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The European crisis and migration to Germany☆

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ABSTRACT

The size of migration flows to Germany from other European countries surged in the aftermath of the 2010 European crisis, and this paper explores the main determinants of this large increase. International migrants tend to move more than once in their lives, and migration episodes to Germany make no exception in this respect. This paper explores some relevant implications of this simple observation for the estimation of gravity models, which is done here with bilateral monthly migration data. We demonstrate that ignoring the sequential nature of migration decisions gives rise to multilateral resistance to migration, thus substantially biasing the estimates. We also show that the expectations about future economic conditions at origin significantly influence bilateral migration flows to Germany.

1. Introduction

Germany has been receiving large and growing gross migration flows from other countries in the European Union in recent years, totaling at around 4.4 million between January 2006 and September 2014,[4] and contributing to make it the second largest migrant destination in the OECD by the end of this period (OECD, 2014). While such a surge is certainly related to the Eastern enlargement of the EU and to the economic crisis that has hit several European countries, a credible identification of the role played by institutional and economic factors has to be based on a suitable representation of the location-decision problem that would-be migrants face. Bertoli and Fernández-Huertas Moraga (2013) have shown that the estimation of gravity equations that are based on a random utility model with distributional assumptions *à la* McFadden (1974) produces biased estimates if location-specific utility is imperfectly modeled. A specific reason why this could occur is connected to the fact that migrants can move more than once throughout their lives. As Dustmann and Görlach (2015) observe, “permanent migrations are — and possibly always have been — the exception rather than the rule” (p. 491), and indeed the outflow of EU immigrants from Germany between January 2006 and September 2014 stood at around 3.1 million (Statistisches Bundesamt, 2015), in line with the observation that “gross migration in one direction [is] the best single

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4 The bilateral migration figures are derived from a special data provision by the Federal Statistical Office (Statistisches Bundesamt, 2015).

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indicator of the amount of backflow" (Sjaastad, 1962, p. 81).[5] This, in turn, implies that the attractiveness of a country at one point in time also depends not just on the expectations about its own future economic conditions, but also on the value associated to possible further moves, provided that migrants do not take myopic decisions. This sequential nature of migration decisions is typically disregarded when lying the theoretical basis of gravity models to be estimated on aggregate data.

We derive the specification that we bring to the data from a dynamic discrete choice model to describe the location-decision problem that individuals face at each point in time, building upon the model that Kennan and Walker (2011) employed to describe individual internal migration decisions. This derivation reveals that canonical specifications based on static micro-foundations with restrictive distributional assumptions produce biased estimates, as in Bertoli and Fernández-Huertas Moraga (2013), unless (*i*) current migration decisions are based on a myopic behavior or (*ii*) the world is frictionless, i.e., there are no migration costs.

The gravity equation based on the proposed dynamic micro-foundations presents a multi-factor error structure (Bai, 2009, Pesaran, 2006), which informs the choice of the estimation approach that we adopt, characterized by being less data-demanding than the ones proposed by Artuç et al. (2010) and Arcidiacono and Miller (2011).

The estimation of the gravity equation with monthly bilateral migration data reveals that the movements in the unemployment rate and the migration policy changes that were introduced over our sample period exert a significant influence on the size of the bilateral migration flows to Germany. Concretely, a 10% increase in the unemployment rate at origin is associated with a 5.4% increase in the bilateral migration rate, while the EU accession and the end of the seven-year transitional arrangements adopted by Germany towards new EU members states are estimated to increase the bilateral migration rate by 183% and 36% respectively. The estimates that we obtain with a canonical static micro-foundation, i.e., a static RUM model with i.i.d EVT-1 disturbances, are significantly biased, and the direction of the bias in the various coefficients is in line with the ones due to multilateral resistance to migration (Bertoli and Fernández-Huertas Moraga, 2013) and by the prevailing pattern of correlation in the data: the unemployment rate estimates are upward biased while the policy effects estimates are downward biased.

We also attempt to directly control for the confounding effect due to changing expectations about the future economic conditions at origin through two proxies, namely a synthetic measure of consumers' confidence and the yields on 10-year sovereign bonds on the secondary market. These two proxies, which we introduce for the first time in the migration literature, significantly influence bilateral migration flows to Germany in the expected direction, but their inclusion is *per se* insufficient to remove the bias on the coefficients of the other variables in the canonical static specification. This negative result is in line with our dynamic discrete choice model, as the current bilateral migration rate depends in a complex and non-linear way on the expectations about future economic conditions in all potential locations, and not in the origin country only.

