Economic Growth and European Integration: A Counterfactual Analysis

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Abstract: We estimate the growth and productivity effects from becoming a member of the European Union (EU). We simulate time series of hypothetical economic growth and productivity trajectories, which show how these would have developed if the countries that became EU members in the 1973, 1980s, 1995 and 2004 enlargements had not joined the EU. Using this model, we identify large positive effects from EU membership. These effects differ across countries and over time, but are negative in only one case (Greece.) We calculate that without European integration, per capita incomes would have been, on average, approximately 10 percent lower today.

Keywords: economic growth, European Union, synthetic counterfactuals
JEL classification: C33, F15, F43, O52

1. Introduction

The formal process of European Integration is now more than half a century old. The events surrounding the Second World War provided the key motivation for this process. Although from the outset it was a process much driven by politics, considerations about its economic benefits have always been paramount (Martin, Mayer and Thoenig, 2008, 2012).

There is an extensive debate about the economic benefits generated by the process of European integration, which encompasses various estimates of the benefits, in terms of economic growth and productivity, from trade liberalization, the single market and the common currency.[1] There are difficult challenges in assessing these benefits because of endogeneity problems, omitted variables, and measurement errors. Arguably the most severe and long lasting difficulty has been the construction of credible counterfactual scenarios. Counterfactuals are essential to isolate the effects of particular policies and to identify causal relationships. Yet, as Boldrin and Canova warn, "historical counterfactuals (what would have happened if transfers had not taken place?) are hard to construct" (2001, p.7). In the same vein, Boltho and Eichengreen caution that "imagining the counterfactual is no easy task" (2008, p.13). Although there is a broad consensus on their relevance, counterfactuals are notoriously difficult to construct. This paper takes advantage of recent econometric techniques designed for this purpose and presents estimates of the growth and productivity effects from European Integration using the synthetic counterfactuals method (or "synthetic control methods for causal inference in comparative case studies") pioneered by Abadie and Gardeazabal (2003).[2] It presents new evidence for these effects at country and regional levels, and for the various EU enlargements (1973, the 1980s, 1995 and 2004.)[3]

Among the questions guiding this research: Are there economic benefits from

[1] See among others Badinger and Breuss (2010), Baldwin (1989), Baldwin and Seghezza (1996), Berger and Nitsch (2008), and Frankel (2010).

[2] See Imbens and Wooldridge (2009) for a discussion of synthetic counterfactuals and how it compares to other recent econometric methods of program evaluation.

[3] We use the term European Union (or EU for short) for convenience throughout, that is, even when referring to what was then called the European Economic Community (up to 1967) or the European Communities (until 1992).

European Integration or are these mostly political? Do EU members grow faster? Can these growth and productivity differentials be causally associated with EU membership? More specifically, what would have been the growth rates of per capita GDP and labor productivity in these countries had they not become full-fledged EU members?

In order to construct credible counterfactuals, we take advantage of the "simplicity" (or binarity) of membership in the EU, as well as of the fact that the EU has experienced four major increases in membership (enlargements) in the last four decades (1970s, 1980s, 1990s and 2000s). But there are at least three important difficulties one should bear in mind: in terms of the complexity of integration, its timing and regarding inter-temporal comparisons. The first difficulty refers to the complexity of integration. Although EU membership is ultimately binary (a country is or is not a full-fledged EU member), one just needs to consider the continuum in terms of economic integration to realize the main limitations of using such dummy variable approach.[4] There are many areas over which economies integrate (finance, goods, services, technology and capital, etc.) and it is plausible that the process of integration varies across these areas and over time. Also recall that the Golden Age of European economic growth, which is the period from 1950 to 1973 (see Temin, 2002, as well as Table 1), coincides with the launching and take-off of the formal process of economic and political integration. This exacerbates the complexity of the construction of relevant counterfactuals.

Insert Table 1 about here

The second difficulty is about timing. EU membership is announced in advance. International investors, for example, may know with certainty that a country will become a

[4] Dorucci, Firop, Fratzscher and Mongelli (2004) and Friedrich, Schnabel and Zettelmeyer (2012) construct indexes of economic integration in Europe. Brou and Ruta (2011) model the relationship between political and economic integration.

full-fledged EU member, and sometimes with many years notice.[5] Therefore, the benefits from EU membership may have been substantially anticipated or spread over time, in some cases well before the official date of EU accession. Anticipation effects reduce the relevance of the actual official date of EU accession as "treatment".

A third important difficulty is that although the consecutive increases in EU membership (enlargements) allow one to compare and contrast the pre- and post-membership performance of members with that of non-members, the fact that these enlargements were spread over time, one in each of the last four decades (1970s, 1980s, 1990s and 2000s), makes such direct comparisons substantially less straightforward. Not only the group of countries that, for example, Greece joined in 1981 is very different from that Slovakia joined in 2004, but also the economic situation in 1981 and 1986 differs from that in 1995 and even more so in 2004 and 2007, when the most recent enlargement took place. The fact that countries "join when ready" and that there have been numerous enlargements (and thus fewer candidates for meaningful comparisons) make it even more difficult to generate sound estimates of the growth dividends from European integration.[6] However, the three difficulties highlighted above bias downward the effects of integration and thus the estimates obtained in our analysis can be considered as conservative estimates or a lower bound of the growth and productivity effects of EU accession.

The main results are as follows. The estimated growth and productivity effects from EU membership are positive and substantial but there is considerable heterogeneity across countries once they become full-fledged members of the EU. More specifically, per capita GDP or productivity growth rates increase with EU membership in Denmark, Ireland, United Kingdom, Portugal, Spain, Austria, Estonia, Hungary, Poland, Latvia, Slovenia and Lithuania. The growth effects tend to be smaller, albeit still mostly positive, for Finland,

[5] This anticipation effect is not uncommon. For instance, the effects of the euro on bilateral trade are detected already for 1998, which is the year *before* the adoption of the common currency (see Frankel, 2010, pp.177-179 for a discussion).

[6] It should also be taken into consideration that the "readiness criteria" has changed between 1973 and 2007.

Sweden, Czech Republic and Slovakia. Note important differences within the latter group between productivity and GDP growth results. Finally, and rather surprisingly, the evidence supports the view that only one country (Greece) experienced smaller GDP or productivity growth rates after EU accession. The negative effect has been persistent, lasting for 15 years after accession, during the period 1981 to 1996. Further research is clearly needed to provide a fuller understanding of why Greece turned out to be exceptional in this regard. We expect payoffs from such research to be high as they can throw light on the Greek crisis during the Great Recession, and hopefully even suggest ways out of it. Regarding the magnitude of these effects, estimates in the literature cover a wide range: European per capita incomes would be 5 percent lower (Boltho and Eichengreen, 2008) to 20 percent lower (Badinger, 2005) if integration did not take place. Although we believe that ours are lower bound estimates, for the reasons above, our estimates suggest that on average the effect is approximately 10 percent. That is, we per capita European incomes in the absence of the economic and political integration process would have been about ten percent lower today. Notice this is an average: there are important variations across countries, enlargements as well as over time.

It should be noted that this set of results is robust to various measures of GDP and productivity growth, to whether we focus on the dynamic or on average effects of EU membership, to changes in the donor pool of countries (ranging from the whole world to very few countries in the EU physical neighbourhood, with the results we report based on a intermediary pool), to substantial changes in the covariates used in the estimation, and to whether one focuses on country-level data or on regional level-data.

The paper is organized as follows. Section 2 briefly discusses previous attempts at estimating the growth effects from EU membership. Section 3 presents the synthetic counterfactual methodology. Section 4 introduces our data set and baseline results. Section 5 discusses various sensitivity checks including further evidence on the anticipation effects, from regional data and difference-in-difference estimates. Section 6 concludes.

2. Growth and Productivity Effects from European Integration

The objective of this section is to briefly and selectively review previous efforts to estimate the growth and productivity effects of EU membership.[7] In spite of the destruction caused by the Second World War, economic recovery took place relatively quickly and already by 1951 most countries show levels of per capita GDP that are the same or above their pre-war levels (Crafts and Toniolo, 2008). This somewhat quick recovery was followed by a period often called the Golden Age of European growth (Temin 2002). As shown in Table 1, between 1950 and 1973 Western and Eastern Europe grew at truly unprecedented rates (see Eichengreen 2007 for a detailed account and a review of the various attendant theories). Among the various explanations, integration figures prominently. The rapid and comprehensive policy of trade liberalization generated huge growth payoffs particularly in the 1960s and in the context of both the EU-6 and EFTA. It is indeed remarkable that the process of European Integration does not seem to stop or reverse since the 1950s: when it slowed down it did so only in terms of its depth, as it clearly progressed horizontally as the first enlargement took place in 1973 (with the accession of the UK, Ireland and Denmark). Similarly, the 1980s see two other increases in EU membership (Greece in 1981 and Spain and Portugal in 1986), followed by a substantial deepening thanks to the Single Market policy. This again is followed by another enlargement in 1995 (Austria, Finland and Sweden) and another deepening with the common currency, which finally is followed by the largest of the enlargements in 2004 (and Bulgaria and Romania in 2007). All of these developments have generated substantial growth and productivity payoffs to the point that many attach exceptionality to Europe, which is the only region in the world in which one finds strong evidence of unconditional beta and sigma convergences. Indeed, per capita incomes in Europe have been able to catch-up with the U.S. very clearly, at least until 1995, when the gap seems to have started to widen again. Three important caveats being that these gaps behave very differently when considering per capita GDP or GDP per hour

[7] Badinger and Breuss (2010) provide an authoritative survey.

worked (Gordon 2011), that there are substantial cross-country variation in Europe, and that the Great Recession has had a substantial impact on these more recent trends.

One of the earliest concerns of the literature on the growth and productivity effects of EU membership was to offer finer and ever more detailed measures of the extent and depth of the process of economic integration itself. The early literature hence conjectured that the effects of integration on growth worked through the effects of integration on trade (for a critical view see Slaughter, 2001). Indeed, one of the more traditional controversies was whether the link between integration and growth was due to the effects of trade on capital accumulation or to trade-induced technological progress. Baldwin and Seghezza (1996) provide an excellent survey of this earlier literature and conclude that European integration has helped to accelerate European growth because the evidence showed that trade liberalization boosted investment in physical capital in Europe. An important issue with the earlier literature is that the evidence it generates focuses on the effects of international trade on growth and often assumes that all the increase in the trade is driven purely by intra-European integration efforts (downplaying globalization.)

Endogenous growth models could more easily accommodate the issue of economic integration.[8] Coupled with the looming of a substantial enlargement of the number of EU members, this helped to focus attention on the growth dividend from EU membership proper. A seminal contribution is the work by Rivera-Batiz and Romer (1991), who emphasized that economic integration for countries with similar incomes per capita leads to long run growth effects if it accelerates technological innovation through larger R&D activities leading to new ideas. Such effects can be achieved through larger trade in goods if the production of ideas does not need the stock of knowledge as an input (in the so-called lab-equipment model). It postulates that the production of ideas uses the same inputs as manufacturing (labor, human and physical capital). In this case, the larger market for

[8] Jones and Romer (2010) propose an updated Kaldor list of stylized facts that stresses the importance of integration: "Fact 1: Increases in the extent of the market. Increased flows of goods, ideas, finance, and people—via globalization, as well as urbanization—have increased the extent of the market for all workers and consumers" (p. 229). See also Acemoglu (2009).

trade of goods arising from integration leads to a scale effect: all available inputs in both countries contribute to technological innovation and thus higher long-term growth. In contrast, when production of ideas uses the stock of existing knowledge, ideas (in the knowledge based model), trade in goods is not sufficient for generating a permanent growth effect through economic integration. In this case, growth effects arise only if, in addition to larger trade in goods, economic integration also leads to larger flows of ideas between countries. In summary, the effects of economic integration on growth are highly dependent on specific channels leading to possible long-term benefits either through larger flows of trade of goods or flows of ideas (Ventura, 2005). Furthermore, the growth dividend depends as well on the degree of similarity in terms of incomes per capita of the countries involved in the integration. Finally, models of economic integration generally abstracts from the role of institutional characteristics of the countries involved. In view of the theoretical difficulties in deriving clear-cut effects of economic integration on growth, empirical analysis is crucial to assess the possible growth dividends of economic integration.

There is a large economic history literature on European Integration.[9] This is closely related to (and broadly supported by) a rich growth accounting literature (e.g. O'Mahony and Timmer, 2009). It is also worth mentioning that there is a vigorous literature that associates integration (for instance, in terms of Structural Funds) with economic growth at the regional level (see Becker, Egger and von Ehrlich, 2010). While the historical literature rarely generates estimates of the growth dividends from integration, the regional literature rarely do so for long periods of time and at the national level.

One of the earlier empirical papers on the growth dividend at the country level, over a considerable period of time, is Henrekson, Thorstensson and Thorstensson (1997), which studied the growth effects of European integration in the European Community vis-à-vis that of its then competitor, EFTA, the European Free Trade Association. Using regression

[9] Se among others Boltho and Eichengreen (2008) and Crafts and Toniolo (2008).

analysis their results suggest that both EC and EFTA memberships do in fact have a positive and significant effect on economic growth, and also that there was no significant difference between EC and EFTA membership. Yet, they argue that these results were not completely robust with respect to changes in the set of control variables and to measurement errors and that they suggest that regional integration may not only affect resource allocation, but also long-run growth rates.[10]

Another important contribution is Badinger (2005). This paper constructs an index of economic integration reflecting global (GATT) and regional (European) integration of the EU member states. It is mostly interested in evaluating whether any growth dividend one can identify from this integration measure is permanent or temporary. The paper uses a growth accounting framework with a panel of fifteen EU member states over the period 1950–2000. The main finding refers to the difficulty in finding permanent growth effects and that the level effects, although sizeable, are also not satisfactorily robust. Nevertheless, based on these estimates Badinger calculates that "GDP per capita of the EU would be approximately one-fifth lower today if no integration had taken place since 1950."

Boltho and Eichegreen (2008) discuss from an economic history perspective each of the major institutional milestones in the process of European economic integration. Particularly interesting from our point of view is that the main concern from these authors is to delineate possible counterfactuals, mostly based on their extensive historical knowledge. They provide a lucid criticism of mainstream econometric estimates and ask, for instance, "if the European Coal and Steel Community had not been created, would European countries have found other ways of restarting production and trade in the products of their iron and steel industries? If the Common Market had not been established, would the major Western European economies have found other ways of commensurately increasing their intra trade? If the European Monetary System had not

[10] Vandhout (2009) presents comparable results in that in a panel setting he fails to establish growth effects from the length of time a country has been a member of the EU (nor from a dummy variable for EU membership.)

been created, would they have found other ways of stabilizing their exchange rates?" Despite the fact that the paper does not carry out a quantitative analysis, the authors provocatively "conclude that European incomes would have been roughly 5 per cent lower today in the absence of the EU." The idea that the central difficulty in satisfactorily identifying the growth dividend from EU membership is, in their words, "fully specifying the counterfactual" resonates with the objectives of this paper.

Finally, one of the latest important efforts in this line of inquiry is that of Kutan and Tinit (2007). They develop an endogenous growth model to investigate the impact of European Union (EU) integration on convergence and productivity growth. Their attendant empirical analysis uses structural break tests and data envelopment analysis to examine the accession process covering the last five members to join the EU15, namely, Spain, Portugal, Austria, Finland, and Sweden, "along with France as the benchmark country." Their results reveal improved rates of productivity growth after accession over and above the Union benchmark level, and increased pace of overall growth due to capital accumulation as a result, they argue, mostly of EU's Structural and Cohesion Funds.

