspecified: at the equilibrium, a positive relation exists between the stock of migrants while the net migration flow becomes zero. This is consistent with stilized facts that show that net migration rates tend to cease over time

for the cost of migration.

Taking the log of both side, we obtain the following estimable equation:

$$m_{i,j}=\alpha_0+\alpha_1 \ln X_i+\alpha_2 \ln X_j+\alpha_3 \ln C_{i,j}+\epsilon_{i,j} \quad (1)$$

With $m_{i,j}$ the log of total migration stocks. However, as we are interested by the influence of discrimination in origin countries, that only affects push factors, we propose to control for pull factors using destination countries fixed-effects instead of the matrix X_j. This choice is made in order to minimize possible omitted variable bias and unobservable heterogeneity. The estimated equation will thus be:

$$m_{i,j}=\alpha_0+\alpha_1 \ln X_i+A_j+\alpha_3 \ln C_{i,j}+\epsilon_{i,j} \quad (2)$$

with A_j destination countries fixed-effects. Unfortunately, we cannot include origin countries fixed-effect as our database does not have enough temporal dimension. Doing so, effects we would like to capture would be dropped by the inclusion of fixed effects. In order to minimize possible bias, we will use in the matrix X_i all variables generally used in empirical studies on the determinants of emigration (see for instance Hatton and Williamson 2002).

We also would like to test the influence of gender discrimination on migration by *gender* and by *skill-level*. We thus estimate six equations:

$$m_{i,j}^{g,s}=\alpha_0^{g,s}+\alpha_1^{g,s} \ln X_i+A_j+\alpha_3^{g,s} \ln C_{i,j}+\epsilon_{i,j}^{g,s} \quad (3)$$

with *g* the gender ($m_{i,j}^{m,s}$ the log of migration between country *i* and country *j* for men with skill-level *s*, $m_{i,j}^{w,s}$ the log of migration between country *i* and country *j* for women with skill-level *s*) and *s* the skill-level (primary, secondary and tertiary).

We then estimate the determinants of the migration gender ratio:

$$m_{i,j}^{w,s}-m_{i,j}^{m,s}=\beta_0+\beta_1 \ln X_i+A_j+\beta_{\ln} C_{i,j}+\epsilon_{i,j} \quad (4)$$

We use Heckman (1979) two-steps method in order to get consistent estimates. One feature of our dependent variable is the high occurrence of zero, corresponding to nil bilateral migration between two given countries (approximately 29.5% in our case). In this case, OLS estimates may be biased and the two-steps procedure is one way to solve this problem. However, as it is difficult to find an additional instrument for the selection equation that explains the probability to get a non-nil migration but does not explain the size of migration, we decide to use this methodology without any additional instrument. As stressed by Wooldridge (2002), this choice does not affect the results[12]. To

12 It may lead to a lower level of significance for estimated coefficients due to a high correlation between the Mills ratio and the other variables in the second step.

check the robustness of our results, we also use robust OLS estimators clustered at the origin-destination level. Most of our results are relatively similar. Moreover, the inverse Mills ratio is always significant suggesting a bias in OLS estimates. That's why we do not reproduce results using OLS estimators here[13].

IV. Empirical analysis

1. data

Matrix X_i in equations 1-4 includes, the level of discrimination, the GDP per capita, the level of population, the average level of education, the share of young people within the population, the level of democracy. All theses variables are the ones for country *i.* The level of discrimination is measured by our index built through PCA. The GDP per capita (in ppp) is a proxy of income which is supposed to affect negatively migration flows. But it may also be seen as a proxy of migration costs: if income is too low, workers do not have the capacity to migrate. The population is included to take into account the size of the country. The larger population a country will have, the larger will be the supply of migrants. For these two variables, data come from the *World Development indicators*. We also include the share of young people (15-34 years-old) within the population. Young peoples have lower migration costs and thus a higher propensity to migrate. Data come from the World Development Prospect 2008 revision. We take into account the level of democracy, measured by a combined polity score (Polity IV) proposed by Gleditsch (2003)[14]. This may affect migration costs. It may be more difficult to migrate when the political regime is autocratic. In order to minimize unobserved heterogeneity between countries, we also add regional dummies.

We add bilateral variables such as the existence of common frontiers, distance between countries, the fact to have a common language, and the fact to have a past colonial past. All these variables are correlated with the existence of a network of migrants and then will influence the migratory costs. These variables are taken from CEPII.

