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**An exercise on policy evaluation: the case of
corporate taxes in the Basque Country**

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AN EXERCISE ON POLICY EVALUATION: THE CASE OF CORPORATE TAXES
IN THE BASQUE COUNTRY

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ABSTRACT

This study evaluates the effect of different corporate taxes in different regions, using the lower tax rate established in the Basque Country as a case study. Our analysis rests on the synthetic control methods developed by Abadía and Gardeazabal (2003) and Abadía, Diamond and Hainmueller (2007). We find that the different corporate tax rate established in the Basque Country seems to have no effect on the number of firms newly established in the region but could have a lagged effect on the capital subscriptions of new firms.

I. INTRODUCTION

At present there is considerable discussion in the relevant literature as to the effectiveness of differences in fiscal policies aimed at attracting firms so that the economic growth of a region is higher and welfare and quality of life there are thus improved. To that end, the Basque Government, which has the authority to establish its own fiscal legislation in the Basque Country, decided to levy corporate tax at a lower rate than the rest of Spain. The aim of this study is to calculate the effect of this tax policy, i.e. to analyze whether a lower tax rate on firms has resulted in more firms establishing themselves in the Basque Country than elsewhere in Spain.

II. A BRIEF HISTORY

Article 31 of the Spanish Constitution of December 27th* 1978 establishes that all persons are to contribute to financing public expenditure according to their financial capabilities. The Corporate Tax Act ("*Ley 61/1978*"), was passed on the same date, and remained in force until December 27th 1995, when it was superseded by a new Corporate Tax Act ("*Ley 43/1995*") which imposed a tax rate of 35% on all firms operating in any Spanish region other than Navarra, the Basque Country, the Canary Islands, Ceuta or Melilla. The regions excepted all had the authority to establish their own tax regimes.

In the case of the Basque Country, it is the provincial councils or "Diputaciones Forales" in each province that set the tax and, in line with the "Concierto Económico" (the economic agreement between the Basque Country and the central Spanish government), the same tax rate was set in all three provinces of the Basque Country. From 1978 to 1995, the corporate tax rate was also 35% for the Basque Country, but in 1996 it was cut to 32.5% while the 35% rate was maintained in the rest of the regions regulated by the Act ("*Ley 43/1995*").

III. DATA AND SAMPLE

We use quarterly region-level panel data for 1995-1997. The corporate tax rate of 32.5% was passed in year 1996. In what follows, we refer to this as the “1996 Act”. Our sample period begins in 1995 because that is the first year for which the number of firms and capital are available for all our control states. It ends in 1997 because in 1998 the terrorist organization ETA declared a truce, which means that analysis of subsequent periods would need to take into account other controls that do not fall within the purview of this study.

The synthetic Basque Country is constructed as a weighted average of potential control regions, with weights chosen so that the resulting synthetic Basque Country best reproduces the values of a set of predictors of the firms established.

The potential control regions exclude those regions that could establish their own fiscal regime and those near the Basque Country (where production activities could be carried out as if firms were in the Basque Country and viceversa). The regions excluded are: Ceuta and Melilla, Cantabria, La Rioja, Navarra and the Canary Islands. All the remaining Spanish regions are taken as potential controls.

Our outcome variables of interest are “number of new firms established” measured as “quarterly total number of firms established” and “quarterly capital subscriptions of those firms”. This data is obtained from “Encuesta de Sociedades Mercantiles 2005”, a survey of trading companies conducted by INE (Spanish National Employment Office).

Our predictors of “firm establishment” are unemployment, population, hourly wage cost, human capital and physical capital. Human capital is measured as the working-age population (between 16 and 65 years old) who have completed either secondary education, three-year higher education courses or more. Physical capital is proxied by several measures described in Appendix A. All variables are averaged over the period 1995-first-quarter to 1995-fourth-quarter, and augmented by adding one lag of “firms established”. Appendix A also provides data sources.

IV. TECHNIQUE

Following the technique developed by Abad e & Gardeazabal (2003) and Abad e, Diamond & Hainmueller (2007), we construct a synthetic Basque Country that mirrors the values of the predictors of firms established in the Basque Country before the passage of the “1996 Act”. We estimate the effect of the “1996 Act” as the difference between the number of new firms established the Basque Country and in its synthetic version in the quarters after the “1996 Act” was passed. When the law seems to have any effect, a series of placebo studies are usually performed that confirm that the estimated effects for the region of interest (in our case, the Basque Country) are unusually large relative to the estimate obtained when we apply the same analysis to other potential control regions. This study is implemented in both cases here to show the similar behaviour when the Act has no effect and to show the difference when the Act does seem to have an effect.

V. RESULTS

Figure 1 plots the time series of the total number of newly created firms in the Basque Country and the average for the other regions. Figure 2 plots the same series for the case of capital subscriptions. The first figure suggests that the other regions of Spain do not provide an adequate comparison group for the Basque Country in studying the effects of differences in tax rates on the number of firms established. The two series are quite different, since the mean of the other regions is higher in every period. Looking at the series it can be observed that there is an economic cycle that is similar for the Basque Country and the other regions. The difference between the Basque Country and the other regions seems to prevail quarter by quarter, so no effects due to the “1996 Act” can be observed.

This conclusion is also obtained in the second case, in which capital subscriptions in the Basque Country seem to differ from the average for the other regions. To evaluate the effect of the “1996 Act” on the number of firms established and on capital subscriptions, the central question is how matters would have developed in the Basque Country after the fourth quarter of 1995 in the absence of the “1996 Act”, i.e. what the time-series for the outcome variables would have been in the absence of the “1996 Act”. The synthetic control method provides a systematic way of estimating this counterfactual.

