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JEL Classification: F22, F31, J32, D15

Keywords: Academic migration, University, Research, Higher education

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International Mobility of Academics: Theory and Evidence*

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April 12, 2023

Abstract

The labour force in the university sector of many countries is extremely international. I propose a theoretical model to study cross border academic mobility, where academics bargain with institutions over pay and choose the countries where they live and work to maximise their lifetime utility. I then test the model on a subset of well over 900,000 research active academics over 33 years. The model predicts academics to respond to short term conditions, such as those caused by changes in their own record and exchange rate fluctuations, with the decision to move of more eminent academics being less influenced by short-term exchange rate fluctuations, but more by changes in their record. These conclusions are confirmed by the empirical analysis.

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1 Introduction

Academics' migration is commonplace: many professors hold posts in several countries over the course of their career, and it is not uncommon for home nationals of academic departments to account for less than half of their members.[1] Economics is among the disciplines where the process of international faculty mobility is strongest, and yet sound economic analyses of the determinants of academics' migratory flows are, like the cobblers' children's shoes, all but non-existent.

Related literatures, such as the relatively substantial body of work on students' international flows (King and Raghuram, 2013; Geddie, 2015), country specific cases studies (Mendoza et al., 2020; Kurek-Ochmańska and Luczaj, 2021), or the sociological literature, often based on small sample interviews (Tremblay, 2005; Kim, 2009; Ortiga et al., 2020; Teichler, 2015) or unfamiliar categories (Bauder et al., 2018; Koh and Sin, 2020) do not hold useful lessons for an economic analysis of academics' migration. The recent analyses of the determinants of highly skilled workers' migration (Kerr et al., 2016, 2017; Beine et al., 2001; Docquier and Rapoport, 2012; Prato, 2022), have identified agglomeration economies as one of its key drivers, typified by the global concentration of activities in locations such as Silicon Valley, Wall Street, and even Hollywood. These are however unlikely to serve as a guide for the study of academics' migration flows: agglomeration externalities are obviously present in academia, but they operate only at the much smaller scale of the department, witness the total absence of incentives to merge geographically close universities and the equally complete lack of pressure towards academic specialisation by discipline in institutions or in countries. Understanding the determinants of academics' migratory flows is important for universities, and, in turn, via

[1] See, among others, Yudkevich et al. (2016); Mihut et al. (2016); Teichler (2017) for recent surveys and descriptive analyses. For detailed examples, Yuret (2017) reports that approximately one third of professors at elite US universities obtained their undergraduate education in a different country. Official UK figures are similar for the entire sector (UK Higher Education Statistics Agency), but suggest an even higher percentage in the elite institutions, with several where UK nationals are less than half: see Table A1. By way of comparison, out of a total of about 4100 footballers who have played at least one Premier League game from the 1992-93 season to 2020-21, 2,381 were foreign, from 113 countries.

the externalities bestowed by the university sector on the growth of technological and human capital, for governments and societies. To identify the policies most suited to recruit and retain academics from a worldwide market requires a solid understanding of both the nature of the incentives motivating them, and of the response of academics to exogenous events that affect their willingness to work in certain locations. My objective in this paper is to lay a foundation to achieve this understanding.

I begin by proposing a theoretical model founded on the two key building blocks of individual lifetime utility maximisation in a life-cycle model with retirement and Nash bargaining over pay and conditions. These two building blocks need to be studied simultaneously, each having the other's output as one of their inputs. This is because academics internalise both the future value of lifetime utility in their location decision, and the current value of outside offers in their bargaining stance: these are tightly linked by the current and expected future currency exchange rates.

The exchange rates are not normally included in analyses of determinants of migration (and when they are, they are rarely found to be important, Gibson and McKenzie, 2011), as what matters to a person residing in a country is the standard of living in the country they live and work, irrespective of the purchasing power their pay may have abroad: thus fluctuations in the international value of the currency have at best minimal influence on the worker's utility. There are however exceptions. Workers who move to a different country to send remittances to family members at home are affected by exchange rate fluctuations, and do indeed respond to them by altering their labour supply (as shown by Yang, 2008; Nekoei, 2013), and by choosing to emigrate or remain or return in the country where their family live (Yang 2006 for the Philippines, and Kırdar 2009 for Germany). Remittances are not a main concern for academics, but the future purchasing power of their accumulated savings in different countries is very likely to be a consideration for their current location decisions: someone planning to retire in a city with beautiful scenery and inexpensive Michelin starred restaurants may well choose to

spend their most productive decades in a foggy and grey metropolis being paid enough to accumulate wealth as pension and residential estate to an amount that would allow a comfortable retirement there, but, converted into the currency of their chosen country, would permit them a genuinely affluent lifestyle. For this reason, the theoretical model in Section 2 includes the exchange rate among the determinants of academics' location decisions, alongside a country's quality of life, both its academic aspects, such as the prestige and culture of its research activities, and those that affect all the country's residents, the nature of its institutions, the quality of its public services, and its GDP per capita.

A clearly important variable but one the nature of whose effect is not immediately apparent is the academic's eminence. One might opine that an academic with more bargaining power, one that is who has a good record of publications and citations would be more able to move to a new institution in order to obtain better conditions. But this plausible argument is orthogonal to migration, as it does not explain whether an academic with more bargaining power would be more or less likely to move to an institution located abroad, rather than to one in her current country, or indeed to use outside offers to negotiate with her current employer. Similarly, it is not immediate to say how a change in the exchange rate would affect the relative desirability of living and working in different countries. My theoretical analysis sheds light on the complex role of these factors, and in particular highlights the importance of the interaction between them. It shows that more eminent academics are more likely to emigrate, and that academics are more likely to move to a country if the country's currency loses purchasing power relative to that of their current country. This effect, however, is weaker, and can even be reversed, for more eminent academics. Why this should be so is not immediately obvious: as explained in more detail in Section 2, it follows from the subtle trade-off between saving to reap the benefit of higher retirement consumption, and making the most of the current bargaining power, which has no value for retirees.

The empirical analysis begins with the construction of a dataset from the publications

in journals in the fields of economics, management, and decision theory listed in the Scopus proprietary catalogue published from 1990 to 2022. This dataset contains, for close to 5 million academics, the year in which they published at least one paper and the institutions they were affiliated with in that year. From this I define a move as a change of affiliation between subsequent appearances, and migratory move as one where the two affiliations are in different countries. This is linked to macroeconomic data on GDP, cost of living indices and exchange rate, and to datasets containing other plausible time varying measure of countries' quality of life.

I first apply, in Section 4, the standard macroeconomic analysis of migratory flows. The results summarised in Table 2 are plausible, but, because they study aggregate flows, cannot capture the role of individual differences. In Section 5, therefore, I study these differences by including individual fixed effects an individual level regression. I find that the migration patterns observed in the period considered match well the theoretical model of Section 2: a reduction in value in the currency of a country attracts academics, and this effect is weaker or reversed for more eminent academics. I also find intriguing differences in behaviour between women and men: these must be considered preliminary, as I must use the given name to identify gender.

In the rest of Section 5, I confirm that the empirical results are very robust to changes in the econometric specification and variable definitions. I also restrict the sample, to identify differences among subgroups of academics defined by some characteristics, such as having moved at least once, having emigrated, at least once, and having been affiliated at least once to one institution with certain characteristics or location (eg the top US universities, the UK Russell Group, or in specific countries).

The paper is organised as follows. In Section 2, I present a Nash bargaining model of lifetime utility maximisation. Section 3 describes in detail the dataset and its construction and Section 4 contains macroeconomic regressions to ascertain the determinants of migration bilateral flows. By its nature, this approach cannot account for difference among in-

dividuals, which the theory shows to be crucial, and so, in Section 5, I study an individual panel regression. Section 6 is a brief conclusion.

2 Theoretical background

Consider the following highly simplified model of a the global academic market. In each country, the university sector is open and mobile, and academics move freely across countries in pursuit of prestige and salary.

2.1 Academics

Academics maximise a lifetime utility function given by the present value of utility u in each future period, which in turn depends on the period's consumption, c, as specified in the convenient standard specification given by

$$u(c) = \frac{c^{1-\rho}}{1-\rho}, \tag{1}$$

with $\rho \in (0,1)$. Academics differ in their preferences for living and being employed in given locations: some people love warm beer and drizzly winter days, others prefer long boozy lunches and hot nights. Formally, I assume that academic location preference are described by a vector $\left\{\xi_j\right\}_{j\in\mathscr{W}} \in \mathbb{R}_+^{|\mathscr{W}|}$, where $\mathscr{W}$ is the set of the world's countries and $|\mathscr{W}|$ its cardinality. If an academic lives in country $j \in \mathscr{W}$ her utility from consumption is multiplied by ξ_j. Invariance of $u(c)$ to monotonic transformations implies that I can normalise to 1 the academic's utility parameter for living in the current country, which, for brevity, I will refer to as the home country. A higher ξ_j characterises someone who, other things equal, is more likely to prefer to work in country j. $\left\{\xi_j\right\}_{j\in\mathscr{W}}$ is an exogenously given idiosyncratic vector: in particular, it is independent of the choices made by other academics. This is not innocuous, but is plausible in a world where academic co-operation is (almost) as easy with someone living in the next city as with someone at the other side of the globe, while, for example, would be untenable for football superstars, whose success

depends crucially upon playing in the best leagues, those where many other superstars also play.[2]

An academic's life is divided in periods indexed by $t = 0, T, T+1$. This notation identifies period 0 as the early career, training and the tenure track period, and I take everything that happens in period 0 as given in the analysis. Period T is the time the academic is employed by institutions as an established researcher. Within period T she may seek and receive job offers from other institutions: these opportunities to change institutions arrive according to a stochastic process loosely described below, but not central to the analysis. Period $T+1$ denotes her retirement, when past savings are used for consumption and bequest motives. Bequests and own consumption are assumed to be additive for simplicity.

I study the choice of an academic at the point in period T when she may negotiate a move with a potential new employer. I assume common knowledge regarding payoff relevant characteristics, the academic's preferences and ability and the employers' willingness to pay. This assumption is considerably less far-fetched than it would be in other high skill sectors, in view both of the publicity of academics' record, and also of the possibility to "try out" a potential hire with short-term visiting arrangements prior to committing to a job offer. Therefore the extensive literature on the on-the-job search, which hinges heavily on employers' asymmetric information (Waldman, 1984; Greenwald, 1986; Golan, 2005; Pinkston, 2009; Eeckhout, 2018), is less relevant in this set-up. The role of outside job offers in academia has anyway received scant attention, with the important exception of Blackaby et al. (2005). But even this paper, with its focus on the effect of exogenous rates of the arrival of outside offers on the pay level and promotion chances of different groups of academics, is only tangential to the present analysis, as any different responsiveness to outside offers or different arrival rates for different groups will be captured by the individual fixed effect of my panel regressions.

[2]Since I study established academics, who are typically able to maintain personal research networks independently of the country they live in or the institution they are affiliated with, makes it plausible to assume that they do not move to a given institution or country in order to increase their skill and hence their future earnings as junior ones and workers in other sectors do (Dustmann and Görlach, 2016).

A job offer consists simply of a salary level, and is determined as the outcome of Nash bargaining.[3] This is determined as the value which maximises the product[4] between the academic's lifetime utility and the additional payoff which the university derives from employing her. I further assume the latter to be given by

$$\left(\frac{\lambda}{\Lambda} - f\left(y_T\right)\right). \tag{2}$$

In (2), λ is a measure of the academic's eminence, Λ is a measure of the university prestige, and $f\left(y_T\right)$ is an increasing function of the salary agreed in the negotiation. Both λ and Λ are time varying. While λ is fixed when negotiation takes place, its evolution over time can be thought of as a Markov process, with uncertain events, such as publications in top journals or the award of prizes, affecting its current value. For the purpose of this paper it is unnecessary to develop this aspect of the model. If Λ is an increasing function of the λs of its academics, then (2) is a shorthand capturing the stylised facts that the (monetary evaluation of the) prestige gained by a university for employing an academic increases with the academic's eminence, and employing an academic of a given eminence is more valuable for a less prestigious university. This is not incompatible with the casual observation that more prestigious universities do appear to pay more, as in equilibrium they will also employ more eminent academics. It can also be reconciled with the observation that some academics are willing to sacrifice higher salary in order to work in a prestigious institution: either by adding to the utility function a further parameter which measures the subjective pleasure of being a scholar at a highly regarded institution, or by conditioning the current value of an academic's λ to her employment history.

[3] The assumption of symmetric information implies that an academic can correctly anticipate the outcome, in terms of employment and pay, of any negotiation she would engage in with outside employers, as well as the response her current employer would make. Thus an academic would consider a job opportunity only when she knows it will lead to a move: there is no point in strategically seeking a job offer in order to obtain a better offer from another employer, her current one or a third one altogether.

[4] Utility functions are invariant to monotonic transformations, and so it is reasonable to normalise the disagreement points to 0, even though in the presence of uncertainty it does entail some loss of generality, as expected utility is only invariant to affine transformations. Note that this imply that the Nash solution of the bargaining game is the same as the Kalai and Smorodinsky's (1975) solution.

When negotiation takes place, the academic maximises utility in her future life. This is the sum of the utility in (what is left of) period T and in period $T+1$, with the relative importance of the utility in the two periods depending on the academic's age and her discount rate. A compact way to capture this is to define the academic's maximand as the weighted sum of the (expected) utility in (the remaining part of) period T, and the (expected) utility in period $T+1$, with weights 1 and $\theta > 0$, respectively. The parameter θ is an increasing function of both the age and the patience of the academic, and so it captures age and discount rate differences between academics. A young academic with plenty of time left in period T will be characterised by a lower value of θ than someone older, who is likely to be more concerned with ensuring a comfortable retirement than increasing utility in the last few years of work before retirement; moreover, for a given age, a higher discount rate decreases an academic's θ. Expectation is taken over the probability of further career moves later in period T and their values, and other variables such as exchange rates, cost of living and other country specific shocks in the remainder of period T and in period $T+1$, taking into account the above mentioned expectations regarding the future paths of λ and Λ.

To lighten notation, I drop the country subscript j, that is I concentrate on one foreign country only. When the salary negotiation takes place both parties take as given the academic's record measured by λ, the university prestige, Λ, the academic's preference parameters ξ, the preference for living in country j relative to the current country, θ, the relative importance of working life and retirement, and and ρ, the rate at which marginal utility of consumption declines, and the value of the academic's current savings, W_T. As explained above, I include among the variable she takes into account when negotiating both the current and the expected future value of the international exchange rate, η_T and η_{T+1}, even though this variable is not normally included among the determinants of labour supply. The reason is that it affects the purchasing power of income saved whenever the currency in which income is paid differ from the currency in which

consumption goods will be purchased. The unit of each currency is normalised so that a given unit of consumption has a cost of 1. The exchange rate is defined with reference to the academic's current home country, as *the number of units of the foreign currency needed to buy a unit of currency of the home country*. Thus an increase in the euro exchange rate with the pound implies a *reduction* in the value of the euro, as a given amount of pounds can now purchase more units of consumption in a country using euros. To sum up, the academic will maximise the sum of the utility in period T and the utility in period $T+1$,

$$\left(1-\delta_T\left(1-\xi\right)\right)u\left(y_T-c_T\right)+\left(1-\delta_{T+1}\left(1-\xi\right)\right)\theta u\left(\frac{\frac{W_T}{\left(1-\delta_T\left(1-\xi\right)\right)}-c_T}{\left(1-\delta_{T+1}\left(1-\xi\right)\right)}\right), \tag{3}$$

where $\delta_t \in \{0,1\}$ is an indicator variable taking value 1 if and only if the academic lives abroad in year t, so that $\left(1-\delta_t\left(1-x\right)\right)=1$ if $\delta_t=0$ (lives at home in period t), and $\left(1-\delta_t\left(1-x\right)\right)=x$ if $\delta_t=1$ (lives abroad in period t).

Both parties, when negotiating the salary, factor in the academic's future choices regarding the allocation of her income between savings and consumption, and the retirement location that the academic will choose. Working backward, I begin by determining the latter. At this point, the academic is unaffected by any employment variable, and needs to decide only in which country to settle.

Proposition 1. *Academic of type ξ chooses to live in the home country in her retirement period $T+1$ if and only if*

$$\xi \leq \eta_{T+1}^{\rho-1}. \tag{4}$$

For the sake of definiteness, I posit that, if indifferent, an academic locates in the home country. The proof of all the results is tedious algebraic manipulation, and relegated to the online appendix. Note that her decision is independent of her wealth: this is not general, but a convenient consequence of the functional form posited for the utility function (1). Intuitively, recall that a higher value of η_{T+1} implies a devaluation of the foreign currency, that is the foreign currency is cheaper. If the period $T+1$ exchange rate increases, the

academic's pension pot buys more units of the foreign currency, and hence more units of consumption abroad, making retirement there more attractive, as it allows more and better quality housing restaurant meals and opera tickets abroad than prior to the exchange rate increase.