13 However, these results are available upon request.

14 See Gleditsch and Ward (1997) for a detailed presentation of the index. Basically, this is a combined index of several sub-dimension measuring different aspects of 'authority' (competitiveness of political participation, regulation of political participation, competitiveness of executive recruitment, openness of executive recruitment, constraints on chief executive). It is included between –10 (autocracy) and 10 (democracy).

Concerning data on migration, we use the database provided by Docquier, Marfouk and Lowell (2007) which are available for 1991 and 2001. We add a dummy variable for 1991 observations in order to take into consideration a possible time trend.

2. Results

We first estimate the determinants of global migration stocks both for men and women. As shown in table 4, the level of discrimination does not have any impact on global migration. However, there is a positive and significant impact of gender equality on the skill ratio, i.e. the ratio of tertiary educated over primary educated migrants.

Other control variables take the expected sign, except maybe the level of income in origin countries. However, the positive sign associated with the per-capita GDP may be explained by higher level of migration costs for too low level of income. An increase of per-capita GDP may be seen as a reduction of migration costs inducing a higher level of migration. Bilateral variables are not significant but this can be explained by the inclusion of regional dummies for origin countries and destination countries fixed-effects[15].

We then propose to test the influence on migration by gender and skill-level to see which theoretical hypothesis is validated by the data. Using the same specification, results are given in table 5[16]. It seems, that all things being equal, a reduction of discrimination tends to be associated with a higher level of female migration and a lower level of male migration. This result suggests a substitution effect between women and men within a given number of migrants.

15 We estimate the model without regional dummies. In these estimations, bilateral variables take the expected sign while the result for other variables does not change.

16 We present only results concerning our variable of interest: gender equality. Significance level and sign of other control variables do not change from the previous specification.

Table 4: Determinants of Total Migration (Heckman Two-steps estimates)

