

German labour market and industrial relations model: anatomy of a dualization process

[FMM Conference paper]

Daniel Herrero (UCM – ICEI)

Abstract

The transformation of the German employment and industrial relations model has been read as a process of dualization. Using the IAB Establishment Panel, this paper empirically tests two aspects of this thesis: (1) the appearance of an economic core, which preserves traditional institutions, and a periphery, where institutional change is concentrated; and (2) the key role structural change in the process. For this purpose, the evolution of atypical employment and the coverage of the dual system of industrial relations is analyzed in nineteen type of establishments. Then, the contributions of each establishment type to the erosion of the model and the impact of structural change are estimated using a decomposition technique. The results reveal that (a) the current status of the model is defined by the presence of a core, a periphery and a semiperiphery of establishments; and (b) the change in the employment structure has played a minor role in the process.

Key words: Industrial Relations, Labor market, Atypical employment, Germany, Institutional change

1. Introduction

Since the early 1990s, the erosion of the German employment and industrial relations (IIRR) model (*Modell Deutschland*, MD) has drawn the attention of many scholars (Eichhorst and Marx, 2011; Hassel, 1999). Although similar liberalization trends have been registered in other European economies (Koch and Fritz, 2013; Visser, 2013), Germany is a striking case because it has been considered a type of nonliberal capitalism (Streeck, 1997) or a coordinated-market economy (CME) (Hall and Soskice, 2001), distinguished by a solid partnership between capital and labor and cooperative relations among firms. Other key features include high levels of standard employment, encompassing sectoral agreements and employees' plant-level representation in work councils with information, participation and co-determination rights. Although the model was grounded in manufacturing industries, these features could be found across the whole economy. Additionally, strong macroeconomic results, i.e., high productivity and competitiveness in dynamic industries, a balanced current account and low levels of wage dispersion and wealth inequality, were achieved within this institutional framework during the 1970s and 1980s.

Some scholars have held that the expansion of non-standard work, the decline of sectoral agreements coverage and the dwindling presence of work councils in establishments were signs of exhaustion of the MD in the globalization era, during which most advanced economies have suffered from similar pressures that have transformed them in a common direction (Baccaro and Howell, 2011). Although the MD has not been converging toward an ideal Anglo-Saxon model, it has experienced an "internal softening" or a re-institutionalization process characterized by the substitution of the former obligatory institutions and the dominance of social agents by voluntary pacts between individual actors (Streeck, 2009). According to these authors, there are some segments

of the economy in which this process has advanced more (mainly low-level services), but leading core industries are not immune to it. This outcome is partly explained by the very nature of capitalism as a social order, which tends to break non-market institutions (Streeck, 2010), and by the shift in an export-led growth regime experienced by Germany, in which price competitiveness is a central concern that cannot be addressed under the former institutional agreements (Baccaro and Benassi, 2017).

Other scholars, mainly linked to the Varieties of Capitalism (VoC) school, have stated that the MD has been involved in a process of dualization, which is the form that liberalization has taken in Germany (Thelen, 2014). Thus, the economy is composed of two economic segments. On the one hand, there is a coordinated core, formed by manufacturing firms and its workforce, for which non-market institutions remain important competitive tools. On the other hand, there is a growing periphery of service activities that rely on market-based coordination, leading to the expansion of atypical employment and the erosion of the IIRR system. Furthermore, the growing importance of the service sector –terciarization– and the shrinking size of manufacturing – due to deindustrialization– have resulted in an increasingly encapsulated model. In summary, the MD is still coordinated in core industries, but it is less encompassing or solidaristic, and it is located in a diminishing proportion of the economy (Carlin and Soskice, 2009; Palier and Thelen, 2010; Reisenbichler and Morgan, 2012; Hassel, 2014; Thelen, 2014; Möller, 2015; Eichhorst, 2015).

Nonetheless, three contributions can be made to dualization thesis. First, normally, less productive and low capital-intensive industries are more likely to use flexible forms of employment and to seek wage-setting practices on the sidelines of collective agreements. Thus, logically, the erosion of the MD will be concentrated in consumer services, and it is important to separate them from business services, which are linked to manufacturing. Second, it is not always clear which parts of the economy belong to the core. For instance, some papers have stated that only large exporting firms belong to it; others have referred to particular industries, and still others have examined the whole manufacturing sector. In any case, it is fairly trivial for the analysis to distinguish advanced manufacturing – predominantly settled in high value added strategies for which coordinated institutions are critical – from nonprogressive manufacturing. At the same time, other variables, such as the firm size or its location, are important to exactly demarcate core manufacturing. Third, more empirical evidence of the role of structural change in the transformation of the MD is needed.

Using data from the *IAB Establishment Panel*, two main objectives are addressed in this paper. The first is to chart the presence and evolution of the MD in the principal activities of the economy, which are those with direct links to manufacturing and that are historically grounded in traditional institutions. To this end, nineteen groups of establishments are built on the basis of three variables: industry (advanced manufacturing, other manufacturing, and business services); location (west and east); and size (small or medium and large establishments). A coordinated core, formed by large western advanced manufacturing establishments, is well defined. The hypothesis is that the classical features of the MD will be present there, i.e., low levels of atypical employment (fixed-term, part-time, agency work and marginal) and the joint presence of sectoral agreement and work council. The second hypothesis is that the erosion of the MD will be concentrated to a greater or lesser degree in a heterogeneous periphery of establishments. The other goal of the paper is to quantify the contributions that each establishment type has made to the erosion of the MD and to determine the role of structural change in the process.

To address the first goal, following the methodology of recent studies based on the same dataset (Addison et al, 2017; Oberfichtner and Schnabel, 2018), the incidence and evolution of atypical employment and the IIRR system is descriptively analyzed in each establishment type throughout the period of 1996-2014. The second goal is addressed by adapting the decomposition technique employed by Sharpe (2009) in his studies of productivity and structural change.

This paper's findings support the dualization thesis, but with four important nuances: (1) core manufacturing establishments have contributed to the erosion of the MD by the expansion of agency work and by moving toward a more individualized IIRR framework but without abandoning collective bargaining; (2) a periphery of establishments, in which non-standard employment has been triggered, and the presence of collective agreements and work councils is residual, has led the erosion of the model; (3) in an intermediate or semiperipheral position, is found a group of establishments in which the retrenchment of the MD is uncompleted; and (4) the role of structural change is of secondary importance, and the factor driving the dualization is the strategic decisions made by individual firms.

The paper is organized as follows. Section 2 provides an overview of the main features of the original MD and the process of institutional change from the point of view of the dualization thesis. The methodology is presented in section 3. Descriptive evidence is reported in section 4. Section 5 presents the results of the decomposition formula. The sixth section concludes.

2. Background of the MD

2.1. The original MD

Until the late 1980s, the MD was characterized as a solidaristic CME, in the sense that coordination institutions “*were relatively encompassing in scope and relatively uniform in content*” (Thelen, 2009: 480). Its main features were the existence of corporatist social actors and a strict labor law that kept salaries and working conditions away from competition. Core manufacturing industries were the heart of the model and acted as pace-setters for the entire economy, defining working conditions and the average wage growth rate. Union density was low (34.4% between 1970 and 1990, OECD Statistics) but was concentrated in these core industries (automotive, machine tools or metalworking) and the public sector. In general, the trade union movement was centralized and non-competitive, and it pursued inclusive labor policies under the principle of “*equal pay for equal work*” (Benassi and Dorigatti, 2015: 536). Membership rates in employer associations were much higher: two thirds of firms were affiliated, in which 80% of the workforce in the private sector was employed (Bunn, 1984; cited in Sylvia, 1997: 189). These associations negotiated with unions considering the average economic situation of their members (the so-called convoy principle). This combination between encompassing actors and tight labor regulation fostered the presence of non-market institutions in the whole economy.

Concerning labor relations, coordination in the core manufacturing industries was achieved by a union strategy that sought low atypical employment levels. Long-term and stable contracts were promoted by industrial firms too because they relied on employees with hard to replace sector- and firm-specific skills (Hall and Soskice, 2001). At the same time, work councils controlled the abusive use of atypical contracts by personnel departments. This institutional environment encouraged mutual trust relationships between management and employees, dominated by a cooperative approach and relative social peace at the workplace level. In this way, in moments of economic slowdowns or

structural change (like during the 1980s), institutional rigidities were compensated for by agreements regarding internal flexibility and distribution of working times (Thelen, 2001). It was also a solidaristic labor market because the regulation was logically extended along the entire economy, assuring high employment protection and great limitations on the use of atypical employment in all industries.

The German system of IIRR was (and still is) “dual”, with two formally independent levels of interest representation – industry and workplace – with separated but complementary functions.

At the upper level, trade unions and employers’ associations set wages and working conditions in industry-wide collective agreements (*flächentarifverträge*). The main determinant of the coverage rate was the density of the employers’ associations because sectoral agreements are legally binding on all of their members. Although sectoral agreements were only compulsory for union members, in practice, companies do not differentiate between affiliated and non-affiliated workers when applying it. Distributive conflict was mainly organized at this level and thus shifted away from plants. Departures from collectively agreed norms at the workplace level could only be concluded in the employees’ favor (the so-called favorability principle, *günstigkeitsprinzip*). The state does not interfere in collective bargaining, in which the principle of autonomy is constitutionally guaranteed (*tarifautonomie*).

At the lower level, work councils and management are the main characters. Work councils are mandatory in plants with five or more permanent employees, but they are not automatic and must be proactively formed by the workforce. They are endowed with information, consultation and co-determination rights on social matters (these rights increase with establishment size) by the Work Constitution Act (*Betriebsverfassungsgesetz*). The number of members of the work council is determined by the number of employees with voting rights (BetrVG §9). The law requires them to work in a “spirit of mutual trust” together with managers (BetrVG §2) and prohibits them from calling strikes or any type of industrial action (BetrVG §74). Furthermore, they are not allowed to reach agreements with managers on matters agreed upon at the sectoral level by collective actors, unless otherwise stipulated in the collective agreement (by means of derogation clauses, which are detailed below).

It has long been recognized that this division of functions, by which distributional issues were settled away from workplaces, while work councils mainly focused on organizational and productive matters, has favored a climate of cooperation between workers and managers at the plant level and has led firms to positive economic performance (Jacobi et al, 1992; Freeman and Lazear, 1995).

The MD was solidaristic apart from being coordinated because core manufacturing industries established benchmarks for other economic sectors in terms of wages and working conditions. Consensual wage bargaining was accomplished by corporatist collective actors, which overcome the individual interests of their members in pursuit of macroeconomic goals (like economic growth, exports or unemployment) (Maier, 1984). Wages were set by pattern bargaining: the collective agreement in metalworking engineering between IG Metall and Gesamtmetall in Baden-Württemberg set the pace for other economic branches and regions. Wage growth was coordinated among industries, so productivity growth was transferred from the more productive to the less productive sectors (Jacobi et al., 1992: 248). Finally, sectoral agreements could be extended to an entire industry or region by the labor ministry if at least 50% of the employees were already covered, and the extension was considered a matter of public interest (Schulten, 2018, provides an excellent revision of this tool).

2.2. Institutional change in the MD

Since the early 1990s, the MD has started to display strong signs of institutional change. Particularly relevant were labor market deregulation, growing expansion of atypical employment and the sharp drop in sectoral bargaining and work council coverage. However, some scholars have pointed out that this process has had an unequal incidence in the economy, taking the form of dualization.

Dualization is characterized by the emergence of two segments in the economy: a coordinated core formed by manufacturing firms in leading industries (not always specifically delimited) and its workforce, in which traditional institutions remain intact; and a periphery of low-level services, in which the incidence of non-standard employment is particularly high, and the dual system of IIRR is hardly present. Both segments are not self-contained areas, but “*the two sides of the same coin*” (Thelen, 2014: 51). The manufacturing producer coalition from which the MD spread across the whole economy has promoted dualization as a strategy to provide the needed labor flexibility for its competitiveness and to protect the real wages of the workers (Palier and Thelen, 2010; Hassel, 2014; Thelen, 2014). Thus, they have sustained – or at least have not opposed – deregulation of the labor market, decentralization of collective bargaining and the fall of its coverage, resulting in a segmented and less egalitarian but still coordinated economy (Thelen, 2009).

