



# European integration, productivity growth and real convergence

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## Abstract

This paper derives a stochastic endogenous growth model to investigate the impact of European Union (EU) integration on convergence and productivity growth. The theoretical model implies both temporary and permanent positive effects of the integration process. The empirical part of the analysis uses structural break tests and data envelopment analysis to examine the accession process of five recent members to the EU15. The results show (i) endogenously identified accession dates as structural breaks, (ii) improved rates of productivity growth after accession over and above the Union benchmark level, and (iii) increased pace of overall growth due to capital accumulation as a result of institutional features of the Union such as Structural and Cohesion Funds. These findings support the theoretical model, implying that economic integration is beneficial for member countries, especially from a long-run perspective, and Cohesion and Structural funds help the new members catch up with the core-EU members' standard of living.

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## 1. Introduction

In an age where many countries strive to join the European Union (EU) although countries like Switzerland and Norway constantly refuse to join, it is natural to ask whether EU membership has any long and/or short run benefits. Although the effects of joining an economic union have been studied extensively because of their implications for policymakers, it is quite difficult to measure the overall benefits of integration because it impacts many aspects of an economy. Even studies focusing on a specific effect of integration on growth have provided incomplete conclusions because they had to use proxies to represent the integration process.<sup>1</sup> These proxies, such as trade, foreign direct investment (FDI), research and development (R&D) expenditures, number of patents issued, and time series dummies are limited in scope, and hence they can only partially capture the overall impact of joining a union. Besides being unobservable, such proxies can lead to false inferences, because of endogeneity and causality issues.<sup>2</sup> While the biggest benefit one expects from entering into a union like the EU is the rise in living standards through a high level of cooperation in all economic, political and institutional aspects, it is very difficult to envisage a proxy for such a complex network of cooperation and sharing of knowledge.

In this paper, we investigate the benefits of integration on economic growth, productivity and convergence, specifically focusing on knowledge spillovers. We employ alternative ways to detect and decompose these unobservable benefits without restricting ourselves to one specific proxy. To accomplish our objective of observing the outcome of broad and multifaceted institutional and technological cooperation, we propose to focus on how the growth process changes following the EU membership. Detecting such changes may not be sufficient, however, because they could be to the result of other factors. Hence, in order to connect the sharing of knowledge to growth, one needs to measure changes in productive as well as technological capabilities. In this paper, we aim to obtain evidence of such abstract benefits by decomposing significant developments in growth into observable changes in economic variables (inputs) and the not-so-observable changes in productivity and efficiency. We also control for the institutional facet of integration, namely the net budget transfers such as the Structural and Cohesion Funds, so that the effects of knowledge spillovers and integration on growth could be separated from the effects of such capital flows.

More specifically, our research extends the stochastic endogenous growth literature to capture the impact of economic integration on convergence and productivity growth. Applying Rivera-Batiz and Romer's (1991, RB-R hereafter) analytical hypothesis that integration leads to sharing of knowledge and technology, we develop a new theoretical framework to capture the effects of integration on growth. Using RB-R's hypothesis, we are able to extend the work of Lee, Pesaran, and Smith (1997, LPS hereafter) to examine changes in productivity and convergence rate after the accession to a union. We subsequently test the theoretical claims of our model using a battery of structural break

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<sup>1</sup>Many examples are cited in the next section.

<sup>2</sup>Regarding estimation problems such as causality and endogeneity, Frankel and Romer (1999) argue that trade variables employed in previous growth studies may be endogenous. Walde and Wood (2004) conclude that the existing literature is "quiet" on the direction of the true causality in the trade-growth relationship. Yanikkaya (2003) reports similar findings.

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