Dep. Var.	lnmig	select	lnmig_prim	select	lnmig_sec	select	lnmig_ter	select	lnskillratio	select
ln(Gender Equality)	-0.0619	-0.202	-0.239	-0.415*	0.254	-0.218	0.217	-0.0157	0.496***	-0.278
	(-0.218)	(-0.818)	(-0.721)	(-1.734)	(1.123)	(-0.934)	(0.975)	(-0.0657)	(3.647)	(-1.186)
ln(gdp_o)	0.373**	0.256**	0.335*	0.303***	0.337***	0.236**	0.441***	0.260**	0.0833	0.322***
	(2.444)	(2.204)	(1.883)	(2.694)	(2.775)	(2.143)	(3.625)	(2.304)	(1.114)	(2.895)
ln(pop_o)	0.811***	0.220***	0.851***	0.248***	0.761***	0.230***	0.779***	0.231***	-0.0677**	0.238***
	(14.55)	(5.436)	(13.13)	(6.327)	(16.36)	(6.009)	(17.69)	(5.853)	(-2.548)	(6.132)
ln(youth)	-1.143***	-0.678*	-1.007**	-0.685*	-0.993***	-0.642*	-1.247***	-0.769**	-0.220	-0.803**
	(-2.596)	(-1.854)	(-1.995)	(-1.934)	(-2.848)	(-1.848)	(-3.594)	(-2.156)	(-1.044)	(-2.296)
ln(edu)	0.252	-0.111	-0.150	-0.0611	0.263	0.0120	0.584***	-0.0566	0.736***	-0.0555
	(1.242)	(-0.668)	(-0.641)	(-0.385)	(1.635)	(0.0768)	(3.655)	(-0.352)	(7.617)	(-0.354)
polity	0.00760	-0.0147	0.0295	-0.00333	-0.0137	-0.0128	-0.0198	-0.0233	-0.0489***	-0.0139
	(0.295)	(-0.673)	(0.997)	(-0.161)	(-0.672)	(-0.619)	(-0.964)	(-1.091)	(-3.973)	(-0.682)
colony	0.0663	0.0361	0.0364	0.0882	0.0866	0.0376	0.151	0.0341	0.111	0.0903
	(0.301)	(0.179)	(0.145)	(0.443)	(0.499)	(0.193)	(0.874)	(0.172)	(1.075)	(0.460)
contig	-0.191	0.0845	-0.313	0.0320	-0.199	0.136	-0.149	0.0917	0.135	0.0614
	(-0.515)	(0.266)	(-0.743)	(0.103)	(-0.683)	(0.439)	(-0.513)	(0.293)	(0.779)	(0.198)
comlang_off	0.169	0.0744	0.327	0.230	0.245	0.157	-0.0181	0.0918	-0.278**	0.177
	(0.707)	(0.393)	(1.177)	(1.226)	(1.282)	(0.859)	(-0.0958)	(0.495)	(-2.428)	(0.963)
dist	4.05e-06	6.79e-06	6.55e-06	1.13e-05	3.49e-07	1.24e-05	3.31e-06	1.05e-05	-5.27e-06	1.35e-05
	(0.282)	(0.554)	(0.396)	(0.943)	(0.0306)	(1.054)	(0.293)	(0.868)	(-0.774)	(1.128)
asia	-1.612***	-0.147	-1.905***	-0.197	-1.731***	-0.220	-1.321***	-0.177	0.603***	-0.180
	(-7.951)	(-0.788)	(-8.173)	(-1.103)	(-10.68)	(-1.263)	(-8.289)	(-0.973)	(6.303)	(-1.019)
america	-1.302***	-0.134	-1.669***	-0.155	-1.434***	-0.212	-0.811***	-0.168	0.842***	-0.127
	(-6.938)	(-0.813)	(-7.709)	(-0.976)	(-9.509)	(-1.364)	(-5.465)	(-1.049)	(9.447)	(-0.810)
africa	-1.461***	-0.633***	-1.572***	-0.589***	-1.316***	-0.621***	-1.093***	-0.536**	0.561***	-0.547**
	(-4.279)	(-2.831)	(-4.042)	(-2.662)	(-4.821)	(-2.852)	(-4.144)	(-2.436)	(3.449)	(-2.501)
pacific	-1.149***	0.110	-1.544***	-0.142	-1.126***	-0.214	-0.855***	-0.0861	0.707***	-0.286
	(-3.429)	(0.363)	(-4.003)	(-0.509)	(-4.224)	(-0.789)	(-3.254)	(-0.302)	(4.426)	(-1.063)
Year 1991	-4.969***	-2.552*	-3.805*	-2.615*	-4.385***	-2.614*	-5.843***	-2.968**	-1.952**	-3.079**
	(-2.766)	(-1.687)	(-1.847)	(-1.784)	(-3.075)	(-1.816)	(-4.129)	(-2.009)	(-2.276)	(-2.128)
Constant	-2.633	-0.973	-2.902	-1.255	-4.452**	-1.380	-5.332***	-1.846	-2.497**	-1.478
	(-1.233)	(-0.549)	(-1.173)	(-0.728)	(-2.567)	(-0.818)	(-3.117)	(-1.065)	(-2.426)	(-0.867)
Mills		2.051***		2.336***		1.525***		1.606***		-0.860***
		(3.278)		(3.893)		(3.160)		(3.584)		(-3.376)
Observations	2005	2005	2005	2005	2005	2005	2005	2005	2005	2005

z-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 5: Effects of discrimination by gender (Heckman two-steps estimates)

Dep. Var.	lnmig-m	select	Lnmig-f	select
ln(Gender Equality)	-0.587*	-0.213	0.523**	-0.137
	(-1.894)	(-0.887)	(2.354)	(-0.573)
Mills ratio		2.220***		1.497***
		(3.445)		(3.351)
Observations	2005	2005	2005	2005

z-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

This first set of estimations tends to validate the screening process hypothesis rather than the push-factor hypothesis. If discrimination explains a gender bias in the screening process, it is also possible that the increased level of migrants selectivity is explained by a higher level of migration for skilled women when discrimination is lower. In order to test this idea, we propose new sets of estimates by gender and skill-level. First results are given in table 6. It gives interesting insights. A lower level of gender discrimination tends to be associated with lower level of migration for low-skilled men and a higher level for high-skilled women. Effect is higher for low skill men. The substitution effect shown in table 5 hides another effect: a reduction of gender bias also increases the general skill-level of migrants (that was already observable in table 4). We get very comparable results for the estimated coefficients of other control variables.

