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A Long-Run Case Study of Three Regions

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A Long-Run Case Study of Three Regions

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Abstract. We analyze the rise and decline of the steel and mining industries in the regions of Saarland, Lorraine und Luxemburg over a long period, from the mid-19th century to 2003. Our main focus in on the period of structural decline in these industries after the second world war. Differences in the institutional framework of these regions are exploited to analyze how the broader fiscal constitution sets incentives for governments to either obstruct or to encourage structural change in the private sector. Our main result is that fiscal autonomy of a region subjected to structural change in its private sector is associated with a relatively faster decline of employment in the sectors affected. Contrary to the political lore, fiscal transfers are not used to speed up the destruction of old sectors, but rather to stabilize incomes.

JEL-Classification: E63, E64, H77, H54.

Keywords: structural change; fiscal federalism; grants in aid; creative destruction.

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1. Introduction

Processes of creative destruction do not occur in a political vacuum. There is a vast literature on systems of innovation which has taken into account (see e.g. Freeman, 1995 and Metcalfe, 1995) the fact that innovative activities are influenced by the institutions that guide interactions between all those who participate in the process of innovation. These contributions are often concerned with the immediate effects of certain institutions and policies on innovative activities in the private sector, and they come to very important insights. One can, however, also push this approach a little further and ask which institutions of government lead to the adoption of policies that create a more or less friendly framework for innovative activities. In this paper, we will attempt to produce a minor, but hopefully interesting contribution to this broad class of questions.

We concern ourselves with periods of intense structural change, which can be seen as an aggregate-level manifestation of processes of creative destruction. Old industries or even entire sectors decline, factors of production become temporarily abundant and eventually migrate into other sectors of the economy. Often, they are absorbed by new industries or services, which are the result of innovative entrepreneurship. The decline of old and the rise of new industries thus go hand in hand. While this may be a trivial insight from a purely economic point of view, one should remember that times of intense structural change are also accompanied by high costs of adjustment, by uncertainty and thus by challenges for economic policy-makers.

In this paper, we will investigate whether different fiscal institutions lead policy-makers to take different responses to the decline of ripe industries. In particular we are interested in the effects of fiscal autonomy and competition: Are regions that are subjected to fiscal competition more or less inclined to support processes of structural change than regions in a unitary state, or regions in a system of cooperative federalism? To answer this question, we look at three neighbouring regions with a broadly similar industrial history: the Saarland, Lorraine and Luxemburg. The argument will proceed as follows: In *Section 2*, we give a very brief overview over issues related to structural change. In *Section 3*, we discuss how policy can in general influence and react to such periods of change. *Section 4*

does then take a political economy approach and asks what kind of response to the decline of incumbent industries actually can be expected. In this section, we also introduce three theoretical ideal types of fiscal institutions. *Section 5* gives background information on the three regions and explains how each can serve as a proxy for the three ideal types introduced earlier. Subsequently, the early period of industrial history of these regions is very briefly summarized and it is shown that until World War II, a convergence of industrial structures has taken place. In *Section 6* we conduct a time-series analysis for the post-war period, where we show that the differing institutions have led to different responses to the decline of the steel and mining industries. Finally, *Section 7* concludes.

2. Structural change: A brief guide to the issues

The case study we are conducting in this paper is focused on long-term structural change: the decline of the steel and mining industries in the Saarland, Lorraine and Luxemburg. In this sense, we are particularly interested in the destructive side of creative destruction, i.e. in the fading away of old sectors that necessarily precedes or accompanies the emergence of novel uses of factors of production. The focus of this study also leads us to be not so much interested in the microfoundations of innovative creation of new industries in structural change, but in the effect of fiscal institutions on the political response to sectoral decline.

As far as the origins of structural change are concerned, a number of contributions to the modern literature have attempted to build upon the famous Schumpeter (1942) notion of *creative destruction* to explain changes in the aggregate production patterns of an economy. For example, Grossman and Helpman (1991) have introduced the metaphor of a *quality ladder* and argue that in the course of their development, economies climb such a ladder and move towards the production of more technology-intensive goods by learning from relatively more developed countries. Those, in turn, respond to imitation by investing into innovations. In general, a large body of literature on neo-Schumpeterian endogenous growth (see e.g. Aghion and Howitt, 1998 and 2006) argues forcefully for the importance of creative destruction for long-run growth. A natural conclusion is that

unhampered change in the composition of aggregate production patterns and high rates of economic growth are essentially two sides of the same coin.

Notably, this does not necessarily imply that productive factors also migrate into highly productive sectors, as already Baumol (1967) has pointed in his famous *cost disease* argument (see also Ngai and Pissarides, 2007). The relevance of this argument is corroborated by some empirical evidence. Fagerberg (2000) investigates a sample of 39 countries for the period between 1973 and 1990, and finds that the high-productivity sector, producing novel goods, did not attract labour from other sectors. Rather, structural change appears to have driven labour into low-productivity, service-oriented sectors. Even if sectoral shifts in production have a positive effect on aggregate growth, it can therefore not be expected that they lead to pareto improvements: In every period of decline of old industries, a relatively large fraction of the affected workforce will not experience immediate upward mobility into more productive and better paid employment.

Recently, some contributions to the economics of the demand side in processes of structural change have also emerged. An early contribution is from Pasinetti (1981), wo argues that, with new goods entering the world as a result of innovation, a theory of change on the demand side is a necessity if one aims at having a normative benchmark to evaluate change on the production side of the economy. An example of a model that explains adaptation of consumers to expanding sets of consumption goods is developed by Saviotti (2001). On a different consumption-related problem of structural change, Laitner (2000) uses an agricultural economy as an analytical starting point. He argues that increased wealth due to gradually increased agricultural productivity allowed a demand shift towards manufacturing goods, which in turn served as a trigger for the accumulation of capital and for growth. A common characteristic of these demand-side models is that consumers do, in one way or the other, care for novelty.

Witt and Brenner (2008), discuss a novel, dynamic equilibrium concept which they propose as a starting point for an evolutionary macroeconomics. Within this framework, they approvingly refer to the diagnosis of Schumpeter that processes of structural change are periods of disruption, in which the economy is coordinated to a lesser degree than in

periods where structural change is less acute. At the same time, they also point out that structural change is an indispensable mechanism to find productive uses for temporarily unemployed factors of production. This hints, in a nutshell, at the multi-faceted nature of structural adjustments: They generally appear useful for the economy as a whole for the various reasons discussed above, but in a world with incomplete mechanisms of compensating the losers of creative destruction, they also lay a burden on a substantial fraction of individuals, at least in the short run. In the following section, we will discuss some implications of this somewhat ambiguous picture for economic policy.