Regarding employment relations, the transformation of the MD is characterized by the sharp increase in the four main types of atypical employment: fixed-term, part-time, marginal and temporary agency work (Keller and Seifert, 2013). A necessary condition for this increase was deregulation of the labor market (Eichhorst and Marx, 2011). The starting point was the approval of the Employment Promotion Act (*Beschäftigungsförderungsgesetz*) in 1985, which extended the maximum duration of fixed-term contracts (until 18 months) and temporary agency work (from 3 to 6 months) without objective reasons. Since then, further reforms have been passed with the aim of rendering the labor market more flexible. Quite relevant were the reforms affecting part-time employment (*Teilzeit- und Befristungsgesetz*, 2001), fixed-term employment (1997) and progressive liberalization of temporary agencies (1997 and 2002). In 2003, the Hartz reforms were the last step in the process. They fully liberalized agency work, removing the maximum length of this type of contract (Hartz I). At the same time, they contributed to the expansion of marginal employment by the creation of *mini-jobs* and *midi-jobs*, with limited social contributions (the maximum of 15 hours per week was abolished under Hartz II). In turn, Hartz III promoted the reorganization of the Federal Employment Agency and reinforced active labor market policies; and the controversial Hartz IV reduced the duration of the unemployment benefit and introduced means-tested social assistance for the long-term unemployed, with the aim of reducing the reservation wage.

Nevertheless, deregulation is only a precondition for non-standard employment growth. Once it is permitted by law, its expansion is led by labor demand. When the obligations imposed by institutions disappeared, non-standard employment rapidly increased among the less-skilled workforce and in those industries in which employees had less control over the production process and diminished union strength. Then, labor market deregulation was selective, *de facto* it mainly affected the periphery of economic activities and not core manufacturing (Eichhorst, 2015; Eichhorst and Tosch, 2015).

Concerning the IIRR system, three main factors of institutional erosion have been identified. The first is the shrinking coverage of sectoral level agreements and work councils and the decrease in employer’s associations and union density. Many companies have abandoned sectoral bargaining

due to their departure from employers' organizations or because they became special members (*ohne tarifbindung*), so they could avoid the wage agreement signed by the association.

Despite defenders of dualization mainly emphasizing the sectoral axis, other important determinants of this trend found in the literature are the firm size or its position in the supply chain. During the 1980s and 1990s, the relationship between suppliers and customers was hampered because of the aggressive tactics of the latter. Powerful large companies faced increasing competition in foreign markets by intensifying cost pressures on suppliers, with which they successfully negotiated price cuts. These practices damaged sectoral bargaining because client companies and suppliers were members of the same employer associations and thus were covered by the same collective agreements, in which the interests of the larger companies prevailed. Agreed-upon wages were too high for suppliers, and small medium firms were affected especially badly. As a result, intercompany solidarity was hurt, and a majority of small and medium enterprises flew from employer associations and sectoral bargaining (Silvia, 1997; Silvia and Schroeder, 2007). Associated with this result, the outsourcing strategies of manufacturing firms have also contributed to the emergence of a segment of employees outside IIRR institutions. Doellgast and Greer (2007) highlighted that "*the creation of new intermediate markets in previously integrated production processes*" undermine coordinated bargaining by moving workforce from core to peripheral firms, in which different wage settlements (if any) are reached. Additionally, an important decline in work council coverage is registered, as is the share of employees without codetermination rights, mainly related to the growing pressures of the employers' associations, which had been pointing out that work councils enjoy "excessive rights" (Kinderman, 2014; Müller and Stegmaier, 2017) and the lack of union structure in these sectors.

The second factor of erosion is the decentralization of collective bargaining. New possibilities for firms to deviate from sectoral agreements and to implement local adjustments were designed. Through hardship clauses (*härtefallklauseln*) and opening clauses (*öffnungsklauseln*) actors at the firm level were able to reach agreements on matters normally addressed at higher levels, eluding the favorability principle. Initially, these clauses were designed for companies with economic difficulties (mainly in the East), but in practice, they were (and still are) employed by healthy firms to implement internal flexibility measures regarding working time, compensation or organizational issues in exchange for investment compromises and employment security in the framework of the Pacts for Employment and Competitiveness (*Bündnisse für Arbeit und Wettbewerbsfähigkeit*) (Seifert and Massa-Wirth, 2005)¹. During the last crisis, these clauses, together with short-time work schemes (*Kurzarbeit*), were mostly employed by manufacturing firms to preserve their skilled workforces (Reisenbichler and Morgan, 2012; Doerflinger and Pulignano, 2018). The regional axis has been critical to understand the decentralization trends. The institutional structure was transferred from western to eastern *Länder*, where the economic structure was weaker, and the firms were less productive, causing a steady decline in bargaining coverage and the creation of the aforementioned hardship clauses². For this reason, IIRR institutions tend to be less present in the East. In addition, the trade union movement has become laterally disorganized, i.e. "*new unions emerged for the same category of employee within the same bargaining area*", creating inter-union competition and hampering the system's governability, leading to a progressive fragmentation of collective bargaining (Burgess and Symon, 2013: 721).

Third, several scholars stressed the importance of the transition towards a service economy (terciarization) in the fragmentation of industrial relations. The relative growth of employment in service industries, in which unions are weak, and the presence of the dual system of IIRR is lower,

has contributed to the decline of the coverage (Lash and Urry, 1987; Traxler, 1996; Thelen, 2014). At the same time, as stated above, the dual system is less grounded in newly founded firms (Silvia, 1997; Addison et al, 2017).

Naturally, this whole process of erosion has damaged social partnership and pattern bargaining, causing a qualitative transformation of peak-level coordination. In the original MD, sectoral agreements imposed minimum standards over local actors, but now they are only a simple reference for individual bargainers at the firm level. For example, the difference between the rates of growth of wage rates agreed upon in sectoral bargaining and the effective average wage (wage drift) has been negative since 1995, which is the first year for which data are available (*WSI-Tarifarchiv, Destatis*).

Although there seems to be a consensus about these general transformations, their dimension and location are not accurately measured. The following empirical analysis attempts to partly overcome this gap. To this end, the center and the periphery of the MD are defined considering the three axes of the process (industry, size and region) and the evolution of non-standard employment, and the coverage of the two pillars of the IIRR are charted.

3. Methodology

The analysis is based on the *IAB Establishment Panel*, a representative dataset of the Institute for Employment and Research (IAB) of the Federal Employment Agency (BA). It annually surveys establishments (not firms) from all sectors and sizes using a stratified random sample of all plants that employ at least one worker covered by social insurance on 30 June of a year. Information about labor contracts and IIRR (among other topics) is collected from personal interviews with the owners or the managers of the establishments. The first survey was conducted in 1993 only for the former West Germany and was extended in 1996 to eastern establishments. The sample size has steadily grown, increasing from 4,265 establishments in 1993 to more than 15,000 from 2001 onward (for more detail, see Fischer et al, 2009; Ellguth et al, 2014). Each cross-section (year) could be combined to form a panel data structure (Umkehrer, 2017). Addison et al (2017) and Oberfichtner and Schnabel (2018) performed similar investigations with this dataset, so their results are referenced throughout the paper.

Three variables are employed to build 19 establishments types.

1. Industry: the analysis is centered on the German private sector³. Economic activities are grouped into five groups: advanced manufacturing, other manufacturing, business services, supplies and consumer services, and construction, agriculture and extractive industries. I employ the OECD taxonomy of economic activities based on R&D for clustering manufacturing industries (Galindo-Rueda and Verger, 2016). Advanced manufacturing (for which non-market institutions are critical) is composed of high and medium high R&D intensity industries. Other manufacturing includes medium-low and low R&D intensity industries. Business services and consumer services constitute the same categories as described in Franke and Kalmbach (2005). Lastly, construction, extractive industries and agriculture are grouped into a single category. This classification is detailed in the appendix (Table A.5). The dataset provides a time-consistent industry classification, so the results in 1996 and 2014 are perfectly comparable, which is not the case in Addison et al (2017) and Oberfichtner and Schnabel (2018).

2. Size: I differ between large establishments (200 or more employees) and small and medium ones (less than 200 employees).

3. Region: Establishments located in eastern *Länder* are separated from those located in the West.

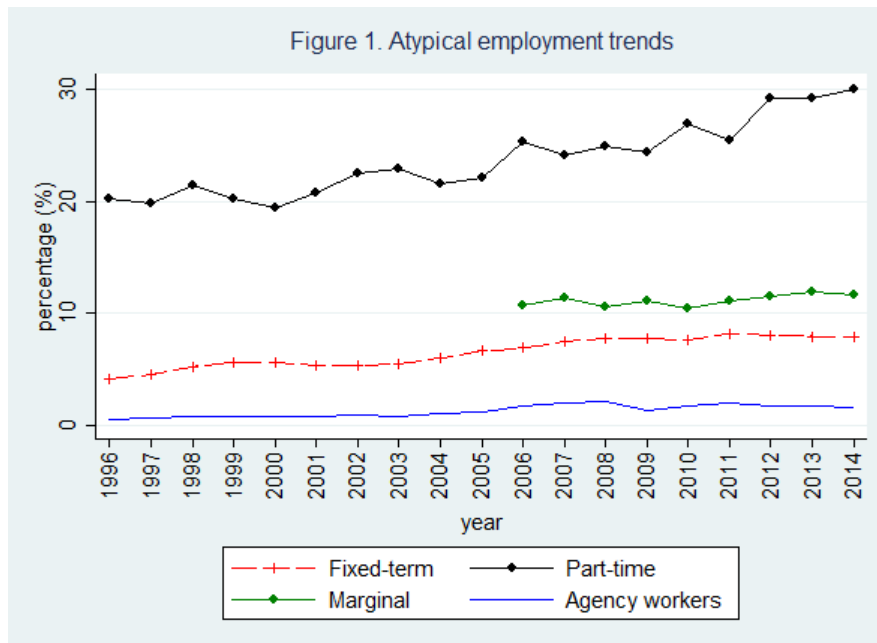
In this way, this article provides an accurate description of German core manufacturing for the empirical analysis. It is identified as the group of large and advanced manufacturing establishments located in the West. The periphery is theoretically composed of the eighteen remaining establishment types.

The analysis excludes all establishments with fewer than five employees since is the employment threshold for works council formation. Because the investigation goal is to capture a process of institutional change, I sought the longest period possible: 1996-2014. For this purpose, 18 cross-sections are used to chart yearly atypical employment incidence and coverage rates. The results are cross-section weighted. The final sample is 190,645 observations (approximately 7,000 for the first four years and between 10,400 and 11,300 in subsequent years). Empirical analysis is focused on the proportion of employees by establishment type.

4. Descriptive evidence

4.1. The evolution of the model: aggregate data

Aggregate evolution of the MD is charted in Figures 1 to 4. The four main forms of non-standard employment (Keller and Seifert, 2013) have increased to a greater or lesser degree throughout the period (Figure 1; Table A.1 in the appendix). Part-time work has been the fastest growing type during the reporting years (9.9 percentage points, pp), reaching an employment share of 30.1% in 2014. Temporary agency work incidence is the lowest (1.6%), but it has tripled in size since 1996. Marginal employment is approximately one tenth of total employment (11.6%), and it remained stable⁴. Fixed-term (7.9% in 2014) has grown 3.9 pp.