Table 6: influence of discrimination by gender and skill level

Dep. Var.	ln_m_mig_prim	select	ln_m_mig_sec	select	ln_m_mig_ter	select	ln_f_mig_prim	select	ln_f_mig_sec	select	ln_f_mig_ter	select
ln(Gender Equality)	-0.739*	-0.447*	-0.392*	-0.0759	-0.191	-0.111	0.245	-0.223	0.882***	0.0524	0.826***	0.0304
	(-1.946)	(-1.907)	(-1.665)	(-0.334)	(-0.666)	(-0.472)	(0.739)	(-0.951)	(3.388)	(0.232)	(4.247)	(0.131)
Mills		2.625***		1.519***		2.059***		2.336***		1.852***		1.356***
		(4.233)		(3.441)		(3.867)		(4.048)		(3.651)		(3.755)
Observations	2430	2430	2430	2430	2430	2430	2430	2430	2430	2430	2430	2430

z-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

These last results, however, do not allow to differentiate the relative importance of two effects: "female education enhancement effect" and "screening effect".

We call hereafter "female education enhancement effect" the fact that when gender equality increases, the access of women to higher education also increases. So with a lower discrimination we will have more skilled women in absolute and relative terms (i.e. relatively to the number of skilled men). This effect must be distinguished from the general fact that in a given country the number of educated women can increase because of a higher investment in human capital (which may be a result of a government policy in favor of higher education or a consequence of the global development of the country, or an effect of the improvement in profitability of human capital). In this latter case the increase is non-gender specific and we have at the same time an increase in the number of qualified women and of qualified men. So a proper indicator of "female education enhancement effect" is the ratio of skilled women on skilled men. If this ratio increases that means that the educative system generates more skilled women relatively to the number of skilled men.

Our problem is to know if the effect on qualified female migration is related to a "screening effect" (the skilled women were discriminated because of their gender and when this discrimination ends they are more often selected) or to a "female education enhancement effect" (there are more skilled women because of an improved access to higher education. Therefore, there are also more skilled women among the migrants). In order to control for this phenomenon, we introduce the ratio of skilled women on skilled men (as an indicator of "*female education enhancement effect"*) as an explicative variable, next to our gender equality variable. Our guess is that if there is effectively a screening effect, our gender equality variable must remain significant even when it is introduced conjointly with the "female education enhancement ratio". Results are given in table 7.

Table 7: influence of discrimination by gender and skill level – with gender ratio by skill-level

Dep. Var.	ln_m_mig_prim	select	ln_m_mig_sec	select	ln_m_mig_ter	select	ln_f_mig_prim	select	ln_f_mig_sec	select	ln_f_mig_ter	select
ln(Gender Equality)	-2.238***	-0.964***	-1.697***	-0.789**	-1.072***	-0.736**	-0.440	-0.699*	0.326	-0.662*	0.727**	-0.399
	(-5.180)	(-2.715)	(-4.432)	(-2.267)	(-2.816)	(-2.039)	(-1.037)	(-1.937)	(0.866)	(-1.902)	(2.188)	(-1.119)
ln_f_educ_ratio	0.730***	0.276*	0.552***	0.343**	0.244	0.336**	0.466**	0.332**	0.230	0.359**	0.0774	0.263*
	(3.952)	(1.915)	(3.298)	(2.424)	(1.484)	(2.287)	(2.527)	(2.249)	(1.394)	(2.517)	(0.535)	(1.798)
Mills	1.810***		1.375***		1.690***		1.835***		1.448***		1.346***	
	(6.498)		(4.999)		(6.080)		(6.459)		(5.334)		(6.005)	
Observations	2430	2430	2430	2430	2430	2430	2430	2430	2430	2430	2430	2430

z-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Our main result is confirmed by this new set of estimates. A higher level of gender equality is still associated with a higher level of migration for high-skilled women but with a lower level for men. The inclusion of these new control variables gives new insights. The *female education enhancement ratio* is associated with a higher level of migration for men whatever is their skill level. This effect is not significant for women. Increasing the ratio of high-skilled women over high-skilled men seems to have a positive effect on migration. Our asumption is that an increase of the relative level of skilled women may be seen as a proxy of the modernization of society, associated with a higher level of mobility due to lower cultural costs of migration. However, this hypothesis should be confirmed by further studies.