The next proposition determines the consumption in period T as a function of the given parameters and of the negotiated salary, y_T. Recall that the indicator function $\delta_t \in \{0,1\}$ is 1 if and only if an academic lives abroad in year t.

Proposition 2. *The utility maximising choice of period T consumption satisfies:*

$$c_T = \begin{cases} \frac{\theta^{-\frac{1}{\rho}}}{\theta^{-\frac{1}{\rho}}+1}\left(W_T + y_T\right) & \text{if } \delta_T = \delta_{T+1} = 0, \\ \frac{\theta^{-\frac{1}{\rho}}}{\theta^{-\frac{1}{\rho}}+\xi^{-\frac{1}{\rho}}\eta_T^{-\frac{1-\rho}{\rho}}}\left(W_T\eta_T + y_T\right) & \text{if } \delta_T = 1 \text{ and } \delta_{T+1} = 0, \\ \frac{\theta^{-\frac{1}{\rho}}}{\theta^{-\frac{1}{\rho}}+\xi^{\frac{1}{\rho}}\eta_T^{\frac{1-\rho}{\rho}}}\left(W_T + y_T\right) & \text{if } \delta_T = 0 \text{ and } \delta_{T+1} = 1, \\ \frac{\theta^{-\frac{1}{\rho}}}{\theta^{-\frac{1}{\rho}}+1}\left(W_T\eta_T + y_T\right) & \text{if } \delta_T = \delta_{T+1} = 0. \end{cases} \tag{5}$$

Note that (5) can be written equivalently as:

$$c_T = \frac{\theta^{-\frac{1}{\rho}}}{\theta^{-\frac{1}{\rho}} + \frac{\left(1-\delta_T\left(1-\xi^{-\frac{1}{\rho}}\eta_T^{-\frac{1-\rho}{\rho}}\right)\right)}{\left(1-\delta_{T+1}\left(1-\xi^{-\frac{1}{\rho}}\eta_T^{-\frac{1-\rho}{\rho}}\right)\right)}}\left(\left(1-\delta_T\left(1-\eta_T\right)\right)W_T + y_T\right). \tag{6}$$

That is, current consumption is a share of the total wealth which depends on the relative importance of periods T and $T+1$, and, only when the academic lives in different countries, her preference for living abroad and the current exchange rate. The wealth itself is affected by the country where period T is spent.

I can now present the main result of this section. To obtain explicit solutions I specify a the function f in (2) as the identify: $f(x) = x$. It is convenient to state it by summarising

the three variables λ, Λ, and W_T into a single one. Thus define β, the relative bargaining power of the academic vis-à-vis the university, as

$$\beta = \frac{\lambda/\Lambda}{W_T}. \tag{7}$$

Proposition 3. *An academic with accumulated wealth W_T and with ability λ, will prefer to be employed in the home country in period T if*

$$\xi \leq \xi_H \equiv \left(\left(1+\theta^{\frac{1}{\rho}}\right) \left(\frac{1+\beta}{\eta_T+\beta}\right)^{\frac{1-\rho}{\rho}} - \theta^{\frac{1}{\rho}} \eta_T^{-\frac{1-\rho}{\rho}} \right)^{\rho} \quad \text{if} \quad \eta_{T+1}^{\rho-1} \geq \xi, \tag{8}$$

$$\xi \leq \xi_A \equiv \left(\left(1+\theta^{\frac{1}{\rho}}\right) \left(\frac{\eta_T+\beta}{1+\beta}\right)^{\frac{1-\rho}{\rho}} - \theta^{\frac{1}{\rho}} \eta_T^{\frac{1-\rho}{\rho}} \right)^{-\rho} \quad \text{if} \quad \eta_{T+1}^{\rho-1} \leq \xi. \tag{9}$$

In words, Proposition 3 determines the cut-off point of the preference for living abroad such that an academic lives abroad in period T if and only if her ownξ is greater than this cut-off.

While (8) and (9) can be interpreted directly, it is more illuminating to determine how small changes in the exogenous parameters affect the cut-off value of ξ, and hence the incentive of academics to emigrate. This is done in the following corollaries. I begin with the roles of the academic's eminence and her accumulated wealth. Recall that ξ_H and ξ_A are the RHS of (8) and (9).

Corollary 1. *Let $\eta_T \gtreqless 1$, then $\frac{\partial \xi_X}{\partial \beta} \gtreqless 0$ and $\frac{\partial \xi_X}{\partial \theta} \gtreqless 0$, $X = H, A$.*

In words, this says that the effect of an increase in an academic's eminence, of a decrease in the prestige of the university she negotiates with and of a decreases in her wealth and her age all decrease the chance of the academic emigrating when the exchange rate is high, and vice versa, increase this chance when the exchange rate is low. The intuition as to why this is the case is that older academic, whose retirement age is nearer, and therefore have less scope to affect the size of their pension pot are less keen to emigrate to a country where the

exchange rate is higher because that will determine a reduction in the home value of the savings that can be added to the pot once consumption is paid for. By the same token an eminent academic can command a higher salary in a negotiation with a foreign institution, but its value decreases as the exchange rate increases.

Figure 1 illustrates. In the diagram, the solid line is the "initial" utility gain from living abroad: thus academics with given β and θ and whose ξ exceeds (is less than) ξ_H live abroad (at home) in period T. Consider an academic with a higher β or a higher θ: the curve for this academic is higher and to the left, for example in the dash curve position for an academic when the exchange rate η_T is above 1. Vice versa, it is lower, to the dot-dash curve position, when the exchange rate η_T is below 1.

The distribution of ξ is superimposed on the Cartesian plane with ξ on the horizontal axis, and the difference between the net present value of the lifetime utility for living abroad in period T, and at home in period T, for those who are at home in retirement (the case of ξ_A is similar). Thus academics whose type is in the purple (darker red) area to the left (right) of ξ_H would choose to live at home (live abroad) following an increase in their bargaining power β or in their relative weight of the retirement period, θ.

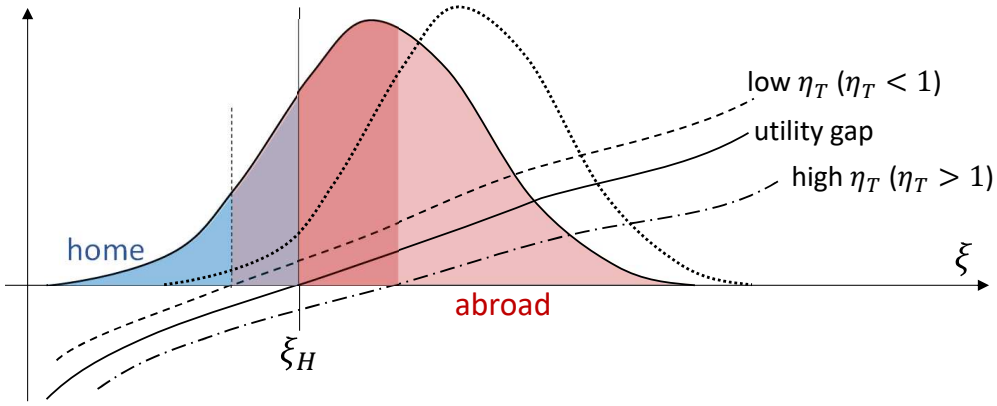
Corollary 2. *Let* $\frac{1}{\eta_T} \gtreqless \frac{(1+\beta)^{1-\rho}\left(1+\theta^{-\frac{1}{\rho}}\right)^{\rho}-1}{\beta}$, *then* $\frac{\partial \xi_H}{\partial \eta_T} \gtreqless 0$. *Define* $\hat{\theta} = \frac{(1+\beta)^{\frac{1-\rho}{\rho}}}{\left(1+\theta^{-\frac{1}{\rho}}\right)}$. *Let*

$$\left(\rho-\frac{1}{2}\right)\left(\frac{1}{\eta_T}-\frac{\hat{\theta}^{\frac{\rho}{1-2\rho}}-1}{\beta}\right) \gtreqless 0; \tag{10}$$

then $\frac{\partial \xi_A}{\partial \eta_T} \gtreqless 0$.

Corollary 2 is less clear-cut than Corollary 1, however, inspection suggests that when the exchange rate is low (which makes $\frac{1}{\eta_T}$ high), all those who will live at home in period $T+1$ will respond to an increase in the exchange rate by becoming more likely to emigrate in period T (the utility gap locus shifts down towards the dash-dot curve). The response of those who will be abroad in period $T+1$ depends on the concavity of their utility

Figure 1: Comparative statics effects.



Note: In the initial situation the utility gap is the solid line: academics whose ξ is to the right of intersection of this curve with the horizontal axis derive more utility if they retire abroad. An increase of β shifts the utility gap schedule up for $\eta < 1$, implying that fewer academics want to emigrate, or down for $\eta > 1$, implying that more academics want to emigrate. An decrease in the desirability of living in the home country shifts the density of academics to the dotted line position.

function. Those whose marginal utility does not decrease too sharply, for whom ρ is high, behave in the same way as those who will be at home in period $T+1$, and vice versa. If these two groups cancel each other out, one would thus expect the aggregate response to be determined by those who will live at home in period $T+1$, and so, in aggregate, an increase in exchange rate causes an increase in emigration.

Note that $\hat{\theta}$ increases with β. Therefore more eminent academics are more likely to have a negative value for the second term in (10), suggesting that for those who will retire abroad, working at home in the last period would become more attractive in response to an increase in the exchange rate (the cut-off ξ_A becomes smaller). This argument might be strengthened by the observation that more eminent academics are also more likely to have a high ρ, ensuring the negative sign for (10).

The intuition for this is that when an academic negotiates with an institution with a higher exchange rate, one, that is, where more units of the local currency can be purchased with one unit of her current country, she is in a stronger bargaining position than in a negotiation with an institution in her own country. This is so because the negotiated

pay will be put to two utility enhancing uses: to purchase consumption in her country of work, and to contribute savings to her "pension pot", her future consumption. The marginal utility of a unit of currency devoted to current consumption is independent of the exchange rate, given that consumption goods in the country of work will need to be paid for in that currency. But the marginal utility of adding a unit of a low value currency is lower, because (the academic would be in the position to argue that it) will purchase fewer units of future consumption.[5] This intuition also explain the finding that the positive effect on the probability of migrating to a country with a high exchange rate is weakened by age. Older academics are likely to already have substantial pension pots, and the potential for a lavish lifestyle in the final years of professional life may well outweigh the smaller addition to the value in the chosen country of retirement of the academic's pension pot.

Figure 1 also includes the change in the distribution of academics' preferences following an increase in ξ, the desirability of the foreign country, with the natural consequence that a more attractive country becomes more likely to attract people who are in a position to be offered jobs, and so the empirical analysis will include controls for country specific characteristics, either through country effects, or, directly including time-varying controls, such as the GDP and other measures fo the quality of life.

These corollaries can guide the empirical analysis, and I formalise them in a set of testable hypotheses, couched in terms of the predicted sign of the corresponding coefficient in a regression where the dependent variable is the propensity to emigrate.

Hypothesis 1. *1. Academics with more bargaining power are more likely to emigrate; the effect is weaker when the exchange rate is higher. Conversely:*

2. Academics are more likely to emigrate when the exchange rate is higher; the effect is weaker, and can possibly be reversed, for academics with more bargaining power.

3. Academics are more likely to emigrate to a country with higher quality of life.

[5] An imagined negotiation phase could go as follows: "Professor, this salary package will give you a very high standard of living in our country!", "That may be so, Vice-Chancellor, but it will also afford me only the smallest retirement bungalow and the lousiest golf course in Florida: you need to offer me more!"

In Section 4, I test empirically these theoretical predictions; before it, Section 3 describes the construction of the dataset used.

3 The data

The determinants of migratory flows are likely to differ considerably across disciplines. In some, such as the STEM subjects, academic moves are likely to be driven by availability of substantial funding; moreover research projects are more likely to require both the physical presence and to have a longer time scale that in more "essay based" disciplines. Conversely, subjects like law, literature, and history are often country or region specific, making it unusual for, say, a specialist in Scottish law to move to Italy, or a Japanese medieval history scholar to move to a Latin American university. For this reason, in this paper I focus on the subset of the academics working in the disciplines of economics, business, management, statistics, and decision science.[6] These are research areas where both location specific expertise and availability of national funding are relatively less likely to constrain international mobility.

I have obtained all the research papers published from January 1990 to September 2022 in journals included in the Scopus catalogue and classified as pertaining to the broad disciplinary areas I consider. For each of these publications, the Scopus database lists a unique identifier for each of the authors who contributed to it, and all the institutions that an author lists as her/his affiliations: for example if the three authors of a given publication have each four affiliations, not necessarily all different, the database reports twelve author-affiliation pairs with the given publication's identifier. To each affiliation, the database associates one and only one country. For each publication, the database also includes the total number of citations which it has collected up to 2022. Following

[6]Scopus classifies the 77m publications it lists in one or more of 27 main "Subject Area Classifications" (SAC, themselves grouped in Earth, Life, Health, and Social Sciences), and around 300 Scopus Subject Areas". See the appendix for more details. The dataset I use here contains all publications in two SACs, "Business, Management and Accounting" and "Economics, Econometrics and Finance", and those in the "Statistics, Probability and Uncertainty" Area in the SAC "Decision Sciences".

some minimal cleaning[7] the dataset contains 8,772,035 entries each identified by a triple (author, affiliation, publication), with nearly 3 million distinct publications. In over 85% of the observations, the author lists only one affiliation. For the remaining cases, I allocate to the author their first listed affiliation.

The dependent variable is a "move". This is constructed in two steps: firstly I determine the affiliation of an academic in every year in which they appear in the dataset, namely the year in which they have published a paper, and secondly in the event of a difference between the affiliation in two consecutive appearances, the year in which a change in affiliation has occurred.

To begin with the first step I note first that only about 3% of academics have more than one publication in a given year. In this cases I assign lexicographically the academic to the affiliation which the authors list as first in the most publications. If more than one institution has the highest number of affiliations listed by the academic in the year, then I look at the affiliations after the first and repeat the process.[8] If I still have ties, I choose randomly: this happens for just 298 observations. The final dataset is an unbalanced academic-year panel with 5,634,353 observations for 2,901,379 academics affiliated to 274,006 distinct institutions in 217 countries: of these academics 913,724 appear twice or more and can be determined to have moved or not.

Moving to the definition of a move, this is defined to have occurred if the affiliation in year t differs from the affiliation in the previous *observed* year. It matters for the empirical analysis in which year the move is considered to have occurred, as time varying variables vary from year to year. This is unambiguous when the last observed year is $t-1$, which

[7] For example, in a handful of cases no information about the country is included, and in another handful an author has no affiliation. These observations are dropped. The STATA code I used to clean elaborate and analyse the data is available in the online appendix.

[8] As an example suppose that in 2010 Professor Lapping lists four publications. He signs two as Gordon Lapping, University of Poppleton and Loamshire University, one as Loamshire University, UoHPK, and University of Poppleton, and the fourth as Loamshire University and UoHPK. Counting publication we see that both Poppleton and Loamshire are both listed as first in two papers in the year. A tie, so I need to count the institutions listed after the first, and compare the count of those tied: Loamshire has two and Poppleton one only, so for for 2010, Lapping is deemed to be affiliated to Loamshire University. Note therefore that I divide all an author's affiliations into "first" and "the rest", with no order within the latter group.

