



**LUND UNIVERSITY**  
School of Economics and Management

Should Sweden apply for an EMU membership?

Tilde Vidman  
Supervisor: Klas Fregert  
Department of Economics  
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## Abstract

This paper examines the effect a membership in the EMU would have on the Swedish economy. This is done by using the synthetic control method where a synthetic Sweden is created and compared with actual Sweden. Synthetic Sweden is created by 11 donor pool countries, which are the 11 countries that joined the EMU in 1999. Using GDP per capita and Export as a percentage of GDP as dependent variables and other economic figures as explanatory variables between 1980-2020 are we able to understand how the Swedish economy would have developed if Sweden would have joined EMU in 1999. The results, in line with previous research, show that Sweden has benefited in terms of GDP per capita by staying outside of the EMU. But the results also display that Sweden would have a larger export if they were a part of the EMU. Because the Euro only has been used since 1999, only short- and medium-term results displayed, and not any long-term effects.

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# Introduction

A central part of European unity and collaboration is the European Monetary Union (EMU). The EMU aims to gather the member states of the European Union (EU) and integrate its economies with a common currency, the euro. These member countries are together forming the euro area. The euro area originates from the 1991's Maastricht Treaty where the work of a common currency began. The treaty aimed to increase collaboration between the nations which would make them more integrated with each other. When the Euro was first introduced in 1999, 11 countries gave up their sovereign monetary policy and abandoned their respective currency to adopt the Euro (ECB, 2022)

Today 19 member states have joined the euro area and the Euro is the second most important currency in the world. The European Central Bank (ECB), which has the sovereign power in the euro area on monetary and exchange rate policies, has a huge influence on the world economy. Joining the euro area comes with several benefits like price stability, better integrated and more efficient financial markets, greater influence in the global economy, reduced exchange rate volatility, reduced transaction costs, increased foreign trade and direct investments, and a sign of European identity (European Parliament, 2022). Even though the benefits of joining are strong, most research has shown that some EU countries have economically benefited from not being a part of the euro area. For these countries, it is shown that the cost of joining is larger than the benefits. The main cost of joining the euro area is the loss of an independent central bank which means that a country loses their ability to control its monetary policy, exchange rate policy, and some of its budgetary policies and therefore its ability to react to shocks and smooth out business cycles (Gyoerk, 2017).

In 1997 did the Swedish government appoint the Calmfors Commission to investigate if Sweden should adopt the Euro in 1999. The commission concluded that Sweden should not join in 1999 because the time was not right. The Swedish parliament (Riksdagen) decided to follow the commission's recommendations and did not join in 1999 and decided that a referendum should decide the future for Sweden. In 2003 did the Swedish citizens vote, and the outcome was that Sweden should not join the euro area for the time being, and every government has since followed that decision (Riksdagen, 2022). Since then, several articles, studies, and arguments have been published on the subject, and later have the discussion not only been about the economical aspect, but also the political.

This paper will study Sweden's decision to not join EMU in 1999 and its effect. The study is built on the hypothetical case of a Swedish EMU membership using the synthetic control method. The method compares the real case scenario of Sweden being outside of the euro area and the hypothetical case of Sweden joining the euro area in 1999. The study will compare GDP per capita and exports. Exports are added since increased exports is one of the main arguments for joining the euro area.

## Previous research

The Calmfors Commission (Calmfors et al. 1996) was appointed by the Swedish government to examine the cost and benefits of membership, and the report has been very influential in the Swedish EMU debate throughout the years. Calmfors Commission's report was made with the purpose to be the foundation for the Riksdag's decision in 1997 on whether Sweden should join EMU or not. The report presented that entering EMU would lead to an efficiency increase in the Swedish economy because of lower transaction costs and less exchange rate uncertainty which would later lead to an increase in foreign trade and direct investments (Calmfors et al. 1997 p. 405). The report also presented the cost Sweden would have to face which would mainly be the cost of losing the independence of their central bank. Losing its independence over its monetary and exchange rate policies would remove a country's ability to immediately react to potential shocks. The outcome of an EMU membership would therefore be gaining the benefits of increasing foreign trade and direct investments but with a risk of not being able to smooth out shocks and business cycles (Calmfors et al. 1997 p. 413). The Calmfors Commission concluded that Sweden should join EMU at a later stage but now was not the right time, and the Swedish government chooses to follow their recommendations (Calmfors et al. 1997 p. 427).

