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Jonne Lehtimäki, David Sondermann

Baldwin vs. Cecchini revisited: the growth impact of the European Single Market

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Abstract

The European Single Market created a common market for millions of Europeans. However, thirty years after its introduction, it appears that the benefits of the common European project are occasionally being questioned at least by some parts of the population. Others, by contrast, strive for deeper integration. Against this background, we empirically gauge the growth effect that arose from the Single Market. Using the Synthetic Control Method, we establish the growth premium for the Single Market overall and for its founding members. Broadly in line with the predictions made by Baldwin (1989) at the onset of the Single Market project, we find significantly higher real GDP per capita for the overall Single Market area of around 12-22%. In comparison, smaller EU Member States seem to have benefited somewhat more compared to larger countries. The estimated growth effects underline the case for further deepening and broadening the Single Market where possible.

Keywords: Single Market, economic growth, synthetic control method
JEL codes: F13, F14, F15, N14

Non-technical summary

Thirty years after the ratification of the Single European Act, which created a common market for millions of European citizens, it appears that the benefits of the common European project are occasionally put into question at least by some parts of the population. At the same time, others contemplate ways to further deepen European Union (EU) integration. Against this background, this paper reviews the growth effect of one of the most far-reaching steps of the European integration process, the creation of the European Single Market.

In 1986, the Member States agreed on the Single European Act which foresaw creating a true common market by January 1993. In particular through increasing common decision making in areas that were previously confined to national competences, EU countries opened the door towards common minimum standards and harmonisation in the area of goods and services provision and access to each others' markets. Through various directives over the years, Member States were bound to grant access to firms from other countries to most of their product markets, among others, by converging towards common rules and standards.

We use the Synthetic Control Method (SCM) developed by Abadie and Gardeazabal (2003), Abadie et al. (2010) and Abadie et al. (2015) to estimate the income premium of the Single Market. Being a tool for comparative case studies, the SCM estimates a counterfactual scenario that reflects how income growth would have behaved if countries would not have joined the Single Market.

We find that the Single Market has raised real GDP per capita by 12%-22% for the aggregate Single Market area looking at its founding member countries. This result is broadly in line with the predictions made by Baldwin (1989) who estimated a growth effect at the beginning of the Single Market to be around 13% in the benchmark scenario, but saw cases in which growth could rise up to 33%.

We demonstrate in a large battery of robustness checks that the results of the benchmark model hold. We turn all parameters of the SCM upside down, by increasing and constraining the set of donor countries or covariates. We implement in-space and in-time placebo estimates as well as check other hypotheses (e.g. the common currency effect) and find that the results remain robust.

On the country level, overall, our results suggest that smaller Member States have benefited somewhat more from the creation of the Single Market. In line with related studies, those countries likely realised the largest relative increases in market access and profited from the reduction of market power of larger producers in larger Member States. However, the effects are heterogeneous among smaller Member States. Moreover, among the larger countries, Spain stands out as having realised a significant growth premium, followed - although with a significant distance - by the United Kingdom. By contrast, the three largest EU countries, Germany, France and Italy did not seem to have benefited as much.

Going forward, the potential of the Single Market to increase the income of its member countries becomes all the more evident when acknowledging that it has not yet, as many studies argue, been applied to the full extent. On one hand, this relates to countries having not always fully applied the EU directives. On the other, the Single Market has been predominantly focused on goods, while the Single Market for services has so far not achieved the same prominence.

The results of the paper, thus, make a case for further integration through deepening and widening the Single Market where possible and desired by EU Member States.

1 Introduction

Thirty years after the ratification of the Single European Act, which created a common market for millions of European citizens, it appears that the benefits of the common European project are occasionally being questioned at least by some parts of the population. At the same time, others strive to further deepen European Union (EU) integration. Against this background, this paper reviews the growth effect of one of the most far-reaching steps of the European integration process, the creation of the European Single Market.

We revisit the growth impact of the European Single Market using the Synthetic Control Method (SCM) developed by Abadie and Gardeazabal (2003), Abadie et al. (2010) and Abadie et al. (2015). To our knowledge this is the first paper which explicitly models the growth effect of the Single Market for the area as a whole and for a broad set of countries using the methodological innovation of the SCM. There are, however, a few papers that are to some extent similar in scope, such as Campos et al. (2019) who measure the benefits of European integration and being part of the EU, looking either further into history than the creation of the Single Market (i.e. back to the 1970s and 80s for most of the countries), or start somewhat later like for the Eastern European countries which joined in 2004. The study, however, does not look into the largest EU Member States. Other methods have also been applied to study the impact of the Single Market. For example Allen et al. (1998) and in 't Veld (2019) estimate the competition and trade effects in a DSGE-framework.

Our results suggest that the common market has created a meaningful growth impact for the group of members as a whole. On the country level, however, the results are more heterogeneous. Our results suggest that smaller Member States have overall benefited somewhat more from the creation of the Single Market. In line with related studies, those countries likely realised the largest relative increases in market access and profited from the reduction of market power of large producers in larger Member States. Moreover, among the larger countries, Spain stands out as having realised a significant growth premium, followed - although with a significant distance - by the United Kingdom. By contrast, the three largest EU countries, Germany, France and Italy did not seem to have benefited as much.

The remainder of the paper is organised as follows: Section 2 summarises the history of European integration and prior research on the creation of the Single Market, Section 3 introduces the Synthetic Control Method and data underlying our analysis, Section 4 presents the main results for the Single Market as a whole and various robustness checks, and Section 6 discusses the growth effect of the Single Market for individual countries. Section 7 concludes.

2 The European Single Market and economic growth

This section aims to recall the political background for the creation and functioning of the Single Market, which mechanism at play are assumed to have impacted economic growth, and previous literature on the subject.

The creation of the European Single Market dates back to the early 1950s with the formation of the European Coal and Steel Community (ECSC) and the European Economic Community (EEC). The founding members of these organisations (Belgium, France, Italy, Luxembourg, Netherlands and West Germany) attempted to increase the economic integration among participating countries. One of the core objectives of the EEC was the establishment of a common market offering the free movement of goods, services, people and capital within its borders. However, it proved difficult to reduce (intangible) barriers with mutual recognition of standards and common regulations among others due to a lack of centralised decision-making. Thus, the failure to complete the European common market in the 1970s and 1980s limited further integration.

The process was re-initiated in 1985 with European Commission's White Paper on Completing the Single Market with a list of requirements to achieve further integration. In an influential report, Cecchini et al. (1998) put forward a narrative of the economic necessities, channels and impact of creating a true single market. Following this, the Member States agreed on the Single European Act in 1986 which foresaw creating common market by January 1993. During the process member countries opened the door towards common minimum standards and harmonisation in the area of goods and services provision and access to each other's markets, in particular, through increasing common decision-making in areas that were previously confined to national competences. Various directives implemented over the years meant that Member States were bound to grant access to firms from other countries to most of their product markets by converging towards common rules and standards. The Commission's White Paper put forward around 300 harmonisation measures which were mostly focused on goods. However, further liberalisation directives in the area of services were added shortly after, most importantly related to facilitating competition in network industries (such as energy, telecommunication and transport services).

The countries forming the market from the beginning of 1993 were Belgium, Denmark, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, and the United Kingdom. Later, the Single Market was extended through accession of Austria, Finland, Liechtenstein and Sweden in 1995. Subsequently, all countries joining the EU automatically also became members of the Single Market.

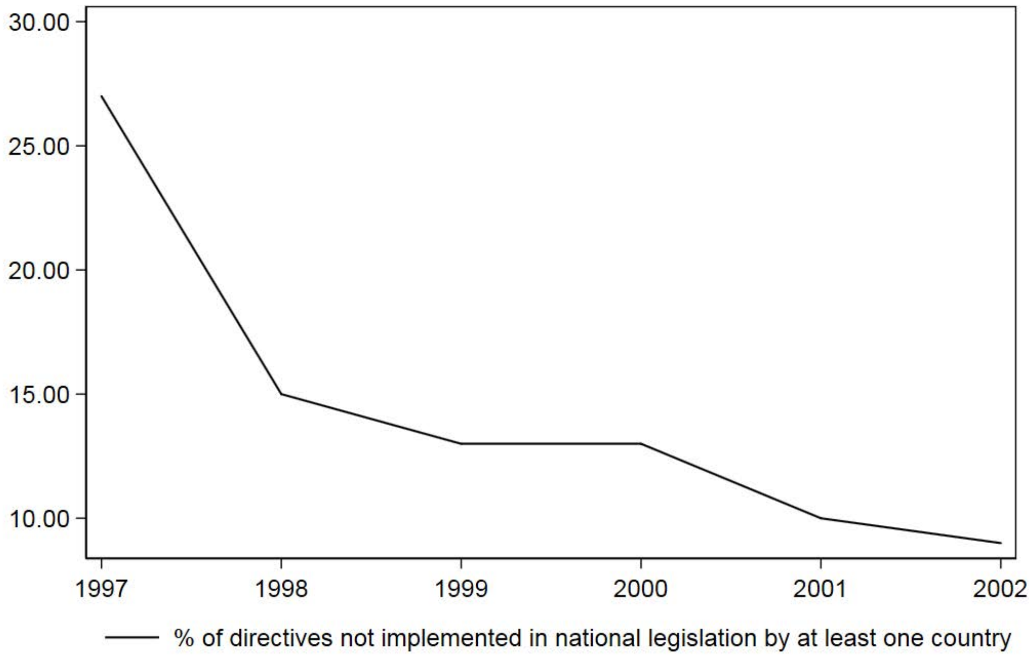
When designing the programme for the completion of the internal market, policy makers had in mind that the creation of a single market through deeper integration would increase the growth potential for the participating countries.

Primarily, the channels at play were assumed to be the elimination of trade barriers, the harmonisation of legislation and standards (also in the area of public procurement), and the effect of more forceful and consistent competition policies, and state aid rules. As Cecchini et al. (1998) state, those channels together provided the impetus for a large supply-side shock to the Community's economy as a whole. The elimination of trade barriers and the harmonisation of legislation and standards in the first instance reduced the costs for businesses. Alongside the opening of markets, policy makers assumed a better pass-through from lower costs to prices against the background of increasing pressure from new competitors in previously closed and domestic markets. This, in turn, spurred innovation, increased productivity, improved employment, disposable income of consumers and thus demand. Those channels were assumed to be multiplied by the emerging economies of scale that firms could reap by tapping, not only the domestic, but also the other EU markets.

In terms of main beneficiaries from the Single Market Programme, it could have been expected ex-ante that smaller, more open countries would benefit more from establishing a common market. As noted, for example, by Scitovsky (1960), international trade can offset the disadvantages of small size. As such, trade liberalisation leading to reduced trade barriers helps firms in smaller countries as they are no longer disadvantaged by small home markets (Aiginer and Pfaffermayr 2004). By establishing one common market, small countries get access to production factors, such as capital and high-skilled labour, from other EU partner countries. Due to the expectation of higher marginal returns, incentives for investment and migration increase. The benefits are not restricted to producers, as consumers in small countries would also likely gain welfare through access to a larger variety of goods than was available before the integration process.

Abstracting from the theoretical channels at play, in reality frictions arose from the adoption of the common directives to their full transposition into national legislation, in turn, limiting competition and thus the additional growth effect. The European Single Market works through EU level directives that are agreed upon among all Member States and which all countries subsequently need to translate into national practices by changing respective national legislation. In this step, the expected impact can be reduced by countries failing to comply in full or in part with the directive. While in clear cases the Commission (backed by the European Court of Justice) started infringement procedures to ensure sufficient transposition, in particular in the first years of the Single Market, the number of non-transposed or not fully transposed directives remained high. Figure 1 shows the percentage of directives not transposed in national legislation in the given year. By 1997, four years into the Single Market, nearly 30% of directives were not yet implemented by at least one Member State. While the number dropped significantly over the subsequent years, it shows that in reality the growth potential of the

Figure 1: Incompleteness rate



Source: European Commission Single Market Scoreboard.

Single Market might have not been fully attained in the first years of the programme.