3. Economic policy and creative destruction

What can economic policy do in order to facilitate structural change? Fagerberg et al. (1999) have criticized a relatively heavy reliance of European economies on manufacturing, compared to the situation in the United States. They have argued that European policy embraced innovative sectors to an insufficient degree, which eventually resulted in slower growth. This diagnosed state of affairs can have originated from a variety of policy decisions. One possible interpretation is that European governments have done too little to foster structural change and the adoption of novel technologies. Aghion and Howitt (2006) argue that there is a causal relationship between spending on education, the rate of innovation and growth. Education policies are identified as an important determinant of economic growth because, quite straightforwardly, better educated people are more at ease with adopting new technologies, and more able at developing them, which is particularly important for countries on or close to the technology frontier.

Proper education policies, and probably also the supply of basic public goods such as secure property rights, can be seen as general inputs into the process of economic development. They are not so much aimed at steering productive activities into a particular direction, but at endowing individuals and firms with the capabilities and infrastructure necessary to find out themselves which activities they consider to be beneficial. On the other hand, institutions and policies that aim at defending rents accrued by incumbents

are ubiquitous. Caballero et al. (2004) show how labour market regulation protecting incumbent workers slows down or even inhibits creative destruction. Empirically, Lee and Wolpin (2006) show that mobility of labour between sectors is low even in the relatively litte-regulated labour market of the United States – low barriers to mobility already have large effects. Wacziarg and Wallack (2004) accordingly show that labour market reforms have a significantly positive effect on inter-sectoral labour mobility.

Again, this example shows that government can affect the speed of structural adjustment with highly general policies, where in some cases the effect on structural change may not even be the intended primary, but an unintended secondary effect. However, governments often also intervene not by setting general, institutional frameworks, but by arbitrarily altering incentives on a case-by-case basis. There are cases where governments attempt to promote structural change by granting subsidies to start-up entrepreneurs, and there are other cases where structural change is impeded because an ailing incumbent firm is supported with public funds *ad infinitum*. Attempts to centrally steer structural change have been successful in many newly-industrialized economies (see e.g. United Nations, 2006), and even in the European Union, structural funds appear to have been used with moderate success (e.g. Beugelsdijk and Eijffinger, 2005).

Attempts to engineer structural change are, however, risky from an *ex ante* perspective. Political decision-makers are necessarily uncertain with regard to the likelihood of success of a particular policy in a particular institutional environment. Aghion and Howitt (2006) argue that this problem is less pervasive when decisions are made below the technology-frontier, i.e. in an economy that can – at least to a certain degree – rely on imitation of successful role-models. Nevertheless, the uncertainty never vanishes completely. Thus, although we have seen in this section that policy can affect processes of creative destruction in numerous ways, it remains open what we can realistically expect from a political economy point of view.

4. The political economics of creative destruction

4.1. **Some general considerations.** Periods of aggregate change in an economy are in general characterized by a high degree of uncertainty. Observing the decline of one industry or even a complete sector exerts pressure to act upon economic policy-makers, who need to signal competence to their constituencies. However, even the most competent and benevolent policy-makers will usually suffer from a deficient stock of knowledge in these kind of situations: While the decline of one industry is easily observable, the question where idle resources could be efficiently employed in the future does normally not have an obvious answer. As we have seen in the preceding section, economic policy-makers have instruments to slow down or to accelerate aggregate change, but policies aimed at achieving the latter are akin to risky investments. They might pay off, economically and politically, but they can just as well fail. In democracies with reasonable levels of political competition, public opinion also both pressures reprsentative decision-makers to take action in times of crisis, and at the same time it also restricts their scope of action to measures that are in line with the current common sense. Uncertainty, on the other hand, provides conditions under which social communication processes may lead to equilibria where, at least temporarily, this common sense is based upon conjectures that are deficient or even false (e.g. Schnellenbach, 2005 or Caplan, 2007).

It can therefore be argued rather straightforwardly that models of bounded rationality are an appropriate framework to analyze political decision-making in situations of structural change. Citizens, whose opinion restricts political decisions, are rationally ignorant and rely on social communication rather than heavy investments into information gathering activities. The situation is thus different from one in which low uncertainty facilitates more enlightened decisions that are immediately connected to a well-defined individual self-interest, or to a collective measure of welfare. Under bounded rationality, even emotions such as fear of change can play an important role in the political process (e.g. Meier and Durrer, 1992). Individuals then often exhibit a tendency to preserve the status quo (Meier and Slembeck, 1998), whose change would require actions associated with cognitive or

real cost: learning about a changed economic environment, critically questioning their old set of mind and so on.

In addition to this, arguments from the more narrow realm of traditional political economics also hint at the relevance of a status quo bias (e.g. Olson, 1965). Benefits from preserving a status quo, e.g. through subsidies to declining industries, are clearly visible, not very uncertain and there is a clearly defined group of economic beneficiaries: shareholders and workers in those industries. The opportunity costs of preserving the status quo are, on the other hand, either dispersed (in the case of tax burdens) or highly uncertain in their payoffs (in the case of a foregone alternative path of economic change). We would therefore expect much more political pressure to develop in favour of the status quo, than in favour of an active policy accelerating structural change. While a general tendency to preserve the status quo in periods of decline of incumbent industries is probably ubiquitous, the extent to which such a tendency translates into actual policy will depend on formal political institutions. This issue will be disussed in the following subsection.

4.2. **Fiscal federalism and structural policy.** We expect different formal political institutions to be associated with different policy responses towards processes of structural change. In this subsection, we discuss the effect of political (de-)centralization, and focus on three prototypical regimes: unitary systems, cooperative federalism and finally competitive federalism.

4.2.1. *Unitary regimes.* First and foremost, unitary systems are typically associated with the problem of centralizing knowledge on regional structural problems on the central level of government. Taking a political economy perspective, it may be unlikely that a central government is responsive at all towards structural problems of peripheral regions, whose voters are not perceived as pivotal in general elections. Even if it is generally possible to centralize information relevant for efficient structural policies, the electoral incentives in a unitary system may therefore not be such that policies take specific needs of single regions into consideration. The availability to the central government of a sufficiently large

and differentiated set of policy instruments to provide differentiated regional policies is therefore not sufficient to actually ensure efficient central policies – policial economy considerations may inhibit these (Besley and Coate 2003).