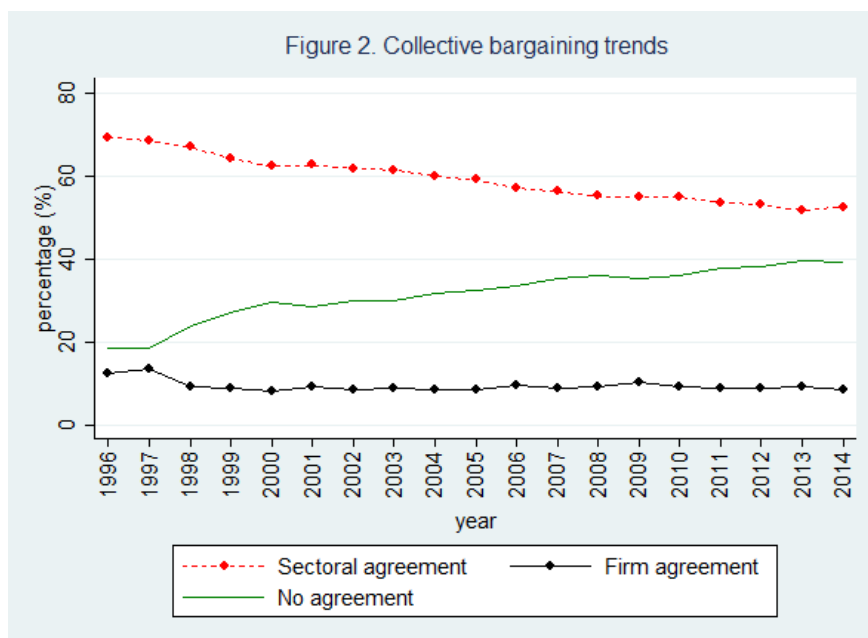


* Data cannot be totaled because the groups overlap | Data on marginal employment are not available from 1996 to 2005 | Data on agency workers from 1999 to 2001 are authors' own calculations

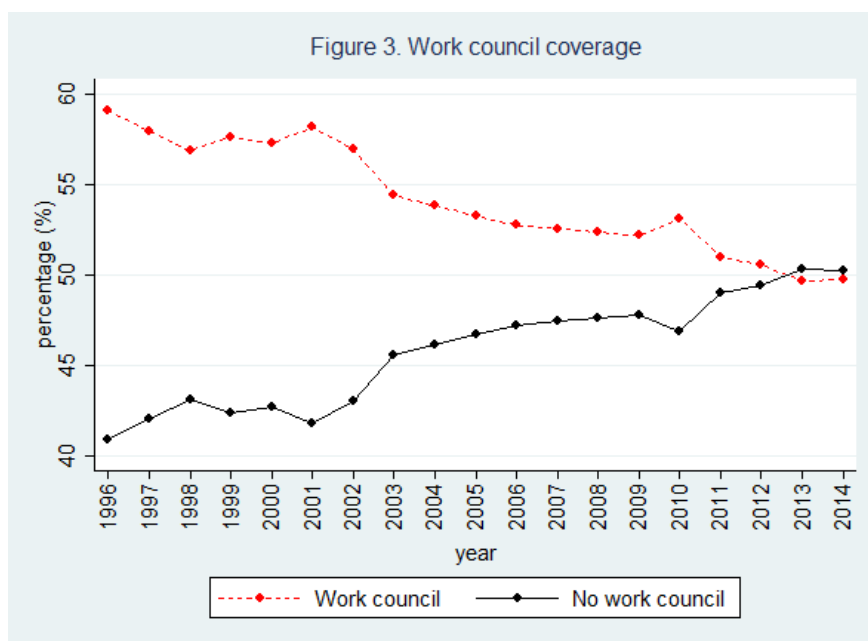
* Source: IAB Establishment Panel, own calculations

IIRR system trends are plotted in Figures 2-4⁵. The share of employees covered by sectoral agreements has substantially fallen (16.8 pp). In 2014, just over half of employees were under these agreements (52.5%). Firm agreement coverage showed a sharp decline in the first years and has remained stable since 1998. As a result of these trends, the segment with no collective bargaining has significantly grown, from 18.5% of total employees in 1996 to 39.1% in 2014 (Figure 2; Table A.2 in the appendix).

Work council coverage has evolved in a similar way (Figure 3; Table A.2 in the appendix). It has decreased 9.2 pp, so in 2014, there was almost the same proportion of employees in establishments without work councils (50.2%) than with them (49.8%).

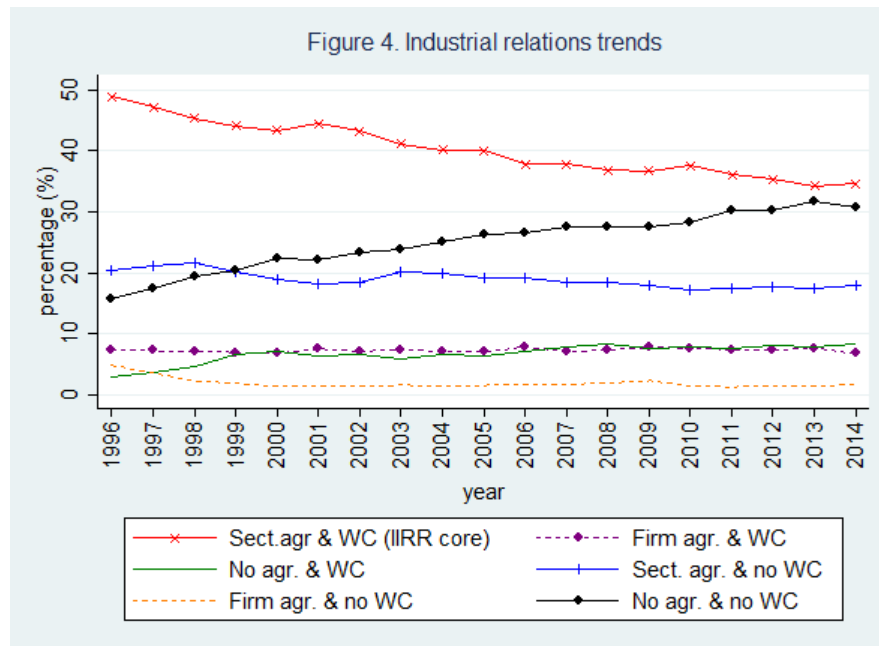


Source: IAB Establishment Panel, own calculations



Source: IAB Establishment Panel, own calculations

Figure 4 (Table A.3 in the appendix) charts the six possible combinations between collective bargaining and work council presence. The joint presence sectoral bargaining and work council is what I have called ‘IIRR-core’, i.e., the proportion of workers in establishments with the two pillars of the German IIRR. In 1996, its coverage rate was 48.9%, but it decreased to 34.6% in 2014. A broader definition of IIRR-core might include the employees covered by firm agreements and work councils. In this case, although this type of coverage is low (7.4% in 2014), it did not change much over the period. Altogether, the proportion of employees covered by work councils and any type of collective bargaining agreement was 41.3% in 2014, indicating that the dual system is in marked retreat. Conversely, the segment without either bargaining or work councils has grown from 15.7% to 30.7%; thus, it had almost the same incidence than the IIRR-core.



Source: IAB Establishment Panel, own calculations

In summary, although this paper only analyzes the private sector, the aggregate results are quite similar to the picture that Oberfichtner and Schnabel (2018) drew for the entire economy. They found that the coverage rate of the IIRR-core, including firm agreements, dropped from 54.4% in 1996 to 39.6% in 2015. This fall is correlated with the increase in the no bargaining and no work councils sector, which rose from 15.9% to 32.9%. Furthermore, Oberfichtner and Schnabel computed the same calculations based on the establishments covered (not employees) and found that the weakening of the two pillars of IIRR has been even more pronounced: IIRR-core fell from 15.5% to 9.4%, and the blank sector increased from 33.5% to 60.7%.

4.2. The evolution of the model: establishment trajectories

Significant differences are found among establishment types when examining disaggregated data. Scatter plots are used to show the establishments that led to the erosion of the MD and those that preserved it. The cumulative growth (1996-2014) of each form of employment and the coverage of the dual system of IIRR (horizontal axis) are plotted against the level of the same variables in 2014 (vertical axis). Lines represent the growth and level of each variable for the whole sample. Acronyms

are used to represent the 19 types of establishments. The first letter is size (“l” large, “s” small and medium), the second is region (“w” west, “e” east), and the third is industry (“a” advanced manufacturing, “o” other manufacturing, “b” business services, “s” supplies and consumer services and “c” construction, agriculture and extractive industries)⁶.

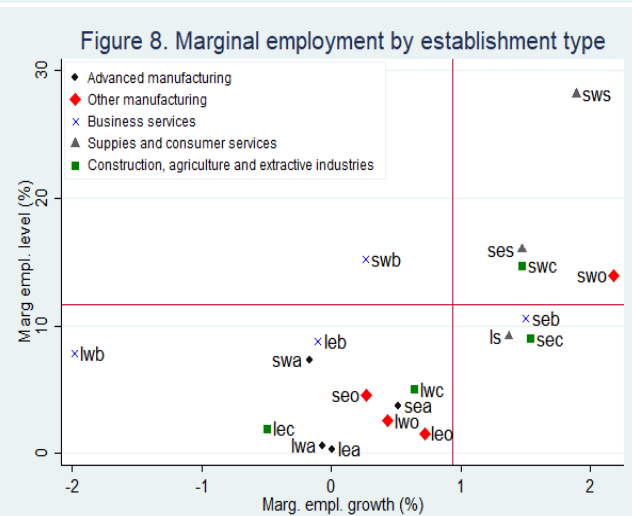
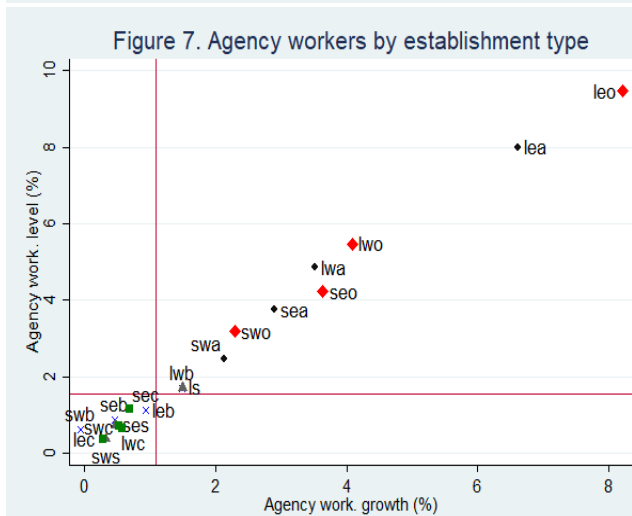
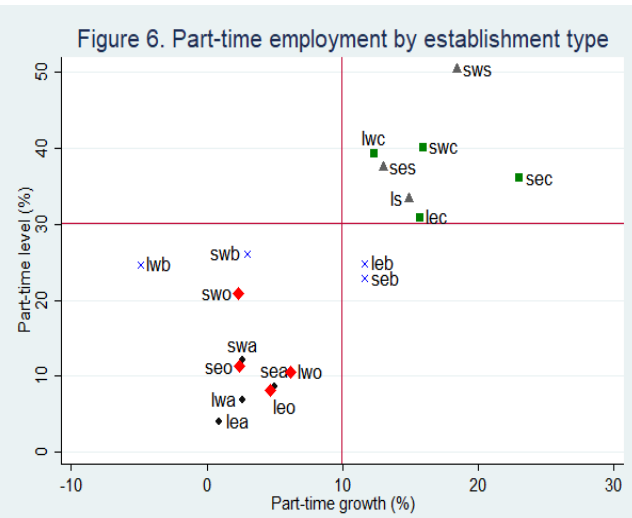
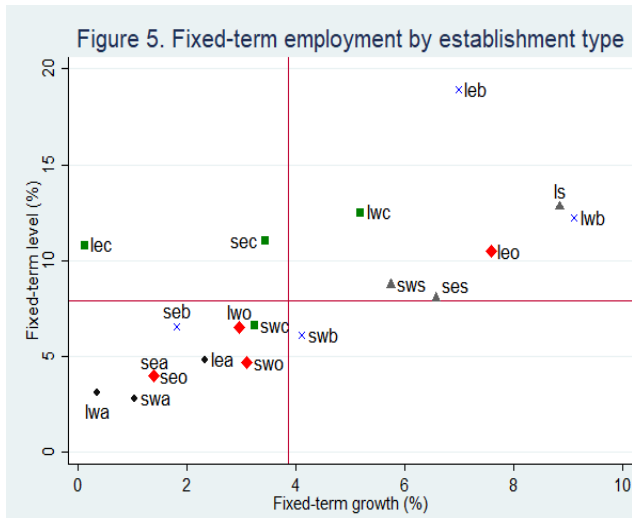
Figures 5-8 (Table A.4 in the appendix) show the evolution of employment. In this case, establishments that drove atypical employment growth are located in the upper-right sector, and those that contained it are in the bottom left sector. Huge heterogeneity can be detected with one quick look.

First, core manufacturing establishments (*lwa*) fall into the bottom left areas of the fixed-term, part-time and marginal employment figures. Nevertheless, they have led the expansion of agency work, along with the rest of the large manufacturing establishments, indicating that some dynamics of segmentation have emerged within these firms (Benassi, 2016). The performance of *lea* establishments was similar, but the share of fixed-term employment and, especially, temporary workers were almost twice that in the core manufacturing. *swa* and *sea* establishments also behaved in an analogous way. They are located in the same areas as *lwa* establishments; however, the incidence of part-time and marginal employment was slightly higher, while it was lower for temporary work and quite similar regarding fixed-term employment.

Conversely, fixed-term work growth was driven by consumer services, large business services establishments, *lwb* and *leo*, while part-time growth was led by consumer services, construction, agriculture and extractive industries and, on a secondary level, by eastern business services establishments. Marginal employment was particularly important for *swa*, *swc* and small establishments in business and consumer services, but it has not grown significantly in any establishment.

Finally, agency work prevailed in manufacturing (especially in large eastern establishments). In this case, sectoral dimension is quite decisive: all manufacturing establishments presented levels and growth of this employment type above the average, whereas the rest of them are situated in the bottom left sector.