With the channels outlined above in mind, both policymakers and academics also put the benefits of the European Single Market into concrete numbers. Under the chairmanship of Paolo Cecchini (Cecchini et al. 1998), the European Commission assessed the effect to be a one-off increase in income of Member States to be between 4.25% and 6.50%. By contrast, Baldwin (1989) calculated the growth impact to be at least double the size, more towards 13%. In one of the scenarios, he stipulated the potential of a higher growth premium of up to 33% if the innovation effect of a typical endogenous growth model would be realised to the full extent.

The large difference between the estimates mainly relates to the role of dynamic effects being explicitly accounted for in the latter and ignored in the former approach. The competitive pressure from market integration brought about by the European Single Market should be expected to have a positive impact on innovation and productivity of firms. Cecchini et al. (1998) do not per se reject the possibility of such dynamic effects, but they find them too difficult to measure. However, even irrespective of the dynamic impact, Baldwin (1989) finds that Cecchini et al. (1998) have underestimated the static effect of the creation of the Single Market. This analysis gets some theoretical support from Khandelwal et al. (2013) who note that productivity gains from trade liberalisation are often far greater than models would predict as trade barriers are managed by inefficient institutions.

In addition to the estimates of the growth effect produced before the Single Market started, some papers have studied various aspects of the Single Market after its implementation. For example, Boltho and Eichengreen (2008) suggest that the EU GDP is about 5 percent higher than it would be without the introduction on the single market program, Ilzkovitz et al. (2007) simulate the total GDP effect of 1.96 to 2.18 % in EU25 countries, and in 't Veld (2019) estimates within a DSGE-framework an average of 8 to 9 % higher EU GDP in the long run.

As noted above, to our knowledge this is the first paper which explicitly models the growth effect of the Single Market for the area as a whole and for a broad set of countries using the methodological innovation of the SCM. There are, however, a few papers that are to some extent similar in scope, such as Campos et al. (2019) who measure the benefits of European integration and being part of the EU, looking either further into history than the creation of the Single Market (i.e. back to the 1970s and 80s for most of the countries), or start somewhat later like for the Eastern European countries that joined the Union in 2004. The study, however, does not look into the largest EU Member States. Boltho and Eichengreen (2008) also look at European integration at large, but they arrive at a much smaller income gain of around 5 percent compared to the counterfactual. Other methods have also been applied to study the impact of the Single Market. For example Allen et al. (1998) and in 't Veld (2019) estimate the competition and trade effects in a DSGE-framework. Some studies specifically analysed the growth effect of the Single Market for individual member countries. For example, Straathof et al. (2008) find a 4 to 6 percent higher income per capita for the Netherlands. Dhingra et al. (2017), in turn, looked at the possible welfare implications of an exit of the UK from the Single Market, and find that incomes could drop by 6.4% to 9.4%.

There are also several papers studying the impact of the Single Market on other economic variables that could impact growth eventually. Allen et al. (1998) study the early effects of the Single Market and find significant reductions in price-cost margins. They conclude that the system had a welfare increasing effects on all participating economies, although there is a large variance in the distributions across countries. Mayer et al. (2018) estimate an average trade growth effect of EU integration of 109 % in goods and 58 % for services. in 't Veld (2019) estimates increases of 55 % for goods and 33 % for services. The positive welfare effect from trade liberalisation is also confirmed by Billmeier and Nannicini (2013), applying as one of the first papers the SCM.

3 Methodology and data used

Measuring the effect of policy decisions is challenging as it requires the construction of a counterfactual. Without a counterfactual it is difficult to disentangle the effect of the policy (i.e. the treatment) and other effects. An increasingly popular method of case study analysis is the Synthetic Control Method (SCM) that calculates an explicit counterfactual which simulates how the unit of treatment would have developed in the absence of any treatment, or vice versa. We follow the SCM as originally proposed by Abadie and Gardeazabal (2003), Abadie et al. (2010) and Abadie et al. (2015) and suggested by Athey and Imbens (2017) to be arguably the most important innovation in the policy evaluation literature in the last 15 years.

The sample of countries $J+1$ includes the particular country of interest $j=1$ which will undergo a particular treatment in period T_0. The remaining set of countries $j=2,...,J+1$ are not impacted by the treatment and therefore are considered the control group. The notational focus on a single country being treated is without the loss of generality. Abadie et al. (2015) note that in cases where multiple units are affected by the event of interest, in our case the creation of an EU-wide Single Market, the method can be applied to each affected unit separately or to an aggregate of all affected units. Borrowed from the medical literature Abadie et al. (2010) denote $j=1$ to be the "treated unit" while the remaining, non-treated countries provide the "donor pool". For a proper identification it is key that the donor countries are not driven by the same structural process and did not undergo a structural shock of the outcome variable in the post-treatment phase.

For our analysis we define the treatment units as the countries that formed the Single Market at the beginning of 1993, namely Belgium, Denmark, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain and the United Kingdom. Later, the Single Market has been extended to all countries joining the EU and the European Economic Area (EEA): Austria, Bulgaria, Cyprus, Czech Republic, Estonia, Finland, Hungary, Latvia, Lithuania, Malta, Norway, Poland, Romania, Slovakia, Slovenia and Sweden. In addition, other countries have entered into special arrangements with the EU participating, at least to some extent, in the Single Market (Switzerland and Turkey). In our analysis, we limit ourselves to the original members of 1993.

The sample covers the time periods (in our case years 1964 to 2014) $t=1,...,T$, with a certain number of pre-treatment years (1964 to 1992), T_0, as well post-treatment periods (1993 to 2014), T_1, so that $T_0+T_1=T$. The treatment country 1, is exposed to the intervention during the years $T_0+1,...,T$. At the same time, the intervention did not have an impact on the pre-treatment years $1,...,T_0$. Given that most countries ratified the corresponding legal acts establishing the European Single Market by 1993, this leaves us with 30 pre-treatment years, a very long period by SCM standards (Abadie et al. 2015).

The counterfactual non-treatment development is calculated with the help of the countries in the donor pool. We explain further below the selection of the donor countries. The synthetic control can be extracted from one or multiple countries in the donor pool. For the latter case, Abadie et al. (2015) define the synthetic control as a weighted average of the countries in the donor pool, mirrored by a $J \times 1$ vector of weights $W = (w_2, ..., w_{J+1})'$ with $0 \leq w_j \leq$ of $j = 2, ..., J$ and $w_2, ..., w_{J+1} = 1$. Following Mill (1848) and specifically the Method of Difference, Abadie et al. (2015) propose selecting the value of W such that the characteristics of the treated unit are best resembled by the characteristics of the synthetic control.

Accordingly, X_1 is a $(k \times 1)$ vector containing the values of the pre-treatment characteristics of the treated unit that we aim to match as closely as possible. At the same time, X_0 is the $k \times J$ matrix collecting the values of the same variables for the units in the donor pool. The pre-intervention characteristics in X_1 and X_0 may include pre-intervention values of the outcome variable. We select a synthetic control, W^*, that minimises the differences between the treated and synthetic control, i.e. minimising the vector $X_1 - X_0W$.

For this we need to identify appropriate covariates that match the pre-treatment characteristics of the treated unit as closely as possible. We proceed in two steps. First, we borrow explanatory variables from growth accounting literature as well as from the seminal SCM-literature that also studied treatment effects on GDP per capita. Second, we use a validation technique, applying root mean squared prediction errors (RMSPE) that calculate the pre-treatment fit.

Overall, we follow Abadie et al. (2010), Abadie et al. (2015), and Adhikari et al. (2018) in selecting the right-hand-side variables. We use the capital stock, population and a measure of human capital to measure the capital and labour input respectively. For the capital intensity, we also include the investment rate. To proxy for productivity, we use total factor productivity. Most of the variables are retrieved from the Penn World Tables (Feenstra et al. 2015). Given that we look at GDP per capita in log levels, the initial level is also essential for the match of donor to treatment countries. We therefore include real GDP per capita for the first year of our sample in the equation.

In the second step, factors outside the neoclassical growth model are included as they also have the potential to influence growth. We proxy those broader factors through indicators such as the institutional strength, regulation intensity, knowledge intensity or trade openness, as compiled by the Economic Complexity Indicator (Hidalgo et al. (2009)) or the Fraser Economic Freedom Index.[1] We provide a list of all variables in the Appendix A.

Our sample ends 2014 given that this is the last year provided by the Penn World Tables, the source for most of the covariates. This, however, is not a limiting factor as the more time elapses since the treatment year, the more other idiosyncratic factors can occur that influence the growth path of the treatment or the donor pool countries in different ways. In this light, the global financial crisis which started in 2008 has been a large scale event which affected the economic growth of European countries substantially and in different magnitudes, and thus

[1]The choice of indicators to proxy institutional strength and framework conditions of doing business is constrained by data availability.

might be a good moment to end the post-treatment window. This is in line with the seminal papers of Abadie et al. (2010) and Abadie et al. (2015) which also study post-treatment periods of just above one decade.

The conceptual approach outlined above can now be operationalised, defining for $m = 1, ..., k$, X_{1m} being the value of the m-th variable for the treated country and X_{0m} the $1 \times J$ vector containing the values of the m-th variable for the countries in the donor pool. Abadie and Gardeazabal (2003) choose W^* as the value of W that minimises

$$\sum_{m=1}^{k} \upsilon_m (X_{1m} - X_{0m}W)^2, \tag{1}$$

with υ_m being the weight reflecting the importance that the model attributes to the m-th variable when establishing the difference between X_1 and X_0W.

Having calculated appropriate weights, the synthetic control estimator of the effect of the treatment is given by the difference of post-intervention outcomes in the treated country on the one hand and the outcome variables of the weighted donor pool of countries on the other, i.e.

$$Y_{1t} - \sum_{j=2}^{J+1} w_j^* Y_{jt}, \tag{2}$$

with Y_{jt} being the outcome variable of country j at time t and Y_1 being a $(T_1 \times 1)$ vector collecting the post-intervention values of the outcome for the treated country. To study the growth effect of the Single Market for Europe, our variable Y is real GDP per capita. Y_0 would then be a $(T_1 \times J)$ matrix, with columns j containing the post-intervention values of the outcome for country $j + 1$.

Relating equation (1) and equation (2), it becomes clear that the matching variables in X_0 and X_1 are serving as the predictors of the post-intervention outcome. Factors unaccounted for in determining the outcome variables could, in theory, limit the validity of the results. Yet, Abadie et al. (2010) show that with a sufficiently large pre-treatment period, unobserved factors are controlled for in the matching of the pre-intervention counterpart Y_0 and Y_1. This follows from the intuition that countries that are similar in terms of observed and unobserved determinants of the outcome variables over a longer period of time, would only produce different trajectories if one of the two groups was affected by the studied intervention.

Abadie et al. (2015) also formally derive the close relation between SCM and standard regression techniques. Linear regressions, by contrast, do not restrict the weights of the linear combination to be between zero and one. Against this background, estimates of counterfactuals based on linear regressions may extrapolate beyond the support of comparison units to provide a perfect fit of the regression line with the data. While extrapolation beyond the support of the data is not necessary following the SCM, an interpolation bias could arise if the donor pool contains units with very different characteristics than the treated unit. This has been initially outlined by Abadie et al. (2010), and more recently formalised in Abadie and L'Hour (2019) and Kellogg et al. (2020).

Against this background and given the above mentioned recommendation to apply a donor pool with roughly similar observed and unobserved determinants, it is advisable to limit the donor pool to countries with similar characteristics. This additionally controls for unobservable characteristics, for example, associated with the level of economic development and any other secular changes over time that might affect countries from different income groups differently (Adhikari et al. 2018).

Such precautionary measures help to ensure the validity of the results. This notwithstanding, Abadie et al. (2010) show that even if there is a synthetic control that provides a good fit for the treated units, interpolation biases could potentially still exist if the simple linear model above does not hold over the entire set of regions. Such non-linearity between the outcome variables and the predictors could, for example, arise if the combination of two extreme donor units is used to construct a synthetic unit that has average value of the covariate. This provides a third argument to focus on donor countries with not too different characteristics from the country that received the treatment.