3. Robustness of our results

In order to test the robustness of our results, we propose to use our alternative indexes of gender equality to check if these results are also valid while taking into account a broader set of countries or specific variables. Index *lngendereq2* includes more country and *lngendereq3* is built only with labour market variables (see section 2 for more details).

Table 8: Impact of Gender Equality on total migration (alternative indexes)

Dep. Var.	lnmig	select	lnmig_prim	select	lnmig_sec	select	lnmig_ter	select	lnskillratio	select	Observations
lngendereq2	0.342	-0.0525	0.0322	-0.338	0.624**	0.0597	0.563*	0.112	0.500***	-0.154	4183
	(1.066)	(-0.224)	(0.0821)	(-1.492)	(1.966)	(0.276)	(1.735)	(0.491)	(2.841)	(-0.691)	
lngendereq3	-0.191*	-0.0917	-0.316***	-0.152*	-0.126	-0.0787	-0.0463	-0.101	0.297***	-0.131	3186
	(-1.934)	(-1.039)	(-2.970)	(-1.838)	(-1.383)	(-0.972)	(-0.510)	(-1.200)	(6.437)	(-1.617)	
lngendereq1av	-0.0934***	-0.0456	-0.121***	-0.0422	-0.0891***	-0.0318	-0.0608***	-0.0325	0.0593***	-0.0307	3308
	(-4.215)	(-1.555)	(-4.483)	(-1.622)	(-3.851)	(-1.288)	(-2.911)	(-1.230)	(4.381)	(-1.229)	
lngendereq2av	0.111	-0.0998	-0.0500	-0.153	0.179	0.0344	0.234	-0.00674	0.303***	-0.0338	4979
	(0.789)	(-0.841)	(-0.313)	(-1.343)	(1.299)	(0.316)	(1.585)	(-0.0591)	(3.725)	(-0.302)	
lngendereq3av	-0.276***	-0.150**	-0.443***	-0.151**	-0.200***	-0.174**	-0.127*	-0.183**	0.347***	-0.160**	4102
	(-4.053)	(-2.011)	(-5.243)	(-2.155)	(-2.809)	(-2.498)	(-1.786)	(-2.543)	(8.478)	(-2.322)	

z-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Whatever is the index chosen, we find that a higher level of gender equality increases the *selectivity* of migrants (column *lnskillratio*). We find for some indexes a negative impact on total migration but this result is not robust. As we can see in table 9, it can be explained by a higher effect on male migration compared to the effect of female migration, observed for some countries.

Table 9: Impact of Gender Equality on migration by gender(alternative indexes)

Dep. Var.	lnmig-m	select	Lnmig-f	select	Observations
lngendereq2	-0.582	-0.193	1.299***	0.219	4183
	(-1.602)	(-0.847)	(4.101)	(0.969)	
lngendereq3	-0.417***	-0.0977	0.107	-0.0741	3186
	(-3.929)	(-1.136)	(1.365)	(-0.881)	
lngendereq1av	-0.135***	-0.0488*	-0.0300	-0.0322	3308
	(-5.871)	(-1.679)	(-1.333)	(-1.210)	
lngendereq2av	-0.410***	-0.176	0.705***	0.102	4979
	(-2.619)	(-1.511)	(5.136)	(0.899)	
lngendereq3av	-0.498***	-0.114	0.0386	-0.0959	4102
	(-6.496)	(-1.585)	(0.558)	(-1.354)	

Globally, we find a negative impact of gender equality on male migration. The estimated coefficient is always negative and significant except when using the second index. For female migration, we find a positive effect in most cases. However, the level of significance is heterogeneous.

Table 10: Impact of Gender Equality on migration and skill-level (alternative indexes)

