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Female's education, wage up, demographic transition and econòmic growth: Methodological notes from the catalan case (1900-2020)

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FEMALE'S EDUCATION, WAGE GAP, DEMOGRAPHIC TRANSITION AND ECONOMIC GROWTH: METHODOLOGICAL NOTES FROM THE CATALAN CASE (1900-2020)[1].

ABSTRACT:

In this paper we account for the early demographic transition of Catalonia and impact on population ageing and productivity levels. Female vocational training and female real wage increase during the first third of the 20th century, high female participation levels in the workforce and the influence of libertarian practices of fertility control seem to be the main reasons of low fertility levels (below replacement) during the first third of the 20th century. The sustained low fertility trend has resulted in a high dependency ratio during the first decades of the 21st century caused in turn by longevity The high proportion of dependents on population has as a result the small adequacy of GDP per capita to measure the evolution of productivity levels during the 21st century.

Keywords: fertility, gender gap, longevity, economic growth

JEL CODES: A11,A12,I15,J11,N3

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1. SOME INSIGHTS ON THE CATALAN DEMOGRAPHIC TRANSITION.

Catalonia has been a first comer regarding the demographic transition. We have documented (Baizan, Camps: 2007) that the main reason behind this fact was not the diminution of mortality levels (Cabré: 1999) but women's vocational training, the increase of female real wages and as a result the diminution of fertility levels during the first third of the 20th century (Camps:2004, Llonch:2008, Garcia Balaña:2002, Vilar:2004). During the 1920s Catalan fertility diminished below replacement (Cabré:1999) not only because of economic reasons, but also because of the influence of the libertarian anarchist movement of the period that was promoting neo-Malthusian reproductive patterns and women's pregnancies strikes – "vagues de ventres"- (Masjoan, 2000). All of these rise the hypotheses that the reasons why the process of fertility reduction was higher in Catalonia than in other Spanish and European regions can be found in the more pronounced trend of female real wages to increase and the higher affiliation and influence of the anarchist movement (Cuco Giner, 1970). Even contemporary demographers such as Josep A. Vandellos (1935), a follower of Corrado Gini, was arguing that the low levels of Catalan natural demographic increase were causing the arrival of migrants form the rest of Spain with higher fertility levels and that this fact would cause the extinction of the Catalan "race" ethnically conceived. Decades latter Anna Cabré (1999) proved that migrants had higher fertility rates but second-generation migrants adopted the Catalan fertility pattern and that therefore Vandellos concern on the extinction of the Catalan race was a misleading idea.

The reasons behind the increase of female labor participation levels of the period are not totally clear but they obey to a mix of factors such as:

1. higher docility of women and children on the work place and lower levels of affiliation in trade unions,
2. schooling for children and therefore higher balance costs/benefits of childbearing and childrearing that affected women's preferences

concerning child conception and education versus paid work (Camps, 2004; Borras-Llop, 2011),

3. technological change in domestic work and as a consequence higher availability of women to employ their time to paid work.

All of this represent a mix of supply and demand factors leading to higher female labor participation levels (Llonch: 2008, García-Balañà:2002, Vilar: 2004). Vocational training rather than formal education seems to be the main reason leading to female real wages steep trend to increase and to the diminution of the gendered wage gap. This last fact implies that the opportunity cost of child bearing and child rearing also increased and this together with mandatory schooling and the regulation/abolition of children's work led to the steep diminution of fertility levels (Camps:2004).

During the 19th century the size of the offspring was large but children were contributing to the family budget by means of their paid work from the age of 7. According to Borras Llop (2011) some of them had 1 year of schooling (from ages 6 to 7) but by 1900 more than half of the Catalan population was illiterate. Schooling, literacy and child education was a process that started during the 1920/30s initially affecting boys rather than girls (Gomez i Aznar,2019). It was not till later than girls and women started to receive formal education. Till then and from the start of the second industrial revolution manual vocational training in schools such as "Escola Industrial" ("Industrial School") addressed to specific human capital formation was the main apprenticeship system received by women.