In summary, there is an important literature that has attempted to directly address the issue of the growth dividends from EU membership. Most of it uses panel data econometrics and information on the 1980s and 1990s enlargements to make statements about the size of these growth payoffs and whether or not they can be said to be permanent (or temporary). We fully echo Boltho and Eichengreen's concern that one main difficulty in these exercises is the satisfactory identification of a benchmark, of a baseline country for comparison or, to use the terminology we favour in this paper, a fully specified counterfactual. It is our view that the literature so far has not addressed this difficulty satisfactorily. The ultimate goal of this paper is to generate a credible set of counterfactuals.

3. Synthetic counterfactuals: Methodological and data issues

Our aim is to empirically investigate whether membership in the European Union generated significant payoffs in terms of GDP per capita and productivity growth. In order to do that, we use a recently developed methodology, synthetic control methods for causal inference in comparative case studies, or in short, synthetic counterfactuals. It was developed by Abadie and Gardeazabal (2003) and Abadie, Diamond, and Hainmueller (2010, 2012).[11] As its name suggests, it generates counterfactual scenarios. We implement it to estimate what would have been the levels of per capita GDP and labor productivity in a given country if it had not become a full-fledged member of the European Union at the time it did. The synthetic control method is intended to estimate the effect of a given intervention (in our case, EU membership) by comparing the evolution of an aggregate outcome variable (in this case, per capita GDP or labor productivity) for a country affected by the intervention vis-à-vis the evolution of the same aggregate outcome for a synthetic control group. For instance, one research question we answer below is: what would have been the level of per capita GDP or productivity in Finland after 1995 if Finland had not become a full-fledge member of the EU in 1995? In this paper, we answer similar questions for all countries that became EU members in the 1973, 1980s, 1995 and for all but two of those in the 2004 enlargement (data availability force the exclusion of Malta and Cyprus).

The method focuses on the construction of the "synthetic control group," or in the words of Imbens and Wooldridge, an "artificial control group" (2009, p. 72). It does so by searching for a weighted combination of other units (countries), which are chosen to mimic as close as possible the country affected by the intervention, for a set of predictors of the outcome variable.[12] The evolution of the outcome for the synthetic control group is an

[11] Imbens and Wooldridge (2009) discuss the synthetic counterfactuals method and how it fits among other recent developments of the econometrics of program evaluation.

[12] We have experimented with various "country donor pools" and the results below are robust to the most dramatic changes, that is, to using the whole world or a few selected EU geographical neighbors. The results reported in this paper are for an "intermediary" donor pool, which is originally from Bower and Turrini (2010) and contains: Argentina, Australia, Belarus, Brazil, Canada, Chile, China, Hong Kong, Colombia, Croatia, Egypt, Indonesia, Iceland, Israel, Japan, Korea, Morocco, Mexico, Macedonia, Malaysia, Norway, New Zealand, Philippines, Russia, Singapore, Switzerland, Thailand, Tunisia, Turkey, Ukraine, and Uruguay.

estimate of the counterfactual. It shows what the behaviour of the outcome variable (in our case, per capita GDP and labor productivity) would have been for the affected country if the intervention had happened in the same way as in the control group.[13]

More formally, for the general case of the synthetic counterfactuals methodology, the estimation of average treatment effect on the treated units can be represented by:

$$\tau_{it} = Y_{it}^{I} - Y_{it}^{C} \quad (1)$$

where Y_{it}^{I} is the outcome of a treated unit i (in our case, country) at time t, while Y_{it}^{C} is country i's outcome at time t had it not been subjected to treatment (in our case, had it not become a full-fledge member of the European Union). We do observe the outcome of the treated country Y_{it}^{I} after the treatment (with $t \geq T_0$), but we do not observe what the outcome of this country would be in the absence of treatment (i.e., we do not know the counterfactual, Y_{it}^{C}, for $t \geq T_0$). Abadie, Diamond, and Hainmueller (2010) propose a method to identify and estimate the above dynamic treatment effect (τ_{it}) considering the potential outcome for the country's $i \in I$ under the following general model:

$$Y_{it}^{I} = \delta_t + \alpha_{it} D_{it} + v_{it} \quad (2)$$

$$Y_{it}^{C} = \delta_t + v_{it} \quad (3)$$

$$v_{it} = \theta_t Z_i + \lambda_t \omega_i + \varepsilon_{it} \quad (4)$$

where Z_i is a vector of independent variables at country level (either time-invariant or time-variant); θ_t is a vector of parameters; λ_t is a unknown common factor; ω_i is a country specific unobservable; ε_{it} is a transitory shock with mean equal to zero; and $\alpha_{it} D_{it} = \tau_{it}$, where D_{it} is dummy variable which takes value 1 when the country $i \in I$ is exposed to the treatment, and zero otherwise.

Now suppose we observe the outcome Y_{it} and a set of determinants Z_{it} of the outcome for $N + 1$ countries, where $i = 1$ is the treated country and $i = 2, \ldots, N + 1$ are the untreated

[13] Abadie and Gardeazabal (2003) investigate "what would have been the levels of per capita GDP in the Basque country in Spain if it had not experienced terrorism?" Abadie, Diamond, and Hainmueller (2010) present two further examples: "what would have been cigarette consumption in California without Proposition 99?" and "what would have been the per capita GDP of West Germany without reunification?" (2012). Other recent papers using this method include Campos and Kinoshita (2010) on foreign direct investment, Lee (2011) on inflation targeting and Billmeier and Nannicini (forthcoming) on trade liberalization.

countries, for each period $t \in [1, T]$ where the intervention on country $i = 1$ begins at time T_0 with $1 < T_0 < T$. In order to construct a counterfactual, a weighted average of Y_{it} (with $i = 2, \dots, N + 1$, and $t < T_0$) is estimated to approximate Y_{1t} (for $t < T_0$), taking into account the covariates Z. In particular, the set of weights is $W = (w_2, \dots, w_{n+1})$, with $w_i \geq 0$ (for $i = 2, \dots, N + 1$) and $\sum_{i=2}^{N+1} w_i = 1$, thus pre-treatment:

$$\sum_{i=2}^{N+1} w_i Y_{it} = Y_{1t} \tag{5}$$

and

$$\sum_{i=2}^{N+1} w_i Z_i = Z_1 \tag{6}$$

For the choice of the optimal W^*, consider, in matrix notation, X_1 the $(k \times 1)$ vector of treated country 1's characteristics in the pre-treatment period (which may or may not include the pre-treatment outcome's path); X_C $(k \times N)$ vector of the same characteristics for the control or "donor" countries; and, V a $(k \times k)$ symmetric and positive semi definite matrix, which measures the relative importance of the characteristics included in X. The optimal vector of weights W^*must solve the following minimization problem:

$$\min(X_1 - X_C W)' V (X_1 - X_C W) \tag{7}$$

$$\text{s.t. } w_i \geq 0 w_i \geq 0 \text{ (for } i = 2, \dots, N + 1) \text{ and } \sum_{i=2}^{N+1} w_i = 1$$

that is, W^* is selected according to a specific metric in order to minimize the pre-treatment distance between the vector of treated country's characteristics and the vector of potential synthetic control characteristics. In other words, it is chosen to minimize the mean squared error of pre-treatment outcomes.[14]

The synthetic counterfactual is then constructed using the optimal weight W^*, so that $\sum_{i=2}^{N+1} w_i^* Y_{it}$ (with $t \geq T_0$) is an approximate estimation of Y_{1t}^C. The treatment effects are estimated as:

$$\widehat{\tau_{it}} = Y_{1t} - \sum_{i=2}^{N+1} w_i^* Y_{it} \qquad \text{for all } t \geq T_0. \tag{8}$$

The path of the weighted average of untreated countries (i.e. the synthetic control)

[14] In this paper we use the distance metric available in the STATA econometric software (the relevant STATA command is called *synth*). See Abadie, Diamond, and Hainmueller (2010) for further technical details.

hence mimics the path of the treated country in the absence of treatment. The accuracy of the estimation depends on the pre-treatment "distance" of the synthetic control with respect to the treated country. All else the same, a longer pre-treatment period allows for a more accurate calibration of the synthetic control. Moreover, the structural parameters reflected in the estimated set of weights should ideally vary little over time so as to generate a satisfactory mimic of the treated country in the post-treatment period.

The synthetic counterfactuals method requires the following two identification assumptions: (1) the choice of the pre-treatment characteristics should include variables that can approximate the path of the treated country, but should not include variables which anticipate the intervention effects proper; and (2) the donor countries used to obtain the synthetic control must not be affected by the treatment.

The first assumption implies that the treatment effects are not anticipated, that is, that they start in full at the exact date assigned for the start of the treatment. In our analysis, the absence of anticipation effects means that the growth effects of EU membership are to be observed only after each candidate country effectively becomes a full-fledged member. If agents form expectations that anticipate these effects, the synthetic counterfactual method will generate a lower-bound estimate of the true effect because part of the full effect occurs before the start of the treatment (EU accession in this case.)[15]

The second assumption requires that countries selected for the donor pool used to obtain the synthetic control group should not be affected by the treatment. Although this assumption clearly holds when one defines the treatment as "full-fledged EU membership," it must be recognized that integration is more likely a continuum, and certainly not a dummy variable.[16] Having in the donor pool some countries that are integrated with the EU but not full-fledged members should also generate lower-bound or conservative

[15] Anticipating our results, in the synthetic counterfactuals below, we do find interesting evidence of anticipation. It is quite noticeable in the 2004 enlargement, slightly noticeable in the 1995 enlargement and practically unnoticeable in the 1973 and 1980s enlargements. We develop this argument below.

[16] See Dorucci, Firop, Fratzscher and Mongelli (2004) and Friedrich, Schnabel and Zettelmeyer (2012) for continuous indexes of economic integration in Europe, and König and Ohr (2012) for a review of recent attempts.

estimates of the true effect of membership, assuming that the level of per capita GDP or productivity in these "not formally integrated" countries would have been lower without "partial integration." [17]

Our choice of pre-treatment characteristics follows the extensive empirical growth literature and, in particular, the specification used by Abadie and Gardeazabal (2003.) It includes the investment share of PPP Converted GDP Per Capita at 2005 constant prices, openness at 2005 constant prices (imports plus exports as a percentage of GDP), population growth and population (all from Penn World Tables 7.0), share of agriculture in value added, share of industry in value added, secondary gross school enrollment (percentage), tertiary gross school enrollment, and population density (all from the World Bank's World Development Indicators.)[18]

This synthetic control approach represents an extension of the differences-in-differences framework by allowing the effects on unobserved variables on the outcome to vary over time. This is similar to the "policy-experiment approach" discussed among others by Henry (2007). Moreover, it "allow(s) researchers to perform inferential exercises about the effects of the event or intervention of interest that are valid regardless of the number of available comparison units, the number of available time periods, and whether aggregate or individual data are used for the analysis" (Abadie, Diamond, and Hainmueller, 2010). This method handles endogeneity and omitted variable concerns but has as a drawback the fact that it "does not allow to assess the significance of the results using standard (large-sample) inferential techniques, because the number of observations in the control pool and the number of periods covered by the sample are usually quite small in comparative case studies" (Bilmeier and Nannicini, forthcoming). Although in our case the number of periods is relatively small, we do believe we have enough observations in the

[17]Baldwin notes that "Nations such as Switzerland and Norway resisted joining but have instead signed agreements that oblige them to implement most EU laws in exchange for equal access to the EU market. They have, however, no formal input in the lawmaking process. Most nations in Europe looked at this 'regulation without representation' and decided they would have more control inside the EU despite Qualified Majority Voting" (2008 p. 128).

[18] Note that the variables value added, share of industry and agriculture are not available (yearly) for Eastern European countries and Greece.

control pool to assess the level of statistical significance of our results. Here we implement a novel yet simple solution to deal with this matter, namely using the difference-in-difference estimator for the actual vis-à-vis the synthetic series. This allows us to make statements about the statistical significance of the effect of EU membership on economic growth and productivity *on average*, before and after.

4. Synthetic counterfactuals: Baseline results

Figures 1 to 4 report our baseline synthetic counterfactual results using the method and data described above. There are two series plotted in each graph. The series represented by the continuous line shows the actual per capita GDP (or labor productivity) of the country in question, while the series represented by a dashed line shows the synthetic counterfactual we estimate. Recall that the question guiding each one of these exercises is: What would have been the GDP (or productivity levels) of the country in question if it had not become an EU member in the year it did? The synthetic counterfactuals are presented for each country in all four EU enlargements, namely for Denmark, Ireland and the UK in 1973, Greece, Portugal and Spain in the 1980s Southern enlargement, for Austria, Finland and Sweden in the 1995 Northern enlargement and for the Eastern European countries in the 2004 enlargement.[19] The results are presented for two growth measures (per capita GDP and labor productivity) and for a donor pool of countries originally used by Bower and Turrini (2010).[20]

Insert Figures 1 to 4 here

Consider the evolution of real per capita GDP in Spain between 1970 and 2008. This is the graph in the center of the Figure. Spain became a full-fledged member of the EU in 1986 and hence in our exercise we specify this as the year the treatment was administered

[19] We have excluded from our analysis Cyprus and Malta because their relative small size (and the difficulties this generate to find good matching experiences) and Bulgaria and Romania because the period post-EU membership is precariously short.

[20] The reported results are robust to large changes in donor pool (from the whole world to selected EU neighbours) which suggests that this donor pool is not a critical aspect of our estimation.

(as shown by the vertical dotted line in the Figure). The weights for the countries in the donor pool are reported in the Appendix. For example, the "synthetic Spain" is constructed on the basis of weights of approximately 52% to Australia and 19% to Argentina (and, for example, 0% for Albania or Brazil.) The graph shows the actual Spanish per capita GDP levels between 1970 and 2008 (continuous line) with the dotted line plotting the same values for the synthetic counterfactual, that is, for a synthetic Spain (which by construction or estimation) did not become a full-fledge EU member in 1986. The results suggest that per capita GDP in Spain would be considerably lower had it not joined the EU in 1986. Indeed, they show it would have been lower in every single year since 1986. The actual and the synthetic Spain series move together before 1986, while they start to systematically diverge in or around 1986, indicating that there was little anticipation or delay of the effects from EU membership. Furthermore, the gap between actual and synthetic Spain seems to be constant, indicating that the benefits from EU membership are more likely to be permanent than temporary. The next set of results is for labor productivity in Spain and they are very similar with one main exception, namely that the gap between the two series is not constant over time (that is, within the time window we have available to carry out our analysis.) The results for Portugal are similar in that we can also identify sizeable benefits from EU membership and that these tend to be permanent in the case of per capita GDP and less so in the case of labor productivity. The main country donors to the construction of "synthetic Portugal" are Turkey (weight of approximately 34%) and Iceland (18%.) The results for the remaining country that joined the EU in the 1980s (Greece in 1981) deserve attention. The estimates show that both Greek per capita GDP and labor productivity would have been higher if Greece did not become a full-fledged EU member in 1981. Notice however that, on the positive side, the gap shrinks over time, which suggests that the strength of this statement weakens during the latter part of our time window (the 2000s in this case).

Figures 1 and 3 also report interesting results for the 1973 enlargement. As it can be seen, the UK and Denmark both benefitted from EU accession, but the gains to Ireland seem to have been even more substantial. Examining these results, one caveat to keep in mind is that the donor pool is smaller than for the other enlargements because of data availability as in this case data is needed since the early 1960s for the pre-treatment period (for further details see the technical Appendix.)

