Regional Variations in the Severity of the Great Depression in France

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Abstract

In France, regional incomes, proxied through taxable industrial and commercial profits and sales tax receipts, converged during the Depression years and diverged afterwards. We try to assess the importance of sectoral specialization in these movements. The more industrial departements, especially those highly specialized in textile and mechanical goods, experienced higher declines in profits as well as in transactions. After 1935, favorable specializations, such as mechanics, construction, textile and mining, explain the income divergence. Once the differences in specialization are accounted for, we find no evidence of spatial effects.

Introduction

Many studies have compared economic performances during the Depression accross countries, stressing the importance of the gold standard in the diffusion of the crisis (Bernanke, 1995). By comparison, very few studies have investigated the regional effects of the contraction, except for the U.S., where the 1930s was a decade of regional divergence, breaking the pattern of general income convergence between states (Barro and Sala-i Martin, 2004). However, there are many ways a disaggregated approach can help us understand better the mechanisms of the Depression.

In France the productive system of the interwar period is traditionnally depicted as dual, with two types of sectors that reacted differently to the crisis. Consumer goods such as textile or cars were more hardly hit than electricity, metallurgy, mechanical constructions or chemicals. In the line of Sauvy (1967), this performance differential has long been attributed to exposure

to international competition, but authors such as Eichengreen and Wyplosz (1988) have also stressed that rather than between exposed and protected industries, the general opposition was between consumer-goods and investment-goods, the latter performing well relatively to the former. Pierre Villa (1996) showed that if precocious recession among France's principal trade competitors hindered the exportations, they were balanced by rapid growth of domestic demand, because of public subsidization of housing and productive investment linked to reconstruction.

We show that those differences of performance accross sectors are reflected in regional growth differences. The fact that the more industrial departments were those specialized in textile and mechanical goods production explains part of the regional convergence that occured between 1929 and 1935. This contrasts with the American situation, where the poorest states were those with the more defavorable industrial specialization during the crisis. As shown by Rosenbloom and Sundstrom (1999), who used employement data at the state level, in the U.S., regions that produced durable goods and inputs to construction were more severely hit by the crisis that regions that had a specialization in services or nondurables manufacturing. Theses differences in industrial composition, added to the regional differences in employment trends preexisting the Depression, explain much of the regional differences in the severity of the crisis across states. Garett and Wheelock (2006) used per capita incomes rather than employment data, but as Rosembloom and Sundstrom, they showed that states that entered the Depression with relatively low per capita incomes tended to suffer larger percentage declines in per capita income than did high income states, because their activity was concentrated in agriculture, mining and construction, sectors that were particularly serverly hit at the national level.

We follow these approaches in showing that differences in specialization help explain differences in regional growth rates during the French Depression. In the remainder of this article, we present the data used to proxy regionally disaggregated incomes, describe the patterns of regional growth and finally present our results on regional convergence cross-section regressions and the role of industrial specialization.

Data

In order to analyse economic movements, we use two types of disaggregated fiscal data. Fiscal data allows us to construct approximations of regional incomes in order to characterize the regional convergence phenomenon that took place in France during the Depression. We base

ourselves on two fiscal sources available at the departement level: the industrial and commercial profits declared for the income tax and the amount of turnover tax collected by the *Contibutions indirectes*.

Both taxes had a very large base. The tax on industrial and commercial profits (*Bénéfices industriels et commerciaux* or BIC) represented between 69% and 80% of all the schedular taxes[1] collected by the direct tax administration[2]. Contrary to wages whose tax base was limited to the top of the distribution, nearly all industrial and commercial profits were liable to the income tax[3]. There were no basic allowance or family deductions. However, since the tax paid the previous year was deductible from the taxable income, we added to the amount of profits declared the tax paid in the previous year[4].

The sales tax (*Taxe sur le chiffre d'affaires* or TCA) had even a larger base than the profits tax. Almost every transaction, with the exception of basic agricultural goods, was hit by the turnover tax. The data available at the department level are the receipts of the tax collected by the indirect tax administration (*Contributions indirectes*), available in the *Bulletin de statistique et de législation comparée*, published by the Ministry of Finance. This series, contrary to the BIC series which uses the tax base, is directly dependent on the rate of the tax. Initially of 1.1% on all transactions, the sales tax rate was first rised by 20% in 1924 and then set at 2% from 1926 until 1937, when it was transformed into a production tax at the rate of 6%[5]. The TCA series has the advantage over the BIC series of being almost unaffected by legislation changes between 1927 and 1937. It is not, however, exploitable before 1926. Indeed, the sales tax, established on 25 June 1920, was initially collected by three different administrations. The *Contributions indirectes*, were at first only in charge of the tax in towns of less than 5000 inhabitants and in firms that they already monitored (that is buisnesses liable for duties on alcohol, tobacco, coffee, benzol, etc.), whereas the *Enregistrement* taxed industries located in cities with over 5000 inhabitants and corporations, and customs were in charge of imported and exported goods. It is only after 1925, that the perception of the turnover tax was rationalized. The *Contributions*

[1]The French income tax defined by the laws of 15th July 1914 and 31th July 1917, taxed incomes first according to their origin (salaries, profits, securities income) by separate schedular taxes and then aggregated them and taxed them as a whole by a general progressive income tax above a certain level.

[2] The income tax on securities income was collected by the registration administration (*Enregistrement*).

[3]Piketty (2001) illustrates this difference in treatment between wage earners and small storekeepers by calculating that in the early 1920s, a storekeeper with earnings equal to two average incomes had to pay the equivalent of one month of profits in taxes, while an executive earning the exact same amount as wages would not pay any tax.

