

# Why Doesn't Labor Flow from Poor to Rich Countries? Micro Evidence from the European Integration Experience\*

Catia Batista<sup>†</sup>

Trinity College Dublin

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## Abstract

Joining the EU is a natural experiment that drastically opens the borders of richer European countries to immigration. However, migration flows from southern Europe responded little to free migration after 1986, despite substantial differentials in real GDP per worker. The simple explanation we propose for this puzzle is migration costs. We explore the implications of our costly migration model by combining individual information from two household survey datasets (Luxembourg Income Study and European Community Household Panel). In estimating wage differentials, we account for observable characteristics, unobservable heterogeneity, and assimilation of immigrants. Based on our theoretical framework, we identify individual migration costs: they seem to be smaller for the young and educated. Nevertheless, we find a negative pattern of self-selection: less able workers appear to be more likely to leave. Our results point to the importance of micro characteristics of potential migrants in determining the effectiveness of free migration policies.

**Keywords:** international migration; economic integration; free migration policy; wage differentials; migrant self-selection; migration costs; European Union

**JEL Codes:** F15; F22; J31; J61; O15; O24

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<sup>†</sup>Email: cpatista@gmail.com. Post: Department of Economics, Trinity College Dublin, Dublin 2, Ireland. Web: [www.catiabatista.org](http://www.catiabatista.org)

# 1 Introduction

International migration is an increasingly important phenomenon: from 1975 to 2005, the stock of international migrants has more than doubled to 191 million, or 3% of the world population (almost 10% of the population in developed countries).<sup>1</sup> This increasing trend occurs despite stricter restrictions on labor mobility being in place from the mid-1970s in Western economies, which may be taken as evidence for the attractiveness of these areas to international migrants in general.

In this setting, and given that legal barriers are still a major impediment to international labor flows, it is important to examine and explain the impact of abolishing restrictions to migration of international workers. For this purpose, we consider a natural experiment that fully lifted barriers to labor mobility: we look at the poorer southern European countries which joined the European Union (EU) in 1986.<sup>2</sup> Our goal is to provide an analysis conditional not only on the most relevant macro characteristics of the countries in question, but also on the characteristics of the individual agents that decided whether to migrate or not. This should allow a better understanding of the extent to which this integration experience can throw light on other integration experiences allowing free labor mobility, such as the Eastern European enlargement or an eventual broadened North American Free Trade Agreement (NAFTA).

At the date of integration, Portugal and Spain had GDP per capita levels representing about 55% and 70% of the EU average, respectively. Between 1985 and 2000, these numbers changed to 70% and just below 80%. While this evolution displays a relatively fast degree of convergence in historical terms, it also shows that sizeable real PPP-adjusted differentials persisted 15 years after integration. Increased South-North migration flows, however, stopped shortly after full labor mobility was allowed. Why did this happen before full convergence was attained? Why do legal barriers to migration seem to have mattered so little in migration decisions of southern European individuals? This is the basic question answered by this paper.

This question may be regarded as the converse to the classical question formulated by Lucas (1990): "Why does capital not flow from rich to poor countries?". Factor flows (and international trade) are actually alternative ways that may contribute to factor price equality across countries, but

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<sup>1</sup>These numbers are from United Nations (2005). International migrant is simply defined as an individual who resides in a country other than its country of birth.

<sup>2</sup>Portugal and Spain actually joined the European Economic Community (EEC) in 1986, which became the European Union (EU) only after 1993. For simplicity, the EU designation will be used throughout this paper.

Legal barriers to labor mobility were not immediately abolished after integration: indeed, Portugal and Spain joined the EU on January 1st, 1986, but full labor mobility was only granted after a transition period, which ended on December 31st, 1991. For more details on the accession clauses the reader is referred to European Commission (2001, pp. 14-16).

whereas the traditional question has deserved extensive treatment in the literature,<sup>3</sup> the converse question we address in this paper has not.<sup>4</sup> The usual justification for this lack of academic interest is that labor flows are deterred by strict legal restrictions to migration. However, in the context of the EU (and also within European countries such as Italy and Spain), where no such restrictions to labor mobility are in place, we still observe the absence of labor migration in presence of persistent real wage differentials.

The theoretical framework we propose to analyze this stylized fact is a simple neoclassical general equilibrium model allowing for costly migration, as well as for investment in human and physical capital (also subject to adjustment costs). As long as the origin country is at a sufficiently low level of development (arguably the case at the time of the southern European integration), the model predicts a surge in migration flows immediately after full labor mobility is allowed, which should afterwards be replaced by return migration as convergence occurs during transitional dynamics. Moreover, there should be cross-country real wage convergence only up to a wedge during transition to the steady-state.

This simple aggregate model describes with impressive accuracy the behavior of macro variables after integration. But it also points to the possibility of heterogeneity in terms of both international real wage differentials and migration costs depending on observable characteristics, such as human capital. Because this type of information cannot be captured using available aggregate data, we choose to depart from the simplifying representative agent framework of the model and to empirically analyze individual heterogeneity using micro datasets that allow us to control for observable and unobservable individual characteristics. The theoretical model is nevertheless used to inform our individual level empirical analysis, namely our estimation of residual migration costs immediately after integration.

Using micro data allows us, for instance, to examine whether individuals indeed faced differing migration incentives depending on their education and age, which can ultimately explain the pattern of observable migrant self-selection - namely the fact that young and skilled workers seem more likely to emigrate than their older and less skilled counterparts. This is particularly relevant given the much higher educational attainment of the labor force in northern relative to southern Europe. This differential creates a compositional effect: the relevant wage gap faced by a randomly chosen potential migrant from southern Europe should be smaller than the gap between the average workers

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<sup>3</sup>See, for instance, Batista and Potin (2007), Alfaro et al. (2006, 2007), Caselli and Feyrer (2006).

<sup>4</sup>Related research by Barro and Sala-i-Martin (1991) shows that labor flows seem to have little impact in ensuring regional wage convergence, even after controlling for unemployment differentials.

of the different European areas, after controlling for other relevant characteristics of the labor force.

An additional essential part of our empirical work will be dedicated to controlling for unobservable self-selection of migrants: if the individuals who emigrate are the most able and motivated in the southern labor force, for example, then simply looking at wage differentials will likely overstate the incentives for migration faced by a random potential migrant in the origin country.

Our empirical analysis makes use of two micro datasets: the Luxembourg Income Study (LIS) and the European Community Household Panel (ECHP). Both LIS and ECHP are projects especially designed to provide directly comparable cross-country information, as is essential for our analysis.<sup>5</sup> Using these data for the period before and after 1986, we are able to examine the evolution of cross-country wage differentials faced by individuals while disentangling the effect of their observable and unobservable characteristics. In addition, the ECHP allows us to control for assimilation effects (i.e. increased productivity of immigrants due to assimilation of the language and other norms of the host country), as proxied by spells of migration.