The Francoist period after the civil war, induced some cohorts of baby boomers (cohorts 1950s 1960s). After overcoming the war defeat of Catalan republicans, family recovery and national Catholicism ideology of the francoist regime had outcomes on gender roles and fertility and the cohorts of 1950s and 1960s were more abundant. But already in the 1970s Catalan fertility rates started to be low again. This process of fertility reduction expands till nowadays, and Catalan fertility levels are currently very low, in 2020s 1,1/1,2 per couple. Female access to higher education, paid work and the diminution of the wage gender gap suggest again some of the reasons behind the diminution of fertility (see on the topic of the

relationship of the gender gap and fertility for the USA case the classical contribution by Claudia Goldin).

2. FURTHER DEMOGRAPHIC OUTCOMES OF A LOW FERTILITY REGIME IN CATALONIA.

In the Catalan case some of the consequences of low fertility regime have been:

a) Population ageing. A direct consequence of fertility levels below replacement is population ageing. In the absence of immigration flows of young cohorts, if fertility rates are below replacement this means that in the midterm the proportion of young adults in the active population is going to decrease and the proportion of retired baby boomer cohorts is going to increase. This leads to a process of population ageing in which the share of retired population progressively increases relative to employed and active population. This process can only be reversed by the inflow of young immigrant cohorts or over the long run by a new trend of fertility growth.

b) The final increase of dependency ratio. As we already stated in point a) fertility rates below replacement mean that young cohorts and active population diminish their weight on overall population while the proportion of retired population increase as a consequence of population ageing. This means that the proportion of dependent population and the dependent ratio increase.

As a consequence of a) and b) population natural growth is currently negative in Catalonia. During the last third of the 20th century the Catalan economy experienced some decades of demographic dividend when the

baby boomers attained the active working life and fertility rates were higher than mortality but after 2020 when the baby boomers retired a new period of high dependency began. The proportion of old people in the overall population has increased and this means that mortality rates are higher than fertility rates and population growth is only explained by immigration. All of these causes the need for immigration from poorer Southern countries in order to feed the demand for labor.

This has caused the segmentation of the labor market in a primary and a secondary sector, being the secondary labor market sector composed of migrants of low educational and productivity levels. Demography and population ageing do not seem to be the sole reason of this immigration flow. It is also caused by the path of specialization of the Catalan economy. The weight in the employment of low skilled labor in the construction and tourism sectors have been growing till recently, and it represents a large share of labor demand and even a major share of GDP growth during the first decades of the 21st century. A good example is the touristic town of Lloret de Mar on the Mediterranean seaside that currently represents the municipality with the lowest levels of GDP per capita of Catalonia. Precarious labor contracts, low wages, and repatriation of profits from tourism seem to be the reasons behind the aforementioned low levels of per capita income.

3. THE FINAL OUTCOMES OF THE CATALAN DEMOGRAPHIC REGIME ON PRODUCTIVITY MEASURES.

During the twenty first century productivity measured as GDP per capita has not been growing but we must bear in mind that an important share of population is increasingly retired because of population ageing and growing longevity (see figures). It was also a period of deep economic crisis such as the great recession or the Covid crisis. But population ageing erodes the ratio producers/consumers of the economy at the expenses of producers and leads to the increase of the dependency ratio. Note that by 2024-25 retired population of more than 65 represents around 30 per cent of active population aged 15-64. This high proportion of dependents caused by longevity together with high levels of unemployment in periods of crisis (also close to 30 per cent) have as a result the bad adequacy of per capita GDP to measure levels of productivity. Immigration of working

African population partially compensate the effects of population ageing on the dependency ratio but we already stated that this migration inflow is composed of a low productivity labor supply. It would be desirable that the offspring of this migrants had access to public education in order to increase productivity levels. But this last issue represents a new problem:

the struggle for public resources and spending to finance a growing sector of public human capital (health and education) services.

GDP per employed worker or per hour worked has been instead growing and is higher among natives and lower among immigrants because of the aforementioned reasons. Productivity per employee is higher in the services sector, followed by manufactures and agriculture at the bottom (see figure). As we know Sub Saharan migrants are mostly employed in agriculture, the sector at lowest rank of productivity. This does not seem to be solely due to the lower levels of education of the newcomer population. It also caused by many factors that erode the value of the harvest: climate change and climate warming have affected the final volume and value of harvests. This means that because of exogenous factors productivity levels decrease both in value and physical terms and that not only migrants but also native peasants are confronting a critical economic situation.