Calmfors (2009) later discusses the arguments of whether to join or not. Different from his studies in the late 90s did Calmfors argue that the economy had changed and now there were other aspects that were more important in the discussion than it was before. Calmfors (2009) concluded that the stabilization risks of not having an independent central bank were in 2009 less than the positive effects of increasing trade and lower transaction costs and therefore was it time for Sweden to enter the euro area. Calmfors (2009) also mentioned the importance of contributing to European political integration; if Sweden joins the euro, it also shows its willingness to contribute to European integration. This means that Sweden's role in the EU could be affected by its decision on EMU, and joining would Sweden gain some positive political effects (Calmfors, 2009 p.1-3).

Rose (2000) did a study based on trade statistics between 1970 and 1990 for 186 countries and territorial units. Of these 186 countries and territorial units, 56 have a common currency. The study concluded that when exchange rate uncertainty is removed foreign trade increases by 13% and outside that foreign trade increases by up to 235%. The study was criticized by

both Persson (2001) and Barro and Tenreyro (2002). The latter pair aimed their study to “destroy” Rose's conclusion but instead did research show an even larger result. In 2002 Rose decided to do a critical study on his own work from 2000 and used 24 different studies about common *currency's effect on trade* and he concluded again, both statistically and economically, that currency unions double the trade size (Flam 2003 p. 71-72). Flam (2003) concluded in his article that if Sweden joined the European currency union it would increase the foreign trade size with others within the Eurozone due to lower transaction costs and exchange rate uncertainty. The effect would at least be a couple of percent and it would also reduce some trade frictions (Flam 2003, p. 74).

Baldwin et al. (2008) did as well use Rose's method to study Euro's impact on trade and foreign direct investments for the European Commission. The study showed that trade among nations using the euro is greater than among countries not using the euro. Baldwin et al. (2008) concluded that the aggregated trade would be boosted by at least 2% by joining the euro area which is way lower than Rose presented in his research (Baldwin et al. 2008, p. 42). The two main channels that explained this increase are first the price channel and second the newly-trade goods channel. The first channel explains that the relative price within the Eurozone lowers and therefore is trade boosted, the lower trading cost could be explained by the higher competition within the zone and reduction in bilateral trade costs. The second channel explained the idea of firms that are euro-induced export a wider range of their products to the Eurozone which increases trade (Baldwin et al. 2008, p. 128-129).

In 2009, 10 years after the introduction of the Euro, did Konjunkturinstitutet publish a report discussing if Sweden, Denmark, and the United Kingdom had made the right decision to not join the euro area in 1999, and they also asked if they should join now (Flam et al. 2009). The report presented, like Calmfors et al. (1997), the positive effects that elimination of transaction costs and exchange rate uncertainty had on trade which they explained by the removal of a starting cost when exporting in the Eurozone. The increased competition within the euro area the common currency contributes and small changes in transportation costs over borders could have large effects over time (Flam et al. 2009, s. 86-89). The result showed that trade with both nations within and outside the euro area would increase and therefore Sweden, Denmark, and the United Kingdom would potentially have a 12% increase separately in trade if they decided to join the EMU (Flam et al. 2009, s. 91). The effects a membership in EMU has on foreign direct investments are not obvious, it could either

become complements or substitutes for trade. Flam et al. (2009) argued that the most positive effects on foreign direct investments would probably come from mergers and acquisitions from companies both within and outside the Eurozone. It was concluded that the removal of exchange rate uncertainty will directly affect investment decisions positively (Flam et al. 2009, p. 95-96). Flam et al. (2009) further discuss the effects of not having an independent monetary and exchange rate policy and how it affects the ability to stabilize immediately negatively. The report also showed that the argument that fiscal policy could replace the losses of not having independent control over the monetary and exchange rate policy was not fully true, it could only replace some of the losses (Flam et al. 2009, p. 12). To understand if it is economically beneficial for Sweden, Denmark, or the United Kingdom to join the EMU does the weighting of an independent central bank in a situation of asymmetric disturbance matter. They conclude that the weight an independent central bank has in such a situation versus the profits from increased trade and foreign direct investments is what is decided (Flam et al. 2009, s. 123).

Höpner (2017) discussed the membership in EMU for Sweden, where he shows how Sweden has outperformed the Eurozone by taking the financial crisis as an example (Höpner 2017, s. 2). Joining EMU means that the capacity for the Riksbank to de- and revalue if necessary is no longer an option and seen in the perspective of the financial crisis may it be beneficial to stay outside the eurozone. Höpner concludes that since Sweden continues to outperform the countries in the euro area, it is not beneficial for them to enter soon (Höpner 2017, s.3-4).