Often, the institutional frameworks of real-world unitary regimes do even prohibit a provision of regionally differentiated policies in important areas of economic policy. It would, for example, be almost unthinkable to deregulate labour markets in low-income areas of a strictly unitary country, in order to facilitate intersectoral labour mobility and accelerate structural change there, while the status quo level of regulation is maintained in the rest of the country. In these cases, it is again unlikely that a centrally devised economic policy will suit the specific conditions of regions facing the problems (or opportunities) of structural change.

On the other hand, unitary governments might be able to overcompensate the problems created by uniform, nation-wide levels of regulation if they are able to channel sufficient transfers to the regions, and if these transfers are earmarked for spending on local public goods that are particularly important to accelerate structural change, such as local infrastructure or training measures for the unemployed. Again, however, it is unclear if we can expect such results if we analyse the problem from a political economy perspective. Von Hagen (2000), for example, shows that transfers from the central government to the regions are on average associated with a substantial degree of income-smoothing, after shocks have negatively affected incomes at the local or regional level. Transfers that directly aim at allowing individuals to sustain their levels of consumption during structural slumps may, however, perpetuate the existence of a mezzogiorno rather than facilitate structural change. If the outcome of processes of structural change is to some degree uncertain in itself and if structural adjustments may fail then the use of transfers for the safe option of subsidizing consumption directly is likely to be politically very alluring in the short run.

4.2.2. *Cooperative federalism.* As cooperative federalism, we denote a system with extensive political coordination both along the horizontal (between sub-central units) and

vertical (between the sub-central and the federal level) axis. Cooperative systems of federalsim are usually characterized by tax sharing arrangements on the revenue side of the budget. Tax rates and bases are centrally defined, and revenue is allocated to the different units of government according to pre-negotiated keys. Typical examples of cooperative federalism, such as Germany, are also characterized by a comprehensive system of vertical and horizontal fiscal equalization schemes. In Germany, there is even a constitutional provision that all *Bundesländer* are to provide similar conditions of living – which could in the most extreme case be interpreted as a demand for a uniform, nationwide supply of public goods (Homburg, 1994). Furthermore, they are endowed with a constitutional right to receive grants in aid if their own resources are not sufficient to provide similar conditions of living as the average *Bundesland*.

Cooperative federalism can be seen as a mechanism that alleviates the knowledge problem sketched above for unitary systems. Even with far-reaching tendencies towards a coordination of policies, there is usually some scope for decentralized governments to implement policies that meet the specific conditions of their region. Even for centralized policies, the peculiar modes of cooperation to be found in cooperative federalisms may help to reduce the problem of centralizing information. Sub-central governments can act as institutionalized lobbyists on the central level and thus open the central political agenda for regional issues related to structural change. Again, however, Besley and Coate (2003) caution us that cooperation of sub-central interests on the central level may lead to inefficient overspending due to a common pool incentive structure. And again, it is doubtful if state and local governments with short-term election constraints will indeed lobby for efficient support of long-term structural change, or rather for short-term subsidies of consumption levels in their region.

The German system of fiscal equalization ensures that even local governments with very weak regional economies (i.e., small tax bases), and therefore extremely low own revenue, are elevated very close to the full average of fiscal resources per capita in the entire federation. The equalizing effect of the horizontal and vertical transfer scheme is enormous. Homburg (1994) argues that the fact that state governments are not sufficiently punished for bad policies by a decline in their disposable budget, gives them an incentive

to avoid costly reform policies. The application of this argument to structural policies is straightforward: Expansion of the own tax base cannot serve as a strong motive for sub-central governments to initiate policies that are conducive to promoting regional growth. Similar arguments may be true for the citizens themselves. Asdrubali et al. (1996) for the United States and Büttner (2002) for Germany show that federal tax and transfer schemes, as well as federal social security schemes, absorb large fractions of negative shocks on household incomes. As long as only single regions are hit by asymmetric shocks, this might make it more tempting to live with a status quo, rather than to allow or even to accelerate risky structural change. On the other hand, one can of course argue that the insurance provided by cooperative federalism does render the experiment of promoting structural change less risky itself. Which of the two effects prevails would be an empirical question.

4.2.3. *Competitive federalism.* Apart from greater autonomy and less coordination in decisions on public spending and regulatory legislation, primarily the dependence on own tax bases, and the sub-central units' opportunity to set their own tax rates, seperate competitive from cooperative federalism. Autonomy on the revenue side, and also an often only negligible stream of grants in aid, imply a stronger incentive to cultivate one's own tax bases, compared to cooperative federalism. More importantly, factor movements in such a framework produce politically relevant price signals (Schnellenbach 2008). For example, strong out-migration from a region with a relatively inefficient policy may produce large enough tax-base effects to make otherwise rationally ignorant voters reconsider the status quo policy, even if they have ex ante not been informed about the existence of more effcient policies in other jurisdictions. Thus, knowledge spillovers on policy issues will be more influential here, compared to a situation where far-reaching fiscal equalization reduces the visibility of political price signals.

As Besley and Case (1995) have shown in their pioneering contribution on yardstick competition, in some cases even factor movements are unnecessary, and an information spillover on policy in neighbouring regions suffices to discipline sub-central representatives. They do, however, also point out that their mechanism of yardstick competition works

well for tax policy, but not for less salient policy issues. It appears that for more complex, or less visible policy areas, additional mechanisms such as factor movements are necessary to induce border-crossing learning processes among voters. In any case, competitive federalism provides a framework for parallel experimentation with different policies and for learning from these experiments. For a complex problem such as managing structural change, which also involves substantial ex ante uncertainty on the relative efficiency of policy measures – in particular in countries on or close to the technology frontier –, this is a substantial advantage compared to the other institutional arrangements discussed above.