As explained in Abad e & Gardeazabal (2003) and Abad e, Diamond & Hainmueller (2007), we can construct the synthetic Basque Country as the convex combination of selected regions that most closely resemble the Basque Country prior to the “1996 Act”. The results are displayed in Tables 1 and 3, which compare the pre-treatment characteristics of the actual Basque Country with those of the synthetic Basque Country and with the average of the 12 regions selected as potential controls. We conclude that the average of the regions that did not implement a similar policy does not seem to provide an adequate control group for the Basque Country since the averages are quite different. For example, the difference in the total number of firms shown in the first row of Table 1 is 717.2131 if we use the average of the 12 control regions, whereas the figure for the synthetic Basque Country is 349.082, which is quite similar to the actual figure of 348.3333. The same conclusion can be drawn from Table 3, where the synthetic value for the difference in capital subscription is quite similar to the actual one, but dissimilar to the average of the other 12 control regions.

Tables 2 and 4 display the weights of each control region in the synthetic Basque Country. The weights reported indicate that the total number of firms in the Basque Country prior to the “1996 Act” is best reproduced by a combination of Andalusia, Asturias and Madrid and that capital subscription is best reproduced by a combination of Asturias, Catalonia and Galicia. All other regions are assigned zero weights.

Figures 3 and 5 show the total number of firms and capital subscription for the actual Basque Country and the synthetic version of it. Notice that, in contrast to the series shown in Figures 1 and 2, the synthetic Basque Country reproduces the trajectory of each variable in the Basque Country extremely well for the entire pre-“1996 Act” period. Combined with the results shown in Tables 1 and 3, the synthetic Basque Country can be thought of as a good approximation to our outcome variables of interest for 1996-1997.

To estimate the effect of the “1996 Act” on the establishment of firms in the Basque Country we compute the difference between the total number of firms actually established and the synthetic version after the passage of the “1996 Act”, and the difference between actual capital subscription and its synthetic version after the “1996 Act”.

Looking at Figure 3 it can be concluded that the total number of firms has not changed substantially over the post-intervention period. This result is confirmed when looking at Figure 4, which depicts the gap between the actual Basque Country and the synthetic version, i.e. our measure of the effect of the “1996 Act”. Although the gap turns out to be positive in some periods, it is negative in others, so that the mean effect is close to zero. The same conclusion cannot be drawn from Figure 5, in which actual capital subscription does not seem to be very different from the synthetic version in 1996, but becomes slightly positive in 1997. This suggests a possible lagged effect of the Act, i.e. the “1996 Act” could affect capital subscriptions of new firms one year after the passing of the Act. Figure 6 confirms this result, as the gap between the actual Basque Country and the synthetic version becomes higher and positive in year 1997.

VI. SOME “PLACEBO STUDIES”

Since in the case of the total number of firms the effect of the policy is close to zero, the inference or “placebo study” does not make much sense apart from showing that if the study had been implemented in regions other than the Basque Country the result would have been similar to that obtained for the Basque Country, i.e. no visible effect for the Basque Country or for the control regions. In the case of capital subscriptions, a “placebo study” should show differences in behaviour for the selected placebo region. To address this question we perform a “placebo study” as in Abad e & Gardeazabal (2003), applying the method to those control regions with the largest weight in each synthetic control for the Basque Country. According to Tables 2 and 4, those regions are Asturias for the outcome variable “total number of firms” and Galicia for the outcome “capital subscriptions”. As might be expected, according to Figures 7 and 8 both cases show that the period after the “1996 Act” does not show any difference between the actual and counterfactual, i.e. the actual and the synthetic time series both seem to move in similar ways in the post-“ 1996 Act” period. So our “placebo study” confirms that the result obtained for the outcome variable “capital subscriptions” in the Basque Country is unusually large and positive for the year 1997.

VII. CONCLUSIONS

Using the Synthetic Control Method Technique developed by Abad e and Gardeazabal (2003) and Abadie, Diamond and Hainmueller (2007), we conclude that the different corporate tax rate established in the Basque Country seems to have had no effect on the number of firms newly established in the region, but could have a lagged effect on capital subscriptions of new firms. The reasons behind this result can be analyzed by looking at the explanatory variables that make firms decide to establish in a region. Although this is beyond the scope of this paper, it would be interesting for future analysis. The relevance of

this result is to advise authorities of the limited effectiveness of the policy that is being implemented to attract firms.

Figure 1: Total Number of New Firms: Basque Country vs. the Average of the Other Spanish Regions