Figures 5-8. Atypical employment by establishment type



*1st letter = size ("l" large, "s" small and medium); 2nd letter = region ("w" west, "e" east); 3rd letter = industry ("a" advanced manufacturing, "o" other manufacturing, "b" business services, "s" supplies and consumer services, "c" construction, agriculture and extractive industries).

Source: IAB establishment panel, own calculations

Disaggregated data of IIRR are presented in Figures 9 and 10, which show respectively a narrow definition (the combination of sectoral agreements and work councils, *IIRR-core*), and a broad definition of the German dual system (the joint presence of sectoral or firm agreements and work councils, *IIRR-core broad definition*) (Table A.5 in the appendix). Due to the growth rate being negative, establishments located in the bottom left sector of these figures have led to the erosion of the IIRR system, while those located on the upper-right side have contained it. It is clear from these figures that the two pillars of IIRR are mainly present in large establishments (as shown by Oberfichtner and Schnabel, 2018): all of them are situated above the average coverage level, while all small and medium establishments are below it, but industry and region variables provide important information.

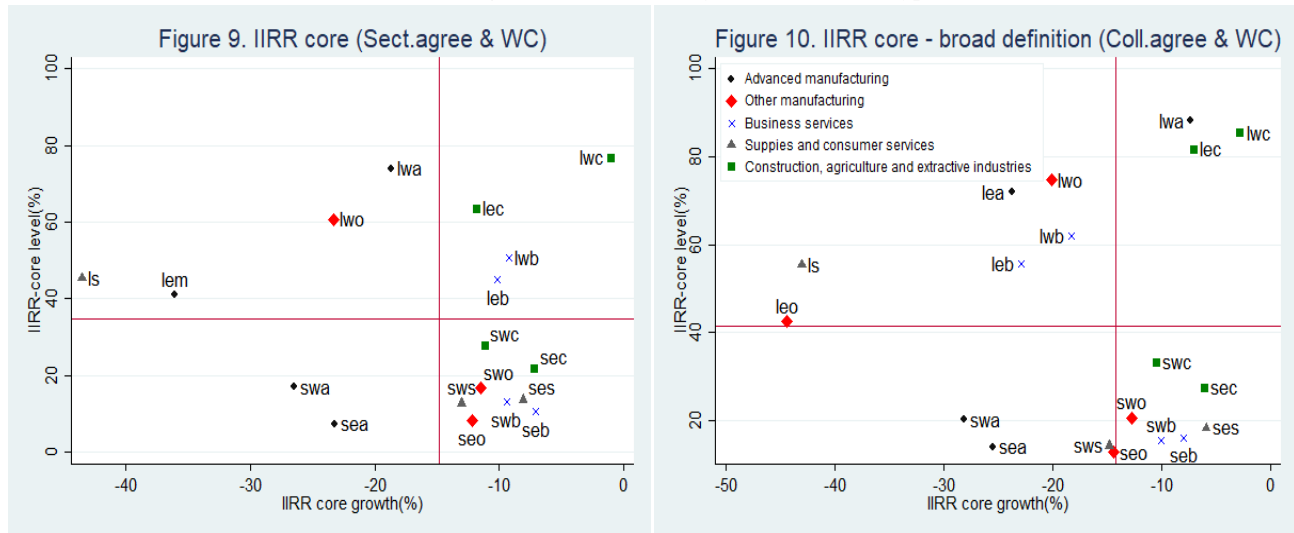
Core manufacturing establishments (*lwa*) are located in the upper-left sector of the narrow definition of the *IIRR-core* figure. However, when the definition is relaxed (Figure 10), it falls in the

upper-right sector. It has been the only manufacturing establishment type in which the MD has resisted, with still high (88.3%) and relatively stable coverage. Stated differently, it seems that German core manufacturing has decentralized collective bargaining, but it has not turned into a “liberal-market” wage-setting system. Additionally, the dual system was preserved in large establishments in construction, agriculture and extractive industries, mainly in western *Länder*s.

The coverage rate in *lwo* establishments has declined by 23.3 pp (20 pp if one uses the soft definition of *IIRR-core*), but it still remains high (60% and 80%, respectively). Conversely, the coverage has suffered an even sharper decrease in both eastern manufacturing (*lem*) (36.1 pp) and consumer services establishments (43.5%)⁷, and their levels in 2014 were the lowest among large establishments, along with business services. *lwb* and *leb* establishments are both located in the upper-right area in Figure 9 (narrow definition), but their coverage rate diminished less than any of the other groups. Nevertheless, if the definition of *IIRR-core* is relaxed, the decrease almost doubles. In general, *IIRR* trends in services were marked by the abandonment of collective agreements.

Finally, the presence of the *IIRR-core* coverage is very low in small and medium establishments (between 7.3% and 16.9% using the narrow definition; between 12.8% and 20.3% adopting the broader one), and its decrease has been particularly severe in *swa* and *sea* establishments (approximately 25 pp using both definitions).

Figures 9-10. *IIRR* by establishment type



**1st letter = size (“l” large, “s” small and medium); 2nd letter = region (“w” west, “e” east); 3rd letter = industry (“a” advanced manufacturing, “o” other manufacturing, “b” business services, “s” supplies and consumer services”, “c” construction, agriculture and extractive industries).

*Due to sample restrictions, large eastern manufacturing establishments are grouped into one category (*lem*, large eastern manufacturing) in Figure 9.

Source: IAB establishment panel, own calculations

In summary, descriptive evidence confirms that the MD is grounded in the large western advanced manufacturing establishments, but they have been involved in the institutional change by increasing the share of agency workers in their workforces and by moving to a more relaxed notion of *IIRR-core*, in which firm agreements have become more important. At the same time, enormous heterogeneity is found across the remaining establishment types, indicating that several protagonists

were involved in the erosion of the MD. As stated by Oberfichtner and Schnabel, the MD “*resembles a Swiss cheese: rather solid from outside, but with many holes inside*” (2018: 27). Although they are only depicting the IIRR system, the analogy might be extended to the labor market too.

5. Establishments’ contributions to the erosion of the MD and the role of structural change

In this section, I seek to quantify the contributions to the erosion of the MD made by each establishment type. Two factors can play important roles here, and both must be controlled: first, contributions made due to atypical employment demand growth (or changes in the incidence of the dual system of industrial relations); and second, contributions made by structural change, i.e., employment reallocations among establishments types. To this end, I have adapted the decomposition formula developed by Sharpe (2009) in his studies of productivity growth to my investigation goals. This formula has advantages over other options. In particular, it successfully controls reallocation effects, in contrast to the Traditional Decomposition Formula (TRAD) (De Avillez, 2012: 114). At the same time, against Fernández and Palazuelos’ (2012) option, it distinguishes between two reallocation effects (level and growth), and it is perfectly additive.

This approach is formalized in Equation (1), which breaks down the absolute change in atypical employment share (IIRR-core) (Δv_t) into three effects throughout the period (t) of 1996-2014. In the formula, k is each of the 19 establishment types. f is the share of each k group over total employment. A is the number of atypical jobs (number of employees covered by the dual system of IIRR). E is total employment.

$$(1) \quad \Delta v_t = \sum_k \underbrace{[\Delta v_t^k * f_{t1}^k]}_{(1) \text{ WGE}} + \sum_k \underbrace{\left[\left(\frac{A_{t1}^k}{E_{t1}^k} - \frac{A_{t1}}{E_{t1}} \right) * \Delta f_t^k \right]}_{(2) \text{ RLE}} + \sum_k \underbrace{\left[\left(\Delta \frac{A_t^k}{E_t^k} - \Delta \frac{A_t}{E_t} \right) * \Delta f_t^k \right]}_{(3) \text{ RGE}}$$

In the Equation, three effects are measured.

(1) *Within Group Effect* (WGE) captures the contributions to non-standard employment growth due exclusively to changes in demand growth undergone by individual establishment types, weighted by its employment share in t1 (1996; 2006 for marginal employment). In the case of IIRR-core, this term captures the contributions to the decrease in dual system coverage.

(2) *Reallocation Level Effect* (RLE) measures the contributions caused by labor shifts to establishments with levels of atypical employment or IIRR-core below – or above – average levels in t1, weighted by its employment share growth. This effect is positive in two situations: when an establishment above-average nonstandard employment (below average IIRR-core coverage, due to it has been negative) level experiences an increase in its labor input share⁸; or when an establishment with below-average non-standard employment (above average IIRR-core coverage) level experiences a reduction in its labor input share⁹.

(3) *Reallocation Growth Effect* (RGE) captures the contributions caused by labor moves to establishments below – or above – average atypical employment (IIRR-core) growth, weighted by its employment share growth. RGE is positive either when an establishment above-average growth gains relative weight¹⁰ or when an establishment below

atypical employment growth loses relative weight (below average and above average IIRR-core, respectively)¹¹.

The total contribution of each of the establishment types (k) is equal to the sum of its components WGE, RLE and RGE. The sum of the nineteen establishment contributions is exactly the absolute change in atypical employment (IIRR-core) throughout the analyzed period since the formula is perfectly additive. Contributions are expressed in relative terms.

6.1. Results: Total contributions to the erosion of the MD

Relative weights in employment of the nineteen establishments are quite distinct (Figure A.1. in the appendix). For example, 36.2% of total employment is in *swb* and *swc* establishments; therefore, its contributions will tend to be higher than most establishments. The six eastern establishments account altogether for a significantly lower proportion (19% in 1996; 17.2% in 2014), so their individual contributions will be rather moderated. At the same time, the major change in the employment structure throughout the period was the labor shift from *swo* and *lec* to *swb*, *swc* and *sws*. These reallocations will be reflected in RLE and RGE. Lastly, the share of workers employed in core manufacturing establishments remained constant (about 7%).

At the aggregate level, the estimations indicate that the effect of cumulative labor shifts – RLE and RGE – was of lesser importance (Table 1). The WGE has performed the key role in both labor market and IIRR. Thus, the main drivers of the erosion of the MD are the strategic decisions made within establishments and not the structural change.

Table 1. Decomposition formula -- Cumulative results

	WGE	RLE	RGE	Total	
Fixed-term employment	104.0%	-6.3%	2.2%	100.0%	$\Delta 3.9pp$
Part-time employment	94.6%	6.2%	-0.8%	100.0%	$\Delta 9.9pp$
Agency workers	110.2%	-0.6%	-9.6%	100.0%	$\Delta 1.1pp$
Marginal employment	73.5%	26.6%	-0.1%	100.0%	$\Delta 0.9pp$
IIRR core (narrow definition)	85.5%	17.0%	-2.4%	100.0%	$\Delta -14.3pp$
IIRR core (broad definition)	82.8%	19.1%	-1.9%	100.0%	$\Delta -14.9pp$

Source: IAB establishment panel, own calculations

When looking at the results by industries (Figures A.2 – A.7), it can be seen that services are primarily responsible for the observed growth in fixed-term employment and the erosion of the IIRR system, while construction, agriculture and extractive industries drove part-time and marginal employment expansion. Manufacturing establishments led agency employment growth. In sum, all industries have contributed, to a greater or lesser degree, to the erosion of the MD.

6.2. Results: Individual contributions to the erosion of the MD

Individual contributions are presented in Tables 2, 3 and 4. Beginning with the expansion of fixed-term employment (Table 2), it is almost totally explained by the WGE and was led by 5 establishments (*swb*, *lwb*, *sws*, *swc* and *lwc*), which altogether account for approximately 70% of the growth. Core manufacturing establishments contributed 0.5%.

Part-time work growth (Table 2) was driven by the WGE and, on a secondary level, by the RLE. The joint contribution of establishments in construction, agriculture and extractive industries

and *sws* totaled 78.4%. On the other side, *lwb* establishments have contained the growth of this employment type (-4%).

Agency work evolution (Table 3) was led by the WGE too. At the same time, it was dampened by the RGE, due to the increase in the *swb* employment share, in which agency workers growth was below average. Western manufacturing establishments drove the expansion of agency workers (66.2%), along with *lwb* (11.1%). The greatest contribution was made by core manufacturing firms (23.1%).

Finally, although marginal employment results should be read with caution because of statistical significance, it is worthwhile to present them (Table 3). Nonetheless, no comments are offered.