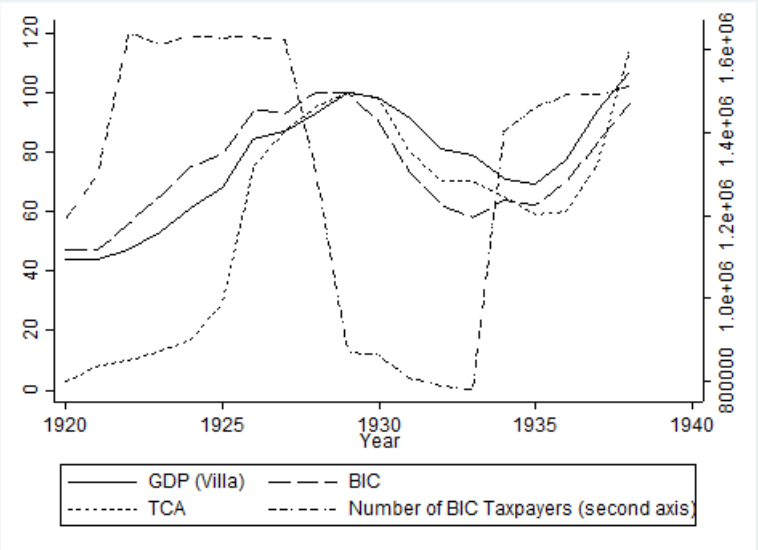
[4]Both the amount of taxable income at the departemental level and of the tax collected come from the *Renseignements statistiques relatifs aux contributions directes*, a yearly publication of the Ministry of Finance.

[5]See Annex 2 for a time line of changes in legislation.

indirectes became in charge of all almost all TCA affairs[6]. Both the rise in rates and the administrative reorganization explain the huge jump in our series between 1925 and 1926 (see Figure 1).

Figure 1, shows the evolution of our aggregated BIC and TCA series. Both follows a trend very similar to Villa's (1994) GDP. During the twenties and the late thirties the match is almost perfect for BIC and GDP. The TCA series follows more accurately the GDP series than the BIC series between 1932 and 1937. During the early years of the thirties, both BIC and TCA experienced a more important decline than the GDP, but profits deteriorated more than sales tax receipts. This was to be expected since profits tend to have a greater short-run elasticity than sales, even if they have approximately the same long-run elasticity (Sobel and Holcombe, 1996). The drop started also earlier: in 1929 for BIC and in 1930 for TCA.

Figure 1: BIC, TCA and GDP (1929=100)



The comparison of our two series with GDP highlights some temporary discrepancies that may be attributed to important reforms that affected the tax base (see Annex 1 and 2 for a complete timeline of legislation changes). Between 1934 and 1935, the BIC increased whereas the GDP declined. This corresponds to the moment when shopkeepers and industrials exploiting their firms only by themselves or with the help of family members (wife, non-married children, etc.) or one employee and making annual income under 5 000 F, that had been excluded from the tax base in 1930 (income of 1929), were reintegrated. They represented half the BIC taxpayers

[6]Banking activities remained the competence of the *Enregistrement*, whereas Customs continued to perceive the tax on imported goods.

but only around 10% of the BIC declared. Nonetheless, since their importance in the taxbase may have greatly varied geographically, we have excluded this reform year from our analysis. For TCA, we have excluded the 1937 year, because the transformation of the turnover tax into a production tax, suppressing the cascade effects of the tax, may have had different impacts according to the degree of integration of industries in the different departments.

Once the effects of these major reforms are accounted for, both our BIC and TCA series evolve, at the aggregate level, for the late 1920s and the 1930s, in line with GDP figures. We are thus confident with their ability to proxy GDP at the disaggregated level.

Regional variations

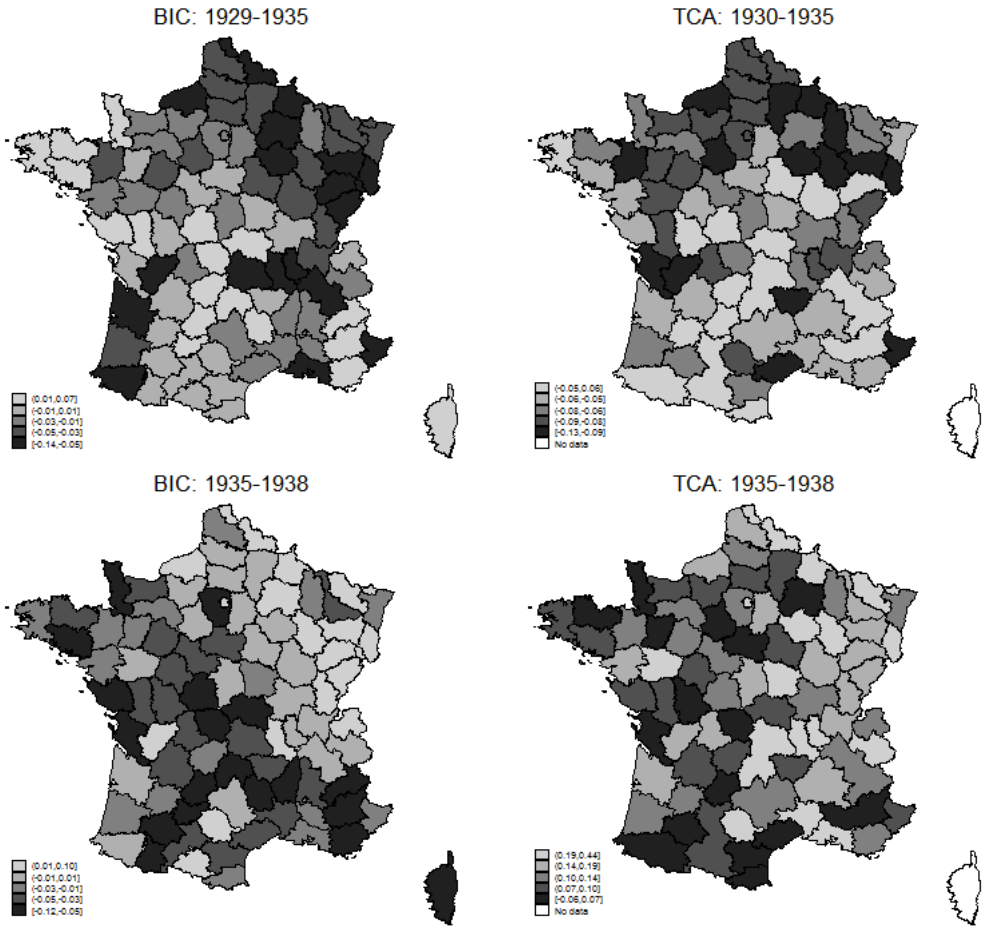
Figure 5 shows the industrial profits and the sales tax receipts in six broad regions[7], normalized to 100 at the beginning of the crisis. It reveals regional variations in timing as well as in intensity. Figure 5a and 5b show that the more industrialized regions - North-East, South-East and Ile-de-France, experienced more important losses than the Center, the North-West and the South-West, whith respect to industrial profits as well as sales tax receipts, after 1929. Industrial profits were there in 1933 between 50 and 60 per cent of their 1929 level, against 70 per cent in the North-West, South-West and Center regions. The decline in sales tax receipts amounted to 20% between 1929 and 1932 for the North-East, South-East and Ile-de-France regions, and to only 10% for the western regions.