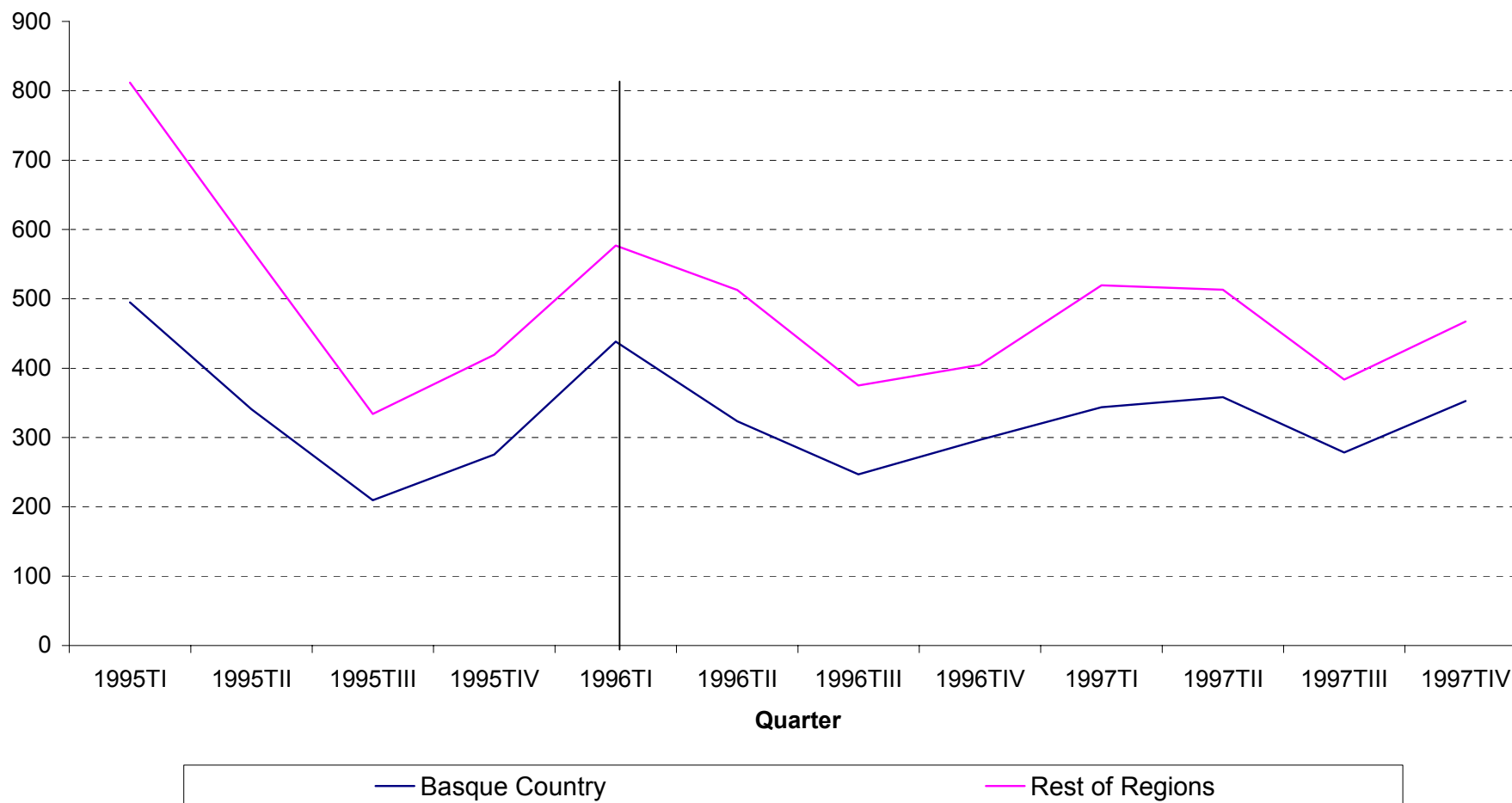


Figure 2: Capital Subscriptions of New Firms (millions of pesetas): Basque Country vs. the Average of the Other Spanish Regions