Our results using the micro data confirm the existence of persistent real wage differentials after integration, even after controlling for observable and unobservable individual characteristics, and immigrant assimilation effects. In particular, we find a negative pattern of migrant self-selection: uneducated and young Portuguese residents were most likely to emigrate, and the least able among these also seem to be more likely to have emigrated. Assimilation effects do not seem to play an important role in our analysis.

Following the strategy suggested by our theoretical model, we find that migration costs faced by young and educated individuals seem to be lower than those experienced by older and less educated potential migrants. The migration costs we identify are in line with evidence from other migration contexts, namely Chiquiar and Hanson (2005), who propose that emigration costs from Mexico to the US are a declining function of education.

In addition, the work of Hunt (2006) is related to ours in that she also studies migration in the context of an European integration experience: the German reunification process. Consistent with our findings, she finds that young and skilled residents in East Germany were much more likely to emigrate than older, unskilled ones, and seemed to respond particularly to wage differentials, whereas older potential migrants responded more to unemployment shocks. These results are in line with our approach in that they account for individual characteristics as determinants of migration responses, even though unobservable self-selection of migrants is not accounted for. However,

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<sup>5</sup>For more details on the data, see the Data Appendix.

the German reunification process had very idiosyncratic characteristics: it was the reunification of a divided country, sharing a common language, and was largely politically driven (e.g. wage setting, monetary union), which is structurally different from the market-driven southern European integration process. These are easier to encompass in a model, that can be more readily extrapolated to most other current and future free labor migration experiences.

Finally, another piece of work related to ours is Caselli and Tenreyro (2004), who examine the post-war convergence process of the southern European economies and compare it to the performance of Eastern economies that joined the EU in 2005. However, their perspective is to identify the macroeconomic mechanisms behind these comparative performances, and they do not discuss labor flows and individual characteristics of potential migrants.

The remaining of the paper is organized as follows. The next section reviews in detail the stylized empirical facts on which we ground our research question. Section 3 describes our theoretical framework and its predictions for the behavior of migration and real wage differentials, depending on education. Next, section 4 explains our empirical approach and presents our results. The last section summarizes and presents directions for further research.

## **2 Why Doesn't Labor Flow Downhill? Stylized Facts of the Puzzle**

In this section, we describe in detail the main stylized facts related to our research question. We start by presenting the real GDP per capita convergence of Portugal and Spain to average EU levels in Fig. 1.<sup>6</sup>

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<sup>6</sup>These computations are based on data from the Penn World Tables (PWT 6.1). Average EU GDP per capita, adjusted for purchasing power parity (PPP) differentials, was calculated as the average for Belgium, France, Germany, Great Britain, Italy and Netherlands.

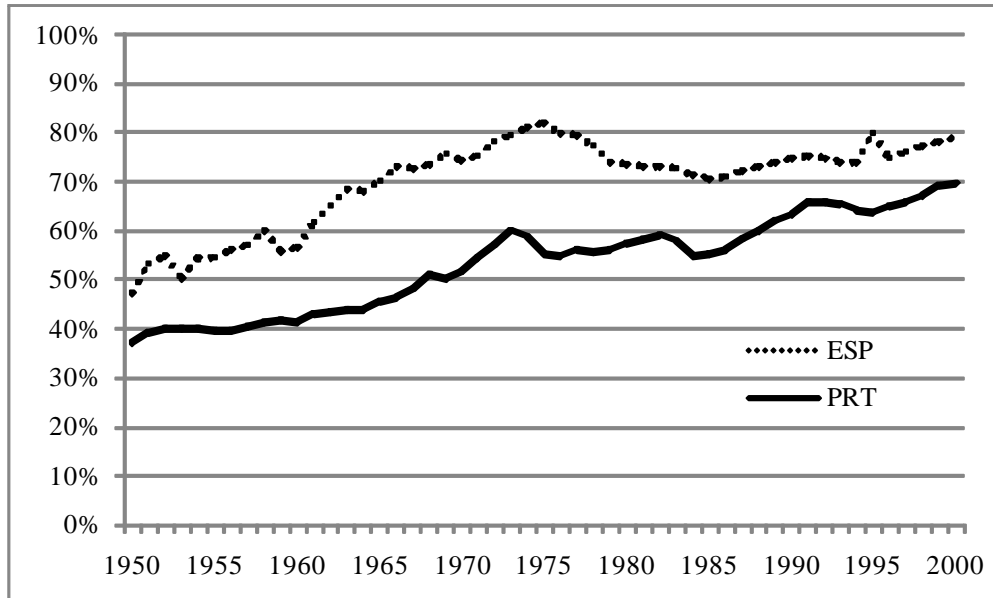


Figure 1: GDP per capita of Portugal and Spain relative to EU average.

Spain and especially Portugal have been converging to the European average at a steady rate. Their post-EU integration convergence experience has been rather fast in historical terms, particularly since the 1970s. It is also clear from Fig. 1 that sizeable real PPP-adjusted differentials persisted 15 years after integration.

The behavior of the stocks of Portuguese and Spanish migrants to the most relevant EU destination countries are depicted in Figures 2 and 3. Clearly, the stock of southern European emigrants decreased after EU-integration, between 1985 and 2000. This is evidence that any migration flows created over this period were more than compensated by return migration and changes in citizenship.

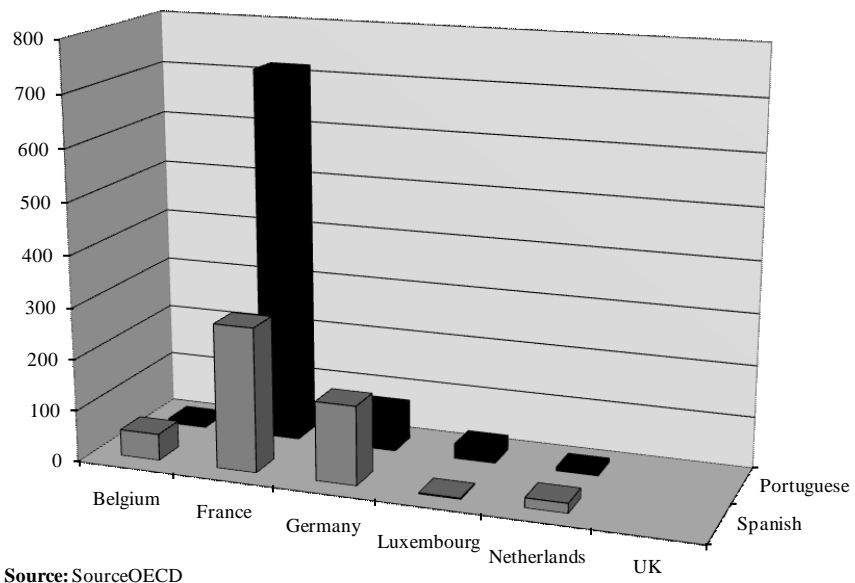


Figure 2: Stocks of Portuguese and Spanish immigrants (in thousands) in 1985 in several EU countries.