Accordingly, we restrict the donor pool in a first step to OECD countries (that joined before 1994). This is to focus the set of potential donor countries to cases with similar income levels and thus reduce the likelihood of interpolation biases (following Abadie et al. 2010, and more recently among others Abadie and L'Hour 2019 and Kellogg et al. 2020 as alluded to above). In the second step, we remove countries which have undergone treatment, i.e. became members of the European Single Market in 1993 or at a later stage. Overall, this leaves Australia, Canada, Israel, Japan, New Zealand and the United States as potential donor countries. However, we show in Section 5 with a wide array of robustness checks, that even when we extend (or limit) the donor pool, our results remain qualitatively unchanged.

Abadie et al. (2015) elaborate in detail on the limitation for inference in comparative case studies, in particular given the small sample size, absence of randomisation and that probabilistic sampling is not employed to select sample units. However, inference can be undertaken through means of falsification exercises or so-called 'placebo' experiments. Verifying the baseline model results through alternation of the intervention time ("in-time placebos"), or attributing the intervention to countries in the donor pool ("in-space placebos") offers two out of many ways to study whether the effects found are robust. For example, for the latter type of tests, each country of the donor pool would individually serve as a treated country. This creates a fan-chart type of distribution of placebo effects. In turn, the baseline results would be deemed robust in case the impact of the actually treated country falls outside or is squarely at the upper range of the placebo tests. We will conduct a two-level analysis, one for the aggregate and one for country-specific Single Market effects. For the former we aggregate the country-specific variables by using population-weighted averages.

4 Results for the Single Market as a whole

In this Section we present the results of the growth impact for the Single Market as a whole, namely for the common group of countries that joined up to 1993. Before presenting the results we explain, in detail, the weight and values of the variables as well as the countries chosen for the control group.

Table 1: Predictor balance

covariate	Treated	Synthetic
log real GDP per capita 1964	9.32	9.49
TFP	0.82	0.84
human capital	2.65	3.04
capital stock	11.29	10.91
Population (change)	1.48	1.21
Economic Complexity Index	1.67	1.41
Economic Freedom Index	6.44	6.49
Openness to trade	34.82	35.95
Share of investment in GDP	0.28	0.28

Table 2: Covariate selection for synthetic unit

covariate	weight
log real GDP per capita 1964	0.06
TFP	0.18
human capital	0.01
capital stock	0.00
Population (change)	0.00
Economic Complexity Index	0.01
Economic Freedom Index	0.27
Openness to trade	0.40
Share of investment in GDP	0.08

Note: See details on the variables in Appendix A.

Table 3: Donor country weights

donor countries	weight
Australia	0.01
Canada	0.00
Israel	0.37
Japan	0.15
New Zealand	0.00
United States	0.47

Table 1 lists the mean value across indicator and time for the two groups of interest. The level of log real GDP per capita is very close. The same is true for the predictors TFP, the share of investment in GDP, openness to trade and the Economic Freedom index. Differences across the mean value of the change in population, human capital, the Economic Complexity indicator and the capital stock between treated and synthetic group are somewhat higher.

The differing values are also reflected in the actual weight that the SCM allocates to the respective covariates (Table 2) in the benchmark model. The openness to trade and the Economic Freedom index (the latter summarising the similarity of economic structures and institutions) provide the largest weight. Total Factor Productivity performance, the share of investment in total GDP and the real GDP per capita also contribute with significant weight. The human capital variable only plays a marginal role, while zero weight is attached to the capital stock (likely because of its strong relation to the share in investment) and the Economic Complexity Indicator.

As discussed in Section 3 we limit the set of control countries to similarly developed countries (in the spirit of Adhikari et al. 2018, Abadie et al. 2015), i.e. all countries that were members of the OECD at the time of the creation of the Single Market and were not part of the Single Market member countries (directly or per third-country agreement). This leaves Australia, Canada, Israel, Japan, New Zealand and the United States.

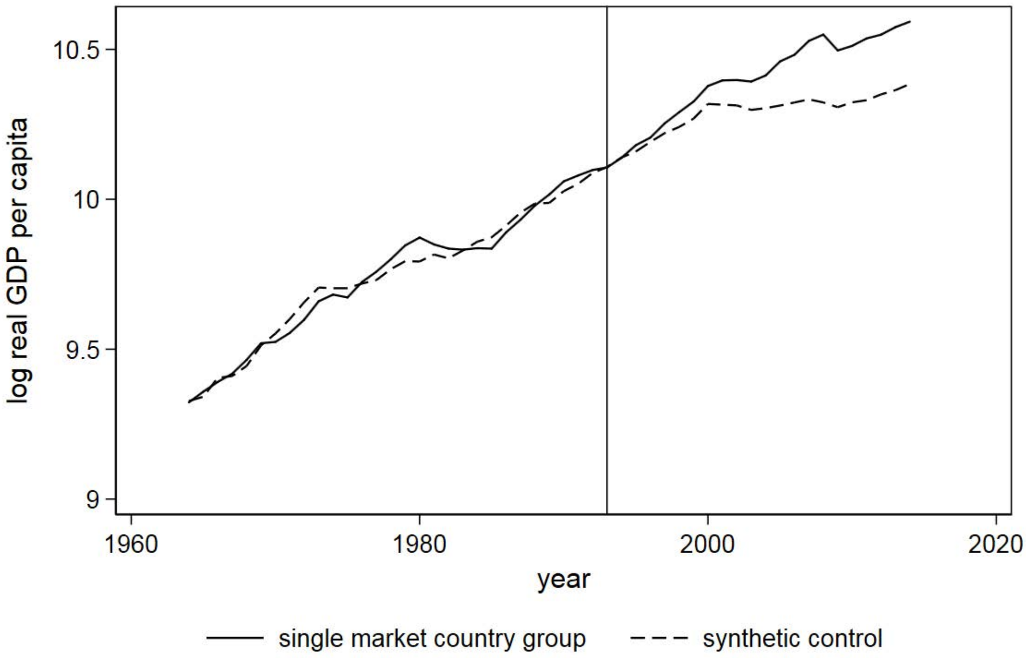
The SCM calculates the country weights so that the distance to the GDP per capita of the treated country is minimised over the pre-treatment period using as a criterion the root mean squared prediction error (RMSPE). Table 3 list the weights chosen for the benchmark model. The US, Israel and Japan carry the highest weight, while Australia only adds a fraction to the aggregate time series of the group and New Zealand and Canada carry zero weight.

The choice of covariates and country weights for the generation of the synthetic control group are essential for the outcome of the counterfactual that, in turn, is the basis for the calculation of the effect of a respective policy choice. In light of the crucial importance of covariates and countries chosen, the robustness of results needs to be proven by showing to which degree the results are sensitive to changes in both the set of variables and control countries. We will demonstrate extensive robustness checks in line with the standard approaches in the literature in this section and Section 6.

According to our baseline results, the European Single Market has created a significant growth-enhancing effect for its member countries. Figure 2 depicts the aggregate GDP per capita of the countries that joined the Single Market at its inception in 1993. The pre-treatment fit of the counterfactual to the treatment group in terms of GDP per capita from 1964 until 1992 is rather close (the pre-treatment RMSPE is very low with 0.0034), in particular taking into account that we use an exceptionally long pre-treatment period of about 30 years.

The vertical line in Figure 2 denotes the entry into force of the large set of directives that formed the common market in January 1993. It becomes evident from this chart that a few years after the start of the Single Market, both curves deviate significantly. Given that the lines are denoted in log of real GDP per capita, the distance between the two lines can be taken as the accumulated or medium-term growth impact of the Single Market. At the end of our sample, in 2014, the growth impact has been 20.8%. This is constructed by comparing the Single Market area's GDP per capita and the synthetic control groups GDP per capita in

Figure 2: The growth effect for the aggregate Single Market area



2014 and compute the growth differential.

However, at that point it is important to review the question of how long a reasonable post-treatment period should be. In principle, there is no limit assuming that the structural process governing the two series remains the same. This means assuming that no major idiosyncratic event affecting only one of the two time series has taken place other than the studied policy treatment. Of course, the more time elapses after the treatment, the more difficult it becomes to exclude that the structural processes started to differ, namely that either the treatment country or the donor group is affected by factors which the other group is not (or not very differently) impacted by. A prominent example of a common shock with vastly different impact on countries has been the Global Financial Crisis and the ensuing euro area sovereign debt crisis. While the crisis impacted nearly all countries worldwide in 2008, the decline in output was very heterogeneous between different countries.

Against this background it might be more prudent to stop the evaluation exercise in 2008, i.e. about 15 years after the implementation of the Single Market. This is broadly in line with the length that Abadie et al. (2010) and Abadie et al. (2015) chose in their seminal papers. Focusing the effect of the Single Market on the time span from 1993-2008 yields an accumulated effect of around 22%. While this is the result of the baseline model, we will conduct a number of robustness and sensitivity checks. Some of those results however, as we will show later, could also be indicative of a somewhat lower growth effect, so that we will eventually report a range for the growth effect that captures most of the models included in the paper.

5 Robustness tests

Before studying the country level differences in terms of growth effects, we look at a battery of sensitivity checks that should allow an assessment to what extent the above mentioned growth effect measured in the baseline model is robust to chosen assumptions. In addition to the specific assumptions, we also cross-check the choice of the overall model by employing difference-in-difference estimation.

5.1 Difference-in-Difference estimations

As noted above, we chose the SCM for several reasons. It offers a data driven method without a large set of assumptions on the data generating process and the potential shortcomings of standard linear estimation models for means of policy analysis. Additionally, the SCM allows going beyond the average effect that is estimated through standard panel or difference-in-difference estimations.

All this notwithstanding, we aim to verify whether the overall conclusion derived from the SCM, namely that the European Single Market created a growth dividend for the participating set of counties as a whole, by applying a complementary approach, namely difference-in-difference regressions. First, we estimate

$$y_{t,i} = \alpha_t + \beta_1 inSM_i + \beta_2 T1992_t + \beta_3 inSM_i \cdot T1992_t + u_t, \tag{3}$$

where log GDP per capita ($y_{t,i}$) is explained by two dummy variables and their interaction term. The first dummy ($inSM$) is 1 for all treated (i.e. Single Market countries) for the entire sample and zero for the control group. The second dummy ($T1992$) is 1 for all countries from 1992 onward and zero before. The coefficient of interest is β_3. A positive and significant estimate of the interaction term would suggest that countries which entered the Single Market in 1992 achieved a growth dividend compared to the pre-accession regime and compared to countries which did not join the Single Market. The results of the difference-in-difference estimation in Table 4 suggest qualitatively similar results as derived by means of the SCM. In particular for the unconditional version without additional covariates, as contained in equation 3, which comes closest to the SCM, the difference-in-difference estimation suggests a significant and meaningful growth dividend for Single Market countries and thus tends to confirm our baseline model.

Table 4: Difference-in-Difference estimation results

	Diff-in-Diff estimate	Standard error	R^2	Observations
Baseline approach	0.138***	(0.045)	0.50	1035
With initial GDP p.c.	0.138***	(0.035)	0.69	1035
With all covariates	0.09***	(0.016)	0.93	896

Notes: Baseline approach using equation 3. *** represents significance at the 1% level.

5.2 Sensitivity of results to changes in assumptions

In addition to experimenting with different approaches, such as the difference-in-difference estimation, we shall test the sensitivity of our results to various assumptions.

The most critical assumptions are the choice of control countries, the covariates used and the timing of the policy treatment. The choices taken for the latter two are particularly important to cross-check in case of possible anticipation effects. Such anticipation effects have arguably been present given that the Single European Act had to be negotiated and included a multi-year implementation period.

We start with robustness checks as regards the timing of the policy treatment, which in the SCM literature is also sometimes referred to as 'in-time placebo' test. The Single Market formally went into force in 1993. This was the year from which onward the largest set of directives were in place. However, as the common market evolved up to the agreed starting point in 1993, the actual project started much earlier, e.g. with the Single Market Act in 1986, and thus could already have had an effect prior to 1993. We aim to test to what extent the magnitude of the baseline effect depends on the specific year chosen as the treatment year. Figure 3 depicts the effect for different starting years. It suggests that the baseline results with the year 1993 is overall rather prudent. Choosing the year 1987, 1988 or 1989 would even result in somewhat higher growth effects whereas using 1990, 1991 or 1992 would result in similar or slightly lower growth impact.