More recently has Olsson (2019) studied if Sweden would have been “richer” or “poorer” if it had joined the euro area. Olsson (2019) used the Synthetic Control Method to measure the counterfactual scenarios of how Sweden's GDP per capita would be if Sweden had joined the euro area in 1999 or in 2004 after the referendum. Olsson used eight countries that had the euro as their currency between the years 1980-2018. It was concluded that Sweden has benefited from not joining the euro area, and between 2013 and 2017 the economic growth has been between a half and three times as big as if Sweden had entered the euro area (Olsson, 2019 p. 29, 32, and 38). Olsson's studies are in line with Gyoerk's studies from 2017. Gyoerk (2017) did as well use synthetic control methods to understand the costs and benefits of EMU membership from the perspective of a non-member. Gyoerk (2017) did use eleven EU countries in its donor pool (compared to Olsson who used eight), and several comparison variables unlike Olsson (2019) who only used four (Gyoerk, 2017 p.913-915).



## Data

In this research Sweden is mainly studied. The control group consists of Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxemburg, Netherlands, Portugal, and Spain. The

period span is from 1980 to 2020 for all countries, and the variables from each country are presented in yearly data. All data is gathered from the IMF economic outlook database, OECD database, or IMF World Bank database.

## Method

The question that is asked is: how high would the GDP per capita be in Sweden if it had been introduced to the Euro in 1999? To answer this question the Synthetic Control Method (SCM) is used.

The SCM was developed by Abadie and Gardeazabal (2003) and Abadie et al. (2010, 2015) and its main purpose is to evaluate treatment effects in comparative case studies.

In this research will SCM compare the actual GDP per capita of Sweden with a hypothetical (synthetic) trend if Sweden had introduced the euro in 1999, this is the counterfactual scenario. The counterfactual scenario is generated by the GDP per capita trend in other countries, which have introduced the euro and have similar economic trends, this is the control group. For the control group to describe the counterfactual scenario in the best way is an algorithm introduced that puts a specific weighting on each country. The weighting is selected in a way so that countries from the control group that have the most similar weighted average of the trend in GDP per capita as the reference country (Sweden) will have the largest weights. A country can have weights between 0% to 100% and all the weights will sum up to 100% (Cunningham s. 289, 2018). Generally, a longer pre-treatment period will result in a better fit in terms that also minimize the deviation of the counterfactual. Intuitively, only the control countries that are like Sweden in both observed and unobserved characteristics can match Sweden over longer periods of time (Gyoerk, 2017).

The core feature of the SCM is to generate the weighted average of the control countries which is done in two steps. First are countries selected that are to make up the control group. These countries cannot have been affected by a major country-specific shock during the period for the study (1980-2020) since these shocks may affect the results. Also, the control-group countries must be a eurozone country (since Sweden is not), and in the years prior to the introduction of the euro (1999) should the country's GDP per capita not diverge significantly from the other countries since that may distort the results. The second step is to determine the weighting for each country in the control group. This is made by using an

econometric algorithm so that the weighted average of the control countries reproduces an accurate GDP per capita trend for the counterfactual. This is done by first comparing the GDP per capita trends in the control countries and Sweden's GDP per capita. Then other economic figures are considered to create a counterfactual Sweden. When the counterfactual is constructed, the aim is to minimize the distance between the synthetic control and the treated unit, by measuring the root mean squared prediction error (RMSPE) this could be done. RMSPE is a function used in the construction of the counterfactual and is a function of predefined prediction covariates (explanatory variables of the dependent variable. Weights are chosen by the SCM procedure for both the included variables and the countries to minimize the deviation between actual and synthetic Sweden. (Gasparotti and Kullas, 2019, p. 2-3)

Later will the same method be used to answer the question: how high would the export be in Sweden if the Euro would have been introduced in 1999? Here the focus is to understand how our exports would have been affected by joining the euro area. Different from before is now export as a percentage of GDP in Sweden the dependent variable and for simplicity are the same countries for the control group used. The other economic figures that are considered in this scenario are the inflation rate in annual percentage, GDP growth in annual percentage, investments in the percentage of GDP, and unemployment rate in percentage.

The method is argued by Abadie et al. (2010) to have many distinct advantages over regression-based methods. First, is SCM using interpolation instead of extrapolation. The estimated effects are based on the comparison between a given year and a counterfactual of the same year. Second, is how SCM is processing its data. By using counterfactuals is it not required to access the post-treatment outcomes during the design phase of the study, which it does in a regression. This helps the researcher to avoid “peaking” at the result while specifying the model. Also, how the weights are chosen matters. This is that the weights were chosen to show how each unit is contributing to the counterfactual. This contrasts with the regression-based method where weights also are used, but we cannot see the weights and therefore do not understand how each unit is contributing (Cunningham p. 289-290, 2018).