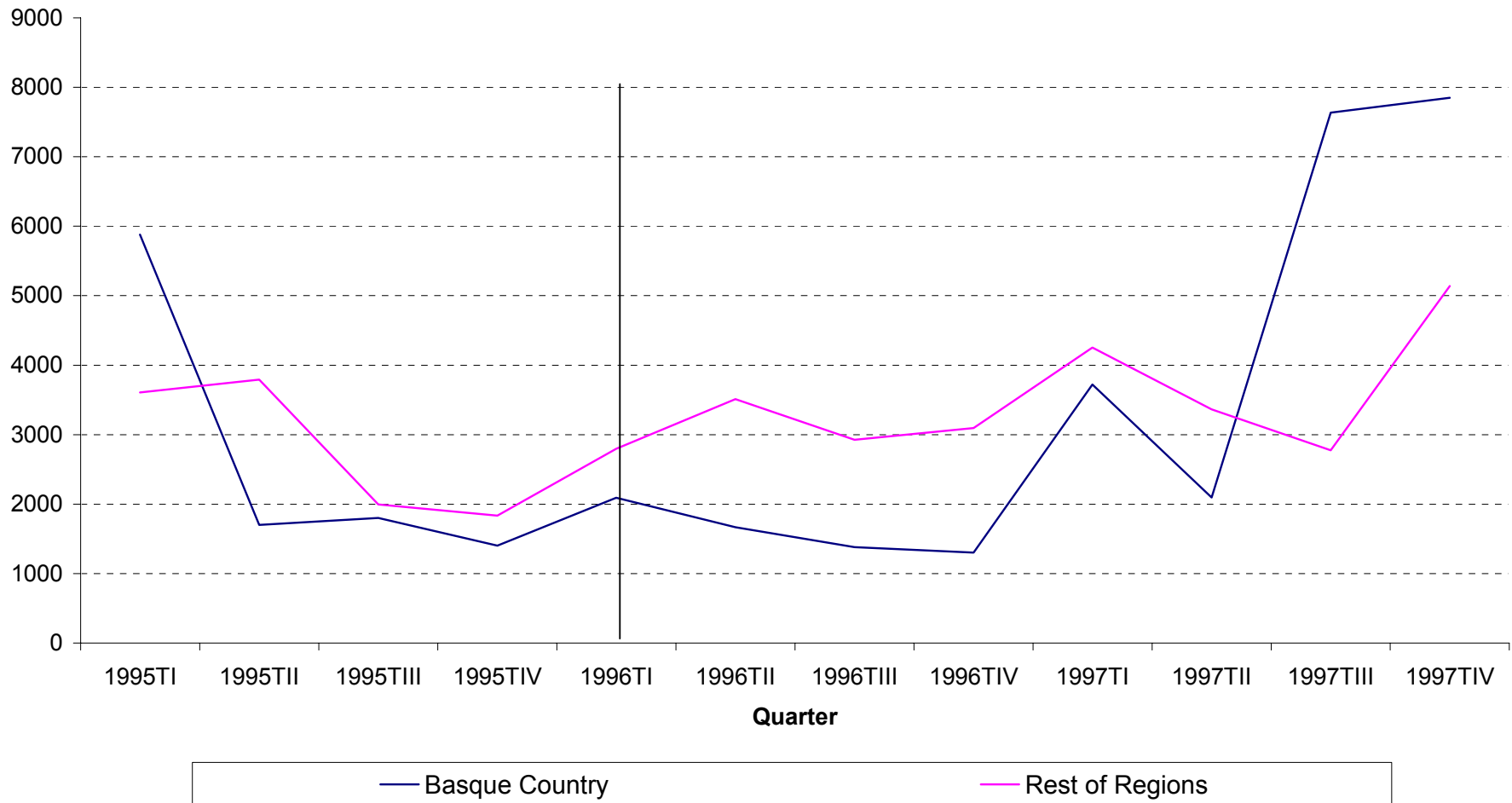


Figure 3: Total Number of New Firms: Basque Country vs. Synthetic Basque Country

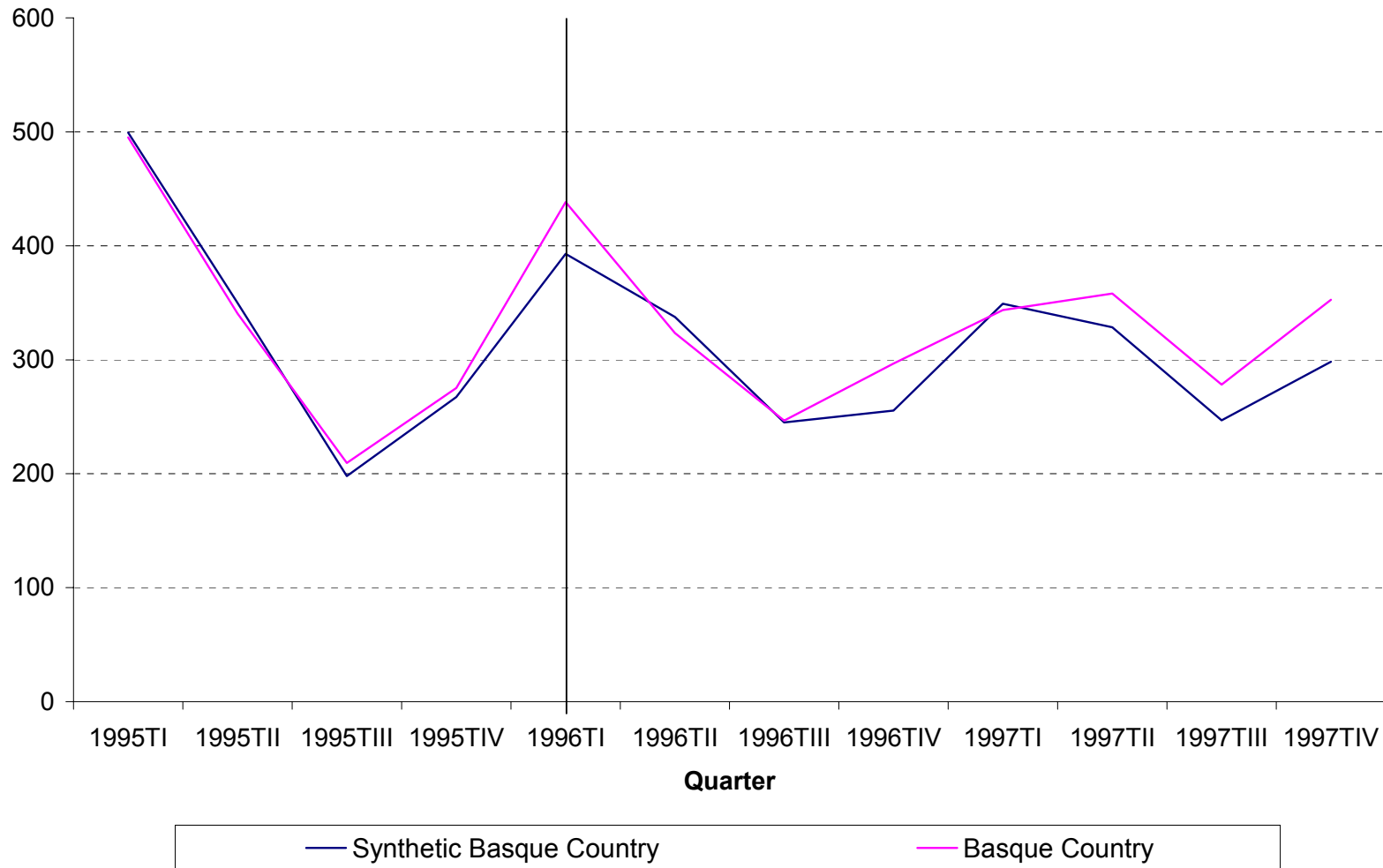


Figure 4: Total Number of New Firms Gap Between Basque Country and Synthetic Basque Country