At the overall aggregate level, the elasticity of GDP per capita increase with respect to population is negative since we already stated that population growth is mostly composed of the elderly or unskilled immigrant workers (see the TABLE).

CONCLUSION:

In this paper we check and prove the impacts of demographic variables on the measurement of economic growth. Particularly we prove the lack of adequacy of measures such as GDP per capita to account for the evolution of the productivity of the Catalan economy. Because of its early demographic transition Catalonia exhibits high levels of dependency ratio (close to 30% in the recent years) in the 21st century that together with high levels of unemployment in periods of economic crisis distorted the results of GDP per capita as the measure currently used to account for the evolution of productivity of an economy. More care should be paid to stress the value of more accurate variables such as GDP per employee or GDP per hour worked even if we understand the GDP per capita is a good approximation to average levels of living standards of an economy. Nonetheless, and regarding to living standards, we must bear in mind that in recent years income inequality has been growing because of the increase of the heterogeneity of the age, origins and qualification composition of working population.

The early development of industry of the Catalan economy and by the first third of the 20th century the higher presence of the anarchist movement and higher female real wages and female labor participation levels seem to be the main reasons for the early Catalan demographic transition and fertility reduction below replacement that led to population ageing in the mid and long run. On the other hand, the higher trend of female real wages to increase and higher exposure of working population to the anarchist movement promoting neo-Malthusian reproductive patterns seem to explain why the trend of fertility decline is more pronounced in Catalonia than in other Spanish or European regions. The sustained trend of fertility reduction till the current very low levels poses further questions on the impact of gender equality and demography for the economic performance. Of course, longevity explains part of the history of the high levels of dependency of the economy but current low fertility poses the question of the sustainability of a new demographic and economic system

in which retired old people represent a growing proportion of total population while working active population producing wealth decreases proportionally. All of these topics deserve more research and we are looking after developing them in the forthcoming future.