Table 2. Decomposition formula -- Disaggregated results (fixed-term and part-time employment)

	Fixed-term employment ($\Delta 3.9$ pp)					Part-time employment ($\Delta 9.9$ pp)			
	WGE	RLE	RGE	Total contribution		WGE	RLE	RGE	Total contribution
<i>swa</i>	0.8%	0.2%	0.2%	1.2%	<i>swa</i>	0.8%	0.3%	0.2%	1.4%
<i>sea</i>	0.3%	0.0%	0.0%	0.3%	<i>sea</i>	0.4%	0.1%	0.0%	0.5%
<i>lwa</i>	0.6%	0.0%	-0.1%	0.5%	<i>lwa</i>	1.9%	-0.2%	-0.1%	1.6%
<i>lea</i>	0.3%	0.0%	0.0%	0.2%	<i>lea</i>	0.0%	-0.2%	-0.1%	-0.2%
<i>swo</i>	5.9%	1.5%	0.4%	7.9%	<i>swo</i>	1.7%	0.4%	1.7%	3.9%
<i>seo</i>	0.5%	0.1%	0.1%	0.8%	<i>seo</i>	0.4%	0.3%	0.2%	0.8%
<i>lwo</i>	3.3%	0.1%	0.2%	3.6%	<i>lwo</i>	2.7%	1.4%	0.3%	4.4%
<i>leo</i>	0.8%	0.0%	0.0%	0.8%	<i>leo</i>	0.2%	0.0%	0.0%	0.2%
<i>swb</i>	13.2%	-2.2%	0.3%	11.3%	<i>swb</i>	3.8%	1.2%	-2.8%	2.2%
<i>seb</i>	1.4%	0.1%	-0.4%	1.2%	<i>seb</i>	3.5%	-0.6%	0.1%	3.0%
<i>lwb</i>	19.2%	0.0%	-0.1%	19.2%	<i>lwb</i>	-4.0%	0.0%	0.1%	-4.0%
<i>leb</i>	2.6%	-0.3%	-0.1%	2.2%	<i>leb</i>	1.7%	0.1%	0.0%	1.8%
<i>sws</i>	12.6%	-0.4%	0.6%	12.9%	<i>sws</i>	15.8%	1.6%	1.1%	18.5%
<i>ses</i>	2.8%	-0.3%	0.3%	2.8%	<i>ses</i>	2.1%	0.2%	0.2%	2.5%
<i>ls</i>	6.1%	0.0%	-0.9%	5.2%	<i>ls</i>	4.0%	0.1%	-0.3%	3.7%
<i>swc</i>	13.6%	-0.3%	-0.2%	13.1%	<i>swc</i>	26.1%	0.6%	0.9%	27.7%
<i>sec</i>	4.6%	-0.7%	0.1%	4.0%	<i>sec</i>	12.1%	0.5%	-1.0%	11.6%
<i>lwc</i>	15.2%	-0.7%	-0.3%	14.2%	<i>lwc</i>	14.1%	-0.6%	-0.2%	13.3%
<i>lec</i>	0.1%	-3.4%	1.9%	-1.3%	<i>lec</i>	7.5%	1.0%	-1.1%	7.3%
Total	104.0%	-6.3%	2.2%	100.0%	Total	94.6%	6.2%	-0.8%	100.0%

1st letter = size (“l” large, “s” small and medium); 2nd letter = region (“w” west, “e” east); 3rd letter = industry (“a” advanced manufacturing, “o” other manufacturing, “b” business services, “s” supplies and consumer services”, “c”- construction, agriculture and extractive industries).

Source: IAB establishment panel, own calculations

Table 3. Decomposition formula -- Disaggregated results (marginal and agency work)

Agency workers ($\Delta 1.1$ pp)	Marginal employment ($\Delta 0.9$ pp)
-----------------------------------	--

	WGE	RLE	RGE	Total contribution		WGE	RLE	RGE	Total contribution
swa	5.7%	0.0%	-0.3%	5.4%	swa	-0.6%	2.5%	0.9%	2.8%
sea	2.0%	0.0%	-0.1%	1.8%	sea	0.4%	0.5%	0.0%	0.9%
lwa	22.7%	0.1%	0.3%	23.1%	lwa	-0.5%	-2.4%	-0.2%	-3.1%
lea	2.7%	0.1%	0.6%	3.4%	lea	0.0%	0.0%	0.0%	0.1%
swo	15.5%	-0.9%	-2.5%	12.1%	swo	15.3%	-1.7%	-1.9%	11.7%
seo	4.8%	0.0%	-0.5%	4.3%	seo	0.4%	1.4%	0.1%	2.0%
lwo	16.2%	-0.7%	-2.4%	13.0%	lwo	2.0%	7.3%	0.4%	9.7%
leo	3.0%	0.0%	0.0%	3.0%	leo	0.4%	0.8%	0.0%	1.2%
swb	-0.8%	0.9%	-4.3%	-4.2%	swb	4.5%	1.9%	-0.3%	6.1%
seb	1.2%	0.0%	-0.4%	0.8%	seb	5.3%	-0.5%	0.2%	5.0%
lwb	11.1%	0.0%	0.0%	11.1%	lwb	-16.1%	-0.5%	-1.5%	-18.1%
leb	1.2%	0.0%	0.0%	1.3%	leb	-0.2%	0.5%	0.3%	0.6%
sws	2.5%	-0.5%	-0.9%	1.1%	sws	18.5%	10.4%	0.6%	29.5%
ses	0.7%	-0.1%	-0.3%	0.3%	ses	2.7%	1.5%	0.2%	4.4%
ls	3.6%	0.1%	-0.3%	3.5%	ls	3.7%	1.9%	-0.3%	5.3%
swc	8.3%	-0.5%	-0.7%	7.1%	swc	25.5%	4.0%	0.8%	30.3%
sec	3.2%	0.0%	0.3%	3.5%	sec	7.2%	-0.2%	0.0%	7.1%
lwc	5.4%	0.2%	0.4%	6.0%	lwc	6.6%	-5.5%	-0.3%	0.9%
lec	1.2%	0.7%	1.5%	3.3%	lec	-1.7%	4.7%	0.8%	3.8%
Total	110.2%	-0.6%	-9.6%	100.0%	Total	73.5%	26.6%	-0.1%	100.0%

1st letter = size ("l" large, "s" small and medium); 2nd letter = region ("w" west, "e" east); 3rd letter = industry ("a" advanced manufacturing, "o" other manufacturing, "b" business services, "s" supplies and consumer services", "c" construction, agriculture and extractive industries).

Source: IAB establishment panel, own calculations

The erosion of the IIRR-core was driven by western small business services and *swc*, due to the combination between WGE (28.8% in the narrow definition; 28.4% in the broader one) and RLE (10.5% and 11.9%, respectively). Their WGE contribution is mainly given to their share in total employment – not by the relatively low change in their coverage rate, as is shown in Figures 10-11 – and their RLE is marked by low levels of coverage rates and the rapid increase in their labor input share.

Core manufacturing establishments (*lwa*) made the fourth highest contribution when using the narrow definition of IIRR-core (8.9%), but it is much smaller if the definition is relaxed (3.1%). As stated above, these establishments have been moving toward a more individualized wage-setting process without leaving collective bargaining and work council representation. On their part, *lwo* establishments have either shifted from a narrower to a broader notion of IIRR-core or have abandoned the dual system of IIRR. However, the contribution is partly due to their loss of relative weight in total employment and their above-average coverage level (RLE contributed about 8%).

Large service establishments play a part in the erosion of IIRR-core as well (15.1%). This contribution is greater when using a softer definition (20.7%). In both cases, the WGE predominates. Relevant contributions were also made by *swa* (5%), doing so via WGE. The contribution of *swo* through WGE was similar, but this effect was alleviated because labor has moved away from these

establishments. Finally, eastern establishments' contributions are low due to their small relative weight in employment.

Table 4. Decomposition formula -- Disaggregated results (IIRR)

	IIRR core (Δ -14.9pp)					IIRR core - broad definition (Δ -14.3pp)			
	WGE	RLE	RGE	Total contribution		WGE	RLE	RGE	Total contribution
swa	5.4%	-0.1%	-0.3%	5.0%	swa	5.5%	-0.2%	-0.3%	5.1%
sea	1.2%	-0.1%	0.0%	1.1%	sea	1.3%	-0.1%	0.0%	1.1%
lwa	9.3%	-0.4%	0.0%	8.9%	lwa	3.5%	-0.3%	-0.1%	3.1%
lem	2.1%	-0.2%	0.2%	2.1%	lea	0.7%	-0.3%	0.1%	0.5%
swo	6.0%	-3.3%	0.4%	3.1%	swo	6.3%	-3.5%	0.3%	3.2%
seo	1.2%	-0.4%	0.0%	0.8%	seo	1.4%	-0.4%	0.0%	1.0%
lwo	7.1%	2.2%	-0.6%	8.7%	lwo	5.8%	2.3%	-0.3%	7.8%
swb	8.2%	7.4%	-1.3%	14.3%	swb	8.4%	8.3%	-1.3%	15.4%
seb	1.5%	1.5%	-0.3%	2.6%	seb	1.6%	1.4%	-0.3%	2.7%
lwb	5.3%	0.0%	0.0%	5.4%	lwb	10.0%	0.1%	0.0%	10.1%
leb	1.0%	0.1%	0.0%	1.2%	leb	2.2%	0.2%	-0.1%	2.4%
sws	7.8%	2.1%	-0.1%	9.8%	sws	8.4%	2.4%	0.0%	10.8%
ses	0.9%	0.9%	-0.2%	1.6%	ses	0.6%	1.0%	-0.3%	1.4%
ls	8.1%	1.9%	-1.4%	8.6%	ls	7.6%	1.9%	-1.3%	8.3%
swc	12.8%	1.0%	-0.3%	13.5%	swc	11.5%	1.2%	-0.4%	12.3%
sec	2.6%	-1.0%	0.4%	2.0%	sec	2.1%	-1.1%	0.4%	1.5%
lwc	0.8%	1.7%	0.8%	3.3%	lwc	2.1%	1.8%	0.7%	4.6%
lec	3.9%	3.7%	0.3%	8.0%	lec	2.3%	4.3%	1.0%	7.6%
Total	85.5%	17.0%	-2.4%	100.0%	Total	82.8%	19.1%	-1.9%	100.0%

1st letter = size ("l" large, "s" small and medium); 2nd letter = region ("w" west, "e" east); 3rd letter = industry ("a" advanced manufacturing, "o" other manufacturing, "b" business services, "c" construction, agriculture and extractive industries).

*Due to sample restrictions, large eastern manufacturing establishments are grouped into one category (*lem*, large eastern manufacturing).

Source: IAB establishment panel, own calculations

6.3. Discussion

The erosion of the MD is a process in which mixed trends were found, and huge heterogeneity among establishments was detected, leading us to a first corollary: although the dualization thesis picks up underlying trends, some of its conclusions should be fine-tuned.

First, structural change, captured by reallocation level (RLE) and reallocation growth (RGE) effects, was secondary to the process of institutional change. The importance placed on it by dualization scholars might be reconsidered. The principal driver of the process was the individual decisions within establishments across the whole private economy, i.e. the change that occurred in the requirements of atypical employment and the dual system of IIRR within each establishment type (WGE).

Second, core manufacturing firms did contribute to the erosion of the MD but in a particular manner. Part-time and temporary work were boosted by them. At the same time, despite their still

coordinating with their employees through the dual system of IIRR, some of them have moved from sectoral to firm agreements, contributing to the decentralization of collective bargaining. In summary, core manufacturing continues to be the coordinated core of the MD, but it has remained neither stable nor aside from the process of institutional change.

Third, the evolution of the model is not only shaped by a simple manufacturing against services logic. Western manufacturing has actively participated in the erosion of the MD (*swa*, and particularly *swo* and *lwo*), contributing to a greater or lesser degree to the expansion of the four forms of non-standard employment and accounting for approximately 25% of the fall in IIRR-core coverage. Conversely, eastern manufacturing establishments have moved away from the original model, but their contributions are comparatively small due to the labor input share. The only exceptions are *lea* establishments, the performance of which was close to that of the *lwa*.

The main drivers of institutional change have been three western small and medium establishment types: *swb*, *sws* and *swc*. They have led the expansion of two forms of atypical employment (fixed-term and part-time) and the drop of the IIRR-core coverage through the WGE combined with the increase in its relative share in employment (structural change). These establishments are the core members of the periphery. Curiously, *lwb*, *ls* and *lwc* present very different behaviors: *lwb* and *lwc* have made significant contributions to the growth of non-standard work, but the former has substantially contribute to the erosion of the dual system of IIRR, whereas it is firmly established in the latter. On the other side, large establishments in consumer services have taken little part in atypical employment growth, although it did contribute to the erosion of the IIRR system.

Finally, eastern service establishments (*seb* and *leb*) performed similarly to their western counterparts, but their low weight in employment reduced their total contributions.