## Model

The model in this study is based on Sweden and the eleven countries that introduced the Euro as their currency in 1999. GDP per capita and exports are used as dependent variables. The GDP per capita is chosen in purchase power parity in million dollars, and exports and imports are in percentage of GDP. Since an EMU membership has a direct effect on exports and openness will not these variables be included as explanatory variables. The variables chosen are those variables that can help to explain the dependent variable but are not directly affected by an EMU membership.

Model (1):

Including the countries joining in 1999

Dependent variable: GDP per capita (PPP)

Variables: Annual inflation rate in %, total government expenditure as % of GDP, total investments in % of GDP, and industrial production index (IPI).

Model (2):

Including the countries joining in 1999

Dependent variable: Exports in the percentage of GDP

Variables: Annual GDP growth in %, unemployment rate in % of labor force, total investments in % of GDP, and annual inflation rate in %.

- Table 1: The two models used in the study.

### *Dependent variables*

*Yearly growth rate of real GDP per capita in purchasing power parity dollars:* The variable explains the annual percentage increase (decrease) in GDP. GDP is the measurement of a country's productive activity comparable to the value generated by the factor production within a country. GDP per capita is the ratio of GDP to population size. Real GDP per capita is computed using prices observed with the common base year 2017. GDP per capita has come to be one of the most important macroeconomic figures, and GDP per capita is sometimes used to measure the material well-being of the inhabitants of a country. GDP per capita is interesting to study in the case of being better off or not when being a member of the euro area. Analyzing GDP per capita and its effect if joining the Euro-Area gives an understanding of the economic aspect of the question. (Burda, & Wyplosz, 2017 p. 29-34)

*Export as a percentage of GDP:* The variable is the percentage change in the volume of exports as a percentage of GDP whose characteristics are unchanged (World Bank, 2022). The export function represents the demand for a country's goods and services outside the country, linking them positively to foreign spending and negatively to the real exchange rate (Burda, & Wyplosz, 2017 p. 567). Export is a key component of GDP, and an increase in exports increases GDP (Burda, & Wyplosz, 2017 p. 40). Export, and trade, are also one of the main arguments when discussing the benefits of being a member of the euro area.

#### Explanatory variables

*Industrial production index:* The variable is a business cycle indicator that measures the changes in price-adjusted output in the industry. The index is an important short-term statistical indicator and is used to identify turning points in the economy, but also to assess the future developments of GDP (EU, 2021).

*Inflation rate in percentage:* The inflation rate measures the rate of change in a price index (an average of all/many prices in an economy) in percentage annually. The larger the inflation rate is, the larger the price changes are from one year to another (Burda, & Wyplosz, 2017 p. 570). Since inflation is directly affecting prices, it is also affecting the GDP. Inflation is negatively related to business cycles and directly affects consumption. If prices go up will consumption fall, and therefore will GDP fall as well, and vice versa (Burda, & Wyplosz, 2017 p. 8-10)

*Total investments:* The variable expresses the ratio of total investments to GDP in the local currency within the country. The value is measured by the total value of the gross fixed capital formation, changes in inventories, and acquisitions (World Bank, 2022). Investments have a direct positive effect on GDP as it is one of the components measuring GDP.

*Total government expenditure as % of GDP:* The variable includes all current expenditures for purchases of goods and services for a government (World Bank, 2022). Government spending or expenditure is one of the variables that is used to decompose GDP. The relationship between the bigger public sector and thus a larger share of public expenditure and its effects on economic growth has been discussed. Barro (1998) shows for example that

there is a significant negative relationship meanwhile (Gwartney, Lawson & Holcombe, 1998) means that the effect is significant positive up to a certain point of public spending.

*Unemployment rate:* The variable is the number of unemployed persons as a percentage of the labor force (the unemployed + the employed). The unemployed are workers who are currently not working but are willing and able to work and are actively searching for work (World Bank, 2022). Labor is a factor of production and is often measured in working hours, the larger labor the more can be produced. The larger the unemployment rate, the smaller is those who work which decreases the total working hours and result in less production (Burda, & Wyplosz, 2017 p. 571).

Country	(2) GDP per capita	(2) Exports
Austria	0	0.001
Belgium	0	0.001
Finland	0	0
France	0.398	0.01
Germany	0	0.767
Ireland	0	0
Italy	0.407	0.23
Luxemburg	0	0
Netherlands	0	0
Portugal	0	0
Spain	0.195	0
RMSPE	20.14561	3.016899

Table 2: The estimated weights per country in the three models according to the synthetic control method. RSMPE is estimating the prediction error.