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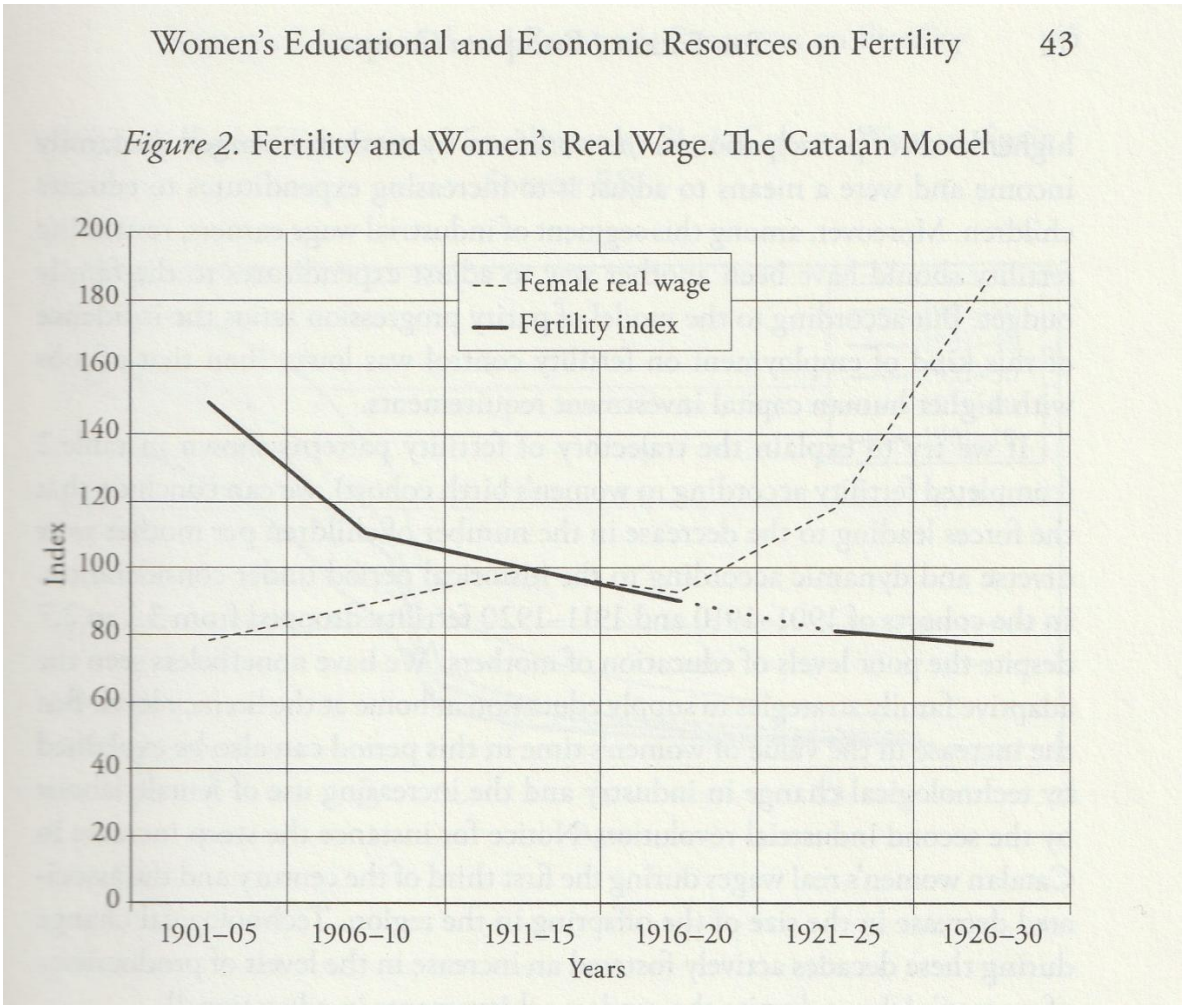
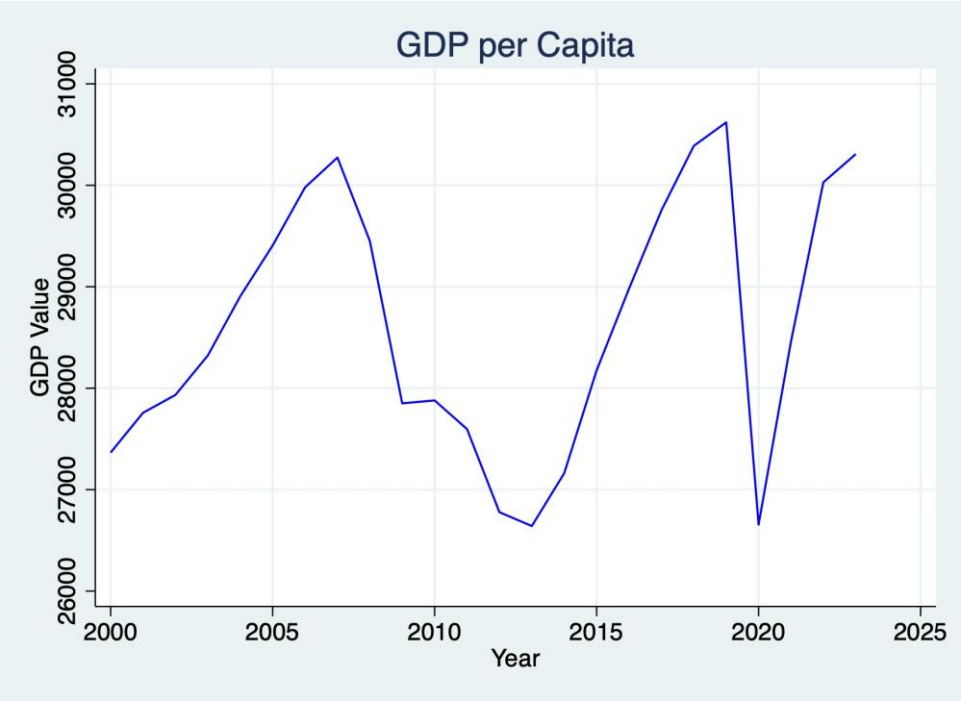
FIGURE 1