Ile-de-France was the place where profits had increased the most during the twenties, and it was the region that experienced the sharpest downturn between 1929 and 1935. There, the decline in profits began only in 1929, that is one year after the rest of France. Besides, whereas in most regions the trough was in 1933, industrial profits continued to decline there until 1935. Since up to 46% of all profits were collected in Ile-de-France, this specific pattern influences strongly the aggregate figures (cf. Figure 1).

Figure 2 maps the BIC and TCA growth rates between 1929 and 1935 and between 1935 and 1938. The more industrial departments were particularly affected by the decline in industrial profits : the North-East (Vosges, Haut-Rhin, Belfort, Haute-Saône, Doubs, Marne, Aube and Nord), the Seine and the Lyon area (Puy-de-Dôme, Loire, Rhône, Isère and Ain). Rural de-

[7]North-East: Picardie, Champagne-Ardenne, Franche-Comté, Lorraine, Nord-Pas-de-Calais, Alsace; North-West: Basse-Normandie, Haute-Normandie, Bretagne, Pays-de-la-Loire; Center: Auvergne, Centre, Limousin, Bourgogne; South-West: Midi-Pyrénées, Languedoc-Roussillon, Poitou-Charentes, Aquitaine; South-East: Rhône-Alpes, Provence-Alpes-Côte-d'Azur; Île-de-France.

Figure 2: Annual Percentage Change in Per Capita Industrial Profits and Sales Tax Receipts (1929-1938)



partments, such as Creuse, Corse, Morbihan, Basses-Alpes, Lot and Lozère were places where industrial profits did not decline between 1929 and 1935. They also had the highest sales tax receipts growth rates. Starting 1935, this overall pattern was reversed, the faster-growing economies being then the industrialized ones.

Profit fell more where they were higher but also where they were more concentrated. We do not have data on the repartion of profits by level by department, by we can approach that with the amount of general income tax collected. The general income tax fell mostly on industrial and commercial incomes and was progressive. Thus, where big profits constituted a higher share of all profits declared, general income tax receipts were higher. The fifteen departments that had the highest contribution to the general income tax relative to their population are depicted in red in Figure 3. They are those where profits declined the most between 1929 and 1935 and

with the largest difference between BIC growth and TCA growth. This suggests that profits of big firms tend to be more volatile in time of economic contraction.

Overall, the Depression contributed to a greater equalization of the levels of industrial profits across departments. It led to a reduction in the dispersion of per capita BIC and TCA levels, as is shown in Figure 4, which reports the evolution of cross-sectional standard deviations of log of industrial profits and sales tax receipts. After 1934 and 1935, TCA and BIC levels respectively became more disperse, but the level of dispersion that had prevailed in the 1920s was not reached again before the Second World War.

In general, departments tended to have similar growth experiences than their neighbors. Measures of spatial association reveal clustered growth rates. We tested for spatial autocorrelation using local Moran's I statistic and a row standardized inverse distance weighting matrix W, distances being computed by using the latitude and longitude coordinates of the center of each department.

The local Moran's I is defined as follows:

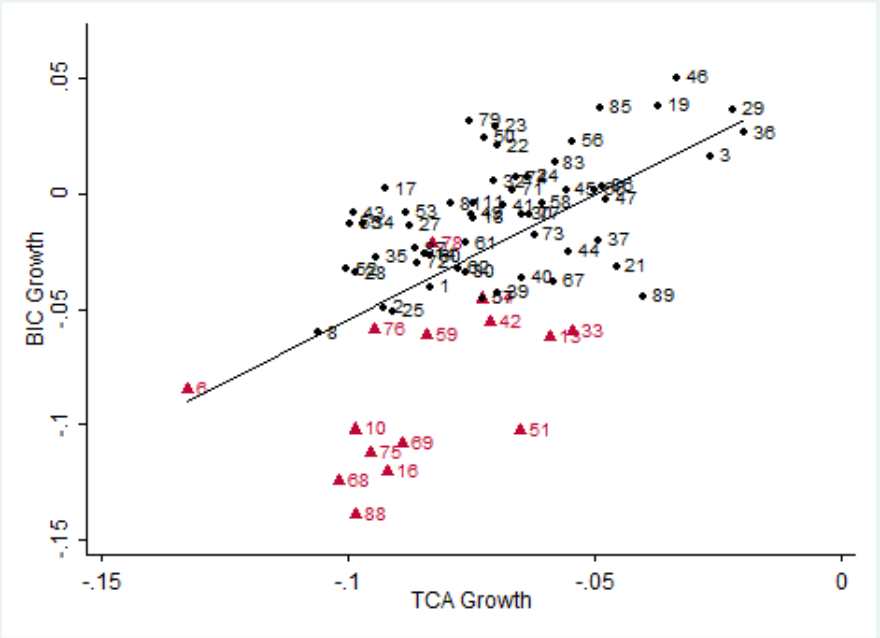
$$I_i = \frac{z_i \sum_j w_{ij} z_j}{\sum_j z_j^2}$$