Dep. Var.	ln_m_mig_prim	select	ln_m_mig_sec	select	ln_m_mig_ter	select	ln_f_mig_prim	select	ln_f_mig_sec	select	ln_f_mig_ter	select	Observations
lngendereq2	-0.929**	-0.641***	-0.482	0.153	-0.160	-0.201	0.887**	0.0607	1.429***	0.161	1.619***	0.479**	4183
	(-2.143)	(-2.883)	(-1.360)	(0.719)	(-0.475)	(-0.902)	(2.214)	(0.272)	(4.241)	(0.749)	(5.853)	(2.157)	
lngendereq3	-0.571***	-0.151*	-0.387***	-0.0401	-0.247**	-0.0955	-0.0448	-0.0911	0.169**	-0.0667	0.267***	-0.0953	3186
	(-5.144)	(-1.893)	(-4.528)	(-0.518)	(-2.540)	(-1.169)	(-0.451)	(-1.131)	(2.082)	(-0.852)	(3.893)	(-1.175)	
lngendereq1av	-0.166***	-0.0461*	-0.140***	-0.0347	-0.0946***	-0.0354	-0.0577**	-0.0349	-0.0235	-0.0316	0.00319	-0.0451*	3308
	(-5.747)	(-1.795)	(-5.856)	(-1.430)	(-3.946)	(-1.355)	(-2.100)	(-1.384)	(-1.000)	(-1.305)	(0.158)	(-1.716)	
lngendereq2av	-0.656***	-0.286**	-0.467***	0.131	-0.201	-0.139	0.482***	0.0852	0.694***	0.101	0.893***	0.202*	4979
	(-3.770)	(-2.568)	(-3.214)	(1.233)	(-1.314)	(-1.244)	(2.939)	(0.764)	(4.878)	(0.943)	(7.114)	(1.814)	
lngendereq3av	-0.670***	-0.131*	-0.486***	-0.0920	-0.316***	-0.152**	-0.185**	-0.103	0.118*	-0.0915	0.212***	-0.0909	4102
	(-7.614)	(-1.946)	(-6.608)	(-1.397)	(-4.189)	(-2.188)	(-2.249)	(-1.507)	(1.653)	(-1.373)	(3.393)	(-1.337)	

z-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The estimated coefficient is always negative and significant for unskilled men. We also find a negative coefficient for secondary and tertiary educated men but the coefficient is not significant in most of the estimations. Concerning female migration, we always find a positive impact on the migration of high-skilled women (except for the index 1_av). However, the magnitude of the coefficient differs a lot between different indexes. We reach the same conclusion for secondary-educated women. For low-skilled women, results are not very instructive. The estimated coefficient is negative in some cases and positive in other. As the result is not robust, we do not conclude on any effects for this category of workers.

Table 11: Impact of Gender Equality on migration and skill-level (alternative indexes)

Dep. Var.	ln_m_mig_prim	select	ln_m_mig_sec	select	ln_m_mig_ter	select	ln_f_mig_prim	select	ln_f_mig_sec	select	ln_f_mig_ter	select
lngendereq2	-1.433***	-0.769***	-0.874**	-0.0561	-0.256	-0.353	0.412	-0.125	1.192***	-0.0807	1.484***	0.272
	(-3.096)	(-3.181)	(-2.287)	(-0.242)	(-0.705)	(-1.456)	(0.960)	(-0.515)	(3.238)	(-0.345)	(4.920)	(1.126)
ln_f_educ_ratio	0.418***	0.0959	0.292**	0.157**	0.0632	0.113	0.366***	0.140*	0.169	0.180***	0.0949	0.155**
	(2.983)	(1.346)	(2.508)	(2.282)	(0.575)	(1.585)	(2.783)	(1.959)	(1.500)	(2.588)	(1.062)	(2.184)
lngendereq3	-0.633***	-0.156*	-0.430***	-0.0622	-0.258**	-0.110	-0.132	-0.106	0.107	-0.0876	0.220***	-0.109
	(-5.553)	(-1.935)	(-4.701)	(-0.802)	(-2.554)	(-1.346)	(-1.257)	(-1.308)	(1.216)	(-1.117)	(3.065)	(-1.336)
ln_f_educ_ratio	0.452***	0.0522	0.325**	0.271**	0.0898	0.188	0.645***	0.175	0.458***	0.258**	0.332***	0.175
	(2.616)	(0.453)	(2.268)	(2.427)	(0.581)	(1.615)	(4.010)	(1.494)	(3.361)	(2.282)	(3.034)	(1.501)
lngendereq1av	-0.178***	-0.0386	-0.150***	-0.0379	-0.0951***	-0.0365	-0.0813***	-0.0390	-0.0402	-0.0342	-0.0121	-0.0606**
	(-6.010)	(-1.472)	(-6.014)	(-1.524)	(-3.819)	(-1.365)	(-2.770)	(-1.506)	(-1.641)	(-1.376)	(-0.572)	(-2.240)
ln_f_educ_ratio	0.225	-0.116	0.168	0.0506	0.00981	0.0173	0.408***	0.0644	0.285**	0.0410	0.253**	0.240***
	(1.574)	(-1.311)	(1.467)	(0.597)	(0.0862)	(0.196)	(3.010)	(0.723)	(2.542)	(0.476)	(2.560)	(2.720)
lngendereq2av	-0.913***	-0.329***	-0.676***	0.0269	-0.262	-0.221*	0.215	-0.00413	0.537***	-0.0264	0.769***	0.0938
	(-4.753)	(-2.684)	(-4.174)	(0.230)	(-1.538)	(-1.796)	(1.189)	(-0.0337)	(3.351)	(-0.223)	(5.487)	(0.767)
ln_f_educ_ratio	0.350***	0.0564	0.264***	0.139**	0.0752	0.108	0.345***	0.118*	0.198**	0.169***	0.155*	0.142**
	(3.102)	(0.840)	(2.800)	(2.142)	(0.754)	(1.601)	(3.267)	(1.756)	(2.110)	(2.580)	(1.929)	(2.120)
lngendereq3av	-0.682***	-0.125*	-0.494***	-0.0967	-0.306***	-0.153**	-0.226***	-0.107	0.0907	-0.0948	0.186***	-0.100
	(-7.748)	(-1.846)	(-6.637)	(-1.464)	(-4.021)	(-2.193)	(-2.723)	(-1.558)	(1.258)	(-1.419)	(2.943)	(-1.475)
ln_f_educ_ratio	0.102	-0.100	0.0738	0.0744	-0.0855	0.0115	0.370***	0.0573	0.233**	0.0520	0.222***	0.155**
	(0.851)	(-1.304)	(0.748)	(1.008)	(-0.857)	(0.150)	(3.369)	(0.738)	(2.454)	(0.692)	(2.686)	(2.019)