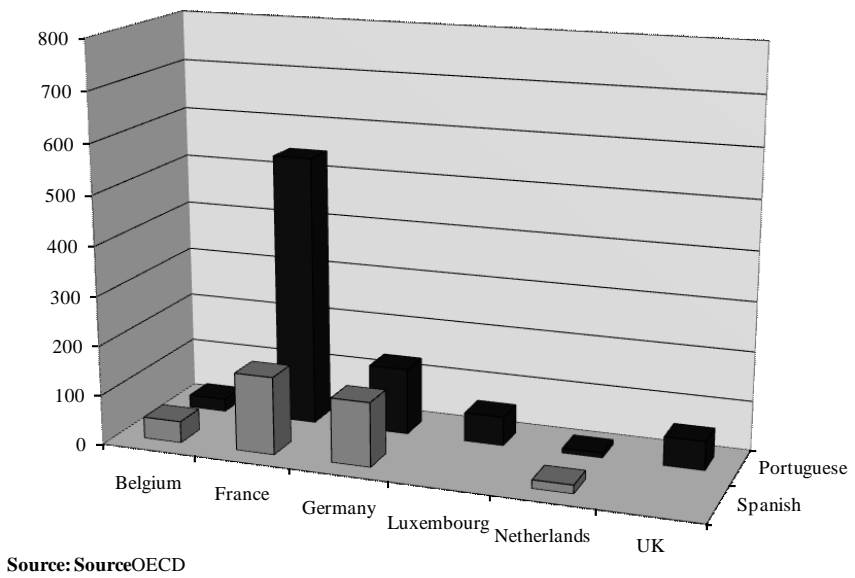
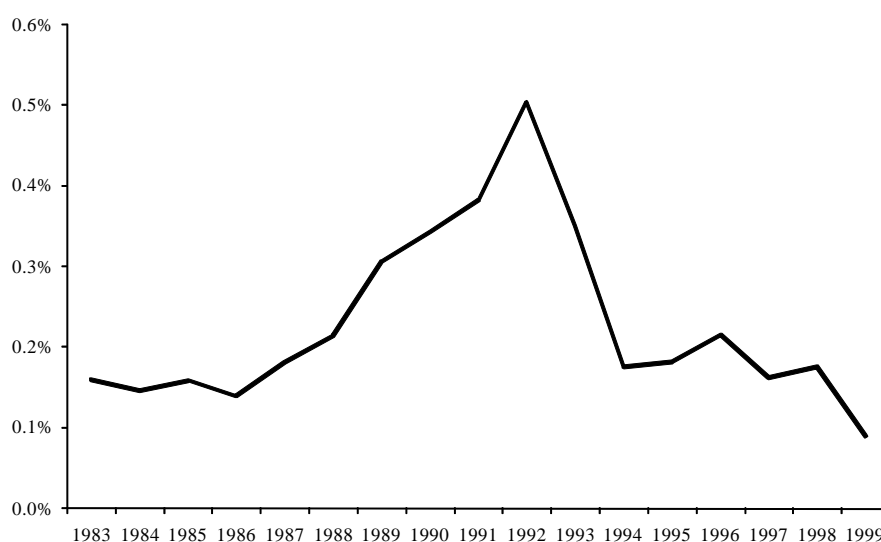


Figure 3: Stocks of Portuguese and Spanish immigrants (in thousands) in 2000 in several EU countries.

Unfortunately, data on migration flows within the EU is scarce. For the case of Portugal, a time series is available from 1983. Although it does not allow us to understand much more about the characteristics of these flows than their magnitude, it provides interesting information in terms of migration trends after the EU integration. Indeed, permanent emigration flows (defined as those with duration longer than one year) display a clear peak around 1992, which represented only 0.5% of the workforce, as can be seen from Fig. 4. These numbers are not large, especially if compared with the historical emigration levels observed between 1960-73 - despite the fact that a substantial fraction of those labor flows were illegal, as described by Lopes (1999). After 1992, and from 1994 in particular, migration flows quickly returned to pre-integration levels.



**Source:** Permanent Emigration Data from INE, and Estimates by Carrilho and Patricio (2003) for 1989-91; Workforce calculated from PWT 6.1.

Figure 4: Permanent Emigration from Portugal as a Fraction of Total Workforce

### 3 Theoretical Framework

The model proposed in this section describes the process of a small economy opening to capital inflows and labor outflows, as experienced by Portugal and Spain when joining the EU. It aims at reconciling the pieces of empirical evidence presented in the previous section in a one-country model economy in the spirit of Stokey (1996), but which opens to costly migration in addition to



capital flows.<sup>7</sup>

In reality, there was an initial period during which capital was freely mobile and trade unrestricted, whereas it took six years for full labor mobility to be in effect. This likely contributed to narrowing North-South wage differentials, which limited the magnitude of the labor migration flows created. This assertion is empirically confirmed by Batista (2005), who finds that, contrary to capital flows, emigration did not sizably contribute to wage growth after Portugal's integration in the EU.

In modelling labor flows, the empirical importance of migration costs is matched by the introduction of migration cost parameters, which may be interpreted as unofficial migration barriers, travelling and differential housing costs, psychological and other loss of local amenities type of costs borne by emigrants. Note that these costs are distinct from "assimilation costs" derived from language and cultural differences that affect a worker's productivity at the destination country, relative to nationals of that country.<sup>8</sup>

The following subsections set the model up in more detail.

### 3.1 Technology

In this economy, production of homogeneous output at date  $t$ ,  $Y(t)$ , occurs according to a homogeneous of degree one aggregate production function with three production factors, as in Stokey (1996):

$$Y(t) = A(t) \cdot F[K(t), U(t), S(t)]$$

where  $K(t)$  denotes the services of capital used in production<sup>9</sup>;  $U(t)$  and  $S(t)$  stand, respectively, for the unskilled and skilled labor inputs to production at date  $t$ <sup>10</sup>; and  $A(t)$  is a country-specific Hicks

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<sup>7</sup>Stokey (1996) develops a fully specified general equilibrium model, under which attention is paid to three cases: a benchmark closed economy, capital inflows in a small open economy, and free trade of goods following economic integration of the small open economy in a more developed area. This framework allows addressing the issue of the development of an economy evolving from autarchy to complete economic integration of the type allowed by NAFTA. However, because integration in the EU also involves abolishing barriers to labor mobility, this model is not suitable to be used in our analysis.