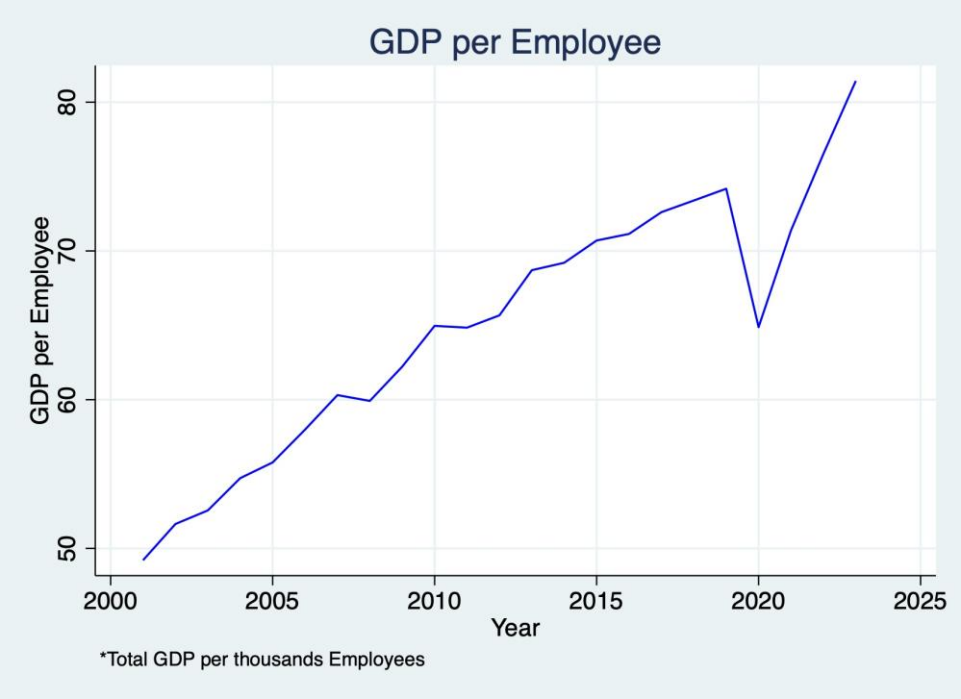
Source: Camps (2007)

FIGURE 2: CATALAN REAL GDP PER CAPITA IN THE EURO ERA



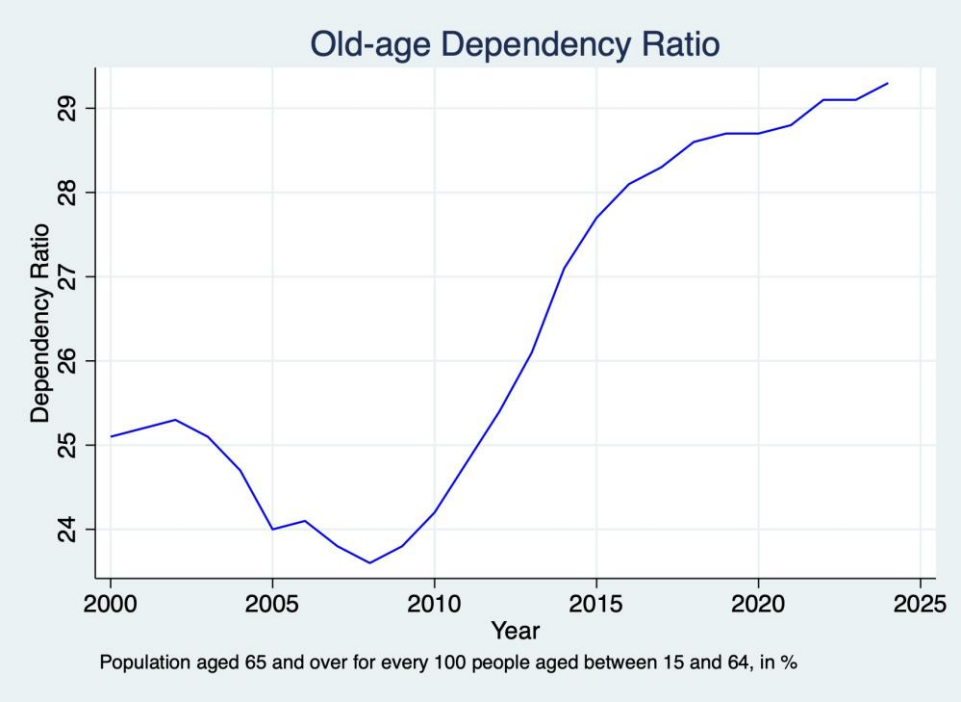
Source: Idescat (online)