The second type of robustness test relates to the covariates applied. Covariates should ideally be unaffected by anticipation effects and thus be exogenous to the event. While most policies do not substantially impact the drivers of economic growth and there were very few significant policies undertaken in the years preceding the official start of the Single Market in 1993, some of the covariates (in particular TFP and Economic Freedom Index) may be affected by the policies and reforms which took place between the negotiation of the Single European Act around 1986 and the final implementation towards the end of 1992.

Against this background, we test how sensitive the results are to changes of the set of covariates by removing critical variables such as TFP, Economic Freedom, or the capital stock.

Figure 3: Start year of the Single Market

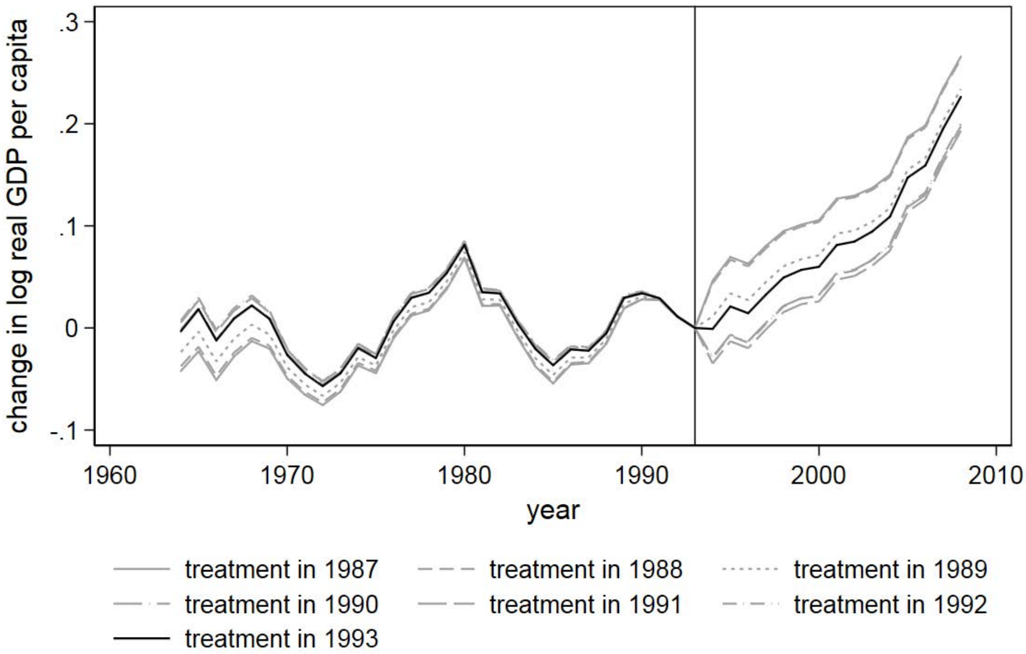


Figure 4: Changing covariates

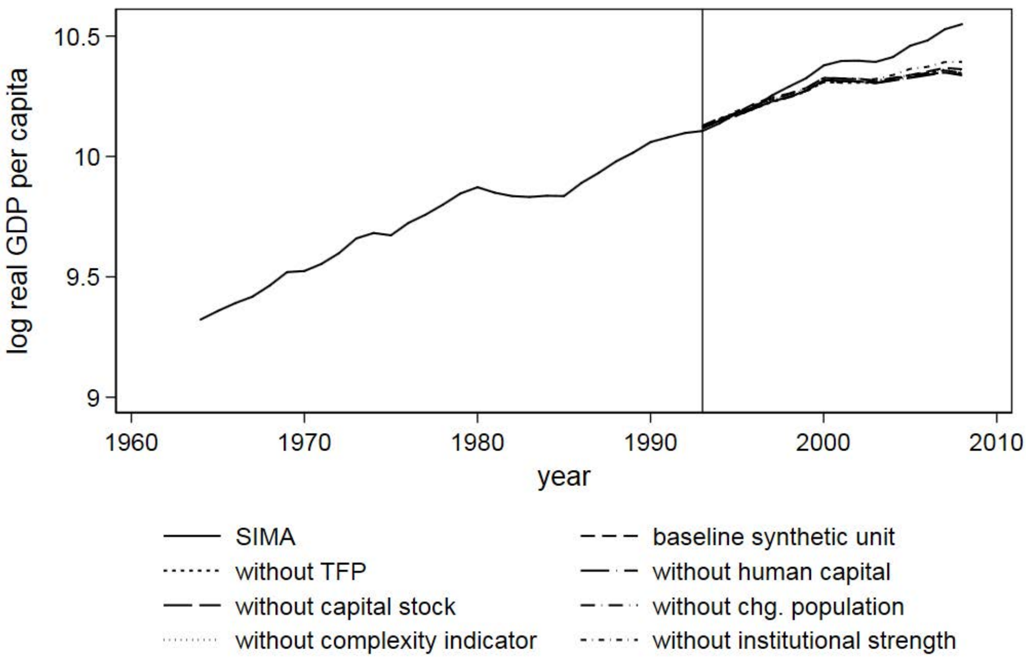


Figure 5: Enlarging the set of donor countries

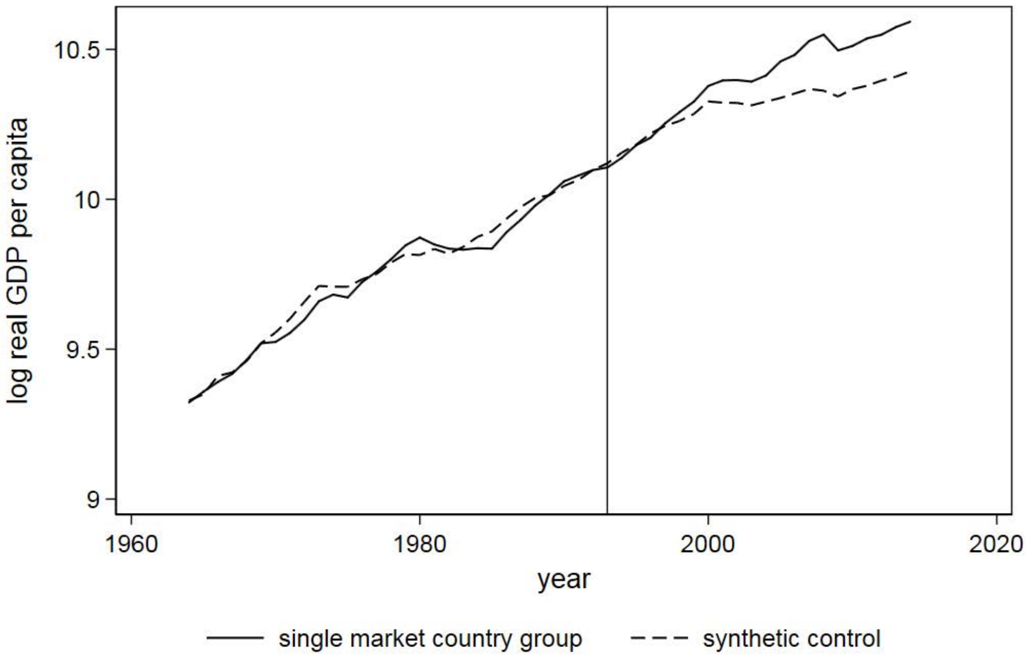
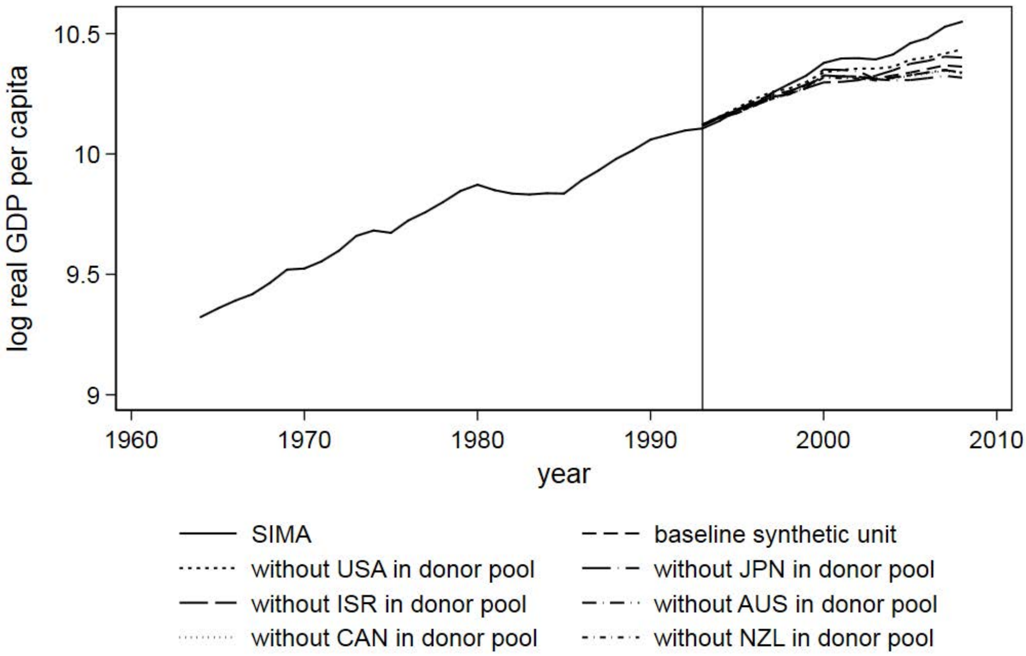


Figure 6: Reducing the set of donor countries



In Figure 4 we check to what extent one of those variables is significantly determining the final results by iteratively removing one variable from the set of covariates. This also allows the SCM to reallocate weights among the remaining variables, thus giving more space to variables which might have been dominated by others in the baseline model. Figure 4 suggests that altering the set of covariates only marginally affects the synthetic control line, i.e. the counterfactual, non-Single Market scenario. The line most distant from the baseline is the counterfactual without the Economic Freedom indicator. Here the cumulative growth impact in 2008 falls to 16%. The only covariate that we cannot easily change is the starting level of GDP per capita, though. Removing this covariate from the equation would make it lose an important anchor to find a common starting position. The key importance of this is also underpinned by the literature selecting a priori countries with similar income levels to ensure an unbiased comparison (e.g. Abadie et al. 2010, and more recently formalised in Abadie and L'Hour 2019 and Kellogg et al. 2020 and as also discussed in Section 3).

The third type of sensitivity check relates to the choice of countries in the donor pool. As noted in Section 3, the SCM is sensitive to interpolation biases, among others by choosing countries to be similar although they are structurally not comparable. It is thus important to use countries with similar levels of GDP to reduce the likelihood of such biases. This notwithstanding, the set of donor countries should not be too small as it otherwise constrains the searching for optimal weights to construct the counterfactual. The selection of the 6 donor countries for the baseline model is well-motivated to avoid interpolation biases, as discussed above and pointed at in Abadie et al. (2010), Abadie and L'Hour (2019) and Kellogg et al. (2020), mainly by selecting similarly developed countries with not too different GDP per capita starting positions (as done in Adhikari et al. 2018).