<sup>8</sup>Sjaastad (1962) presents the seminal analysis of migration as a human capital investment decision, clearly discussing the role of different types of costs and benefits of migrating. The empirical role of migration costs has been studied in the context of the small magnitude of internal migration within European countries. Namely, the fact that migration does not seem to respond to shocks (that cause, for instance, increased regional unemployment) seems to point to the presence of significant costs, which should be regarded as a lower bound to migration costs of international migration within Europe, given the language and cultural differences across countries. References are, for Italy, Attanasio and Padoa Schioppa (1991), Faini et. al. (1997), and Cannari et. al. (2000); and, for Spain, Bentolila (1997), Antolin and Bover (1997), and Bover and Velilla (1999).

<sup>9</sup>These services of capital are assumed to be proportional to the original capital stocks, measured in efficiency units.

<sup>10</sup>We assume that  $U(t)$  and  $S(t)$  add to  $L$ , the national workforce of the country, which is, for simplicity, taken as constant over time, i.e. number of retiring people equals number of workers entering the force. This implies that we

neutral technological factor. We choose to leave the functional form for the aggregate production function,  $F$ , unspecified. It suffices that it exhibits constant returns to scale.<sup>11</sup>

Rewriting the production function in per (national) worker terms, we obtain

$$y(t) = A(t).f [k(t), s(t)]$$

where

$$y(t) \equiv \frac{Y(t)}{L}; \quad s(t) \equiv \frac{S(t)}{L}; \quad k(t) \equiv \frac{K(t)}{L}$$

Competitive firms' profit maximizing choices determine the following return to capital and level of skill premium:

$$\begin{aligned} r(t) &= A(t).f_1 [k(t), s(t)] \\ w_z(t) - w_u(t) &= A(t).f_2 [k(t), s(t)] \end{aligned}$$

where  $r(t)$  denotes the rental rates of capital, and  $w_z(t)$  and  $w_u(t)$  stand for the wage rates paid to skilled and unskilled workers, respectively.

### 3.2 Introducing Migration

If we assume that there are no restrictions to factor mobility in this country, this economy's setting can be summarized as follows.

If (exogenous) foreign wages,  $w_i^*(t)$ ,  $i = z, u$ , are initially high enough so that the representative household optimally chooses positive emigration, we can define  $m_z(t)$  and  $m_u(t)$  as the fractions of the labor force  $L$  that are (stocks of) skilled and unskilled emigrants, respectively. These are chosen by the representative household at each date. In their optimization problem, families must consider the costs  $\psi_z$  and  $\psi_u$  incurred when skilled and unskilled, respectively, individuals migrate. This cost can be thought of as cultural/psychic separation costs and transportation or other pecuniary costs.

The possibility of emigration implies that production will be given by

$$y(t) = A(t).f [k(t), z(t), m_z(t), m_u(t)] \tag{1}$$

where  $m_z(t)$  and  $m_u(t)$  are taken as given.

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are abstracting from the existence of unemployment in this economy.

<sup>11</sup>Batista (2005) examines the implications of allowing for capital-skill complementarity á la Krusell et al. (2000) for the behavior of skilled and unskilled wages in the presence of migration and/or capital flows.

This implies the same profit maximizing conditions for competitive firms as before:

$$r(t) = A(t).f_1 [k(t), z(t), m_z(t), m_u(t)] \quad (2)$$

$$w_z(t) - w_u(t) = A(t).f_2 [k(t), z(t), m_z(t), m_u(t)] \quad (3)$$

Given homogeneity of degree 1 property of the aggregate production function in both countries, Euler theorem implies that domestic product per worker is equal to:

$$y(t) = w_z(t). [z(t) - m_z(t)] + w_u(t) [1 - z(t) - m_u(t)] + r(t).k(t) \quad (4)$$

### 3.3 Preferences

Households are assumed to supply labor inelastically and to privately finance all investment in human capital. Accumulation of human capital is subject to adjustment costs, contrary to physical capital accumulation. This is an unrealistic simplifying assumption, but it should not affect the pattern of transitions, only exaggerate its speed. Adjustment costs are introduced by the parameters  $0 < \phi, B < 1$ . Human capital depreciates at the rate  $0 < \eta < 1$ , which includes the effects of retirement. In addition to choosing optimal emigration paths, the representative households must determine consumption per worker  $c(t)$ , and investment in human capital  $z(t)$ .

Free capital mobility implies that the path of physical capital will be a function of the households' choice for  $z, m_z$ , and  $m_u$ , in a way that its marginal productivity always exactly equals the corresponding depreciation rate ( $\delta$ ) plus the world interest rate ( $\rho$ ).

$$A.f_1 [k(z, m_z, m_u), z, m_z, m_u] = \delta + \rho \quad (5)$$

Because the representative household can borrow and lend at the world interest rate, its investment and consumption decisions can be thought of as separated. The investment problem therefore corresponds to the choice of the human capital and migration levels that maximize the discounted labor income stream net of migration and human capital investment costs:

$$\max_{\{I_z(t), m_z(t), m_u(t), t \geq 0\}} \int_0^{\infty} e^{-\rho t} \left[ \begin{array}{l} w_z(t). [z(t) - m_z(t)] \\ + w_u(t). (1 - z(t) - m_u(t)) \\ + w_z^*(t). m_z(t) + w_u^*(t). m_u(t) \\ - I_z(t) - \psi_z. m_z(t) - \psi_u. m_u(t) \end{array} \right] dt$$

*s.t.*  $\dot{z}(t) = BI_z(t)^\phi - \eta.z(t)$

taking  $z_0, \{w_z(t), w_u(t), w_z^*(t), w_u^*(t), t \geq 0\}$  as given.

Optimality requires the following conditions to hold:

$$w_z(t) = w_z^*(t) - \psi_z \quad \text{if } m_z(t) > 0 \quad (6)$$

$$w_u(t) = w_u^*(t) - \psi_u \quad \text{if } m_u(t) > 0 \quad (7)$$

$$\dot{z}(t) = B^{\frac{1}{1-\phi}} [\phi \mu(t)]^{\frac{\phi}{1-\phi}} - \eta \cdot z(t) \quad (8)$$

$$\frac{\dot{\mu}(t)}{\mu(t)} = \eta + \rho - \frac{1}{\mu(t)} \cdot A.f_2 [k(z(t), m_z(t), m_u(t)), z(t), m_z(t), m_u(t)] \quad (9)$$

where  $\mu(t)$  is the co-state for  $z(t)$ .

The consumption problem solved by households is to maximize lifetime utility, subject to their lifetime earnings:

$$\begin{aligned} & \max_{\{c(t), t \geq 0\}} \int_0^{\infty} e^{-\rho t} \frac{c(t)^{1-\sigma} - 1}{1-\sigma} dt \\ \text{s.t. } & \int_0^{\infty} e^{-\rho t} c(t) dt \leq \int_0^{\infty} e^{-\rho t} \left[ \begin{array}{l} w_z(t) \cdot [z(t) - m_z(t)] \\ + w_u(t) \cdot (1 - z(t) - m_u(t)) \\ + w_z^*(t) \cdot m_z(t) + w_u^*(t) \cdot m_u(t) \\ - I_z(t) - \psi_z \cdot m_z(t) - \psi_u \cdot m_u(t) \end{array} \right] dt + k(0) \end{aligned}$$

given  $k(0)$ .