where w_{ij} is an element of the row-standardized weights matrix W and z_i and z_j are the standardized variables under consideration.

A large positive I_i value indicates that the value in the i-th location is similar to the values in the neighboring locations, whereas large negative I_i values indicate that the values in the i-th location is the opposite sign to those of its neighbours. We reported on Figure 6 only the places where the I_i value was significant at the 10% level. The departments where the standardized value as well as the spatially lagged variable is positive (High-High) are represented in bright red. These are departements of relatively high growth, surrounded by similar neighbors. Conversely, departements where growth is low, in a depressed neighborood (Low-Low) are represented in bright blue. Where the department experienced high growth but there is negative spatial autocorrelation (High-Low) it is represented in light red, whereas are depicted in light

Figure 3: BIC and TCA growth 1929-1938

(a) 1929-1935



(b) 1935-1938

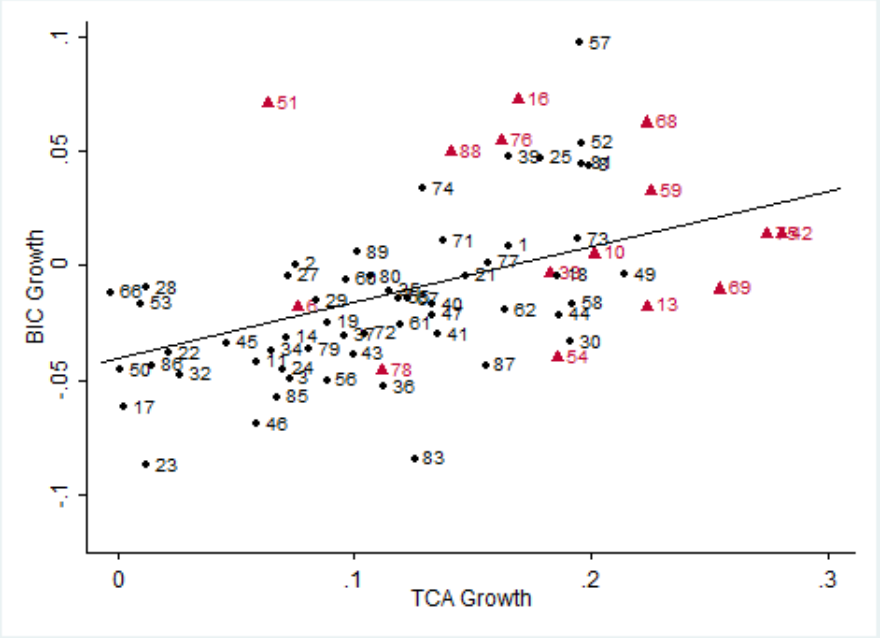


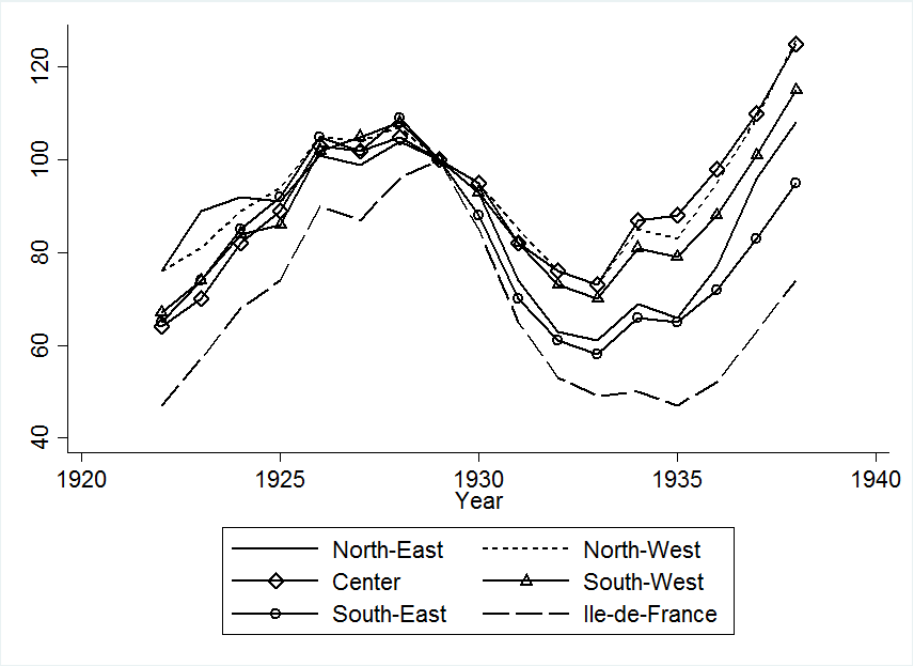
Figure 4: Standard deviation of the logarithm of BIC and TCA per capita

(a) BIC

(b) TCA

Figure 5: Regional indexes of industrial profits and sales tax receipts

(a) Index of Per Capita Industrial Profits (1929=100)