In 1995, Austria, Finland and Sweden joined the EU. As shown in Figures 1 and 3, the results for Austria and Finland suggest that EU membership generated permanent growth dividends both in terms of per capita GDP and labor productivity. However, the Austrian case is interesting because of the possibility that there has been an anticipation of these benefits. They suggest their start coincide with the end of the Cold War, a factor that many relate to Austria's delayed entry into the EU. In the case of Finland, the pre-treatment matching is rather good especially considering the depth of the economic crisis the country went through in the early 1990s. The results for Sweden show a more nuanced picture in that there seem to have been little effect from EU membership in terms of per capita GDP, although there is a more noticeable (positive) effect when considering labor productivity. Overall the results for Sweden, at to a lesser extent Austria and Finland, seem to be small compared to the effects from the 1973 and 1980s enlargements. One interpretation is that when these three countries joined the EU they already had a relatively high level of per capita income and hence were at a disadvantage. We believe this interpretation is incorrect. If our results were picking up the benefits from relatively lower per capita incomes (that is, from convergence according to which relatively poorer countries grow faster) then this would damage our choice of method. It should be noted that the UK and Denmark were also relatively rich at the time of joining and these have experienced substantial benefits. Therefore, we prefer to associate the relatively smaller dividends estimated for the 1995 enlargement instead delayed full-fledged EU

membership. In other words, these three countries were already "partially integrated" with the EU when they formally joined.

Figures 2 and 4 show the results for the Eastern European countries that joined teh EU in 2004 in terms of per capita GDP and productivity, respectively. The picture is somewhat mixed in this case, with the one exception that the benefits from EU membership seem to have started a few years before the actual accession date: that is, there seem to have been an anticipation of the effect. With this caveat, overall these results tend to be quite good in that most show a satisfactory pre-treatment match. However, for some countries the benefits are quite clear, while for others they are very difficult to identify. Countries in the first group include Estonia, Poland, Latvia, Lithuania, while countries in the latter group are the Czech Republic, Slovakia, Slovenia and Hungary.

In summary, it seems that the synthetic counterfactual methodology does a good job in identifying the growth dividends from EU membership. Furthermore, the synthetic counterfactuals indicate that the growth dividends are positive and that they often tend to be substantial and lasting. Yet there is heterogeneity across countries. Specifically, GDP or productivity growth rates significantly increase with EU membership in Denmark, Ireland, United Kingdom, Portugal, Spain, Austria, Finland, Estonia, Poland, Latvia and Lithuania. The growth effects are smaller but still positive, for Sweden, Czech Republic, Slovakia, Slovenia and Hungary, but with important differences regarding productivity or GDP growth. Finally, and surprisingly, the evidence supports the view that only one country (Greece) experienced smaller GDP or productivity growth rates with EU accession.

5. Anticipation effects, difference-in-differences and regional evidence

The objective of this section is to try to further shore up the results discussed above. This is done in three ways: (a) we run "placebos in time" to evaluate whether unaccounted for anticipation effects are indeed weakening the baseline results above; (b) we present differences-in-differences estimates for the comparison between the actual and the

synthetic series so as to be able to make statements in terms of the statistical significance; and (c) we present similar synthetic counterfactuals evidence but using regional instead of country-level data.[21]

Firstly, we carry out a robustness test to account for the possibility of "anticipation effects," in particular in the context of the 2004 Eastern Enlargement. This refers to the possibility that the growth effects of EU membership started to be evident before the official date of accession. It represents an acknowledgement that the Eastern Enlargement was different in various aspects (see Elvert and Kaiser, 2004, for a historical analysis of EU enlargements). It was the largest in terms of entrants but it also required substantial institutional change in the EU itself and this partly explains why it took much longer than previous exercises.[22] In order to evaluate the importance of these anticipation effects we re-estimated the synthetic counterfactuals but instead of using the official accession date (in this case, 2004) we specify 1998 as the treatment year. As Figures 5 and 6 show, for both per capita GDP growth and labor productivity, there is evidence that the positive growth dividends from EU membership are indeed larger. The exceptions being the Czech and Slovak Republics for which the results are weaker.

Insert Figures 5 and 6 here

One drawback of the synthetic control method, in our view, is that there is no natural way of carrying out standard hypotheses tests and, consequently, there is a limited amount one can say about the confidence one should attach to each one of these estimates. Hence we estimate difference-in-differences for the country's actual and its synthetic series before and after the treatment so as to be able to make statements about the level of

[21] We also run placebo test on donor countries. The results from placebo tests broadly support our main conclusions above and are reported in Figure A.1 to A.4 in the technical Appendix. Such placebo tests compare the effects on the treated country with those obtained by subjecting the donor countries to the same treatment. In most of the cases, the effect on the EU countries is greater than the effects on the donor countries (however notice that in some donor countries the pre-treatment mismatch is very large).

[22] Kutan and Yigit (2007) present econometric evidence supporting the view that the 1980s and 1990s enlargements did not suffer from severe anticipation effects. They estimate structural breaks in GDP and productivity series and report that they occur substantially close to the "official" accession dates.

statistical significance of this differential.[23] In order to do that we incur a large cost, namely that the statistical tests are run for differences before and after, that is, for average values before and after treatment. It is natural to expect for those countries in which these gaps are not constant over the post-treatment time window that statistical significance will be hard to attain. This is serious for those countries in which the gap increases and subsequently decreases. This is why we think these results are conservative. Table 2 reports these tests, first for each country and then for each of the four enlargements, and for both GDP and labor productivity series.

Insert Tables 2 and 3 here

The results in Table 2 confirm, for the average effects, that the economic benefits from EU membership we estimate above are statistically significant. That is, the difference between the synthetic counterfactual series and the actual series are statistically significant. This is clearly the case for Denmark, United Kingdom and Ireland (both for GDP per capita and for labour productivity), Spain (only for GDP), Portugal (both for GDP and for labor productivity), Greece (note the average effect is negative, as before), and Austria (both for GDP and for labor productivity). There are no significant *average* differences in the cases of Sweden and Finland. Considering the 1998-anticipation effects on the 2004 enlargement, differences are also not statistically significant in the case of Czech Republic, Lithuania, Slovakia and Slovenia. This contrasts to the cases of Estonia (for labor productivity), Hungary, Latvia, and Poland (both for GDP and for labor productivity.)

In summary, the difference-in-difference estimates provide strong support to the synthetic counterfactuals results, especially in the case of the 1970s and 1980s enlargements. For the countries of the 1995 enlargement and for Eastern countries, these results are somewhat weaker and this may well be due to the fact that these averages are for the shorter post-treatment period (compared to the previous enlargements).

[23] See Bertrand, Duflo and Mullainathan (2004) for a classic critique of the difference-in-differences approach.

Difference-in-differences allows us to generate additional results for each of the four enlargements individually (by pooling Greece into the 1986 enlargement). These are presented in the lower part of Table 2. The growth dividends from EU membership for the countries that became EU members in 1973 tend to be positive and statistically significant at conventional levels. For the 1980s enlargement, statistical significance is observed for per capita GDP when we exclude Greece. For the 1995 enlargement, the average labor productivity effects are statistically significant, while the same can be said for the per capita GDP effects in the 2004 enlargement.

The difference-in-differences results in Table 2 complement the synthetic counterfactual results in the sense that they allow us to state that the average differences in GDP or productivity are statistically different before and after EU accession. However, what about the magnitude of these effects? Table 3 presents a simple calculation of the differences between before and after EU accession (that is, the differences between their actual and their predicted levels from the synthetic counterfactuals), for each country, in percentages (in the case of GDP per capita) and in percentage points (in terms of per capita GDP growth). We present three important versions of each of these: the average difference for the whole post-accession period, the average difference for the first ten and for the first five years after accession to the EU.

Table 3 has various interesting results. Focusing on GDP levels (columns 1 to 3), one can see that there is little evidence for the notion that the difference (the effect of EU accession) decreases over time, after each enlargement. Column 1 shows that the 1970s enlargement has the highest growth dividends, while the 1986 enlargement (Spain and Portugal) and the Eastern enlargement have higher growth dividends than those from the 1995 enlargement. However, the 1970s, 1980s (excluding Greece), and the Eastern enlargement (considering anticipation effects) seem strikingly similar over the first decade after accession. Indeed, these are our preferred estimates and they suggest that incomes would be around 11 to 12 percent lower today if European Integration did not happen. For

the countries which joined EU in the 1980s, it is also interesting to note that there is not a huge difference between the results for the whole post accession period compared to its first ten years, while that difference for the Eastern enlargement with the anticipation effect is also small (although in the latter case it is almost by construction.) Ireland is an exception in that the benefits from membership accrue much later (one can speculate that structural funds and increased capital mobility may be the reasons). If one focuses on the more comparable "first ten years after accession," one can identify Latvia, Poland and Estonia as the countries that have benefited the most and, again, Greece as the one that has benefited the least (to a lesser extent, the others are Sweden, Finland and the Czech and Slovak Republics). As an overall grand average of these effects, we calculate that these countries' per capita incomes would be ten percent lower today if they had not joined the EU at the time they did. These conclusions are broadly similar when we focus on growth rates. On average, without European integration growth rates would have been 1.2 percentage points lower over the period and the one country that clearly stands out is again Latvia, for which the benefits from being an EU member amount to additional five percentage points in its GDP growth rate.

We analyze as well regional data to evaluate the growth dividends of EU membership within the synthetic counterfactuals methodological framework. Such regional perspective can be seen both as an additional robustness test (regional data may be less prone to measurement error) and as a way to verify whether the growth dividends of EU accession that we identified at the country level were equally spread across regions. To ensure sufficiently long pre-and post-treatment periods, and to deal with a unique and harmonized source of regional level data, we use data from Cambridge Econometrics to study the 1995 enlargement. The Cambridge Econometrics European regional database covers NUTS2 regions for EU27 countries plus Norway and Switzerland. It includes variables for GDP, value added, population, labor force, employment, investment, hours

worked and salaries, and consumption at aggregate and (broad) sector level.[24] This database offers comparable series of data across regions and time and has been widely used in the context of the economic analysis of EU regions.[25] Here we use the 2004 version of the database, which includes annual data from 1980, and from which we construct the following variables, all expressed at constant 1995 prices: productivity per hours worked (which is our dependent variable), annual population growth rates, population density, investment rate (defined as the share of investment over GDP for the total regional economy), share of employment in manufacturing over total regional employment, and share of employment in agriculture over total regional employment.

The Figures 7.a to 7.c present results for all NUTS-2 Austrian, Finnish and Swedish regions between 1980 and 2004. In this case, the donor pool is given by all regions in Switzerland and Norway. These results are by and large supportive of those obtained at the country level. The growth dividends for EU membership among Austrian regions tend to be large and clearly not temporary, with the notable exception of the capital region (Wien). In the case of Finnish regions, the results again show clear positive growth dividends from EU membership with the obvious exception of the Finnish northern region (Pohjois-Suomi) and this may well be explained by the stronger links of this region with Russia (Gorodnichenko, Mendoza and Tesar, 2012). Indeed, the dominant role of Russia as trade partner seems to reduce the scope for growth effects from trade integration with the EU. Finally, in the case of the regions of Sweden we can observe a distinctive positive effect of EU membership on labor productivity with essentially no exceptions. In a few regions there seems to have been some anticipation of these benefits, but that is not general and surely not the case for the capital region (Stockholm).

[24] The data are aggregated for six broad sectors: agriculture, energy and manufacturing, construction, distributions and hotels, communication, financial and business services, non-market services.
[25] See, for instance, Becker, Egger and von Ehrlich (2010) and Tabellini (2010).

6. Conclusions and suggestions for future research

The objective of this paper was to provide an alternative, novel and somewhat more satisfactory answer to the important question of whether one can identify significant and substantial payoffs from EU membership in terms of GDP and labor productivity growth rates. The main finding is that there seems to be a strong tendency for the growth and productivity effects from EU membership to be positive and substantial. However, there is considerable heterogeneity across countries. More specifically, GDP or productivity growth rates increase with EU membership in Denmark, Ireland, United Kingdom, Portugal, Spain, Austria, Estonia, Hungary, Poland, Latvia, Slovenia and Lithuania. The growth effects tend to be smaller, albeit still mostly positive, for Finland, Sweden, Czech Republic and Slovakia. Yet notice that there are important differences, within the latter group, between the effects on productivity and on GDP growth. Finally, and surprisingly, the evidence also supports the view that only one country (Greece) after EU accession experienced smaller GDP or productivity growth rates than its counterfactual. It is not just the disappointing absolute growth performance in Greece for the first 15 years after accession (that is, 1981-1996), but also the fact that its relative performance was also below par: during this period, the gap between Greek and the EU average GDP has actually increased. Indeed, Greece provides the only case on record in which this gap has increased for more than 5 years following membership.

There are three directions for further research. One is that research is clearly needed to provide a fuller understanding of why Greece turned out to have such an exceptionally negative economic growth performance since EU accession. The return we expect from such research activities is high, as they can certainly throw light on the current Greek situation, and hopefully even suggest ways out of it. The second direction should focus on disentangling the various aspects of the integration process, including the political economy dimension. Future analysis could focus not only on trade and financial integration but also on democracy, transparency and political support for European

integration. These issues appear particularly relevant in light of the tensions that arose within the EU and especially within the Euro area as a result of the Great Recession. The third and last area for further research regards the specific mechanisms and channels through which EU membership seems able to support faster GDP and productivity growth rates, as these mechanisms, and their effectiveness, may well have changed over time.

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Table 1: Economic Growth in Europe and Around the World: 1820-2008

(Average annual compounded growth rates, GDP per capita, US$ 1990 Geary-Khamis PPP estimates)

Period	Western Europe	Southern Europe	Eastern Europe	Former Soviet Union	United States	Japan	East Asia	Latin America
1820-1870	1.0	0.6	0.6	0.6	1.3	0.2	-0.1	0.0
1870-1913	1.3	1.0	1.4	1.0	1.8	1.4	0.8	1.8
1913-1950	0.8	0.4	0.6	1.7	1.6	0.9	-0.2	1.4
1950-1973	3.8	4.5	3.6	3.2	2.3	7.7	2.3	2.5
1973-1994	1.7	1.9	-0.2	-1.6	1.7	2.5	0.3	0.9
1994-2008	1.6	2.7	4.0	4.2	1.7	1.0	3.9	1.6

Note: Regional aggregates are population-weighted. Western Europe refers to Austria, Belgium, Denmark, Finland, France, West Germany, Italy, the Netherlands, Norway, Sweden, Switzerland, and the United Kingdom. Eastern Europe refers to Albania, Bulgaria, Czechoslovakia, Hungary, Poland, Romania, and Yugoslavia. Southern Europe refers to Greece, Ireland, Spain, and Turkey. After 1989, West Germany becomes Germany, and the data reflect the newly independent countries in Eastern Europe that emerge from Czechoslovakia and Yugoslavia.

Source: World Bank (2012)

Notes on Figure 1 to 5: SYNTHETIC COUNTERFACTUAL RESULTS

There are two series plotted in each Figure.
The one with a continuous line represents the actual per capita GDP or labor productivity levels of the country in question.
The series with a dashed line plots the synthetic counterfactual results that purport to answer the following question:

> *What would have been the GDP (or productivity levels) of the country in question if it had NOT become an EU member in the year it did?*

The synthetic counterfactuals are presented for each country in the last four EU enlargements:

- Denmark, Ireland, and United Kingdom in the 1970s.
- Greece, Spain and Portugal in the 1980s.
- Austria, Finland and Sweden in the 1990s.
- Eastern European countries in the 2000s.