There are primarily two types of placebo testing for interference in the synthetic control method: in-space and in-time (Abadie et al. 2010), and in this study will the in-time be used. The intention of the tests is to verify the method's ability to follow the effect of the treatment period (1999 and forward) in isolation exactly. The in-time test assigns treatment to each country in the donor pool at an arbitrary point in time which tests the treatment respectively (Gyoerk, 2017).

The placebo in-time test checks if the synthetical control has been appropriately assigned. By assigning an earlier treatment starting period (before 1999) is it tested if the earlier point yields a close co-movement of the two series (actual and counterfactual) until 1999. If a sizable deviation from the original analysis is observed, it is suggested that the counterfactual is capturing some effects other than the introduction of the Euro (Gyoerk. 2017).

# Result

## Main results

The result shows the synthetic control method estimations when the combination of variables that gives the lowest RMSPE is used. The solid line represents actual Sweden, the dotted line synthetic Sweden, and the vertical line in 1999 represents the treatment period (when the Euro was introduced). The figure shows the deviation between actual Sweden and the synthetical Sweden from 1999 and onwards.

Figure 1 displays the counter factor analysis for GDP per capita. Counterfactual Sweden and actual Sweden are moving in the same direction in the pre-treatment period, even though actual Sweden is more volatile. From 2002 and forward there is a widening of the gap between the two lines, and the figure indicates that GDP per capita would have a flatter trend if Sweden would have entered the euro area in 1999. The gap continues to grow over time which suggests that there is a persistent and increasing benefit in terms of GDP per capita for Sweden to remain outside of the euro area. Figure 2 shows the difference in percentage between actual Sweden and synthetic Sweden. It is shown that the gap peaks in 2015-2016 where 27% and 28% deviation is recorded. The gap then slowly decreases, which can be the beginning of a downward trend or the effect of other factors.

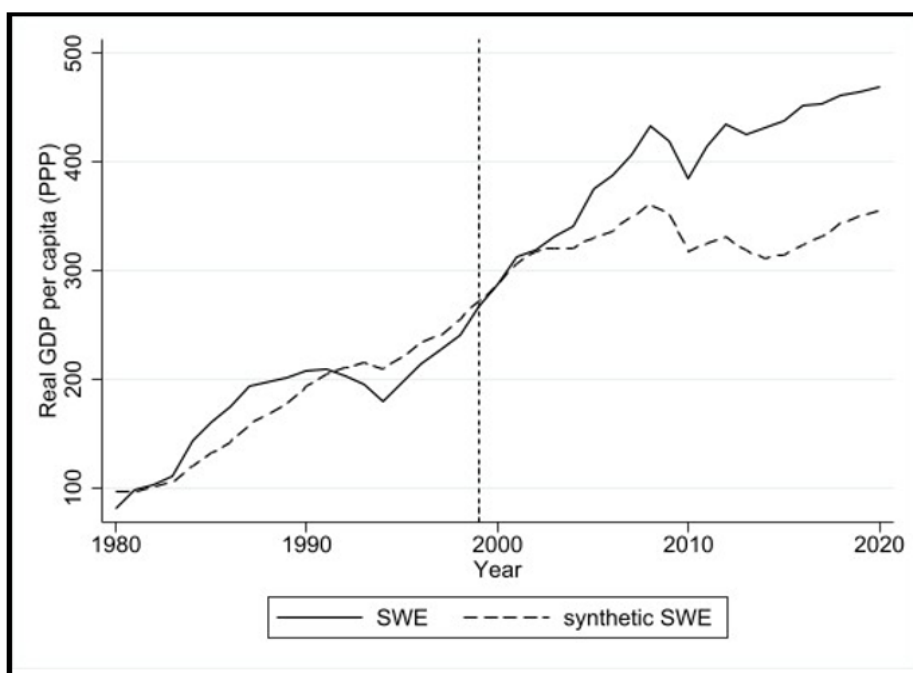


Figure 1: Real GDP per capita in PPP



The weightings in counterfactual Sweden is composed of 39.8% France, 40.7% Italy, and 19.5% Spain. The larger weights display the importance of these countries in the control unit to create a counterfactual Sweden. Their large weights follow from similarities in the size of the countries, and the economic development compared to other countries in the donor pool.