(b) Index of Per Capita Sales Tax Receipts (1930=100)

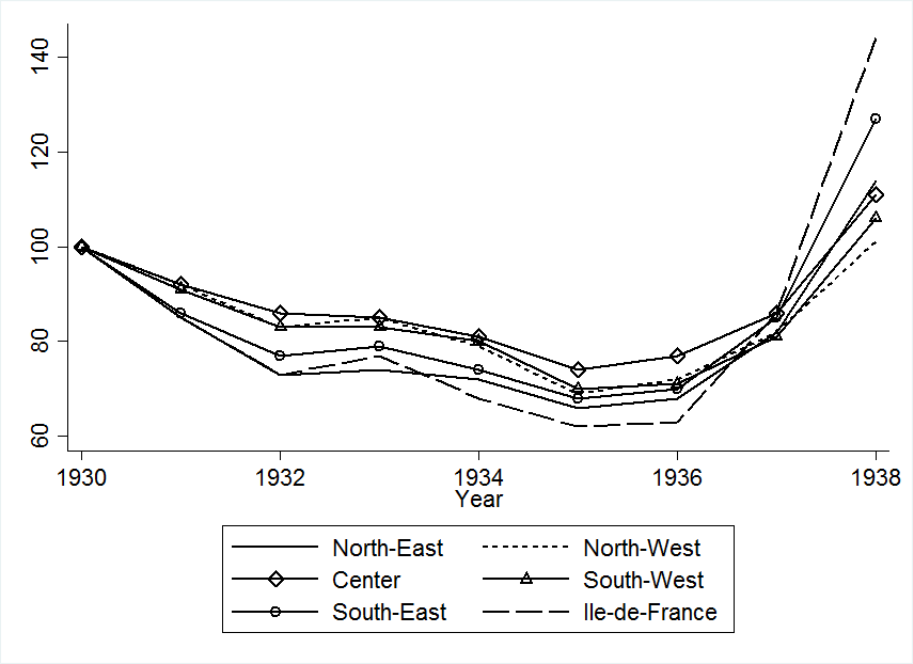
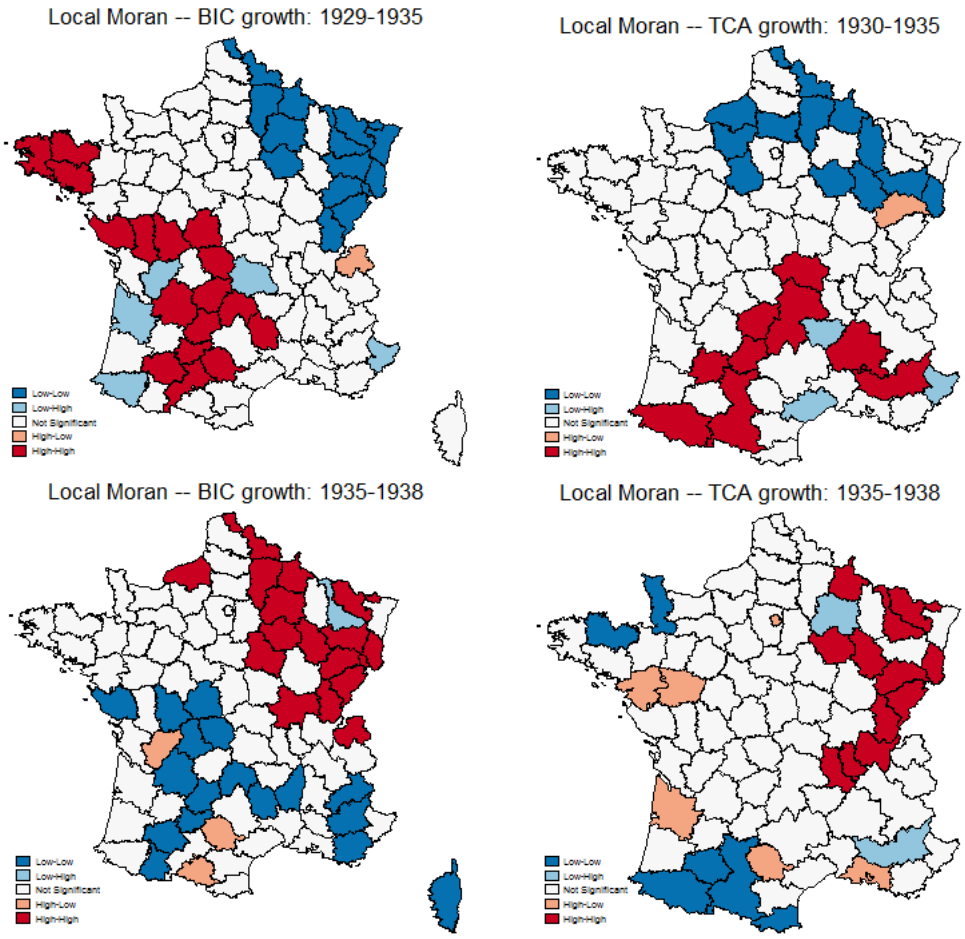


Figure 6: Local Moran's I (1929-1938)



blue Low-High patterns: the location has a low value among neighbours that have high values for the standardized data.

From the point of view of profits, two clusters of industrial departments in the North-East had low growth between 1929 and 1935 and relatively high profits growth afterwards: Nord, Aisne, Ardennes, Marne, Aube on the one hand, Meurthe-et-Moselle (an outlier after 1935), Moselle, Bas-Rhin, Haut-Rhin, Haute-Saône, Belfort, Doubs, Jura on the other hand. Conversely, the West is characterized by a cluster of departments with relatively high profits growth between 1929 and 1935 but low afterwards in, with significant outliers : Charente, Gironde, Pyrénées-Atlantique and Puy-de-Dôme, that is departments with relatively high levels of industrial profits per capita.