Greater autonomy in fiscal policy also offers some advantages for regions facing the challenges of structural change on material policy issues. On the EU level, a country like Ireland shows how a mix of fiscal consolidation and low tax burdens can help attract a stream of high-technology investments and significantly accelerate growth (de la Fuente and Vives 1997). In a similar vein, Hauptmeier et al. (2006) collect evidence which indicates that large-scale cuts in consumptive public expenditures are followed by periods of stronger growth in industrialized countries. And the Swiss experience shows how economically peripheral cantons can consolidate their budgets by attracting additional tax bases with comparatively low tax burdens. In short, fiscal autonomy may provide chances in particular for economically weak regions to achieve structural change and enter a long-term growth path – greater chances, in any event, than sustained dependence on federal grants in aid combined with relatively little fiscal autonomy.

4.2.4. *Empirically testable hypotheses.* There are two broad hypotheses that follow from our theoretical discussion, and that will be investigated empirically in the second part of the paper. The first one straightforwardly follows from the discussion of a status quo bias in policy responses to structural change.

Hypothesis 1: *Transfers in cooperative federalism are used not to promote structural change, but to subsidize individuals or firms affected by sectoral decline.*

The second hypothesis rests on the assumption that regions that are subjected to strong fiscal competition face higher opportunity costs of perpetuating the status quo than regions in cooperative federalism, who can pay at least a fraction of subsidies to incumbent industries from central transfers.

Hypothesis 2: *Transfers to regions within a system of cooperative federalism will lead to a slower decline of employment in a declining sector, compared to an autonomous region that is subjected to strong fiscal competition.*

Finally, the third conjecture is based on the assumption that the region receiving transfer payments, while having a strong incentive to use the bulk of the money to stabilize the status quo, can diversify its policies and invest a fraction of received transfers into supporting structural change. If this is the case, and if the problem of centralizing knowledge in unitary regimes is indeed pervasive, we arrive at

Hypothesis 3: *Transfers should allow regions in a system of cooperative federalism to manage structural change at a faster pace compared to regions in a unitary state.*

Before we test these hypotheses econometrically in *Section 6*, we present some background information on the regions investigated in this study in the following *Section 5*.

5. Saarland, Lorraine and Luxemburg: Some background information

5.1. **The institutional framework.** The three regions whose long-term development we investigate in this paper can each serve as a proxy for one of the ideal types of federal fiscal institutions discussed above. Lorraine is a *Région* in northeastern France and shares a border with Germany. It currently has a population of just over 2,3 million individuals and is comprised of four *Départements*. In our study, it represents a region in a unitary state. It should be noted that France has experienced some cautious steps of decentralization during the last three decades. In 1982, the regions became territorial authorities in their own right, and general elections to the *Conseils Régionales* have been held every six years since 1986. French regions have gained some limited autonomy in decision-making over culture, eductation, local transport infrastructure and regional

planning. They even have gained some leeway to engage in regional business development. The competencies are, however, limited. Regional economic policies focus on administrative help for local business, on marketing activities for the regions and other relatively small-scale approaches such as paying subsidies to local businesses. French regions are allowed to levy a number of taxes, such as the *taxe d'habitation*, which is a consumer tax on housing, and property taxes. Furthermore, they levy fees, e.g. on the registration of cars. The revenue of these taxes and fees is, however, small relative to the regional budget, the bulk of which is financed through transfers from the central state and fixed portions of revenue collected from several taxes that are centrally legislated.

On the level of the *Départements* there has also been a gradual increase of sub-central competencies since 1982, but again this concerns political issues such as primary and secondary education and urban planning that are not of particularly importance with regard to structural change. Furthermore, France still does, to a large degree, maintain a top-down institutional structure where sub-central authorities execute centrally devised policies. This is certainly the case for economic policy on a larger scale. Even taking the steps of political decentralization in France into account, we therefore still consider it to be a good proxy for a unitary state.

The Saarland is a German *Bundesland* which is adjacent both to Lorraine and to Luxemburg. It is home to approximately 1 million citizens, and it represents a sub-central entity in a regime of cooperative federalism in this study. Compared to the French institutional regime, German federalism allows for a considerably larger scope of autonomous decision-making for its *Länder*. In particular, they have their own legislative branch, which is not the case for French regions. The additional scope of decision-making is, on the other hand, also substantially smaller than what can be found in regimes of competitive federalism, such as Switzerland and the United States. In particular, it is by and large restricted to the expenditure side of the budget. State-level governments in Germany are financed to a great extent through an elaborate revenue sharing scheme for taxes that are administered at the central level (the personal and corporate income tax, as well as the value added tax). Sub-central deviations from the uniform, nation-wide tax rates are not possible. In addition to this, there are vertical and horizontal equalization

grants which all but level out regional differences in fiscal capacity. And regulatory policies that are relevant for structural change, e.g. on the labour market, are almost entirely enforced through uniform central policies. However, state and local governments can decide autonomously on the supply of several sub-central public goods, such as education (including tertiary education) and infrastructure. They can also autonomously engage in sub-central structural policies. As Büttner et al. (2004) show, this does indeed result in measurable heterogeneity in public spending between the *Länder* in Germany. Thus, there are substantial institutional differences between the Saarland and Lorraine.

Finally, Luxemburg serves as a proxy for the small, autonomous region. It is an autonomous country with nearly half a million citizens. Apart from transfers from the European Union, where it is subject to the same general rules as other countries and regions, Luxemburg has no hope to receive grants-in-aid in case of structural slumps. Luxemburg has traditionally been a net contributor to the EU budget. It is therefore reasonably safe to assume that the burden of regional structural change has been carried by the country itself.

5.2. **Regional economic history until Word War II.** The Saarland has not always been a semi-autonomous entity in a regime of cooperative federalism. Following the Congress of Vienna, a period of French rule in the Saarland ended, which had started at the pinnacle of the French Revolution. Now, the territories were distributed to different German states, notably Bavaria and Prussia. Interestingly, both foreign rulers played a pivotal rule in the process of industrialization.