In summary, this paper's findings reveal indeed the existence of a small core and a heterogeneous periphery in the MD, but they slightly different than those described by the dualization thesis:

- The core is made up of core manufacturing establishments, which have increased the share of temporary workers and, although they still coordinate with their workforce through IIRR-core institutions, have moved toward a more individualized bargaining style. It represents about 7% of the workforce.
- The periphery is formed by small and medium-sized establishments in non-advanced manufacturing, services and construction, agriculture and extractive industries. They have departed from the dual system of IIRR (the incidence of which was testimonial in 2014) and, in general, have substantially raised their levels of atypical employment, which vary depending on its form. It accounts for approximately 64% of the workforce.
- In an intermediate or semiperipheral position, large establishments in non-advanced manufacturing industries, services and construction, agriculture and extractive industries are found. On the one hand, they have decisively contributed to the decomposition of the MD through significant, atypical employment growth. On the other hand, they still presented in 2014 above-average IIRR-core coverage rates. Also in this semiperipheral area are located small western and eastern advanced manufacturing establishments, in which atypical employment levels and growth are below average, while the dual system of IIRR has almost disappeared. Here about 28% of the workers are located.

7. Concluding remarks

This investigation has provided empirical evidence about the transformation of the MD using data from the *IAB Establishment Panel*. By clustering establishments by industry, region and size, it is possible to consistently define the German core manufacturing and to disentangle the performance of different segments of the private economy. With the aim of properly capturing the main features of the process, this approach has introduced a novel methodology by combining descriptive analysis with a decomposition technique.

Although signals of dualization are detected, the empirical findings allow for the qualifying of some aspects of the thesis defended by Hassel (2014) or Thelen (2014). Two hypotheses have been examined. The first one indicated the existence of a coordinated core formed by core manufacturing establishments, in which traditional institutions still have a strong presence. The results support this idea; core manufacturing establishments are the last stand of the MD, but only 7% of the workforce is employed there. In these establishments, standard employment and the two pillars of the IIRR system strongly prevail. However, some signs of change were detected too: *lwa* establishments have led the expansion of agency work and have slightly abandoned sectoral agreements in favor of firm-level agreements.

The second hypothesis stated that the erosion of the MD should be concentrated on a set of small and medium establishments in non-advanced manufacturing, construction, agriculture and, particularly, services industries. The analysis has shown evidence in favor of this hypothesis, but some nuance was introduced. A periphery of small and medium non-advanced manufacturing and services establishments has been perfectly delimited (64% of the workforce), with *swb*, *sws* and *swc* establishments as the core members. There, non-standard employment has exponentially expanded, and the joint presence of collective agreements and work councils was rarely found in 2014. Additionally, I found a semiperipheral area composed of establishments that used certain institutions and not others (28% of the workforce); these are small, advanced manufacturing establishments that have overwhelmingly abandoned the dual system of IIRR, but the incidence of atypical employment has remained remarkably low. There are also large establishments in non-advanced manufacturing, services and construction, agriculture and service industries, in which atypical employment is high, but the two pillars of IIRR are still present (although they have decisively contributed to the decrease in IIRR-core).

In addition, the article estimates the role of the structural change - namely the relative rise of employment in the service sector- in the transformation of the MD. By adapting Sharpe's (2009) decomposition formula, I found that it accounts for a small amount, contrary to what is expected by, e.g., Traxler (1996) or Thelen (2014). Thus, even though the transition towards a service economy did contribute to the erosion of the MD, it is the conversion in the establishment's preferences regarding its coordination strategies with the workforce which mainly explains the process of institutional change.

This landscape appears not to be an arrival point for the MD, but it can be hardly identified as only a transition towards liberalization. It seems that each of the segments of the dual economy is on its way to a different place. On the one hand, core manufacturing establishments are advancing to an individualized model of collective bargaining in which firm-level agreements have growing importance. Of course, their leading role for the whole economy exerted through sectoral bargaining would be increasingly undermined as long as this trend continues. On the other hand, semiperipheral and peripheral areas are not inexorably moving toward a framework in which atypical employment and market-driven IIRR predominate. Several reasons lead to this consideration. The first is that

informal practices are emerging among the establishments that have abandoned the IIRR-core, namely voluntary orientation toward sectoral agreements (31.6% of total establishments in 2015) and alternative forms of employee representation (12.9%) (Oberfichtner and Schnabel, 2018). The second reason is that stages of economics deregulation alternate with stages of *re-regulation* (Eichhorst and Marx, 2011). Since the Hartz reforms, successful initiatives to introduce new norms to the more deregulated segment of the economy have taken place. The main one was the strengthening of collective bargaining by introducing a statutory national minimum wage in 2015, together with a reform that facilitated the legal preconditions for the extension of sectoral agreements. Additionally, Benassi and Dorigatti (2015) showed that the strategies of German unions regarding marginal workers have changed since 2006, and now it is a priority for them to regulate and include the working conditions of these workers in collective bargaining. In this sense, Haipeter stated that collective actors “*have been sent to retirement too early*” by some scholars (2013: 116), and they are still powerful (and creative) in renewing some of the eroded institutions.

The final results of these trends remain open to question, and they will mark the new nature of the MD.

Notes

1. In 2003, 44% of establishments that concluded a company-level pact were in a profit situation rated as good or very good by their work councils. Furthermore, the economic situation of establishments that concluded company-level pacts in this year was only slightly worse than that of those that did not (*Work Council Survey*, in Seifert and Massa-Wirth, 2005: 224).
2. Note that, at the same time, the environment in which eastern firms used to operate radically changed due to: (1) the privatization of the Kombinat (industrial production cores of the GDR) and the demise of the commercial partners of the former COMECON, which led to an increase in input prices and the closure of export markets; and (2) sudden exposure to national and international market and rapid exchange rate appreciation, resulting in a sharp crisis in 1992-93.
3. Oberfichtner and Schnabel (2018) showed that the dual system of industrial relations was almost perfectly preserved in the public sector between 1996 and 2015. Addison et al (2017) showed that collective bargaining and work council coverage decreased by 10 percentage points in the construction sector, although it was greater than the whole economy average.
4. Marginal employment grew rapidly between 1996 and 2005 (Destatis), but the *IAB Establishment Panel* does not provide data for these years.
5. Like Addison et al (2017) and Oberfichtner and Schnabel (2018), it is assumed that, if one establishment was covered by a collective agreement, all of its employees would be covered too.
6. Due to sample restrictions large supplies and consumer services establishments are grouped into one category (*ls*).
7. Due to sample restrictions, I have grouped large eastern manufacturing establishments (*lem*) in the analysis of the narrow definition of *IIRR-core*. This problem does not exist for the broad definition. The results of the broad definition of *IIRR-core* lead into thinking that *leo* establishments are much further from the original MD than *lea* establishments (Figure 10).
8. When $\left(\frac{A_{t1}^k}{E_{t1}^k} > \frac{A_{t1}}{E_{t1}}\right)$ and $(f_{2014}^k > f_{1996}^k)$ for atypical employment; when $\left(\frac{A_{t1}^k}{E_{t1}^k} < \frac{A_{t1}}{E_{t1}}\right)$ and $(f_{2014}^k > f_{1996}^k)$ for *IIRR-core*.

9. When $\left(\frac{A_{t1}^k}{E_{t1}^k} < \frac{A_{t1}}{E_{t1}}\right)$ and $(f_{2014}^k < f_{1996}^k)$ for atypical employment; when $\left(\frac{A_{t1}^k}{E_{t1}^k} > \frac{A_{t1}}{E_{t1}}\right)$ and $(f_{2014}^k < f_{1996}^k)$ for IIRR-core.
10. When $\left(\Delta \frac{A_t^k}{E_t^k} > \Delta \frac{A_t}{E_t}\right)$ and $(f_{2014}^k > f_{1996}^k)$ for atypical employment; when $\left(\Delta \frac{A_t^k}{E_t^k} < \Delta \frac{A_t}{E_t}\right)$ and $(f_{2014}^k > f_{1996}^k)$ for IIRR-core.
11. When $\left(\Delta \frac{A_t^k}{E_t^k} < \Delta \frac{A_t}{E_t}\right)$ and $(f_{2014}^k < f_{1996}^k)$ for atypical employment; when $\left(\Delta \frac{A_t^k}{E_t^k} > \Delta \frac{A_t}{E_t}\right)$ and $(f_{2014}^k < f_{1996}^k)$ for IIRR-core.

References

- Addison, J., Teixeira, P., Pahnke, A. y Bellmann, L. (2017). “The demise of a model? The state of collective bargaining and worker representation in Germany”. *Economic and Industrial Democracy*, 38(2):193-234.
- Baccaro, L. and Benassi, C. (2017). “Throwing out the ballast: growth models and the liberalization of German industrial relations”. *Socio-economic Review*, 15(1):85–115.
- and Howell, C. (2011). “A Common Neoliberal Trajectory: The Transformation of Industrial Relations in Advanced Capitalism”. *Politics & Society*, 39(4):521-563.
- Benassi, C. (2016). “Liberalization Only at the Margins? Analysing the Growth of Temporary Work in German Core Manufacturing Sectors”. *British Journal of Industrial Relations*, 53(3):533–555.
- and Dorigatti, L. (2015). “Straight to the Core – Explaining Union Responses to the Casualization of Work: The IG Metall Campaign for Agency Workers”. *British Journal of Industrial Relations*, 54(3):597–622.
- Burgess, P. and Symon G. (2012). “Collective bargaining unity and fragmentation in Germany: Two concepts of trade unionism?” *Economic and Industrial Democracy*, 34(4): 719-739.
- Carlin, W. and Soskice, D. (2009): “German economic performance: disentangling the role of supply-side reforms, macroeconomic policy and coordinated economy institutions” *Socio-Economic Review*, 7(1):67–99.
- De Avillez, R. (2012). “Sectoral Contributions to Labour Productivity Growth: Does the Choice of Decomposition Formula Matter?”. *International Productivity Monitor*, (24):97-117.
- Doellgast, V. and Greel, I. (2007). “Vertical Disintegration and the Disorganization of German Industrial Relations”. *British Journal of Industrial Relations*, 45(1):55-76.
- Doerflinger, N. and Pulignano, V. (2018). “Crisis-related collective bargaining and its effects on different contractual groups of workers in German and Belgian workplaces”. *Economic and Industrial Democracy*, 39(1): 131-150.
- Eichhorst, W. (2015). “The Unexpected Appearance of a New German Model” *British Journal of Industrial Relations*, 53 (1):49-69.
- and Marx, P. (2011). “Reforming German labour market institutions: A dual path for flexibility”. *Journal of European Social Policy*, 21(1):73-87.

- and Tobsch, V. (2015). “Not so standard anymore? Employment duality in Germany”. *Journal of Labour Market Research*, 48:81-95
- Ellguth, P., Kohaut, S., and Möller, I. (2014). “The IAB Establishment Panel – Methodological Essentials and Data Quality”. *Journal for Labour Market Research*, 47(1-2):27–41.
- Fernández, R. and Palazuelos, E. (2012). “European Union Economies Facing 'Baumol's Disease' within the Service Sector”. *Journal of Common Market Studies*, 50 (2):231-249.
- Fischer, G., Janik, F., Müller, D. and Schmucker, A. (2009). “The IAB Establishment Panel: Things users should know”. *Schmollers Jahrbuch* 129(1):133–148.
- Franke, R. and Kalmbach, P. (2005). “Structural change in the manufacturing sector and its impact on business-related services: an input-output study for Germany”. *Structural Change and Economic Dynamics*, 16:467-488.
- Freeman, R.B. and Lazear, E.P. (1995). “An economic analysis of work councils”, in Rogers, J. and Streeck, W. (eds). *Work councils. Consultation, representation and cooperation in industrial relations*. Chicago: University of Chicago Press: 27-52.
- Galindo-Rueda, F. and Verger, F. (2016). “OECD Taxonomy of Economic Activities Based on R&D Intensity”. OECD Science, Technology and Industry Working Papers, 2016/04.
- Haipeter, T. (2013), Erosion, Exhaustion or Renewal? New Forms of Collective Bargaining in Germany 115–134 in K.V.W. Stone, H. Arthurs (eds.), *Rethinking Workplace Regulation: Beyond the Standard Contract of Employment*. Russell Sage Foundation, New York.
- Hall, P.A. and Soskice, D. (eds.) (2001): *Varieties of Capitalism. The Institutional Foundations of Comparative Advantage*. Oxford: Oxford University Press.
- Hassel, A. (1999). “The Erosion of the German System of Industrial Relations”. *British Journal of Industrial Relations*, 37(3):483-505.
- (2014). “The Paradox of Liberalization-Understanding Dualism and the Recovery of the German Political Economy” *British Journal of Industrial Relations*, 52(1):57-81.
- Jacobi, O., Keller, B., and Müller-Jentsch, W. (1992). “Germany: Codetermining the Future”. In: Ferner, A. and Hyman, R. (eds.). *Industrial Relations in the New Europe*. Oxford: Blackwell.218-270.
- Koch, M. and Fritz, M. (eds.) (2013), *Non-Standard Employment in Europe: Paradigms, Prevalence and Policy Responses*. Basingstoke: Palgrave Macmillan.
- Keller, B. and Seifert, H.(2013). “Atypical employment in Germany. Forms, development, patterns”. *Transfer: European Review of Labour and Research*, 19(4): 457-474.
- Kinderman, D. (2014). “Challenging Varieties of Capitalism. The new social market initiative and the German employers’ quest for liberalization, 2000-2014”, MPIfG Discussion Paper 14/16.
- Lash, S. and Urry J. (1987): *The End of Organized Capitalism*. Oxford: Polity Press.
- Maier, C.S. (1984). "Preconditions for Corporatism", in John H. Goldthorpe, ed., *Order and Conflict in Contemporary Capitalism*. Oxford: Clarendon Press: 39-59.
- Möller, J. (2015): “Did the German Model Survive the Labor Market Reforms?”. *Journal of Labour Market Research*, 48:151-168.
- Müller, S. and Stegmaier, J. (2017). “Why is there resistance to work councils in Germany? An economic perspective”. *Economic and Industrial Democracy*, 00(0):1-22.