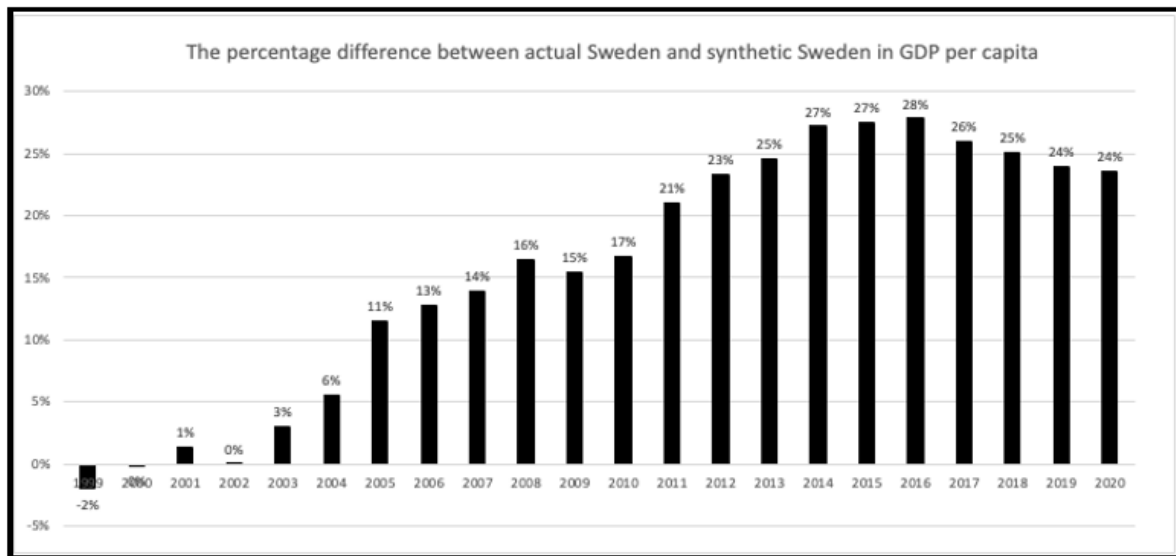


Figure 2: Plots the difference in percentage between actual Sweden and synthetic Sweden in GDP per capita in the treatment period.

Figure 3 is the counterfactual analysis of exports as a percentage of GDP displayed. Counterfactual Sweden and actual Sweden somewhat follow the same trends in the pre-treatment period, but also past 1999 when the treatment period starts. The similar movements in the first years of the common currency suggest that Sweden would have recorded the same increasing trade as the countries in the Euro-Area. These trends may occur because Sweden benefited from the increased trade within the euro area, and Sweden was still an important trade partner. Despite the positive trends at the start of the pre-treatment period, the figure displays that around 2010 the Swedish export trend flattened, but for synthetic Sweden, it continues to increase. In the later years, the gap was reduced, but synthetic Sweden continued to have a higher export. The figure shows the benefits of being a part of the euro area.

The weighting in counterfactual Sweden is composed of 0.1% Austria, 0.1% Belgium, 1% France, 23% Italy, and 76.7% Germany. The importance of Germany as a component in counterfactual Sweden may follow from the similarities in the composition of export goods (cars, capital equipment, etc), exporting partners, and geographical locations. Sweden and Germany have also for a long period of time been important trading partners to each other, and Germany is Sweden's most important trading partner (Sweden Abroad, 2022).