Clustered growth rates can have many explanations. They could simply reflect spatially clustered

levels of income. They could also result from geographically similar industrial specializations, in which case aggregate sector-specific shocks can have geographical consequences. In this perspective, the geographical clustering of profits growth rates may be the simple reflection of the fact that the crisis hit the different industrial branches with various intensities. They could be also due to the presence of spatial spillovers if industries have a vendor/sellor relationship accross departement boundaries, or benefit from neighbouring markets. To explore these hypothesis, the next section presents results of cross-section regressions of growth rates on initial levels of per capita income, with controls for sectoral composition and tests for the presence of spatial spillovers. It appears that industrial specialization, measured via factor analysis or via a composition index, accounts for most of the convergence and divergence of incomes that occured during the 1930s.

Methodology and empirical results

We base ourselves on the basic β-convergence model developped by Barro and Sala-i Martin (2004) to estimate the sources of regional convergence. The standard specification of β-convergence is expressed as follows:

$$log\left[\left(y_{it}/y_{i,t-T}\right)/T\right] = \alpha - \left[\left(1-e^{-\beta T}\right)/T\right] \cdot log\left(y_{i,t-T}\right) + \gamma.xi, t + u_{i,t}$$

where y_{it} denotes per capita income in the department i at time t and x_{it} a set of control variables. α represents the intercept and u_{it} errors for the different departments that are supposed to be independent. $\lambda = -(1-e^{-\beta T})/T$ is the convergence coefficient. This coefficient is estimated using OLS regression. If $\lambda < 0$, there is a negative correlation between initial per capita income and the growth in per capita income over period *T:* relatively poor regions tend to grow faster than rich ones, resulting in a catching-up process. For the U.S. states, the convergence speed was estimated to be around 2% per year. Barro and Sala-i-Martin (2004) have estimated a lower coefficient, around 1%, for 21 French regions between 1950 and 1990. For the period preceeding the First World War, the speed of convergence between French departments has been estimated to be even lower, around 0.8%(Bazot, 2014). For the interwar, it appears that if there was convergence, this was entirely due to the Depression years.

Table 1 reports the regression estimates for the unconditional convergence equations. Each regression has a specification with six regional dummies. Both BIC and the TCA equations

Table 1: Unconditional convergence

(a) BIC

	(1) BIC: 1929-1935	(2) BIC: 1929-1935	(3) BIC: 1935-1938	(4) BIC: 1935-1938
Per Capita Income	-0.060***	-0.060***	0.043***	0.036***
	(0.00)	(0.01)	(0.01)	(0.01)
Constant	0.344***	0.347***	-0.283***	-0.258***
	(0.03)	(0.03)	(0.07)	(0.08)
Regional dummies	No	Yes	No	Yes
R-squared	0.680	0.709	0.149	0.349
N	90	90	90	90

* p<0.10, ** p<0.05, *** p<0.01

(b) TCA

	(1) TCA: 1930-1935	(2) TCA: 1930-1935	(3) TCA: 1935-1938	(4) TCA: 1935-1938
Per Capita Income	-0.017***	-0.015**	0.087***	0.081***
	(0.01)	(0.01)	(0.01)	(0.02)
Constant	0.005	0.014	-0.247***	-0.206**
	(0.02)	(0.03)	(0.06)	(0.08)
Regional dummies	No	Yes	No	Yes
R-squared	0.114	0.181	0.327	0.369
N	80	80	80	80

* p<0.10, ** p<0.05, *** p<0.01

confirm a movement of convergence during the crisis and of divergence afterwards[8].

Adding controls for sectoral composition helps explaining most of these movements. We controlled for the impact of sectoral composition in two ways. The first is based on factor analysis. The second is based on the construction of an index of industrial composition. Both yield similar results.

Factor analysis

To control for sectoral effects, we used data on the share of active population of each department employed in 14 different sectors[9], derived from the 1926 census [10]. We grouped these 14 explanatory variables into three factors, using principal factor analysis and Quartimax rotation.

The creation of principal factors is necessary because the sector variables are highly correlated

[8]We tried also specifications excluding Paris and its region, but the results were not significantly affected.

[9]Agriculture, Mining, Food, Chemicals, Rubber and Paper, Textile, Construction, Metallurgy, Mechanics, Retail and Wholesale Trade, Banking and Insurance, Transportation, Services and Other Industries.

[10]Censuses were conducted every five years, in 1921, 1926, 1931 and 1936 for the interwar.

Table 2: Rotated factor loadings and unique variances

Variable	Factor1	Factor2	Factor3	Uniqueness
agriculture	-0.84	-0.31	-0.42	0.02
mining	0.02	0.80	0.14	0.33
food	0.68	0.04	-0.26	0.46
chemicals	0.77	0.10	-0.19	0.37
rubber & paper	0.16	-0.13	0.37	0.82
textile	0.34	0.01	0.72	0.37
construction	0.62	0.21	0.02	0.58
metallurgy	0.11	0.82	-0.09	0.31
mechanics	0.42	0.07	0.61	0.44
trade	0.94	-0.07	0.00	0.11
finance	0.83	-0.09	0.21	0.27
transportation	0.80	0.20	-0.16	0.30
services	0.84	-0.20	-0.08	0.25
other	0.84	-0.12	0.24	0.23

with one another. For example, there is a 0.42 correlation coefficient between the share of active population employed in mining and and the share of active population employed in metallurgy. The share of active population employed in trade has a correlation of above 0.70 with the share of active population employed in chemicals, finance, or transportation.