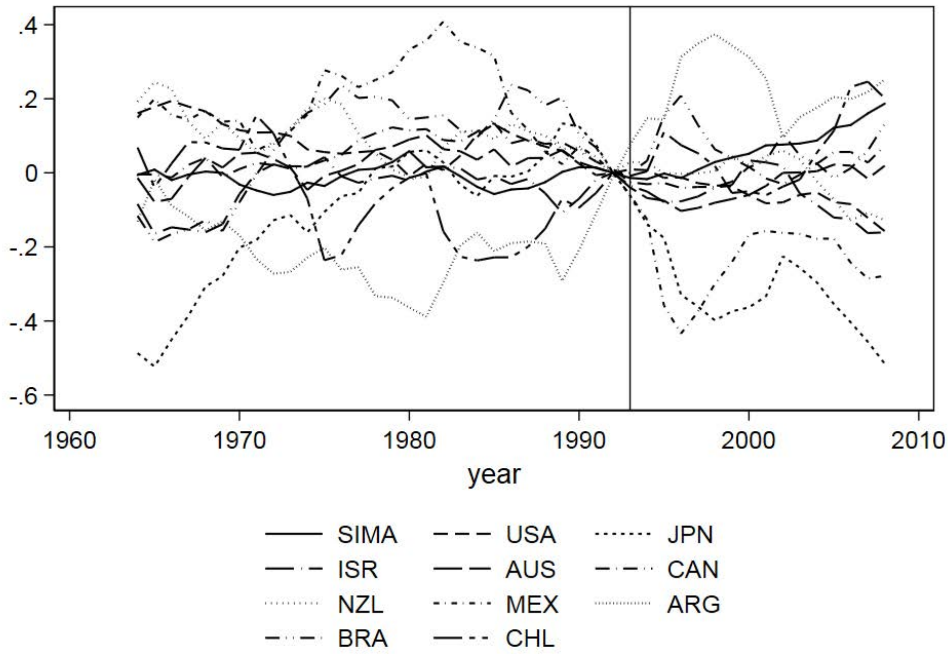
However, we want to show that adding more countries to the donor group leaves the results qualitatively unchanged. We add a further four countries, namely Argentina, Brazil, Chile, and Mexico. Those countries are considerably less developed (as measured in terms of GDP p.c.), yet still closer to the average GDP p.c. than other world countries that would remain available as a potential control country. Running the SCM with these additional countries gives the algorithm more degrees of freedom to choose other countries than those picked in the baseline model. The initial selection of donor countries is supported as only Brazil would receive an arguably small contribution in the creation of the donor group, while the other additional donor countries would not be considered relevant. Figure 5 displays the result with the larger set of donors. The overall picture remains unchanged with the overall growth dividend to arrive at a cumulative 17% higher GDP per capita in 2008 compared to the counterfactual.

Another way of showing the robustness of the results is by forcing a sub-set of the original donor countries (see Figure 6). Klößner et al. (2018) argue that many robustness checks in studies done with the SCM are driven by the United States. In our study the SCM applies the highest weight in the baseline model to the US, Israel and Japan. Australia, Canada and New Zealand receive a weight close to or exactly zero. When iteratively removing one of the countries, the SCM reassigns the weights in the donor pool. In particular, removing the US and Israel somewhat changes the counterfactual, bringing the cumulated growth impact down to 12% and 15% respectively. This notwithstanding, overall in all robustness checks in Figure 6 the counterfactual line remains clearly and significantly below the GDP per capita of that of the Single Market countries. Moreover, it should be noted that excluding potential donors or covariates could reduce the pre-treatment fit. Thus, while such sensitivity checks are plausible and informative, they tend to constrain the potential of the SCM to find the best fit to the treated unit.

One additional common and crucial test of the method's validity is the use of 'in-space placebos'. As elaborated in Section 3, Abadie et al. (2015) suggest that inference can be undertaken through means of falsification exercises or placebo experiments. The idea is to randomly test whether the effect would be similar if a non-treated country from the donor pool would be considered to be the alleged treated country. The growth effect of the SCM using the actual treated country should be systematically higher than that of the placebo treated countries. We apply the same logic to the Single Market case by iteratively using another country from the donor pool as the treated country. We use the extended donor pool from the robustness check above, i.e. the ten countries to allow for a greater number of control cases. Figure 7 displays the effects derived under the different models. The effect is the difference of log GDP per capita between the treated countries' GDP and the counterfactual built from the remaining donor countries. The figure reveals that the Single Market effect stands out from the placebo effects, confirming the robustness of the baseline results. At first glance, it seems that two countries, Argentina and Chile have a higher growth dividend although they have not received the treatment. Yet, when looking at the pre-treatment fit, it becomes clear that both countries do considerably worse than most other control cases in matching the control group. As also noted by Abadie et al. (2010), the pre-treatment fit is essential to ensure that the growth gap between the real and the synthetic unit has not been artificially created by lack of fit. Similarly, in this placebo test the better performance likely stems from an insufficient fit pre-treatment.

To account for the degree of pre-treatment fit when evaluating the in-space placebo, Abadie et al. (2010) and Abadie et al. (2015) suggest as an indicator the ratio between the post-treatment RMSPE to the pre-treatment RMSPE. Table 8 displays the ratios for all placebos and the true treatment group. The true Single Market area stands out in comparison to the other countries, and thus confirms the robustness of the baseline results. An important caveat of in-space placebos is that it becomes more powerful when more placebo countries are added to the test. Yet, given the desire to avoid interpolation biases as explained earlier, we stop

Figure 7: Placebo treatment



with ten control countries out of which the SCM can select. This is not an unusually small control group and is comparable to studies like Abadie and Gardeazabal (2003), Abadie et al. (2015) or Puzzello and Gomis-Porqueras (2018).

Reviewing again the baseline effects shown in in Figure 2, it seems that the growth effect of the Single Market took some time to unfold. In particular in the initial years, maybe up to the end of the century, the growth effect was rather small. As the growth effect gradually increased, another important event happened in Europe: the introduction of the euro as common currency for some of the countries that formed the Single Market. It is therefore important to exclude that the effect captured in Figure 2 is effectively a common currency effect instead of a Single Market effect.

Luckily, it is straightforward to test this in our context as only a sub-set of the Single Market countries joined the euro area. This allows us to test within the SCM environment whether euro area Single Market countries saw a higher growth effect than non-euro area Single Market countries. The treated country group thus excludes the non-euro area countries which are moved into the donor pool of countries next to the other non-EU OECD countries that formed the pool so far.[2] Figure 9 depicts the effect the euro had on the aggregate set of Single Market countries that joined the common currency. The results indicate that there has been

[2] We also checked whether limiting the donor pool to the non-euro area Single Market countries, i.e. removing the other non-EU OECD countries, would make a difference, but results remain robust.

Figure 8: Ratio of Post-treatment RMSPE to Pre-treatment RMSPE: Single Market area and Control Countries

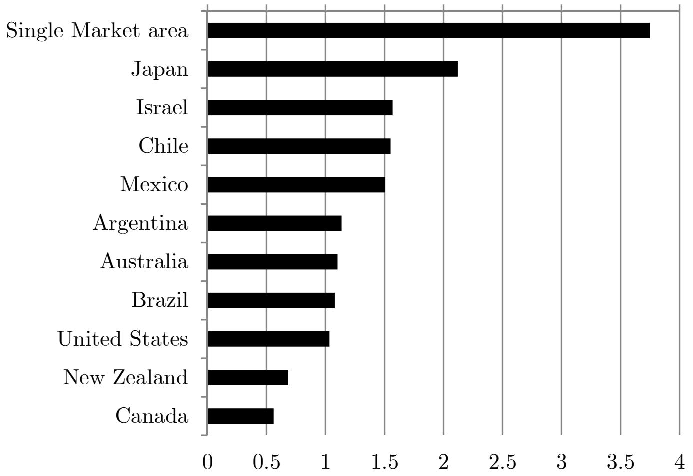
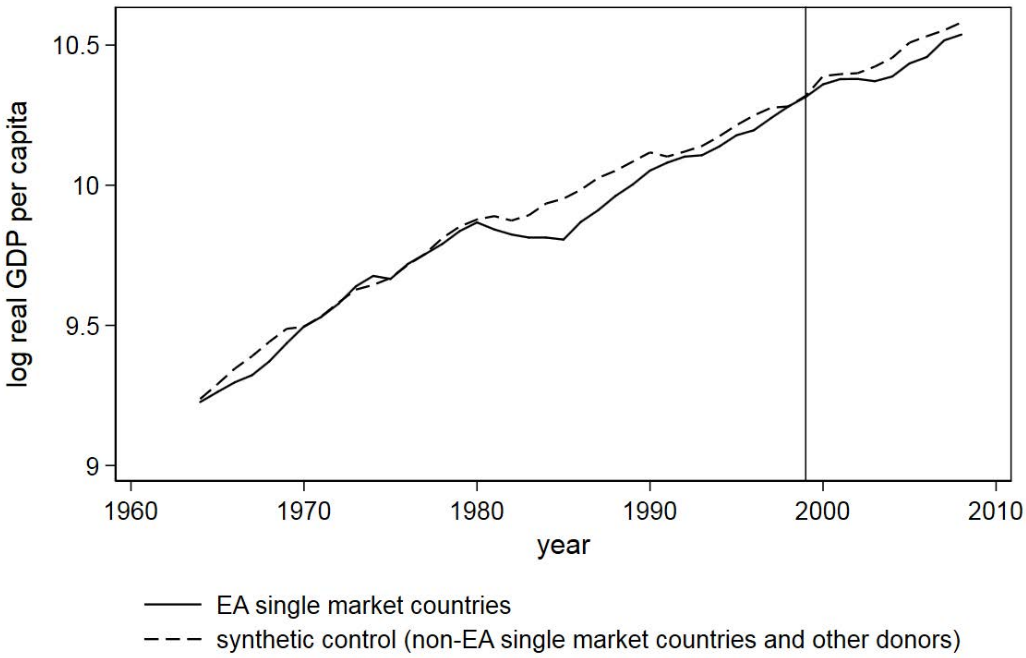


Figure 9: Euro effect



no clear growth effect from the introduction of the single currency for the overall group of countries when compared to the counterfactual. This finding is in line with the literature that aims to measure the potential growth effect of the euro introduction (Fernández and García Perea 2015 or Puzzello and Gomis-Porqueras (2018)). This confirms the baseline results likely identifying a growth effect that has been induced by the creation of the Single Market rather than the common currency.

In sum, reviewing the growth effect of the creation of the European Single Market seems to have significantly raised real GDP per capita for the area as a whole. The baseline suggests a long term growth premium of up to 22% in 2008. Even when manually constraining the SCM parameters, and therefore restricting the model's choice to find the best fit to the treated unit, the lowest overall growth estimates does not fall below 12%.

6 Results for individual countries

Table 5: Single Market growth impact of individual countries

	1993-1999	1999-2008	1993-2008
Denmark	-0.08	5.75	5.67
Italy	6.92	0.04	6.96
France	0.05	9.72	9.77
Belgium	-4.68	17.01	12.33
Germany	0.80	13.60	14.40
United Kingdom	10.66	4.65	15.31
Greece	7.78	11.18	18.96
Portugal	15.29	17.59	32.88
Netherlands	9.28	24.12	33.40
Spain	12.54	22.17	34.71
Ireland	37.33	44.13	81.46

Note: Baseline cumulative growth difference in percentage change of real GDP per capita between 1993-2008 compared to non-treated countries.

The Single Market area covers a large set of countries. In the previous section we have shown that the creation of the common market had a significant growth effect for the area as a whole. In this part of the paper we want to go more granular and study the growth impact for the individual countries. We focus on the countries that joined the Single Market at the beginning for ease of comparison.

For each of the countries we not only display the baseline results, but also a battery of robustness checks. Specifically, we let the model iteratively go through any possible combination of covariates and donor countries and produce one synthetic counterfactual for each scenario. This has been mainly done, as explained for the case of the aggregate, to test whether leaving out covariates that might be affected by anticipation effects would change the results. As explained in Section 5.2, variables like TFP growth might potentially already be affected by anticipation of measures in the realm of competition policies before the start of the Single Market. With the nine covariates listed in Table 2, we arrive at a possible set of 255 combinations. For the six donor countries, we can perform 63 different combinations of control countries. With a view not to overburden the reader with too many charts, we transform the set of 318 counterfactual time series into fan chart format. The fan chart will show the benchmark counterfactual, the 25th and 75th percentile as well as the 10th and 90th percentile of all the synthetic counterfactuals.

Looking across all figures showing country specific results, i.e. Figure 10 to Figure 20, it becomes evident that all countries experienced a positive growth impact through the creation of the Single Market up until 2008. This can be taken from the fact that all country-specific GDP per capita lines are above the full interval of counterfactuals at the brink of the financial crisis. However, there is stark heterogeneity among countries. Table 5 displays the growth impact from 1993 to 2008 across all countries.