Results are presented for two growth measures (per capita GDP and labor productivity). Others are available from the authors upon request.
Results are presented for a donor pool of countries taken from Bower and Turrini (2010). The reported results are robust to dramatic changes in donor pool (from the whole world to selected EU neighbors); these are available from the authors upon request.

Figure 1: Real GDP per capita in the Northern and Southern enlargements

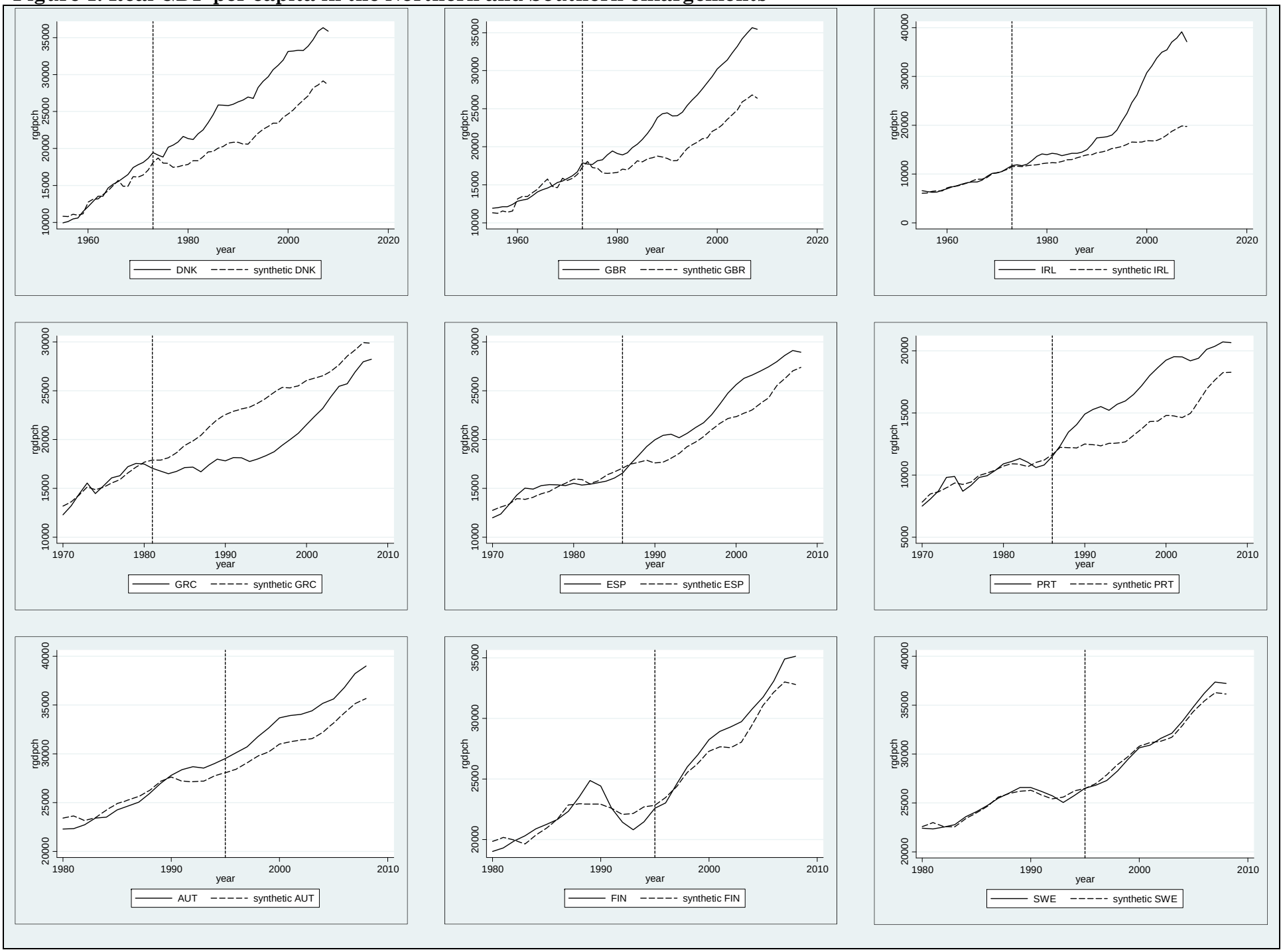


Figure 2: Real GDP per capita in the Eastern enlargement

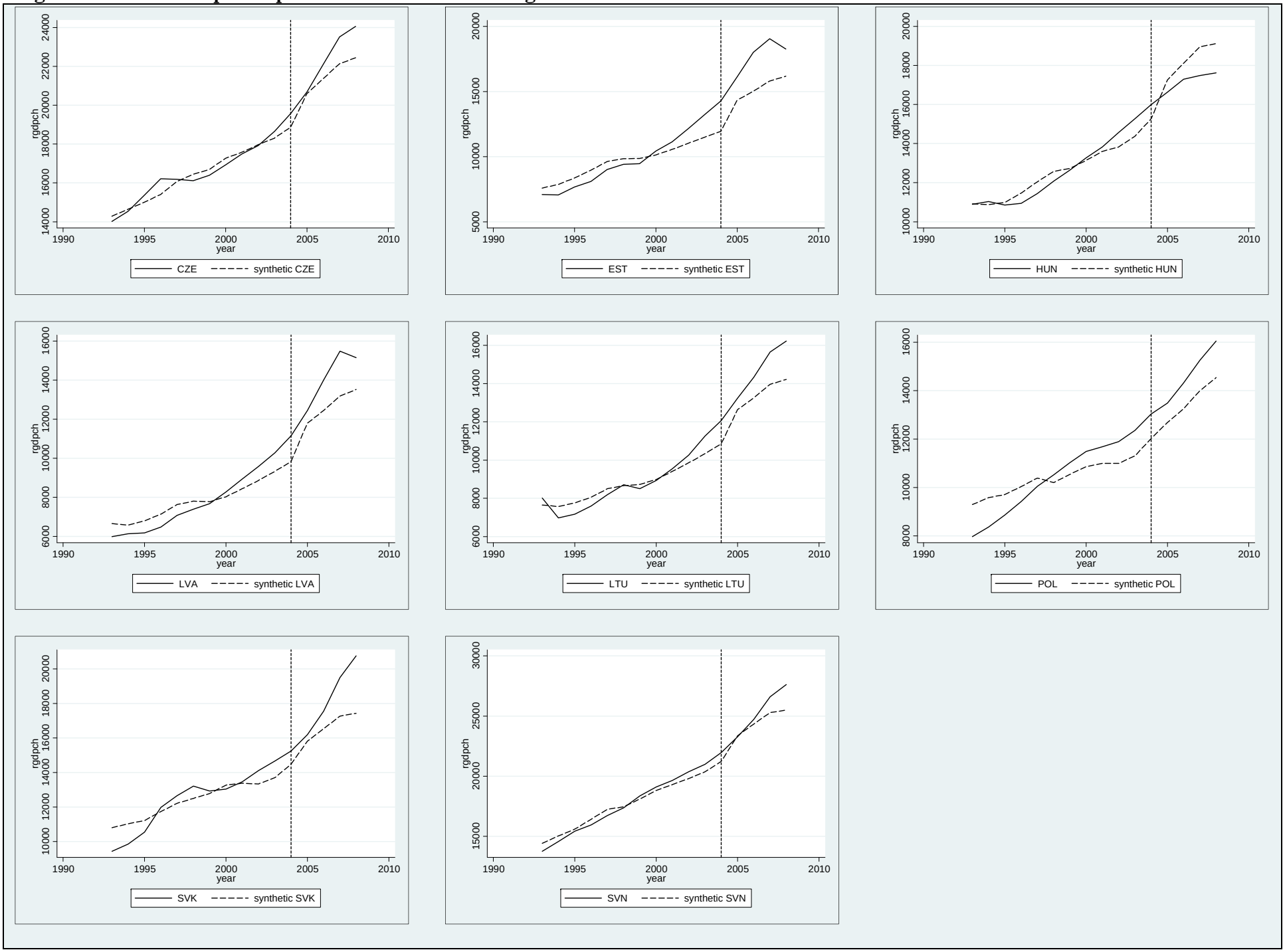


Figure 3: Labor productivity in the Northern and Southern enlargement

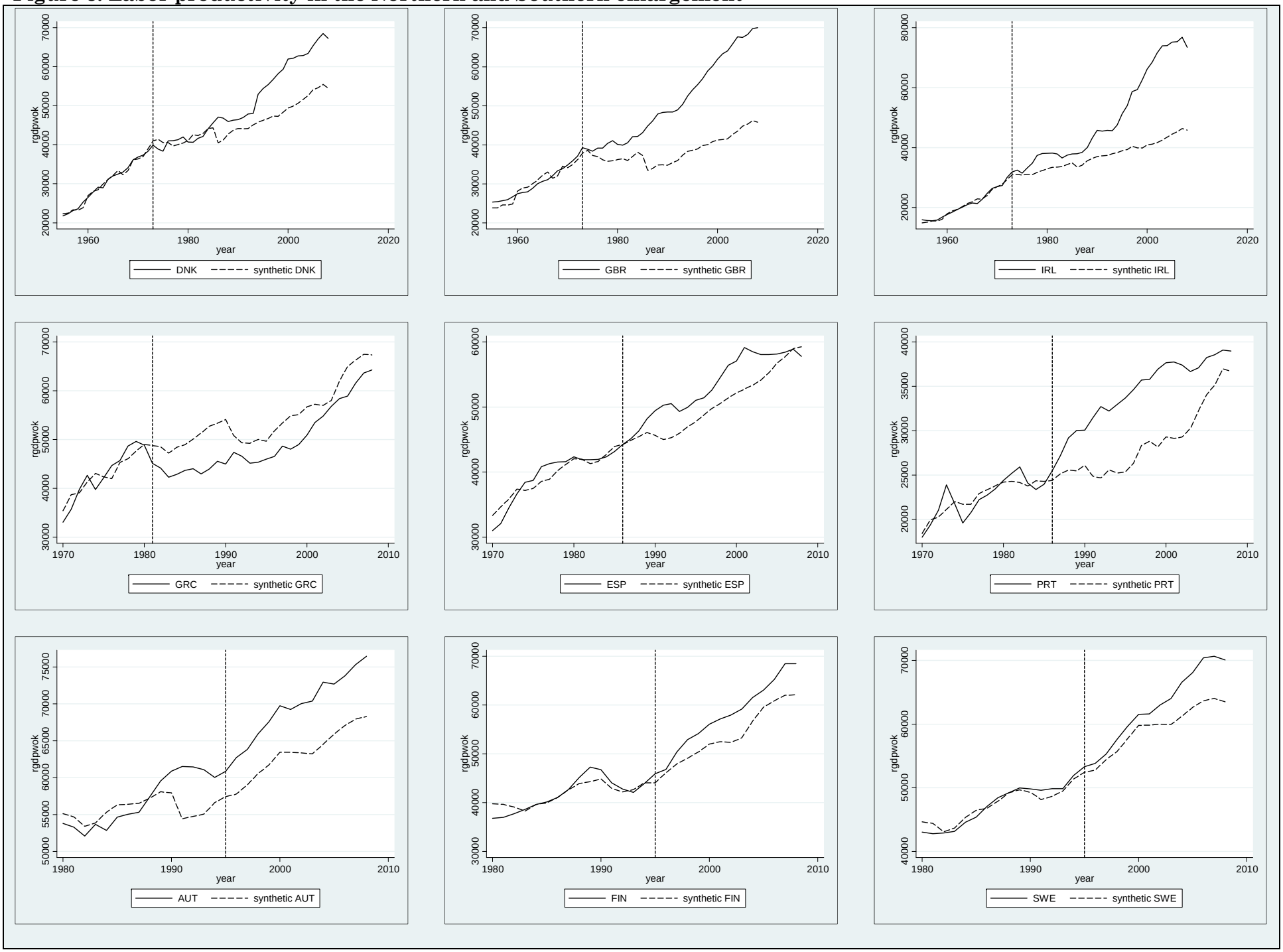


Figure 4: Labor productivity in the Eastern enlargement

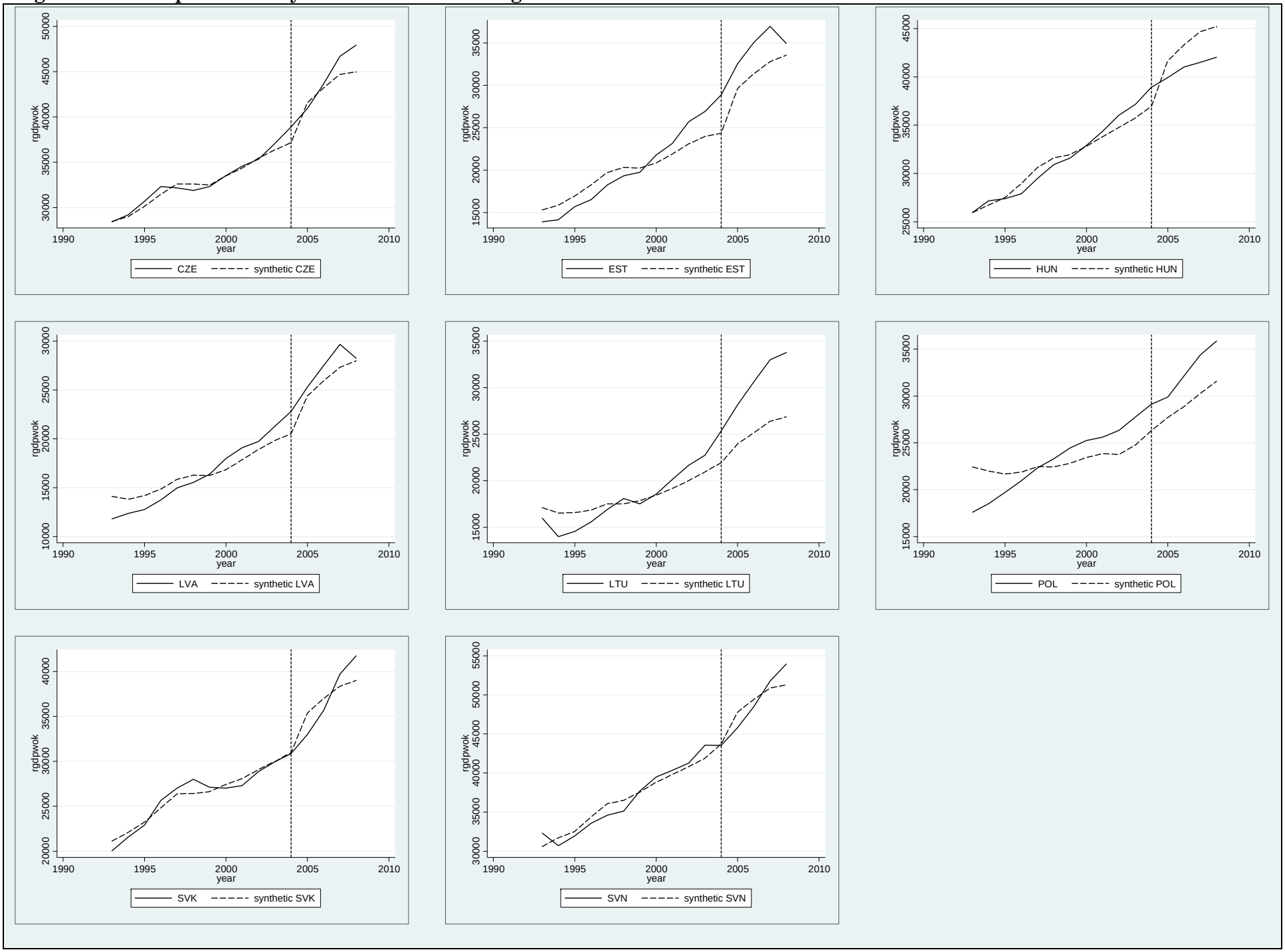


Figure 5: Anticipation effects in real GDP per capita in the Eastern enlargement

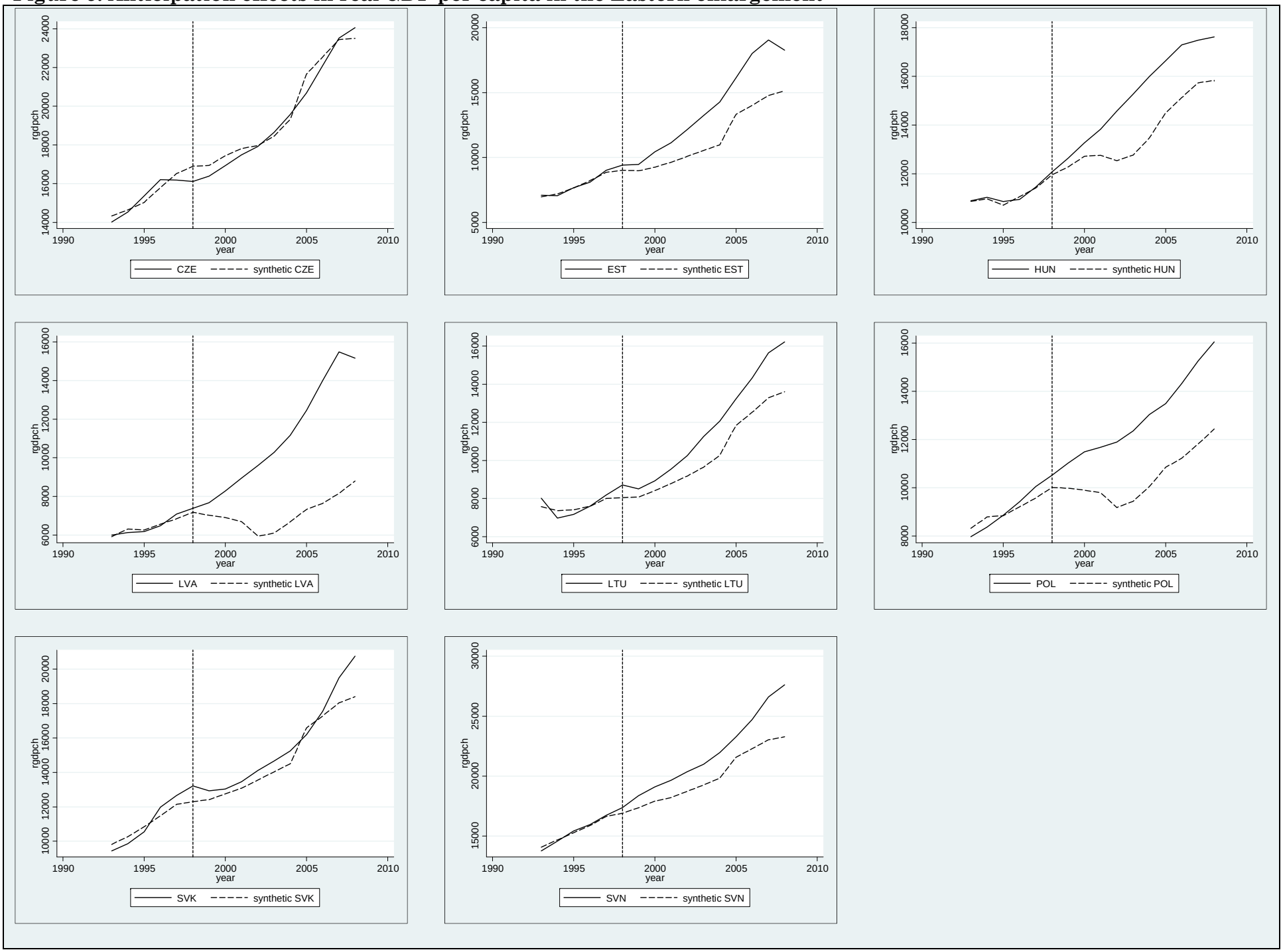


Figure 6: Anticipation effects in labor productivity in the Eastern enlargement

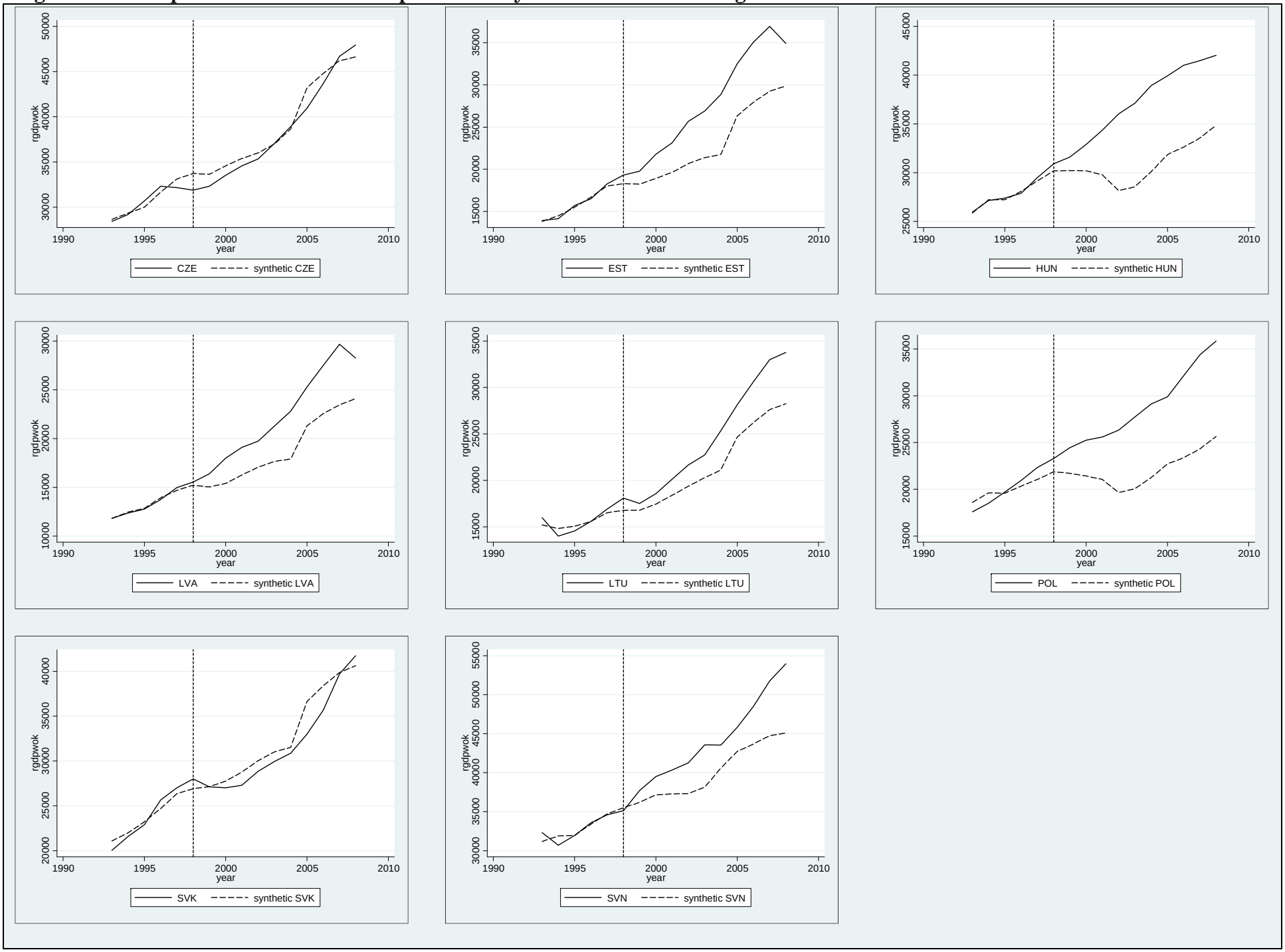


Table 2: Differences-in-differences estimates of EU membership

	Real GDP per capita		Labor productivity	
	DID estimate and std error	R-square and Number of obs	DID estimate and std error	R-square and Number of obs
Denmark	4939 1389.870***	0.645 108	5235 2548.472**	0.625 108
United Kingdom	4882 1242.031***	0.575 108	12498 2302.802***	0.622 108
Ireland	6417 1693.316***	0.478 108	12641 3098.360***	0.607 108
Greece	-3680 1199.280***	0.523 78	-5055 2650.815*	0.385 78
Portugal	2969 818.513***	0.708 78	5786 1375.306***	0.699 78
Spain	2036 1163.037*	0.633 78	2725 1901.338	0.679 78
Austria	2500 1264.643*	0.718 58	5158 1863.316***	0.724 58
Sweden	182 1445.066	0.638 58	3462 2208.747	0.751 58
Finland	957 1507.296	0.620 58	4123 2707.401	0.681 58
Czech Republic	-228 1315.601	0.444 32	-635 2588.259	0.432 32
Hungary	1514 773.860*	0.597 32	5944 1591.742***	0.686 32
Poland	2419 750.940***	0.640 32	6468 1653.858***	0.663 32
Estonia	2342 1416.446	0.496 32	4784 2628.393*	0.544 32
Latvia	3819 970.475***	0.575 32	3435 1989.282*	0.535 32
Lithuania	1368 1109.930	0.421 32	2993 2363.981	0.441 32
Slovakia	716 1305.509	0.480 32	-835 2737.253	0.468 32
Slovenia	1983 1417.173	0.568 32	3878 2288.965	0.574 32
Northern enlargement 1973	5412 1049.586***	0.478 324	10125 1767.457***	0.567 324
Southern enlargement 1981&1986	172 990.688	0.401 234	735 2760.823	0.221 234
Southern enlargement 1986	2503 1174.714***	0.432 156	4256 3241.477	0.225 156
Northern enlargement 1995	1213 966.225	0.561 174	4248 2062.294**	0.481 174