The analysis produces 3 factors with an eingenvalue superior to one. Together, they explain 65% of cumulative variance and have all but food, rubber and construction communalities above 0.6. The loading on the rotated factors are displayed in Table 2.

Factor 1 opposes rural departments to urban ones, with high scores for specializations in trade, finance, transportation and services, that is an important tertiary sector. Factor 2 and Factor 3 distinguish two types of secondary sector specializations. Factor 2 is based on high loadings for mining and metallurgy, that is industry-oriented production, whereas Factor 3 contains high scores for textile and mechanics that is consumer goods industries.

When the three factors are added as controls in the convergence regressions, it appears that during the Depression years (1929-1935), profits growth was significantly lower in departments with a high specialization in textile and mechanics. After 1935, profits growth was higher in departments specialized in industrial activity, consumer as well as industry oriented. Those being the richest departments, it explains at least part of the divergence phenomenon of the late thirties. When factor scores are included in the regression, the λ coefficient, even if still positive, is no longer significant, as is shown in Table 3.

Index of industrial composition

Using factor analysis does not require any hypothesis on the activity of the various industrial sectors during the period under consideration. However, it is possible to refine the analysis if one has an idea of how well the various industrial sectors resisted during the Depression. Fiscal data does not allow to disaggregate industrial profits by sector, but one can proxy it using sectoral data at the national level. To do that, we used reports of the *Inspecteurs du travail* available from 1930. They concern all firms employing more than 100 people[11] on the workforce and hours worked, thus allowing to measure the evolution of levels of activity in 17 sectors[12]. Sectors most affected by a reduction in activity (the activity index fell by more than 4% between 1930 and 1935) were those related to construction (construction itself, as well as cement, lime, plaster and wood), textile, and mechanics (Table 4). Those sectors were also those with the higher growth of the index after 1935. Sectors typical of urban environments such as Insurance and Banking, Retail and Wholesale Trade, Edition and Food continued to have a diminishing activity after 1935.

To capture the impact of these sector-specific shocks, we constructed an index of industrial composition similar to the structure variable Barro and Sala-i Martin (2004) use in their analysis of convergence between U.S. states. The industrial composition index $S_{it}$is defined as:

$$S_{it} = \sum_{j=1}^{17} \omega_{ij,t-T} \left[log \left(y_{jt} / y_{j,t-T} \right) / T \right]$$

where $\omega_{ij,t-T}$ is the share of the active population in department i employed in sector j at time $t-T$ and y_{jt} is the national index of activity in sector j at time t. This structure variable is a prediction of how much income should grow if income in each sector grew at a similiar manner as activity at the national level.

We find evidence that differences in industrial specialisations contributed to the regional variations in growth observed through BIC and TCA. The more a department was specialized in

[11]The response rate was 43.5% (Penissat and Touchelay, 2009).

[12]Mining, Food, Chemicals, Rubber & Paper, Edition, Textile, Clothing, Leather, Wood, Metallurgy, Mechanics, Fine metals, Cement, lime & plaster , Manutention, Transportation, Retail & Wholesale Trade and Insurance & Banking.

Table 3: Conditional convergence with Factor Variables

(a) BIC

	(1) BIC: 1929-1935	(2) BIC: 1929-1935	(3) BIC: 1935-1938	(4) BIC: 1935-1938
Per Capita Income	-0.060***	-0.051***	0.005	0.006
	(0.01)	(0.01)	(0.02)	(0.02)
Scores for factor 1	0.004	-0.002	0.010	0.012*
	(0.00)	(0.01)	(0.01)	(0.01)
Scores for factor 2	-0.000	0.002	0.014***	0.012***
	(0.00)	(0.00)	(0.00)	(0.00)
Scores for factor 3	-0.008**	-0.009***	0.015***	0.012***
	(0.00)	(0.00)	(0.00)	(0.00)
Constant	0.345***	0.287***	-0.048	-0.074
	(0.06)	(0.06)	(0.12)	(0.11)
Regional dummies	No	Yes	No	Yes
R-squared	0.726	0.750	0.357	0.510
N	90	90	90	90

* p<0.10, ** p<0.05, *** p<0.01

(b) TCA

	(1) TCA: 1930-1935	(2) TCA: 1930-1935	(3) TCA: 1935-1938	(4) TCA: 1935-1938
Per Capita Income	0.002	0.006	0.035	0.038
	(0.01)	(0.01)	(0.03)	(0.03)
Scores for factor 1	-0.006	-0.007	0.013	0.013
	(0.01)	(0.01)	(0.01)	(0.01)
Scores for factor 2	-0.001	-0.001	0.015**	0.017**
	(0.00)	(0.00)	(0.01)	(0.01)
Scores for factor 3	-0.010**	-0.010**	0.029***	0.028***
	(0.00)	(0.00)	(0.01)	(0.01)
Constant	-0.082	-0.089	-0.029	-0.022
	(0.06)	(0.07)	(0.11)	(0.13)
Regional dummies	No	Yes	No	Yes
R-squared	0.198	0.237	0.417	0.453
N	80	80	80	80

* p<0.10, ** p<0.05, *** p<0.01

Table 4: Evolution of indexes of industrial activity in % (1930-1938)

	1930-1935	1935-1938
Cement, lime and plaster	-8.5%	11.7%
Wood	-7.9%	9.7%
Textile	-7.8%	8.0%
Mechanics	-7.6%	8.9%
Construction	-7.5%	9.1%
Manutention	-7.1%	7.8%
Mining	-7.0%	7.5%
Chemicals	-6.5%	6.8%
Fine metals	-6.3%	5.1%
Clothing	-6.1%	4.6%
Metallurgy	-5.9%	4.3%
Leather	-5.9%	2.9%
Transportation	-5.2%	2.7%
Rubber & Paper	-4.9%	2.5%
Retail and Wholesale Trade	-3.1%	-1.6%
Insurance and Banking	-3.0%	-0.5%
Edition	-2.3%	-3.6%
Food	-2.2%	-3.7%

