

## **Productivity in the Spanish regions during the recent economic cycles**

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Abstract:

In this paper, the decomposition proposed by Leamer (2008) between normal and extraordinary contributions is applied to nine productive sectors of the Spanish regions in order to examine their behaviour in productivity during expansions, so that will help us identify more branches potential to stimulate economic growth when it reached again the path of recovery.

Keywords: Business Cycles, Productivity, Time series, Productive sectors, Spanish regions, Services

JEL Codes: E32, E24, C22, E23, 052

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*"Productivity isn't everything, but in the long run it is almost everything"*  
*Krugman (1992, p. 9)*

## **1. Introduction**

The Spanish regions are facing a severe recession caused by the international financial crisis that has overlapped with the correction that had been recorded in the property market, which has led to a sharp drop in economic activity and a rapid destruction process employment. In these circumstances it is a priority to begin a new growth path based on a more productive and sustainable pattern, which enhances competitive sectors and contribute to the creation and consolidation of employment.

Given the modest track record in productivity, emphasis has been placed on productivity growth. Questions has been raised on whether such record has its origin in a few sectors or if it is a generalize problem, on what are the sectors favoring the advancement of productivity, and on what are the causes of the uneven productivity performance among the regions.

This paper attempts to shed light on these questions examining the evolution of the contributions to productivity growth during the period 1980-2008, with special emphasis on the evolution of productivity growth in service sectors over the economic cycle.

The paper is organized as follows. Section 2 presents the data used and outlines the methodology, while Section 3 provides the results. Finally, Section 4 offers some concluding remarks.

## 2. Data and methodology

In this paper, we use the DBMORES database (Bustos *et al.*, 2008), extended to 2007 using data from the Spanish Regional Accounts (INE 2011). From both sources we have obtained homogeneous series covering the 1980-2008 period for Gross Value Added at constant prices of 2000 (*GVA*) and for employment (*L*) for both total production (TOT) and nine productive sectors.

The productive sectors under review are:

1. Agriculture and fisheries (AGR)
2. Extractive industries and energy (ENE)
3. Industry (IND)
4. Construction (CON)
5. Trade and catering (COM)
6. Transport and communications (TRA)
7. Financial intermediation (FIN)
8. Other market services (OTH), and
9. Non-market services and government (NMS)

From these data, we first calculate productivity (*Prod*) as the ratio between *GVA* and *L* for each region:

$$Prod_{j,t} = \frac{GVA_{j,t}}{L_{j,t}}$$

where *j* represents region and *t* denotes time. Regional productivity growth ( $\rho_{j,t}$ ) is then computed from *t-1* to *t* as follows:

$$\rho_{j,t} = \left( \frac{Prod_{j,t} - Prod_{j,t-1}}{Prod_{j,t-1}} \right) \cdot 100$$

Note that  $\rho_{j,t}$  can also obtain from the following expression:

$$\rho_{j,t} = \delta_{t,j} - \theta_{t,j} + \delta_{t,j} \theta_{t,j}$$

where  $\delta_{t,j} = \frac{(GVA_{j,t} - GVA_{j,t-1})}{GVA_{j,t-1}} \cdot 100$  and  $\theta_{t,j} = \frac{(L_{j,t} - L_{j,t-1})}{L_{j,t-1}} \cdot 100$  (i. e.,  $\delta_{t,j}$  is the real growth rate and  $\theta_{t,j}$  is the employment growth rate).

Second, we calculate the contributions of each productive sector to the regional productivity growth in aggregate productive:

$$\rho_{j,t} = \sum_{i=1}^9 (\alpha_{i,j,t-1} \delta_{i,j,t} - \beta_{i,j,t-1} \theta_{i,j,t} + \alpha_{i,j,t-1} \delta_{i,j,t} \cdot \beta_{i,j,t-1} \theta_{i,j,t})$$

where  $\alpha_{i,j,t-1}$  is the share of sector  $i$  in total regional GVA at time  $t-1$ ,  $\delta_{i,j,t}$  is the real rate of growth in sector  $i$ ,  $\beta_{i,j,t-1}$  is the share of sector  $i$  in total regional employment at time  $t-1$ , and  $\theta_{i,j,t}$  is the employment rate of growth in sector  $i$ :  $\alpha_{i,j,t-1} = \frac{GVA_{i,j,t-1}}{GVA_{j,t}}$ ,

$$\delta_{i,j,t} = \frac{(GVA_{i,j,t} - GVA_{i,j,t-1})}{GVA_{i,j,t-1}} \cdot 100, \beta_{i,j,t-1} = \frac{L_{i,j,t-1}}{L_{j,t}}, \text{ and } \theta_{i,j,t} = \frac{(L_{i,j,t} - L_{i,j,t-1})}{L_{i,j,t-1}} \cdot 100,$$

Third, and following Leamer (2008), we decompose the contributions of each of the subsectors to aggregate productivity in "normal" and "abnormal". To that end, we first apply the filter proposed by Hodrick and Prescott (1997) to the series of contributions to get the trends, which are identified as normal contributions. Subsequently, we calculate the difference between the original contributions and regular contributions to obtain the extraordinary contributions of each component to aggregate productivity. It should be noted that, in accordance with the recommendations of Baxter and King (1999) and Maravall and del Rio (2001), as we use annual series, the parameter that determines the degree of smoothness of the filter is set at a value equal 10.

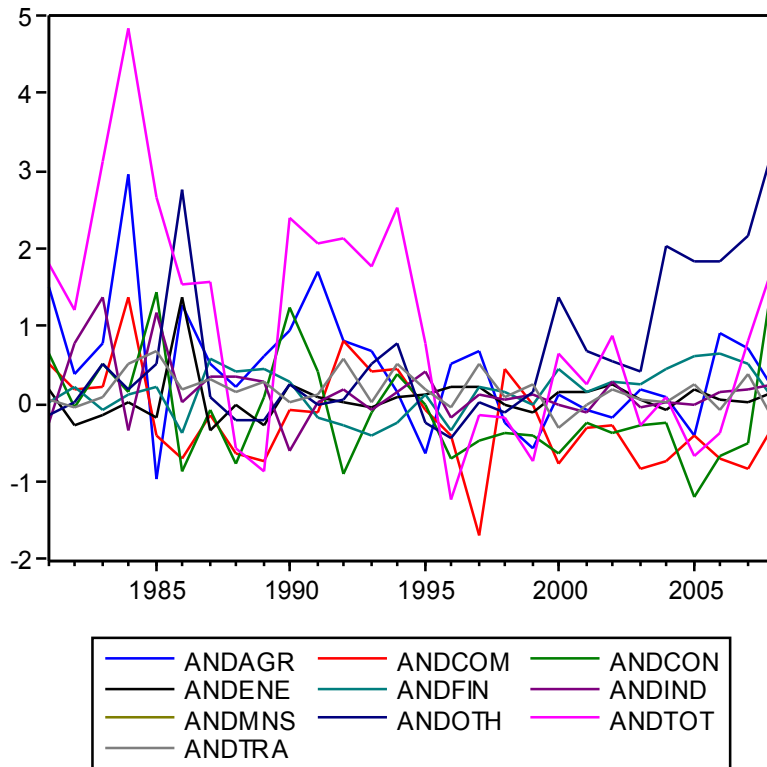
Since we are interested in analyzing the behavior of the various production sectors throughout the economic cycle, we need to adequately characterize the cycle for the Spanish economy from the available data. In this regard, we note that there are several statistical procedures for calculating economic cycles involving several steps, so we adopted the results of ECRI (2011) concerning the detection of peaks and troughs in the economic cycle of the economy Spanish, which is a benchmark widely used in literature

ECRI (2011) notes the existence of two phases of expansion in the Spanish economy during the period under review (which would go from 1984 to 1991 and from 1993 to 2008) and two recessions (which would include the sub-periods 1980-1984 and 1991-1993). These phases roughly correspond with those found by the International Monetary Fund (2002).

### 3. Empirical results

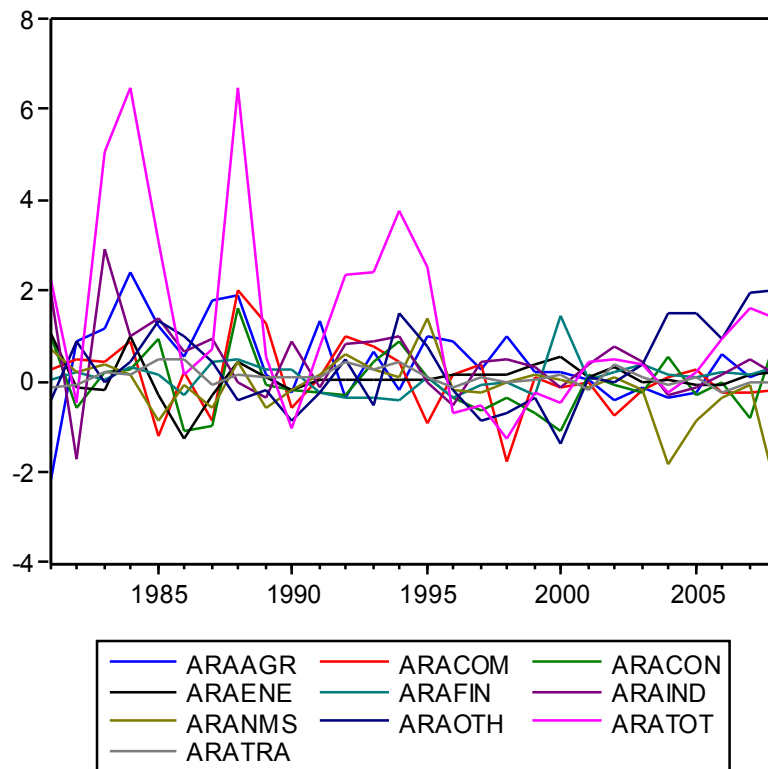
Figures 1 to 17 show the evolution of total productivity growth and the contributions of each nine sectors for the Spanish regions.

**Figure 1: Regional productivity growth and sectoral contributions: Andalucia, 1981-2008**



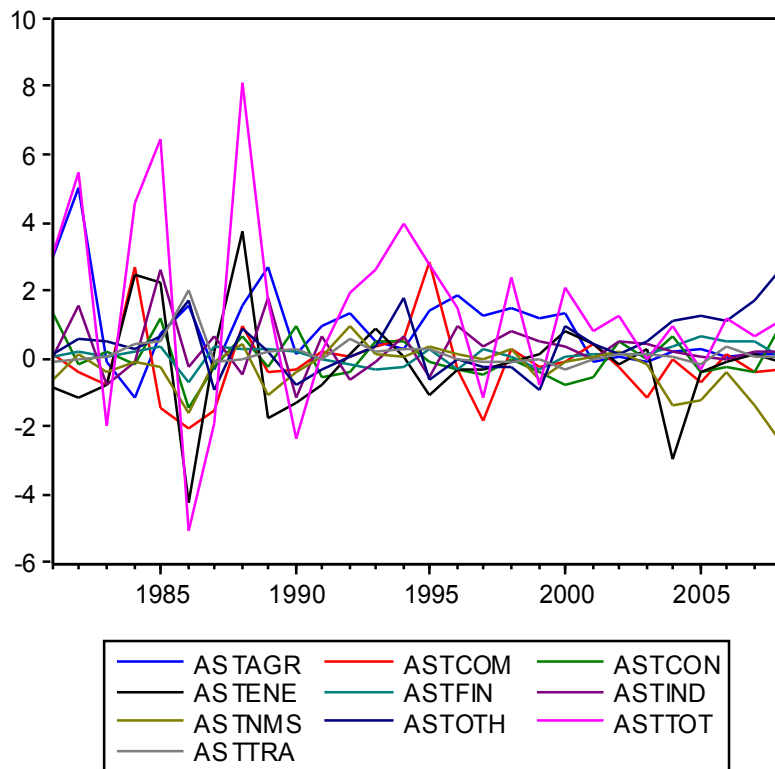
Source: Own computations based on BDMORES database and Spanish Regional Accounts

**Figure 2: Regional productivity growth and sectoral contributions: Aragón, 1981-2008**



Source: Own computations based on BDMORES database and Spanish Regional Accounts

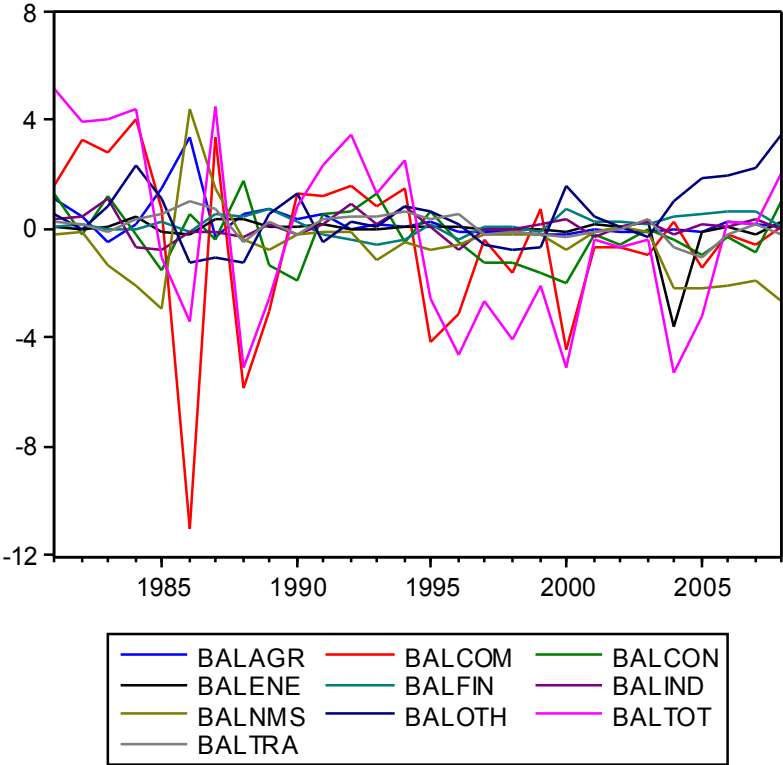
**Figure 3: Regional productivity growth and sectoral contributions: Asturias, 1981-2008**



Source: Own computations based on BDMORES database and Spanish Regional Accounts

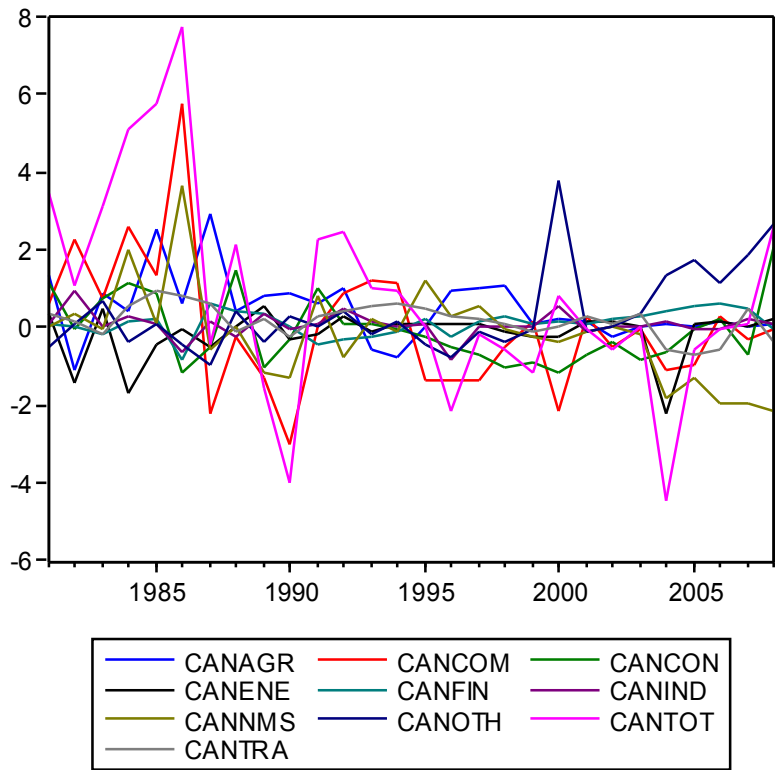


**Figure 4: Regional productivity growth and sectoral contributions: Balears, 1981-2008**



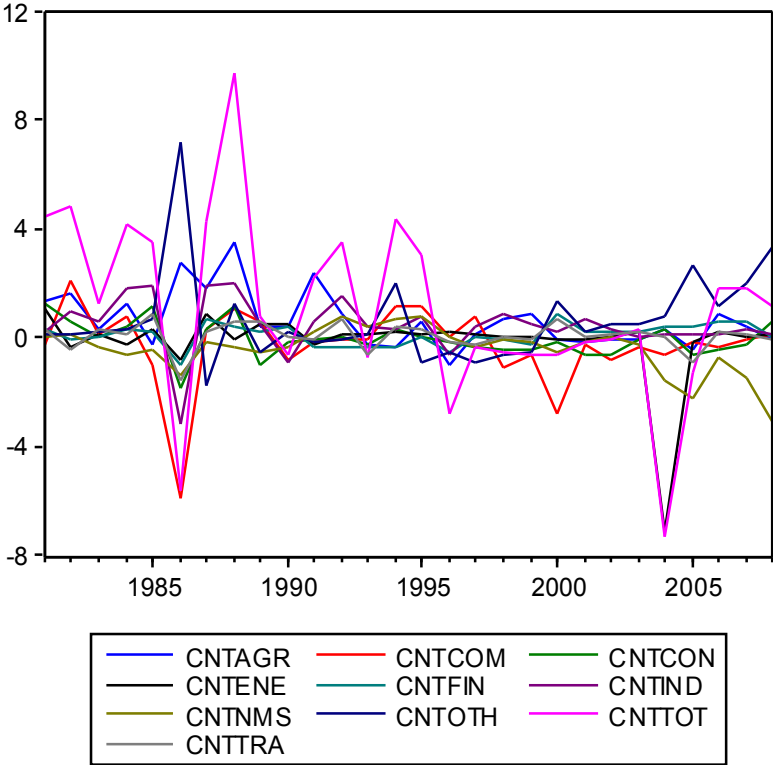
Source: Own computations based on BDMORES database and Spanish Regional Accounts

**Figure 5: Regional productivity growth and sectoral contributions: Canarias, 1981-2008**



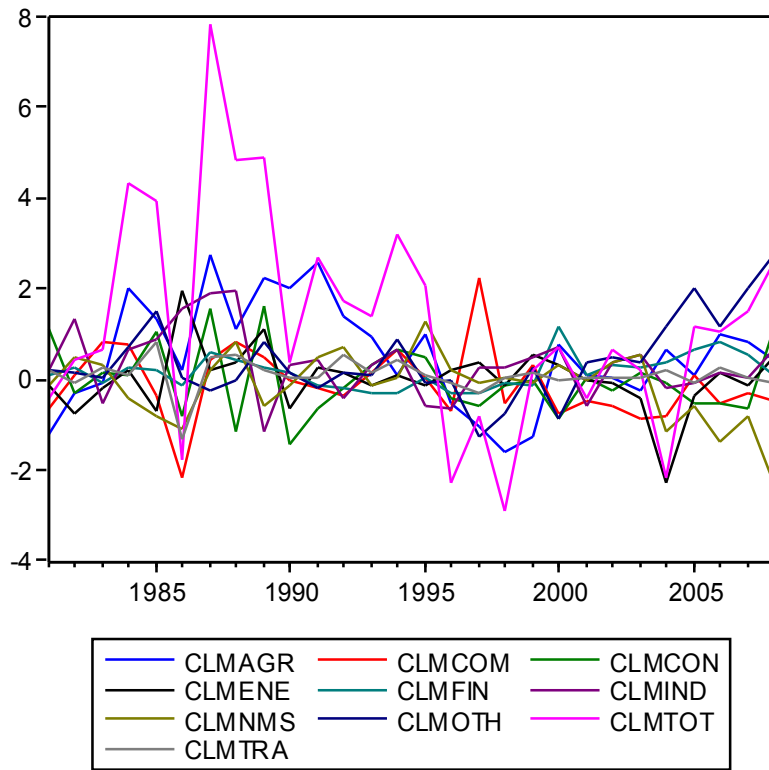
Source: Own computations based on BDMORES database and Spanish Regional Accounts

**Figure 6: Regional productivity growth and sectoral contributions: Cantabria, 1981-2008**



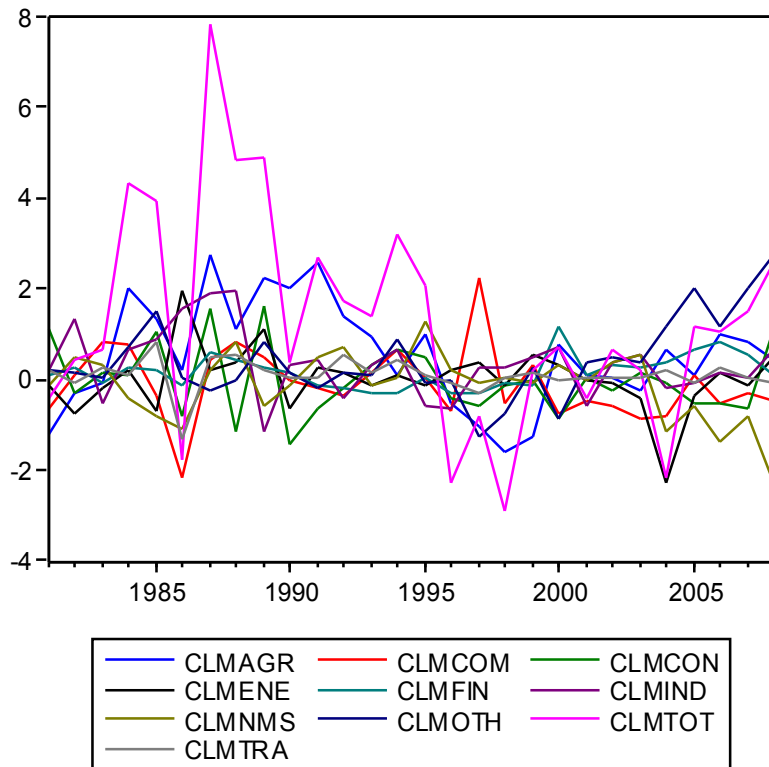
Source: Own computations based on BDMORES database and Spanish Regional Accounts