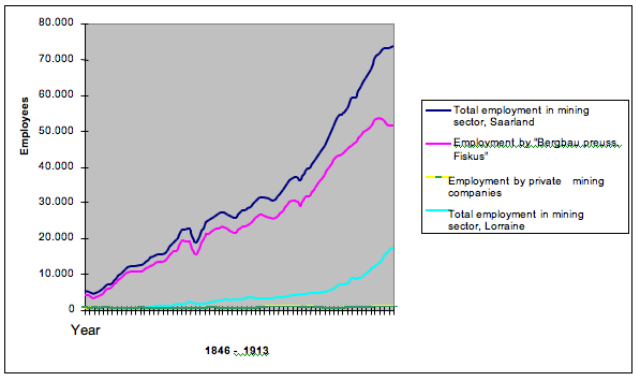

Figure 1: Employment in the mining sector in Prussian-controlled Saarland

Figure 1 illustrates this for the mining industry in the part of the Saarland controlled by Prussia. The exponential increase of employment in this sector between 1846 and 1913 is obvious, but what may be surprising is that state-controlled mines are responsible for the largest fraction of the growth of the sector, while private mining plays only a minuscule role. The growth of the sector as a whole has been demand-driven: Beginning in 1852, the rapid expansion of the railroad network in Germany and the accelerating industrialization both increased demand for coal and ore. At the same time, the abolishment of tariffs fostered economic integration and opened new markets for output from the Saarland mines (e.g. Banken, 2002a). Apart from short periods of stagnation or decline – with the *Gründerkrise* of 1873 leaving the largest dent –, employment in the mining sector increases until the beginning of World War I. It is worth noting that the pace of industrialization of the Saarland has been much higher than in the Lorraine and Luxemburg regions (Banken, 2002b).

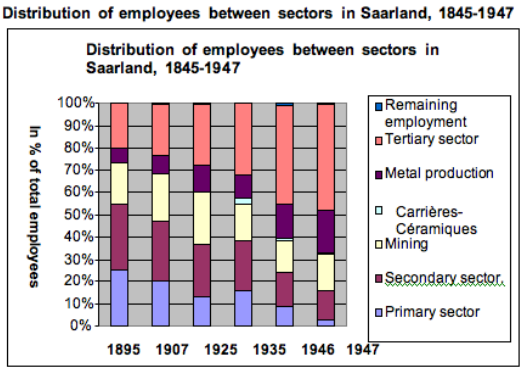

Figure 2: Employment shares in the Saarland by sectors

Looking beyond World War I and taking a more aggregate perspective on the relative importance of different sectors, *Figure 2* illustrates the decline of the mining sector from 1925 onwards, and the continuing rise of the services sector. The decline of the mining industy is partially compensated by an increased relative importance of the steel producing sector. Politically, the Saarland went through an eventful period during the interwar period and until after World War II: Between 1920 and 1935, it was a formally autonomous region with heavy economic dependence on France, in 1935 it became a part of Germany

again, before returning to French administration in 1945 and finally, after a referendum, becoming a German *Bundesland* in 1957.

The industrialization of Lorraine commenced significantly later than in the Saarland; it did not begin prior to the German occupation of Alsace-Lorraine with the treaty of 1871. Until around 1880, Alsace-Lorraine was a predominantly argricultural economy, and the heavy reliance on agriculture remained a feature of this region until the interwar period. A practical problem for Lorraine is the lack of reliable data for the early periods, where we have both German and French sources which did not always apply the exact same definitions and classifications.

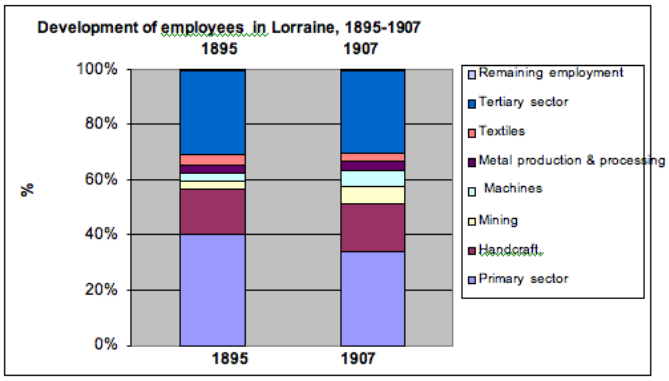

Figure 3: Employment shares in Lorraine by sectors, German data

Figure 3 shows employment shares for Lorraine until 1907, and while we observe a relatively strong secondary sector by then, the steel and mining industries play only a minor role. In the French data set, the *Département* of Moselle is a good proxy for the region of Lorraine as a whole. As we can see in *Figure 4*, steel and mining industries gain relative weight in the interwar period, mostly at the expense of agriculture.

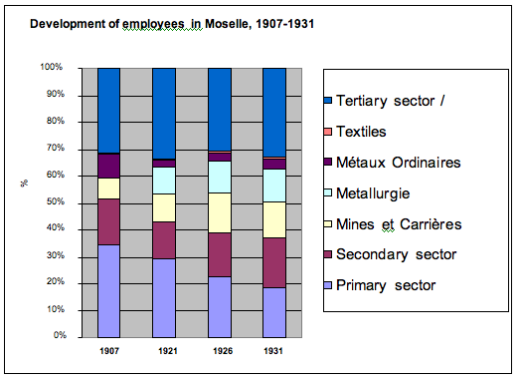

Figure 4: Employment shares in Moselle by sectors, French data

Finally, Luxemburg has also industrialized relatively late. In 1871, around 60% of the population were still employed in the primary sector. Industrial production was mostly confined to small companies (Pohl, 1999), which pioneered in establishing the seeds of a steel and mining industry in Luxemburg. An important reason for the late industrialization of Luxemburg has been the need for a technological innovation: Only in 1879 has the so-called *Thomas-Technique* been invented, which finally allowed for the processing of phosphor-rich *Minette* ore, which was found in the mines in southern Luxemburg, at lower costs. In the subsequent years, the steel and mining sector boomed, financed to a great extent with capital inflows from Germany. However, active industrial policy also played a role: Mining concessions in Luxemburg were awarded conditional on local processing of the ore. Consequently, Luxemburg industrialized quickly. *Figure 5* sums up the employment shares.

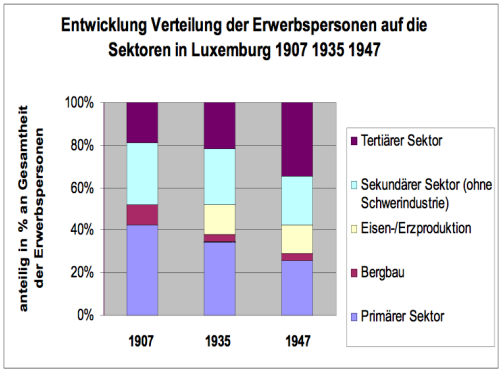

Figure 5: Employment shares in Luxemburg

It is also noteworthy that the next step of structural change, towards Luxemburg as a financial centre, has also been initiated rather early, in the interwar period. In 1928, the stock market was established, which coincided with the invention of the *Sociétés Holding*, a legal structure that allowed companies taking residence in Luxemburg to reduce their tax burden (Anders, 1932).