As described when reporting the baseline results for the aggregate Single Market area, the results in Table 5 are constructed by comparing the country's GDP per capita and the synthetic control groups' GDP per capita at the end of the sample and computing the growth differential. Given that the lines are denoted in log of real GDP per capita, the distance between the two lines can be taken as the accumulated or medium-term growth impact of the Single Market. The most significant gains in income growth are found for Ireland, Spain, Netherlands and Portugal, all with above 30% increase in real GDP per capita up until 2008 compared to a hypothetical similar country that did not take part in the Single Market.

Table 5 shows the cumulative growth effects for the entire period and broken down into two periods. The breakdown shows that most of the countries reaped most of the benefits of the common market in the second half of the sample. Aside from specific country factors, the general trend could be related to the slow de facto implementation of the Single Market. As shown in Figure 1 in Section 2 that while 300 harmonisation measures were identified in the initial White Paper of the European Commission and many more followed in the subsequent years, several countries lagged behind in terms of full transposition into national legislation. Against this background, the Single Market remained incomplete at the beginning and the growth effect was mainly driven by countries with significant catch up potential, as we will explain in more detail below.

Greece still realised a growth premium around 20%, followed by the United Kingdom. By contrast, in particular Germany, France and Italy gained less with cumulated growth differentials of only around 10%.[3]

Figure 10 displays the effect for Ireland. The pick up in real GDP per capita in Ireland since the inception of the Single Market stands out compared to other countries. It seems unlikely that such a high figure could be the result of a higher trade and/or competition effect. By contrast, for Ireland a number of factors probably came together that are captured in the overall growth effect. Having been an already very open and flexible economy, Ireland was best prepared to benefit from the increased opportunities to export. Moreover, and probably most importantly, many multinational companies over the years used the low-regulation, low-tax environment on the island to shift parts of their production there. Also other studies found that Ireland as well as Portugal have experienced a particularly positive effect from integrating

[3]Luxembourg was excluded from the analysis because the SCM failed to find a combination of donor countries that resembled a close fit to the development of real GDP per capita. This is very likely related to the extremely high GDP per capita level of this very small, financial sector-dominated Member State.