**Figure 7: Regional productivity growth and sectoral contributions: Castilla-La Mancha, 1981-2008**



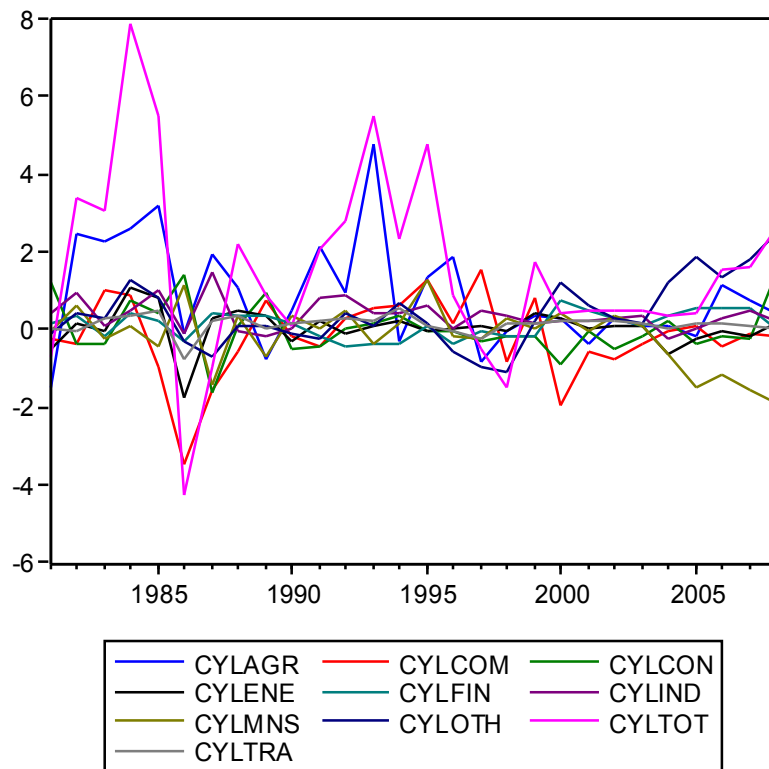
Source: Own computations based on BDMORES database and Spanish Regional Accounts

**Figure 7: Regional productivity growth and sectoral contributions: Castilla-La Mancha, 1981-2008**



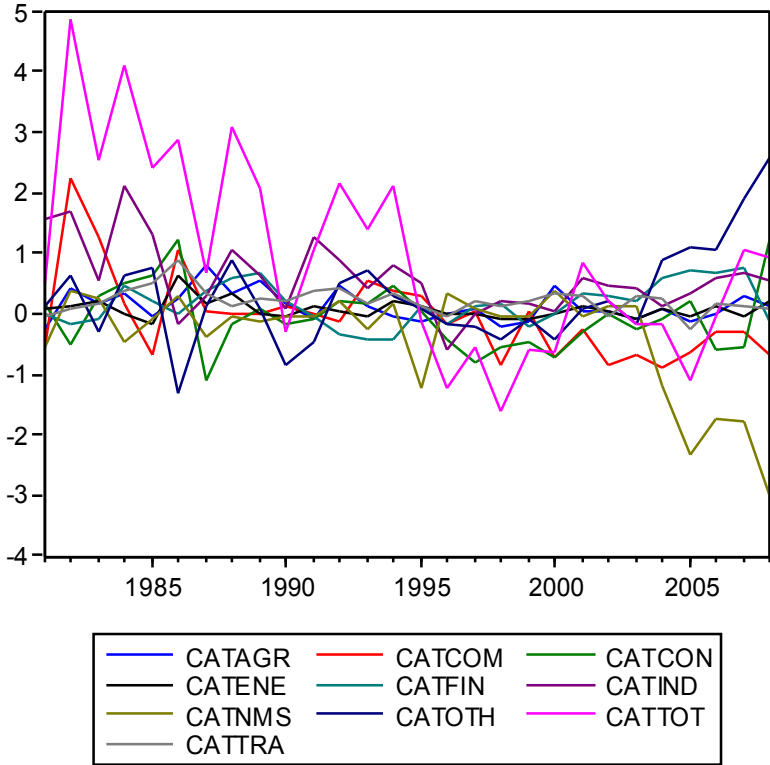
Source: Own computations based on BDMORES database and Spanish Regional Accounts

**Figure 8: Regional productivity growth and sectoral contributions: Castilla y León, 1981-2008**



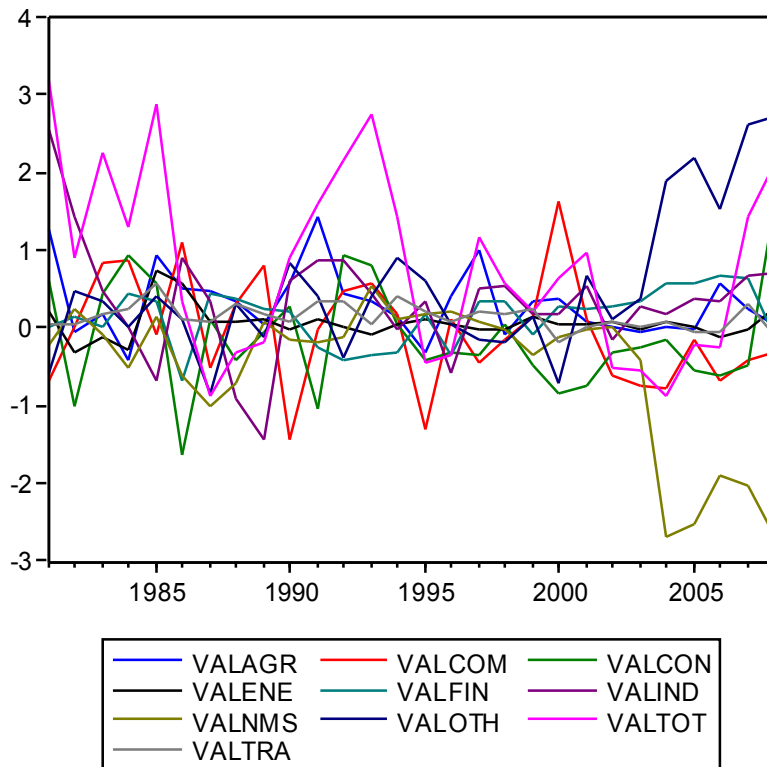
Source: Own computations based on BDMORES database and Spanish Regional Accounts

**Figure 9: Regional productivity growth and sectoral contributions: Cataluña, 1981-2008**



Source: Own computations based on BDMORES database and Spanish Regional Accounts

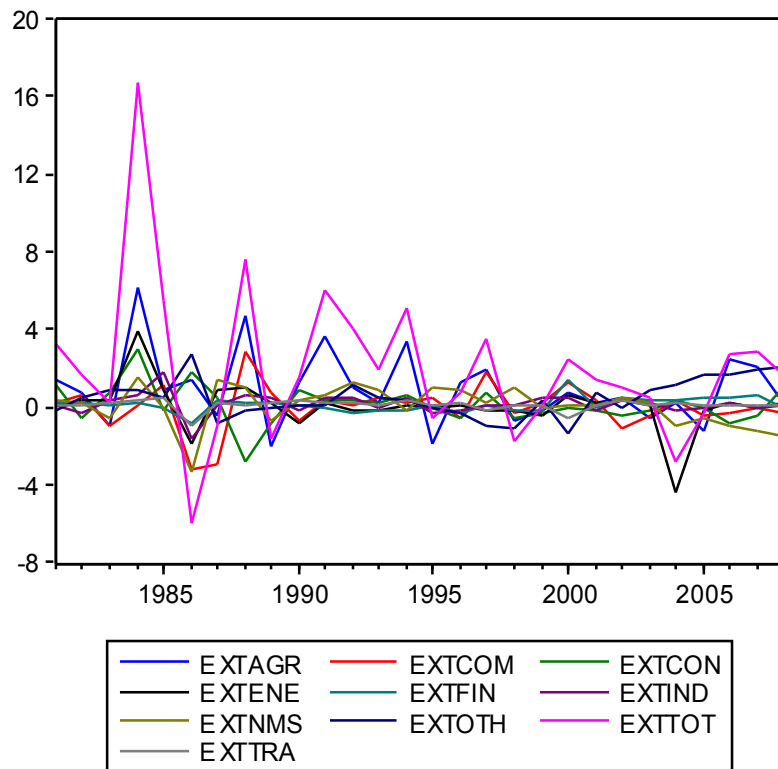
**Figure 10: Regional productivity growth and sectoral contributions: Comunidad Valenciana, 1981-2008**



Source: Own computations based on BDMORES database and Spanish Regional Accounts

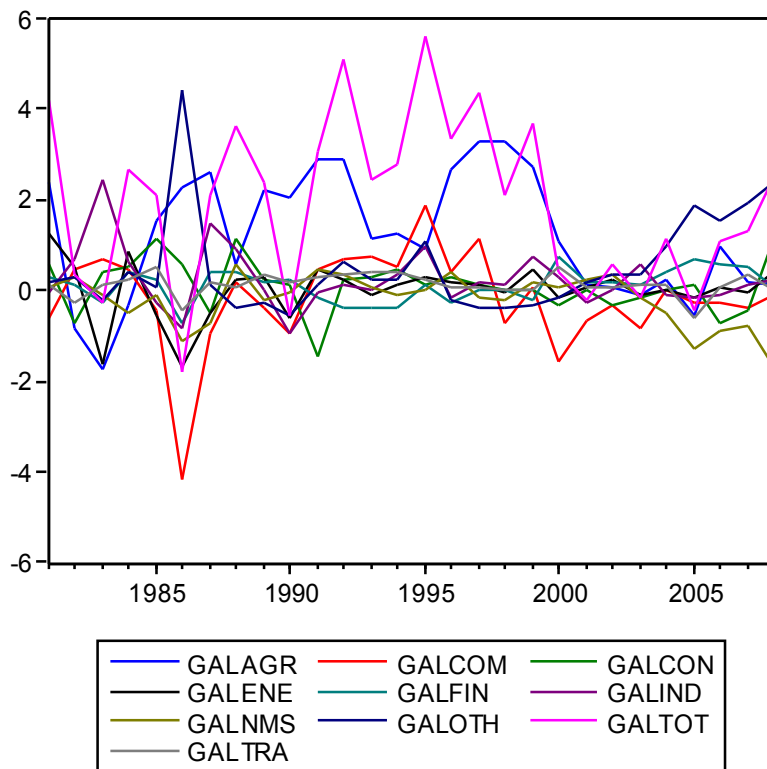


**Figure 11: Regional productivity growth and sectoral contributions: Extremadura, 1981-2008**



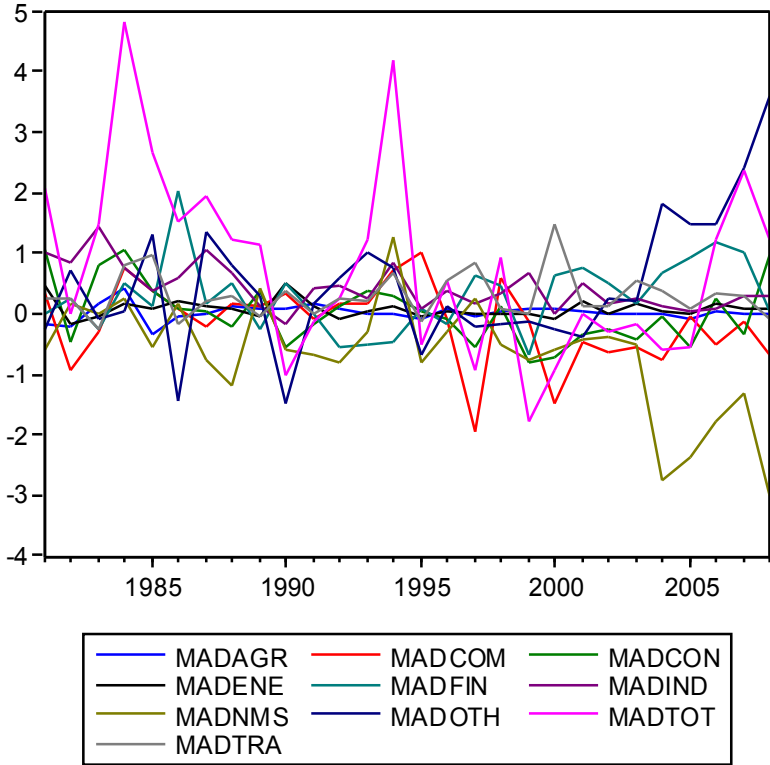
Source: Own computations based on BDMORES database and Spanish Regional Accounts

**Figure 12: Regional productivity growth and sectoral contributions: Galicia, 1981-2008**



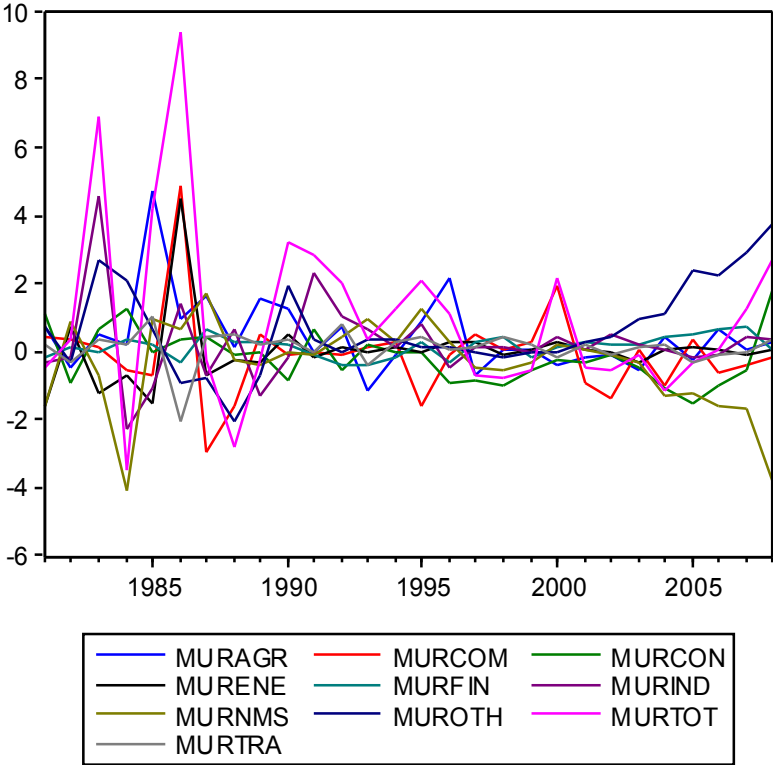
Source: Own computations based on BDMORES database and Spanish Regional Accounts

**Figure 13: Regional productivity growth and sectoral contributions: Madrid, 1981-2008**



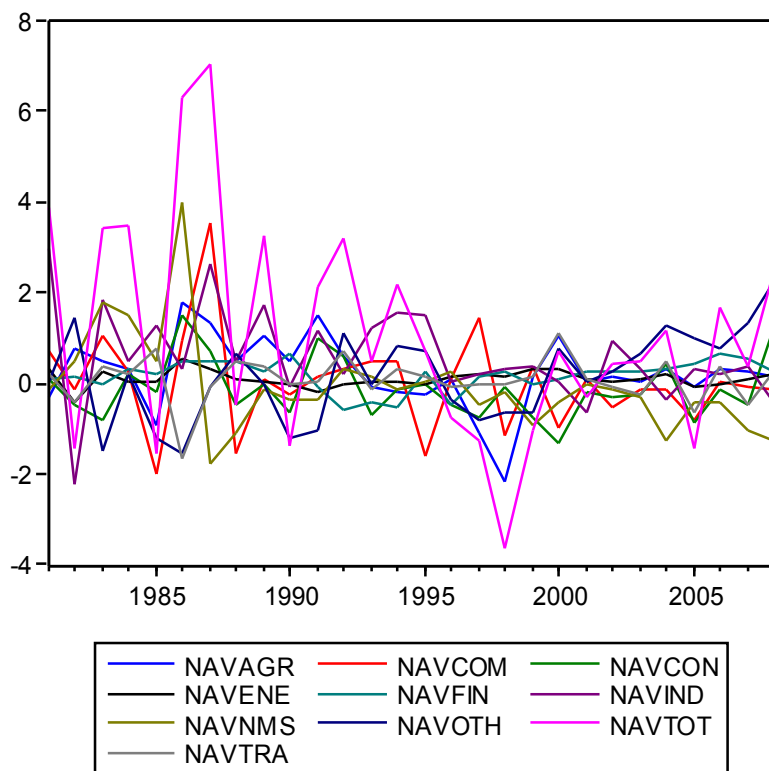
Source: Own computations based on BDMORES database and Spanish Regional Accounts

**Figure 14: Regional productivity growth and sectoral contributions: Murcia, 1981-2008**



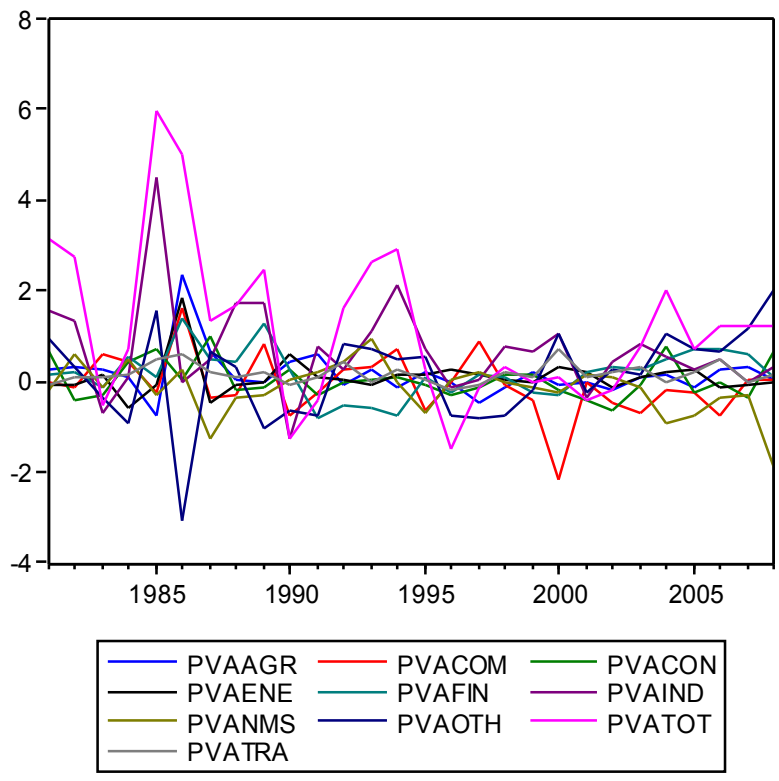
Source: Own computations based on BDMORES database and Spanish Regional Accounts

**Figure 15: Regional productivity growth and sectoral contributions: Navarra, 1981-2008**



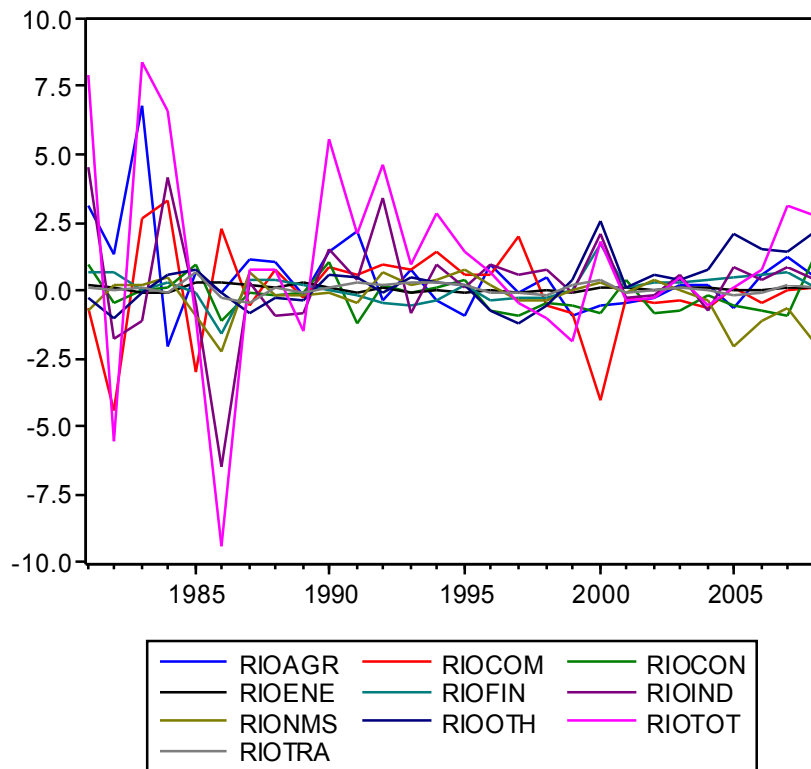
Source: Own computations based on BDMORES database and Spanish Regional Accounts