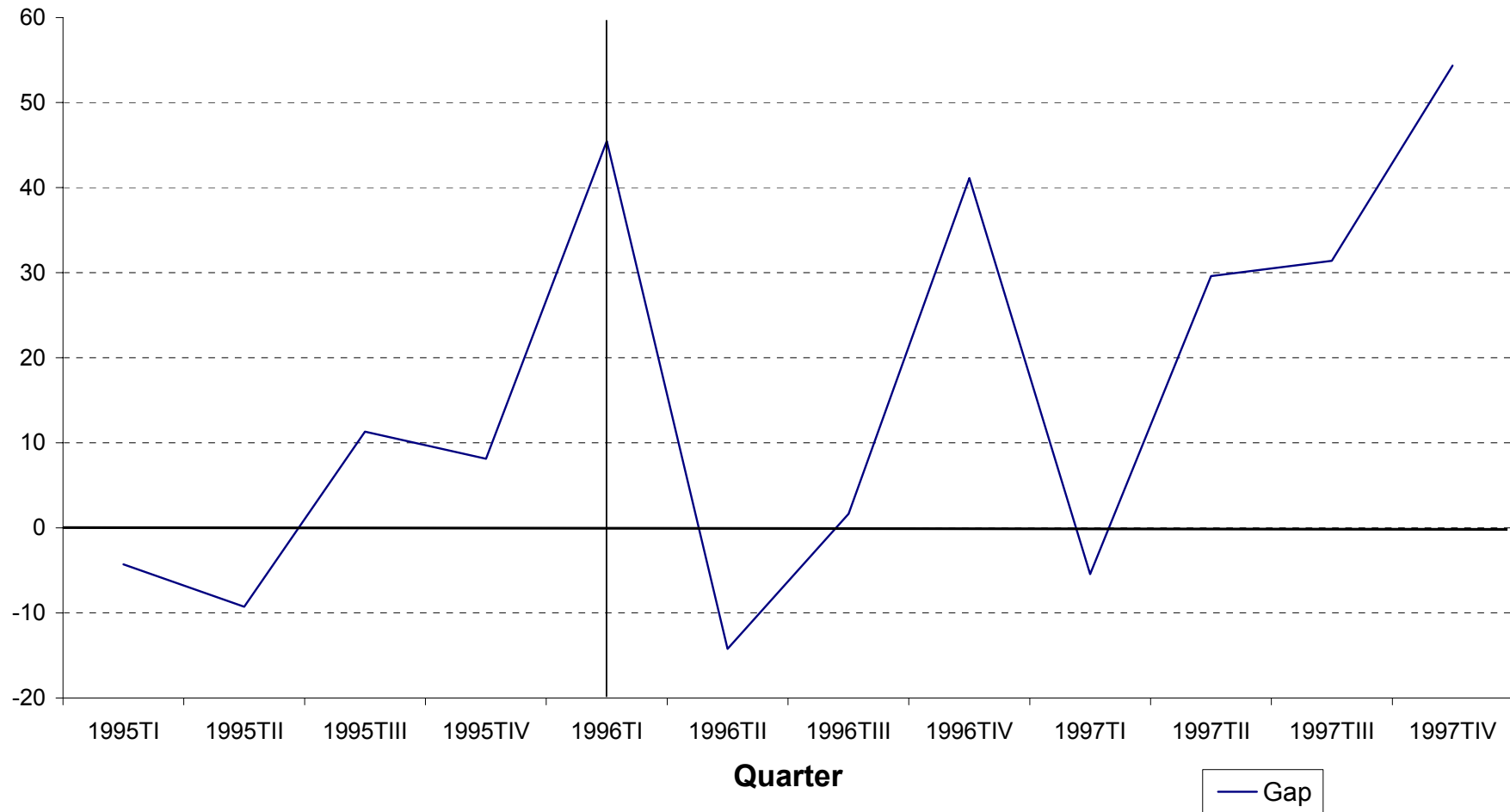


Figure 5: Capital Subscriptions of New Firms (millions of pesetas): Basque Country vs. Synthetic Basque Country

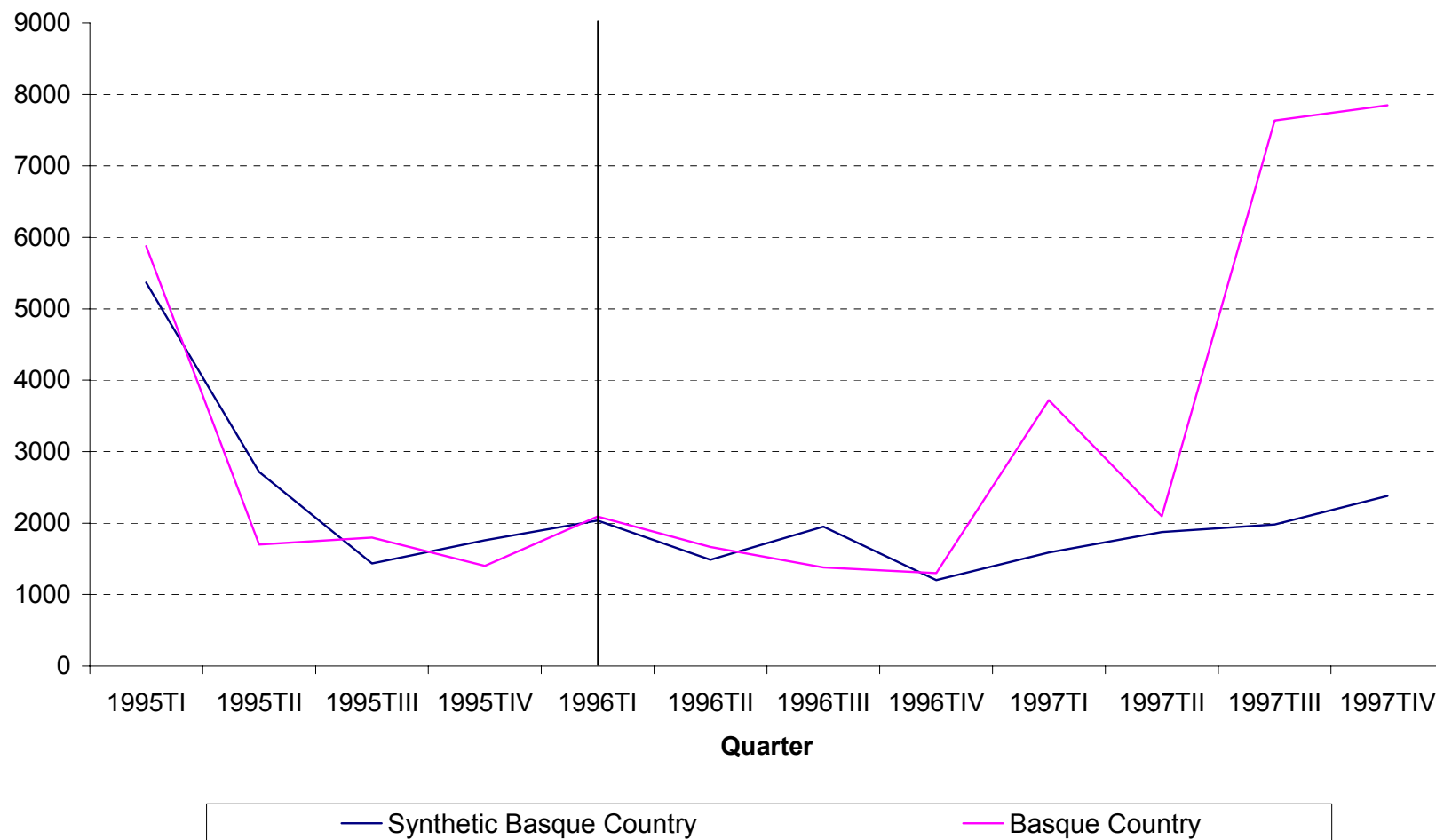


Figure 6: Capital Subscriptions of New Firms Gap Between Basque Country and Synthetic Basque Country