The solution to this problem is given by a constant stream of consumption ( $\bar{c}$ ) which has a discounted value equal to the maximized value of the objective function of the investment problem,  $V(z(0))$ .

$$\frac{\bar{c}}{\rho} = V(z(0)) + k(0) \quad (10)$$

where  $t = 0$  corresponds to the date of opening the economy to factor flows.

The steady-state values for human and physical capital are the same as before the economy opened to factor flows, and are given by:

$$A.f_1 [\bar{k}, \bar{z}, \bar{m}_z, \bar{m}_u] = \delta + \rho \quad (11)$$

$$A.f_2 [\bar{k}, \bar{z}, \bar{m}_z, \bar{m}_u] = (\eta + \rho) \left( \phi^{-1} B^{-\frac{1}{\phi}} [\eta \cdot \bar{z}]^{\frac{1-\phi}{\phi}} \right) \quad (12)$$

where an upper bar denotes a steady-state value.

These steady-state levels are set so that the productivity of both physical and human capital exactly offsets depreciation and discount rates - adjusted for the impact of adjustment costs in the case of human capital.

The transitional dynamics for this economy are given by (8) and (9) for human capital and its co-state. Physical capital adjusts so that its rate of return keeps constant given household's choices for human capital and migration, as described by (5).

At this stage, the theoretical analysis performed qualitatively describes how opening economies to factor flows can cause cross-country wage convergence up to a wedge (created by migration costs  $\psi_z$  and  $\psi_u$ ) in an initial stage of transition. This is the result of a decision of households to migrate immediately after it becomes allowed in order to maximize wages net of migration costs. During transition to the steady-state, however, as human capital accumulation leads international wage differentials to fall below  $\psi_z$  and  $\psi_u$ , there will be return migration.

## 4 Empirical Analysis

In this section, we turn to empirically examining the research question described in the previous sections: why did labor not keep flowing from poor southern European countries to rich EU countries after the former joined the EU? Our theoretical model simply proposes migration costs as the answer to this question. But how sizeable are these? And what exactly do they encompass? To answer these questions, we must necessarily start by evaluating the wage differentials faced by a random potential migrant in southern Europe. Only then we will be able to identify the magnitude of these costs.

Because of the sizable differences in the educational composition of labor forces, compositional effects on average wages are likely important and we need to control for individual skills, as already theoretically modelled. In addition there may be other individual characteristics (such as age) determining migration incentives. For this reason we want to examine wage differentials conditional on observable individual characteristics.

Moreover, there may be unobservable characteristics, such as ability, motivation or quality of acquired skills, that also determine wages and therefore incentives to migrate. These unobservables must therefore be accounted for when measuring cross-country differentials, or these will be biased if there is a significant pattern of positive (or negative) unobservable self-selection.

Finally, it is necessary to control for the fact that the duration of migration spells likely affects

immigrant integration (through assimilation of language and other norms of the host economy). This implies that wages earned by immigrants generally suffer a negative premium relative to natives, which decreases (in absolute value) as immigrants' length of stay increases. These assimilation patterns create an asymmetry between the migration costs relevant for initial and for return migration decisions. The way we include this issue in our analysis is to simply estimate this "assimilation premium" and exclude it when calculating the wage differential relevant for initial migration decisions.

In order to accomplish this analysis, we make use of household surveys made available by two distinct projects: the Luxembourg Income Survey (LIS) and the European Community Household Panel (ECHP).<sup>12</sup> Because no reliable Spanish data is available before 1990 and because the second largest migrant destination country (Germany) experienced a reunification process very close in time to the southern European integration, we choose to focus on migration from Portugal to France. As noted by Caselli and Tenreyro (2005), French real GDP per worker has closely followed the European average since the 1950s. Moreover, France is and has been from 1960 the main host for Portuguese emigrants: indeed it still hosts nowadays about 500.000 Portuguese citizens, or 5% of the entire resident population in Portugal.<sup>13</sup>

#### **4.1 LIS: Preliminary Wage Differential Evaluation**

We start by evaluating the real North-South wage gap given by the median PPP-adjusted real annual wage differential between France and Portugal from 1984 to 1994. This is depicted in the figure below.<sup>14</sup>

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<sup>12</sup>Please refer to the Data Appendix for additional details on data sources and treatment.

<sup>13</sup>Note that this number excludes individuals born in Portugal and naturalized French, as well as immigrants' children that are French citizens.

<sup>14</sup>Please refer to the Data Appendix for additional details on data sources and treatment.

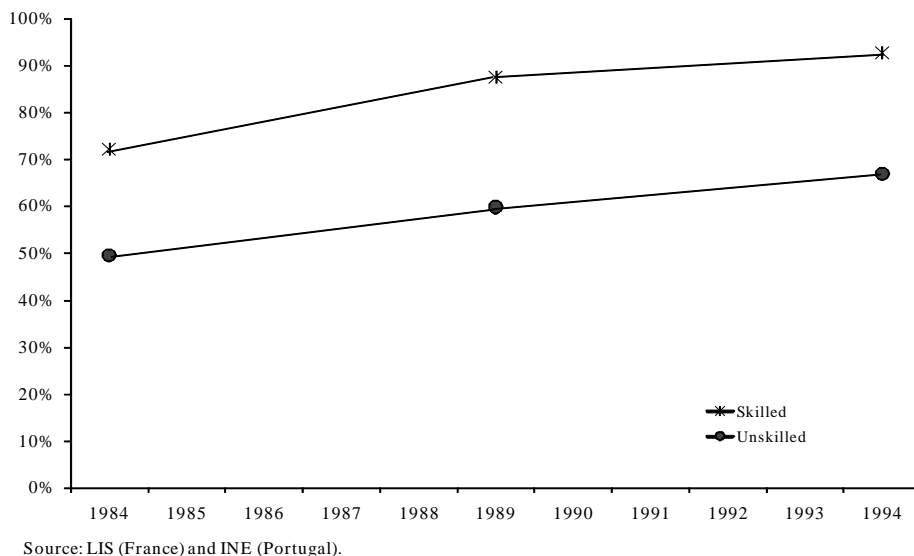


Figure 5: Real annual wage convergence between Portugal and France, per level of education (males aged 25-54 working full-time)

This figure shows that, despite substantial convergence during the 10 years immediately after integration, significant real wage differentials persist, especially for unskilled workers. If we take the initial differential to be as large as required by our model to generate out-migration after barriers to labor mobility are abolished, the seemingly implausible emigration pattern observed after Portugal joined the EU (described in section 2) can easily be reconciled with the predictions from our theoretical model.