- Palier, B. and Thelen, K. (2010). "Institutionalizing dualism: Complementarities and Change in France and Germany". *Politics & Society*, 38 (I):119-148.
- Reisenbichler, A. and Morgan, K.J., (2012). "From 'Sick Man' to 'Miracle': Explaining the Robustness of the German Labor Market During and After the Financial Crisis 2008-09". *Politics & Society*, 40(4):549-579.
- Schulten, T. (2018). "The role of extension in German collective bargaining", in Hayter, S. and Visser, J. (eds). *Collective Agreements: Extending Labour Protection*. Geneva: ILO Publications: 65-92.
- Seifert, H. and Massa-Wirth, H. (2005). "Pacts for employment and competitiveness in Germany". *Industrial Relations Journal*, 36(3):217-240.
- Sharpe, A. (2009). "The paradox of market-oriented public policy and poor productivity growth in Canada". In *A Festschrift in Honour of David Dodge's Contributions to Canadian Public Policy*: 135-191.
- Silvia, S. (1997). "German Unification and Emerging Divisions within German Employers' Associations. Cause or Catalyst?". *Comparative Politics*, 29(2): 187-208.
- and Schroeder, W. (2007). "Why are German Associations Declining? Arguments and Evidence". *Comparative Political Studies*, 40(2):1433-1459.
- Streeck, W. (1997). "Beneficial constraints: on the economic limits of rational voluntarism". In Hollingsworth, J., Rogers y Boyer, R. (eds) *Contemporary capitalism: the embeddedness of institutions*. Cambridge: Cambridge University Press: 197-219.
- (2009). *Re-Forming capitalism. Institutional change in the German political economy*. Oxford: Oxford University Press
- (2010). "Taking capitalism seriously: towards an institutionalist approach to contemporary political economy". *Socio-economic Review*, 9:137-167.
- Thelen, K. (2001). "Varieties of Labour Politics in the Developed Democracies", in Hall, P.A. and Soskice, D. (eds.), *Varieties of Capitalism. The Institutional Foundations of Comparative Advantage*. Oxford: Oxford University Press: 71-103.
- (2009). "Institutional Change in Advanced Political Economies". *British Journal of Industrial Relations*, 47(3):471-498
- (2014). *Varieties of liberalization and the new politics of social solidarity*. New York: Cambridge University Press.
- Traxler, F. (1996). "Collective bargaining and industrial change: a case of disorganization? A comparative analysis of eighteen OECD countries". *European Sociological Review*, 12(3): 271-287
- Umkehrer, M. (2017). "Combining the Waves of the IAB Establishment Panel: a Do-file for the Basic Data Preparation of a Panel Data Set in Stata". *FDZ-Methodenreport* 12/2017.
- Visser, J. (2013). "Wage Bargaining Institutions -from crisis to crisis". *Economic Papers* 488, European Commission. April.

Appendix

Table A.1. Evolution of atypical employment

	Fixed-term	Part-time	Agency workers	Marginal	n
1996	4.1%	20.2%	0.5%	-	6,768
1997	4.5%	19.8%	0.6%	-	6,245
1998	5.2%	21.4%	0.7%	-	7,115
1999	5.6%	20.3%	0.7%	-	7,548
2000	5.6%	19.4%	0.8%	-	10,443
2001	5.3%	20.8%	0.8%	-	11,600
2002	5.3%	22.6%	0.8%	-	11,867
2003	5.4%	22.9%	0.7%	-	11,373
2004	6.0%	21.6%	1.0%	-	11,497
2005	6.6%	22.1%	1.1%	-	11,330
2006	6.9%	25.4%	1.7%	10.7%	10,944
2007	7.5%	24.1%	1.9%	11.3%	10,906
2008	7.8%	25.0%	2.2%	10.5%	10,600
2009	7.7%	24.3%	1.3%	11.1%	10,611
2010	7.6%	27.0%	1.6%	10.4%	10,017
2011	8.2%	25.5%	1.9%	11.1%	10,206
2012	8.1%	29.2%	1.7%	11.5%	10,417
2013	7.9%	29.2%	1.7%	11.9%	10,709
2014	7.9%	30.1%	1.6%	11.6%	10,449
Trend	***	***	***	ns	

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Source: IAB establishment panel, own calculations

Table A.2. Evolution of IIRR: collective bargaining and work councils coverage

	Sectoral agreement	n	Firm agreement	n	No agreement	n	Work Council	n	No Work Council	n
1996	69.3%	4,505	12.2%	939	18.5%	1,324	59.0%	3,897	41.0%	2,871
1997	68.4%	4,015	13.3%	925	18.3%	1,305	57.9%	-	42.1%	-
1998	66.9%	4,372	9.3%	751	23.8%	1,992	56.8%	3,741	43.2%	3,374
1999	64.1%	4,301	8.8%	759	27.1%	2,488	57.6%	3,915	42.4%	3,633
2000	62.2%	5,799	8.2%	926	29.6%	3,718	57.3%	5,182	42.7%	5,261
2001	62.5%	6,346	9.0%	1,014	28.4%	4,240	58.1%	5,671	41.9%	5,929
2002	61.7%	6,449	8.5%	986	29.8%	4,432	56.9%	5,640	43.1%	6,227
2003	61.3%	5,929	9.0%	939	29.7%	4,505	54.4%	4,888	45.6%	6,485
2004	59.9%	5,964	8.5%	991	31.6%	4,542	53.8%	5,127	46.2%	6,370
2005	59.0%	5,788	8.5%	1,041	32.5%	4,501	53.3%	5,015	46.7%	6,315
2006	57.0%	5,377	9.5%	1,028	33.5%	4,539	52.7%	4,710	47.3%	6,234
2007	56.1%	5,151	8.8%	966	35.1%	4,789	52.6%	4,517	47.4%	6,389

2008	55.1%	4,943	9.2%	953	35.8%	4,704	52.4%	4,258	47.6%	6,342
2009	54.7%	4,861	10.1%	985	35.2%	4,765	52.2%	4,220	47.8%	6,391
2010	54.9%	4,349	9.1%	816	36.1%	4,852	53.1%	3,821	46.9%	6,196
2011	53.5%	4,356	8.6%	783	37.8%	5,067	51.0%	3,861	49.0%	6,345
2012	53.0%	4,406	8.8%	834	38.2%	5,177	50.5%	3,996	49.5%	6,421
2013	51.6%	4,434	9.0%	865	39.4%	5,410	49.7%	3,973	50.3%	6,736
2014	52.5%	4,284	8.4%	811	39.1%	5,354	49.8%	3,801	50.2%	6,648
Trend	***		***		***		***		***	

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Source: IAB establishment panel, own calculations

Table A.3. Joint coverage of collective bargaining and work councils

	IIRR-core	n	Firm agre & WC	n	No agre & WC	n	Sectoral agre & no WC	n	Firm agre & no WC	n	No agre & no WC	n
1996	48.9%	3,177	7.4%	493	2.8%	227	20.5%	1,328	4.8%	446	15.7%	1,097
1997	47.1%	-	7.2%	-	3.7%	-	21.0%	-	3.5%	-	17.5%	-
1998	45.3%	2,897	7.0%	511	4.5%	333	21.6%	1,475	2.3%	240	19.3%	1,659
1999	44.1%	2,881	6.9%	540	6.6%	494	20.0%	1,420	1.9%	219	20.5%	1,994
2000	43.3%	3,776	6.8%	666	7.2%	740	18.9%	2,023	1.4%	260	22.4%	2,978
2001	44.4%	4,094	7.5%	746	6.2%	831	18.2%	2,252	1.5%	268	22.2%	3,409
2002	43.3%	4,116	7.1%	719	6.5%	805	18.5%	2,333	1.3%	267	23.3%	3,627
2003	41.1%	3,538	7.4%	664	5.9%	686	20.2%	2,391	1.6%	275	23.8%	3,819
2004	40.1%	3,624	7.1%	708	6.6%	795	19.8%	2,340	1.4%	283	25.0%	3,747
2005	39.9%	3,508	7.0%	757	6.3%	750	19.1%	2,280	1.5%	284	26.2%	3,751
2006	37.8%	3,201	7.8%	735	7.1%	774	19.2%	2,176	1.7%	293	26.4%	3,765
2007	37.8%	3,021	7.1%	680	7.7%	816	18.3%	2,130	1.7%	286	27.4%	3,973
2008	36.7%	2,817	7.3%	651	8.3%	790	18.3%	2,126	1.9%	302	27.4%	3,914
2009	36.7%	2,770	7.8%	661	7.7%	789	18.0%	2,091	2.3%	324	27.6%	3,976
2010	37.6%	2,502	7.6%	597	7.9%	722	17.3%	1,847	1.4%	219	28.2%	4,130
2011	36.1%	2,522	7.4%	599	7.6%	740	17.5%	1,834	1.3%	184	30.3%	4,327
2012	35.3%	2,533	7.3%	632	8.0%	831	17.7%	1,873	1.5%	202	30.3%	4,346
2013	34.2%	2,505	7.7%	646	7.8%	822	17.4%	1,929	1.3%	219	31.6%	4,588
2014	34.6%	2,394	6.7%	593	8.4%	814	17.8%	1,890	1.7%	218	30.7%	4,540
	***		ns		***		**		***		***	

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Source: IAB establishment panel, own calculations

Table A.4. Evolution of atypical employment by establishment type

<i>Fixed-term employment</i>				<i>Part-time employment</i>				<i>Agency workers</i>				<i>Marginal employment</i>			
	1996	2014	Trend		1996	2014	Trend		1996	2014	Trend		2006	2014	Trend
swa	1.8%	2.8%	ns	swa	9.5%	12.1%	ns	swa	0.3%	2.5%	***	swa	7.5%	7.3%	ns
sea	2.5%	3.9%	ns	sea	3.6%	8.7%	***	sea	0.9%	3.8%	***	sea	3.2%	3.7%	ns
lwa	2.7%	3.1%	ns	lwa	4.3%	6.9%	*	lwa	1.3%	4.9%	***	lwa	0.6%	0.6%	ns
lea	2.5%	4.8%	*	lea	3.1%	4.1%	ns	lea	1.4%	8.0%	***	lea	0.3%	0.3%	ns
swo	1.6%	4.7%	***	swo	18.6%	20.9%	ns	swo	0.9%	3.2%	***	swo	11.8%	13.9%	ns
seo	2.6%	4.0%	ns	seo	8.9%	11.3%	ns	seo	0.6%	4.2%	***	seo	4.3%	4.6%	ns
lwo	3.5%	6.5%	**	lwo	4.4%	10.6%	***	lwo	1.4%	5.5%	***	lwo	2.1%	2.5%	ns
leo	2.9%	10.5%	**	leo	3.5%	8.2%	ns	leo	1.3%	9.5%	***	leo	0.8%	1.5%	ns
swb	2.0%	6.1%	***	swb	23.2%	26.2%	ns	swb	0.7%	0.6%	ns	swb	15.0%	15.3%	ns
seb	4.8%	6.6%	ns	seb	11.4%	23.0%	***	seb	0.4%	0.9%	ns	seb	9.1%	10.6%	ns
lwb	3.1%	12.2%	***	lwb	29.7%	24.7%	ns	lwb	0.2%	1.7%	***	lwb	9.8%	7.8%	ns
leb	11.9%	18.9%	ns	leb	13.2%	24.9%	*	leb	0.2%	1.1%	*	leb	8.9%	8.8%	ns
sws	3.0%	8.7%	***	sws	32.1%	50.5%	***	sws	0.1%	0.4%	***	sws	26.3%	28.2%	ns
ses	1.5%	8.1%	***	ses	24.5%	37.5%	ns	ses	0.3%	0.7%	ns	ses	14.5%	16.0%	ns
ls	4.0%	12.8%	**	ls	18.4%	33.4%	**	ls	0.2%	1.7%	***	ls	7.8%	9.2%	ns
swc	3.4%	6.6%	***	swc	24.3%	40.2%	***	swc	0.1%	0.7%	***	swc	13.3%	14.7%	ns
sec	7.6%	11.1%	**	sec	13.1%	36.1%	***	sec	0.5%	1.2%	ns	sec	7.5%	9.0%	ns
lwc	7.4%	12.5%	**	lwc	27.1%	39.4%	**	lwc	0.2%	0.7%	*	lwc	4.4%	5.0%	ns
lec	10.7%	10.8%	ns	lec	15.3%	31.0%	***	lec	0.1%	0.4%	*	lec	2.4%	1.9%	ns