This leads to an interesting observation, namely that in both Luxemburg and the Saarland government intervention did play an important role in the processes of structural change. This was the case in the rise of the mining industry in the Saarland, and it was obviously the case at crucial marks in Luxemburg's economic history. These examples show that an active government can in fact support processes of structural change. However, it would probably be premature to generalize these obervations to the conjecture that governments command sufficient knowledge to efficiently *initiate* sectoral adjustments in developed economies. Knowledge that there were profits to be made from mining in the Saarland was easily accessible for public decision-makers in the first half of the 19th century. Gaining knowledge on the prospects of different industries in a complex, highly differentiated 21st century economy would be an entirely different issue.

6. Structural change in the post war period: A time-series analysis

6.1. **The empirical strategy.** We have seen above that the three regions which we investigate in this paper have arrived at broadly similar states of economic development towards the end of the interwar period. In particular, steel and mining industries together absorb roughly similar fractions of the workforce. Given this convergence in economic terms and the difference in fiscal institutions, we can now focus on the impact of the latter on structural change in the post-war period. To do so, we will analyze time-series data for the 1961-2003 period. We are restricted to this time-period both due to data problems, and due to institutional changes. The Saarland has been reunited with Germany and thus integrated into a cooperative federal regime only in 1957.

We have time-series data for employment in the steel and mining industries in all three regions. The shares of steel and mining in total employment are plotted in *Figure 6*.

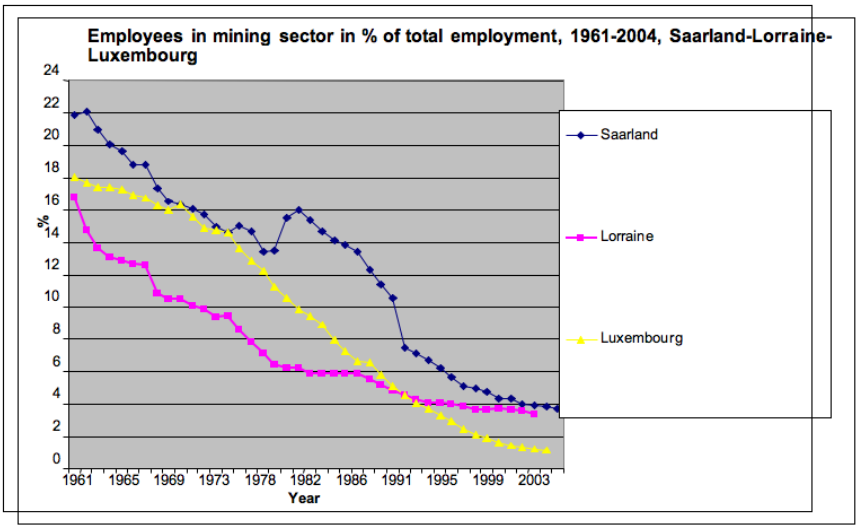

Figure 6: Employment shares in the steel and mining industries

We see declining employment shares in all regions, which is not surprising. Towards the end of the 1950s, post-war reconstruction began to slow down and the Korean war had ended. Accordingly, demand for steel was subject to a short-term decline. On the supply side of the market, new competition from the developing countries in Asia began to emerge and market shares of European producers declined. Technological innovations led to an increase of capital intensity in the steel and mining industries. Consequently, they have absorbed ever smaller fractions of the labour force.

While the trend is similar, we are interested in the relative speed of decline: When creative destruction is taking place, do fiscal institutions have an impact on the pace at which the destructive process occurs? On first sight, the series in *Figure 6* seem to be inconclusive in this respect, only the spike in employment shares in the Saarland at the beginning of the 1980s appears to be suspicious. Given the discussion above on the institutional differences, we obviously have no data on transfers for Luxemburg – as an autonomous region it does not receive any. Lorraine on the other hand receives transfers from its central government, but in particular before the instituional reforms of 1982, they are not always devised transparently, and high quality data on transfers within a unitary regime is difficult to obtain. For the Saarland, on the other hand, we have obtained high quality transfer data for the entire period.

Given these data limitations, we have decided to pursue the following empirical strategy. We are interested in the question whether transfers from the central level are used to foster structural change, or to slow it down. A natural starting point is therefore to look at employment shares for the Saarland relative to employment shares in each of the other two regions and to investigate if this dependent variable is affected by transfers. Taking Luxemburg as a benchmark does then imply that we look at the employment share of the steel and mining industry of the Saarland divided by that of Luxemburg. A significant, positive impact of transfers to the Saarland on this dependent variable would mean that transfers lead to a slower decline of employment in the declining sector. A significant, negative impact would on the other hand imply that transfers are used to foster structural change, and that labour migrates to other industries relatively faster in the Saarland due to these transfers.

When we take Lorraine as a benchmark (i.e., look at the series of relative employment shares of Saarland and Lorraine), this allows us to investigate whether in a system of cooperative federalism, the sub-central unit combines received transfers and local knowledge to foster structural change in a manner that could not be expected from a unitary regime, which has to cope with the problem of centralizing policy-relevant knowledge. Again, a negative effect of transfers would indicate that this is the case, while a positive effect would indicate that even vis-à-vis unitary regimes, structural change is slowed down in a system of cooperative federalism.