**Figure 16: Regional productivity growth and sectoral contributions: País Vasco, 1981-2008**



Source: Own computations based on BDMORES database and Spanish Regional Accounts

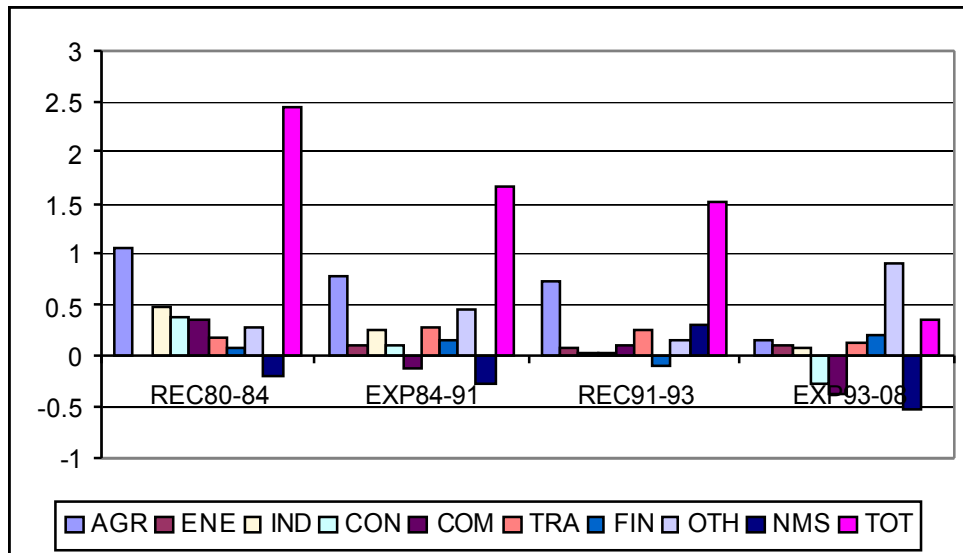
**Figure 17: Regional productivity growth and sectoral contributions: Rioja, 1981-2008**



Source: Own computations based on BDMORES database and Spanish Regional Accounts

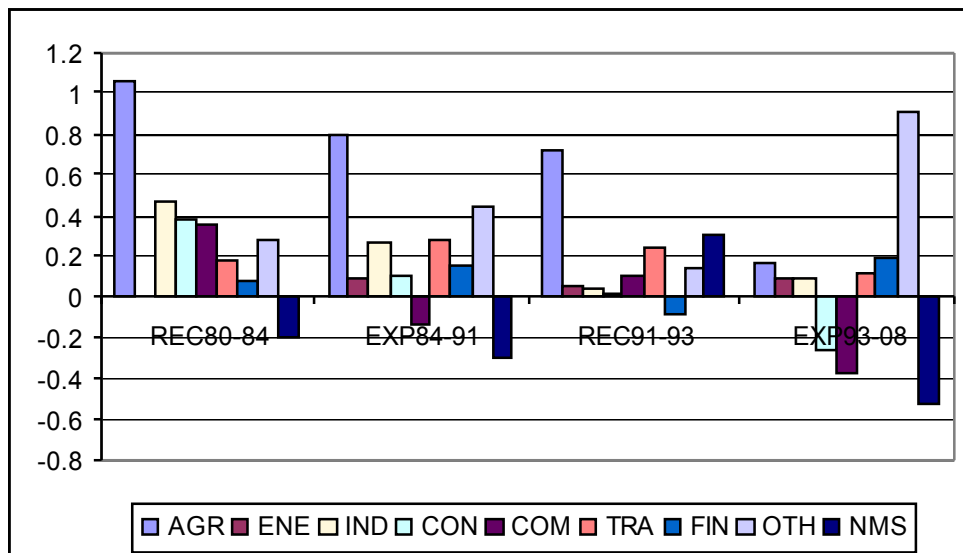
Figures 18 to 34 show the average normal contributions to regional productivity growth in each of the phases of the cycle that we detected during the period under study.

**Figure 18: Average normal contributions to regional productivity growth during recent business cycles: Andaluca**



Source: Own computations based on BDMORES database and Spanish Regional Accounts

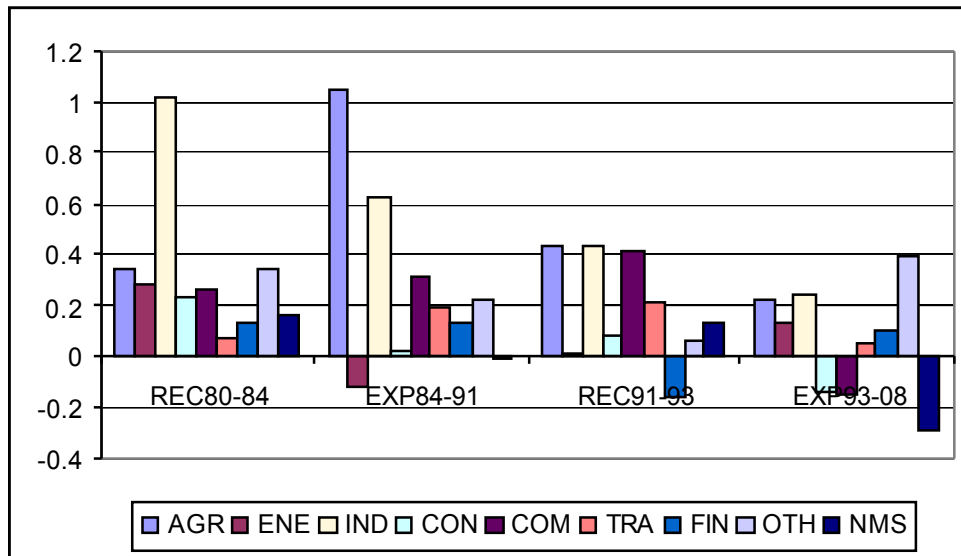
**Figure 19: Average normal contributions to regional productivity growth during recent business cycles: Aragón**



Source: Own computations based on BDMORES database and Spanish Regional Accounts

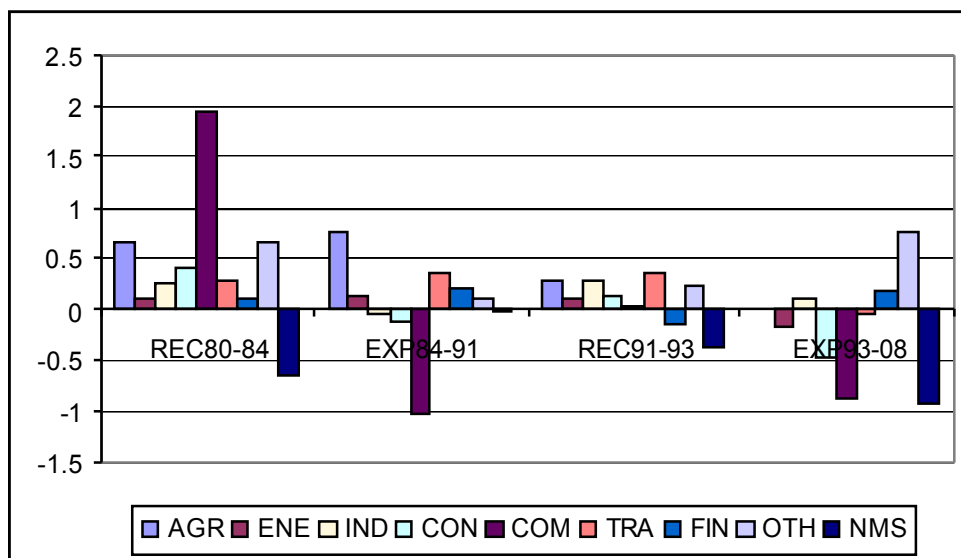


**Figure 20: Average normal contributions to regional productivity growth during recent business cycles : Asturias**



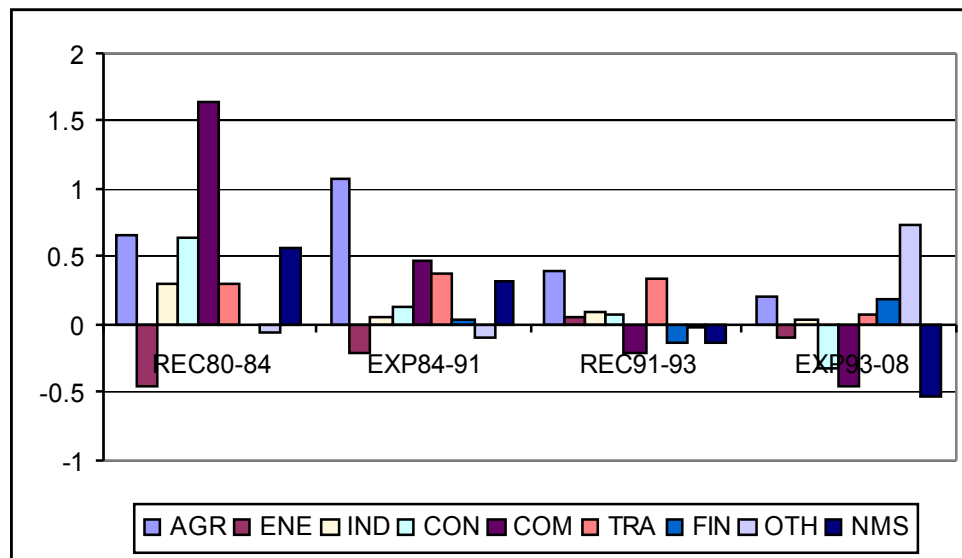
Source: Own computations based on BDMORES database and Spanish Regional Accounts

**Figure 21: Average normal contributions to regional productivity growth during recent business cycles : Balears**



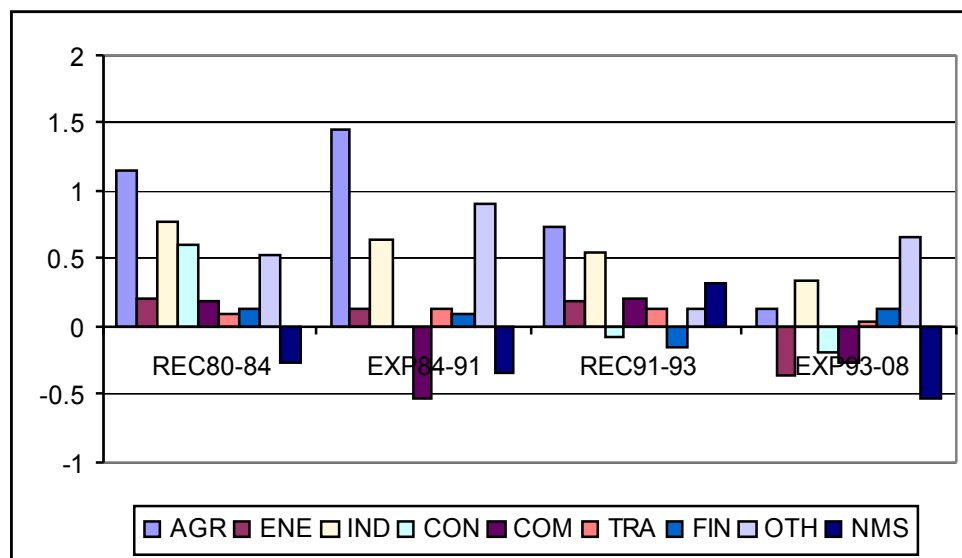
Source: Own computations based on BDMORES database and Spanish Regional Accounts

**Figure 22: Average normal contributions to regional productivity growth during recent business cycles: Canarias**



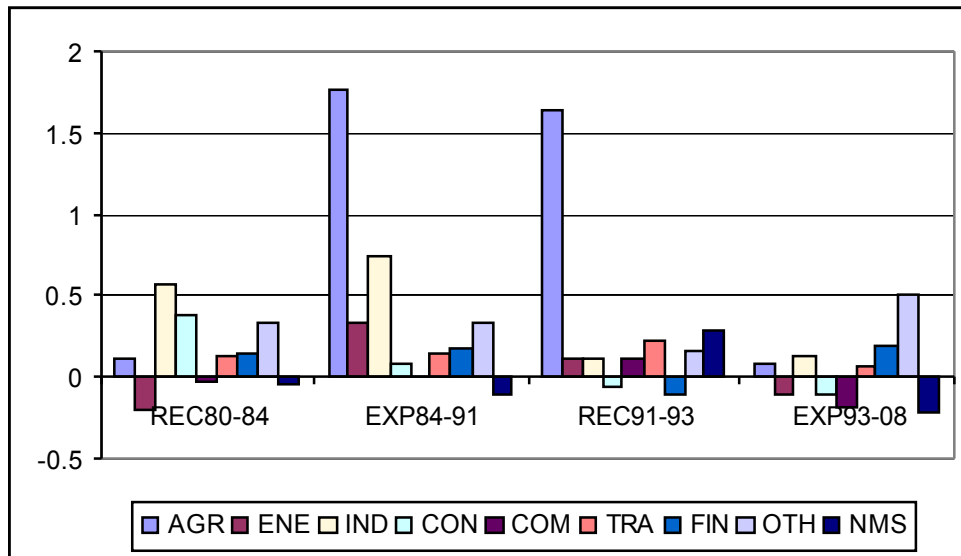
Source: Own computations based on BDMORES database and Spanish Regional Accounts

**Figure 23: Average normal contributions to regional productivity growth during recent business cycles: Cantabria**



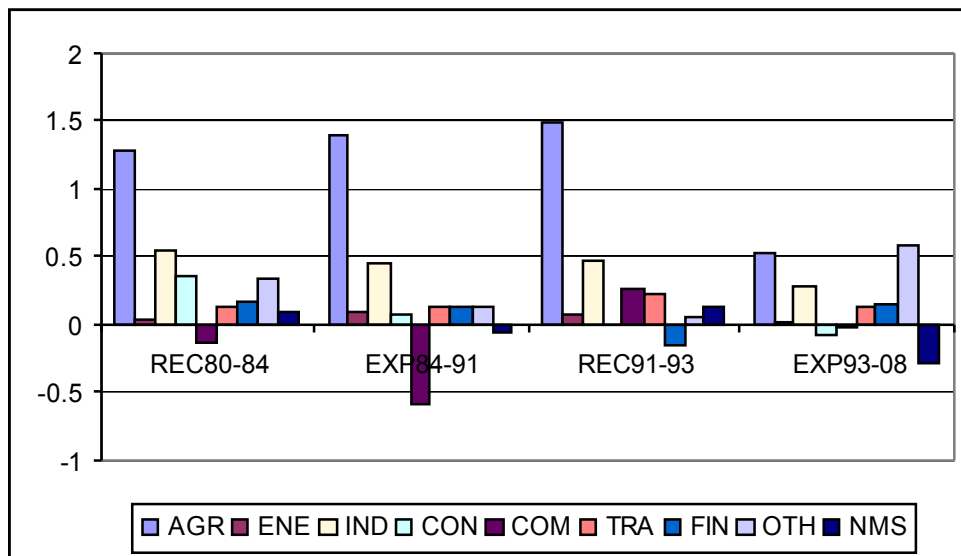
Source: Own computations based on BDMORES database and Spanish Regional Accounts

**Figure 24: Average normal contributions to regional productivity growth during recent business cycles : Castilla-La Mancha**



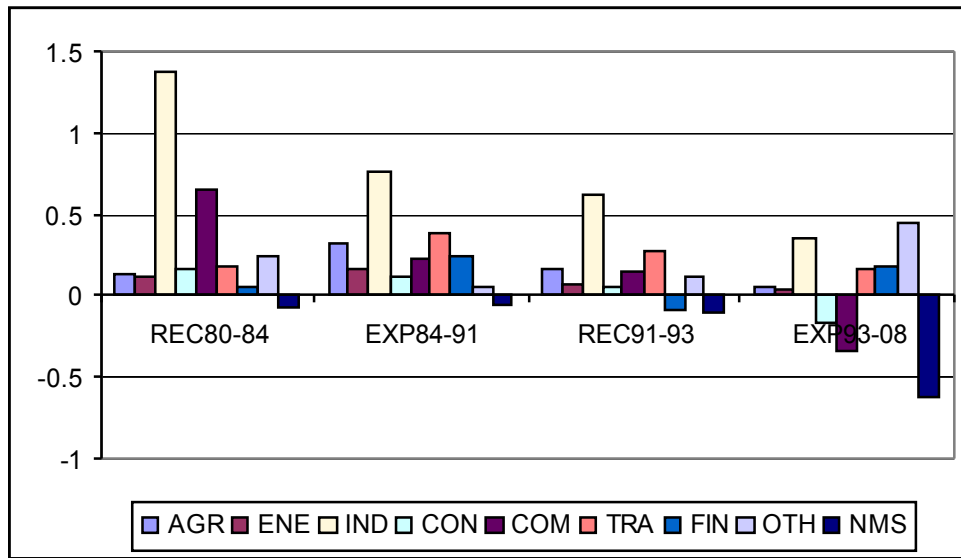
Source: Own computations based on BDMORES database and Spanish Regional Accounts

**Figure 25: Average normal contributions to regional productivity growth during recent business cycles : Castilla y León**



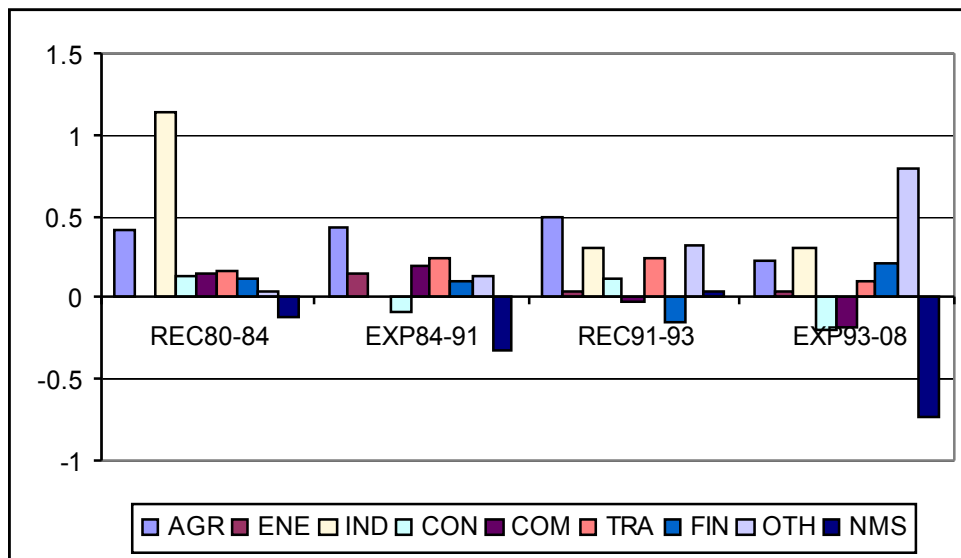
Source: Own computations based on BDMORES database and Spanish Regional Accounts

**Figure 26: Average normal contributions to regional productivity growth during recent business cycles: Cataluña**



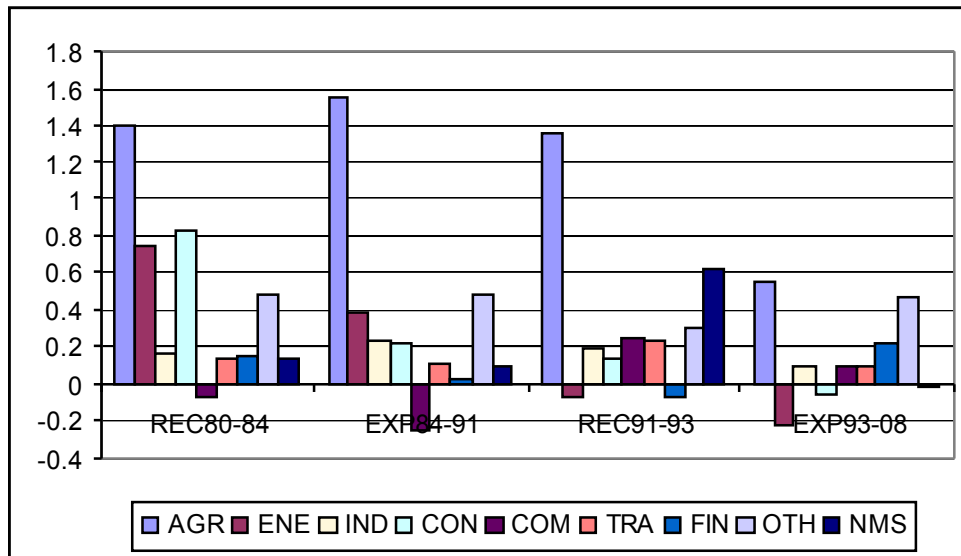
Source: Own computations based on BDMORES database and Spanish Regional Accounts

**Figure 27: Average normal contributions to regional productivity growth during recent business cycles: Comunidad Valenciana**



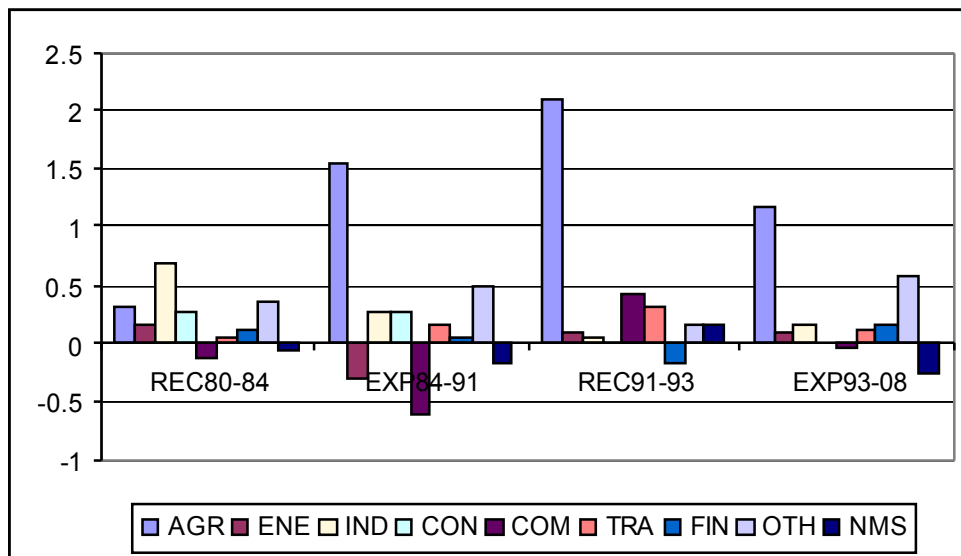
Source: Own computations based on BDMORES database and Spanish Regional Accounts