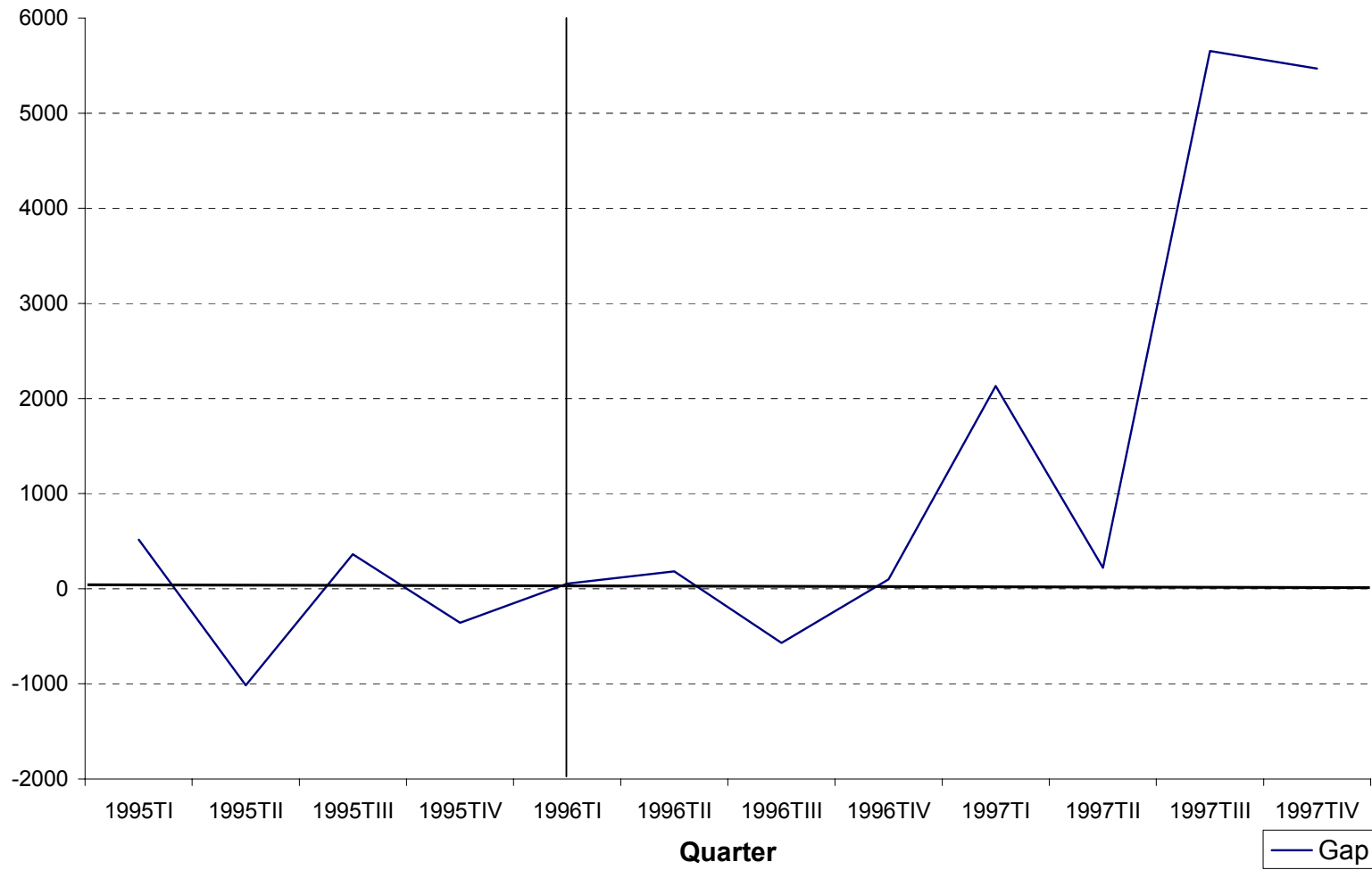


Figure 7: Total Number of New Firms: Asturias vs. Synthetic Asturias

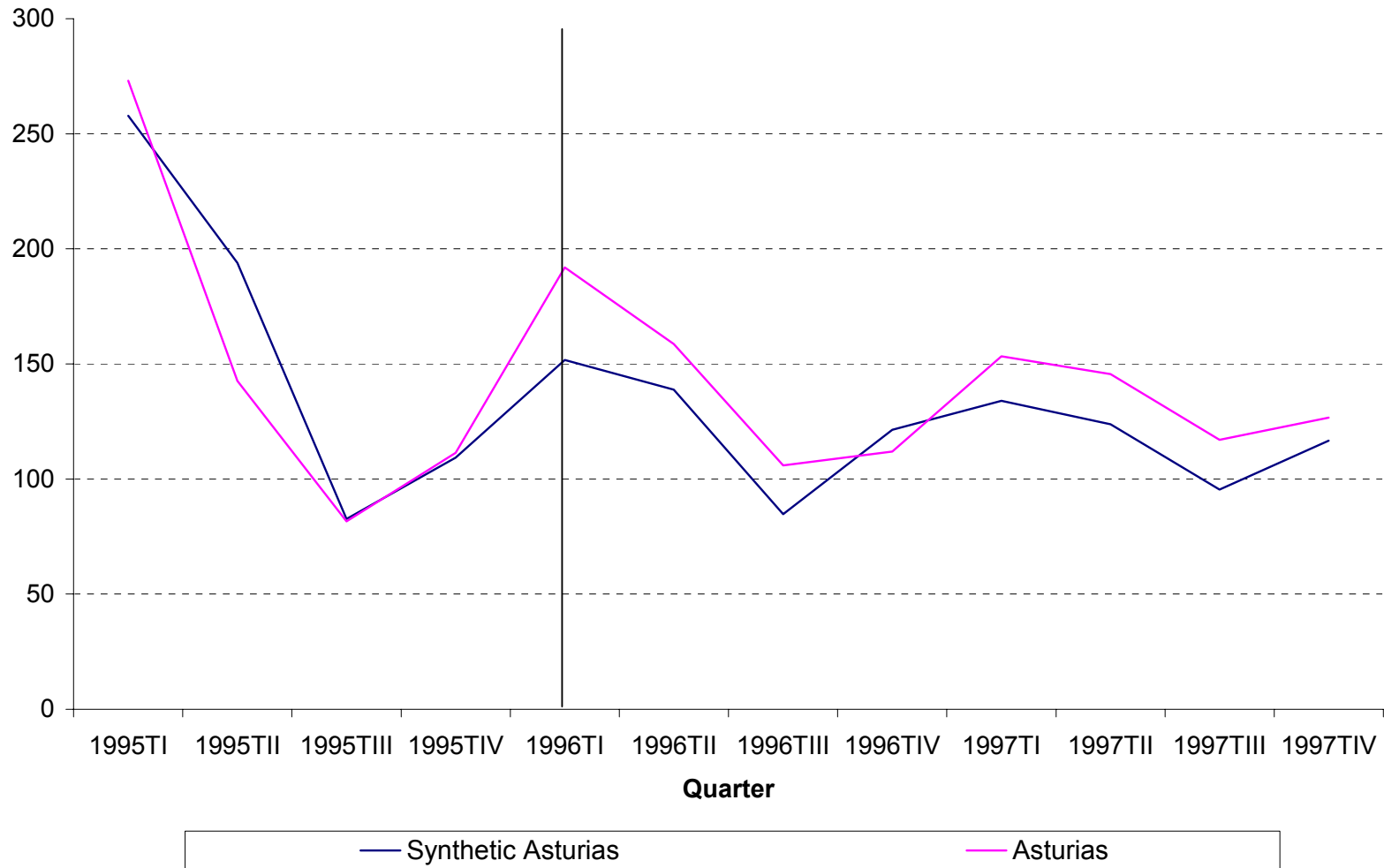


Figure 8: Capital Subscriptions of New Firms (millions of pesetas): Galicia vs. Synthetic Galicia