Table 1: Summary statistics for the academics in the sample

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Total	Twice or more	%twice (2)/(1)	Move	%move (4)/(2)	Emi-grate	%emigr (6)/(4)
United States	1,014,218	715,716	70.6	165,651	23.1	30,102	18.2
Canada	135,716	97,071	71.5	18,844	19.4	7,026	37.3
Rest of Americas	212,436	124,155	58.4	24,895	20.1	5,323	21.4
United Kingdom	281,867	207,591	73.6	47,398	22.8	15,632	33.0
France	173,600	130,267	75.0	52,437	40.3	8,361	15.9
Germany	239,539	163,517	68.3	34,640	21.2	10,098	29.2
Italy	160,251	125,368	78.2	21,803	17.4	5,629	25.8
Spain	144,083	110,954	77.0	16,675	15.0	4,163	25.0
Rest of Europe	757,833	528,141	69.7	98,268	18.6	28,209	28.7
Northern Africa	59,796	36,712	61.4	9,779	26.6	1,801	18.4
Sub-Saharan Africa	56,977	30,563	53.6	5,238	17.1	2,045	39.0
China	1,002,372	525,612	52.4	86,728	16.5	9,498	11.0
South-eastern Asia	203,854	115,043	56.4	21,104	18.3	7,093	33.6
Eastern Asia	438,366	290,087	66.2	47,767	16.5	11,547	24.2
Centr. and South. Asia	452,731	235,367	52.0	52,528	22.3	8,583	16.3
Western Asia	148,606	96,568	65.0	15,383	15.9	6,528	42.4
Australia	128,876	97,364	75.5	18,961	19.5	5,887	31.0
Rest of Oceania	23,264	16,943	72.8	3,139	18.5	1,561	49.7
Total	5,634,353	2,732,540	48.5	741,362	27.1	169,219	22.8

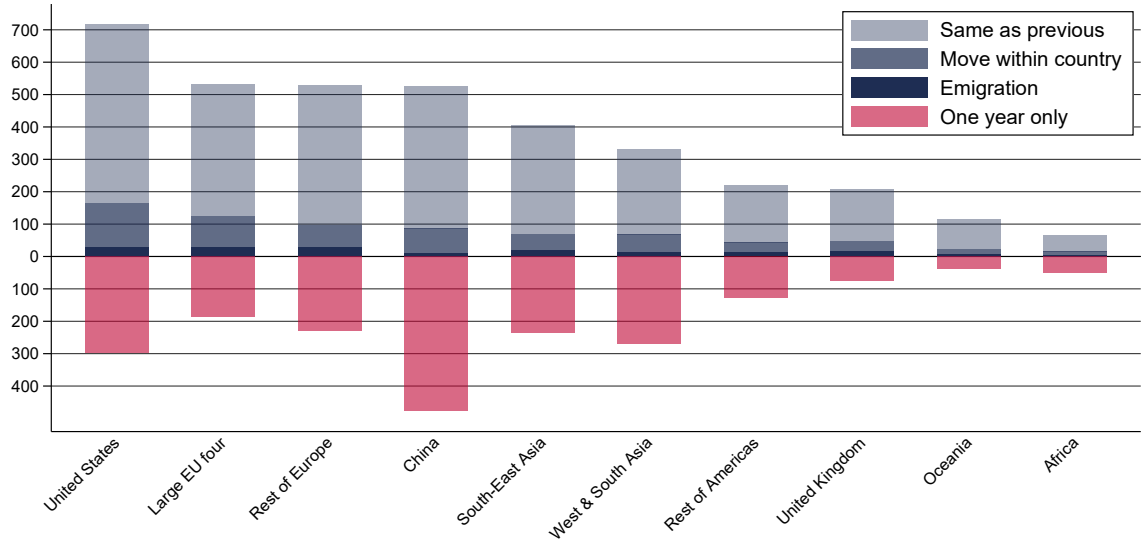
Note: The number reported are the academic-year pairs. The first row include all academics, the second excludes academics who appear only once, and hence are dropped in the panel estimation of (17). The rest of the row partition the sample according to the origin country: the same academic may appear in more rows, if she has changed country. A move is defined as having a different institution relative to that of the previous appearance in the dataset. If in addition the institution is in a different country then it is included in the count of the last two columns. **Source**: My elaboration of Scopus data.

is the case in 44% of the moves. In the remaining cases, I take an intermediate year, with a bias towards year t, on the grounds that a move is more likely to have happened close to a publication.[9]

While in some cases determining the location of an academic from their publication record would be unsatisfactory, the aim of this paper is such that this is in fact the best way of doing so. To see why, note that, in my theoretical set-up, there is no conceptual

[9]In detail, if g is function mapping the difference between observed years, I have assumed that the time varying variable for the origin affiliation and country are those of the year $g(\tau)$, where $g(\tau) = t-1$ for $\tau \in [1,4)$, $g(\tau) = t-2$ for $\tau \in [4,7)$, $g(\tau) = t-3$ for $\tau \in [7,10)$, $g(\tau) = t-4$ for $\tau \in [10,15)$, $g(\tau) = t-5$ for $\tau \in [15,21)$, $g(\tau) = t-6$ for $\tau \in [21,31)$, and $g(\tau) = t-7$ for $\tau \geq 31$. Column (4) in Table A7 in the online appendix reports a regression when the move is presumed to have occurred in the middle year: the results are essentially unchanged.

Figure 2: Geographical distribution of academics

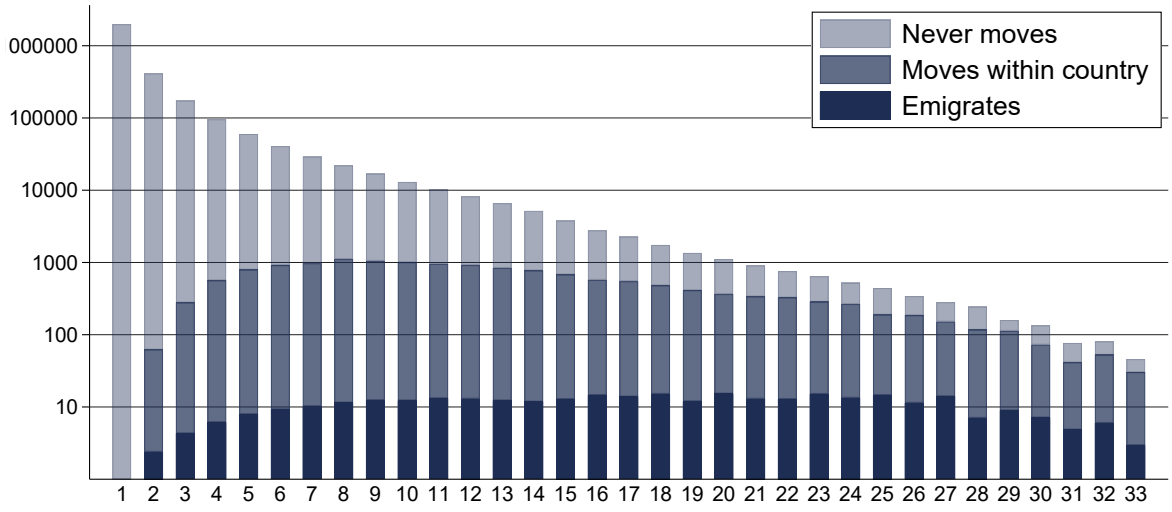


Note: The red portion of the bar counts, for each region, the number of academics (in thousand) who make only one appearance in the dataset. Above the horizontal axis, the lighter portion of the bar counts the academics who are always affiliated to the same institution, the darker portion those who move within the same country, and the darkest part those who change country (and hence institution) at least once.

difference between a British born academic who has spent her earlier career in the UK, and who is in the US in year t and her Dutch colleague who works in California in year t and has never set foot in Britain: both individuals are motivated by the same incentives to move to the UK in year $t+1$. By contrast, administrative datasets would not serve the purpose of identifying academics' migration, as at best they report the nationality or place of birth, but not their country of origin or destination of academic who enter or leave a country's dataset.

Related to this, there might be a concern that some academics will not appear in the dataset because they do not publish frequently enough, and of those who do appear, around half of those included have publications in one year only in the period, and therefore are excluded by the empirical analysis. In fact, this, far from constituting a drawback, is an appealing feature of the dataset I have constructed, as it ensures that the sample focuses on the academics whom institutions in different countries seek out to attract them away from their current institution with the promise of better conditions. The idea of global competition for academic talent underpinning the model is that for an academic to come

Figure 3: Appearances, moves, and migration of academics in the dataset



Note: Number of academics according to the number of appearances in the dataset, and the proportion of these appearances which are all in the same institutions (the light part of the bar), in different institutions but all in the same country (the darker part of the bar), or in institutions in two or more countries (the darkest part of the bar). The underlying data to draw the graph is in Table A3.

to the attention of a university across the globe, she must be visible, and a regular presence in outlets listed in Scopus does indeed creates more global visibility than other academic activities however necessary and valuable they may be, such as scholarly work that does not lead to publication, excellent teaching, or a tireless contribution to administrative, managerial, and outreach activities in one's own institution. In brief, the academics who are more likely to be highly international mobile, and hence those whose location decisions are more likely to be affected by international variables and exchange rate fluctuations, are precisely those who appear frequently in the Scopus database.

Summary statistics information on the sample is collected in Table 1 and Figures 2 and 3. Figure 2 plots the number of each type of possible pairs of consecutive appearances of an academic: those in red appear only once, and therefore no move of theirs can be recorded, they are excluded from the subsequent analysis. Above the horizontal axis, the length of each portion of the bars is the number (of thousand) of pairs of observations for the same person according to whether they have the same affiliation as they had in the previous observation (that is the academic has not moved: lighter colour), in different

affiliations (indicating a move within the country, darker colour), or in institutions located in different countries (the academic has emigrated, the darkest colour). Table 1 contains the same information, with a different, finer partition of the world: for the regions which are the same in the table and in 2, the first column is the height of the entire bar (both the red and the blue part).

Table 1 and Figure 2 distinguish the types of *moves*, whereas Figure 3 divides the *academics* according to their mobility: some never moves in (the observed part of) their career, some move but spend their whole working life within one country, and the rest are affiliated to institutions in at least two different countries. The vertical bars report in different shades the three types, in proportions of the total number who fall into each category. For each integer n, the overall height of the bar is the natural log of number of academics who appear in the data n times.

4 Empirical results. Preliminary: aggregate flows

The international trade model (Thursby and Thursby, 1987) can be adapted to the study of migration flows from two countries, the origin and the destination, as done among others by Santos Silva and Tenreyro (2006). I use here a simple form of this model, given by the following equation:

$$\phi_{od\tau} = \Gamma_m \mathbf{X}_{od\tau} + u_{od\tau}, \tag{11}$$

where $\phi_{od\tau}$ is the migration flow from the origin to the destination country, denoted by subscripts o and d, and $\mathbf{X}_{od\tau}$ is a vector of time varying origin-destination country pair specific variables. The error term contains year fixed effects, a time invariant component for the origin and the destination country-pair, which of course encompasses country fixed effects, and a normally distributed random error.

The vector $\mathbf{X}_{od\tau}$ contains three groups of variables. The first group are time varying "non-academic" variables which affect the quality of living conditions in the origin and destination countries. Specifically, I include the the GDP per capita, in log, denoted by

$G_{o\tau}$ and $G_{d\tau}$, as a proxy for the standard of living, and a more specific quality of life index, $q_{o\tau}$ and $q_{d\tau}$, which I have constructed from a principal component analysis of three measures: (i) the corruption perception index (from), itself a composite measure where a low value denotes a corrupt country, (ii) the quality of the public administration, which may matter to foreign academics for activities such as buying or renting a house, paying taxes, organising schools and travels, and (iii) the degree of autonomy enjoyed by universities from interference from non-academic persons or agencies. In addition, I include the exchange rate between the origin and the destination country, which the theoretical model in Section 2 shows to play an important role. This is computed as the ratio of exchange rate destination country relative to that of the origin country $\eta_{od\tau}$, both adjusted for differences in cost of living (Keita, 2016, p. 2939). Formally:

$$\eta_{od\tau} = e_{od\tau}\frac{P_{o\tau}}{P_{d\tau}}, \tag{12}$$

where $e_{od\tau}$ is the nominal exchange rate[10] of the currency of country d at time τ, that is the number of units of the currency of country d per unit of the currency of country o, and $P_{i\tau}$ is the consumer price index in country i at time τ.[11]

Many academics are motivated by, among other things, the general scientific environment of the country where they work. This is proxied by the second group of two variables I include: $N_{o\tau}$ and $N_{d\tau}$, the number of academics, either in log or as a proportion of the overall population, to account for the importance of academia in the country, and $p_{o\tau}$

[10]Data on corruption is obtained from `transparency.org`, on public sector from `v-dem.net`, and exchange rates, and other macroeconomic variables such as population, GDP, and price indices, from `data.worldbank.org`. As one expects, the correlation between $G_{d\tau}$ and $q_{d\tau}$ is high, at 0.769. A complete table of summary statistics and pairwise correlation of the variables used in this section is available in the online appendix, Tables A4 and A5. All exchange rates are normalised to the year 2010: this corresponds to defining the unit of consumption as one that cost one unit of the currency in 2010. For countries which changed currencies in the 1990-2022, principally the eurozone countries, I have converted the exchange rate using the official rates or the rates in the two years before and after the conversion.

[11]The literature studying the determinant of individual migration decisions rarely includes the exchange rate. When it does, it is in view of its effects on wages Mishra and Spilimbergo (2011) and the labour supply of migrants, who may be more flexible in their hours and also need to remit a certain amount to their country of origin Nekoei (2013).

and $p_{d\tau}$, the "research prestige", given by the (first principal component of) the number of publications authored by the country's academics in the year and their citations to the present date. While there are many aspects of academic life, a country where academics publish and are cited a lot may be more likely to be considered a suitable location by the academics who also publish regularly, and are therefore included in the dataset.

The country variables in these two groups are included both for the origin and for the destination country. On the other hand, the final group reflects the idiosyncratic characteristics of where academics live, the origin country: I do so to attempt to capture country specific events which affect short-term social and demographic characteristics of the academics affiliated to institutions in the country which may directly affect their propensity to emigrate: this could be changes in tenure rules or pay and conditions, macroeconomic or fiscal measures directed at stemming or reversing the brain-drain. In this third groups I include the average age of the academics who publish in the year, $a^A_{o\tau}$, the average age of those who move, $a^M_{o\tau}$, and the average age of those who emigrates, $a^E_{o\tau}$. I measure age as the number of years lapsed since the first appearance in the dataset: this clearly is a very rough measure but is likely to be correlated with an academic's actual age. Finally, in this group, I include as a regressor the ratio between the number of academics who move abroad as a proportion of the total number of academics who move anywhere: this "emigration rate", $\nu_{o\tau}$ is the propensity to leave the country conditional on changing institution.

To sum up, I estimate a panel regression of the following specification:

$$\begin{aligned}\phi_{od\tau} = &\mu_0\eta_{od} + \sum_{x=o,d}\left(\mu_{1x}G_{x\tau} + \mu_{2x}q_{x\tau} + \mu_{3x}p_{x\tau} + \mu_{4x}N_{x\tau}\right) + \sum_{X=A,M,E}\mu_{Xo}a^X_{o\tau} + \\ &\mu_\nu\nu_{o\tau} + u_{od\tau}, \qquad o,d \in \mathscr{W}, \qquad \tau = 1990,\ldots,2022.\end{aligned} \tag{13}$$

In (13), $\phi_{od\tau}$ is the gross migration flow from origin o and destination d country, η_{od} is the real exchange rate between the countries, (12), $G_{o\tau}$, $q_{o\tau}$, $p_{o\tau}$, $N_{o\tau}$ are the per capita GDP,

Table 2: Migratory flows between pairs of countries

VARIABLES	No controls (1)	Macro controls (2)	Main (3)	Non-linear (PPML) (4)	Ex-rate (not log) (5)	No internal flows (6)
Real Exchange Rate	4.002*	-0.0166	0.0232	-0.00266	0.00844	1.622
	(2.193)	(2.457)	(2.007)	(0.0217)	(0.0290)	(1.979)
GDP per capita (origin)		9.534	-8.969*	-0.149***	-8.976**	-5.759
		(6.805)	(4.493)	(0.0200)	(4.227)	(4.798)
GDP per capita (dest.)		32.83***	16.13***	0.0871***	16.14***	5.852
		(6.150)	(4.880)	(0.0222)	(4.716)	(5.444)
Quality of life (origin)		17.24***	-0.840	-0.0164*	-0.841	-4.650**
		(3.857)	(2.632)	(0.00985)	(2.634)	(2.193)
Quality of life (dest.)		17.83***	3.182	0.0309***	3.183	1.009
		(2.647)	(2.042)	(0.0101)	(2.041)	(2.162)
Academic prestige (origin)			4.066***	0.0154***	4.065***	6.798***
			(0.759)	(0.00257)	(0.759)	(1.057)
Academic prestige (dest.)			2.222**	0.00234	2.221**	4.577***
			(0.825)	(0.00293)	(0.825)	(1.267)
N academics, log (origin)			49.79***	0.291***	49.79***	37.69***
			(2.922)	(0.0123)	(2.923)	(2.495)
N academics, log (dest.)			27.93***	0.157***	27.93***	12.89***
			(2.099)	(0.0145)	(2.096)	(1.629)
Emigration rate (origin)			73.57***	0.215***	73.57***	135.3***
			(7.613)	(0.0323)	(7.588)	(7.080)
Average age (origin)			5.292***	0.0191***	5.292***	5.079***
			(1.236)	(0.00391)	(1.234)	(1.233)
- of those who move			-0.236	0.00509	-0.236	-1.239
			(0.660)	(0.00414)	(0.660)	(0.899)
- of those who emigrate			-0.940**	-0.00972***	-0.940**	-0.811
			(0.459)	(0.00323)	(0.460)	(0.613)
Observations	36,133	35,952	35,606	31,533	35,606	32,564
R-squared	0.858	0.862	0.886	0.7247	0.886	0.767

Note: All column are log-log panel estimates, except (4), which uses the maximum likelihood pplm estimator (see Santos Silva and Tenreyro, 2006), and (5), which is log-linear. All specifications include year fixed effects, and origin-destination pair fixed effects. Robust standard errors in parenthesis, clustered at the year (except (4)) and the origin-destination country pair. Exchange rate is given in (12). * , ** , *** denote significance at the 10, 5, and 1 percent level.

the quality of life index, the academic prestige, and the number of academics in the origin country, with the corresponding measures for the d, the destination country. In addition, $a_{o\tau}^{X}$ is the average age of the academics, $X = A$, the academics who move, $X = M$, and those who emigrate $X = E$ in the origin country, and $\nu_{o\tau}$ is the percentage of moves where the destination is to a foreign country. The error term is described after (11), and $\mathscr{W}$ is the set of countries in the data.