**Figure 28: Average normal contributions to regional productivity growth during recent business cycles: Extremadura**



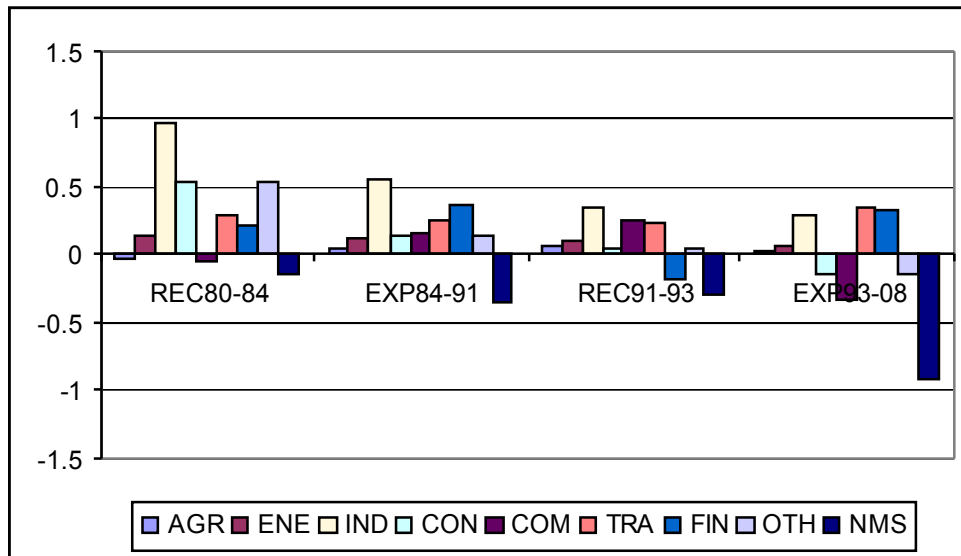
Source: Own computations based on BDMORES database and Spanish Regional Accounts

**Figure 29: Average normal contributions to regional productivity growth during recent business cycles: Galicia**



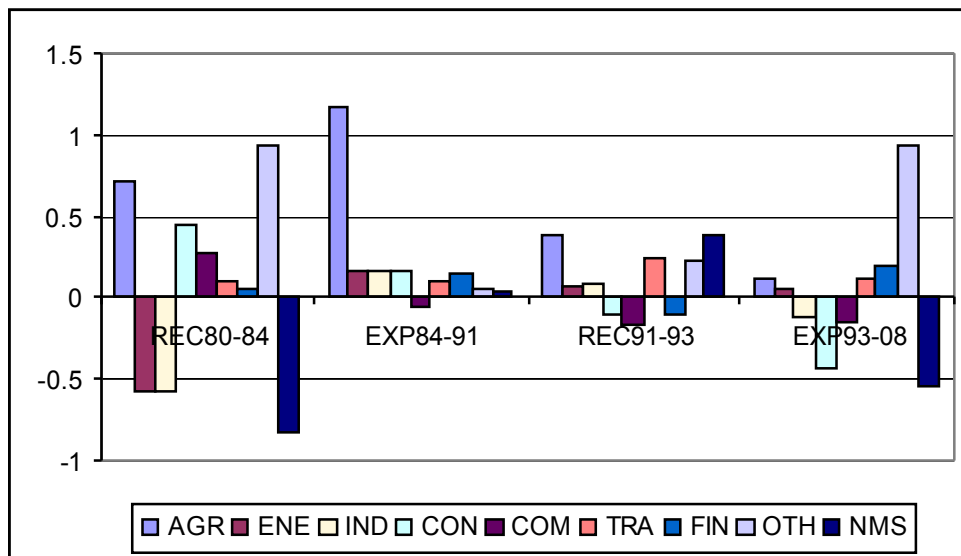
Source: Own computations based on BDMORES database and Spanish Regional Accounts

**Figure 30: Average normal contributions to regional productivity growth during recent business cycles: Madrid**



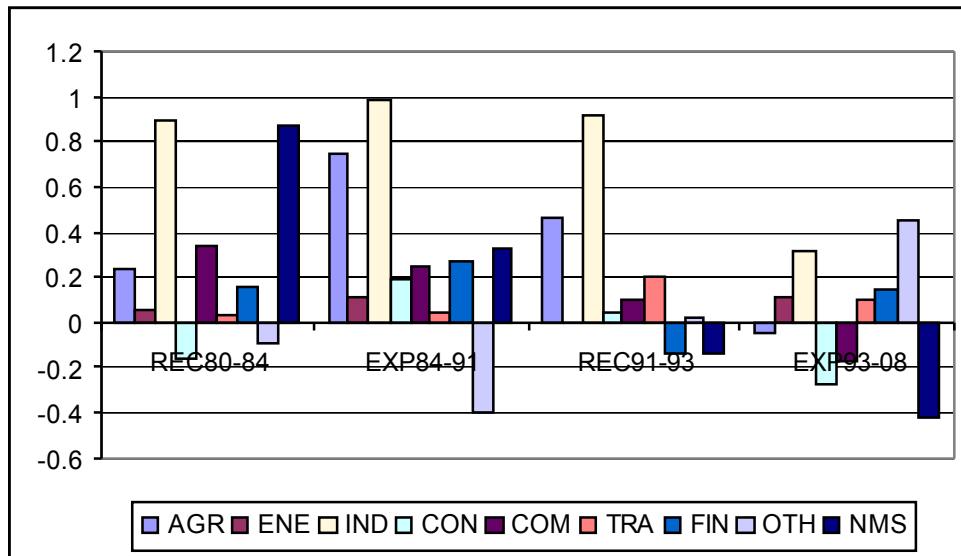
Source: Own computations based on BDMORES database and Spanish Regional Accounts

**Figure 31: Average normal contributions to regional productivity growth during recent business cycles: Murcia**



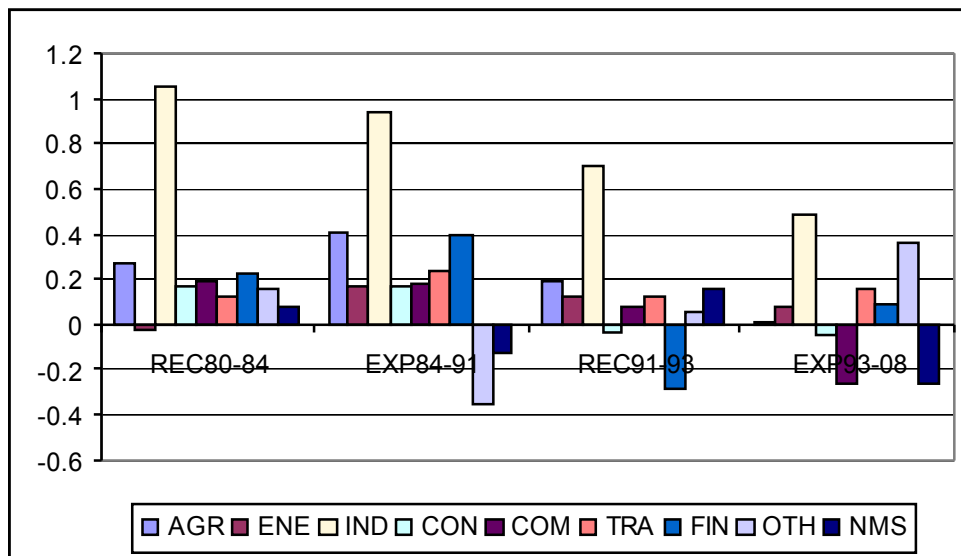
Source: Own computations based on BDMORES database and Spanish Regional Accounts

**Figure 32: Average normal contributions to regional productivity growth during recent business cycles : Navarra**



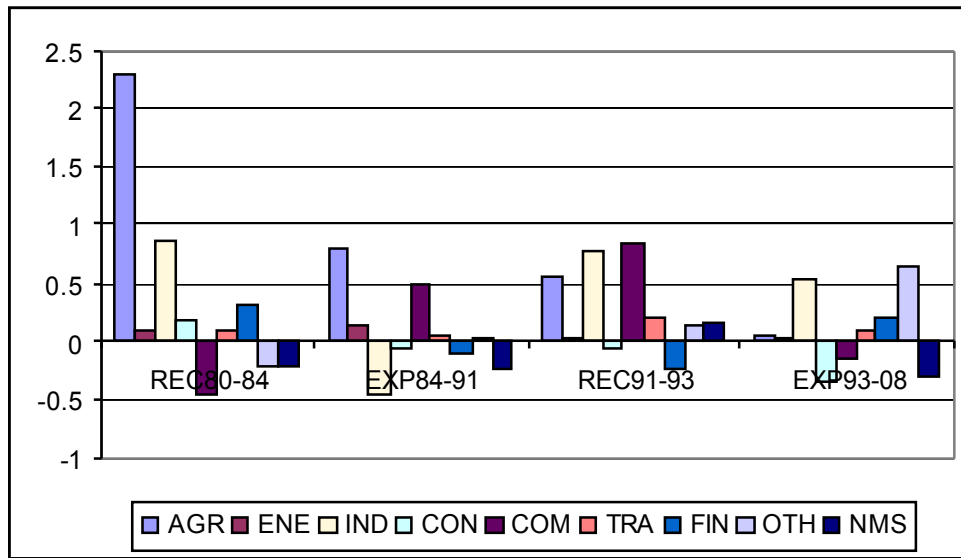
Source: Own computations based on BDMORES database and Spanish Regional Accounts

**Figure 33: Average normal contributions to regional productivity growth during recent business cycles : País Vasco**



Source: Own computations based on BDMORES database and Spanish Regional Accounts

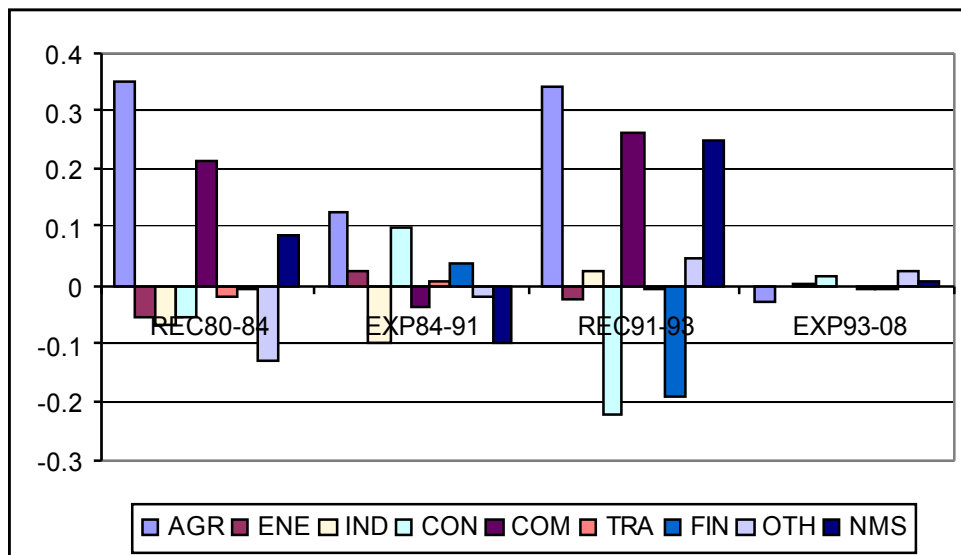
**Figure 34: Average normal contributions to regional productivity growth during recent business cycles: Rioja**



Source: Own computations based on BDMORES database and Spanish Regional Accounts

Figures 35-51 show the abnormal sectoral contributions to regional productivity growth.

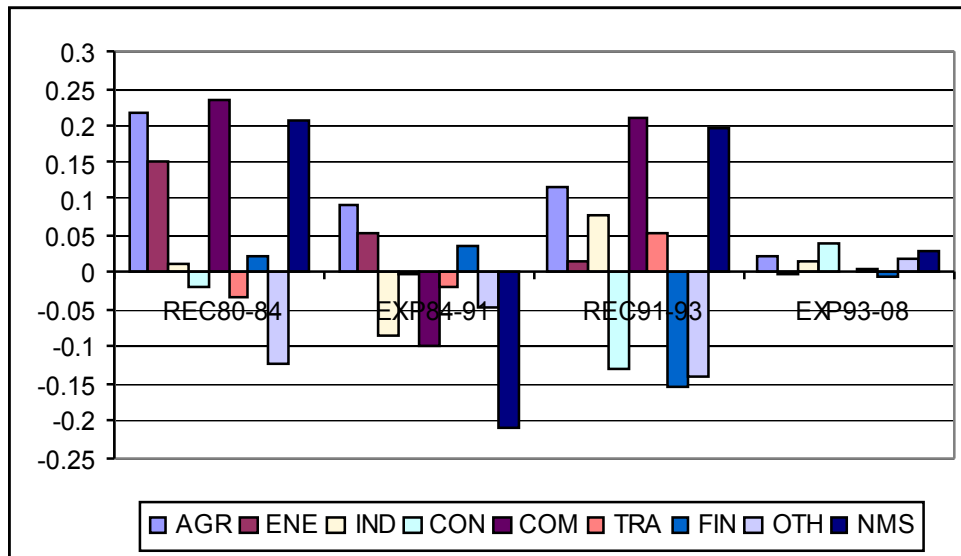
**Figure 35: Average abnormal contributions to regional productivity growth during recent business cycles: Andalucia**



Source: Own computations based on BDMORES database and Spanish Regional Accounts

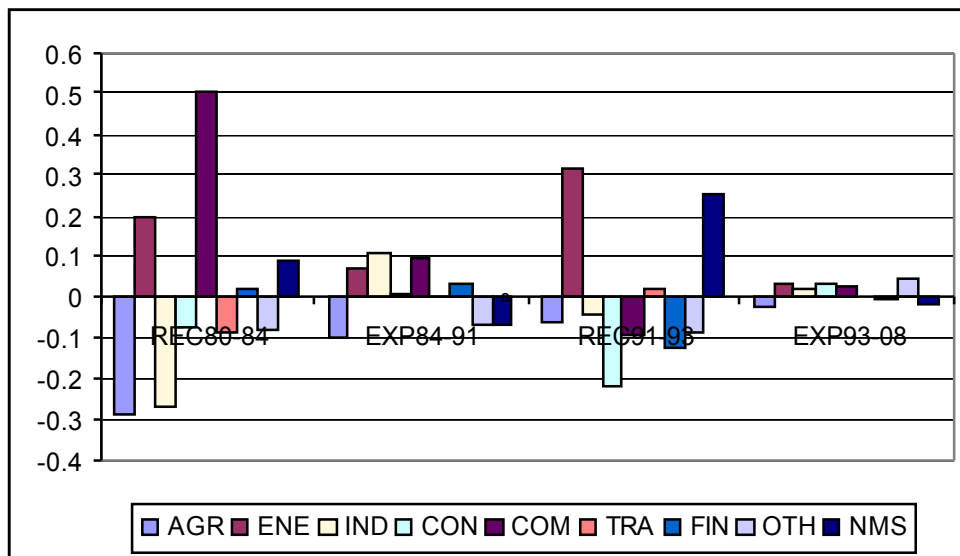


**Figure 36: Average abnormal contributions to regional productivity growth during recent business cycles: Aragón**



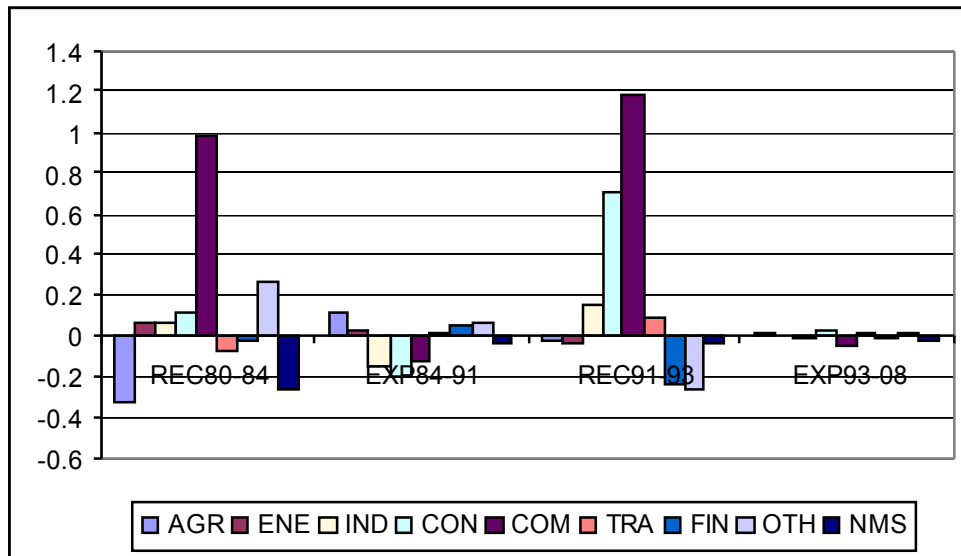
Source: Own computations based on BDMORES database and Spanish Regional Accounts

**Figure 37: Average abnormal contributions to regional productivity growth during recent business cycles: Asturias**



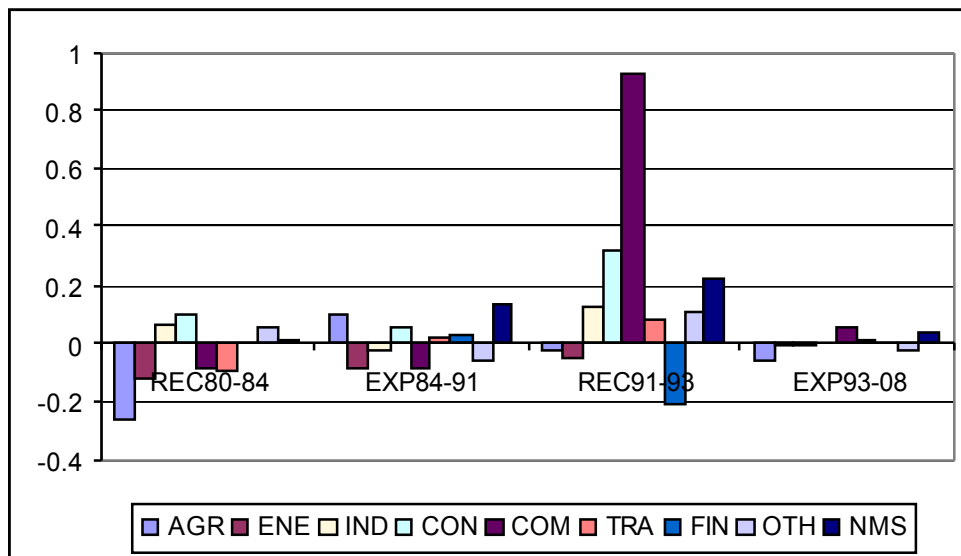
Source: Own computations based on BDMORES database and Spanish Regional Accounts

**Figure 38: Average abnormal contributions to regional productivity growth during recent business cycles : Baleares**



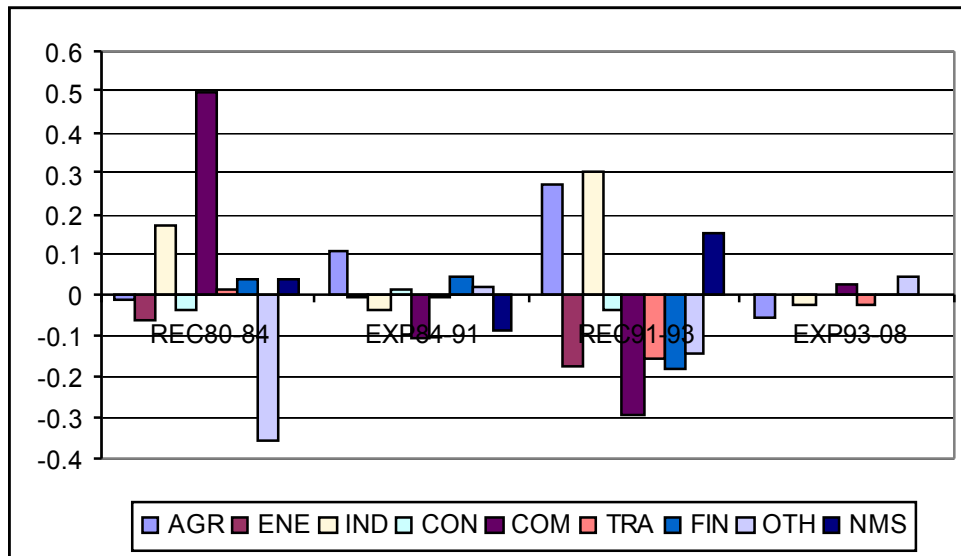
Source: Own computations based on BDMORES database and Spanish Regional Accounts