FIGURE 3: CATALAN REAL GDP PER EMPLOYEE IN THE EURO ERA



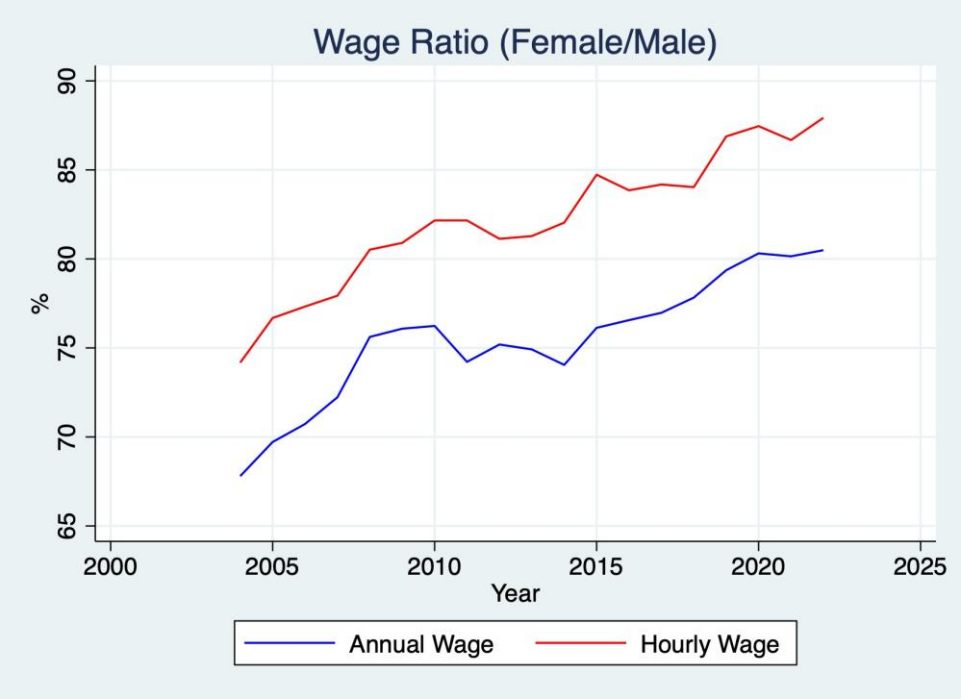
Source: Idescat (online)

FIGURE 4: CATALAN OLD AGE DEPÈNDENCY RATIO, 2000-2025



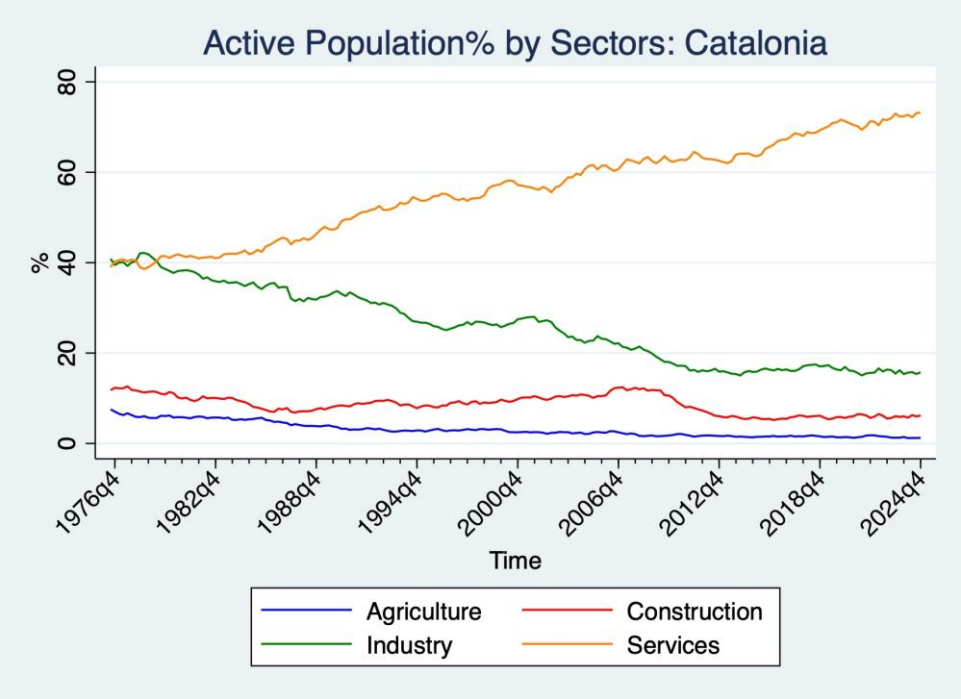
Source: Idescat (online)