Table 5: Conditional convergence with Composition Index

(a) BIC

	(1) BIC: 1929-1935	(2) BIC: 1929-1935	(3) BIC: 1935-1938	(4) BIC: 1935-1938
Per Capita Income	-0.045***	-0.049***	0.002	0.012
	(0.01)	(0.01)	(0.01)	(0.01)
Industrial Composition	0.918**	0.831*	2.414***	1.969***
	(0.40)	(0.49)	(0.47)	(0.56)
Constant	0.278***	0.296***	-0.076	-0.144*
	(0.04)	(0.04)	(0.07)	(0.08)
Regional dummies	No	Yes	No	Yes
R-squared	0.689	0.707	0.345	0.466
N	90	90	90	90

* p<0.10, ** p<0.05, *** p<0.01

(b) TCA

	(1) TCA: 1930-1935	(2) TCA: 1930-1935	(3) TCA: 1935-1938	(4) TCA: 1935-1938
Per Capita Income	-0.000	0.001	0.033	0.033
	(0.01)	(0.01)	(0.02)	(0.02)
Industrial Composition	0.907*	1.010*	3.395***	4.280***
	(0.53)	(0.60)	(1.00)	(1.14)
Constant	-0.047	-0.034	-0.101	-0.074
	(0.04)	(0.04)	(0.07)	(0.08)
Regional dummies	No	Yes	No	Yes
R-squared	0.144	0.222	0.390	0.457
N	80	80	80	80

* p<0.10, ** p<0.05, *** p<0.01

sectors that performed relatively better, the higher was its growth rate. Including the index of industrial composition as an explanatory variable in the regressions reduced the magnitude of the coefficient on the initial per capita income. If this coefficient remains positive for BIC for the contraction period, it is unsignificantly different from zero for TCA both before and after 1935. When controls for industrial composition are included, there is no evidence of the presence of spatial effects in the residuals, which would be the case if there were signifiant spatial spillovers. Both Moran's I and Lagrange multiplier tests on our models indicated no need for spatial lag or spatial error modelization.

Conclusion

Profits and economic activity fell considerably in France during the first half of the 1930s, but the extent to the crisis varied a lot regionally. Per capita incomes became less disperse during the Depression years and more disperse afterwards. Between 1929 and 1935, the industrial departments, mostly located in the North and the East, were hit harder by the contraction. Conversely, after 1935, most departments started to recover, and the recovery was faster in the richer and more industrial regions. Part of these movements are explained by differences in industrial specialization. During the contraction phase, departments with a higher degree of specialization in textile and mechanics had significantly lower growth rates. After 1935, those departments tended to grow faster, as well as those specialized in metallurgy and mining.

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Annex 1: Timeline of reforms for the Profits Tax

Year*	Definition of the tax base	Rate
1917	General regime: no exemption Special regimes - workers, craftman's widows, trolly man, fisherman: fraction of income below 1500 francs excempted.	4.5
1918	no change	4.5
1919	no change	4.5
1920	no change	8
1921	no change	8
1922	no change	8
1923	General regime: no change Special regimes - workers, craftman's widows, etc. transferred to the wages category	9.6
1924	General regime: no change Special regimes - special rules for calculating taxable income for insurance companies	14.4
1925	no change	9.6
1926	General regime: system of categories for income smaller than 50 000 francs (e.g. 10 to 800: pay 22.5; 801 to 1500, pay 45; etc.). The rate of 15% applies to income $>$ 50000. Special regimes: no change	15
1927	no change	15
1928	General regime: no change Special regimes - tax relief for storekeepers	15
1929	General regime: no change Special regimes - Tax exemption for storekeepers and industrials that exploit their firms only with the help of family members (wife, non-married children, etc) and whose income is $<$ 5000. Reduced tax liabilities for those with income $>$ 5000.	15
1930	no change	15
1931	no change	15
1932	no change	15
1933	General regime: no change Special regimes - increases in amounts due for very specific categories.	15

* The change in definitions were set in years $t+1$, but applied on the incomes of the previous year t. Source: *Bulletin Statistique du Ministère des Finances,* N. 3, 1947.

Year*	Definition of the tax base	Rate
1934	General regime: abolition of the system of categories introduced in 1927	
	Special regimes: abolition of specifities applied to insurance companies introduced in 1925; abolition of tax reliefs for storekeepers and entrepreneurs working only with the help of family members introduced resp. in 1929 and 1930. The tax reliefs are replaced by reduced rates.	12
1935	no change	12
1936	no change	12
1937	no change	14
1938	General regime: no change	
	Special regimes: further tax break for small storekeepers	16

* The change in definitions were set in years $t+1$, but applied on the incomes of the previous year t. Source: *Bulletin Statistique du Ministère des Finances,* N. 3, 1947.

Annex 2 : Timeline of reforms for the Sales Tax

Year	Normal rate	Reduced rate	Luxury rates	Alterations to the tax base : introduction of production taxes
1920	1.1		3 or 10	
1921	1.1		3 or 10	
1922	1.1		3 or 10	
1923	1.1		3 or 10	
1924	1.3		3.6 or 12	
1925	1.3		3.6 or 12	
1926	2	1.3		On coal and meat
1927	2			On tea, coffee and fertilizers
1928	2			On sugar
1929	2			On sulfur imports
1930	2			On wine, cider and resinous products
1931	2			
1932	2			On alcohol, liquors and fatty substances
1933	2			
1934	2			On beverages, food and pharmaceuticals
1935	2			
1936	2			On cars
1937	6	2		
1938	8	2		