**Figure 39: Average abnormal contributions to regional productivity growth during recent business cycles : Canarias**



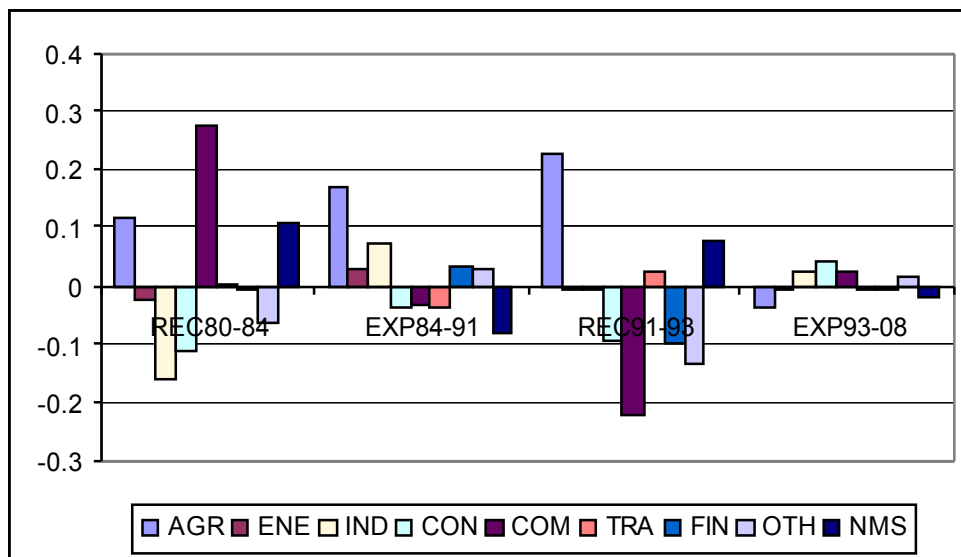
Source: Own computations based on BDMORES database and Spanish Regional Accounts

**Figure 40: Average abnormal contributions to regional productivity growth during recent business cycles: Cantabria**



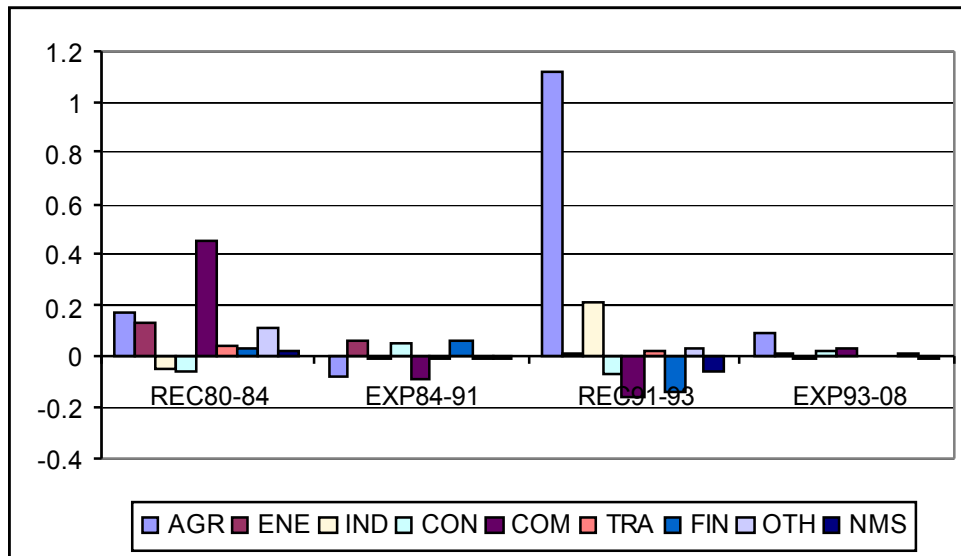
Source: Own computations based on BDMORES database and Spanish Regional Accounts

**Figure 41: Average abnormal contributions to regional productivity growth during recent business cycles: Castilla-La Mancha**



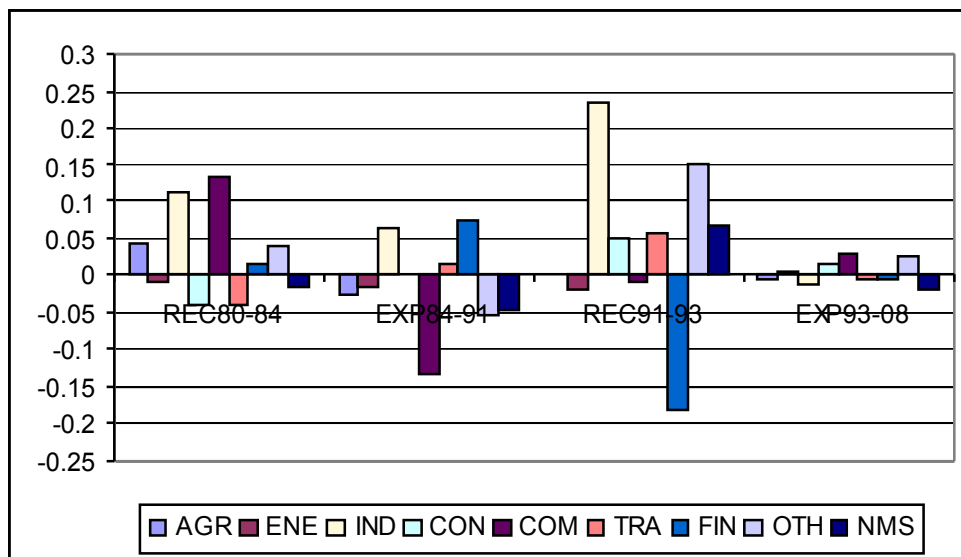
Source: Own computations based on BDMORES database and Spanish Regional Accounts

**Figure 42: Average abnormal contributions to regional productivity growth during recent business cycles : Castilla y León**



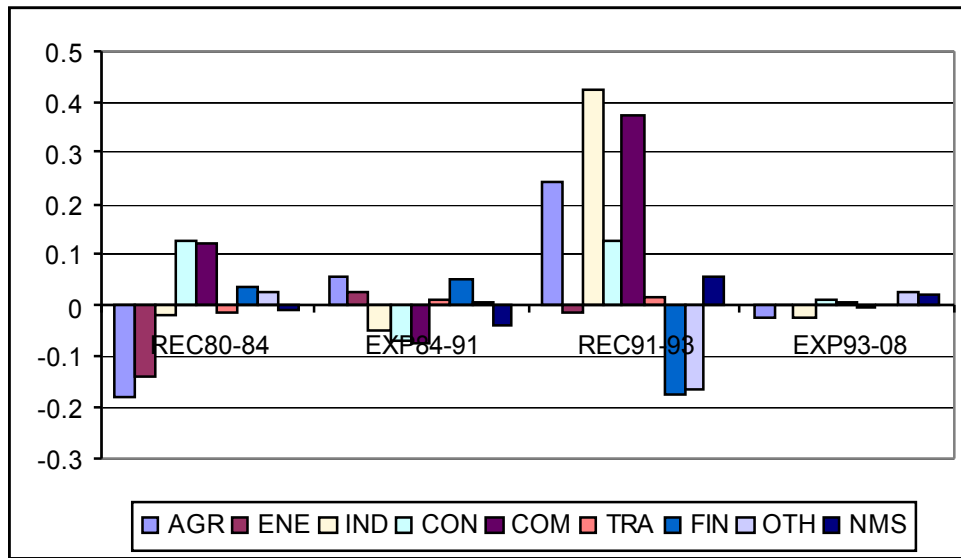
Source: Own computations based on BDMORES database and Spanish Regional Accounts

**Figure 43: Average abnormal contributions to regional productivity growth during recent business cycles : Cataluña**



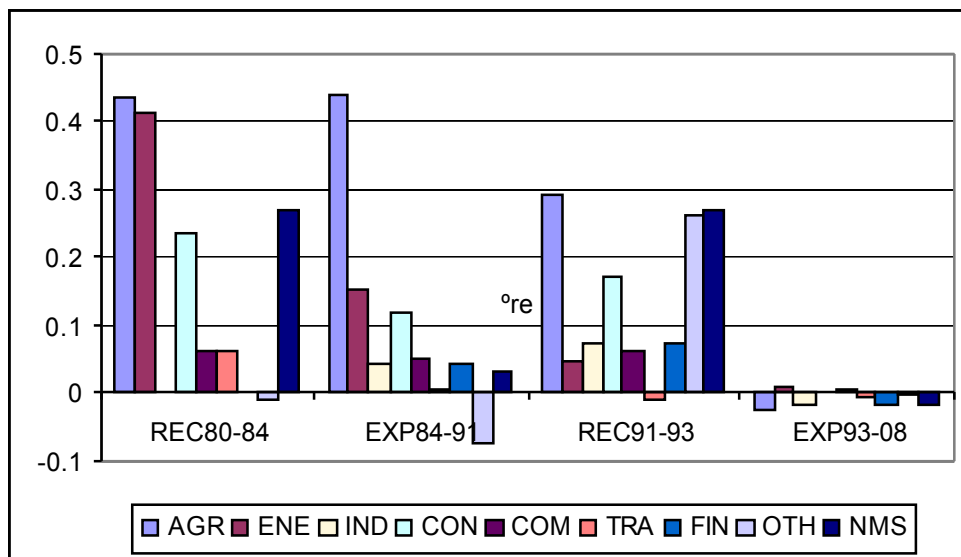
Source: Own computations based on BDMORES database and Spanish Regional Accounts

**Figure 44: Average abnormal contributions to regional productivity growth during recent business cycles: Comunidad Valenciana**



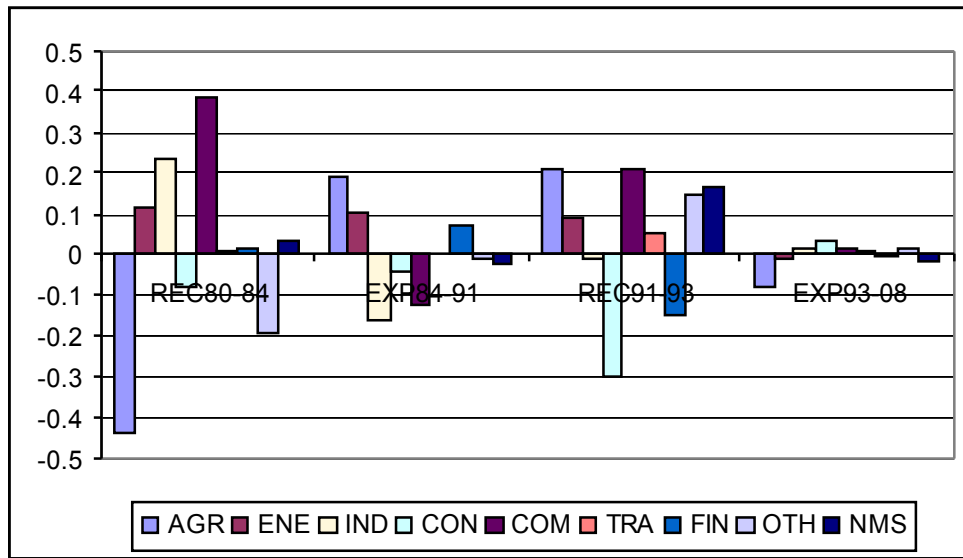
Source: Own computations based on BDMORES database and Spanish Regional Accounts

**Figure 45: Average abnormal contributions to regional productivity growth during recent business cycles: Extremadura**



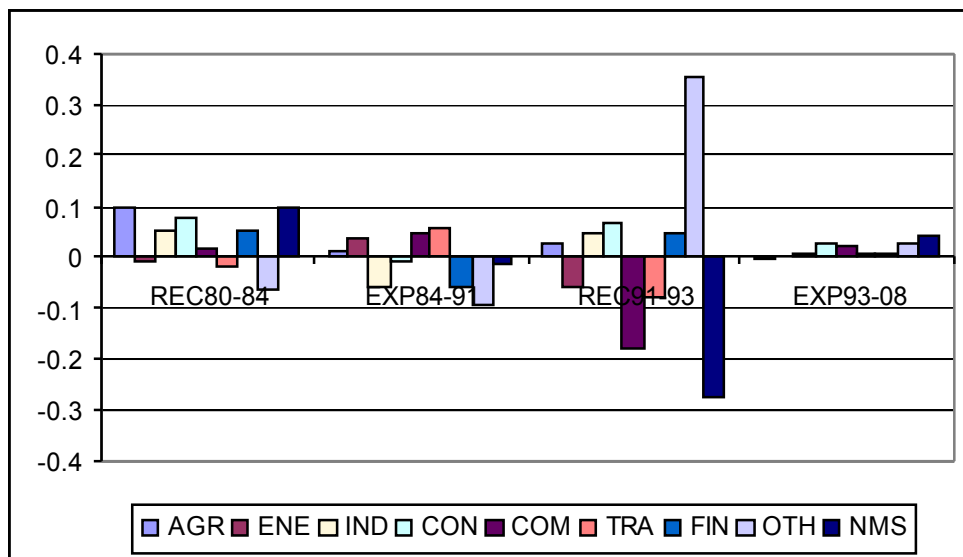
Source: Own computations based on BDMORES database and Spanish Regional Accounts

**Figure 46: Average abnormal contributions to regional productivity growth during recent business cycles: Galicia**



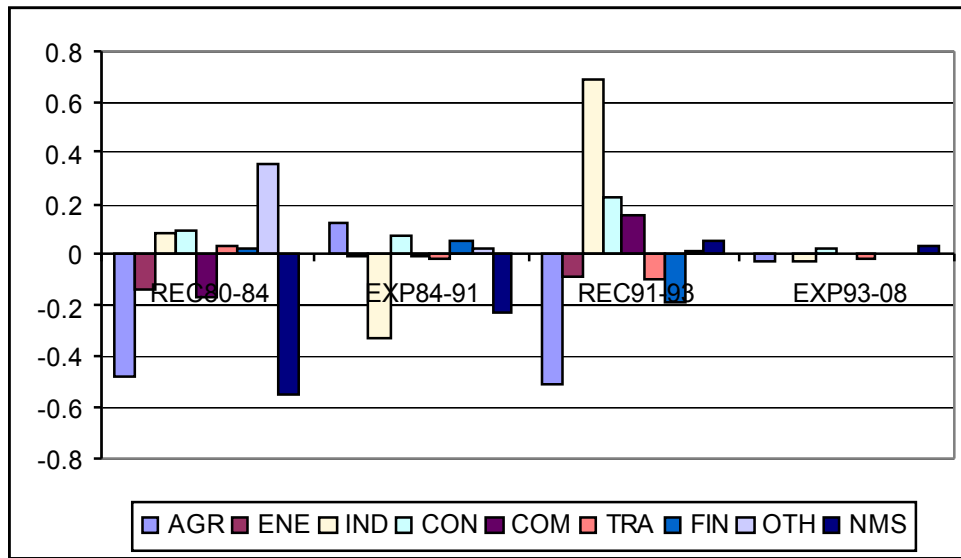
Source: Own computations based on BDMORES database and Spanish Regional Accounts

**Figure 47: Average abnormal contributions to regional productivity growth during recent business cycles: Madrid**



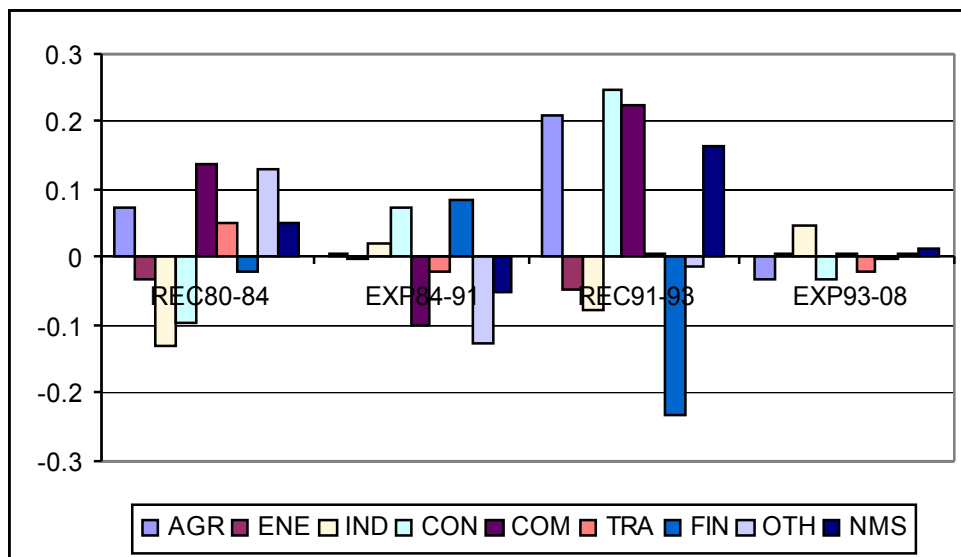
Source: Own computations based on BDMORES database and Spanish Regional Accounts

**Figure 48: Average abnormal contributions to regional productivity growth during recent business cycles: Murcia**



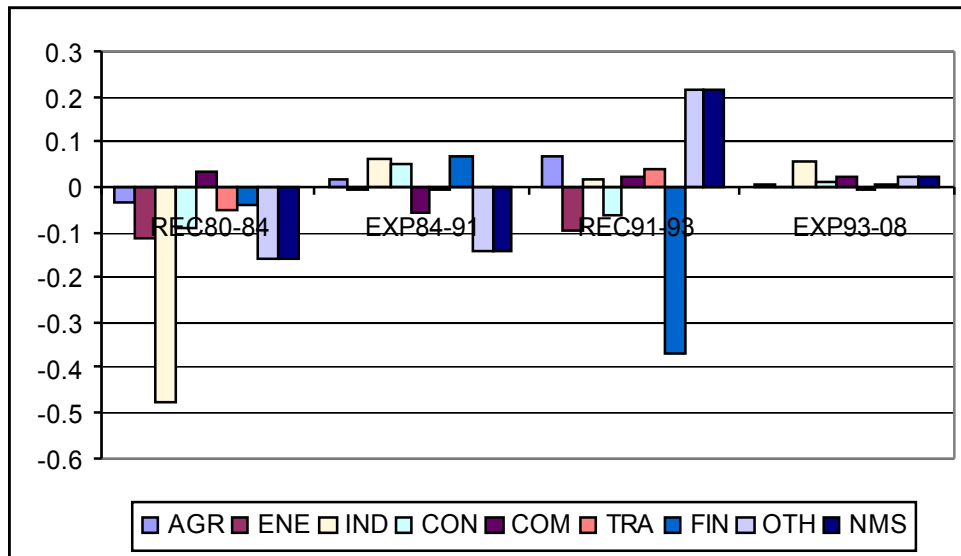
Source: Own computations based on BDMORES database and Spanish Regional Accounts

**Figure 49: Average abnormal contributions to regional productivity growth during recent business cycles: Navarra**



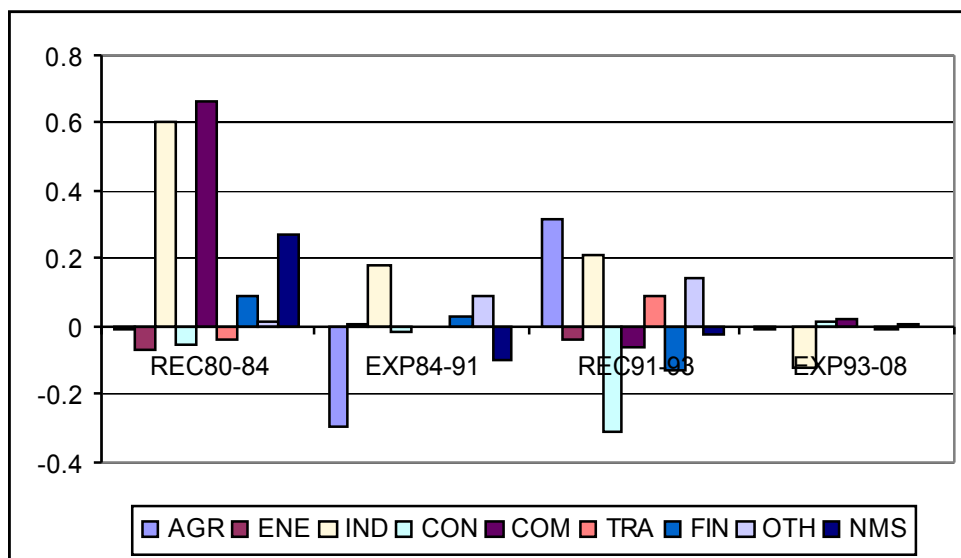
Source: Own computations based on BDMORES database and Spanish Regional Accounts

**Figure 50: Average abnormal contributions to regional productivity growth during recent business cycles : País Vasco**



Source: Own computations based on BDMORES database and Spanish Regional Accounts

**Figure 51: Average abnormal contributions to regional productivity growth during recent business cycles : Rioja**

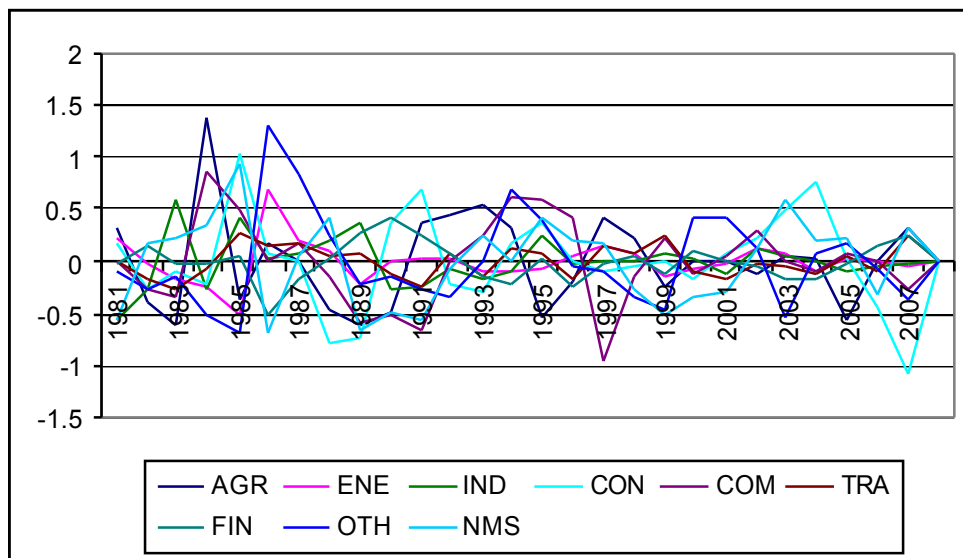


Source: Own computations based on BDMORES database and Spanish Regional Accounts



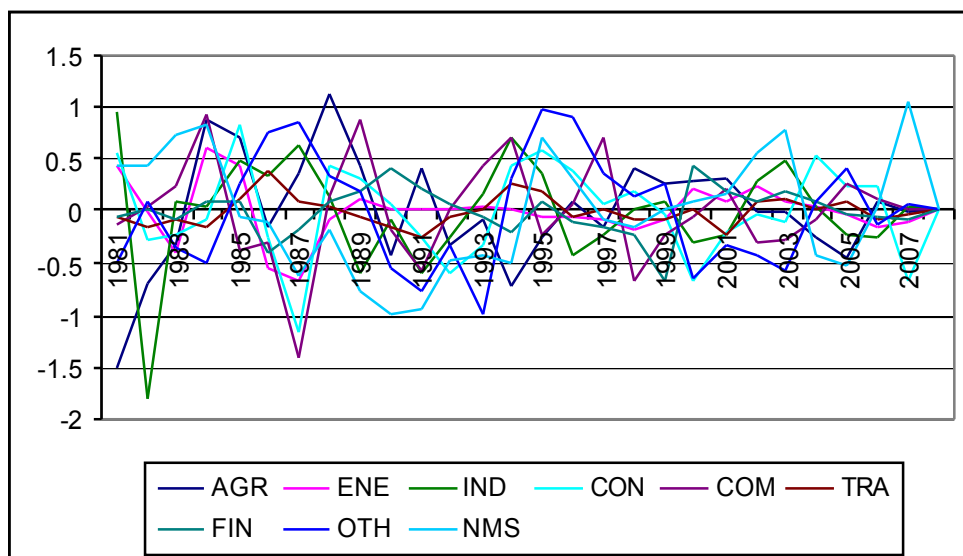
Cumulative abnormal sectoral contributions turn the growth rates into levels. Figures 52-68 plots the results, where the lines wiggle up and down around zero by construction. Notice that when the line is moving down, the sectoral contributions are less than normal, while when the line is moving up, the sectoral contributions exceed normal.