Indeed, for sufficiently high initial wage differentials and large enough adjustment costs in capital accumulation (so that transition is not too fast), the initial increase in emigration flows can be explained as the result of the remaining legal restrictions to labor mobility in place until 1992. Note that emigration flows peak at this time, although two years later they are back to pre-integration levels, consistent with our model's predictions. According to the model, wage differentials in 1994 should therefore approximately correspond to migration costs,  $\psi_u$  and  $\psi_s$ , which caused emigration to stop and return migration to start as wage convergence progressed further - consistent with the evidence also described in section 2 that stocks of immigrants were falling between 1985 and 2000.

Given the abundant evidence on assimilation costs experienced by immigrants (due, for example, to language and other cultural barriers) which likely translate into productivity disadvantages, one should discount this type of effect from the observed wage differentials in order to identify relevant

migration costs more accurately. Ideally one would control for individual migrants' length of stay at the destination country. However, this information is not available in the LIS dataset for France. For this reason, we estimate a median assimilation effect for Portuguese immigrants in France in 1994: the coefficient on a dummy for Portuguese immigrants included in simple Mincer median regressions.

According to our results, this measure of assimilation costs has diminished in magnitude and statistical significance over time, between 1984 and 1994.<sup>15</sup> This finding is robust to considering different skill groups. It may happen because, as return migration outweighs new immigration, there is an improvement in the quality of skills of new immigrants that compensates their lack of assimilation. Of course, it is also possible that net return migration increases noise in our estimation as the number of sampled Portuguese immigrants falls, which explains the increasing lack of statistical significance.

In identifying migration costs,  $\psi_u$  and  $\psi_s$ , we choose to use the median 4.5% assimilation cost value estimated for all skills in 1994, which is larger than the point estimate obtained for each of the skills when estimated separately. Taking into account this cost, the relevant unskilled wage gap was about 42% of Portuguese wages, which corresponds to a migration cost no smaller than 4066 international dollars (in 1996 prices) per year. For skilled immigrants, however, we are only able to identify a 3% adjusted wage gap, or approximately 550 international dollars (in 1996 prices) per year.

The migration costs identified in this sub-section point to these being particularly high for uneducated workers relative to educated ones. While this result is according to what one could expect, there are several robustness aspects (such as controlling for length of migration or unobservable characteristics of individuals) that we are unable to test using LIS data. We turn to these more robust exercises in the next sub-section.

## 4.2 ECHP: Identifying Heterogeneous Migration Costs and Selection Patterns

In the previous subsection we described the evolution of wage differentials for different educational levels and presented preliminary results on the identification of migration costs. These were based on observable characteristics of Portuguese at home and abroad, as the datasets in LIS do not provide information on the date of immigration (necessary to properly account for assimilation effects at the individual level) or on other variables that allow us to control for unobserved heterogeneity of

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<sup>15</sup> Appendix A has details on these estimations.



migrants. To complement this analysis, we now turn to the ECHP, a panel dataset with household survey data for the EU15 between 1994 and 2001 that includes migrant characteristics such as trajectory and date of arrival in the destination country, citizenship and country of birth (also not available from LIS).

The problem when using ECHP for our purposes is that it does not explicitly identify the country of birth or nationality, but only the region of birth or nationality - EU being the most detailed classification available for Portuguese born individuals, for example. The way we address this issue is by combining information in the LIS and ECHP datasets. Using LIS data for France in 1994, we first estimate the probability of European citizen immigrants being Portuguese conditional on their observable characteristics. We then predict this probability for European citizens in the ECHP wave for 1994, which we use to accordingly adjust the sampling weight of these individuals. The results we obtain are reassuringly consistent with other sources of information, namely with LIS but also, for instance, with the pattern of migration flows data depicted in Fig. 4.

#### 4.2.1 Heterogeneous Migration Costs

The results of our baseline analysis, comparable to that performed using LIS data, are described in Table B.1. in appendix. We run median regressions (to avoid trimming the data) on the net monthly income of full-time male employees, (to avoid labor force participation selection issues as much as possible). This effort is made at the expense of a number of observations in our dataset, particularly for France, as we only include wage earners with Portuguese citizenship.

According to our results, immigrant assimilation effects, as proxied by individual migration spells, are not statistically significant, although they display a positive coefficient after controlling for observable characteristics, as we could expect. This finding is consistent with the results obtained in the previous sub-section, according to which there does not seem to be evidence of significant assimilation gains by Portuguese immigrants in France in 1994. This can perhaps be related to the existence of strong historical Portuguese immigrant networks, which may substantially decrease integration costs. Unfortunately we have no way to test for this hypothesis, as the ECHP provides us with no information on immigrant networks.

As implied by the theoretical model and discussed in the previous sub-section, migration costs can be measured as the residual wage differential immediately after full labor mobility is allowed and migration flows subside. Even though Portugal joined the EU in 1986, fully free mobility was only granted to Portuguese workers in 1992. As can be observed in Fig. 4, post-integration

migration flows attained a peak exactly during 1992-1993. For this reason, we therefore measure migration costs from the relevant cross-country wage differentials observed in 1994. A first set of results is displayed in Table 1.

Table 1: Wage gain for Portuguese worker of moving to France in 1994.

	Actual	Median Estimate	Median Estimate: Zero Migration Spells
Young Unskilled	63.4%	64.1%	60.2%
Young Skilled	29.1%	14.3%	10.2%
Old Unskilled	77.4%	74.4%	68.1%
Old Skilled	30.7%	20.0%	15.7%

Table 1 displays median individual migration costs per skill/age group: the first column gives actual numbers, whereas the other two are obtained from predicted values of regressions controlling for observable characteristics (education, age and duration of migration spell). All of these specifications provide values for migration costs that are of similar magnitude. These results point to migration costs decreasing with education, whereas they increase with old age - which we arbitrarily take as 40, a typical time of life for individuals to have started a family and/or bought a house, which should likely increase migration costs.

#### 4.2.2 Unobservable Selection

We now turn to examining the issue of migrant unobservable heterogeneity, i.e. the fact that migrants may systematically differ from the Portuguese resident population where they are drawn from in terms of ability, motivation or other unobservable characteristics affecting their productivity. This situation is adequately addressed by estimation procedures in the spirit of Heckman's sample selection two step estimation procedures.

In the first step, we estimate the individual probability of migration:

$$\Pr(Mig_i = 1) = \alpha_0 + \alpha'_1 X_i + \alpha'_2 Z_i + \varepsilon_{mi} \quad (13)$$

This probability depends on a set of variables  $X_i$  and  $Z_i$  that include individual, family and macro determinants of the future benefits and costs of migration, and on an additive random error term,  $\varepsilon_{mi}$ . To identify the pattern of self-selection, we need exclusion restrictions and propose  $Z_i$  as a set of exogenous shifters of the decision to migrate, which are uncorrelated to individual wages

earned by immigrants in France. At the individual level we consider the marital status at the time of migration and changes of marital status 3 years before or after migration, which may be interpreted as non-wage motives to migrate. At the macro level, we use an instrument in the spirit of Harris-Todaro: the Portugal-France unemployment rate differential at the time of migration. This may be regarded as a motive for migration that does not directly affect the wages paid to individual Portuguese immigrants in France. <sup>16</sup>

Note that we avoid further sample selection issues by comparing only full-time male positive wage earners in France and in Portugal, in the first step.