Table 2 reports my results. The first column includes only the exchange rate and year and country-pair fixed effects. To this, time varying "non-academic" country variables (GDP and corruption score) are added in Column (2). The main regression adds the academic variables, and is in the third column. Column (4) follows Keita (2016) in using the Poisson pseudo-maximum likelihood (PPML) estimator developed by Santos Silva and Tenreyro (2006). Column (5) replaces the log of the exchange rate with its value, with little change in the coefficients of the other variables. The regression in the final column weights the observations with the origin country population.[12] Except in column (5) the model is a standard log-log panel estimation, implying that the coefficients are the corresponding elasticities, expressed as a percent for readability: thus, for example, a 1% higher GDP in a country suggest an *emigration* flow lower by 0.09%*, and an *immigration* flow higher by 0.161%***, in the preferred specification, Column (3).

Coefficients are broadly consistent across specifications. The exchange rate appears to have limited aggregate effect on the migration flows. GDP per capita seems to have the expected sign: academics leave poorer country in favour of wealthier ones, whereas the corruption score of a country does not appear to influence migratory flows. Academic prestige and size of both origin and destination also increase flows, which would be consistent with a narrative that countries with an active academic sector are those where institutions seeking to attract academics look for them, and those where academics themselves are more willing to move to.

5 Individual level analysis

The previous section shows associations between aggregate flows and aggregate national variables. These have some descriptive interest, but the theoretical analysis presented in Section 2 does highlights that an academic's decision to emigrate depends crucially on

[12] Table A6 in the appendix presents some more specifications. For example taking the number of academics as a percentage of the total population rather than its log, and using the US dollar exchange rate rather than the pound sterling. There are no noticeable changes.

both her own idiosyncratic preferences and her own eminence. Given that academics are not randomly distributed across countries at any given moment in time, differences in academics' unobservable individual characteristics cannot be aggregated. Hence, in this section, I perform an individual level analysis of the migration decision. An additional advantage of this approach is that it allows me to separate the analysis in different samples, so as to identify any structural behavioural differences in academics with different backgrounds.

I build my individual level panel analysis from an equation such as:

$$m_{i\tau} = f\left(\mathbf{Z}_{i\tau}, \mathbf{X}_{od\tau}\right) + u_{iod\tau}, \tag{14}$$

where $m_{i\tau}$ takes value 1 if academic i has moved from one institution to a different one in period τ, and $\mathbf{X}_{od\tau}$ is a subset of the vector of origin and destination country variables included in (13). The new vector $\mathbf{Z}_{i\tau}$ includes controls affecting academic i in period τ. The theoretical conclusion derived in the model in Section 2 is that an academic chooses to move if the outcome of the negotiation with the employer is preferable to the current conditions. This outcome is in turn determined by her relative bargaining power vis-à-vis the university u she is negotiating with. In (7), I proxy the non-observable bargaining power of academic i vis-à-vis university u with the ratio between her eminence, $\lambda_{i\tau}$, computed in Section 4 as a principal component analysis of academic i's number of publications in year τ and cumulated up to year τ and the citations collected by these publications., and the product between her wealth in year τ, $W_{i\tau}$, and the prestige of the institution she is negotiating with, $\Lambda_{u\tau}$. I have of course no information regarding wealth: wealth is likely positively correlated with age, which in turn is likely correlated with the time interval from the first appearance in the dataset, though the association, is likely to be imperfect.[13] Finally, it seem natural to measure $\Lambda_{u\tau}$ with the average eminence of

[13] This proxy for age and the academic's eminence are positively correlated, as one would expect, but, at 0.394, the correlation is far from extreme.

the university's academics working there in year[14] τ: $\Lambda_{u\tau} = \sum_{i \in u} \lambda_{i\tau} / n_{u\tau}$, where $n_{u\tau}$ is the number of academics with at least one publications in institution u in year τ. All these variables are fixed at the time of the negotiation and hence cannot be influenced by the move itself. Next I assume, plausibly, that the institutions where the academics is in her next appearance in the dataset, in year $\tau + 1$, is indeed her preferred one, that is the assumptions that all other institutions are either less preferred, or not in her choice set, and hence can be disregarded for year τ. To sum up, following (7), I construct academic i's relative bargaining power vis-à-vis university u in year τ as (the log of) the ratio between academic i's eminence, $\lambda_{i\tau}$, and the product between her "age" in year τ, $age_{i\tau}$, and the average eminence of the university's academics working there, $\Lambda_{u\tau}$:

$$\beta_{i\tau} = \ln \lambda_{i\tau} - \ln age_{i\tau} - \ln \left(\frac{\sum_{i \in u} \lambda_{i\tau}}{n_{u\tau}} \right). \tag{15}$$

The "macroeconomic" variables in the vector $\mathbf{X}_{od\tau}$, which are constant across all academics who move between two given countries, are the same as in (11). Note that we include academics also when they do not move, or move within the country, and that all the macroeconomic variables change even when the country of origin is the same as the destination country, as they are measured in different years.

The error term $u_{iod\tau}$ has a rich structure, and I will consider several specifications. The preferred one, used for all the robustness tests and separate samples, is the fullest:

$$u_{iod\tau} = i \times \text{origin} \times \text{dest} + \tau + \varepsilon_i. \tag{16}$$

(16) adds a year fixed effect to the individual-origin-destination triple fixed effect, with an additional additive idiosyncratic error term. This rich structure captures specific individual preferences for given country pairs, to account for the possibility that individual

[14] A question may arise the average should be taken in year τ or in year $\tau + 1$. Negotiation take time, and there are also publication delays so that there is the argument for $\tau + 1$ would have to hinge on both parties rational expectation on the future value of $\Lambda_{u\tau}$. In any case, running the regressions with $\Lambda_{u,\tau+1}$ leaves all quantitative results essentially unchanged.

preferences for given countries may change following specific events in a manner that differs from individual to individual. As shown by comparing the results reported in the first three columns with those obtained when the error term is (16), reported in the fourth column of Table 3, altering the structure of the fixed effects does not change the results in any noticeable way. Column (1) posits $u_{iod\tau} = \text{origin} \times \text{dest} + \tau + \varepsilon_i$, in Column (2) I have imposed $u_{iod\tau} = i + \text{origin} \times \text{dest} + \tau + \varepsilon_i$, and in Column (3) $u_{iod\tau} = \text{origin} \times i + \text{dest} \times i + \text{origin} \times \text{dest} + \tau + \varepsilon_i$.

One important implication of Corollary 1 is that the role of bargaining power varies according to the exchange rate. This suggests the inclusion of an interaction term between β and η_T, and so the chosen specification is

$$m_{i\tau} = \alpha_0 \beta_{i\tau} \times \eta_{od\tau} + \beta_1 \mathbf{Z}_{i\tau} + \beta_2 \mathbf{X}_{od\tau} + u_{iod\tau}, \tag{17}$$

Table 3 reports my empirical results.[15] Column (4) is the main regression, specification (17), with the error structure given in (16). The exchange rate and the bargaining power, and their interaction, are all statistically significant. The interpretation of the values of the estimated coefficient is best conducted with the aid of a graphical analysis. To this aim, Figure 4 plots the marginal effect of each of bargaining power and exchange rate, keeping the other variable fixed at various levels. I have added non-linear terms and their interaction up to the third degree to capture any nuances in the response: the corresponding diagrams without these terms are qualitative identical. In line with the prediction from the theoretical model, on the top panel we see that academics in a stronger bargaining position are more likely to emigrate. This effect becomes weaker (the curve becomes less steep) as the normalised exchange ratio increases from 0.7 to 1.3. This is exactly in line with the theoretical prediction in Section 2. The diagram superimposes the density of the academics' relative bargaining power in the year (this measure, the

[15] The regressions in this section are run using the high dimension fixed effect panel estimator in Correia (2017).

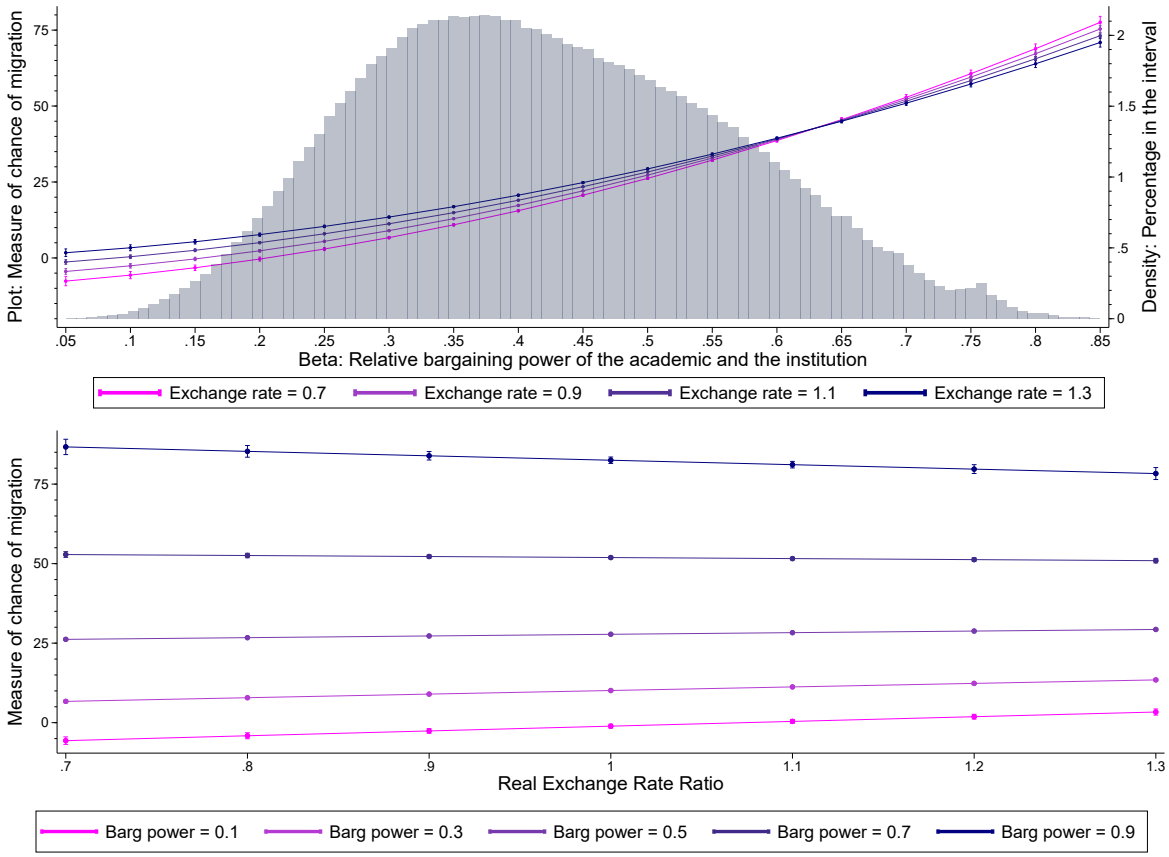
Table 3: Main Results: Individual level regression

Variables	(1) Country pair FE	(2) Country +indiv FE	(3) Or×ind+ dest×ind	(4) Triple inter FE	(5) Women	(6) Men
Real Exchange rate (log)	22.59***	19.93***	19.36***	19.54***	24.40***	21.28***
	(0.783)	(0.864)	(1.077)	(1.091)	(3.227)	(1.750)
Relative BG power	9.979***	12.13***	12.66***	12.71***	15.11***	13.81***
	(0.145)	(0.184)	(0.241)	(0.245)	(0.692)	(0.395)
Interaction BG power×XR	-3.286***	-3.206***	-3.095***	-3.122***	-4.166***	-3.388***
	(0.138)	(0.165)	(0.220)	(0.224)	(0.629)	(0.359)
GDP per capita ratio	13.07***	8.615***	16.97***	17.20***	17.06***	14.93***
	(0.314)	(0.354)	(0.635)	(0.645)	(1.990)	(1.067)
Δ quality of life dest—origin	0.764***	0.943***	1.374***	1.388***	0.585	-0.462*
	(0.114)	(0.131)	(0.153)	(0.153)	(0.449)	(0.268)
Academics: dest/origin	-2.340***	-2.465***	-15.00***	-17.34***	-19.40***	-17.63***
	(0.121)	(0.169)	(0.631)	(0.697)	(2.722)	(1.236)
Δ country academic prestige	0.0379	0.624***	1.364***	1.380***	2.028***	1.189***
	(0.0334)	(0.0377)	(0.0734)	(0.0751)	(0.268)	(0.133)
Authors: 1st institution (log)	1.331***	2.624***	2.811***	2.818***	3.678***	3.095***
	(0.0531)	(0.0543)	(0.0624)	(0.0626)	(0.192)	(0.106)
Authors: 2nd institution (log)	-1.830***	-1.415***	-1.842***	-1.855***	-1.930***	-1.182***
	(0.0731)	(0.0710)	(0.0831)	(0.0833)	(0.258)	(0.141)
Propensity to emigrate, origin	-25.86***	-21.34***	-24.37***	-24.93***	-22.86***	-22.58***
	(0.557)	(0.649)	(0.726)	(0.731)	(2.092)	(1.161)
Average age, origin	-0.0588	-1.399***	-1.638***	-1.626***	-1.488***	-1.855***
	(0.0806)	(0.0985)	(0.107)	(0.108)	(0.293)	(0.173)
Average age movers, origin	0.0490	0.771***	0.835***	0.841***	0.738**	1.253***
	(0.0868)	(0.0992)	(0.107)	(0.108)	(0.291)	(0.172)
Average age migrants, origin	-0.0911*	-0.00247	-0.0639	-0.0667	-0.290*	-0.0381
	(0.0497)	(0.0549)	(0.0577)	(0.0577)	(0.151)	(0.0904)
Individual FE		✓				
Origin×destination FE	✓	✓	✓			
Individual×origin FE			✓			
Individual×destination			✓			
Indiv×origin×destination FE				✓	✓	✓
Observations	2,721,448	2,309,539	2,162,033	2,138,541	235,635	757,920
Academics	910,085	498,519	469,723	469,255	53,415	152,419
Institutions	101,335	78,214	70,515	69,983	16,513	34,847
Countries	148	143	132	132	117	126

Note: Panel estimates of (14). The preferred specification, as specified in (17), is in Column (4), where a three way fixed effect is included. The robust standard errors are reported in parenthesis, clustered at the year and the origin-destination country pair. Exchange rate is given in (12). All specification include year fixed effects and a constant term. * , ** , *** denote significance at the 10, 5, and 1 percent level.

expression in (7), is constructed to lie in $(0,1)$, and less than 0.01% of the observation are outside the $(0.15, 0.85)$ range shown on the axis). The bottom panel shows the different effect of the exchange rate according to the bargaining power of the academics: it increases (decreases) with the exchange rate for low (high) bargaining power. The measures on the