Eastern enlargement (1998-anticipation effect)	1742 1009.064*	0.176 256	3254 2064.973	0.183 256

NOTES: These results assess the statistical significance of the differences between the average difference pre-treatment (between the actual country and its synthetic) and the average difference post-treatment (between the actual country and its synthetic) estimated by the synthetic counterfactuals in Figures 1, 2, 5 and 6. Results are presented for each country and then for each enlargement and for GDP per capita and labor productivity series. The results are robust to other growth measures which are available upon request. Robust standard errors are reported. Inference: *** p<0.01; ** p<0.05; * p<0.1

Table 3. Difference between country's Actual and Synthetic Per Capita GDP paths

	DIFFERENCE (%) in post-treatment average GDP pc LEVEL between ACTUAL and SYNTHETIC			DIFFERENCE (pp) in post-treatment compounded annual GDP pc GROWTH RATE between ACTUAL and SYNTHETIC		
	All post-treatment	10 years after treatment	5 years after treatment	All post-treatment	10 years after treatment	5 years after treatment
Denmark	24.214	14.394	10.275	0.450	1.063	2.072
United Kingdom	24.701	9.386	5.597	0.764	0.952	2.107
Ireland	43.459	9.413	5.316	1.785	0.702	2.324
Greece	-15.167	-14.286	-9.356	-0.030	-1.867	-1.968
Portugal	20.932	17.523	11.468	0.624	2.396	4.496
Spain	9.552	7.499	6.371	0.392	0.984	3.545
Austria	7.820	7.576	6.742	0.305	0.219	0.679
Finland	3.431	2.835	1.113	0.630	0.337	0.952
Sweden	0.574	-0.130	-1.035	0.223	0.123	-0.134
Czech Republic	-1.191	-1.191	-1.914	0.735	0.735	1.200
Estonia	20.546	20.546	14.493	1.554	1.554	3.913
Hungary	11.380	11.380	8.886	0.993	0.993	3.479
Latvia	53.486	53.486	30.915	5.387	5.387	10.020
Lithuania	13.227	13.227	9.658	1.031	1.031	1.575
Poland	23.073	23.073	18.306	2.117	2.117	4.431
Slovak Republic	4.740	4.740	4.205	0.502	0.502	-0.580
Slovenia	9.898	9.898	6.862	1.492	1.492	1.211
Northern enlargement 1973	29.407	11.315	7.323	0.953	0.933	2.142
Southern enlargement 1981&1986	0.905	1.329	1.597	0.228	0.317	1.802
Southern enlargement 1986	14.098	11.548	8.460	0.4867	1.567	3.947
Northern enlargement 1995	3.964	3.4672	2.374	0.367	0.206	0.469
Eastern enlargement 1998 (anticipation)	12.978	12.978	8.998	1.526	1.526	2.582

Notes on Figure 6: SYNTHETIC COUNTERFACTUAL RESULTS USING REGIONAL DATA

Regional data for the 1995 enlargement: Austria, Finland and Sweden.
The donor pool are regions from Norway and Switzerland.
The dependent variable is the labor productivity per hour worked.
The source of the regional data is Cambridge Econometrics.

