



# Regional integration, international liberalisation and the dynamics of industrial agglomeration



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## ABSTRACT

This paper presents a 3-region footloose-entrepreneur new economic geography model. Two symmetric regions are part of an economically integrated area (the Union), while the third region represents an outside trade partner. We explore how the spatial allocation of industrial production and employment within the Union is affected by changes in two aspects of trade liberalisation, regional integration and globalisation, conditional to the skill endowment and the market size of the outside region. Our main contribution pertains to the analysis of the local and global dynamics of the specified factor mobility process. We show that significant parameter ranges exist for which an asymmetric distribution of economic activities is one of the possible long-run outcomes which may allow a smooth transition to agglomeration (in contrast to the NEG typical catastrophic scenario). In addition, we show that multistability is pervasive and that some attractors are Milnor attractors. Both results reinforce the NEG narrative on the importance of initial conditions for the long-run location of industrial activity.

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## 1. Introduction

New Economic Geography (NEG) models do not typically account for the presence of regions other than the ones involved in the economic integration process. Nevertheless, a vast body of empirical evidence reveals the ongoing long-term parallel trends of increasing regional integration and globalisation. The EU is a part of this phenomenon: on the one hand, within-EU integration has become more important over the last decades and, on the other hand, the EU as a whole has gained greater exposure to the world economy (Foster et al., 2013).

The analytic structure of NEG models is intrinsically complex, therefore many NEG models are actually confined to the analysis of two regions, aiming to predict the impact of stronger integration on industrial agglomeration in a given economically integrated area (e.g., EU regions). However, the understanding of agglomeration and dispersion forces

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stemming from stronger exposure of the integrated area to the rest of the world (e.g., EU integration into the world economy) requires a more general set up including (at least) an “outside” region.

Scholars dealing with 3-region NEG models – see, among others, Paluzie (2001), Krugman and Livas Elizondo (1996), and Brühlhart et al. (2004) – typically explore how the spatial distribution of economic activities in a given home country is affected by international trade liberalisation. On the other hand, as pointed out by Behrens (2011), a large part of this literature underplays the role of regional integration. That is, one relevant aspect of economic integration – globalisation – is studied, while the second one – regional integration – is left out of the picture.

Commendatore and Kubin (2013) consider a footloose entrepreneur (FE) model (Forslid and Ottaviano, 2003) with three identical regions separated by symmetric trade barriers. The mobility hypothesis for the skilled workers or “entrepreneurs” is such that their decision to move to one of the three regions depends on a comparison between the real income gained in a region and the weighted average of the incomes in all regions. They analyse the impact of regional integration on industrial agglomeration by studying the local stability properties of the long-term stationary equilibria, while Commendatore et al. (2014) look at the global stability properties of the same model. Their results show significant differences with respect to the symmetric 2-region case. In particular, their results reveal the occurrence of stable asymmetric equilibria which do not exist in the 2-region counterpart. Moreover, they detect complex/strange two-dimensional attractors that cannot emerge in a 2-region NEG model, which is typically one-dimensional. Their analysis, however, still considers a unique economic area exploring the effects of further regional integration on the distribution of industrial activities within that same integrated area.

In this contribution, instead, inspired by the case of the EU, we aim to explore how the spatial allocation of industrial production and employment within an economically integrated area (the Union) is affected by changes in both aspects of trade liberalisation: regional integration and globalisation. Where the latter aspect can be explored only by admitting the existence of an “outside” region that can be, alternatively, interpreted as “the rest of the World”, which is typically different from and comparatively less integrated than the regions belonging to the Union. Our main objective is to study the effects of higher integration within the Union (reduced internal transport costs), and those due to higher economic integration of the Union as a whole with the rest of the World (reduced external transport costs). Furthermore, motivated by the changing picture of the main trade partners of the EU, we study the impact of both aspects of integration under alternative assumptions on the industrialisation level of the Union's trade partners (outside countries, trade areas or, without any specification, “regions”). In particular, we will show that integration with less industrialised regions will make agglomeration of industrial activity within the Union less likely. In addition, we also analyse the effects of international integration under alternative assumptions about the size of the outside region. For many parameter values, trade liberalisation ultimately leads to agglomeration of economic activity within the Union. However, the pattern of the transition to agglomeration depends upon the size of the outside region. When integrating with a small outside region, catastrophic agglomeration will be observed; instead when integrating with a large outside region, the transition path to full agglomeration will be smooth.

We depart from the existing multi-region NEG models in three other relevant respects. In contrast with most previous contributions, we assume that unskilled workers are immobile both domestically and internationally. This assumption makes our model closer to the reality of the EU where labour mobility plays a relatively unimportant role as compared to other economically integrated areas such as the US (Gáková and Dijkstra, 2008). On the other hand, we will maintain that the interregional mobile factor is human capital embodied in skilled workers (Forslid and Ottaviano, 2003). A second important departure is the specification of our model in discrete time. This represents an easy way to account for delays in the dynamic process (that are obviously involved in firm relocations). Finally, we try to fill a relevant gap in the NEG literature: the lack of explicit dynamic analysis. This is a particularly relevant issue as many core results of the NEG depend on the properties of dynamic processes, such as multiple equilibria, change in stability properties, the nature of the basins of attraction. We carefully analyse the emerging bifurcation scenarios – detecting a typical sequence – and show that coexistence of equilibria is much more pervasive than in standard NEG models. We show that in some cases – due to the complex structure of the basins of attraction – it is even impossible to predict the long-run spatial distribution of economic activity.

The remainder of the paper is structured as follows. Section 2 provides some stylised facts on the case of EU which inspired our work and reviews the main findings of the literature most related to our contribution. Section 3 presents the general framework of the model including the definition and properties of short-run and long-run equilibria. Section 4 presents results on local and global dynamics of the model. Section 5 concludes.

## 2. Stylised facts and related literature

The starting point for our analysis are three stylised facts:

- Trade barriers among European regions have been lowered by the long-term process of EU integration.
- Globalisation has produced greater exposure of the EU to the world economy, leading to higher dependency of the Union (and of each Member State) on final demand outside the EU.
- The deeper integration into the world economy of the EU is currently characterised by an increasing weight of big, less industrialised trade partners.

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