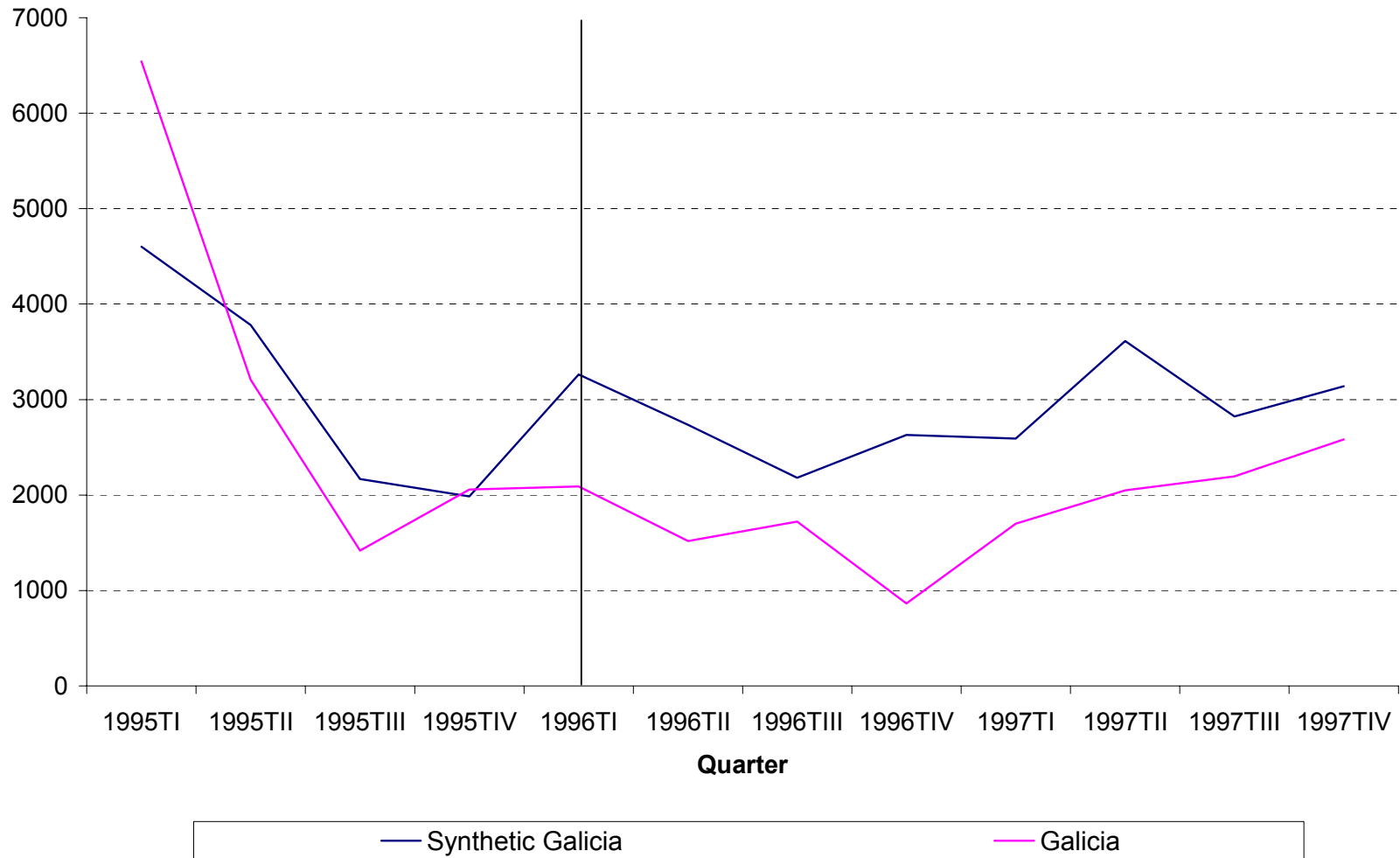


Table 1: Total Number of New Firms: Predictor Means

Variables	Basque Country		Average of 12 control regions
	Actual	Synthetic	
Lagged Total Firms	348.3333	349.082	717.2131
Unemployment Rate	22.535	21.82433	21.95771
Population older than 16	1752.75	1572.207	1926.94
Labor Cost	9.6275	8.214385	7.417083
Vocational Studies	774.09	624.5121	940.0475
Higher Education I	106.1	76.44374	112.7858
Higher Education II	115.44	67.87831	104.8025
Houses	4.43E+07	3.79E+07	7.25E+07
Road Infrastructure	7120668	4622565	6504189
Public Hydraulic Infrastructure	1389901	2001406	3408979
Train Infrastructure	1736244	1585246	1988493
Port Infrastructures	203014.6	155857.8	288442.9
Air Infrastructure	1446328	960116.1	610326.2
Urban Infrastructure	1028440	1003881	1418821
Other Buildings	4.24E+07	2.75E+07	4.19E+07
Motor-Vehicles	1205646	1046761	1876632
Other Transport Material	1087126	1000225	1511843
Agriculture and Farming products	49732.6	67253.6	135930.5
Iron Products	1775900	854480.6	1370474
Mechanical Equipment	6081355	3232990	5219863
Office Equipment	246422.2	147029.7	264844.5
Communications	1420587	1019317	1657086
Other equipment	2829727	1844402	2868023
Software	366612.9	277414.7	486121
Other Products	171704.4	126199.5	221010.4

Note: All variables are averaged for 1995TII-1995TIV except Lagged-Total Firms, which is averaged for 1995TII to 1995TIV.

Table 2: Weights of Regions in the Synthetic Basque Country.Total Number of Firms.	
Region	Weight
Andalusia	0.108
Aragón	0
Asturias	0.843
Balearic Islands	0
Castilla La Mancha	0
Castilla y León	0
Catalonia	0
Valencia	0
Extremadura	0
Galicia	0
Madrid	0.049
Murcia	0

Table 3: Capital Subscription of New Firms. Predictor Means

Variables	Basque Country		Average of 12 control regions
	Actual	Synthetic	
Lagged Capital Subscription	3125	3171.243	3851.436
Unemployment Rate	22.535	18.63535	21.95771
Population older than 16	1752.75	1949.91	1926.94
Labor Cost	9.6275	6.981645	7.417083
Vocational Studies	774.09	744.9893	940.0475
Higher Education I	106.1	89.89921	112.7858
Higher Education II	115.44	62.04003	104.8025
Houses	4.43E+07	3.98E+07	7.25E+07
Road Infrastructure	7120668	6672876	6504189
Public Hydraulic Infrastructure	1389901	1649824	3408979
Train Infrastructure	1736244	996002.3	1988493
Port Infrastructures	203014.6	181826.4	288442.9
Air Infrastructure	1446328	1021125	610326.2
Urban Infrastructure	1028440	703056.3	1418821
Other Buildings	4.24E+07	3.35E+07	4.19E+07
Motor-Vehicles	1205646	1244060	1876632
Other Transport Material	1087126	906319.2	1511843