FIGURE 5: CATALAN WAGE GENDER GAP (ANNUAL AND HOURLY)



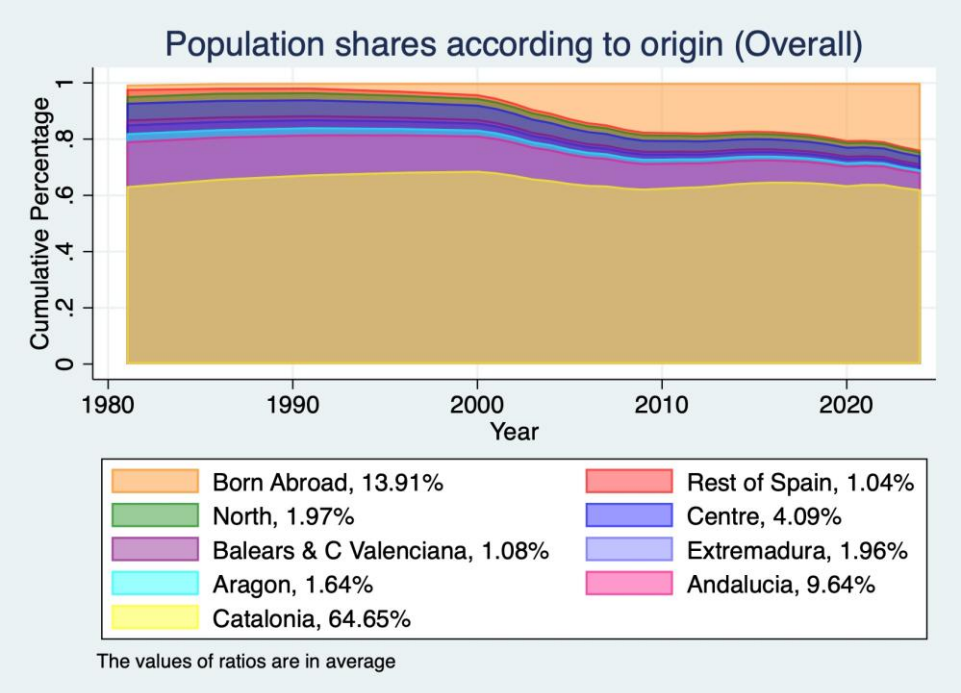
Source: EPA and Idescat (online)

FIGURE 6: CATALAN ACTIVE POPULATION BY SECTOR



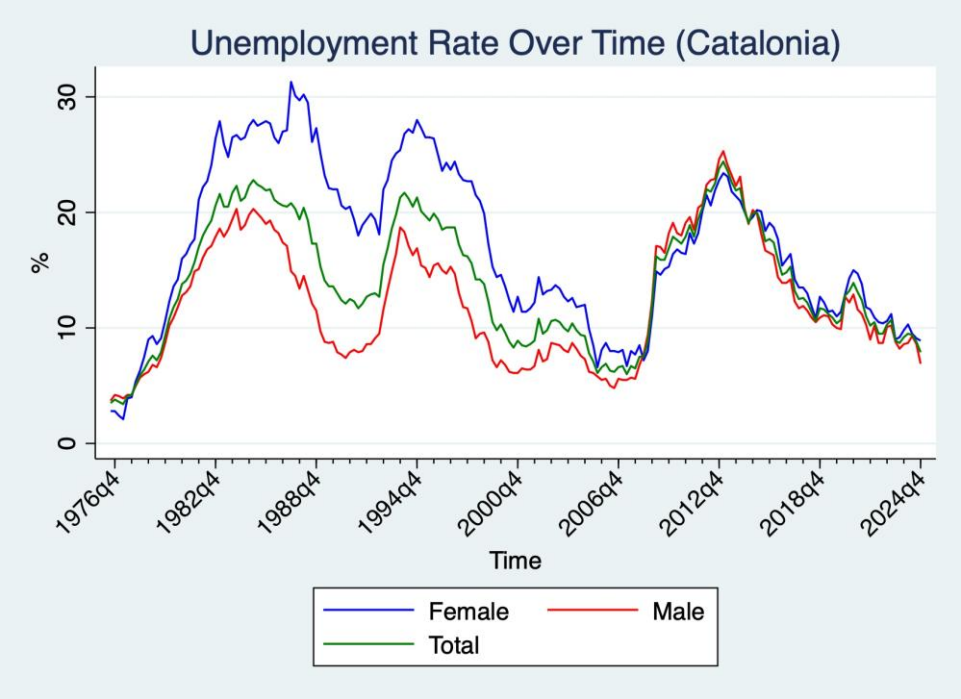
Source: EPA (1976-2024)