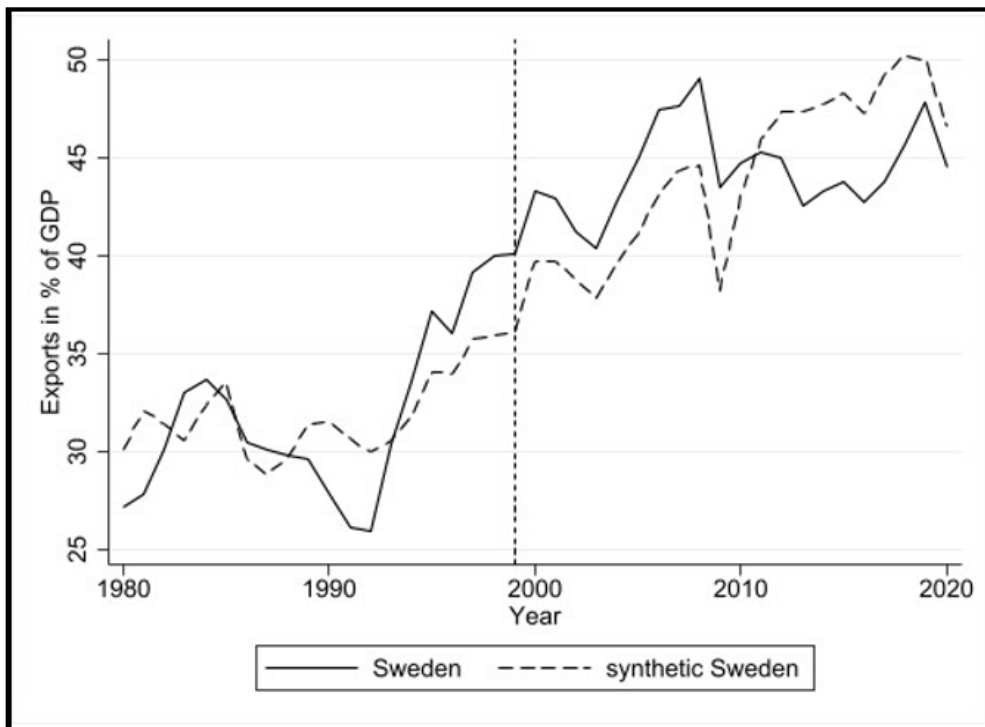


Figure 3: Exports in the percentage of GDP.

The synthetic control method determines whether Sweden would benefit or not from joining the euro area in 1999. The results find that it appears to be a benefit of being a member of EMU in terms of export, but the cost of not having an independent central bank is larger than the benefits since counterfactual Sweden has a lower GDP per capita than actual Sweden. Therefore, has Sweden benefited from not being a part of the euro area in terms of GDP per capita, which also determines higher prosperity for Sweden compared to counterfactual Sweden.

During the 1990s did Sweden face a big financial crisis, the crisis was exceptionally large. The financial crisis can be seen in figure 1 when the positive trend actually turns into a

negative trend in the 1990s. Because the crisis did not hit the donor pool countries, we are not able to see the same reaction in synthetic Sweden whose graph continues to grow on the same path. Also, since the Euro was introduced in 1999 the economy has faced three major economic crises, first the financial crisis of 2007-2008, the euro crisis which followed the financial crisis of 2009-2019, and the Covid crisis in 2020. The crisis did affect Sweden and the donor countries differently. For example, did the Euro crisis have a larger effect on the countries within the euro area than Sweden. Also, did the different countries react to the Covid-19 crisis differently, some had lockdowns, some did not, etc. Because synthetic Sweden is created by the donor pool countries and not actual Sweden, there may be some small errors in the pre-treatment period but also in the treatment period. It is therefore important to take these outside factors into consideration when analyzing the results.

Even though the result may be affected by some calculation errors (as described above) there is no doubt that Sweden has benefited in terms of GDP per capita by staying outside of the euro area. As the figure shows, Sweden recovered way better from the Euro crisis than synthetic Sweden. According to previous research, this is because Sweden still has an independent central bank that could react to the shock immediately, different from the euro countries. This could be an explanation for why the results show that even though a membership gives the opportunity for higher exports, it affects BNP per capita negatively. Looking forward, an independent central bank may not be as important in the long run, as it has been in the short run.

## Placebo test results

In the placebo in-time test is a new treatment period created by changing the pre-treatment period. In this study where the pre-treatment period changed from 1980-1999 to 1980-1995. The test aims to control if the effects on the treatment period may depend on other effects than the implementation of the Euro. As shown in figures 4 and 5 there are no significant divergences from the original figures (1, and 3). This adds validity to the original graphs and analysis and strengthens the argument that the effects are caused by the implementation of the Euro. There is a small deviation in the pre-treatment period, these deviations follow from the inability of the donor pool countries to simulate the shocks experienced in Sweden during this

period, and therefore should the deviation not be seen as a weakening of the result in the original models.

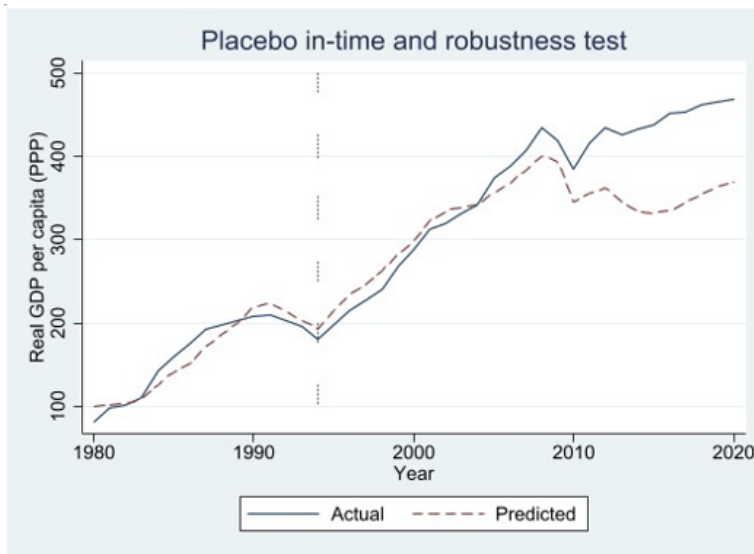


Figure 4: Placebo in-time test and robustness test for Real GDP per capita (PPP)