Agriculture and Farming products	49732.6	199660.6	135930.5
Iron Products	1775900	1060695	1370474
Mechanical Equipment	6081355	4423572	5219863
Office Equipment	246422.2	191193.4	264844.5
Communications	1420587	1215594	1657086
Other equipment	2829727	2502130	2868023
Software	366612.9	341008.8	486121
Other Products	171704.4	171342.1	221010.4

Note: All variables are averaged for 1995TII-1995TIV except Lagged-Capital Subscription, which is averaged for 1995TII to 1995TIV.

Table 4: Weights of Regions in the Synthetic Basque Country.Capital Subscription.

Region	Weight
Andalusia	0
Aragón	0
Asturias	0.229
Balearic Islands	0
Castilla La Mancha	0
Castilla y León	0
Catalonia	0.026
Valencia	0
Extremadura	0
Galicia	0.745
Madrid	0
Murcia	0

APPENDIX A: DATA SOURCES

This appendix describes the data used in the analysis and provides sources.

- Total Number of New Firms. Source: INE. Estadística de Sociedades Mercantiles 1995.
- Capital Subscriptions. Source: INE. Estadística de Sociedades Mercantiles 1995.
- Unemployment Rate. Source: INE. Encuesta de Población Activa.
- Population older than 16: Source: INE. Encuesta de Población Activa.
- Labor Cost. Source: INE. Encuesta de Estructura Salarial and Encuesta de Costes Laborales. Measured as cost per hour.
- Vocational Studies: IVIE. Human Capital. The selected population is that between 16 and 65 years old, with Vocational Studies completed.
- Higher Education I : IVIE. Human Capital. The selected population is that between 16 and 65 years old with 3-year-College Studies completed.
- Higher Education II: IVIE. Human Capital. The selected population is that between 16 and 65 years old with 5-year-College-Studies, Ms or PhD completed.
- Houses: IVIE. Physical Capital.
- Road Infrastructure: IVIE. Physical Capital.
- Public Hydraulic Infrastructure: IVIE. Physical Capital.
- Train Infrastructure: IVIE. Physical Capital.
- Port Infrastructure: IVIE. Physical Capital.
- Air Infrastructure: IVIE. Physical Capital.
- Urban Infrastructure: IVIE. Physical Capital.
- Other Buildings: IVIE. Physical Capital.
- Motor-Vehicles: IVIE. Physical Capital.
- Other Transport Material: IVIE. Physical Capital.

- Agriculture and Farming products: IVIE. Physical Capital.
- Iron Products: IVIE. Physical Capital.
- Mechanical Equipment: IVIE. Physical Capital.
- Office Equipment: IVIE. Physical Capital.
- Communications: IVIE. Physical Capital.
- Other equipment: IVIE. Physical Capital.
- Software: IVIE. Physical Capital.
- Other Products: IVIE. Physical Capital.

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