Figure 6.a: Regional labor productivity - Austria

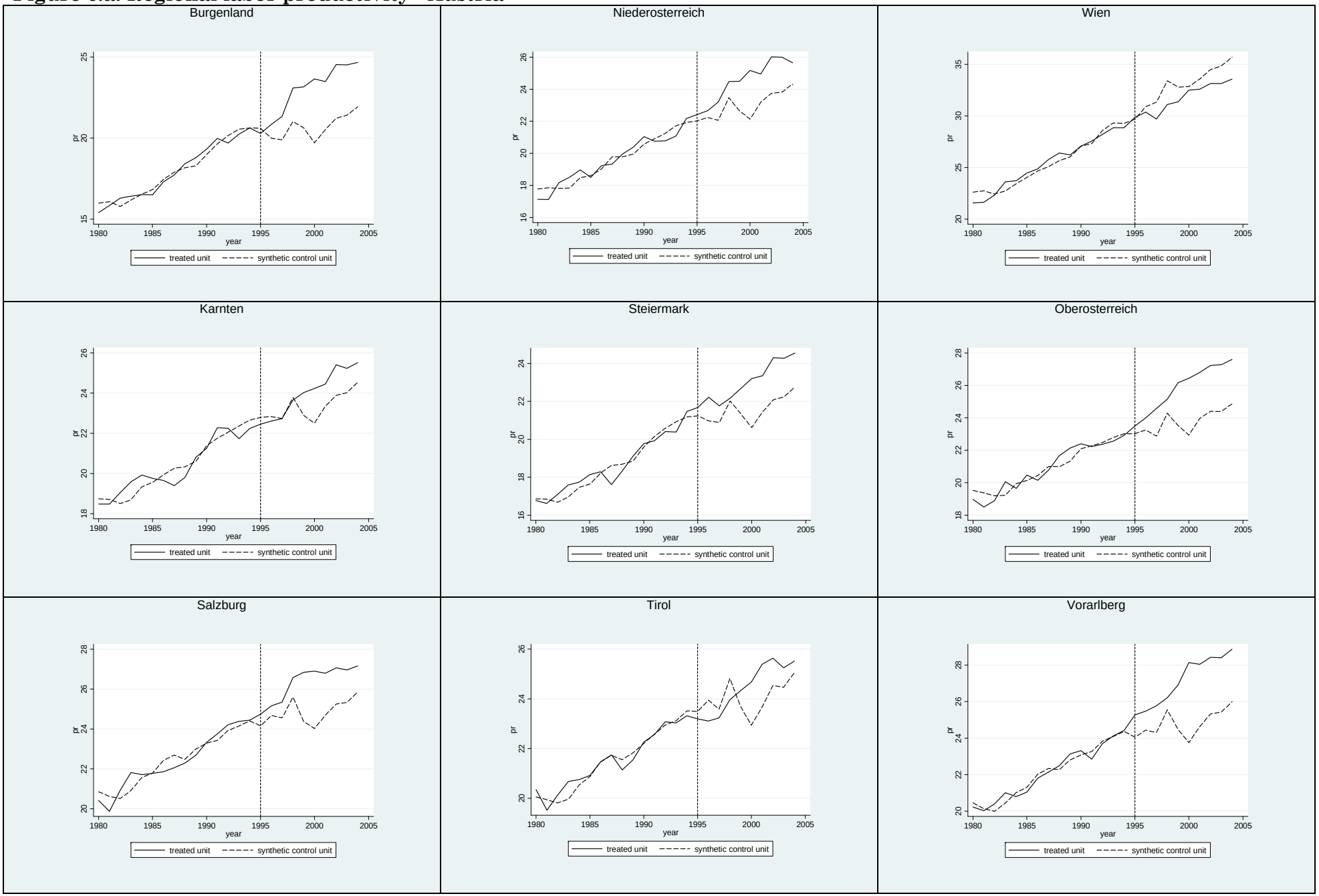


Figure 6.b: Regional labor productivity - Finland

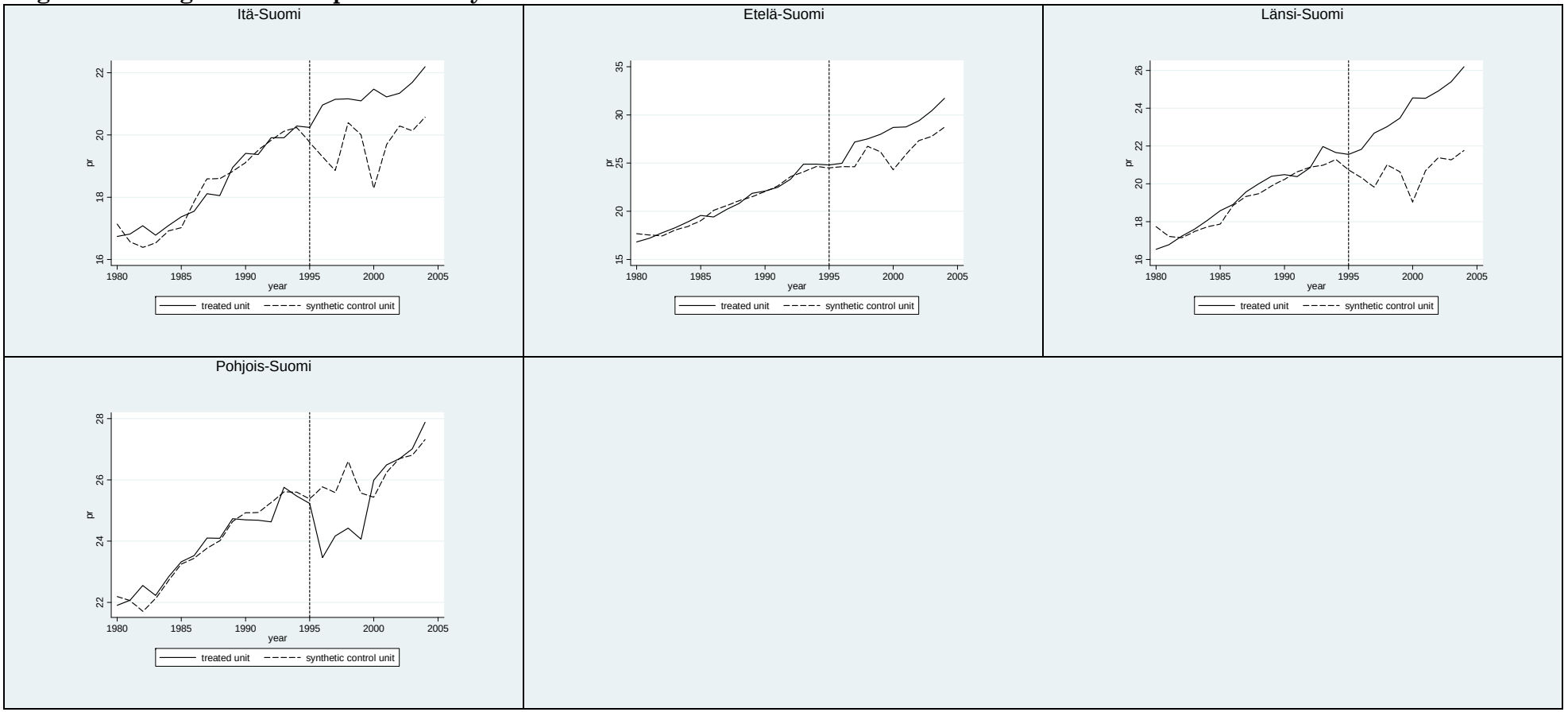
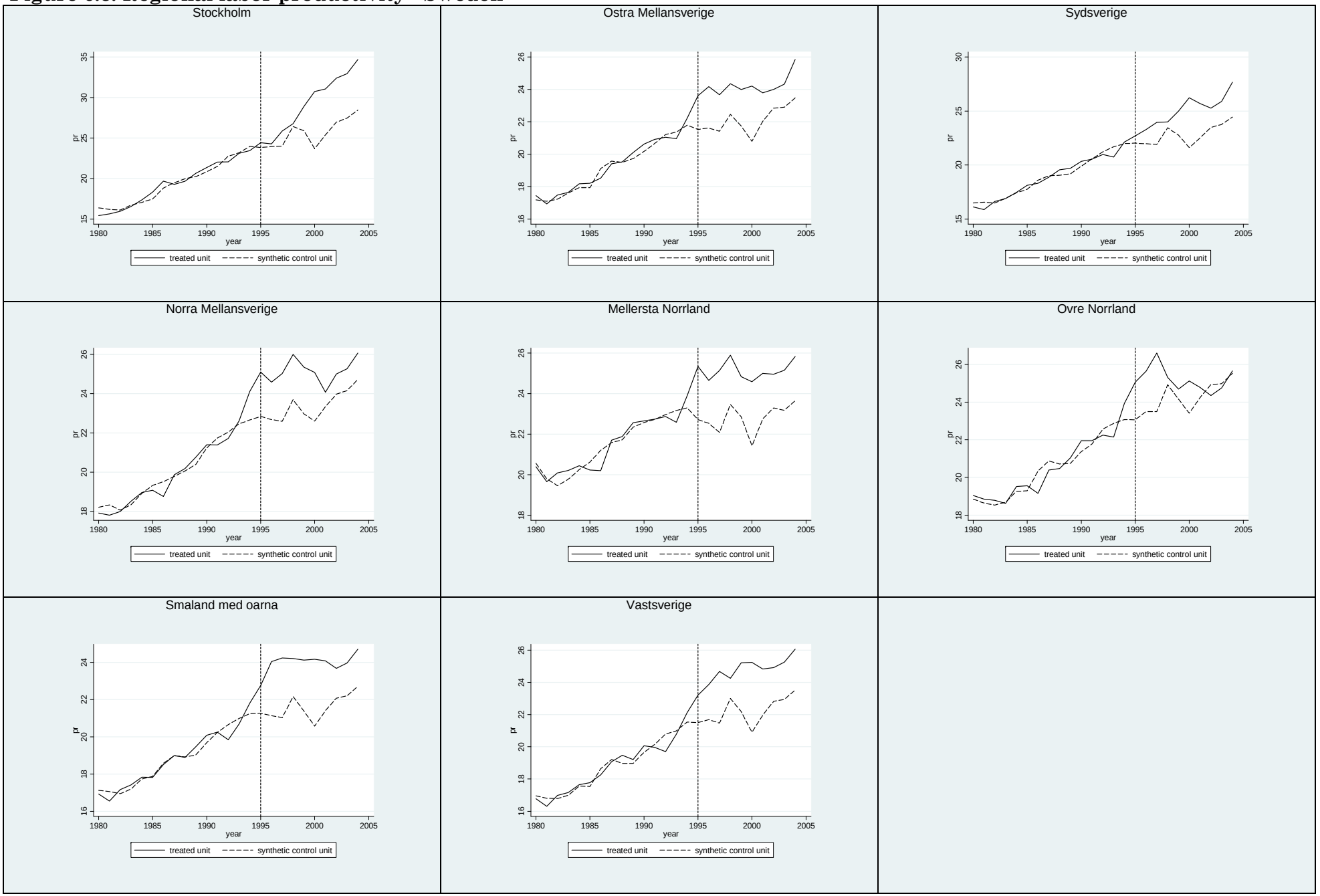


Figure 6.c: Regional labor productivity - Sweden



Appendix

Table A.1: Unit weights and predictor balance – Real GDP per capita in the Northern and Southern enlargements

DNK

Co_No	Unit_Weight		Treated	Synthetic
ARG	0	rgdpch	14128.42	13781.82
BRA	0	ki	18.5992	19.26247
CHL	0	openk	30.1045	23.64842
CHN	0	dens	113.4803	47.12548
COL	0	popgr	-.0734791	-.1410557
EGY	0	pop	4707.356	15871.74
JPN	.14	agr	6.466325	11.53364
KOR	0	ind	31.92838	32.99036
MEX	0	ter	20.4622	19.18892
NZL	.86	sec	93.00428	78.93301
PHL	0			
THA	0			
TUR	0			

GBR

Co_No	Unit_Weight		Treated	Synthetic
ARG	.088	rgdpch	13913.92	13854.64
BRA	0	ki	14.05553	18.64536
CHL	0	openk	21.84542	25.20256
CHN	0	dens	225.9397	10.00904
COL	0	popgr	-.0290001	-.1532594
EGY	0	pop	53638.89	4239.138
JPN	0	agr	2.834722	12.45094
KOR	0	ind	41.51076	32.70868
MEX	0	ter	14.88064	18.92526
NZL	.912	sec	75.38846	74.77053
PHL	0			
THA	0			
TUR	0			

IRL

Co_No	Unit_Weight		Treated	Synthetic
ARG	.257	rgdpch	8184.698	8184.087
BRA	0	ki	18.71273	18.73474
CHL	0	openk	31.03721	14.54451
CHN	0	dens	42.19595	72.83208
COL	0	popgr	-.1567079	-.1624889
EGY	0	pop	2890.526	35512.44
JPN	.203	agr	16.56953	20.26631
KOR	0	ind	34.49368	34.52512
MEX	.015	ter	11.62112	13.68258
NZL	.24	sec	74.38288	56.13163
PHL	0			
THA	0			
TUR	.286			

GRC

Co_No	Unit_Weight		Treated	Synthetic
ALB	0	rgdpch	15438.97	15374.55
ARG	0	ki	30.68624	30.49525
AUS	.281	openk	21.31609	21.45409
BRA	.132	dens	70.92705	154.9721
CAN	0	popgr	.001197	.0219185
CHE	0	pop	9140.592	73546.11
CHL	0	ter	15.91769	20.06139
CHN	0	sec	74.82954	75.50592
COL	0			
EGY	0			
HKG	0			
IDN	0			
ISL	0			
ISR	0			
JPN	.493			
KOR	0			
MAR	0			
MEX	0			
MYS	0			
NZL	0			
PHL	0			
THA	0			
TUN	.093			
TUR	0			
URY	0			

ESP

Co_No	Unit_Weight		Treated	Synthetic
ALB	0	rgdpch	14801.19	14809.37
ARG	.198	ki	22.62071	22.64224
AUS	.522	openk	17.9698	18.22055
BRA	.19	dens	72.85315	21.01268
CAN	0	popgr	.0631041	.0632322
CHE	.012	pop	36435.65	40125.24
CHL	0	agr	8.548183	8.564857
CHN	0	ind	37.5927	39.50187
COL	0	ter	19.69868	19.71548
EGY	0	sec	76.33068	67.01273
IDN	0			
ISL	0			
JPN	.014			
KOR	.021			
MAR	.001			
MEX	.043			
MYS	0			
NZL	0			
PHL	0			
THA	0			
TUN	0			
TUR	0			
URY	0			

PRT

Co_No	Unit_Weight		Treated	Synthetic
ALB	0	rgdpch	9851.037	9863.569
ARG	0	ki	23.66904	26.33484
AUS	0	openk	30.26919	39.94156
BRA	0	dens	102.4411	42.89579
CAN	0	popgr	.0176952	.0176214
CHE	.075	pop	9521.294	18472.69
CHL	0	agr	21.99968	19.07358
CHN	0	ind	30.77487	30.7784
COL	0	ter	10.54996	10.57261
EGY	0	sec	49.49542	50.64321
IDN	0			
ISL	.189			
JPN	0			
KOR	0			
MAR	.1			
MEX	0			
MYS	0			
NZL	.042			
PHL	0			
THA	0			
TUN	.136			
TUR	.344			
URY	.114			

AUT

Co_No	Unit_Weight		Treated	Synthetic
ALB	0	rgdpch	25563.83	25599.76
ARG	0	ki	22.20473	26.49845
AUS	.256	openk	60.13667	59.49917
BRA	0	dens	92.86038	103.5351
CAN	0	popgr	.0313564	.1421614
CHE	.572	pop	7680.184	10803.99
CHL	.006	agr	3.86332	6.137594
CHN	0	ind	32.90471	34.16473
COL	0	ter	29.14543	23.33576
EGY	0	sec	98.22047	98.11098
IDN	0			
ISL	0			
JPN	0			
KOR	0			
MAR	0			
MEX	0			
MYS	.166			
NZL	0			
PHL	0			
THA	0			
TUN	0			
TUR	0			
URY	0			

FIN

Co_No	Unit_Weight		Treated	Synthetic
ALB	0	rgdpch	21584.77	21582.48
ARG	0	ki	24.05991	24.00462
AUS	.002	openk	42.04161	53.45448
BRA	.118	dens	16.19758	16.2057
CAN	.313	popgr	.0203774	.1459742
CHE	.042	pop	4933.075	26483.03
CHL	0	agr	7.022083	8.844635
CHN	0	ind	34.50779	34.43856
COL	0	ter	40.84733	40.50074
EGY	0	sec	108.2895	83.82644
IDN	0			
ISL	.406			
JPN	0			
KOR	0			
MAR	0			
MEX	0			
MYS	0			
NZL	.009			
PHL	0			
THA	0			
TUN	.107			
TUR	0			
URY	.001			

SWE

Co_No	Unit_Weight		Treated	Synthetic
ALB	0	rgdpch	24649.82	24651.62
ARG	0	ki	17.55956	21.22014
AUS	0	openk	50.63147	50.61927
BRA	0	dens	20.63541	35.73619
CAN	.324	popgr	.0273545	.140671
CHE	.188	pop	8491.591	11418.76
CHL	.074	agr	4.137151	6.492595
CHN	0	ind	30.5305	32.9409
COL	0	ter	32.59514	46.08598
EGY	0	sec	93.11512	93.25807
IDN	0			
ISL	.267			
JPN	0			
KOR	0			
MAR	0			
MEX	0			
MYS	0			
NZL	.147			
PHL	0			
THA	0			
TUN	0			
TUR	0			
URY	0			

Figure A.1: Placebo cross-country – Real GDP per capita in the Northern and Southern enlargements