Figure 10: Single Market effect Ireland

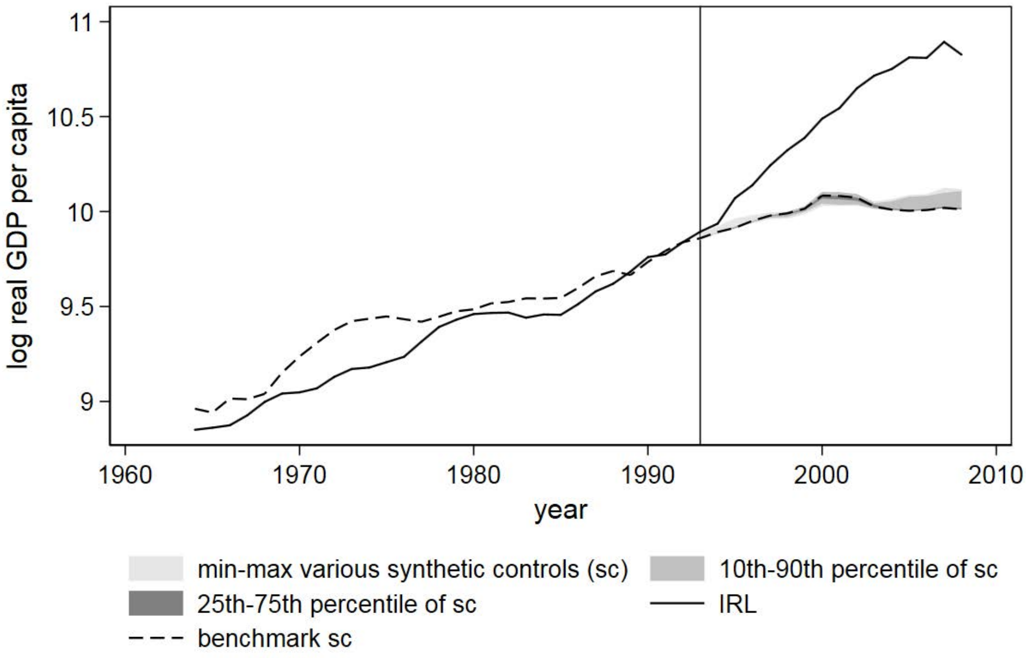


Figure 11: Single Market effect Netherlands

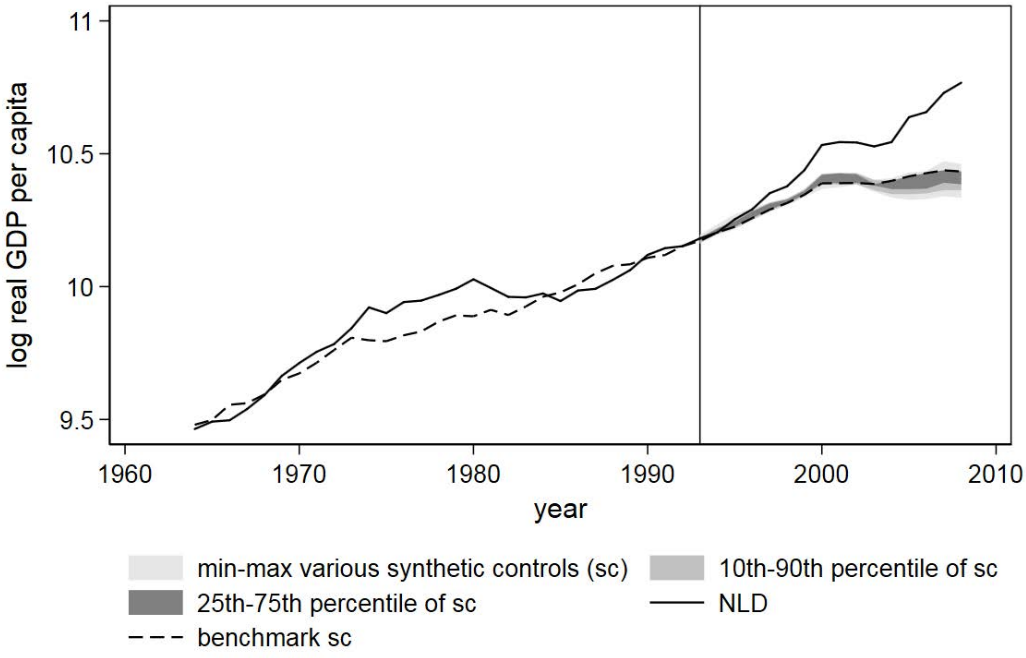


Figure 12: Single Market effect Portugal

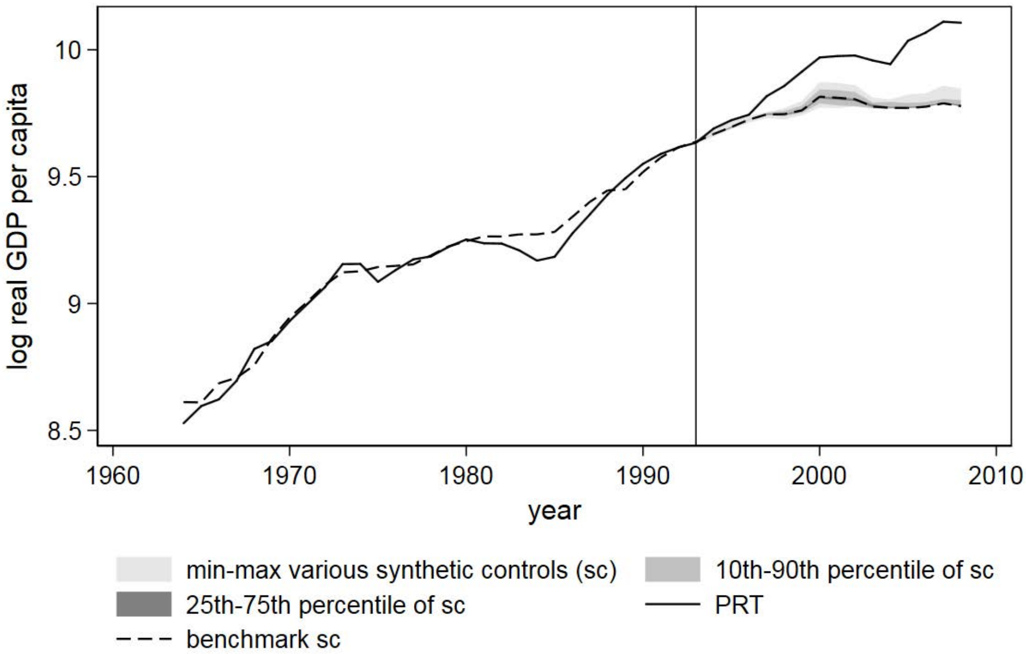


Figure 13: Single Market effect Spain

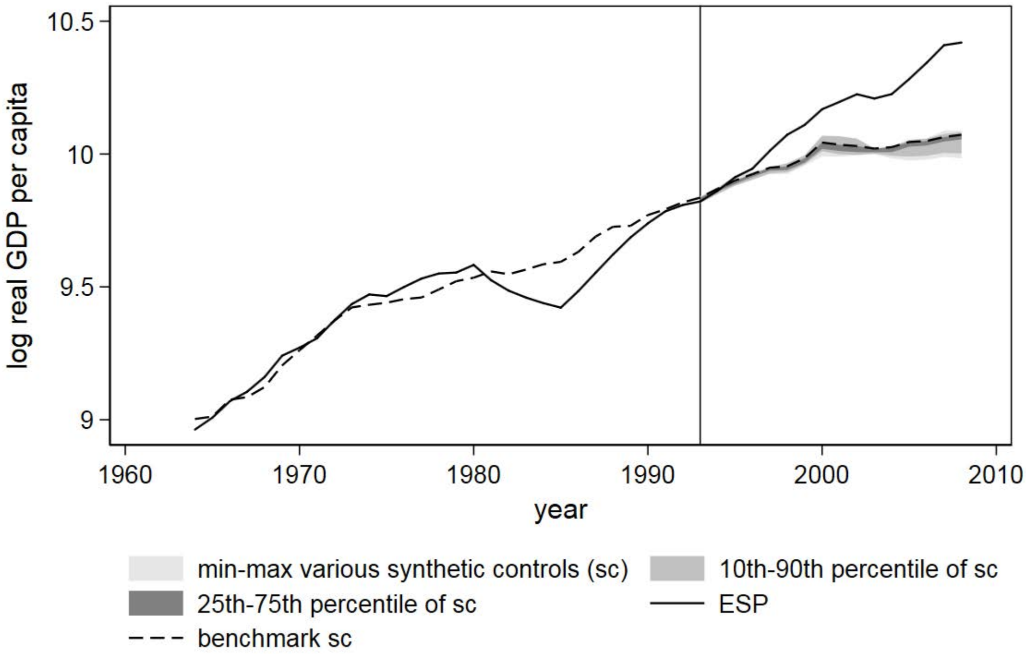


Figure 14: Single Market effect United Kingdom

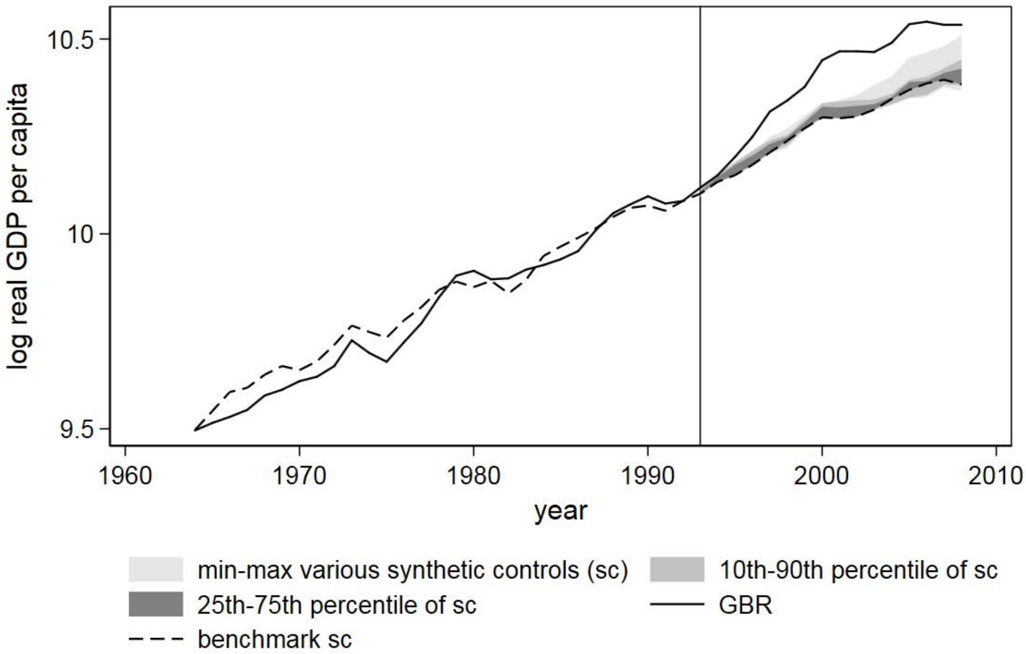
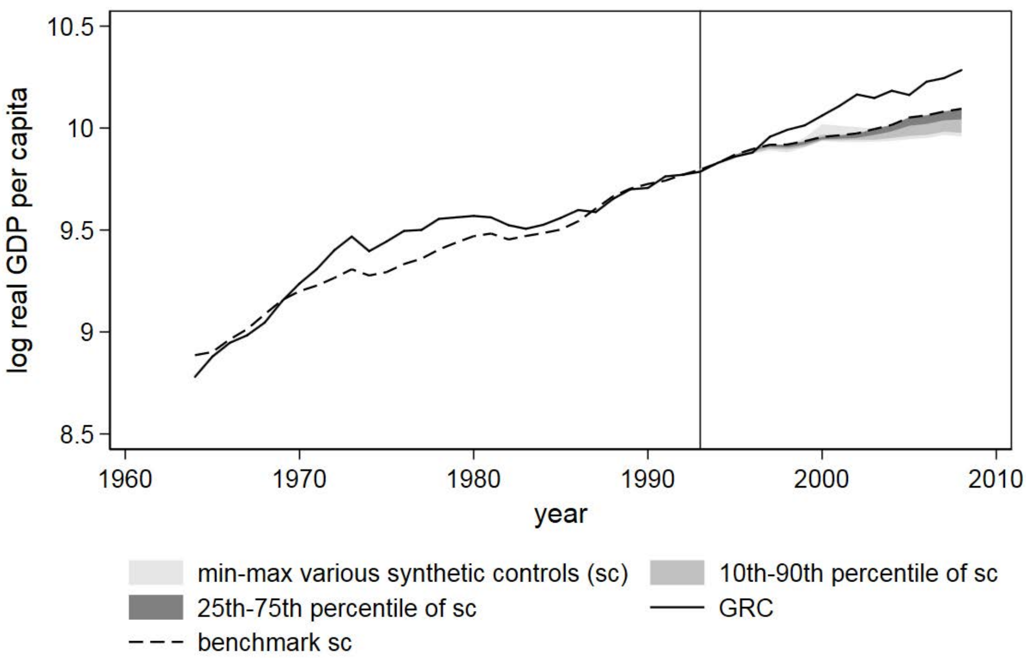


Figure 15: Single Market effect Greece



into the common European market (see e.g. Aiginer and Pfaffermayr 2004 or Campos et al. (2019)).

Similarly, positive growth effects have also been found for Portugal and the Netherlands. Both countries are rather small open economies which depend a lot on trade and for which the creation of the common European market established a much larger market to serve. Figure 10, Figure 11 and Figure 12 highlight that the fan chart, containing hundreds of counterfactuals, is clearly far below the real GDP per capita increase of Ireland, Portugal or the Netherlands.

For the larger countries, the growth effect of Spain stands out. Figure 13 suggests that the Single Market unfolded a positive growth effect in the first years and then extended it in the early 2000s. This is in line with Siotis (2003) who finds that economic integration led to a particular adjustment of margins and an increase of competitive pressure in Spain. He notes that in addition to the Single Market programme, Spain was in parallel embarking in major domestic reforms, basically being in a thorough political transition from the dictatorship that ended in the 1970s and with the previous statist or corporatist economic system being progressively dismantled. Another factor that might be captured in the very positive growth effect is the contribution from structural and cohesion funds that Spain benefits from, in particular when entering the Community. It cannot be excluded that these "confounding treatments" might have impacted the growth dividend derived from the Synthetic Control Method and that we primarily ascribe to the Single Market programme.

Although significantly less than for Spain, also the UK seems to have built up a clear growth differential that can be linked to the Single Market as documented in Figure 14. All different combinations of donor countries and covariates confirm this with a clear difference to the real GDP per capita series of the UK. Only towards the end of the sample a few counterfactuals diminish the returns of the Single Market to some extent. Campos et al. (2019) also find quite a significant growth impact from European integration, although for a different time horizon.

Similarly, looking at Figure 15, Greece seems to have profited from the entry into the common market with a growth differential of around 19% compared to the scenario in which the country would not have entered it. Belgium (Figure 16) realised a positive growth premium, but only from the mid-2000s. Before that, the set of counterfactuals does not produce convincing results.

The growth effects are even less clear for the larger countries, in particular for France, Germany and Italy. Figures 17, 18 and 19 document that the countries' realised GDP per capita development exceeds that of the scenario without the Single Market only towards the very end of the sample. Even if the baseline counterfactual is comfortably below the real GDP per capita of the respective countries, the fan chart sometimes comes close to that line. This suggests increased model uncertainty with the estimated growth rates contained in Table 5 to be the ceiling while the floor is often closer to half of the estimates at best.