6.2. **Estimation and results.** We have employed a standard set of diagnostic tests in order to check for non-stationarity of our time-series. The autocorrelation functions (using Bartlett's formula and 95% confidence bands) and the partial autocorrelation functions of both the relative employment series and the transfer series for the Saarland suggest highly autoregressive processes. We subsequently have employed also unit root tests for the level series, which did not allow us to rule out the presence of a unit root even at the 10% critical level. The unit root tests for the series of first differences, on the other hand, allowed us to clearly reject the hypothesis of a presence of a unit root at the 1% critical level. To check for robustness, we have employed these tests for lag orders suggested by

the Schwarz criterion. In no case the presence of a unit root is indicated for the series of first differences, which leaves us condifdent that the level series are $I(1)$, which allows us to use the standard toolbox of time-series analysis on the first differences. As far as cointegration tests are concerned, we used the Johansen rank test, which did not indicate cointegration.[1]

As the theoretical discussion above has indicated, we are not entirely sure which way the causality between employment and transfers runs: Are transfers used to accelerate structural change, or only to support incomes in regions that are hit by structural slumps? We therefore estimate two ADL-models for each pair of regions, namely

$$\Delta E_t = \alpha + \sum_{k=0}^{K} \beta_k \Delta E_{t-k} + \sum_{k=0}^{K} \delta_k \Delta T_{t-k} + \sum_{n=0}^{N} \gamma_n D_n + \varepsilon_t \tag{1}$$

and

$$\Delta T_t = \phi + \sum_{k=0}^{K} \tau_k \Delta T_{t-k} + \sum_{k=0}^{K} \kappa_k \Delta E_{t-k} + \sum_{n=0}^{N} \rho_n D_n + \mu_t \tag{2}$$

where ΔE_t and ΔT_t denote the first differences of relative employment shares and of transfers at time t, and k denotes the lag. In order to cope with autocorrelation, we include up two five lags of the explanatory variables. D denotes a vector of additional variables. We have included trend for the 1994-2004 period to take account for a period were the Saarland has benefitted from extraordinary federal bailouts, and a dummy for 1991, where the steel industry of the Saarland was hit by an extremely large negative shock.

For the transfer models, the Durbin-h test statistic suggests that residuals are by and large normally distributed and autocorrelation is not a problem. For the employment model, the Durbin-h test reports values that are on the verge of slight autocorrelation, but since we include five lags this should not lead to troubling levels of inefficiency. As a first benchmark, we have estimated the two models as autoregressive distributed lag (ADL) models. The results are presented in *Tables 1a* and *1b*. In the first table, the first difference of the relative employment share of the Saarland, relative to Lorraine and Luxemburg, is the dependent variable. For Luxemburg, we see that only the structural

[1] All test results are available upon request from the authors.

break dummy has a significant impact, with the expected sign. All other explanatory variables have insignificant coefficients.

For Lorraine, we observe that the first differences of employment shares appear to be autoregressive, albeit with a weakly significant coefficient. Furthermore, transfers appear to have a negative effect, which is also weakly significant on the 10% level. Taken for granted, this effect would indicate that transfers are indeed used in the Saarland to reduce employment in the steel and mining industry at a faster pace compared to Lorraine. However, it is somewhat suspicious from a theoretical point of view that transfers would affect employment instantaneously, in the same period where they arrive in the Saarland. One would expect some lag to occur here. If we look at the results of the transfer model, the suspicion grows.

ADL models, employment

	Lorraine	Luxembourg
	b/se	b/se
DEmployment(-1)	0.327*	0.048
	(0.162)	(0.129)
DEmployment(-2)	0.041	-0.059
	(0.173)	(0.139)
DEmployment(-3)	-0.318	0.174
	(0.203)	(0.169)
DEmployment(-4)	0.269	-0.050
	(0.221)	(0.168)
DEmployment(-5)	-0.117	0.238
	(0.197)	(0.158)
DTransfers	-0.204*	0.117
	(0.115)	(0.083)
DTransfers(-1)	0.100	0.067
	(0.116)	(0.083)
DTransfers(-2)	-0.098	0.109
	(0.111)	(0.082)
DTransfers(-3)	-0.033	0.103
	(0.097)	(0.070)
DTransfers(-4)	-0.006	0.125*
	(0.096)	(0.072)
DTransfers(-5)	-0.123	-0.029
	(0.097)	(0.073)
break	-0.473***	-0.549***
	(0.128)	(0.096)
smalltrend	-0.008	0.009
	(0.007)	(0.008)
Constant	0.031	0.033
	(0.026)	(0.020)
N	36	36
F	2.013	4.082
Adj. R2	0.273	0.534
Root MSE	0.121	0.088

Table 1a: Results of the ADL-estimation of the employment model

ADL models, transfers

	Lorraine	Luxembourg
	b/se	b/se
DEmployment	-0.610*	0.705
	(0.345)	(0.500)
DEmployment(-1)	0.121	0.062
	(0.303)	(0.317)
DEmployment(-2)	0.428	0.473
	(0.285)	(0.328)
DEmployment(-3)	-1.006***	-1.147***
	(0.302)	(0.347)
DEmployment(-4)	0.740*	0.360
	(0.362)	(0.406)
DEmployment(-5)	-0.477	-0.243
	(0.327)	(0.404)
DTransfers(-1)	0.219	0.022
	(0.198)	(0.206)
DTransfers(-2)	-0.263	-0.211
	(0.186)	(0.205)
DTransfers(-3)	-0.096	-0.106
	(0.167)	(0.178)
DTransfers(-4)	0.091	-0.011
	(0.165)	(0.187)
DTransfers(-5)	-0.184	-0.096
	(0.169)	(0.179)
break	-0.275	0.523
	(0.275)	(0.353)
smalltrend	-0.024*	-0.020
	(0.012)	(0.019)
Constant	0.062	0.024
	(0.045)	(0.052)
N	36	36
F	1.482	1.232
Adj. R2	0.152	0.079
Root MSE	0.209	0.216

Table 1b: Results of the ADL-estimation of the transfer model

Here, we see that both for Lorraine and for Luxemburg, the third lag of employment shares has a highly significant (at the 1% level) negative effect on the change of transfers. A reasonable interpretation for this result would be that a decline in employment shares leads to an increase of transfers with a delay of about three years. Furthermore, we also see a weakly significant negative effect of employment on transfers, which relates to our suspicious result from the first model. In Germany, transfers flow quickly and automatically within institutionalized fiscal equalization schemes when an asymmetrical, negative shock leads to regional declines in the tax base. We would therefore expect that the second model shows the true direction of causality, while the first does not. To discriminate between the two models and their seemingly contradictory results, we perfomed a joint F-Test for both, which supports the assumption of a causal relationship only for the second model, but not for the first. This leads us the interpretation that indeed, employment drives transfers and not vice versa.

However, another general problem with estimating an ADL model is that it rests on a strict assumption of exogeneity of the right hand side variables, which is not necessarily met in our case. We have therefore also specified a VAR model in which all variables can be treated as endogenous. It is constructed on the basis of equations (1) and (2), and we include the same number of lags as in the ADL models.