**Figure 52: Cumulative abnormal contributions to regional productivity growth: Andaluca**



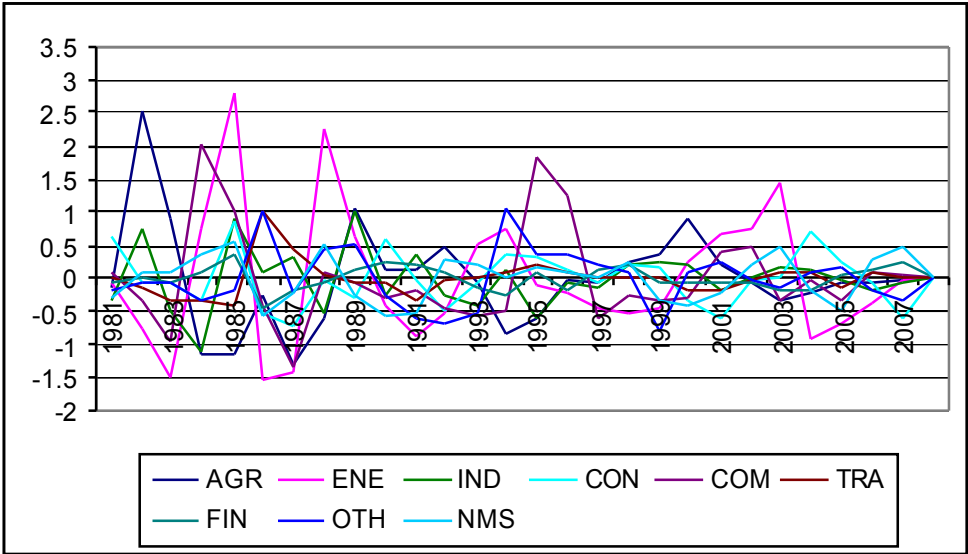
Source: Own computations based on BDMORES database and Spanish Regional Accounts

**Figure 53: Cumulative abnormal contributions to regional productivity growth: Aragón**



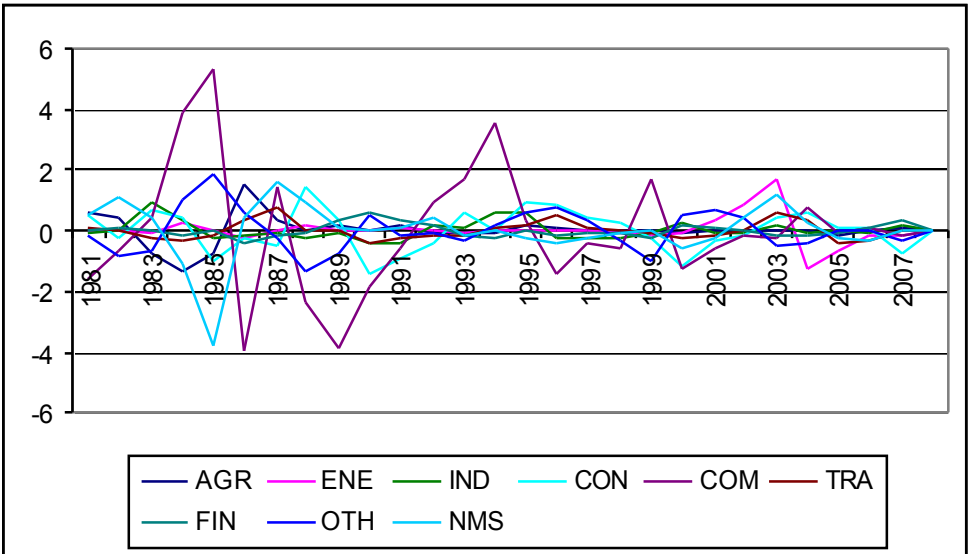
Source: Own computations based on BDMORES database and Spanish Regional Accounts

**Figure 54: Cumulative abnormal contributions to regional productivity growth: Asturias**



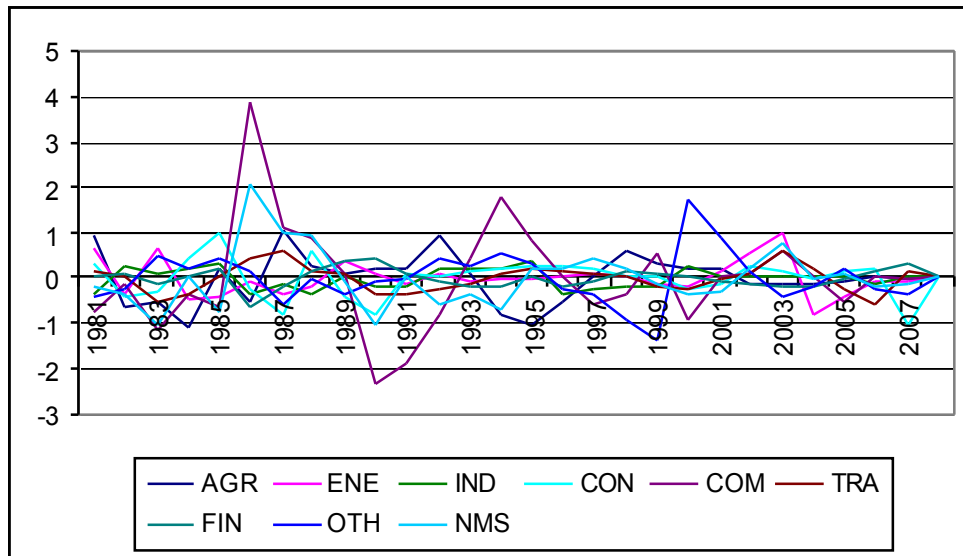
Source: Own computations based on BDMORES database and Spanish Regional Accounts

**Figure 55: Cumulative abnormal contributions to regional productivity growth: Baleares**



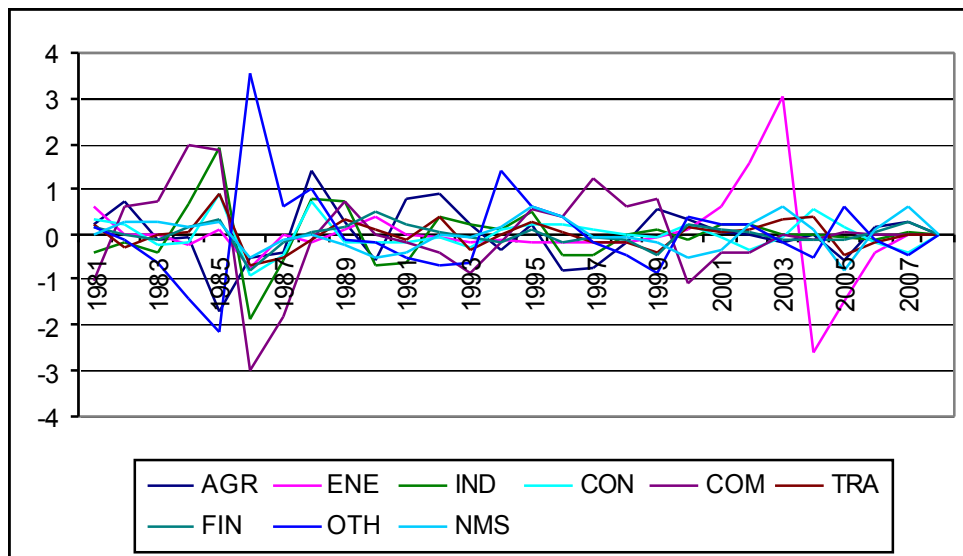
Source: Own computations based on BDMORES database and Spanish Regional Accounts

**Figure 56: Cumulative abnormal contributions to regional productivity growth: Canarias**



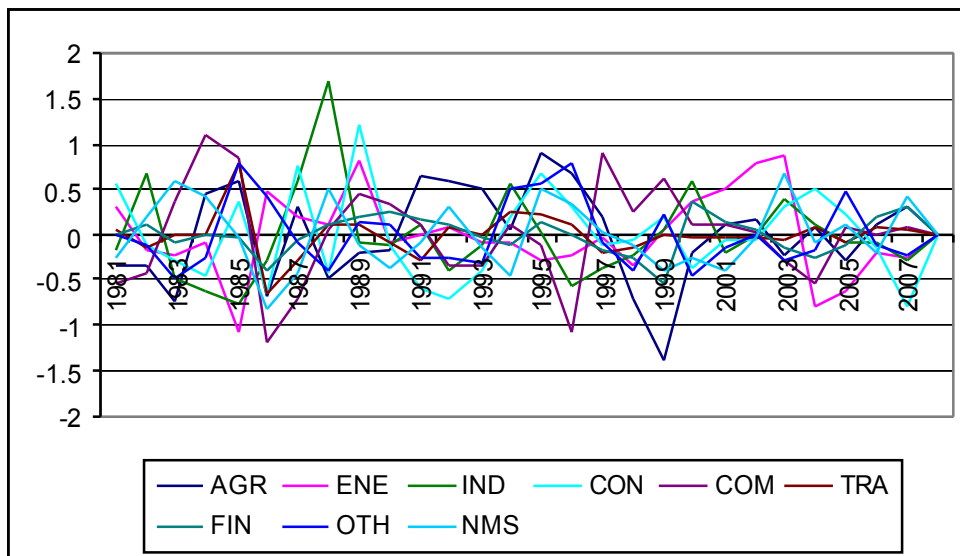
Source: Own computations based on BDMORES database and Spanish Regional Accounts

**Figure 57: Cumulative abnormal contributions to regional productivity growth: Cantabria**



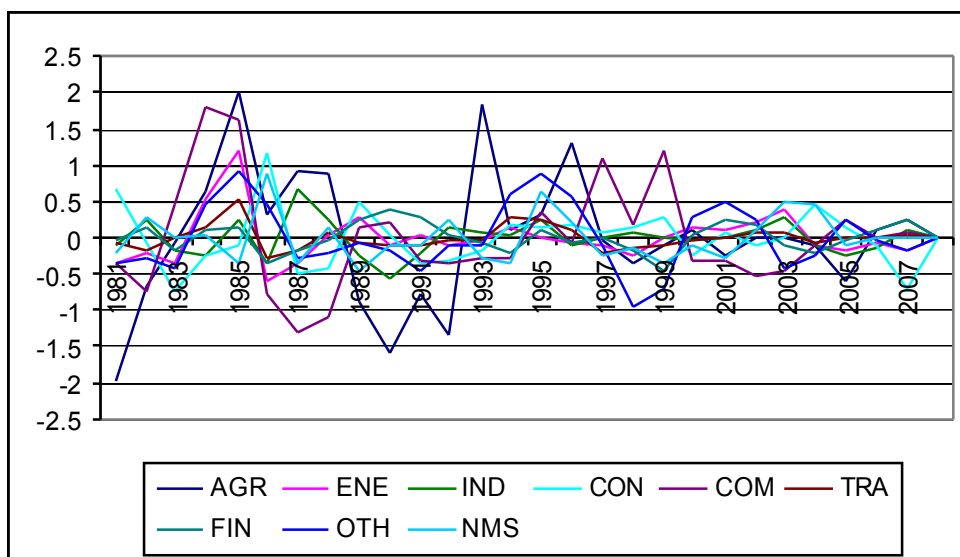
Source: Own computations based on BDMORES database and Spanish Regional Accounts

**Figure 58: Cumulative abnormal contributions to regional productivity growth: Castilla-La Mancha**



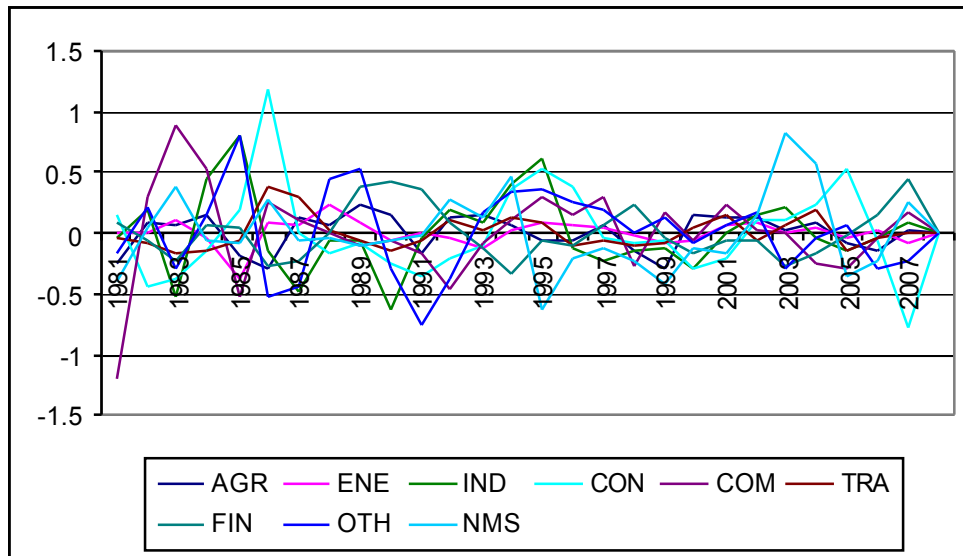
Source: Own computations based on BDMORES database and Spanish Regional Accounts

**Figure 59: Cumulative abnormal contributions to regional productivity growth: Castilla y León**



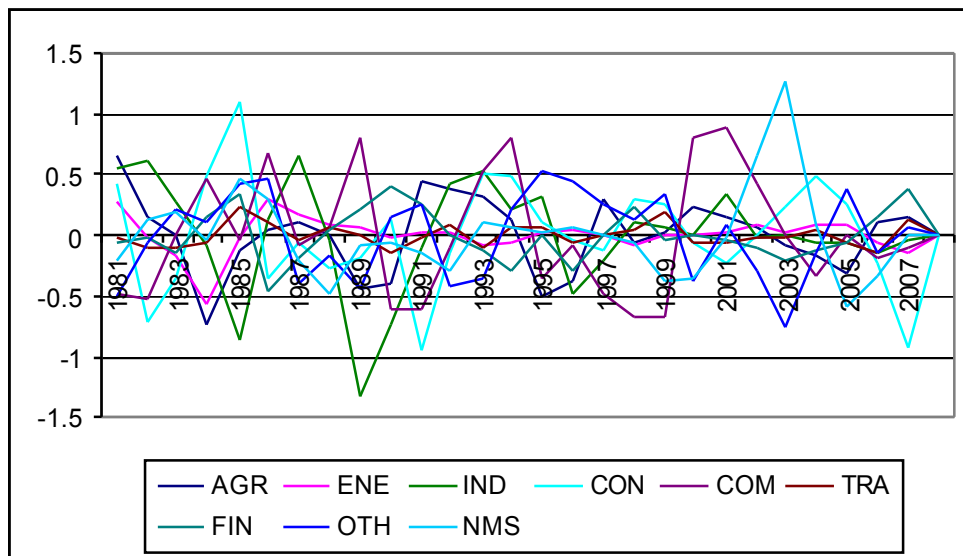
Source: Own computations based on BDMORES database and Spanish Regional Accounts

**Figure 60: Cumulative abnormal contributions to regional productivity growth: Cataluña**



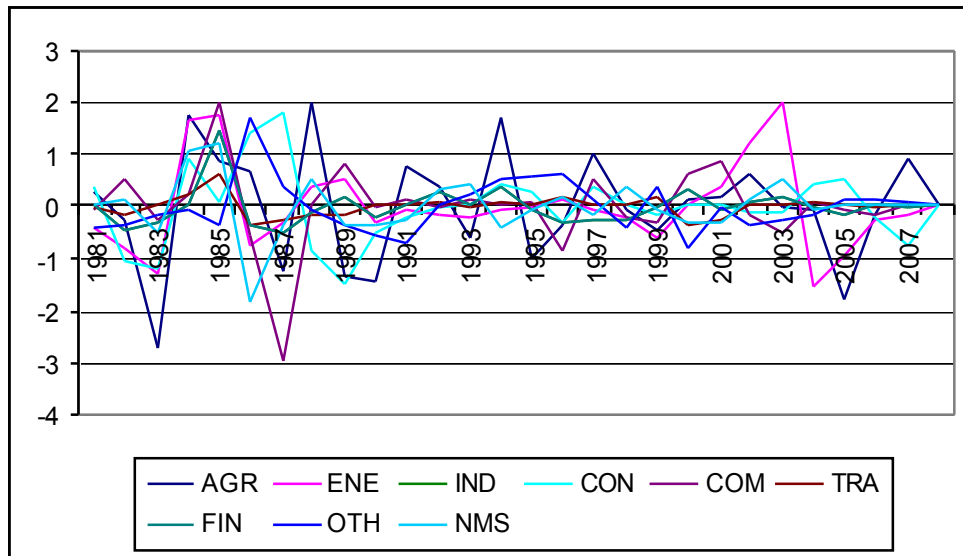
Source: Own computations based on BDMORES database and Spanish Regional Accounts

**Figure 61: Cumulative abnormal contributions to regional productivity growth: Comunidad Valenciana**



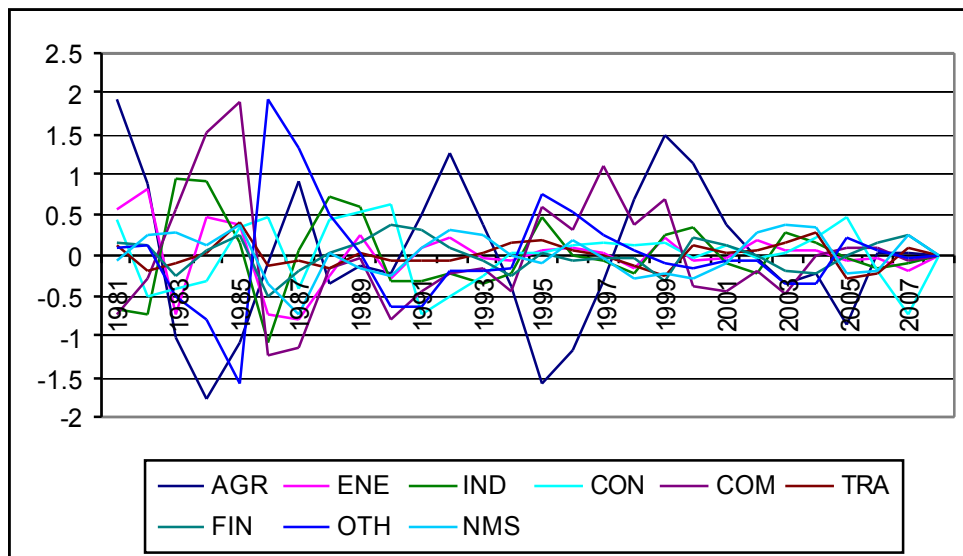
Source: Own computations based on BDMORES database and Spanish Regional Accounts