FIGURE 7: GEOGRPAHICAL ORIGINS OF CATALAN POPULATION



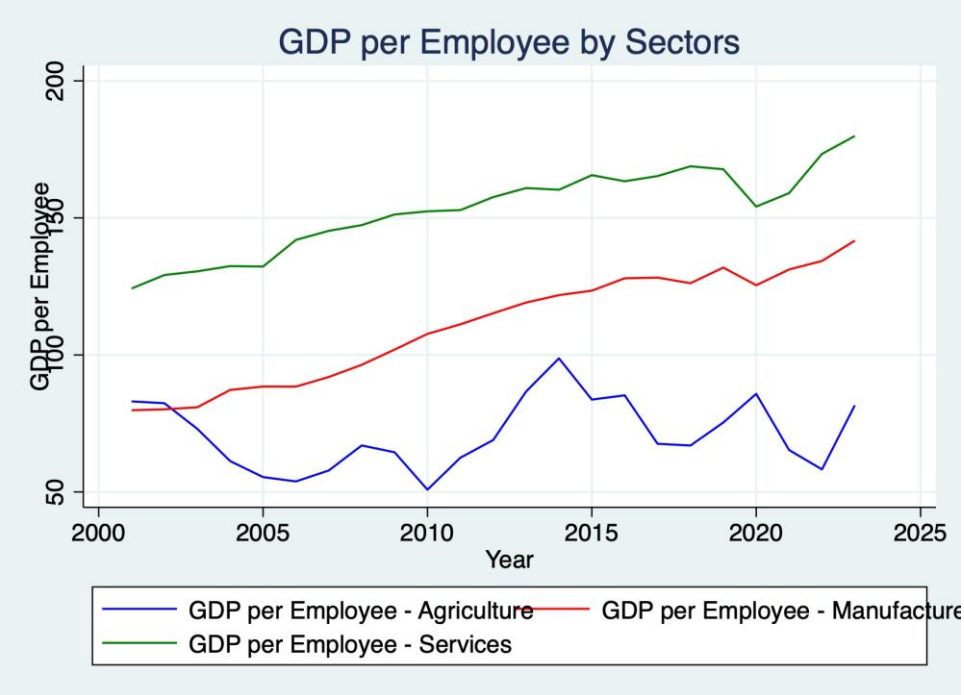
Source: Anuario Estadístico (1980-2024)

FIGURE 8: CATALAN UNEMPLOYMENT RATES (1976-2024)



Source: EPA (1976-2024)

FIGURE 9. GDP PER EMPLOYEE BY SECTORS OF ACTIVITY



Source: Idescat (online)

TABLE 1. IV REGRESSION ANALYSIS POPULATION GROWTH IMPACT ON THE ECONOMY. WORLD WIDE SAMPLE, 1960-2220

	Log(GDP per capita) (IV)	Log(Price) (IV)
Log(Population)	-1.4533^{***}	5.4367^{***}
	(0.2025)	(0.909)
CO_2 per capita	0.1315^{***}	-0.1365^{***}
	(0.008)	(0.032)
Gini Coefficient	0.0070	0.046^{***}
	(0.0035)	(0.017)
Gender Equality Index	-0.0129^{***}	0.0525^{***}
	(0.002)	(0.015)
Religious Freedom Index	0.0051^{***}	-0.0109^{*}
	(0.001)	(0.006)
First Stage: Log(Population)	-0.0043^{***}	-0.0045^{***}
Tertiary gross enrolment rate (%)	(0.0004)	(0.0004)
Country FE	Y	Y
Time FE	Y	Y

Kleibergen-Paap rk Wald F statistic	134.406	126.189
Observations	1160	1107
# countries	28	27

Source: Camps(2024)