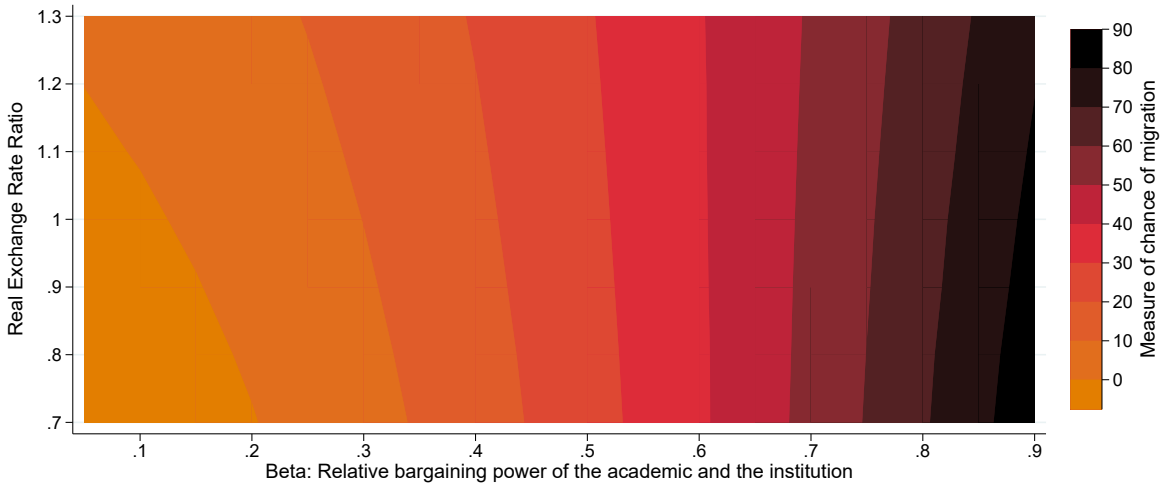
Figure 4: Marginal effects of changes in bargaining power and exchange rate. All academics



Note: The top diagram plots the marginal effect of bargaining power at various levels of the exchange rate, overlaid on the density function of the distribution of the academics bargaining power, obtained from a version of regression in Column (4) in Table 3 augmented by third degree interaction terms between bargaining power and exchange rate. The lower diagram plots the marginal effect of the exchange rate at various levels of the academic's bargaining power.

vertical axis is the predicted linear probability of migration, multiplied by 100, to avoid leading zeros in the tables, and should in theory be bounded between 0 and 100. Figure 5 presents the same information in a different manner: each coloured band contains combinations of exchange rate and bargaining power such that the predicted probability of migration for the academic with the values represented by that point is the one to the corresponding colour on the vertical bar to the right of the diagram. Returning to Table 3, the coefficients of the "macro" control variables the positive coefficient of the log of the GDP ratio suggest academics' tending to emigrate to more prosperous countries than the ones they current live in. Similarly for the quality of life, measured by a combination of low corruption, bureaucratic efficiency, and academic autonomy, and by the academic

Figure 5: Probability of migration



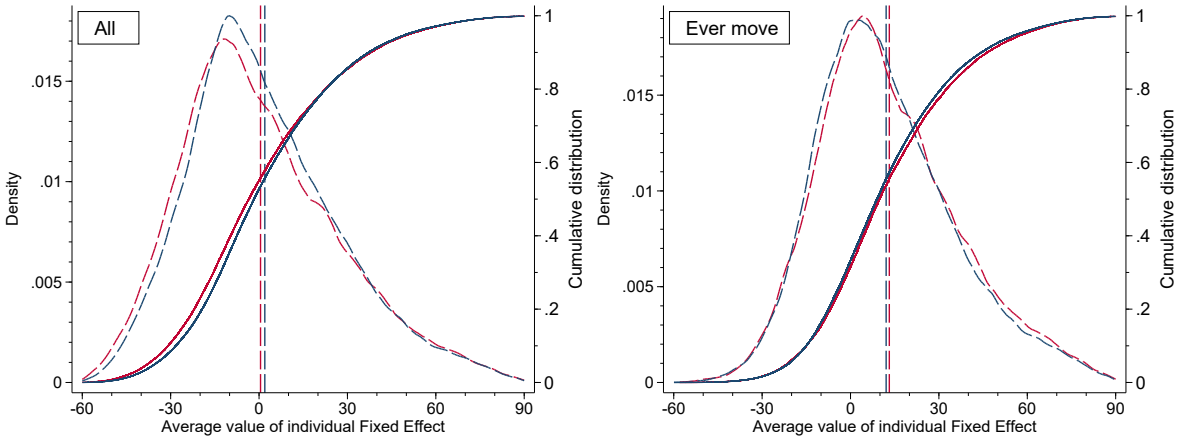
Note: In the Cartesian plane the colour of each point represents the predicted probability, in percent, that an academic with relative bargaining power β measured along the horizontal axis migrates when the exchange rate has the value measured along the vertical axis.

prestige, given by the frequency of highly cited publications in the country's research institutions. The size of the country, on the other hand, suggests that academics tend to move to smaller countries, that is with fewer publishing academics than the one they live in.[16] The signs of the last four "country" variables, the propensity to emigrate, and the average ages of various subsets of academics are not straightforward to interpret, and should be viewed as controls; in any case, excluding them alters only very little the values of the other coefficients. Finally, the variables which vary by institution, the number of authors (both first and second) suggest a tendency to move towards institution with more first authors and fewer second authors than the academic current one.

In the last two columns of Table 3, I explore differences in behaviour between women and men. This is an important question. The Scopus data does not report the gender of an academic author, and I have resorted to the approximative method of using the given names, to attribute the gender. In many cases this proved impossible, such as when an au-

[16]There may be reasons to suspect that size differences may affect the propensity to emigrate in a non-linear way. Introducing a quadratic term in Δ_n, the difference in the (log) number of academics in the destination and the origin country produces a coefficient of -0.426^{***}, and change the other coefficients only after the third or fourth significant digit. Calculating the maximum, I found it to be at -22, well outside the range of the variables: in sum the quadratic coefficient adds nothing.

Figure 6: Distribution of individual fixed effects.



Note: The figure reports the kernel densities of the fixed effects obtained from the main regression, Column (4) in Table 3, for men (in blue) and for women (in red). The dashed vertical line is the mean of the distribution. In the LHS the entire sample is considered, on the RHS only the academics who move at least once.

thor is only listed with the initials, or extremely uncertain or ambiguous. Nevertheless, the gender of close to one quarter of the academics in the sample could be attributed according to name dictionaries (Raffo, 2016, 2021), and so, even bearing in mind that the attrition is not random, as academics with certain characteristics are more likely to use given names which can be allocated to a specific gender with a sufficient degree of certainty,[17] interesting tentative results can be presented. The last two columns of Table 3 report the separate regressions for the two samples of (likely) men and women. The qualitative features of the result do not highlight any substantial difference between women and men in the determinants of migration.

To explore further this theme, I compare the individual fixed effects obtained from the main regression, Column (4) in Table 3. For each academic, I have averaged their fixed effect across all the years they are included in the regression. The distributions of these average fixed effects for the two subsets are shown in Figure 6, where I have truncated

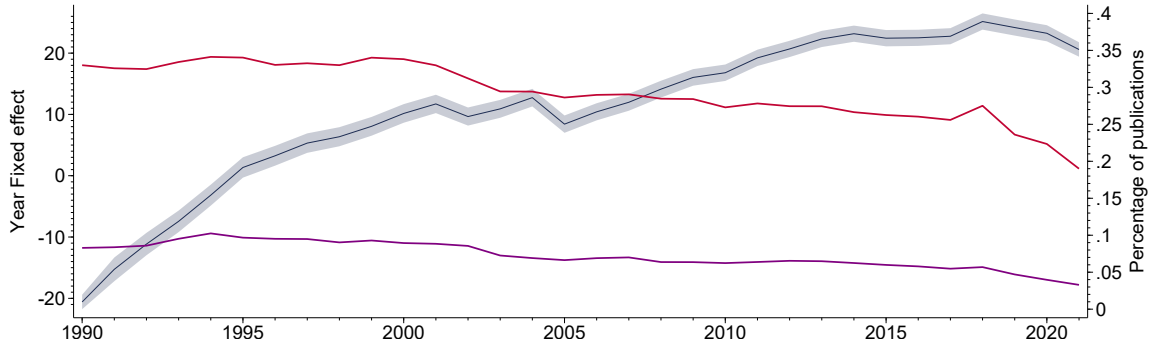
[17] I have run t-test for some relevant characteristics: academics with attributable names are less likely to have been in a US or Chinese university (and also in a top US institution), and more likely to have been in a British (and Russell group), German, French, Italian, Spanish, Australian, and Canadian, but there is no statistically significant difference in the date of appearance in the dataset.

very flat tails amounting to less than 0.3% of each sample. The panel on the left hand side is the entire regression sample. The RHS panel restricts the sample to those who move at least once. In both panels the red curves refer to the sample of women, the blue ones to the men. In both, I plot the kernel densities, and the cumulative distributions (as the dashed and the solid curves), and the means of the fixed effects in the two samples, as the vertical dashed lines. Note the difference in means and in distributions (confirmed by t and Kolmogorov-Smirnov tests): For the entire sample, on the LHS, the fixed effects for the women subset contains smaller values and has a smaller mean than that of the subset of men. The *opposite* is true for the subset of the academics who move at least once, on the RHS. This difference between the samples is not something that would be expected a priori and lacks an immediate explanation, and therefore points to differences in moving and migration behaviour between women and men which deserves further analysis.

Not reported in the table, the results also highlight a definite increasing trend in propensity to emigrate: this is shown in Figure 7, which plots the year fixed effects with the corresponding confidence interval at 5%. I would surmise that the dip in the recent years is more likely to be due to missing information on migration towards the end of the data period, and before inferring any consequence of migratory flow due to events such as the Covid-19 pandemic. To confirm this, further data is needed to identify moves by academics who will publish in the future. Measured on the RHS vertical axis, the diagram also shows the percentage of observations in each year where a move and a move abroad occur.

These results are very robust to changes in the specification, as the rest of this section shows. I begin with Table 4. In the first two columns I restrict the sample first to those academics who move at least once in the period, and then to those who change country at least once in the period. This is to capture the idea that some academics may be unable or unwilling to move, irrespective of the financial and professional attractiveness that a move may determine; similarly some may be prepared to move, but unwilling to change country,

Figure 7: Time trend of the propensity to emigrate.



Note: The figure reports the year fixed effects obtained from the main regression, Column (4) in Table 3, with confidence intervals at 5%, in the navy blue areas, measured on the left vertical axis. The right vertical axis measures the percentage of publications in the year published by authors whose affiliation is different in the subsequent year (top line), and also in a different country (bottom purple line).

and there may be reasons to investigate whether their motivations differ. Naturally the sample size in these cases reduces dramatically, by 40 and 85% approximatively, and yet the main thrust of the results in the main regression is unchanged. It will be interesting to investigate possible explanations for the lower values of the coefficients for exchange rate, bargaining power and their interaction in the sample of those who change country at least once in their career.

In the rest of the table, I return to the original sample to explore different specifications of some of the variables. I begin in Column (3), by replacing the pound sterling exchange rate with the US dollar. The results are similar, the smaller coefficients in the first and third rows being explained by the higher standard deviation of the dollar relatively to the sterling exchange rate. In Column (4) I replace the number of academics in the country with a different measure, the academic "intensity", which takes into account the overall population. The dependent variable in Column (5), is not a move but a change of country. This implies that the triple interaction fixed effect would be collinear with the other variables, and so I replace it with the interaction between individual and origin country, plus that between individual and destination country. Further robustness tests

Table 4: Robustness tests

Variables	(1) Movers only	(2) Migrants only	(3) USD XR rate	(4) Academics per capita	(5) Migration as dep v	(6) Log of the XR
Real Exchange rate (log)	29.98***	7.390***	8.213***	19.66***	22.28***	16.70***
	(1.749)	(2.344)	(1.245)	(1.092)	(1.163)	(1.081)
Relative BG power	17.24***	12.40***	11.79***	12.70***	12.96***	9.560***
	(0.375)	(0.560)	(0.287)	(0.245)	(0.269)	(0.0698)
Interaction BG power×XR	-4.840***	-1.286**	-2.291***	-3.093***	-3.407***	-2.839***
	(0.351)	(0.510)	(0.272)	(0.224)	(0.248)	(0.240)
GDP per capita ratio	28.94***	9.157***	22.43***	15.60***	19.06***	18.61***
	(1.038)	(1.197)	(0.652)	(0.639)	(0.691)	(0.627)
Δ quality of life dest—origin	1.054***	1.237***	1.438***	1.271***	1.525***	1.388***
	(0.257)	(0.342)	(0.153)	(0.153)	(0.157)	(0.153)
Academics: dest/origin	-19.94***	-5.754***	-17.92***	134.0***	-5.564***	-17.52***
	(0.854)	(0.634)	(0.697)	(6.068)	(1.139)	(0.697)
Δ country academic prestige	1.864***	1.226***	1.263***	0.972***	1.354***	1.359***
	(0.105)	(0.147)	(0.0749)	(0.0759)	(0.0790)	(0.0751)
Authors: 1st institution (log)	3.852***	3.750***	2.812***	2.778***	2.814***	2.817***
	(0.0693)	(0.167)	(0.0626)	(0.0626)	(0.0627)	(0.0626)
Authors: 2nd institution (log)	-1.748***	-0.854***	-1.847***	-1.847***	-1.903***	-1.856***
	(0.0922)	(0.217)	(0.0833)	(0.0833)	(0.0836)	(0.0833)
Propensity to emigrate, origin	-37.13***	-22.12***	-25.38***	-19.60***	-19.49***	-24.95***
	(1.151)	(1.381)	(0.732)	(0.724)	(0.780)	(0.731)
Average age, origin	-2.475***	-2.272***	-1.666***	-1.673***	-1.871***	-1.628***
	(0.173)	(0.220)	(0.108)	(0.108)	(0.111)	(0.108)
Average age movers, origin	2.064***	1.700***	0.885***	0.935***	0.888***	0.835***
	(0.177)	(0.214)	(0.108)	(0.108)	(0.111)	(0.108)
Average age migrants, origin	-0.209**	-0.499***	-0.0725	-0.0534	0.00348	-0.0621
	(0.0967)	(0.134)	(0.0577)	(0.0577)	(0.0586)	(0.0577)
Observations	1,350,337	354,369	2,138,541	2,138,541	2,163,071	2,138,541
Academics	260,876	60,753	469,255	469,255	469,748	469,255
Institutions	68,266	18,002	69,983	69,983	70,568	69,983
Countries	128	126	132	132	134	132

Note: In all the columns the estimated specification in Column (4) of Table 3, and so include a constant and a triple interaction fixed effect, except Column (5), where the fixed effect is individual×origin + individual×destination. In Columns (1) and (2) the sample is restricted to the academics who change institution at least once in the period, and to those who change country at least once in the period, respectively. In the third and fourth column, the exchange rate is relative to the US dollar, and the number of academics in the country is relative to the population, instead of the log of the total. In the last two columns, the dependent variable is 1 if the country of affiliation has changed, Column (5), and the the exchange rate is measured in log, Column (6). * , ** , *** denote significance at the 10, 5, and 1 percent level.

are in Table A7. The key coefficients of interest, those in the first three rows of the table, change minimally.

In Table 5, the last of the paper, I study the subsamples constructed by selected academics according to the countries and the institutions they have been affiliated with:

Table 5: Different samples of academics.