**Figure 62: Cumulative abnormal contributions to regional productivity growth: Extremadura**



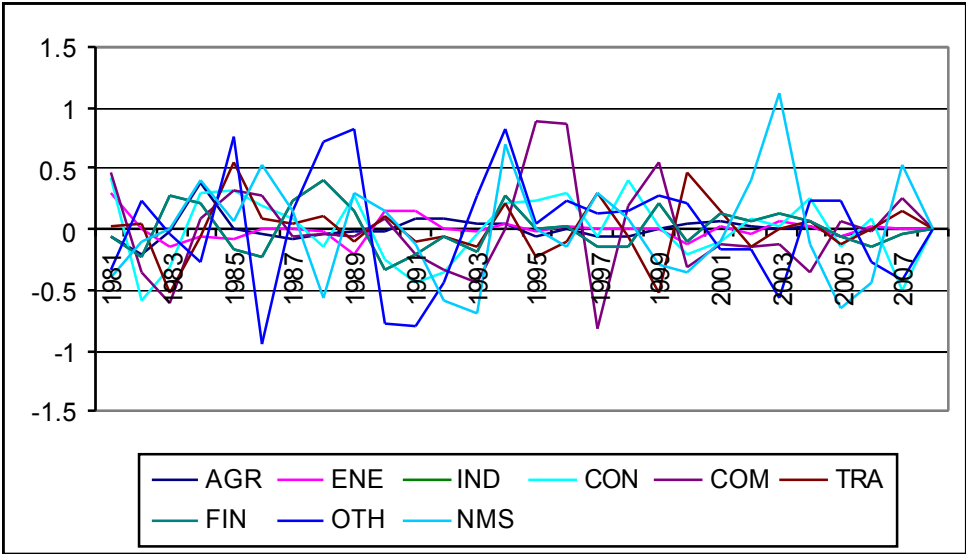
Source: Own computations based on BDMORES database and Spanish Regional Accounts

**Figure 63: Cumulative abnormal contributions to regional productivity growth: Galicia**



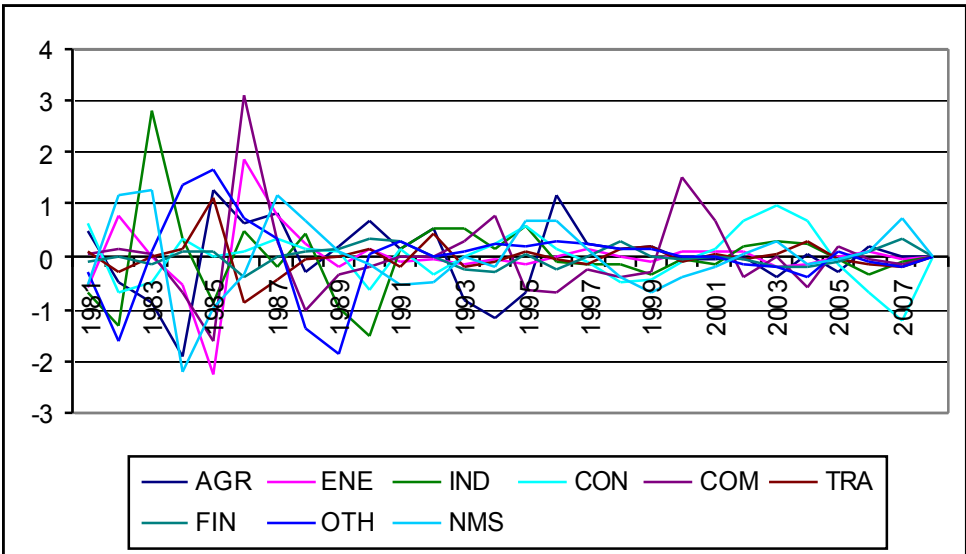
Source: Own computations based on BDMORES database and Spanish Regional Accounts

**Figure 64: Cumulative abnormal contributions to regional productivity growth: Madrid**



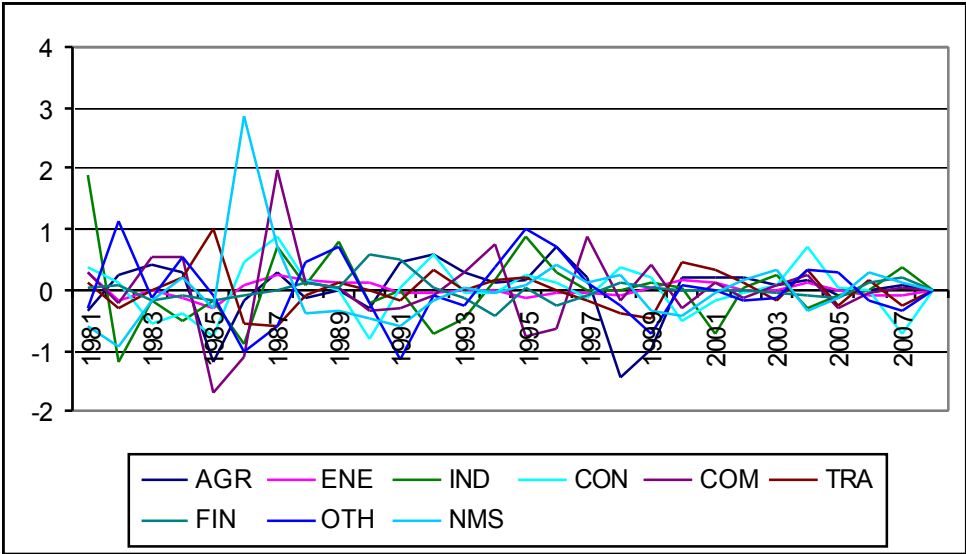
Source: Own computations based on BDMORES database and Spanish Regional Accounts

**Figure 65: Cumulative abnormal contributions to regional productivity growth: Murcia**



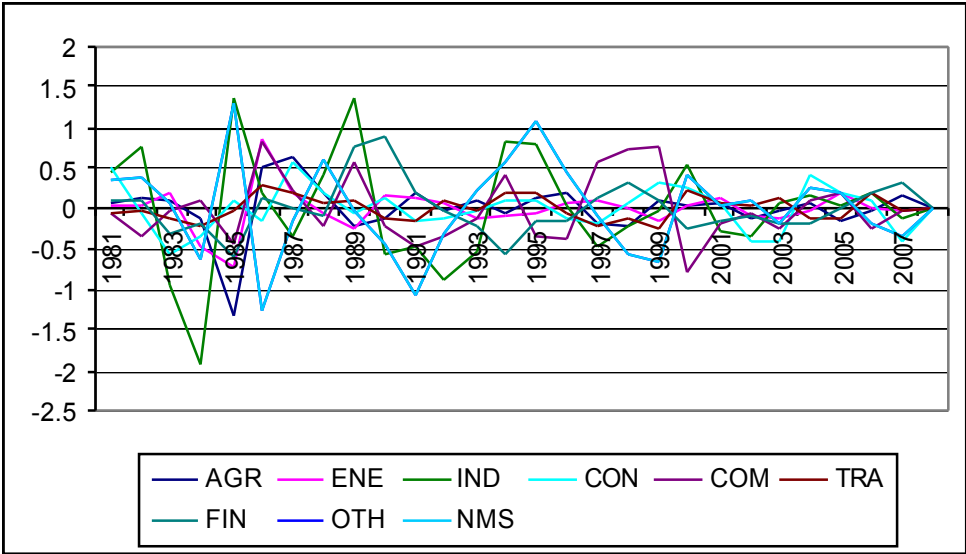
Source: Own computations based on BDMORES database and Spanish Regional Accounts

**Figure 66: Cumulative abnormal contributions to regional productivity growth: Navarra**



Source: Own computations based on BDMORES database and Spanish Regional Accounts

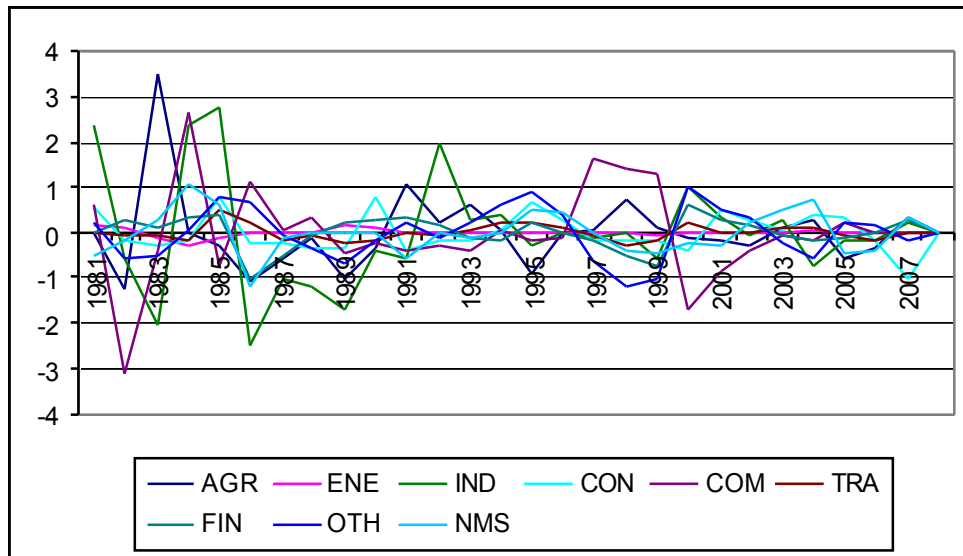
**Figure 67: Cumulative abnormal contributions to regional productivity growth: País Vasco**



Source: Own computations based on BDMORES database and Spanish Regional Accounts



**Figure 68: Cumulative abnormal contributions to regional productivity growth: Rioja**

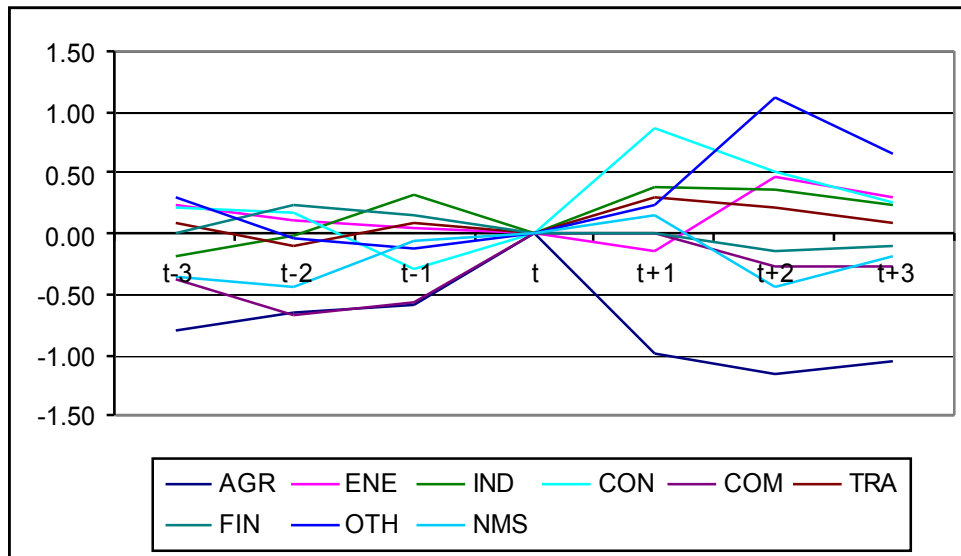


Source: Own computations based on BDMORES database and Spanish Regional Accounts

An alternative way of analysing the information of the cumulated abnormal contributions consists in extracting the data around expansions, normalized by subtracting the value at the cycle through. This makes the value at each cycle equal to zero. Figures 69-85 show the results for the average of these contributions during the two expansions experienced in our sample. In particular, we offer the average behaviour from three years before the cycle through to three years after the cycle through. Note that if the line for a given sector is flat that sectoral contribution is normal. If the line is declining, that means that the sectoral contribution is less than normal, indicating that the sector is contributing to weakness in regional productivity growth. Finally, if the line is rising, is greater than normal, suggesting that the sector is contributing to strength of regional productivity growth.

**Figure 69: Cumulative abnormal contributions to regional productivity during expansions:**

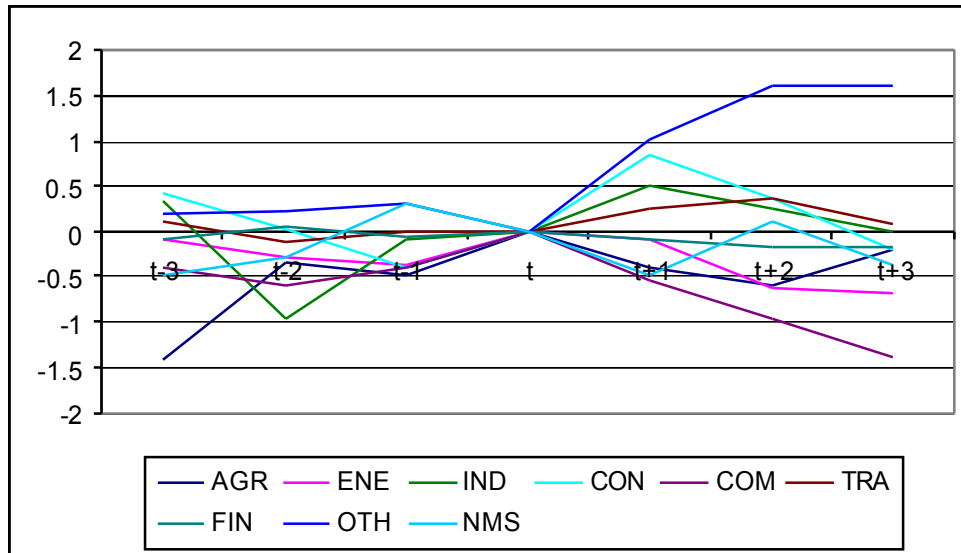
**Andalucía**



Note: Average results for the 1984-1991 and 1993-2008 expansions, normalized to zero at the cycle through.

Source: Own computations based on BDMORES database and Spanish Regional Accounts

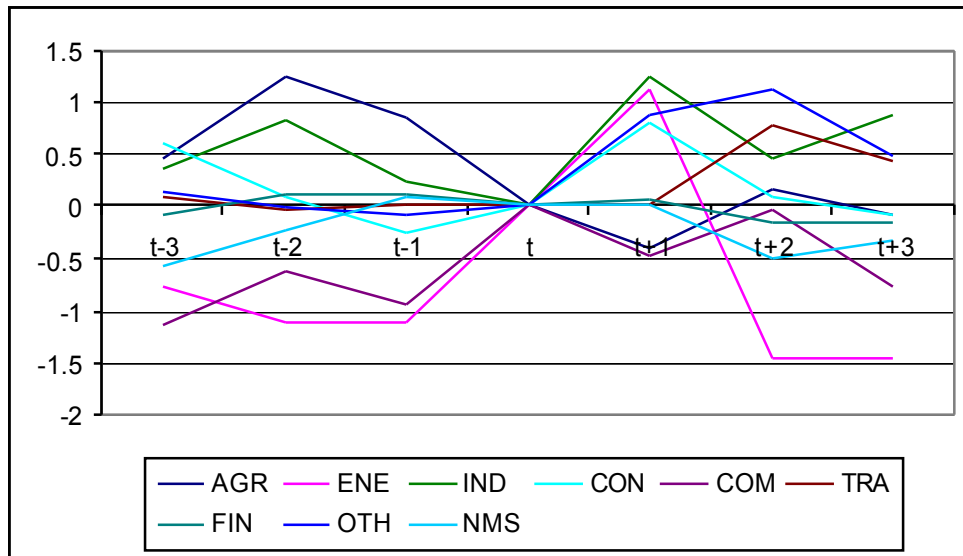
**Figure 70: Cumulative abnormal contributions to regional productivity during expansions: Aragón**



Note: Average results for the 1984-1991 and 1993-2008 expansions, normalized to zero at the cycle through.

Source: Own computations based on BDMORES database and Spanish Regional Accounts

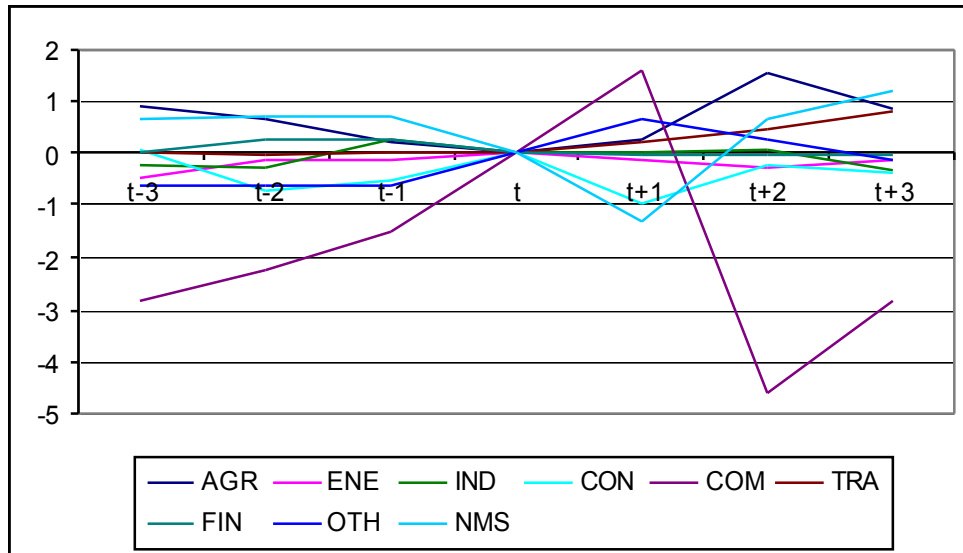
**Figure 71: Cumulative abnormal contributions to regional productivity during expansions: Asturias**



Note: Average results for the 1984-1991 and 1993-2008 expansions, normalized to zero at the cycle through.

Source: Own computations based on BDMORES database and Spanish Regional Accounts

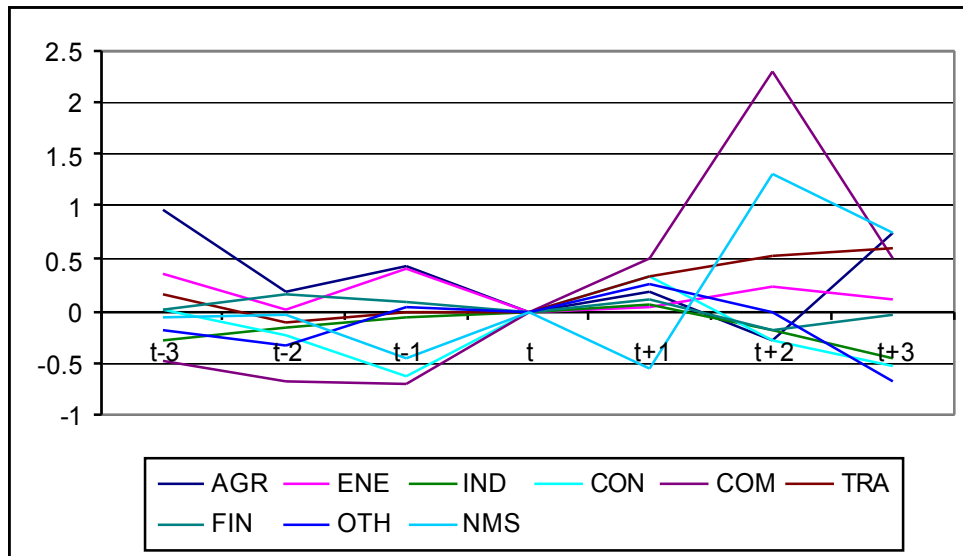
**Figure 72: Cumulative abnormal contributions to regional productivity during expansions: Baleares**



Note: Average results for the 1984-1991 and 1993-2008 expansions, normalized to zero at the cycle through.

Source: Own computations based on BDMORES database and Spanish Regional Accounts

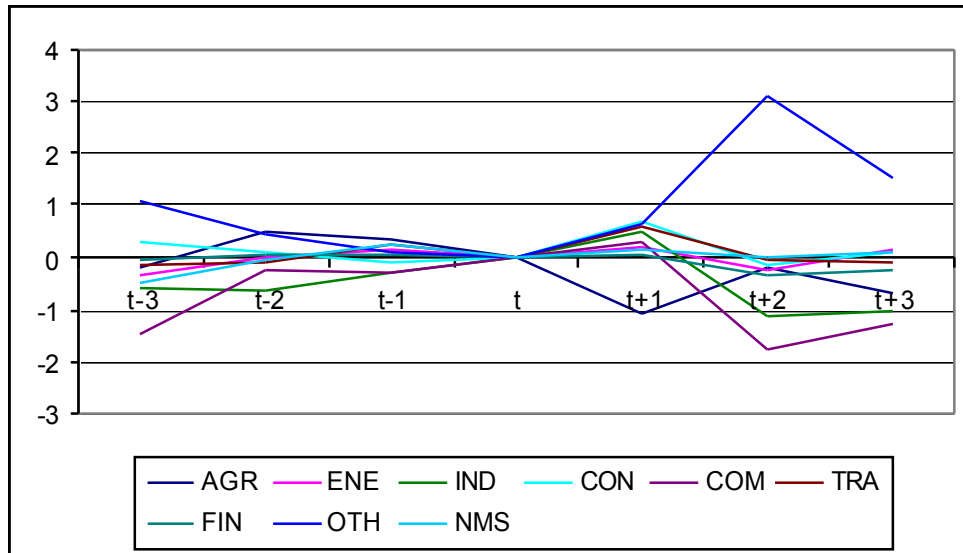
**Figure 73: Cumulative abnormal contributions to regional productivity during expansions: Canarias**



Note: Average results for the 1984-1991 and 1993-2008 expansions, normalized to zero at the cycle through.