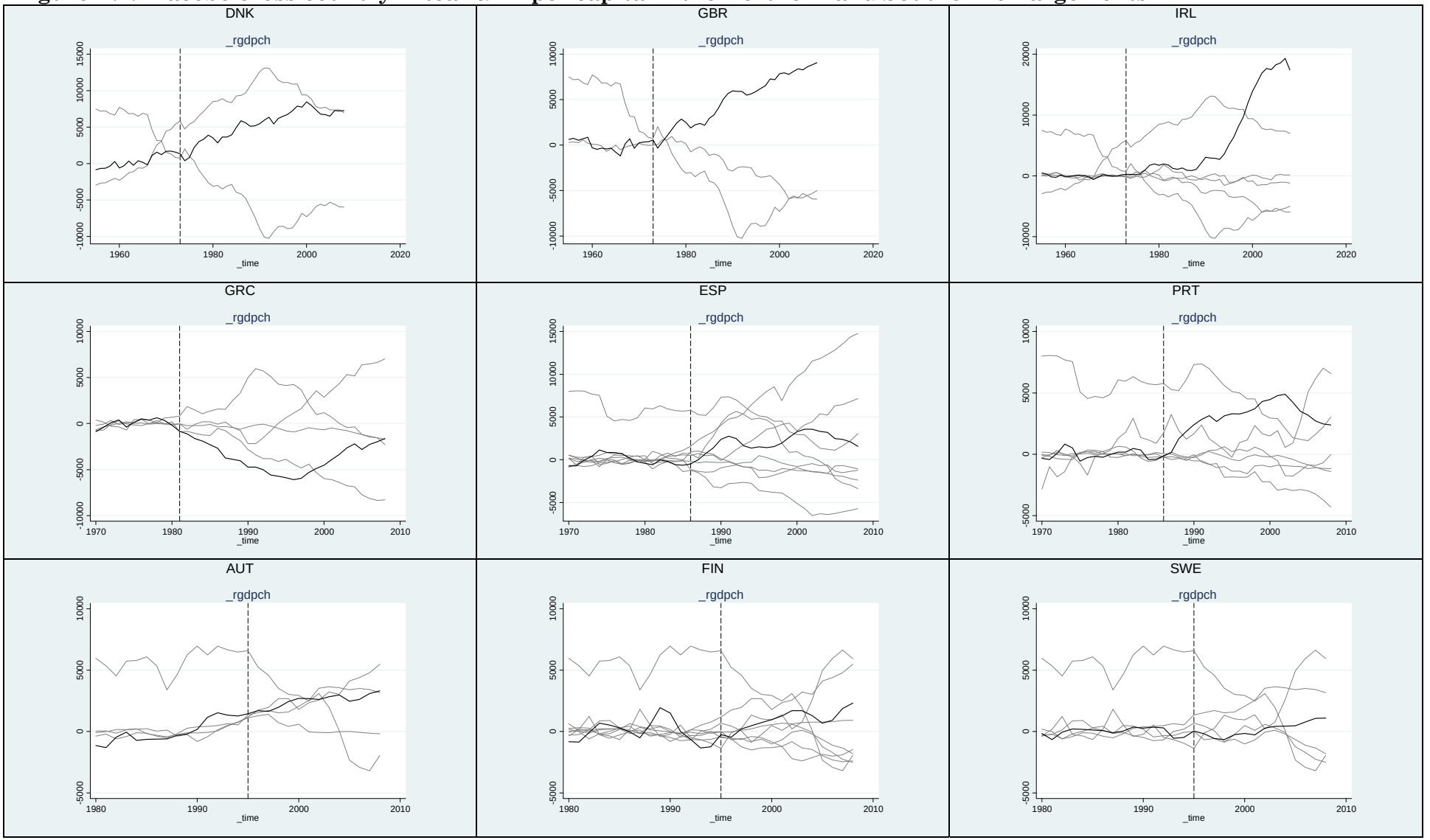


Table A.2: Unit weights and predictor balance – Labor productivity in the Northern and Southern enlargements

DNK

Co_No	Unit_Weight		Treated	Synthetic
ARG	0	rgdpwok	30005.19	29968.94
BRA	0	ki	18.5992	20.95852
CHL	0	openk	30.1045	18.74878
CHN	0	dens	113.4803	105.0577
COL	0	popgr	-.0734791	-.1329159
EGY	0	pop	4707.356	39784.62
JPN	.355	agr	6.466325	9.793382
KOR	0	ind	31.92838	35.33023
MEX	.084	ter	20.4622	17.87791
NZL	.561	sec	93.00428	76.37113
PHL	0			
THA	0			
TUR	0			

GBR

Co_No	Unit_Weight		Treated	Synthetic
ARG	.278	rgdpwok	29986.85	29843.95
BRA	0	ki	14.05553	20.24261
CHL	0	openk	21.84542	20.90074
CHN	0	dens	225.9397	41.59006
COL	0	popgr	-.0290001	-.1543576
EGY	0	pop	53638.89	19411.06
JPN	.121	agr	2.834722	11.06025
KOR	0	ind	41.51076	37.00394
MEX	0	ter	14.88064	18.00556
NZL	.6	sec	75.38846	69.81651
PHL	0			
THA	0			
TUR	0			

IRL

Co_No	Unit_Weight		Treated	Synthetic
ARG	0	rgdpwok	20962.44	20924.27
BRA	0	ki	18.71273	21.77532
CHL	0	openk	31.03721	17.77406
CHN	0	dens	42.19595	117.6811
COL	.335	popgr	-.1567079	-.1874131
EGY	0	pop	2890.526	45576.72
JPN	.398	agr	16.56953	14.30623
KOR	0	ind	34.49368	34.68684
MEX	0	ter	11.62112	14.07285
NZL	.267	sec	74.38288	64.18454
PHL	0			
THA	0			
TUR	0			

GRC

Co_No	Unit_Weight		Treated	Synthetic
ALB	0	rgdpwok	42784.13	42721.82
ARG	0	ki	30.68624	30.41041
AUS	0	openk	21.31609	44.85153
BRA	.061	dens	70.92705	88.41666
CAN	0	popgr	.001197	-.0081944
CHE	.17	pop	9140.592	29742.9
CHL	0	ter	15.91769	15.90935
CHN	0	sec	74.82954	83.13898
COL	0			
EGY	0			
HKG	0			
IDN	0			
ISL	.572			
ISR	0			
JPN	.197			
KOR	0			
MAR	0			
MEX	0			
MYS	0			
NZL	0			
PHL	0			
THA	0			
TUN	0			
TUR	0			
URY	0			

ESP

Co_No	Unit_Weight		Treated	Synthetic
ALB	0	rgdpwok	39388.36	39268.66
ARG	0	ki	22.62071	24.61626
AUS	.413	openk	17.9698	20.35542
BRA	.23	dens	72.85315	92.88469
CAN	0	popgr	.0631041	.0571259
CHE	.134	pop	36435.65	58543.7
CHL	0	agr	8.548183	6.903183
CHN	0	ind	37.5927	38.58924
COL	0	ter	19.69868	19.70236
EGY	0	sec	76.33068	76.33312
IDN	0			
ISL	0			
JPN	.218			
KOR	0			
MAR	0			
MEX	.005			
MYS	0			
NZL	0			
PHL	0			
THA	0			
TUN	0			
TUR	0			
URY	0			

PRT

Co_No	Unit_Weight		Treated	Synthetic
ALB	.003	rgdpwok	22494.05	22527.2
ARG	0	ki	23.66904	23.17229
AUS	0	openk	30.26919	33.27717
BRA	0	dens	102.4411	27.16638
CAN	0	popgr	.0176952	.0314353
CHE	0	pop	9521.294	21614.83
CHL	0	agr	21.99968	21.11588
CHN	0	ind	30.77487	30.79941
COL	.373	ter	10.54996	10.56679
EGY	0	sec	49.49542	49.59341
IDN	0			
ISL	.232			
JPN	0			
KOR	0			
MAR	0			
MEX	0			
MYS	0			
NZL	.062			
PHL	0			
THA	0			
TUN	.064			
TUR	.267			
URY	0			

AUT

Co_No	Unit_Weight		Treated	Synthetic
ALB	0	rgdpwok	56832.47	55706.88
ARG	0	ki	22.20473	23.62397
AUS	.112	openk	60.13667	51.05631
BRA	0	dens	92.86038	102.3621
CAN	.274	popgr	.0313564	.1174451
CHE	.614	pop	7680.184	13266.7
CHL	0	agr	3.86332	3.337138
CHN	0	ind	32.90471	32.78999
COL	0	ter	29.14543	42.04317
EGY	0	sec	98.22047	100.4226
IDN	0			
ISL	0			
JPN	0			
KOR	0			
MAR	0			
MEX	0			
MYS	0			
NZL	0			
PHL	0			
THA	0			
TUN	0			
TUR	0			
URY	0			

FIN

Co_No	Unit_Weight		Treated	Synthetic
ALB	0	rgdpwok	41699.93	41657.21
ARG	0	ki	24.05991	24.05948
AUS	0	openk	42.04161	48.38746
BRA	0	dens	16.19758	75.48382
CAN	.244	popgr	.0203774	.1458365
CHE	0	pop	4933.075	14088.89
CHL	0	agr	7.022083	9.476161
CHN	0	ind	34.50779	34.45906
COL	0	ter	40.84733	40.76466
EGY	0	sec	108.2895	91.4924
IDN	0			
ISL	.462			
JPN	0			
KOR	.17			
MAR	0			
MEX	0			
MYS	0			
NZL	0			
PHL	0			
THA	0			
TUN	0			
TUR	0			
URY	.123			

SWE

Co_No	Unit_Weight		Treated	Synthetic
ALB	0	rgdpwok	47167.41	47203.16
ARG	0	ki	17.55956	18.81346
AUS	0	openk	50.63147	50.66183
BRA	0	dens	20.63541	7.94606
CAN	.9	popgr	.0273545	.1679103
CHE	0	pop	8491.591	27842.08
CHL	0	agr	4.137151	4.846499
CHN	0	ind	30.5305	33.00149
COL	0	ter	32.59514	80.07969
EGY	.059	sec	93.11512	93.60544
IDN	0			
ISL	0			
JPN	0			
KOR	0			
MAR	0			
MEX	0			
MYS	.042			
NZL	0			
PHL	0			
THA	0			
TUN	0			
TUR	0			
URY	0			

Figure A.2: Placebo cross-country – Labor productivity in the Northern and Southern enlargements

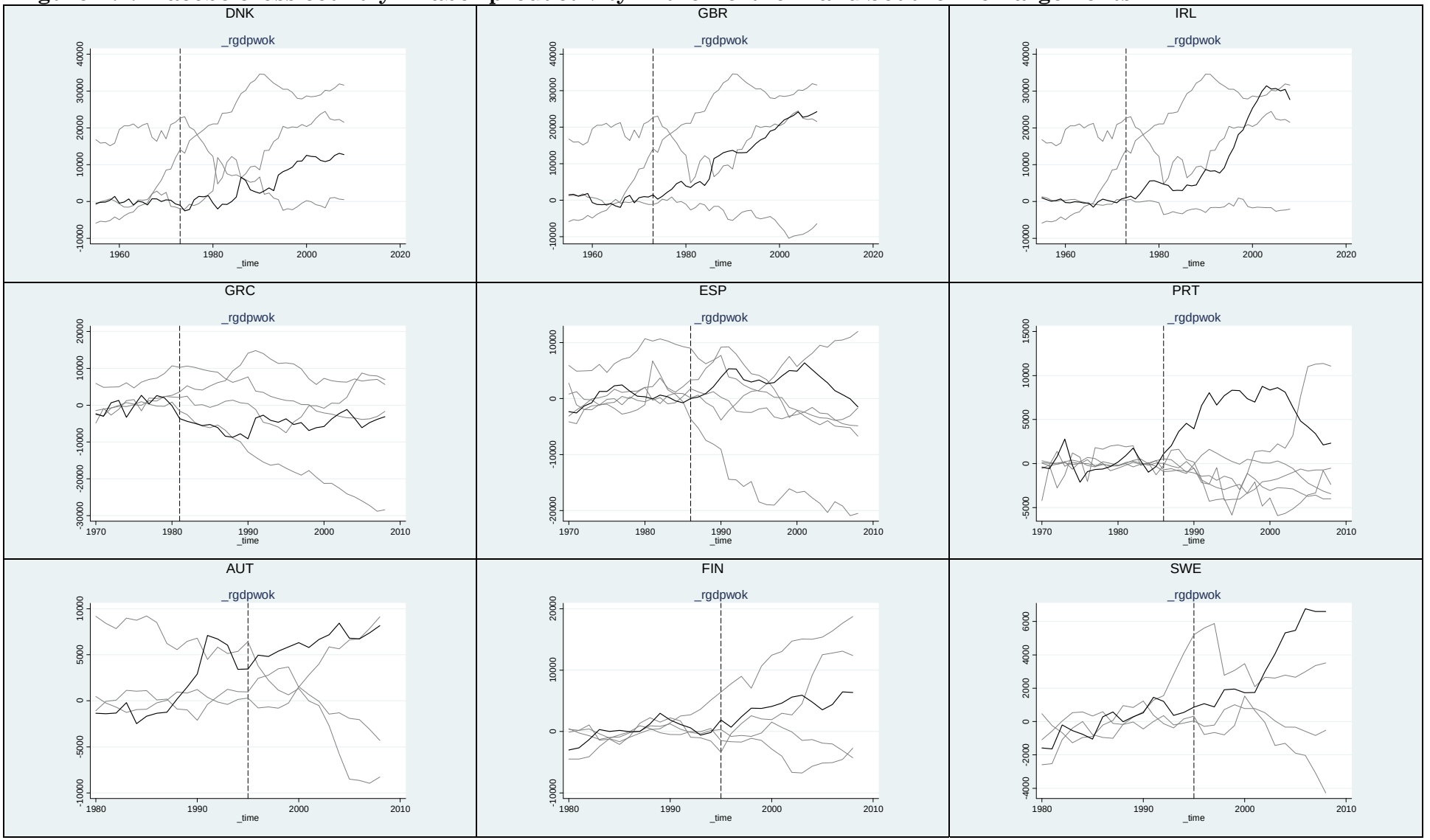


Table A.3: Unit weights and predictor balance –Real GDP per capita in the Eastern enlargement (1998 anticipation)

CZE

Co_No	Unit_W	Co_No	Unit_W		Treated	Synthetic
ALB	0	JPN	.175	rgdpch	15261.36	15267.26
ARG	0	KOR	0	ki	22.16795	22.16668
AUS	0	MAR	0	openk	69.43389	70.97353
BRA	0	MEX	0	dens	133.5837	113.0011
CAN	0	MKD	0	popgr	.0486624	.0742206
CHE	0	MYS	0	pop	10318.59	24877.22
CHL	0	NZL	0	ter	20.3791	30.25677
CHN	0	PHL	0	sec	91.11272	88.80191
COL	0	RUS	0			
EGY	0	THA	0			
HKG	0	TUN	0			
HRV	.631	TUR	0			
IDN	0	UKR	0			
ISL	.171	URY	.023			
ISR	0					

EST

Co_No	Unit_W	Co_No	Unit_W		Treated	Synthetic
ALB	0	JPN	0	rgdpch	7783.545	7776.776
ARG	0	KOR	0	ki	21.63741	21.59448
AUS	0	MAR	0	openk	105.5148	92.46768
BRA	0	MEX	0	dens	34.00993	81.56834
CAN	0	MKD	0	popgr	.152569	.092854
CHE	0	MYS	.047	pop	1449.33	8340.764
CHL	0	NZL	0	ter	31.31793	26.83056
CHN	0	PHL	0	sec	96.84887	81.11214
COL	0	RUS	0			
EGY	0	THA	0			
HKG	0	TUN	.008			
HRV	.878	TUR	0			
IDN	0	UKR	.066			
ISL	0	URY	0			
ISR	0					