Using the results from this first step estimation, one can compute the inverse Mill's ratio, which gives the probability of being included in the estimation sample (i.e. of choosing to migrate):

$$\lambda_i = \frac{\varphi(M_i)}{\Phi(M_i)} \quad (14)$$

The inverse Mill's ratio is then included as a regressor in the relevant second-step wage regression:

$$\ln w_i = \beta_0 + \beta_1' Y_i + \beta_2 \lambda_i + \varepsilon_{wi} \quad (15)$$

where  $Y_i$  denotes individual characteristics affecting individual log-wages earned by immigrants, and  $\beta_2$  should be interpreted as the way unobservable characteristics of immigrants (related to how they self-select into migration) affect their wages.

We propose two alternative specifications to run this second step corrected wage regression. First, in the spirit of the traditional Heckit, we estimate a first stage probit, followed by a median regression including the inverse Mills ratio as regressor, where we use bootstrapped standard errors. For robustness purposes, we also run Heckman's two-step procedure using full maximum likelihood estimation.

All results are displayed in Table B.2. In both the two-step median and full maximum likelihood specifications, unobservable selection seems to be negative, although this effect is statistically more significant using the first specification. This effect seems to be particularly strong for older employees, which may be related to cohort effects that we should try to incorporate in our analysis in future work.

Overall, our findings confirm our preliminary evidence (composition of Portuguese emigration stocks) that less educated workers are most likely to emigrate, which would be consistent with the

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<sup>16</sup>Note that in all "at date of migration" variables, non-migrants are attributed 1994 as the date of non-migration.

simplest Borjas (1987) type of selection argument à la Roy (1951), given the highest returns to education experienced in Portugal relative to France.

Table 2: Wage gain for Portuguese worker of moving to France in 1994.

	Median Estimate: No Selection	Heckman Estimate: No Selection
Young Unskilled	237.9%	168.0%
Young Skilled	239.6%	197.6%
Old Unskilled	240.2%	154.8%
Old Skilled	242.0%	182.9%

In Table 2, we can observe the migration costs implied by our unobservable migrant heterogeneity estimates. Given the negative sign of the coefficient summarizing the impact of unobservable self-selection on wages, it is expected that these migration costs have a larger magnitude than the ones in Table 1. Nevertheless, even though this magnitude is actually rather similar using any of the two specifications we use, we fear that these results may be somewhat driven by cohort effects that we should incorporate in our analysis. A robust finding across specifications is, for instance, that migration costs corrected for unobservable heterogeneity are now relatively lower for older individuals compared to younger ones. This may be related to the lowest quality of education (or complete absence of it) of older immigrants.

Additional steps of interest in this analysis could be extending our work to other countries in the ECHP. This is not a straightforward decision in that these other countries have only smaller number of Iberian immigrants and may have suffered simultaneous shocks (as was the case of the German reunification). Nevertheless, such an exercise could provide an additional source of variation to better explain costs of migration (e.g., using past emigration stocks as instrument in decision to emigrate) while accounting for cross-country choice of destination countries. This type of issue could potentially be particularly meaningful in understanding the diversion issues currently discussed for the Eastern enlargement particularly in the UK.

## 5 Concluding Remarks

This paper examines the impact of the 1986 southern European integration in the EU on migration flows from these countries to the richest initial members. Aggregate stylized facts suggest the puzzling fact that international labor movements almost did not react to the full lifting of legal

barriers to migration, despite the existence of significant GDP per worker gaps between the rich initial EU members and the poor southern entrants.

In order to understand this puzzle we propose a simple neoclassical general equilibrium framework according to which the observed migration flows behavior can be simply attributed to individual migration costs in the context of a transition to the steady-state.

We empirically analyze this question by combining individual data provided by two different household survey datasets. We obtain that, regardless of important compositional effects due to the very low level of education in southern European countries, there were important real wage differentials at the time of integration and there are still despite the convergence trajectory up to 2000. Controlling for immigrant assimilation productivity improvements (as proxied by spells of migration) did not prove relevant for our analysis. On the contrary, when controlling for migrant unobservable heterogeneity, we find evidence of a negative self-selection effect both in terms of observable and unobservable skills.

Using our theoretical framework, we identify individual migration costs as wage differentials between migrants and non-migrants in 1994. The numbers we obtain are consistent with the idea that migration is less costly for younger and more educated individuals. Regardless of this pattern, the migrant self-selection on observables points to negative selection: unskilled workers are in reality most likely to emigrate, consistent with Roy (1951) model type of arguments for an economy with relatively high income inequality.

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## 6 Data Appendix

Sub-section 4.1. uses labor income individual data from household surveys carried out at the national level. The data for France were compiled by the Luxembourg Income Study (LIS). The data for Portugal are not yet available in the LIS, and were obtained directly from the National Statistics Office (INE).

The national survey sources of the data are the *Family Budget Surveys* (FBS) for both countries. The time points for which data are available immediately before 1986 and after this year are:

- France: 1984/1989/1994;
- Portugal: 1980/1989/1994/2000.

### 6.1 Data Treatment

Some characteristics of the variables used and their treatment can be summarized as follows.

- Annual labor income expressed in national currency at current prices was used since reliable hourly data were unavailable.
- French data were adjusted for potential double-counting due to household composition (variable D5 in LIS).
- Only workers aged 25 to 54 with non-null wages were kept in the sample. Age 25 threshold was chosen to minimize the number of workers who have not completed their studies. Age 54 was chosen to avoid self-selection issues related to early retirement, which is a particularly strong concern for France.
- Self-employed and employers were excluded from all samples, as well as individuals whose labor force status was not currently holding a job. This allows us to avoid under-reporting of wages, as well as self-selection issues related to the characteristics of self-employed workers.
- Attempts to exclude part-time workers were made. Considering only full-time workers would allow us to control for differences in hours worked as a source of labor income inequality, which could bias empirical results if part-time work significantly depended on workers' characteristics such as the level of education.