	(1)	(2)	(3)	(4)	(5)	(6)
	Academics who were at least once in					
Variables	the US	top US	the UK	Russell	China	big EU 4
Real Exchange rate (log)	14.11***	20.82***	40.22***	55.00***	2.709	49.70***
	(2.794)	(5.094)	(6.540)	(10.68)	(5.032)	(2.853)
Relative BG power	10.10***	11.45***	19.77***	23.35***	4.448***	15.45***
	(0.593)	(1.144)	(1.697)	(2.856)	(1.009)	(0.579)
Interaction BG power×XR	-0.437	-1.692	-7.493***	-10.55***	2.905***	-3.436***
	(0.551)	(1.066)	(1.628)	(2.749)	(0.929)	(0.537)
GDP per capita ratio	64.87***	77.95***	21.33***	23.38***	61.03***	16.88***
	(2.557)	(5.079)	(3.161)	(5.398)	(2.638)	(2.025)
Δ quality of life dest—origin	-6.898***	-7.108***	-1.787**	-2.102	7.865***	-1.575***
	(0.572)	(1.165)	(0.876)	(1.372)	(0.688)	(0.394)
Academics: dest/origin	-16.33***	-25.68***	-10.30***	-13.47***	-45.24***	-18.73***
	(1.455)	(3.302)	(1.783)	(2.973)	(1.849)	(1.970)
Δ country academic prestige	0.425***	1.111***	1.732***	2.781***	4.133***	1.976***
	(0.113)	(0.233)	(0.405)	(0.662)	(0.361)	(0.407)
Authors: 1st institution (log)	3.238***	4.769***	5.263***	5.851***	0.402***	4.874***
	(0.130)	(0.238)	(0.256)	(0.414)	(0.154)	(0.125)
Authors: 2nd institution (log)	-2.391***	-4.186***	-1.920***	-2.796***	-1.968***	-0.870***
	(0.172)	(0.293)	(0.347)	(0.542)	(0.178)	(0.158)
Propensity to emigrate, origin	-22.60***	-17.66***	-13.58***	-19.14***	-32.33***	-20.76***
	(2.459)	(5.285)	(3.935)	(6.418)	(5.438)	(1.339)
Average age, origin	-2.474***	-1.255*	-1.618***	-2.175**	-4.988***	-0.980***
	(0.371)	(0.674)	(0.612)	(0.983)	(1.070)	(0.220)
Average age movers, origin	1.103***	-0.407	0.874	0.460	4.128***	1.472***
	(0.423)	(0.849)	(0.577)	(0.960)	(1.013)	(0.195)
Average age migrants, origin	-0.735***	-0.656	-0.649*	-1.578**	-1.168*	-0.338***
	(0.259)	(0.603)	(0.347)	(0.625)	(0.629)	(0.0868)
Observations	541,014	144,425	169,112	70,276	302,930	573,089
Academics	103,904	23,676	31,665	11,956	73,846	121,267
Institutions	18,193	5,248	7,184	3,115	8,406	20,343
Countries	106	78	101	83	67	97

Note: In all the columns the estimated specification is Column (4) in Table 3. In each column the sample is all academics who publish at least once in a US university, in one of 21 selected US elite universities (footnote 18), in one in the UK, in a Russell group UK university, in one in China, and, in the last column, in one of the 4 large countries in continental Europe. * , ** , *** denote significance at the 10, 5, and 1 percent level.

in Columns (1)-(4) I consider academics who have been affiliated at least once to any US university, to an "elite" US university,[18] to any UK one, to one in the Russell group of UK universities, and to institutions based in Spain France Italy or Germany, and to a Chinese institution. The idea is to identify a potential differences among groups of

[18]From the QS ranking for recent years, I have constructed a list of the highest placed US universities in the relevant disciplines: this included Harvard, MIT, Berkeley, Stanford, Chicago, Pennsylvania, Columbia, New York, Michigan, Northwestern, Yale, Princeton, Duke, Indiana, Cornell, Michigan State, Arizona, Boston, Southern California, Penn State, Minnesota, though even fairly substantial changes to the list do not alter the qualitative nature of the results.

academics whose motivation in seeking moves may be different. While there are some such differences, for example academics who have spent at least one year in the UK, or in the EU appear to be more responsive to changes in the exchange rate and in their relative bargaining power, and event more so if they have been in a Russell group university, while the opposite seems to be the case for the table does not show any meaningful qualitative difference. Table A8 shows that other subsamples again have similar responses to exogenous changes.

6 Concluding remarks

In this paper I have attempted to lay the foundation to our understanding of the motivations of the migratory flows of the academic scholars whose international visibility is determined by their publications in recognised outlets. The theoretical model builds on a plausible minimal set of assumptions, which lead to precise testable implications, summarised formally in Hypothesis 1. Encouragingly, these are confirmed in the comprehensive empirical analysis of the location choice of nearly 5 million academics across a 33 year period: individuals are motivated by the characteristics of the various countries they can move to, and their propensity to move depends on short term economic fluctuations of the relative purchasing power of the currency in these countries. The relative bargaining power of the academic and her employer, which I proxy with number and quality of publications, and, in line with the theoretical prediction, I adjust for age, also affect both the propensity to migrate, which it increases, and the responsiveness of scholars to short term fluctuations of the exchange rate, which it dampens.

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Appendix. For online publication

A Proofs of the results in Section 2

Proposition 1. Academic of type ξ chooses to live in the home country in her retirement period $T+1$ if and only if

$$\xi \leq \eta_{T+1}^{\rho-1}. \tag{4}$$

Proof of Proposition 1. In period $T+1$ she can only consume, so she only chooses where to live. Given wealth w_{T+1} (measured in sterling) saved from the previous period, she has utility

$$u(c) = \begin{cases} u\left(W_{T+1}\right) & \text{if she lives at home} \\ \xi u\left(\eta_{T+1} W_{T+1}\right) & \text{if she lives abroad} \end{cases}$$

From the above, there is a cut-off value of ξ, say ξ^{T+1}, such that if her $\xi < \xi^{T+1}$ then she stays at home. If $u(c) = \frac{c^{1-\rho}}{1-\rho}$ ($\rho < 1$), then $\xi^{T+1} = \eta_{T+1}^{\rho-1}$, which conveniently depends only on the exchange rate, as is the value of ξ which satisfies: $\frac{W_{T+1}^{1-\rho}}{1-\rho} = \frac{\xi\left(\eta W_{T+1}\right)^{1-\rho}}{1-\rho}$. □

Now move to period T. Begin with the consumption choice: this is determined in Proposition 2.

Proposition 2. The utility maximising choice of period T consumption satisfies:

$$c_T = \begin{cases} \frac{\theta^{-\frac{1}{\rho}}}{\theta^{-\frac{1}{\rho}}+1}\left(W_T + y_T\right) & \text{if } \delta_T = \delta_{T+1} = 0, \\ \frac{\theta^{-\frac{1}{\rho}}}{\theta^{-\frac{1}{\rho}}+\xi^{-\frac{1}{\rho}}\eta_T^{-\frac{1-\rho}{\rho}}}\left(W_T\eta_T + y_T\right) & \text{if } \delta_T = 1 \text{ and } \delta_{T+1} = 0, \\ \frac{\theta^{-\frac{1}{\rho}}}{\theta^{-\frac{1}{\rho}}+\xi^{\frac{1}{\rho}}\eta_T^{\frac{1-\rho}{\rho}}}\left(W_T + y_T\right) & \text{if } \delta_T = 0 \text{ and } \delta_{T+1} = 1, \\ \frac{\theta^{-\frac{1}{\rho}}}{\theta^{-\frac{1}{\rho}}+1}\left(W_T\eta_T + y_T\right) & \text{if } \delta_T = \delta_{T+1} = 0. \end{cases} \tag{5}$$

Proof of Proposition 2. Four different cases need to be considered, corresponding to the four possible combinations of living at home and abroad in periods T and $T+1$.

- Begin with $\xi \leq \eta_{T+1}^{\rho-1}$: the academic will be at home in retirement.

  - Suppose she consider working at home in period T: if she obtains income y_T she will choose c_T to maximise $\frac{c_T^{1-\rho}}{1-\rho} + \theta \frac{W_{T+1}^{1-\rho}}{1-\rho} = \frac{c_T^{1-\rho}}{1-\rho} + \theta \frac{(W_T + y_T - c_T)^{1-\rho}}{1-\rho}$. This has first order condition $c_T^{-\rho} = \theta (W_T + y_T - c_T)^{-\rho}$, giving $c_T = \frac{\theta^{-\frac{1}{\rho}}}{1+\theta^{-\frac{1}{\rho}}} (W_T + y_T)$. This is the first line in (5).
  - Alternatively, if she chooses to work abroad in period T: if she has income y_T she will choose c_T to maximise $\xi \frac{c_T^{1-\rho}}{1-\rho} + \theta \frac{W_{T+1}^{1-\rho}}{1-\rho} = \xi \frac{c_T^{1-\rho}}{1-\rho} + \frac{\theta \left(W_T + \frac{y_T - c_T}{\eta_T} \right)^{1-\rho}}{1-\rho}$.[19] This has first order condition $\xi c_T^{-\rho} = \frac{\theta}{\eta_T} \left(W_T + \frac{y_T - c_T}{\eta_T} \right)^{-\rho}$, giving $c_T = \frac{W_T \eta_T + y_T}{1 + \frac{\xi}{\theta}^{-\frac{1}{\rho}} \eta_T^{1-\frac{1}{\rho}}}$.

- In the case when $\xi > \eta_{T+1}^{\rho-1}$, the type ξ will be abroad in retirement.

  - Again she compares lifetime utility in the two cases: if she works at home in period T, and negotiates income y_T she will choose c_T to maximise $\frac{c_T^{1-\rho}}{1-\rho} + \theta\xi \frac{W_{T+1}^{1-\rho}}{1-\rho} = \frac{c_T^{1-\rho}}{1-\rho} + \xi\theta \frac{((W_T + y_T - c_T)\eta_T)^{1-\rho}}{1-\rho}$.[20] The first order condition is $c_T^{-\rho} = \xi\theta\eta_T ((W_T + y_T - c_T)\eta_T)^{-\rho}$, giving $c_T = \frac{\xi^{-\frac{1}{\rho}} \theta^{-\frac{1}{\rho}} \eta_T^{\frac{\rho-1}{\rho}}}{1+\xi^{-\frac{1}{\rho}} \theta^{-\frac{1}{\rho}} \eta_T^{\frac{\rho-1}{\rho}}} (W_T + y_T)$,
  - And finally, if she chooses to work abroad in period T in this case, and she has income y_T she will choose c_T to maximise $\xi \frac{c_T^{1-\rho}}{1-\rho} + \theta\xi \frac{W_{T+1}^{1-\rho}}{1-\rho} = \xi \frac{c_T^{1-\rho}}{1-\rho} + \xi\theta \frac{(W_T\eta_T + y_T - c_T)^{1-\rho}}{1-\rho}$. This has first order conditions $c_T^{-\rho} = \theta (W_T\eta_T + y_T - c_T)^{-\rho}$, giving $c_T = \frac{\theta^{-\frac{1}{\rho}}}{1+\theta^{-\frac{1}{\rho}}} (W_T\eta_T + y_T)$,

This completes the proof of the Proposition. □

The next is the main result of the theoretical section.

[19] If she has income y_T and spends c_T,she is left with $(y_T - c_T)$ units of foreign currency, which adds $\frac{y_T - c_T}{\eta_T}$ to the accumulated wealth.

[20] After consumption, she has $(y_T - c_T)$ units of the home currency, which, added to current wealth W_T converts to adds $\frac{W_T + y_T - c_T}{\eta_T}$ units of the foreign currency available to spend in retirement.

Proposition 3. An academic with accumulated wealth W_T and with ability λ, will prefer to be employed in the home country in period T if

$$\xi \leq \xi_H \equiv \left(\left(1+\theta^{\frac{1}{\rho}}\right) \left(\frac{1+\beta}{\eta_T+\beta}\right)^{\frac{1-\rho}{\rho}} - \theta^{\frac{1}{\rho}} \eta_T^{-\frac{1-\rho}{\rho}} \right)^{\rho} \quad \text{if} \quad \eta_{T+1}^{\rho-1} \geq \xi, \tag{8}$$

$$\xi \leq \xi_A \equiv \left(\left(1+\theta^{\frac{1}{\rho}}\right) \left(\frac{\eta_T+\beta}{1+\beta}\right)^{\frac{1-\rho}{\rho}} - \theta^{\frac{1}{\rho}} \eta_T^{\frac{1-\rho}{\rho}} \right)^{-\rho} \quad \text{if} \quad \eta_{T+1}^{\rho-1} \leq \xi. \tag{9}$$

Proof of Proposition 3. Again, the four different cases need to be considered, corresponding to the four possible combinations of living at home and abroad in periods T and $T+1$, and I substitute the consumption level determined in Proposition 5 as a starting point.

- Following the same order, I begin with $\xi \leq \eta_{T+1}^{\rho-1}$: the academic will be at home in retirement.

  - Substitute consumption into her utility function to obtain that her utility is $\frac{c_T^{1-\rho}}{1-\rho} + \frac{\theta(W_T+y_T-c_T)^{1-\rho}}{1-\rho} = \frac{\theta\left(\theta^{-\frac{1}{\rho}}+1\right)^{\rho}}{1-\rho}(W_T+y_T)^{1-\rho}$. So the Nash bargaining solution is:

$$\max_{y_T} \left\{ \ln \frac{\theta\left(\theta^{-\frac{1}{\rho}}+1\right)^{\rho}}{1-\rho} + (1-\rho)\ln(W_T+y_T) + \ln(\lambda-y_T) \right\},$$

    which has first order condition $\frac{1-\rho}{W_T+y_T} - \frac{1}{\lambda-y_T} = 0$, and yields a salary equal to $y_T = \frac{(1-\rho)\lambda-W_T}{2-\rho}$, giving utility:

$$\frac{\theta\left(\theta^{-\frac{1}{\rho}}+1\right)^{\rho}}{(1-\rho)^{\rho}(2-\rho)^{1-\rho}}(W_T+\lambda)^{1-\rho}. \tag{A1}$$

  - Alternatively, if she chooses to work abroad in period T, her utility will be $U_{AH}(\eta_T W_T + y_T)^{1-\rho}$, where $U_{AH} = \frac{\xi\left(1+\theta^{\frac{1}{\rho}}\xi^{-\frac{1}{\rho}}\eta_T^{-\frac{1-\rho}{\rho}}\right)^{\rho}}{1-\rho}$. So the Nash

bargaining is

$$\max_{y_T} \{\ln U_{AH} + (1-\rho)\ln(\eta_T W_T + y_T) + \ln(\lambda - y_T)\}$$

which has first order condition $\frac{1-\rho}{\eta_T W_T + y_T} - \frac{1}{\lambda - y_T} = 0$, and yields a salary equal to $\frac{(1-\rho)\lambda - \eta_T W_T}{2-\rho}$, giving utility:

$$\frac{\xi\left(1+\theta^{\frac{1}{\rho}}\xi^{-\frac{1}{\rho}}\eta_T^{-\frac{1-\rho}{\rho}}\right)^{\rho}}{1-\rho}\left(\frac{1-\rho}{2-\rho}\right)^{1-\rho}(\eta_T W_T + \lambda)^{1-\rho}. \tag{A2}$$

- In the case when $\xi > \eta_{T+1}^{\rho-1}$, the type ξ will be abroad in retirement.
  - Substitute $c_T = \frac{\xi^{-\frac{1}{\rho}}\theta^{-\frac{1}{\rho}}\eta_T^{\frac{\rho-1}{\rho}}}{1+\xi^{-\frac{1}{\rho}}\theta^{-\frac{1}{\rho}}\eta_T^{\frac{\rho-1}{\rho}}}(W_T + y_T)$, into the utility function, to get $\frac{\left(1+\xi^{-\frac{1}{\rho}}\theta^{-\frac{1}{\rho}}\eta_T^{\frac{\rho-1}{\rho}}\right)^{\rho}\xi\theta\eta_T^{1-\rho}}{1-\rho}(W_T + y_T)^{1-\rho}$. So the Nash bargaining is

$$\max_{y_T}\left\{\ln\frac{\left(1+\xi^{-\frac{1}{\rho}}\theta^{-\frac{1}{\rho}}\eta_T^{\frac{\rho-1}{\rho}}\right)^{\rho}\xi\theta\eta_T^{1-\rho}}{1-\rho} + (1-\rho)\ln(W_T + y_T) + \ln(\lambda - y_T)\right\}$$

which has first order condition $\frac{1-\rho}{W_T + y_T} - \frac{1}{\lambda - y_T} = 0$, and yields a salary equal to $\frac{(1-\rho)\lambda - W_T}{2-\rho}$, giving utility

$$\frac{\left(1+\xi^{-\frac{1}{\rho}}\theta^{-\frac{1}{\rho}}\eta_T^{\frac{\rho-1}{\rho}}\right)^{\rho}\xi\theta\eta_T^{1-\rho}}{1-\rho}\left(\frac{1-\rho}{2-\rho}\right)^{1-\rho}(W_T + \lambda)^{1-\rho}. \tag{A3}$$

  - And finally, if she chooses to work abroad in period T in this case, given her choice of c_T she has utility $\frac{\theta\xi\left(\theta^{-\frac{1}{\rho}}+1\right)^{\rho}}{(1-\rho)}(W_T\eta_T + y_T)^{1-\rho}$. So the Nash

bargaining is

$$\max_{y_T}\left\{\ln\frac{\theta\xi\left(\theta^{-\frac{1}{\rho}}+1\right)^{\rho}}{(1-\rho)}+(1-\rho)\ln\left(W_T\eta_T+y_T\right)+\ln\left(\lambda-y_T\right)\right\}$$

which has first order condition $\frac{1-\rho}{W_T\eta_T+y_T}-\frac{1}{\lambda-y_T}=0$, and yields a salary equal to $y_T=\frac{(1-\rho)\lambda-W_T\eta_T}{2-\rho}$, giving utility:

$$\frac{\theta\xi\left(\theta^{-\frac{1}{\rho}}+1\right)^{\rho}}{(1-\rho)}\left(\frac{1-\rho}{2-\rho}\right)^{1-\rho}\left(W_T\eta_T+\lambda\right)^{1-\rho}. \tag{A4}$$