Source: Own computations based on BDMORES database and Spanish Regional Accounts

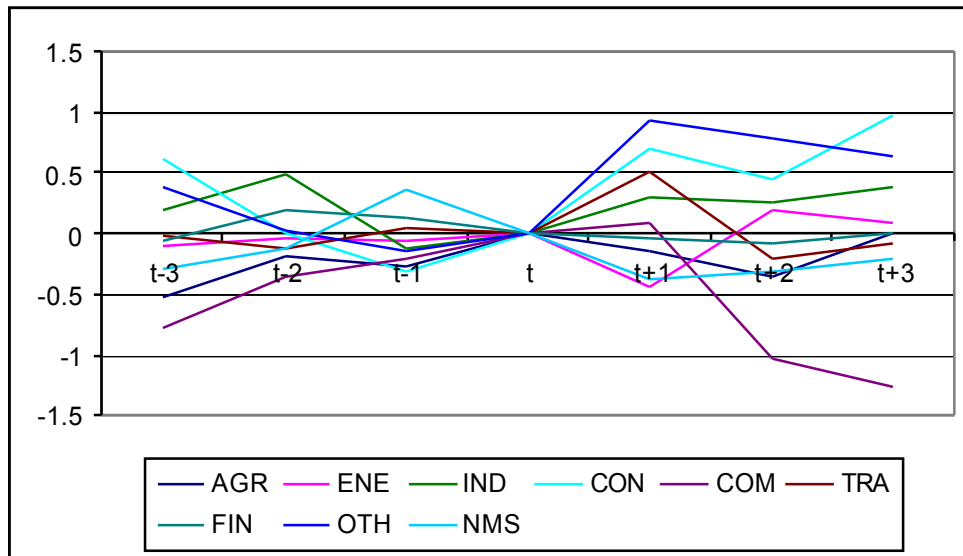
**Figure 74: Cumulative abnormal contributions to regional productivity during expansions: Cantabria**



Note: Average results for the 1984-1991 and 1993-2008 expansions, normalized to zero at the cycle through.

Source: Own computations based on BDMORES database and Spanish Regional Accounts

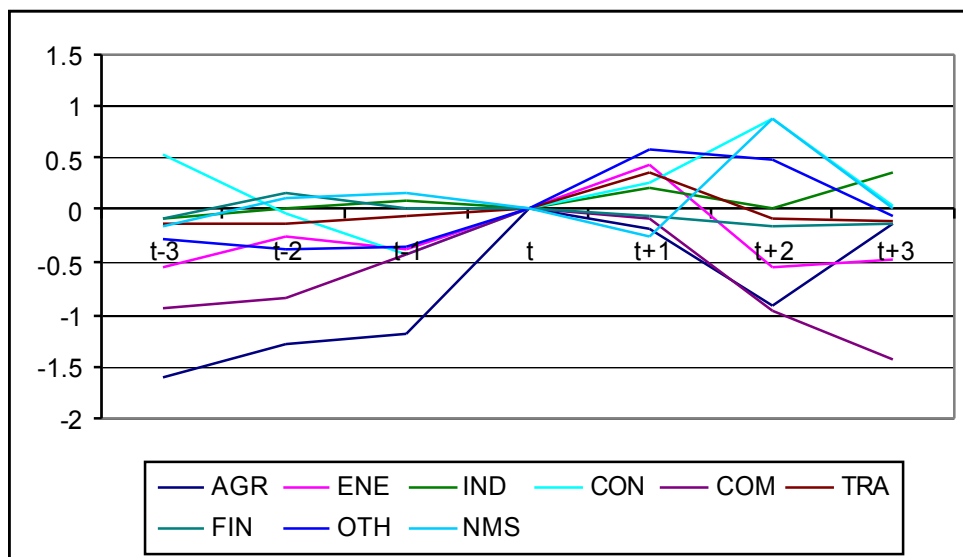
**Figure 75: Cumulative abnormal contributions to regional productivity during expansions: Castilla-La Mancha**



Note: Average results for the 1984-1991 and 1993-2008 expansions, normalized to zero at the cycle through.

Source: Own computations based on BDMORES database and Spanish Regional Accounts

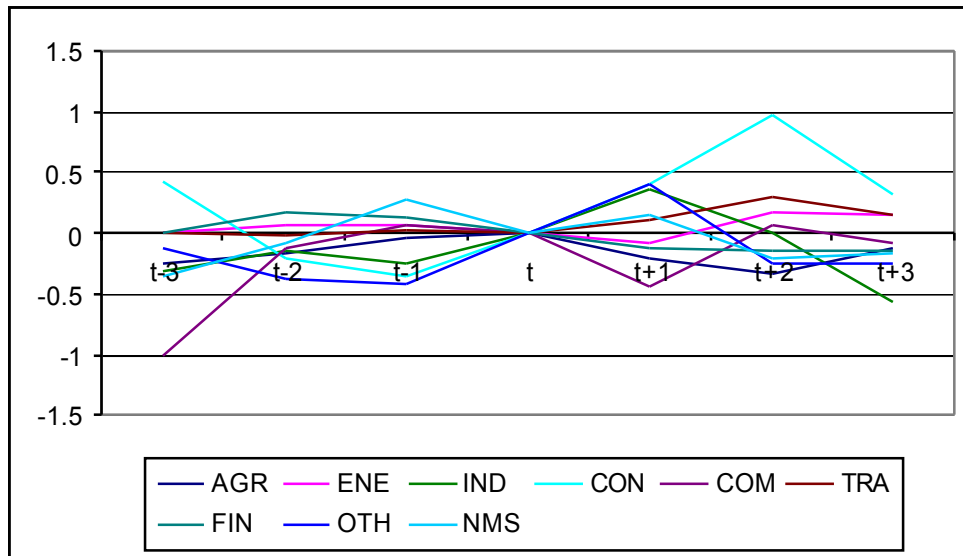
**Figure 75: Cumulative abnormal contributions to regional productivity during expansions: Castilla y León**



Note: Average results for the 1984-1991 and 1993-2008 expansions, normalized to zero at the cycle through.

Source: Own computations based on BDMORES database and Spanish Regional Accounts

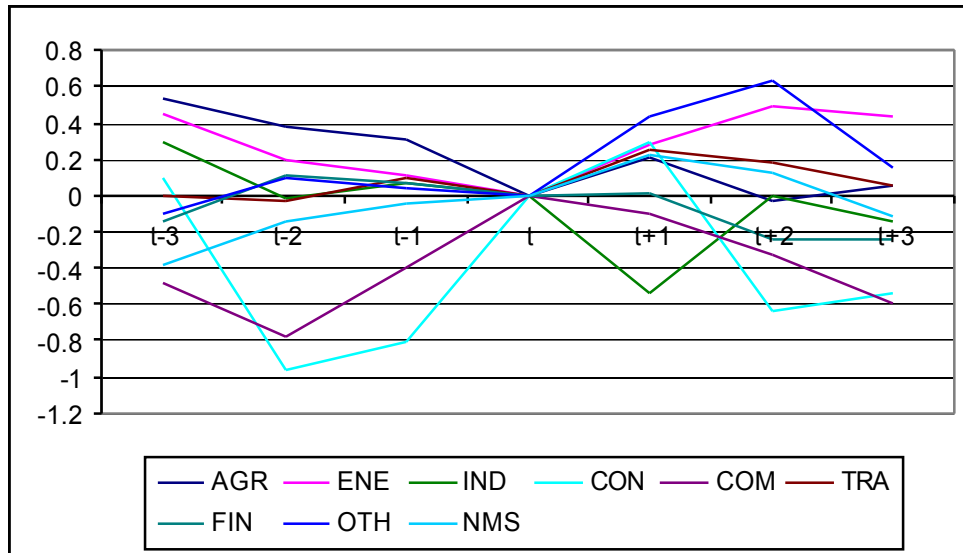
**Figure 76: Cumulative abnormal contributions to regional productivity during expansions: Cataluña**



Note: Average results for the 1984-1991 and 1993-2008 expansions, normalized to zero at the cycle through.

Source: Own computations based on BDMORES database and Spanish Regional Accounts

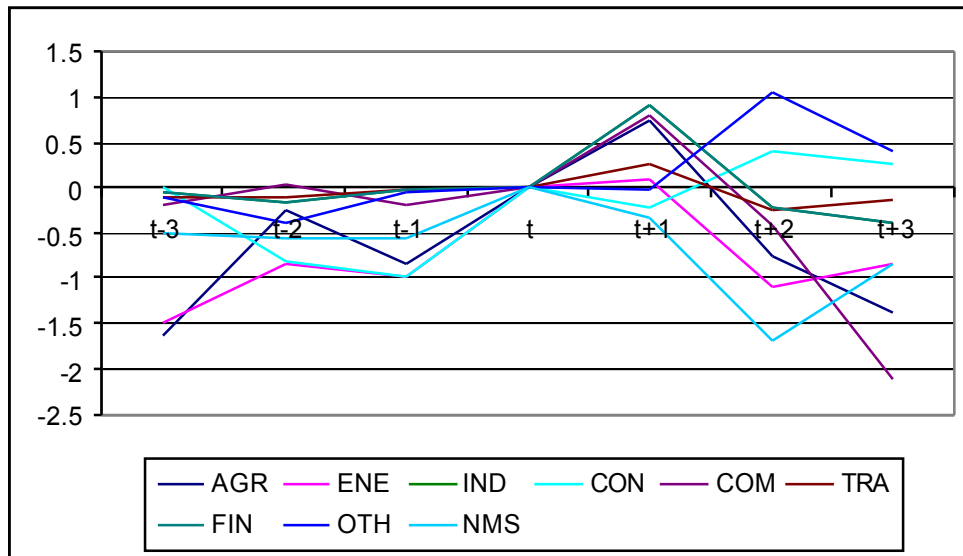
**Figure 77: Cumulative abnormal contributions to regional productivity during expansions: Comunidad Valenciana**



Note: Average results for the 1984-1991 and 1993-2008 expansions, normalized to zero at the cycle through.

Source: Own computations based on BDMORES database and Spanish Regional Accounts

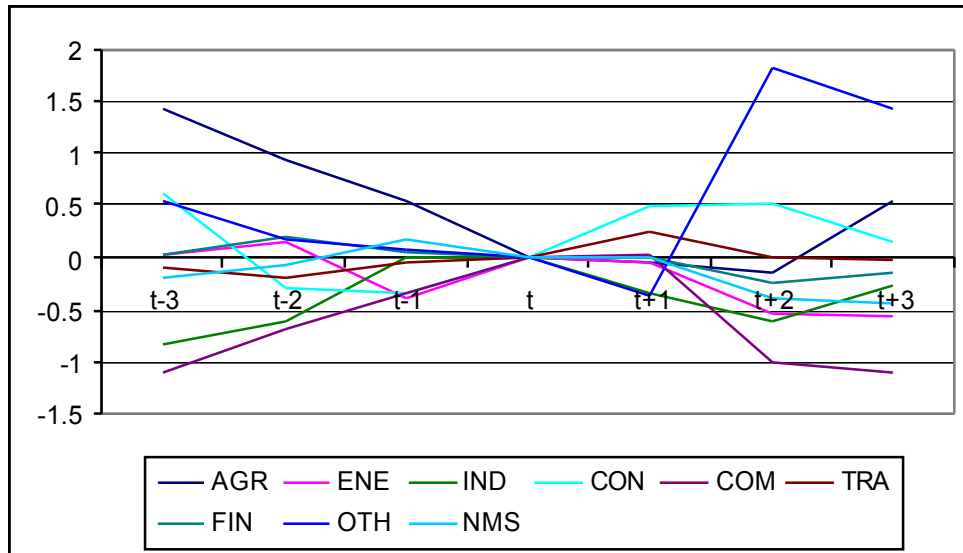
**Figure 78: Cumulative abnormal contributions to regional productivity during expansions: Extremadura**



Note: Average results for the 1984-1991 and 1993-2008 expansions, normalized to zero at the cycle through.

Source: Own computations based on BDMORES database and Spanish Regional Accounts

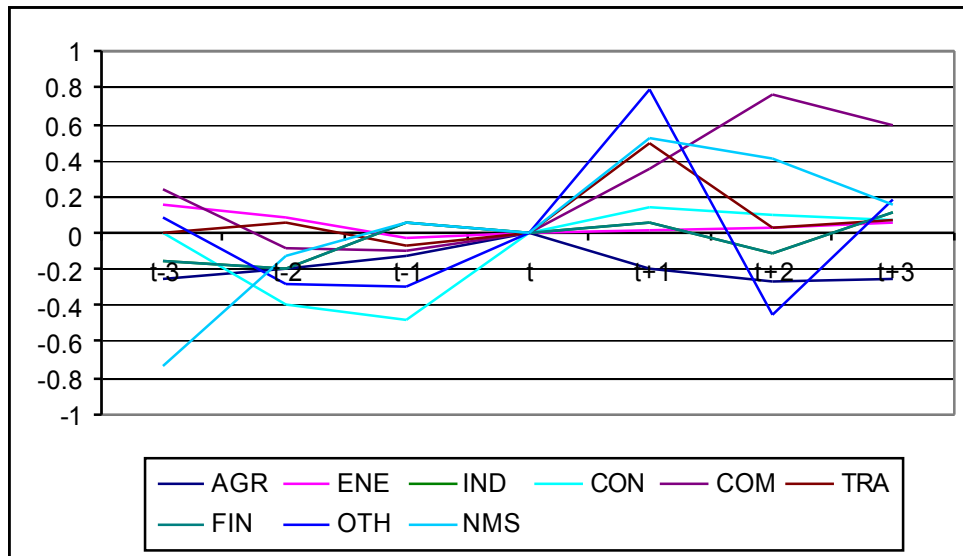
**Figure 79: Cumulative abnormal contributions to regional productivity during expansions: Galicia**



Note: Average results for the 1984-1991 and 1993-2008 expansions, normalized to zero at the cycle through.

Source: Own computations based on BDMORES database and Spanish Regional Accounts

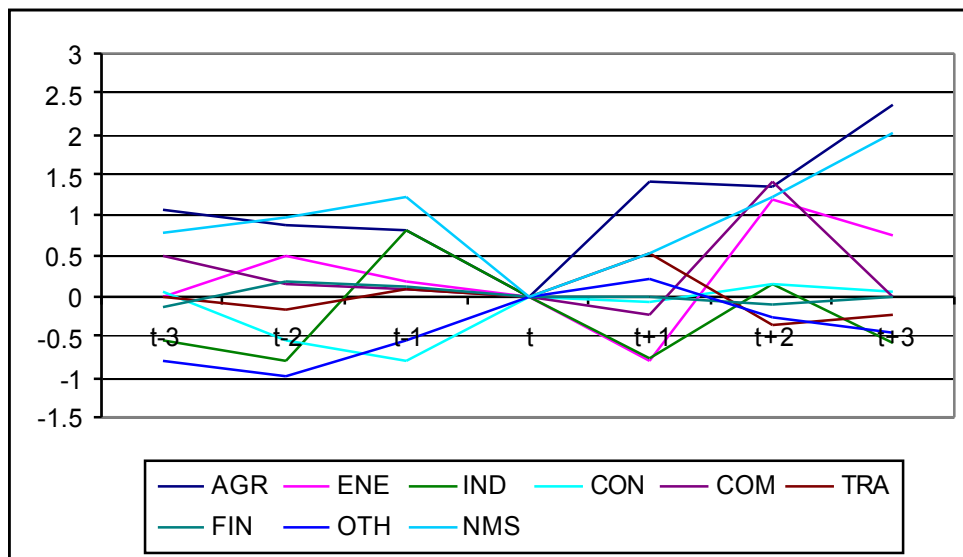
**Figure 80: Cumulative abnormal contributions to regional productivity during expansions: Madrid**



Note: Average results for the 1984-1991 and 1993-2008 expansions, normalized to zero at the cycle through.

Source: Own computations based on BDMORES database and Spanish Regional Accounts

**Figure 81: Cumulative abnormal contributions to regional productivity during expansions: Murcia**

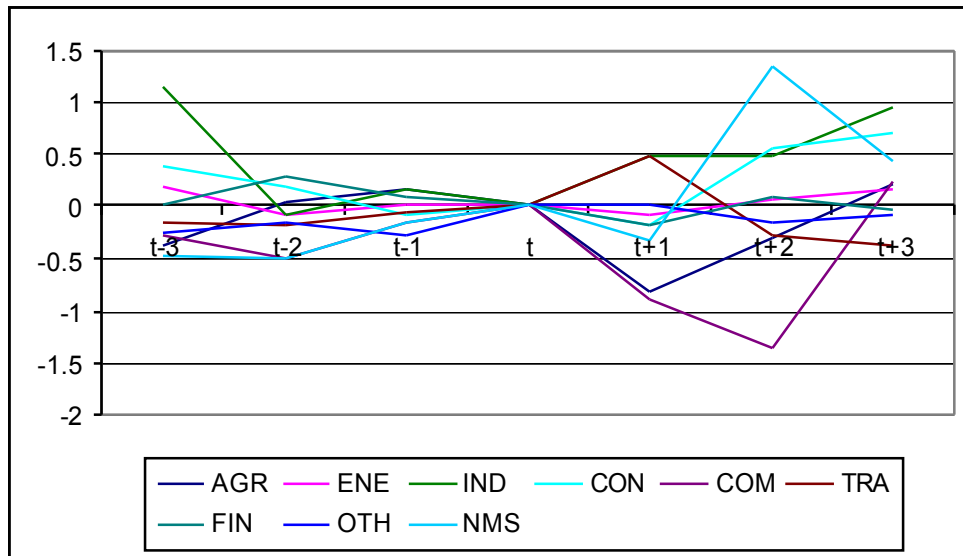


Note: Average results for the 1984-1991 and 1993-2008 expansions, normalized to zero at the cycle through.

Source: Own computations based on BDMORES database and Spanish Regional Accounts



**Figure 82: Cumulative abnormal contributions to regional productivity during expansions: Navarra**

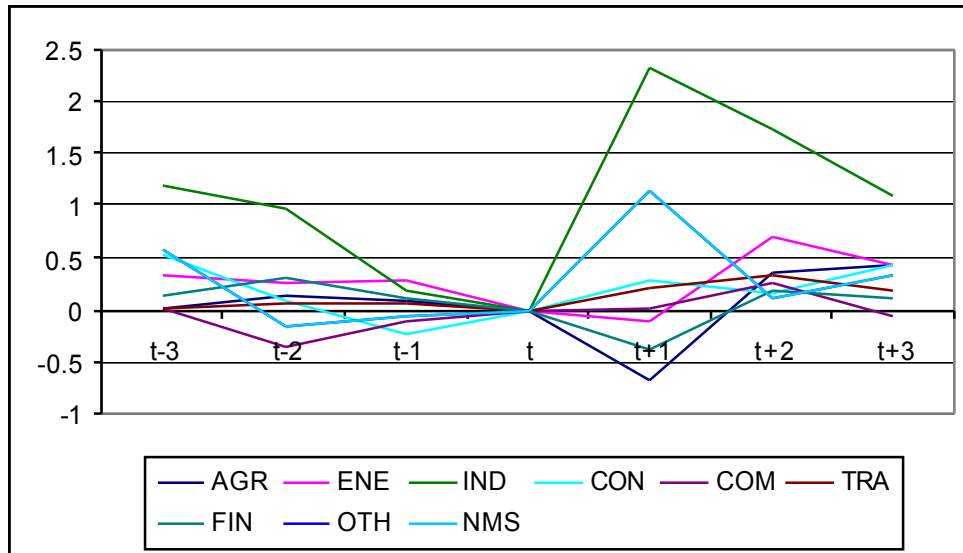


Note: Average results for the 1984-1991 and 1993-2008 expansions, normalized to zero at the cycle through.

Source: Own computations based on BDMORES database and Spanish Regional Accounts

**Figure 83: Cumulative abnormal contributions to regional productivity during expansions: País**

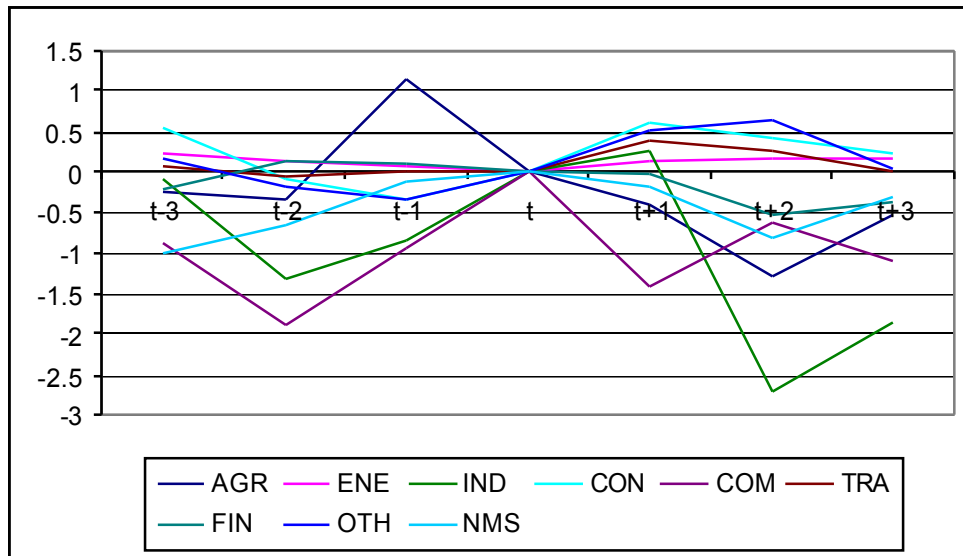
**Vasco**



Note: Average results for the 1984-1991 and 1993-2008 expansions, normalized to zero at the cycle through.

Source: Own computations based on BDMORES database and Spanish Regional Accounts

**Figure 84: Cumulative abnormal contributions to regional productivity during expansions: Rioja**



Note: Average results for the 1984-1991 and 1993-2008 expansions, normalized to zero at the cycle through.

Source: Own computations based on BDMORES database and Spanish Regional Accounts

#### **4. Concluding remarks**

This paper has attempted to shed light on what branches of production can be the basis for a new production model of the Spanish economy to overcome the weaknesses in the present, making special emphasis in services. To this end, the behavior of productivity during expansions will be analyzed for twenty production branches by applying the methodology proposed by Leamer (2008), based on the decomposition of contributions to the growth of the productivity of each of these branches in "normal" and "outstanding".

The results will identify production branches that have contributed to the weakening of productivity during recessions as well as those that have created an important stimulus to productivity during expansions.

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