	Lorraine	Luxembourg
	b/se	b/se
Employment share		
DEmployment(-1)	0.345**	0.061
	(0.169)	(0.131)
DEmployment(-2)	-0.053	-0.003
	(0.172)	(0.137)
DEmployment(-3)	-0.129	0.043
	(0.181)	(0.144)
DEmployment(-4)	0.135	-0.008
	(0.217)	(0.169)
DEmployment(-5)	-0.023	0.228
	(0.198)	(0.162)
DTransfers(-1)	0.063	0.076
	(0.119)	(0.084)
DTransfers(-2)	-0.050	0.091
	(0.112)	(0.083)
DTransfers(-3)	-0.015	0.099
	(0.101)	(0.071)
DTransfers(-4)	-0.028	0.135*
	(0.100)	(0.073)
DTransfers(-5)	-0.098	-0.044
	(0.100)	(0.074)
break	-0.476***	-0.532***
	(0.133)	(0.097)
smalltrend	-0.004	0.007
	(0.007)	(0.008)
Constant	0.021	0.039**
	(0.027)	(0.020)

Table 2a: Results of the VAR-estimation of the employment model

Table 2a and *2b* report the results for the VAR estimate of the employment model. The dependent variable is again the first difference of relative employment shares between either Saarland and Lothringen, or Saarland and Luxemburg. The results show that the fourth lag of the change in transfers in the Saarland has a weakly significant (at the 10% level) positive impact in the Luxemburg case: Additional transfers in cooperative federalism appear to slow down structural change relative to the small autonomous region, albeit with a rather long lag. The effect of other lagged transfer changes is, on the other hand, not significant. When we take Lorraine as a benchmark, lagged transfer changes to not significantly affect the dependent variable at all. Unitary regimes and a region in a regime of cooperative federalism do not appear to differ too much with regard to their

response to structural slumps. Here, however, employment appears to be autoregressive: The coefficient on the first lag of employment share differences is positive and significant at the 5% level.

Transfer		
DEmployment(-1)	-0.089	0.104
	(0.292)	(0.322)
DEmployment(-2)	0.461	0.470
	(0.297)	(0.335)
DEmployment(-3)	-0.928***	-1.117***
	(0.312)	(0.354)
DEmployment(-4)	0.657*	0.355
	(0.375)	(0.414)
DEmployment(-5)	-0.463	-0.082
	(0.342)	(0.396)
DTransfers(-1)	0.180	0.075
	(0.205)	(0.207)
DTransfers(-2)	-0.233	-0.146
	(0.194)	(0.204)
DTransfers(-3)	-0.088	-0.037
	(0.174)	(0.174)
DTransfers(-4)	0.108	0.084
	(0.172)	(0.178)
DTransfers(-5)	-0.124	-0.127
	(0.173)	(0.181)
break	0.015	0.148
	(0.231)	(0.237)
smalltrend	-0.021*	-0.014
	(0.012)	(0.019)
Constant	0.050	0.052
	(0.047)	(0.049)
N	36	36
Log-L	45.511	56.594
AIC	-39.022	-61.189

Table 2b: Results of the VAR-estimation of the transfer model

The results for the VAR-estimation of the transfer model are completely unambiguous and very conclusive: The third lag of the first difference of relative employment shares has a negative coefficient and is highly significant at the 1% level. With a lag of three years, a (relative) decline in employment in the Saarland is entailed by a significant increase of transfers. Finally, we have also performed a test on Granger causality for the VAR estimations. This test corroborates the interpretation that transfers do not affect employment, but changes in relative employment shares are causal for changes in transfers.

6.3. **Discussion.** The evidence we have reported above is in strong support of our *Hypothesis 1*, as it strongly suggests that transfers are not used to accelerate structural adjustments. Transfers in a federal system do not leed to a swifter decline of employment in

a declining industry; rather, they are caused by the decline of an industry and increase with its severity. This is in sharp contrast to statements that are frequently made in the political sphere in order to justify fiscal transfers to ailing regions. The most important argument made there is that transfers endow the receiving regions with the resources necessary to manage structural adjustments themselves. In the light of our evidence, this appears not to be the case. The data are, however, not in contradiction with theoretical approaches that predict a status quo bias in structural policies.

Another interesting point with respect to the first hypothesis is that in the VAR-estimation with Luxemburg as a benchmark, transfers even significantly slow down the relative decline of employment in the steel and mining industries. However, with Lorraine as a benchmark, this effect does not appear. Despite the weak significance, this could be (cautiously) interpreted as supporting evidence for the conjecture that regions who have to rely on their own resources are more inclined to follow policies that allow the destructive part of creative destruction to occur. This supports our *Hypothesis 2*. At the same time, transfers to not induce the receiving region to pursue policies with significantly different employment effects compared to the region in a unitary state. This could support the presumption that regions in unitary states find means of externalizing the costs of supporting the status quo. Such means may be transfers from the central government to the regions, similar to what we see in cooperative federalism.

The fact that transfers to the region in cooperative federalism have no significant effect on the decline in relative employment is also contradicting our *Hypothesis 3*. Either, the problem of policy-relevant knowledge that cannot be centralized does not matter for structural policies, or the incentive effect – the possibility of externalizing the costs of supporting the status quo – overcompensates the knowledge effect. Unfortunately, our data do not allow us to disentangle both effects. However, in *Table 2a* the signs of the (insignificant) transfer coefficients are negative in the Lorraine estimates, while they are, with only one exception, positive in the Luxemburg estimates. This could be interpreted as a very weak hint that the economic mechanisms are in fact different in both cases, and that the knowledge argument might in fact play a role, after all. But overall, the evidence is rather inconclusive here.

7. Conclusions

In this paper, we have investigated and compared three cases of long-term interaction between fiscal institutions and structural change. From a theoretical point of view, we have argued that a status quo bias implies that political preferences in regions that are subjected to structural change typically tend towards preserving the declining incumbent industry. We have also argued that this tendency should be affected by fiscal institutions: Autonomous regions that cannot externalize costs of impeding sectoral decline ought to be more open to aggregate processes of creative destruction.

Our empirical time-series evidence by and large supports these theoretical propositions. Transfers received by a non-autonomous region are not used not foster structural change. Rather, causality goes the other way: Sectoral decline induces transfers, which are then used for income policies or to preserve the status quo, but not to accelerate sectoral change. The common political justifications that are usually given to vindicate such policies are therefore deeply flawed.

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