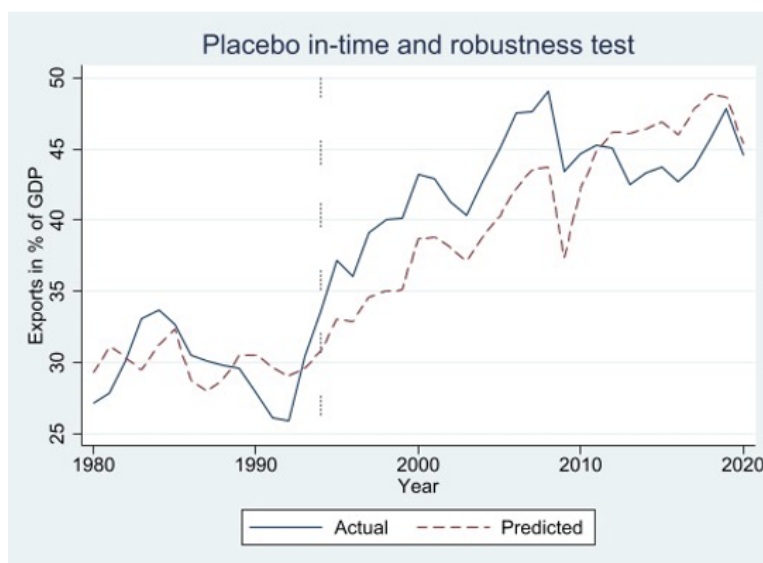


Figure 5: Placebo in-time test and robustness test for Exports.

## Conclusion

This study aimed to answer the question of how Sweden's GDP would per capita, and exports would have been affected if Sweden had chosen to join the euro area in 1999. These two variables were studied since GDP per capita is commonly used to determine the prosperity of a country, and export is an important argument in the Euro-discussion. Those who are pro-Euro, and most research, show that increased trade, exchange rate stability, and lower interest rates are some of the greatest benefits of a common currency and why Sweden should join the Euro-Area. The potential cost of entering the Euro-Area is the loss of an independent central bank, and therefore the sovereign power over a country's monetary and exchange rate policy since that would be controlled by the ECB instead of an independent central bank. This means that Sweden no longer would be able to immediately act against potential shocks or changes in business cycles. Some studies, for example, Calmfors (2009) discuss the political aspect, if Sweden chooses to join the Euro-Area is that also a political statement that Sweden is willing to contribute to European integration.

The synthetic control method compares actual Sweden outside the euro area to a counterfactual Sweden within the euro area. Counterfactual Sweden is constructed from the donor pool countries (12 countries in the Euro-Area) using a dependent variable and several explanatory variables. The pre-treatment period which is the period before the Euro is implemented in 1999 is between 1980-1998, and the treatment period is the period between 1999-2020. The explanatory variables are economic figures that help describe the dependent variables without being variables that are directly affected by a common currency. As expected from previous research Sweden in terms of GDP per capita benefited from staying outside of the euro area, but it is with the cost that membership would lead to higher exports. When the result is tested are there some in-space deviations that show that the result may fail to capture some of the effects from the donor pool countries in the treated period.

Since the Euro was introduced in 1999 the economy has faced three major economic crises, first the financial crisis of 2007-2008, the euro crisis which followed the financial crisis of 2009-2019, and the Covid crisis in 2020. This means that during the treatment period three

major economic crises happened which may explain the importance of an independent central bank. This could be an explanation for why the results show that even though a membership gives the opportunity for higher exports, it affects BNP per capita negatively. Looking forward, an independent central bank may not be as important in the long run, as it has been in the short run.

To conclude the result shows that if Sweden would have entered the euro area in 1999 would Sweden have had larger exports, but with the cost of having slower growth in GDP per capita. These results show that in the short run it is beneficial from an economic perspective to be outside of the Euro-Area, but in the long run may the resulting change since an independent central bank may be a less important decrease in the long run. Sweden may also face a political cost of staying outside, which may be a strong enough argument to start the discussion again if Sweden should enter the euro area.

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