HUN

Co_No	Unit_W	Co_No	Unit_W		Treated	Synthetic
ALB	0	JPN	0	rgdpch	11035.94	11001.41
ARG	0	KOR	0	ki	17.06667	18.58144
AUS	0	MAR	0	openk	57.38999	67.41381
BRA	0	MEX	.218	dens	114.9309	113.9884
CAN	0	MKD	.53	popgr	-.0001189	.1747698
CHE	0	MYS	0	pop	10291.17	23878.41
CHL	0	NZL	0	ter	21.47465	21.43687
CHN	0	PHL	0	sec	92.37348	78.00207
COL	0	RUS	0			
EGY	.042	THA	0			
HKG	.01	TUN	0			
HRV	0	TUR	0			
IDN	0	UKR	0			
ISL	.197	URY	.002			
ISR	0					

LVA

Co_No	Unit_W	Co_No	Unit_W		Treated	Synthetic
ALB	0	JPN	0	rgdpch	6377.258	6381.024
ARG	0	KOR	0	ki	12.20334	16.21778
AUS	0	MAR	0	openk	82.46302	50.10215
BRA	0	MEX	0	dens	40.06805	33.38711
CAN	0	MKD	0	popgr	.0163368	.2677545
CHE	0	MYS	0	pop	2494.698	22217.19
CHL	0	NZL	0	ter	26.22805	31.74279
CHN	0	PHL	0	sec	88.50974	78.27632
COL	0	RUS	0			
EGY	.341	THA	0			
HKG	0	TUN	0			
HRV	0	TUR	0			
IDN	0	UKR	0			
ISL	0	URY	.659			
ISR	0					

LTU

Co_No	Unit_W	Co_No	Unit_W		Treated	Synthetic
ALB	0	JPN	0	rgdpch	7586.694	7587.52
ARG	0	KOR	0	ki	10.7057	20.64397
AUS	0	MAR	0	openk	91.09633	90.97001
BRA	0	MEX	0	dens	57.8992	354.0716
CAN	.013	MKD	.005	popgr	.1377906	.1040714
CHE	0	MYS	0	pop	3674.981	24539.4
CHL	0	NZL	0	ter	27.95088	33.58612
CHN	0	PHL	0	sec	86.00709	85.989
COL	0	RUS	0			
EGY	0	THA	0			
HKG	.046	TUN	0			
HRV	.515	TUR	0			
IDN	0	UKR	.421			
ISL	0	URY	0			
ISR	0					

POL

Co_No	Unit_W	Co_No	Unit_W		Treated	Synthetic
ALB	0	JPN	0	rgdpch	8928.349	8942.925
ARG	0	KOR	0	ki	15.95067	16.86188
AUS	.11	MAR	0	openk	42.28706	48.34186
BRA	0	MEX	0	dens	126.731	29.07228
CAN	0	MKD	0	popgr	.2625728	.2626474
CHE	0	MYS	0	pop	38580.3	20607.13
CHL	0	NZL	0	ter	31.61196	35.97875
CHN	0	PHL	0	sec	96.92753	85.49217
COL	0	RUS	0			
EGY	.283	THA	0			
HKG	0	TUN	0			
HRV	0	TUR	0			
IDN	0	UKR	0			
ISL	0	URY	.607			
ISR	0					

SVK

Co_No	Unit_W	Co_No	Unit_W		Treated	Synthetic
ALB	0	JPN	0	rgdpch	10898.34	10911.87
ARG	0	KOR	0	ki	21.37569	24.15714
AUS	.128	MAR	0	openk	92.13366	92.11543
BRA	.051	MEX	0	dens	111.3941	113.0656
CAN	0	MKD	0	popgr	.2009542	.2011651
CHE	0	MYS	.144	pop	5357.327	16623.31
CHL	0	NZL	0	ter	18.78215	29.28024
CHN	0	PHL	0	sec	89.27523	86.71877
COL	0	RUS	0			
EGY	0	THA	0			
HKG	.008	TUN	0			
HRV	.669	TUR	0			
IDN	0	UKR	0			
ISL	0	URY	0			
ISR	0					

SVN

Co_No	Unit_W	Co_No	Unit_W		Treated	Synthetic
ALB	0	JPN	0	rgdpch	15292.52	15310.3
ARG	0	KOR	0	ki	23.12446	24.83614
AUS	.165	MAR	0	openk	92.48478	92.59097
BRA	0	MEX	0	dens	98.76509	98.66479
CAN	.176	MKD	0	popgr	.210008	.2544466
CHE	0	MYS	.187	pop	2004.566	14129.23
CHL	0	NZL	0	ter	30.99486	41.99612
CHN	0	PHL	0	sec	90.91187	90.9946
COL	0	RUS	0			
EGY	0	THA	0			
HKG	.008	TUN	0			
HRV	.465	TUR	0			
IDN	0	UKR	0			
ISL	0	URY	0			
ISR	0					

Figure A.3: Placebo cross-country – Real GDP per capita in the Eastern enlargement (1998 anticipation)

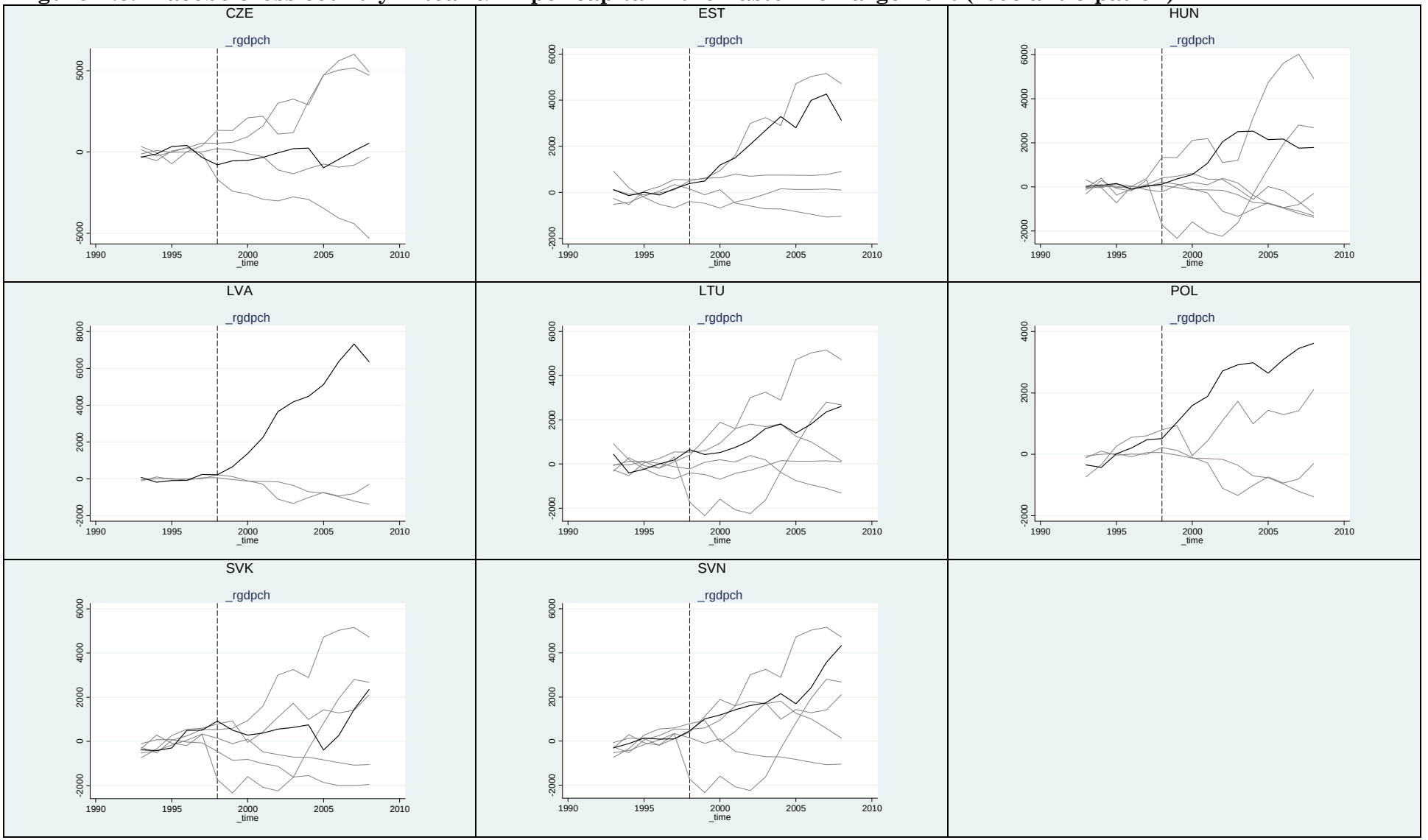


Table A.4: Unit weights and predictor balance – Labor productivity in the Eastern enlargement (1998 anticipation)

CZE

Co_No	Unit_W	Co_No	Unit_W		Treated	Synthetic
ALB	0	JPN	.18	rgdpwok	30558.09	30550.2
ARG	0	KOR	0	ki	22.16795	22.16745
AUS	0	MAR	0	openk	69.43389	69.49417
BRA	0	MEX	0	dens	133.5837	134.9004
CAN	0	MKD	0	popgr	.0486624	.0768296
CHE	0	MYS	0	pop	10318.59	25425.71
CHL	0	NZL	0	ter	20.3791	30.41847
CHN	0	PHL	0	sec	91.11272	88.93057
COL	0	RUS	0			
EGY	0	THA	0			
HKG	.004	TUN	0			
HRV	.577	TUR	0			
IDN	0	UKR	0			
ISL	.172	URY	.067			
ISR	0					

EST

Co_No	Unit_W	Co_No	Unit_W		Treated	Synthetic
ALB	0	JPN	0	rgdpwok	15708.13	15709.98
ARG	0	KOR	0	ki	21.63741	22.04206
AUS	0	MAR	0	openk	105.5148	96.4155
BRA	0	MEX	0	dens	34.00993	109.1165
CAN	0	MKD	0	popgr	.152569	.2145071
CHE	0	MYS	.05	pop	1449.33	17889.37
CHL	0	NZL	0	ter	31.31793	26.27984
CHN	0	PHL	.185	sec	96.84887	79.50583
COL	0	RUS	0			
EGY	0	THA	0			
HKG	0	TUN	0			
HRV	.765	TUR	0			
IDN	0	UKR	0			
ISL	0	URY	0			
ISR	0					

HUN

Co_No	Unit_W	Co_No	Unit_W		Treated	Synthetic
ALB	0	JPN	0	rgdpwok	27574.6	27495.06
ARG	.001	KOR	0	ki	17.06667	18.07437
AUS	.11	MAR	0	openk	57.38999	49.49066
BRA	.002	MEX	.002	dens	114.9309	16.23989
CAN	.146	MKD	.006	popgr	-.0001189	.1543053
CHE	0	MYS	0	pop	10291.17	10915.75
CHL	.001	NZL	0	ter	21.47465	42.72911
CHN	0	PHL	.001	sec	92.37348	91.78547
COL	.001	RUS	.001			
EGY	.024	THA	0			
HKG	0	TUN	0			
HRV	.001	TUR	.001			
IDN	0	UKR	.002			
ISL	.004	URY	.694			
ISR	0					

LVA

Co_No	Unit_W	Co_No	Unit_W		Treated	Synthetic
ALB	0	JPN	0	rgdpwok	13127.59	13142.47
ARG	0	KOR	0	ki	12.20334	23.59068
AUS	0	MAR	.438	openk	82.46302	73.76906
BRA	0	MEX	0	dens	40.06805	72.68391
CAN	0	MKD	0	popgr	.0163368	.0648894
CHE	0	MYS	0	pop	2494.698	13967.11
CHL	0	NZL	0	ter	26.22805	19.88665
CHN	0	PHL	0	sec	88.50974	62.66599
COL	0	RUS	0			
EGY	0	THA	0			
HKG	0	TUN	0			
HRV	.562	TUR	0			
IDN	0	UKR	0			
ISL	0	URY	0			
ISR	0					

LTU

Co_No	Unit_W	Co_No	Unit_W		Treated	Synthetic
ALB	0	JPN	0	rgdpwok	15402.28	15427.88
ARG	0	KOR	0	ki	10.7057	20.40715
AUS	.005	MAR	0	openk	91.09633	88.30643
BRA	0	MEX	0	dens	57.8992	254.8456
CAN	0	MKD	0	popgr	.1377906	.0949265
CHE	0	MYS	0	pop	3674.981	23748.86
CHL	0	NZL	0	ter	27.95088	32.98372
CHN	0	PHL	0	sec	86.00709	85.9614
COL	0	RUS	0			
EGY	0	THA	0			
HKG	.029	TUN	0			
HRV	.556	TUR	0			
IDN	0	UKR	.41			
ISL	0	URY	0			
ISR	0					

POL

Co_No	Unit_W	Co_No	Unit_W		Treated	Synthetic
ALB	0	JPN	0	rgdpwok	19815.68	19834.82
ARG	0	KOR	0	ki	15.95067	16.80936
AUS	.102	MAR	0	openk	42.28706	48.44448
BRA	.001	MEX	0	dens	126.731	29.4652
CAN	0	MKD	0	popgr	.2625728	.2644932
CHE	0	MYS	0	pop	38580.3	20984.26
CHL	0	NZL	0	ter	31.61196	35.66494
CHN	0	PHL	0	sec	96.92753	84.96109
COL	0	RUS	0			
EGY	.289	THA	0			
HKG	0	TUN	0			
HRV	0	TUR	0			
IDN	0	UKR	0			
ISL	0	URY	.608			
ISR	0					

SVK

Co_No	Unit_W	Co_No	Unit_W		Treated	Synthetic
ALB	0	JPN	0	rgdpwok	23441.75	23471.65
ARG	0	KOR	0	ki	21.37569	22.22432
AUS	.128	MAR	0	openk	92.13366	89.00794
BRA	0	MEX	0	dens	111.3941	111.9551
CAN	0	MKD	0	popgr	.2009542	.1312204
CHE	0	MYS	.064	pop	5357.327	7238.56
CHL	0	NZL	0	ter	18.78215	31.38228
CHN	0	PHL	0	sec	89.27523	87.94202
COL	0	RUS	0			
EGY	0	THA	0			
HKG	.007	TUN	0			
HRV	.801	TUR	0			
IDN	0	UKR	0			
ISL	0	URY	0			
ISR	0					

SVN

Co_No	Unit_W	Co_No	Unit_W		Treated	Synthetic
ALB	0	JPN	0	rgdpwok	32639.39	32633.84
ARG	0	KOR	0	ki	23.12446	23.14465
AUS	.08	MAR	0	openk	92.48478	85.28437
BRA	0	MEX	0	dens	98.76509	101.9445
CAN	.06	MKD	.344	popgr	.210008	.2102692
CHE	0	MYS	.14	pop	2004.566	7199.799
CHL	0	NZL	0	ter	30.99486	30.9654
CHN	0	PHL	0	sec	90.91187	88.97266
COL	0	RUS	0			
EGY	0	THA	0			
HKG	.01	TUN	0			
HRV	.071	TUR	0			
IDN	0	UKR	0			
ISL	.295	URY	0			
ISR	0					

Figure A.4: Placebo cross-country – Labor productivity in the Eastern enlargement (1998 anticipation)