This paper draws from three main strands of literature. First, the literature on the determinants of international migration flows (Beine et al., 2011, 2013, 2016; Belot and Ederveen, 2012; Belot and Hatton, 2012; Bertoli et al., 2011; Clark et al., 2007; Grogger and Hanson, 2011; Lewer and den Berg, 2008; Mayda, 2010; Pedersen et al., 2008), and more specifically on the papers that have relaxed the distributional assumptions on the underlying RUM model (Bertoli and Fernández-Huertas Moraga, 2015; Bertoli et al., 2013; Ortega and Peri, 2013), and those that have analyzed the determinants of migration to Germany, mainly in the context of the Eastern enlargement of the EU (Boeri and Brücker, 2001; Brücker and Siliverstovs, 2006; Fertig, 2001; Flaig, 2001; Sinn et al., 2001; Vogler and Rotte, 2000). Second, the literature on static (de Palma and Kilani, 2007; McFadden, 1974, 1978; Small and Rosen, 1981) and dynamic discrete choice models (Arcidiacono and Miller, 2011; Artuç et al., 2010; Kennan and Walker, 2011; Pessino, 1991). Third, the literature on the estimation of linear models with a common factor structure in the error term (Bai, 2009; Pesaran, 2006; Pesaran and Tosetti; 2011).

The remainder of the paper is structured as follows: Section 2 presents a RUM model that describes the sequential location-decision problem that potential migrants face. Section 3 introduces our sample and data sources, and it also provides the relevant descriptive statistics. Section 4 presents the results of our econometric analysis. Section 5 draws the main conclusions of the paper.

2. A sequential model of migration

We consider a set of infinitely lived agents, each of them denoted by i, located in country j that have to choose their preferred location from a set of countries D, with $\#D = n$, in period t. The utility of opting for country k at time t is given by:

$$U_{ijkt} \equiv w_{kt} - c_{jk} + \beta V_{t+1}(k) + \epsilon_{ikt} \tag{1}$$

This depends on: (*i*) a deterministic instantaneous component w_{kt}, (*ii*) a deterministic component c_{jk} that describes the cost of moving from j to k,[6] (*iii*) the discounted value, with time discount factor $\beta < 1$, of the expected utility $V_{t+1}(k)$ from optimally choosing the preferred location from time $t+1$ onwards conditional upon being in k at time t, and on (*iv*) a stochastic individual and time-specific serially uncorrelated component ϵ_{ikt}. The evolution of w_{jt}, for all $j \in D$, is non-stochastic,[7] and known to the agents, who also know the $n \times n$ matrix C of bilateral migration costs. We also assume that individual i chooses her preferred location after having observed the realizations of the stochastic component of utility at time t for all countries.

We can obtain an analytic expression for the continuation payoff $V_{t+1}(k)$ in Eq. (1) by specifying the distributional assumptions on the stochastic component of utility ϵ_{ikt}. If we assume that the stochastic component of utility follows an i.i.d. EVT-1 distribution (McFadden, 1974) with zero mean, i.e., $F(\epsilon_{ikt}) = e^{-e^{-\epsilon_{ikt}-\gamma}}$ where γ is Euler's constant, then Small and Rosen (1981) imply that the continuation payoff can be recursively written as follows:

$$V_{t+1}(k) = \ln\left(\sum_{l \in D} e^{w_{lt+1} - c_{kl} + \beta V_{t+2}(l)}\right) \tag{2}$$

[5] See also Bijwaard et al. (2014) and Bandiera et al. (2013) for evidence on the incidence of temporary migration in different geographical and historical contexts; Artuç and Özden (2014) provide evidence that a substantial share of migrants have been residing outside their country of birth just before moving to the United States, thus suggesting that return is not the only available option at the end of a temporary migration experience.

[6] The assumption that c_{jk} is time-invariant is retained only to simplify the exposition of the theoretical model, but it is relaxed in the estimation.

[7] This assumption, which has been introduced in influential dynamic discrete-choice models (see, *inter alia*, Keane and Wolpin, 1997 and Lee, 2005) allows for providing a clearer analytical derivation of the dependence of current bilateral migration rates on the future attractiveness of alternative destinations; the inclusion of a stochastic aggregate component would complicate the model but would not alter the insights that can be derived from it.