We can now put these results together: a type $\xi\leq\eta_{T+1}^{\rho-1}$ will choose to stay at home in period T if (A1) exceeds (A2), that is if

$$\frac{\left(W_T+\lambda\right)^{1-\rho}}{(2-\rho)^{1-\rho}(1-\rho)^{\rho}}\left(\left(\theta^{\frac{1}{\rho}}+1\right)^{\rho}-\left(\frac{\eta_T W_T+\lambda}{W_T+\lambda}\right)^{1-\rho}\left(\xi^{\frac{1}{\rho}}+\theta^{\frac{1}{\rho}}\eta_T^{-\frac{1-\rho}{\rho}}\right)^{\rho}\right)\geq 0 \tag{A5}$$

which is the case if

$$\xi\leq\left(\left(1+\theta^{\frac{1}{\rho}}\right)\left(\frac{W_T+\lambda}{\eta_T W_T+\lambda}\right)^{\frac{1-\rho}{\rho}}-\theta^{\frac{1}{\rho}}\eta_T^{-\frac{1-\rho}{\rho}}\right)^{\rho}. \tag{8}$$

By the same token, a type $\xi>\eta_{T+1}^{\rho-1}$ will choose to stay at home in period T if (A3) exceeds (A4), that is if:

$$\frac{\left(W_T+\lambda\right)^{1-\rho}}{(2-\rho)^{1-\rho}(1-\rho)^{\rho}}\left(\left(\xi^{\frac{1}{\rho}}\theta^{\frac{1}{\rho}}\eta_T^{\frac{1-\rho}{\rho}}+1\right)^{\rho}-\xi\left(\frac{\eta_T W_T+\lambda}{W_T+\lambda}\right)^{1-\rho}\left(\theta^{\frac{1}{\rho}}+1\right)^{\rho}\right)\geq 0 \tag{A6}$$

or

$$\xi\leq\left(\left(1+\theta^{\frac{1}{\rho}}\right)\left(\frac{W_T\eta_T+\lambda}{W_T+\lambda}\right)^{\frac{1-\rho}{\rho}}-\theta^{\frac{1}{\rho}}\eta_T^{\frac{1-\rho}{\rho}}\right)^{-\rho}. \tag{9}$$

Simply substitute the value of β to complete the proof of the Proposition. □

Corollary 1. Let $\eta_T \gtreqless 1$, then $\frac{\partial \xi_X}{\partial \beta} \gtreqless 0$ and $\frac{\partial \xi_X}{\partial \theta} \gtreqless 0$, $X = H, A$.

Proof of Corollary 1. Differentiate the RHS of (8): $\frac{\partial \xi_H}{\partial \beta} = \xi_H^{\frac{\rho-1}{\rho}} (1-\rho)(\eta_T - 1)\left(1+\theta^{\frac{1}{\rho}}\right)\left(\frac{(1+\beta)^{1-2\rho}}{\eta_T+\beta}\right)^{\frac{1}{\rho}}$. Similarly $\frac{\partial \xi_A}{\partial \beta} = \xi_A^{\frac{\rho+1}{\rho}} (1-\rho)(\eta_T - 1)\left(1+\theta^{\frac{1}{\rho}}\right)\left(\frac{(\eta_T+\beta)^{1-2\rho}}{1+\beta}\right)^{\frac{1}{\rho}}$. Next consider θ. $\frac{\partial \xi_H}{\partial \theta} = \left(\frac{1+\beta}{\eta_T+\beta}\right)^{1-\rho} \xi_H^{\frac{\rho-1}{\rho}} \theta^{-\frac{\rho-1}{\rho}} \left(1-\left(\eta_T \frac{1+\beta}{\eta_T+\beta}\right)^{\frac{\rho-1}{\rho}}\right)$: , this is positive if $1 > \left(\eta_T \frac{1+\beta}{\eta_T+\beta}\right)^{\frac{\rho-1}{\rho}}$, or $\eta_T > 1$. The analysis is similar for ξ_A. □

And the final corollary.

Corollary 2. Let $\frac{1}{\eta_T} \gtreqless \frac{(1+\beta)^{1-\rho}\left(1+\theta^{-\frac{1}{\rho}}\right)^{\rho}-1}{\beta}$, then $\frac{\partial \xi_H}{\partial \eta_T} \gtreqless 0$. Define $\hat{\theta} = \frac{(1+\beta)^{\frac{1-\rho}{\rho}}}{\left(1+\theta^{-\frac{1}{\rho}}\right)}$. Let

$$\left(\rho - \frac{1}{2}\right)\left(\frac{1}{\eta_T} - \frac{\hat{\theta}^{\frac{\rho}{1-2\rho}}-1}{\beta}\right) \gtreqless 0; \tag{10}$$

then $\frac{\partial \xi_A}{\partial \eta_T} \gtreqless 0$.

Proof of Corollary 2. Differentiate the RHS of (8): $\frac{\partial \xi_H}{\partial \eta_T} = \xi_H^{\frac{\rho-1}{\rho}} (1-\rho)\left(\frac{(1+\beta)^{1-\rho}}{\eta_T+\beta}\right)^{\frac{1}{\rho}} \left(\theta^{\frac{1}{\rho}}\left(\left(\frac{1+\frac{\beta}{\eta_T}}{(1+\beta)^{1-\rho}}\right)^{\frac{1}{\rho}}-1\right)-1\right)$ The sign of $\frac{\partial \xi_H}{\partial \eta_T}$ is therefore given by the sign of $\left(\theta^{\frac{1}{\rho}}\left(\left(\frac{1+\frac{\beta}{\eta_T}}{(1+\beta)^{1-\rho}}\right)^{\frac{1}{\rho}}-1\right)-1\right)$, which establishes the first statement.

Now for the second statement: $\frac{\partial \xi_A}{\partial \eta_T} = \xi_A^{\frac{\rho+1}{\rho}} (1-\rho)\left(\left(\left(1+\theta^{\frac{1}{\rho}}\right)\left(\frac{\eta_T+\beta}{1+\beta}\right)^{\frac{1-\rho}{\rho}} - \theta^{\frac{1}{\rho}} \eta_T^{\frac{1-\rho}{\rho}}\right)^{-\rho}\right)^{\frac{\rho+1}{\rho}} \frac{\eta_T^{\frac{1-2\rho}{\rho}}\left(1+\theta^{\frac{1}{\rho}}\right)}{(1+\beta)^{\frac{1-\rho}{\rho}}} \left(\frac{(1+\beta)^{\frac{1-\rho}{\rho}}}{\left(1+\theta^{-\frac{1}{\rho}}\right)} - \left(1+\frac{\beta}{\eta_T}\right)^{\frac{1-2\rho}{\rho}}\right)$, and so its sign is given by the sign of the last term. This term equal 0 when $\frac{1}{\eta_T} = \frac{\hat{\theta}^{\frac{\rho}{1-2\rho}}-1}{\beta}$. This last term is increasing in $\frac{1}{\eta_T}$ when $\rho > \frac{1}{2}$: thus when $\rho > \frac{1}{2}$, $\frac{1}{\eta_T} \gtrless \frac{\hat{\theta}^{\frac{\rho}{1-2\rho}}-1}{\beta}$ implies $\frac{\partial \xi_A}{\partial \eta_T} \gtrless 0$; viceversa, when $\rho < \frac{1}{2}$, $\frac{1}{\eta_T} \gtrless \frac{\hat{\theta}^{\frac{\rho}{1-2\rho}}-1}{\beta}$ implies $\frac{\partial \xi_A}{\partial \eta_T} \lessgtr 0$. □

B The Scopus categories

Scopus allocates all journals it lists to one or more of 27 main "Subject Area Classifications". These are listed below. Each Subject Area Classifications is then subclassified into several hundreds "Scopus Subject Areas". The full list is available at this link.

B.1 Scopus Subject Area Classifications

Physical Sciences: Chemical Engineering; Chemistry; Computer Science; Earth and Planetary Sciences; Energy; Engineering; Environmental Science; Material Science; Mathematics; Physics and Astronomy; Multidisciplinary.

Health Sciences: Medicine; Nursing; Veterinary; Dentistry; Health Professions; Multidisciplinary.

Social Sciences: Arts and Humanities; Business, Management and Accounting; Decision Sciences; Economics, Econometrics and Finance; Psychology; Social Sciences; Multidisciplinary.

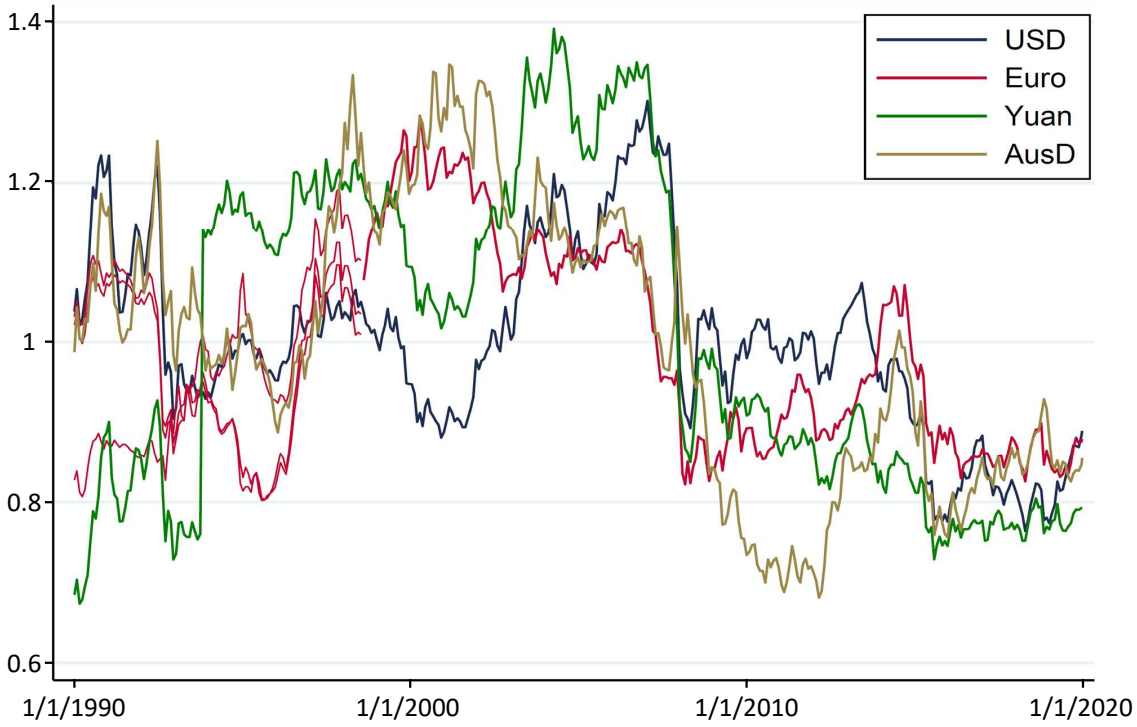
Life Sciences:

Agricultural and Biological Sciences; Biochemistry, Genetics and Molecular Biology; Immunology and Microbiology; Neuroscience; Pharmacology, Toxicology and Pharmaceutics; Multidisciplinary.

C Exchange rate fluctuations

Considerable short term fluctuation in exchange rates has been a constant feature of the last few decades, as Figure A1 illustrates. The lines depict the exchange rate with the pound, normalised to average 1 in the period to ease comparison, of four selected currencies in the thirty years from 1st January 1990.

Figure A1: Exchange rates fluctuation.

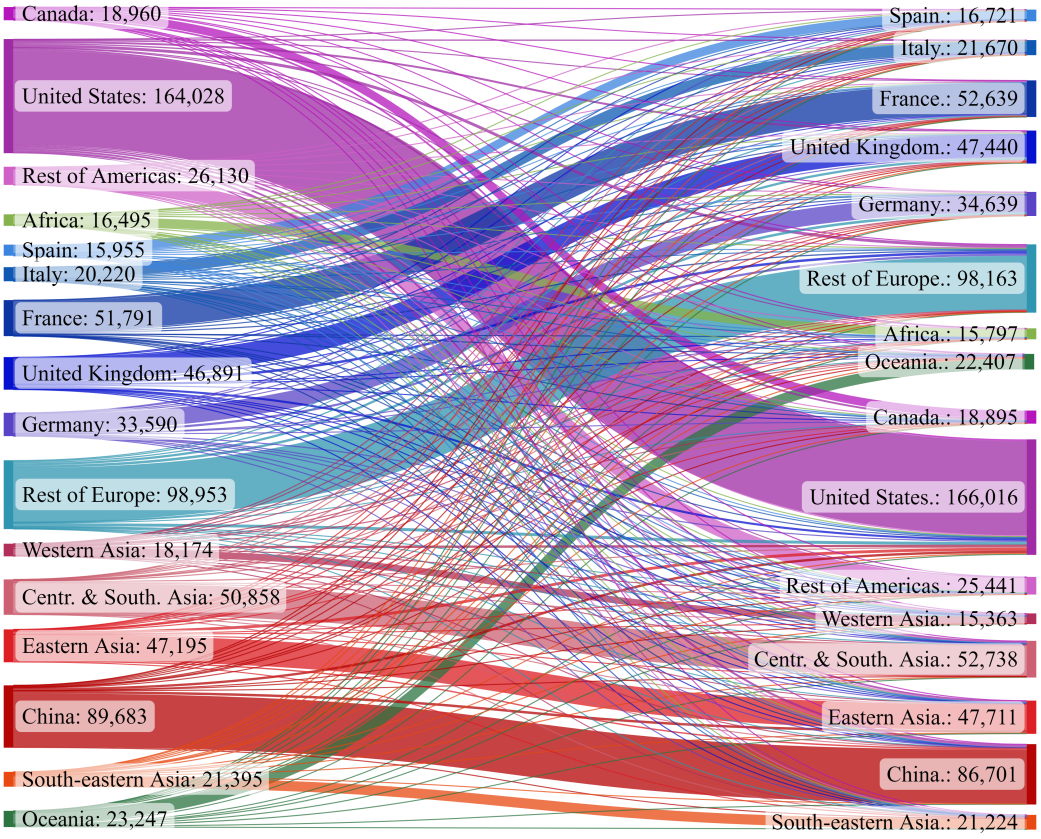


Note: Sterling exchange rates 1990-2020, monthly data, for selected currencies. The rates are normalised to 1 on the period average.

D Migratory flows

The Sankey diagram in Figure A2 illustrates the movement of academics from one institution to another. The thickness of the flow is proportional to the number of moves from an institution located in a region on the LHS to an institution in a region labelled on the RHS.

Figure A2: Academic moves.



Note: The flows measure academics' moves from one of the regions on the LHS axis to regions on the RHS axis. The numbers on the LHS are the number of academics leaving an affiliation in the region, those on the RHS the number of academics moving to an institution in the region.

E Administrative data for the UK

Table A1 reports administrative data for the UK for recent years with the nationality of the individuals holding an academic post in a UK higher education institution.

Table A1: Nationality of UK academics

	Full Time							
	UK Nationals		European Union		Rest of the world		not known	
	Number	%	Number	%	Number	%	Number	%
2014/15	177,115	66.7	48,235	18.2	36,265	13.6	4,085	1.5
2015/16	177,710	65.8	51,435	19.0	38,040	14.1	2,900	1.1
2016/17	180,565	65.2	54,270	19.6	40,060	14.5	1,950	0.7
2017/18	182,010	64.7	55,470	19.7	42,520	15.1	1,480	0.5
2018/19	183,685	64.0	56,125	19.6	45,605	15.9	1,615	0.6
2019/20	186,880	63.7	55,975	19.1	48,835	16.6	1,810	0.6
2020/21	189,085	63.4	55,610	18.7	51,460	17.3	1,965	0.7
2021/22	191,935	63.4	54,270	17.9	54,380	18	2,360	0.8

	Part Time							
	UK Nationals		European Union		Rest of the world		not known	
	Number	%	Number	%	Number	%	Number	%
2014/15	50,645	77.4	7,515	11.5	5,220	8.0	2,090	3.2
2015/16	51,445	77.1	8,035	12.0	5,530	8.3	1,735	2.6
2016/17	53,075	77.5	8,790	12.8	5,630	8.2	970	1.4
2017/18	54,575	76.6	9,525	13.4	6,365	8.9	785	1.1
2018/19	56,130	76.3	10,025	13.6	6,770	9.2	630	0.9
2019/20	58,325	76.0	10,410	13.6	7,350	9.6	665	0.9
2020/21	56,885	75.4	10,405	13.8	7,515	10.0	640	0.8
2021/22	61,970	75	10,875	13.2	8,930	10.8	835	1

Note: Academics employed at the beginning of the academic year by UK higher education institutions in "non-atypical" positions. **Source**: Higher Education Statistics Agency.