Our main result is confirmed by this new set of estimates once we control for the *female education enhancement effect* (variable *ln_f_educ_ratio*). The estimated coefficient for low-skilled men is always significant and negative while the one for high-skilled women is always positive and significant except for one index where the coefficient is not significant. For secondary-educated men, the coefficient is also always negative and significant. In some cases, we also find a negative coefficient for high-skilled men but this result is not robust for all indexes. Concerning female migration, results are not robusts for secondary and primary educated workers. For secondary-educated women, we find a positive effect of gender equality for two indexes while we find a negative effect for primary-educated women for two other indexes.

The female education enhancement effect is also observed in most cases. The ratio of skilled women is positively correlated with the level of migration of men. We also find a positive effect on the migration of women in some cases.

These estimates give interesting insights. It helps to determine which results are clearly robust to the use of alternative indexes. In particular, one could argue that our results are driven by an effect of discrimination in education, not a discrimination on the labor market. If these two phenomenon are instrinsequely linked, justifying an agregate index including both dimensions, most of our results are confirmed even when we use *genderequality3* as a proxy of gender equality. This index is built only with variables related to the labor market.

Several results can be considered as robust. First, it is clear that improving gender equality is positively correlated with the selectivity of migrants. Second, a higher level of gender equality is associated with a lower level of male migrants and a higher level of female migrants, all things being equal. The screening hypothesis tends to be validated, rather than the push-factor hypothesis. It also appears that the negative impact is strong and robust for low-skilled men while the positive

effect is robust for high-skilled women. The results for other workers are ambiguous and thus cannot be considered as definitive. Lastly, the higher is the share of female in the tertiary-educated labor force, the higher is migration, especially for men.

V. Conclusions

In this paper we test empirically two theories. The first one is a « push factor » theory that implies that when gender discrimination decreases the female workers migrate less because conditions of work are better in their source country. The second theory is a « gender screening » theory that implies that there is a gender bias in the selection of migrants when discrimination is high. This second approach means that when discrimination is decreasing, there is more female migrants, especially high skilled female workers. In order to realize the test, we construct several original indexes of gender discrimination based on a principal component analysis. Our empirical test rejects the « push factor » theory and validates the « gender screening » theory. One important consequence of our study is that a reduction of gender bias increases the general skill-level of migrants. Then one can fear an increase in the brain drain. However, the reduction in gender discrimination also gives more incentive for women to undertake long studies and to invest in human capital. Future researches will be devoted to this question.

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