- Only data for male workers is used. This enables us to avoid selection and other problems related to female participation in the labor force.
- Three comparable educational levels were constructed for each sample. Comparability was ensured by LIS, who followed the UNESCO ISCED-97 comparability rules for education degrees, and used specific information from country specialists in education data. The educational levels and their meaning are the following:
  - Educational Level 1: secondary schooling not completed;
  - Educational Level 2: secondary schooling or more completed.
- Labor income was adjusted for purchasing power differences and expressed in 1996 international dollars using the constant price PPP GDP deflator implicit in Heston, Summers and Aten (2002). This conversion to international dollars allows us to evaluate the purchasing power of wages if they are spent in the country where they are earned. This could be misleading to evaluate incentives to migrate in the case of return migration with savings and/or remittances to the source country, which could be corrected, for example, by constructing some weighted average of purchasing power adjusted and actual earnings. However, purchasing power adjustment is crucial for the purpose of comparing the *levels* of real earnings across countries and over time since exchange rates among the economies under consideration were still subject to some volatility in the period of analysis.
- Median statistics and median regressions are used to minimize problems of data unreliability at the extremes, without the need to trim the data.

## 7 Appendix A - LIS: Simple Mincer Median Regressions

### 7.1 Definition of Variables

- *lnwage*: natural logarithm of net annual wage (in 1996 international dollars) of male full-time employees;
- *age*: age of worker -18;
- *squage*: square of age;
- *educ*: educ = 1 (worker completed secondary schooling)
- *pt*: pt = 1(worker's country of birth is Portugal).

### 7.2 Median Mincer Regressions with Controls for Nationality

Tables 3 to 11 display the results of median Mincer regressions for the wages of unskilled workers (who did not complete secondary education) in France, in which a dummy control is introduced for the nationality of immigrant workers.

Table 3: Median Regression - FRANCE 84, ALL SKILLS

ln wage	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]
age	.0309076	.0028515	10.84	0.000	.0253172 .036498
squage	-.0148958	.0020346	-7.32	0.000	-.0188846 -.010907
educ	.2536077	.0130125	19.49	0.000	.2280967 .2791187
pt	-.124053	.0402347	-3.08	0.002	-.2029331 -.045173
Number of obs. =	4468				Pseudo R2 = 0.0882

Table 4: Median Regression - FRANCE 89, ALL SKILLS

ln wage	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]
age	.0264477	.0041554	6.36	0.000	.0183003 .0345951
squage	-.0076015	.0029726	-2.56	0.011	-.0134298 -.0017732
educ	.2314483	.0189817	12.19	0.000	.1942314 .2686653
pt	-.0891904	.0609038	-1.46	0.143	-.2086027 .0302219
Number of obs. =	3357				Pseudo R2 = 0.0799

Table 5: Median Regression - FRANCE 94, ALL SKILLS

ln wage	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]
age	.0262429	.0032083	8.18	0.000	.0199528 .032533
squage	-.0087729	.0022796	-3.85	0.000	-.0132422 -.0043036
educ	.2549988	.0142361	17.91	0.000	.2270881 .2829095
pt	-.0446091	.0504751	-0.88	0.377	-.1435685 .0543503
Number of obs. =	3993				Pseudo R2 = 0.0681

Table 6: Median Regression - FRANCE 84, SKILL 1

ln wage	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]
age	.018889	.0036664	5.15	0.000	.0116983 .0260797
squage	-.0108091	.0025351	-4.26	0.000	-.0157811 -.0058372
pt	-.106479	.0337968	-3.15	0.002	-.1727632 -.0401949
Number of obs. =	1839				Pseudo R2 = 0.0120

Table 7: Median Regression - FRANCE 89, SKILL 1

ln wage	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]
age	.0218959	.0068541	3.19	0.001	.008449 .0353428
squage	-.0090574	.0047301	-1.91	0.056	-.0183373 .0002225
pt	-.0759758	.0662916	-1.15	0.252	-.2060327 .054081
Number of obs. =	1237				Pseudo R2 = 0.0280

Table 8: Median Regression - FRANCE 94, SKILL 1

ln wage	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]
age	.0174991	.0048645	3.60	0.000	.0079572 .0270411
squage	-.0065451	.0034232	-1.91	0.056	-.0132599 .0001697
pt	-.0295407	.0514752	-0.57	0.566	-.130511 .0714296
Number of obs. =	1516				Pseudo R2 = 0.0166

Table 9: Median Regression - FRANCE 84, SKILL 2

ln wage	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]
age	.0389859	.003965	9.83	0.000	.0312111 .0467607
squage	-.0159996	.0029066	-5.50	0.000	-.0216991 -.0103
pt	-.3626441	.1693593	-2.14	0.032	-.6947354 -.0305528
Number of obs. =	2629				Pseudo R2 = 0.0772

Table 10: Median Regression - FRANCE 89, SKILL 2

ln wage	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]
age	.0257222	.0047272	5.44	0.000	.0164518 .0349926
squage	-.0033417	.0034687	-0.96	0.335	-.0101441 .0034606
pt	-.1570584	.135992	-1.15	0.248	-.4237503 .1096336
Number of obs. =	2120				Pseudo R2 = 0.0750

Table 11: Median Regression - FRANCE 94, SKILL 2

ln wage	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]
age	.0292681	.0047925	6.11	0.000	.0198704 .0386658
squage	-.0077473	.0034252	-2.26	0.024	-.0144639 -.0010307
pt	-.0158019	.1398629	-0.11	0.910	-.2900623 .2584585
Number of obs. =	2477				Pseudo R2 = 0.0471

## 8 Appendix B – ECHP: Wage Regressions Controlling for Unobservable Self-Selection

Table 12: Median Regressions on Log Net Monthly Wages (PPP-Adjusted)

	(1) Median PT	(2) Median FR	(3) Median FR
Educated	0.5978 (0.0532)***	0.2218 (0.0867)**	0.2238 (0.0944)**
Old (Age>40)	0.2231 (0.0406)***	0.2695 (0.0858)***	0.2715 (0.1014)***
Migration Spell			0.0020 (0.0049)
Constant	6.1789 (0.0290)***	6.7047 (0.0771)***	6.6501 (0.1112)***
Observations	2410	78	78

Bootstrapped standard errors in parentheses.  
\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

Table 13: Wage Regressions Controlling for Unobservable Heterogeneity

	(1)	(2)	(3)
	First Stage	Median Regression	Heckit FML
Educated	-0.3549 (0.2982)	0.6029 (0.1365)***	0.7026 (0.2216)***
Old (Age>40)		0.2301 (0.2363)	0.1724 (0.2867)
Migration Spell		-0.0139 (0.0129)	-0.0036 (0.0107)
Mills Ratio		-0.2279 (0.1130)*	-.5834 (.4178)
Age at date of migration	0.0055 (0.1073)		
Age at date of migration <sup>2</sup>	-0.0013 (0.0019)		
Married at date of migration	0.0217 (0.5894)		
Change in Marital Status	0.0228 (0.2708)		
PT-FR Unemployment Differential	0.3390 (0.0540)***		
Constant	-0.5560 (1.6000)	7.3964 (0.3605)***	7.1648 (0.3660)***
Observations	3417	46/3417	46/3417

Robust standard errors in parentheses, clustered at household level.  
\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%