F Number of publications and authors in the data

Table A2: Publications and authors pairs.

Year	(1) Number	(2) Appear twice+	(3) %regr (1)/(2)	(4) Move in year	(5) %move (4)/(2)	(6) Migr in year	(7) %migr (6)/(4)
1990	11,936	8,158	68.3	2,680	22.5	692	25.8
1991	13,794	9,574	69.4	3,037	22.0	773	25.5
1992	18,380	12,324	67.1	3,809	20.7	1,006	26.4
1993	23,016	15,628	67.9	4,908	21.3	1,382	28.2
1994	22,184	16,337	73.6	5,188	23.4	1,554	30.0
1995	23,325	17,261	74.0	5,426	23.3	1,573	29.0
1996	25,672	19,555	76.2	5,947	23.2	1,691	28.4
1997	26,964	20,741	76.9	6,368	23.6	1,810	28.4
1998	28,328	21,828	77.1	6,605	23.3	1,806	27.3
1999	33,338	25,408	76.2	7,915	23.7	2,147	27.1
2000	35,076	26,826	76.5	8,322	23.7	2,218	26.7
2001	37,982	29,458	77.6	8,953	23.6	2,404	26.9
2002	40,591	31,987	78.8	9,168	22.6	2,520	27.5
2003	47,405	36,813	77.7	10,022	21.1	2,459	24.5
2004	46,670	36,955	79.2	9,981	21.4	2,353	23.6
2005	117,694	84,195	71.5	23,014	19.6	5,315	23.1
2006	142,492	101,371	71.1	27,535	19.3	6,573	23.9
2007	168,509	119,946	71.2	32,031	19.0	7,792	24.3
2008	202,848	142,442	70.2	36,886	18.2	8,247	22.4
2009	229,563	158,803	69.2	40,315	17.6	9,030	22.4
2010	237,387	163,918	69.1	39,464	16.6	9,073	23.0
2011	240,071	165,906	69.1	39,973	16.7	9,159	22.9
2012	243,747	174,657	71.7	41,418	17.0	9,876	23.8
2013	265,864	187,814	70.6	43,974	16.5	10,418	23.7
2014	282,743	197,532	69.9	44,159	15.6	10,299	23.3
2015	299,298	207,050	69.2	44,556	14.9	10,143	22.8
2016	352,767	235,754	66.8	48,021	13.6	10,655	22.2
2017	412,463	261,441	63.4	48,366	11.7	10,318	21.3
2018	455,066	274,173	60.2	46,149	10.1	9,526	20.6
2019	376,859	224,334	59.5	37,883	10.1	7,617	20.1
2020	391,542	225,967	57.7	31,604	8.1	5,627	17.8
2021	461,017	229,993	49.9	17,561	3.8	3,030	17.3
2022	319,794	162,890	50.9				
Total	5,634,385	3,647,039	64.7	741,238	13.2	169,086	22.8

Note: Number of publications-authors pairs by year: in each year, each author has at most one observation to which the most frequent affiliation is attached.

G Number of appearances in the data

Table A3: Appearances, moves, and migration of academics in the dataset.

Appearances in dataset	Total	Frequency			Percentage		
		Never moves	Emigrates		Never moves	Emigrates	
			No	Yes		No	Yes
1	1,987,655						
2	413,151	281,187	104,162	27,802	68.1	25.2	6.7
3	174,378	93,026	60,253	21,099	53.3	34.6	12.1
4	95,982	42,953	37,848	15,181	44.8	39.4	15.8
5	60,083	23,624	25,150	11,309	39.3	41.9	18.8
6	40,816	14,584	17,685	8,547	35.7	43.3	20.9
7	29,111	9,617	12,912	6,582	33.0	44.4	22.6
8	22,104	6,597	10,116	5,391	29.8	45.8	24.4
9	16,949	4,838	7,730	4,381	28.5	45.6	25.8
10	13,052	3,527	6,072	3,453	27.0	46.5	26.5
11	10,292	2,646	4,775	2,871	25.7	46.4	27.9
12	8,222	1,995	3,889	2,338	24.3	47.3	28.4
13	6,623	1,554	3,181	1,888	23.5	48.0	28.5
14	5,220	1,164	2,550	1,506	22.3	48.9	28.9
15	3,802	794	1,831	1,177	20.9	48.2	31.0
16	2,788	556	1,290	942	19.9	46.3	33.8
17	2,275	418	1,083	774	18.4	47.6	34.0
18	1,751	303	811	637	17.3	46.3	36.4
19	1,361	225	668	468	16.5	49.1	34.4
20	1,115	177	505	433	15.9	45.3	38.8
21	909	132	435	342	14.5	47.9	37.6
22	761	97	371	293	12.7	48.8	38.5
23	646	82	293	271	12.7	45.4	42.0
24	521	56	249	216	10.7	47.8	41.5
25	443	62	186	195	14.0	42.0	44.0
26	343	36	164	143	10.5	47.8	41.7
27	282	31	119	132	11.0	42.2	46.8
28	245	33	125	87	13.5	51.0	35.5
29	160	11	80	69	6.9	50.0	43.1
30	135	17	64	54	12.6	47.4	40.0
31	77	11	38	28	14.3	49.4	36.4
32	81	8	40	33	9.9	49.4	40.7
33	46	5	28	13	10.9	60.9	28.3
Total	2,901,379	490,366	304,703	118,655	13.0	58.7	28.3

Note: The regression sample can include only academics who appear more than once in the data. An academic "never moves" if their affiliation is the same in each appearance in the data. Emigration is defined as having affiliation in different countries. Totals differ slightly from those in Table 1, as some observations are dropped from the regression, even though the academic appears more than once.

Source: My elaboration of Scopus data.

The table in the previous page reports the data used to draw Figure 7, the number of academics categorised according to their number of appearances in the data, and according to whether they have moved or changed country during the period studied.

H Further macroeconomic tables

Table A4: Summary statistics for the variables used in regression (13)

	mean	st. dev.	min	max
Migration flow	70.49	858.02	1	45273
GBP Exchange rate	1.095	0.377	0.108	7.607
USD Exchange rate	1.183	0.488	0.117	9.666
GDP per capita (log)	9.719	1.258	4.713	12.20
Quality of life score	1.270	1.552	-3.238	3.939
Academic prestige	3.226	4.264	1	24.82
N academics, per pop	6.595	2.192	0	10.74
Average age in year	6.404	2.056	1	21
- of those who move	5.950	1.877	1	24
- of those who emigrate	5.636	1.768	1	28
Emigration rate (origin)	0.342	0.194	0	1

Note: Time varying aggregate country variables. The summary statistics are computed from an unbalanced panel of 157 country and 14 years. See Section 4 for explanation of how the variables are constructed.

Table A5: Correlation table for the variables used in regression (13)

	Migr flow	GBP XRate	USD XRate	GDP pc	Life quality	Acad prest	N ac pc	Av age	Av age mover	Av age migr
GBP Exchange rate	-0.010									
USD Exchange rate	-0.006	0.945								
GDP per capita (log)	0.017	-0.172	-0.172							
Quality of life score	0.003	-0.186	-0.232	0.776						
Academic prestige	0.076	-0.103	-0.121	0.252	0.250					
N academics, per pop	0.073	-0.019	0.022	0.511	0.373	0.558				
Average age in year	0.018	-0.081	0.049	0.510	0.305	0.108	0.426			
- of those who move	0.013	-0.082	0.030	0.448	0.259	0.089	0.333	0.908		
- of those who emigrate	0.011	-0.033	0.062	0.319	0.121	0.051	0.252	0.707	0.814	
Emigration rate (origin)	-0.048	-0.083	-0.092	-0.115	-0.083	-0.302	-0.583	-0.093	-0.071	-0.006

Table A6: Migratory flows between pairs of countries. Robustness tests for Table 2.

VARIABLES	(1) Academic controls	(2) Academics per pop	(3) Ex-rate with USD	(4) Weighted regression	(5) Add year ×dest FE
Real Exchange Rate	-1.142	0.155	0.590	0.0278	1.667
	(2.156)	(2.361)	(1.945)	(3.605)	(3.478)
GDP per capita (origin)	-20.00***	1.705	-8.749*	4.658	
	(4.677)	(5.773)	(4.478)	(7.410)	
GDP per capita (dest.)	19.19***	30.30***	15.91***	39.11***	14.09**
	(4.781)	(5.830)	(4.907)	(13.18)	(5.304)
Quality of life (origin)	-0.454	12.73***	-0.844	-4.317	
	(2.948)	(3.365)	(2.633)	(5.787)	
Quality of life (dest.)	3.173	13.82***	3.186	-0.523	3.404*
	(2.172)	(2.482)	(2.041)	(4.566)	(1.996)
Academic prestige (origin)	4.414***	6.836***	4.064***	2.674***	
	(0.810)	(1.126)	(0.759)	(0.886)	
Academic prestige (dest.)	1.944**	4.105***	2.223**	5.866**	2.452**
	(0.792)	(0.892)	(0.825)	(2.376)	(0.907)
N academics, log (origin)	42.18***	79.93	49.77***	57.22***	
	(2.505)	(69.03)	(2.921)	(6.323)	
N academics, log (dest.)	29.80***	93.22	27.95***	17.64***	25.47***
	(2.153)	(58.27)	(2.102)	(3.721)	(1.970)
Emigration rate (origin)		41.03***	73.65***	134.6***	
		(9.663)	(7.611)	(13.74)	
Average age (origin)		-9.248***	5.277***	10.68***	
		(1.317)	(1.234)	(3.662)	
- of those who move		-1.808*	-0.225	-2.741	
		(0.890)	(0.657)	(2.052)	
- of those who emigrate		1.138*	-0.943**	-1.877	
		(0.641)	(0.459)	(1.117)	
Observations	35,952	35,606	35,614	35,606	35,111

Note: Robustness tests for the specification used in Table 2. Column (1) includes only the academic controls; column (2) adds the number of academics per unit of population, and column (3) considers the exchange rate with the US dollar. In column (4) the regression is weighted with the country's population, and in column (5) the year and country pair fixed effects are replaces by year×origin country and destination country fixed effects. Robust standard errors in parenthesis, clustered at the year and the origin-destination country pair. Exchange rate is given in (12). * , ** , *** denote significance at the 10, 5, and 1 percent level.

I Additional individual level regressions

Table A7: Further robustness tests for Table 2.

	(1)	(2)	(3)	(4)	(5)	
	Individual controls	Macro controls	Academic controls	Move in mid year	Separate origin/dest origin	destination
Real Exchange rate (log)	24.72***	19.02***	19.26***	13.56***	12.17***	
	(1.104)	(1.105)	(1.093)	(0.875)	(1.067)	
Relative BG power	11.49***	11.16***	11.43***	11.43***	5.971***	
	(0.254)	(0.244)	(0.239)	(0.217)	(0.247)	
Interaction BG power×XR	-3.273***	-2.972***	-3.072***	-1.445***	-1.669***	
	(0.238)	(0.228)	(0.223)	(0.192)	(0.223)	
GDP per capita ratio		13.86***	18.12***	15.91***	-21.01***	24.41***
		(0.637)	(0.644)	(0.479)	(0.649)	(0.672)
Δ quality of life dest—origin		1.061***	1.160***	0.395***	0.893***	-0.468***
		(0.150)	(0.153)	(0.141)	(0.228)	(0.156)
Academics: dest/origin			-15.85***	-16.47***	15.30***	0.697***
			(0.683)	(0.679)	(0.627)	(0.0750)
Δ country academic prestige			1.348***	0.903***	-0.337***	-6.444***
			(0.0751)	(0.0522)	(0.0797)	(0.0941)
Authors: 1st institution (log)				2.749***	-8.383***	2.195***
				(0.0620)	(0.0818)	(0.108)
Authors: 2nd institution (log)				-1.851***	6.635***	-8.626***
				(0.0830)	(0.105)	(0.638)
Propensity to emigrate, origin			-25.04***	-21.29***	-20.33***	
			(0.729)	(0.729)	(0.748)	
Average age, origin			-1.382***	-1.741***	-0.628***	
			(0.107)	(0.107)	(0.125)	
Average age movers, origin			0.864***	0.283***	0.708***	
			(0.108)	(0.109)	(0.107)	
Average age migrants, origin			-0.0704	0.136**	-0.145**	
			(0.0578)	(0.0568)	(0.0573)	
Observations	2,141,074	2,140,878	2,138,541	2138322	2,138,541	
Academics	469,697	469,652	469,255	469,239	469,255	
Institutions	70,198	70,172	69,983	70,162	69,983	
Countries	162	153	132	132	132	

Note: In all the columns the estimated specification is Column (4) in Table 3. In each column the sample is all academics who publish at least once in each of the countries at the head of the corresponding column. * , ** , *** denote significance at the 10, 5, and 1 percent level.

Table A8: Different samples of academics. II.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Academics who were at least once in						
	Australia	Canada	Spain	France	Germany	Italy	the EU
Real Exchange rate (log)	32.38***	32.24***	32.53***	49.83***	26.71***	43.16***	22.68***
	(5.628)	(5.947)	(6.535)	(7.383)	(6.344)	(7.986)	(4.034)
Relative BG power	17.55***	13.83***	20.73***	17.12***	10.52***	16.50***	15.17***
	(1.420)	(1.549)	(1.479)	(1.557)	(1.352)	(1.568)	(0.789)
Interaction BG power×XR	-3.909***	-2.271	-5.414***	-8.612***	0.412	-3.794***	-2.655***
	(1.299)	(1.412)	(1.340)	(1.470)	(1.265)	(1.464)	(0.730)
GDP per capita ratio	15.96***	13.14***	18.10***	25.00***	28.43***	7.722	16.14***
	(4.259)	(3.699)	(5.473)	(4.633)	(4.893)	(5.745)	(2.379)
Δ quality of life dest—origin	-2.931**	-1.706	-7.988***	3.258**	-1.276	3.557**	-1.767***
	(1.317)	(1.191)	(1.490)	(1.435)	(0.996)	(1.412)	(0.478)
Academics: dest/origin	-8.997***	-8.391***	-4.136	-7.412**	-3.586	-13.60***	-16.64***
	(2.643)	(1.998)	(3.492)	(3.000)	(2.794)	(4.604)	(1.940)
Δ country academic prestige	1.731**	1.505***	2.417**	0.428	1.397**	3.391***	2.989***
	(0.675)	(0.495)	(1.083)	(0.667)	(0.545)	(0.869)	(0.411)
Authors: 1st institution (log)	6.891***	4.926***	6.239***	6.118***	3.331***	4.479***	4.653***
	(0.441)	(0.379)	(0.326)	(0.244)	(0.301)	(0.320)	(0.198)
Authors: 2nd institution (log)	-4.344***	-3.130***	-0.451	-2.299***	-1.684***	-0.731*	-0.849***
	(0.565)	(0.525)	(0.466)	(0.271)	(0.421)	(0.401)	(0.270)
Propensity to emigrate, origin	-27.30***	-17.38***	-0.573	-25.05***	-25.68***	-12.42*	-21.53***
	(5.545)	(4.946)	(7.416)	(6.255)	(4.700)	(7.387)	(1.431)
Average age, origin	-1.111	-2.744***	1.120	-4.190***	-1.963**	-1.129	-1.652***
	(0.995)	(0.785)	(1.017)	(0.924)	(0.895)	(1.145)	(0.281)
Average age movers, origin	-0.683	0.232	-2.278*	4.469***	3.394***	0.349	0.832***
	(1.057)	(0.737)	(1.186)	(0.891)	(0.905)	(1.104)	(0.208)
Average age migrants, origin	-0.148	0.500	-0.241	-0.771*	-1.483***	-0.597	-0.0930
	(0.638)	(0.546)	(0.633)	(0.462)	(0.456)	(0.586)	(0.0914)
Observations	77,456	78,559	82,137	98,953	117,062	95,380	276,890
Academics	14,526	14,371	15,546	19,267	24,493	17,739	58,130
Institutions	3,541	3,901	3,187	6,934	6,767	4,052	11,951
Countries	79	87	76	87	84	81	104

Note: In all the columns the estimated specification is Column (4) in Table 3. In each column the sample is all academics who publish at least once in each of the countries at the head of the corresponding column. * , ** , *** denote significance at the 10, 5, and 1 percent level.