Figure 16: Single Market effect Belgium

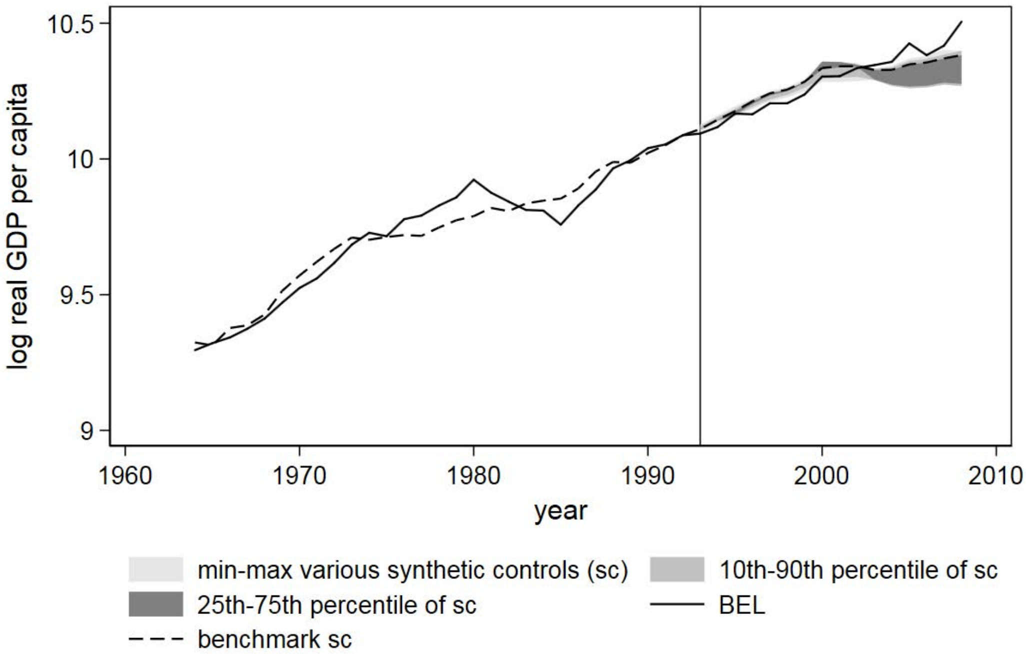


Figure 17: Single Market effect Germany

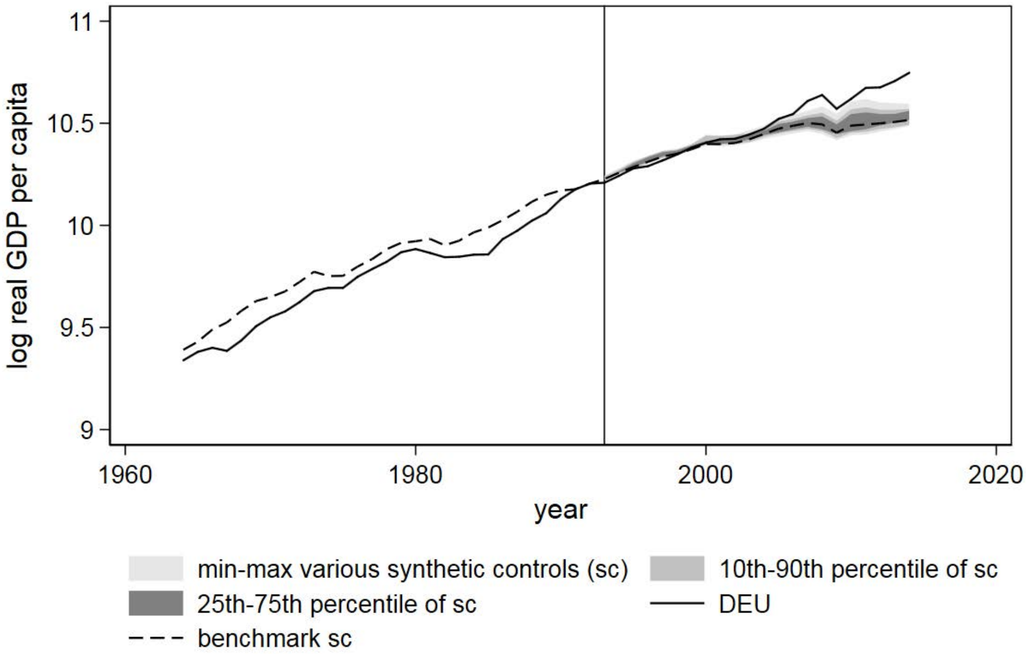


Figure 18: Single Market effect France

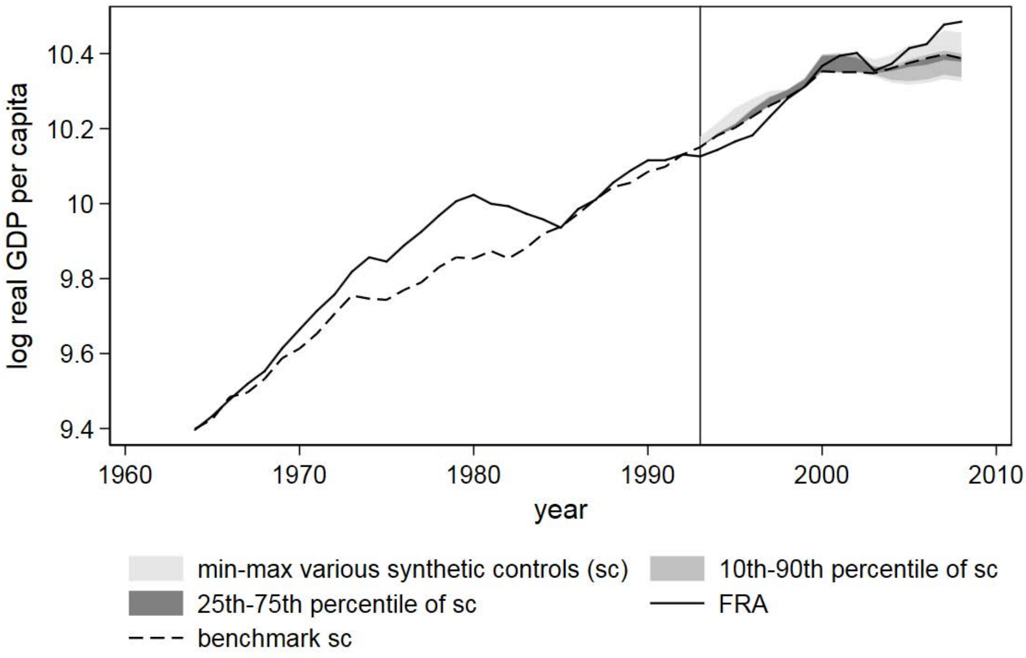


Figure 19: Single Market effect Italy

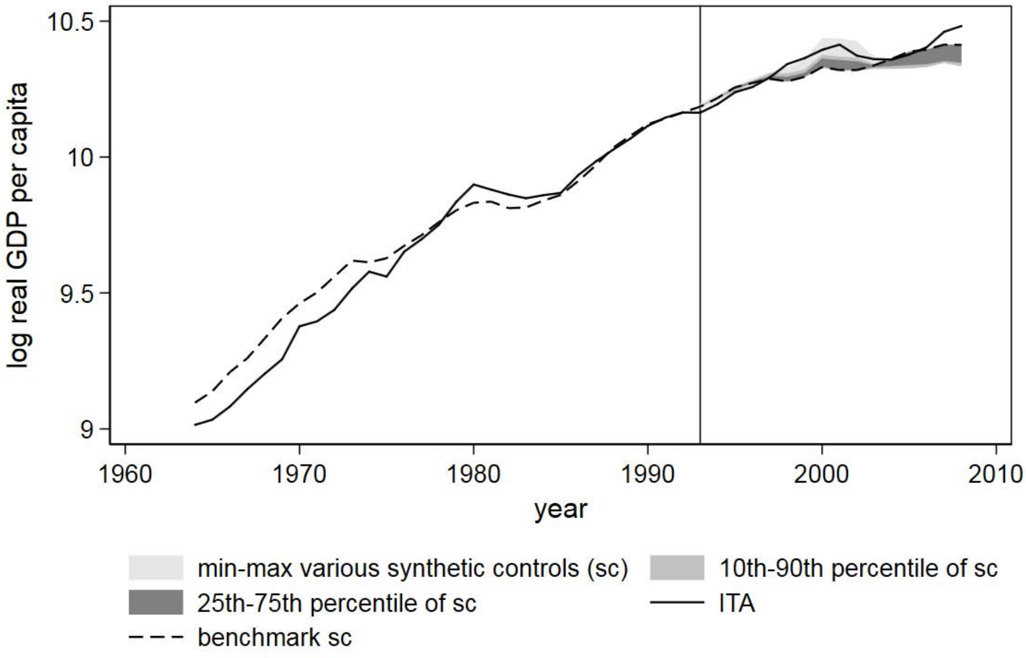
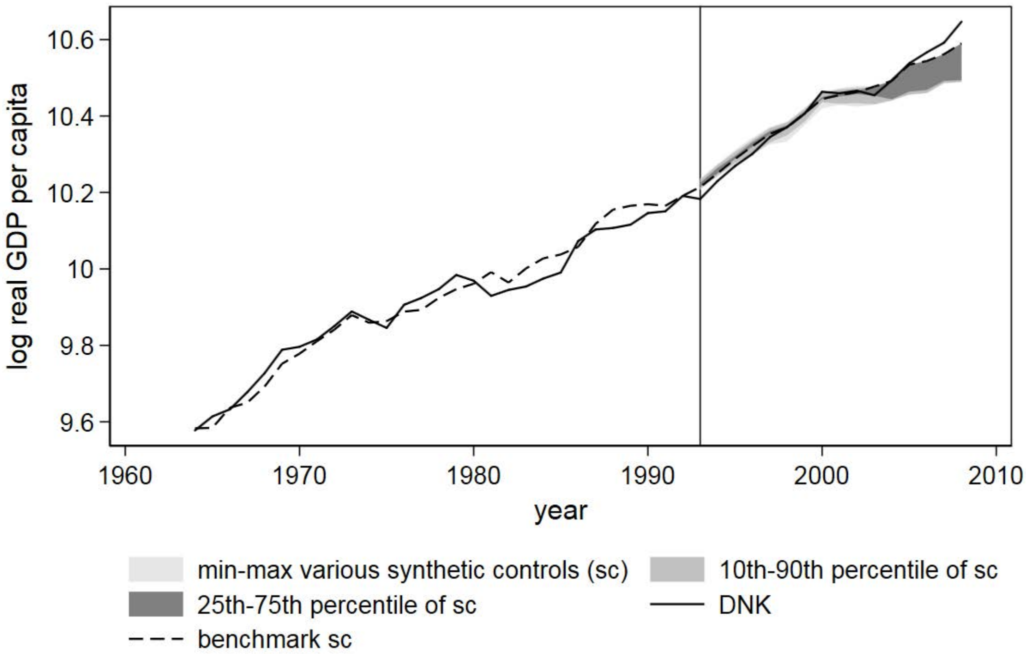


Figure 20: Single Market effect Denmark



It is important to also look into the specific country developments to carefully check whether the SCM approach holds. A particularly important case is Germany. When describing the assumptions underlying the SCM in Section 3, we highlighted that the validity of the results hinge on the two series (the treated and the counterfactual) to follow the same structural process since the treatment. For example, any shock occurring to any of the two groups in the proximity of the treatment should also affect the other group to a similar extent. However, Germany has been severely affected by another path-breaking event exactly in the years of the creation of the Single Market, namely the German unification.

One of the seminal papers on the Synthetic Control Method specifically studied the economic impact of the German unification on West-Germany. Abadie et al. (2015) find that the German Unification led to around 8% lower GDP per capita for West-Germany up until 2003 compared to a synthetic Germany without the reunification. It it thus likely that Figure 17 captures both the positive effect of the Single Market and the drag that arose from the reunification.

Overall, many smaller countries seem to have been able to better reap the benefits of the common market compared to the larger EU countries. Our finding is in line with the hypotheses and results in the literature. Aiginer and Pfaffermayr (2004) argue that following the Single Market, a process of deconcentration dominated and this led to declining market shares of large producers and countries while smaller countries gained market shares. They specifically single out Ireland and Portugal as countries which benefited from the process and increased their market share. In addition, the authors find that this effect is not only confined to existing firms, but that also start-ups were promoted as firms were no longer disadvantaged by small home markets. Moreover, multinationals also played a role as they made use of the common market and predominantly channelled funds into smaller countries. Allen et al. (1998) and in 't Veld (2019) confirm this hypothesis stating that the smaller economies in Europe experienced the most significant welfare gains. In addition, König (2015) establishes that smaller Member States should grow more quickly the further the common market integration progresses and that countries with lower initial income tend to grow faster. Mohler and Seitz (2012), in turn, estimate the welfare gains from increased product variety. While this is certainly not reflected in the GDP per capita figures we look at, it is noteworthy that they also come to the conclusion that the small and open economies benefited the most. By contrast, the study does not observe a significant increase in import product variety in the four largest EU economies, Germany, France, Italy and the UK. Given that over 70% of the increase can be related to intra-EU trade, their findings are strongly linked to the EU integration process and the common Single Market.

While our approach (to model the aggregate and country-specific effects of the Single Market with the SCM) is novel, other papers have approached the topic through modelling or used the SCM for slightly different research questions. Overall, our results are not too different from the existing papers in the literature. Campos et al. (2019) is closest as regards the methodology also applying the SCM, but they concentrate on the benefits of EU membership. As noted in Section 1, the authors use a different set of countries and significantly different time periods. This notwithstanding, they do find a positive impact from EU membership in particular for the smaller EU countries. However, in contrast to our results, they do not find a significantly positive impact for Greece. In addition, they do not analyse the effect on the largest three EU countries: Germany, Italy and France and therefore a full comparison to our results is difficult. Overall they argue that in the absence of the economic and political integration process per capita European incomes would have been, on average, 12 percent lower.

Allen et al. (1998) and in 't Veld (2019) are different as regards the method applied as they use DSGE models. However, they also specifically approach the question of the welfare effects of the European Single Market. The advantage of these kind of papers is that they are able to explicitly model different channels through which the common market affected incomes in the EU. More specifically, they distinguish between trade and competition effects. in 't Veld (2019) estimates the economic benefits of the Single Market to be, on average, around 8-9% of GDP for the EU. With this estimate, the author arrives above the original estimates of Cecchini et al. (1998) and comes close to the mid-point of the range estimated by Baldwin (1989). With 12-22% growth impact, our benchmark results are somewhat higher for the aggregate.

7 Conclusions

The creation of the European Single Market has been a cornerstone of the European integration process. As the integration process has advanced, arguments and uncertainties about the advantages of EU membership arise on a regular basis with some questioning the benefits while others contemplate further integration. In this context, it seems worthwhile to empirically study the growth effects of the introduction of the common market.

We use the Synthetic Control Method developed by Abadie and Gardeazabal (2003) and Abadie et al. (2010) as it is an ideal tool for undertaking comparative case studies and therefore also the creation of the common market through the Single European Act agreed in 1986 which foresaw creating a true Single Market by January 1993. During the process member countries opened the door towards common minimum standards and harmonisation in the area of goods and services provision and access to each other's markets, in particular through increasing common decision-making in areas that were previously confined to national competences. Various directives implemented over the years meant that Member States were bound to grant access to firms from other countries to most of their product markets by converging towards common rules and standards.

We find that the Single Market has raised real GDP per capita by around 12-22%. This estimate describes the growth premium that the founding Single Market countries realised compared to a hypothetical counterfactual scenario in which these countries would not have created the common market. Interestingly, this result is broadly in line with the predictions made by Baldwin (1989) who estimated a growth effect of around 13% in the baseline scenario, but sees the possibility of up to 33% growth premium.

We demonstrate with a large battery of robustness checks that the results of the benchmark model hold. We turn all parameters of the SCM upside down by varying the set of donor countries and covariates. We implement in-space and in-time placebo estimates as well as check other hypotheses (e.g. the common currency effect) and find that the results remain robust.

On the country level our results suggest that smaller Member States have benefited somewhat more from the creation of the Single Market. In line with related studies, those countries likely realised the largest relative increase in market access and profited from the reduction of market power of larger producers in larger Member States. However, the effects are also heterogeneous among smaller Member States. Moreover, of the larger countries, Spain stands out as having realised a significant growth premium. The United Kingdom has also realised a significant growth premium over time from having access to the common market. By contrast, the other three largest EU countries, Germany, France and Italy did not seem to have benefited to a similar degree.

Going forward, the potential of the Single Market to increase the income of its members becomes all the more evident when acknowledging that the Single Market remains incomplete. Various studies (e.g. Monti 2010 or Mariniello et al. 2015) suggest that the Single Market has not yet been applied to the full extent. On one hand, this relates to the countries not having fully applied the EU directives. On the other, the Single Market has been predominantly focused on goods, while the Single Market for services has not yet achieved the same prominence.

The results of the paper, thus, make a case for a further integration through deepening and widening the Single Market where possible and desired by Member States.

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Appendices

A Description of the dataset

Table 6: Dataset

Variable	Description	Source
Real GDP	Output-side real GDP (in millions 2011 US$)	PWT
Population	Population (in millions)	PWT
TFP	TFP at constant national prices (2011=1)	PWT
Human capital	Human capital index, years of schooling and returns to education	PWT
Capital stock	Capital stock (in millions 2011 US$)	PWT
Economic Complexity indicator	Diversity of exports a country produces and their ubiquity	Harvard Center for International Development
Economic Freedom index	Headline indicator	Fraser Institute
Trade openness	Ratio of imports and exports to GDP	World Bank
Share of investment in GDP	Share of gross capital formation	PWT

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Jonne Lehtimäki
University of Turku, Turku, Finland; email: joleht@utu.fi

David Sondermann (corresponding author)
European Central Bank, Frankfurt am Main, Germany; email: david.sondermann@ecb.europa.eu

Postal address 60640 Frankfurt am Main, Germany
Telephone +49 69 1344 0
Website www.ecb.europa.eu

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