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Source: IAB establishment panel, own calculations

Table A.5. Evolution of IIRR by establishment type

<i>IIRR-CORE</i> (Sectoral agreement & Work council)				<i>IIRR-CORE</i> (Coll. agreement & Work council)			
	1996	2014	Trend		1996	2014	Trend
swa	43.4%	16.9%	***	swa	48.4%	20.3%	***
sea	30.5%	7.3%	***	sea	39.5%	14.0%	***
lwa	92.6%	73.9%	ns	lwa	95.6%	88.3%	ns
lem	77.2%	41.1%	**	lea	95.7%	72.0%	ns
swo	28.4%	16.9%	***	swo	33.4%	20.7%	***
seo	20.4%	8.2%	***	seo	27.2%	12.8%	***
lwo	84.1%	60.8%	***	lwo	94.7%	74.7%	**
swb	22.6%	13.2%	***	swb	25.5%	15.5%	***
seb	17.7%	10.6%	**	seb	24.1%	16.1%	**
lwb	60.1%	50.8%	ns	lwb	80.2%	61.9%	*
leb	55.0%	44.9%	ns	leb	78.5%	55.6%	*
sws	25.8%	12.8%	***	sws	29.1%	14.3%	***
ses	21.8%	13.7%	ns	ses	24.3%	18.4%	ns

ls	88.9%	45.4%	***	ls	98.5%	55.5%	***
swc	39.1%	27.9%	***	swc	43.7%	33.2%	***
sec	28.9%	21.7%	***	sec	33.7%	27.5%	**
lwc	77.8%	76.8%	ns	lwc	88.2%	85.4%	ns
lec	75.4%	63.6%	ns	lec	88.8%	81.7%	ns

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Source: IAB establishment panel, own calculations

Table A.6. Classification of economic activities (WZ08)

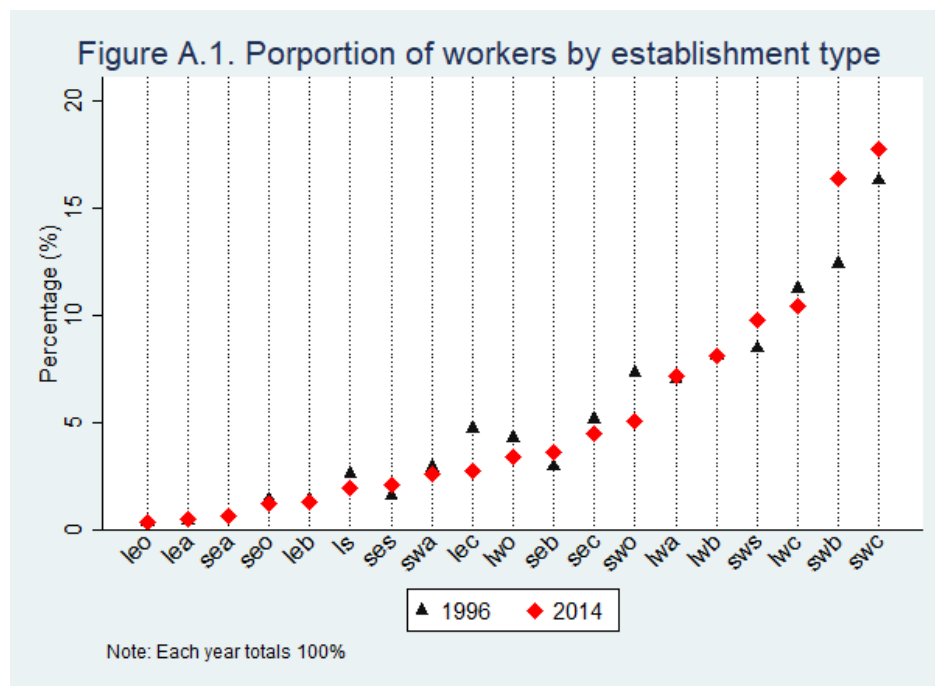
Advanced Manufacturing	Other manufacturing	Business services
303 Manufacture of air and spacecraft and related machinery	13 Textiles	46 Wholesale trade and commission trade, except of motor vehicles and motorcycles
21 Pharmatheuticals	15 Leather and related products	H Transportation and storage
26 Computer, electronic and optical products	17 Paper and paper products	J Information and communication
254 Manufacture of weapons and ammunition	10 Food products	64 Financial intermediation, except insurance and pension funding
29 Motor, vehicles, trailers and semi-trailers	11 Beverages	66 Activities auxiliary to financial services and insurance activities
325 Manufacture of medical and dental instruments and supplies	12 Tobacco	L Real estate activities
28 Machinery and equipment nec	14 Manufacture of wearing apparel	M Professional, scientific and technical activities
20 Chemicals and chemical products	251 Manufacture of structural metal products	N Administrative and support service activities (except Travel agency, tour operator and other reservation service and related activities (79))
27 Electrical equipment	252 Manufacture of tanks, reservoirs and containers of metal	
302 Manufacture of railway locomotives and rolling stock	253 Manufacture of steam generators, except central heating hot water boilers	
304 Manufacture of military fighting vehicles	255 Forging, pressing, stamping and roll-forming of metal; powder metallurgy	
309 Manufacture of transport equipment n.e.c.	256 Treatment and coating of metals; machining	
22 Manufacture of rubber and plastic products	257 Manufacture of cutlery, tools and general hardware	
301 Building of ships and boats	259 Manufacture of other fabricated metal products	
322 Manufacture of musical instruments	19 Manufacture of coke and refined petroleum products	
323 Manufacture of sports goods	310 Manufacture of furniture	
324 Manufacture of games and toys	161 Sawmilling and planing of wood	
329 Manufacturing n.e.c.	162 Manufacture of products of wood, cork, straw and plaiting materials	
23 Other non-metallic mineral products	181 Printing and service activities related to printing	
24 Basic metals	182 Reproduction of recorded media	
331 Repair of fabricated metal products, machinery and equipment		
332 Installation of industrial machinery and equipment		

Source: own elaboration

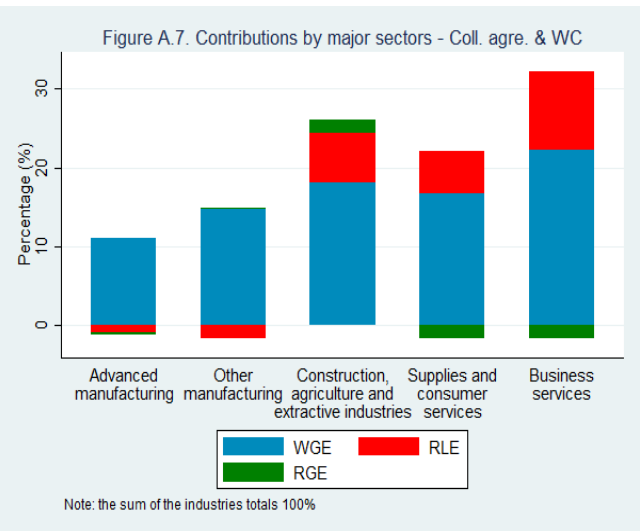
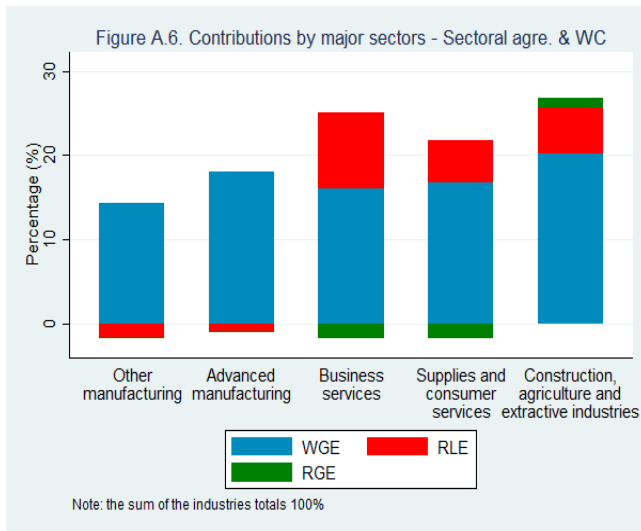
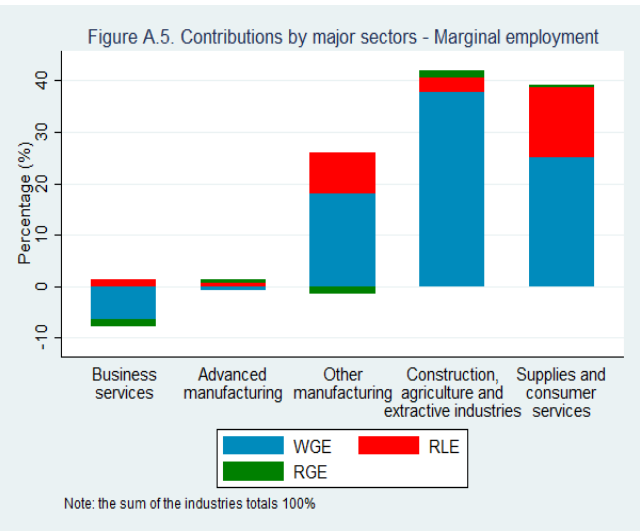
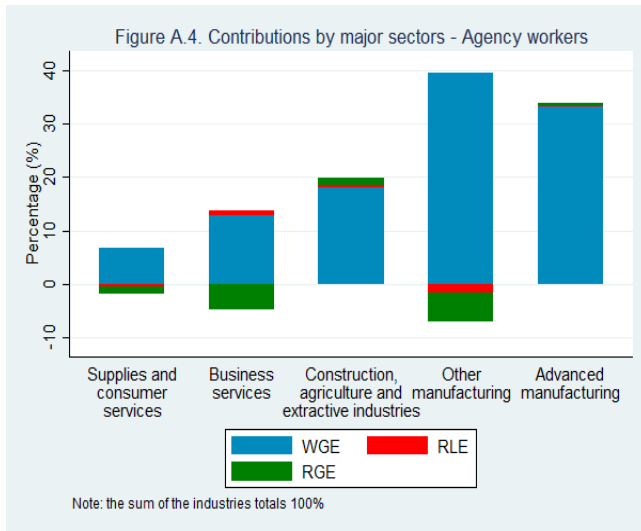
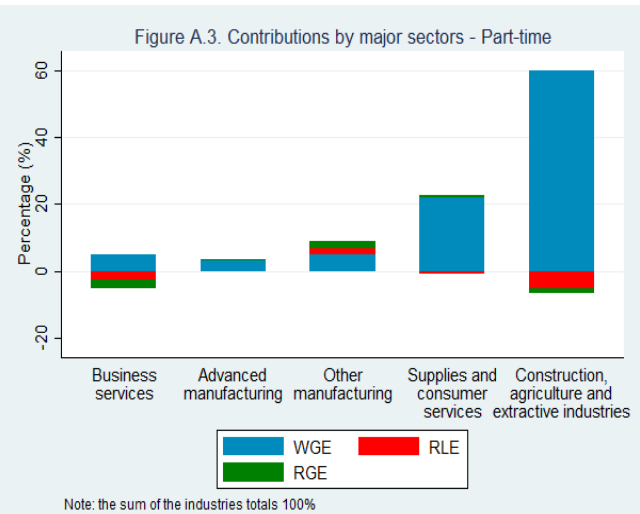
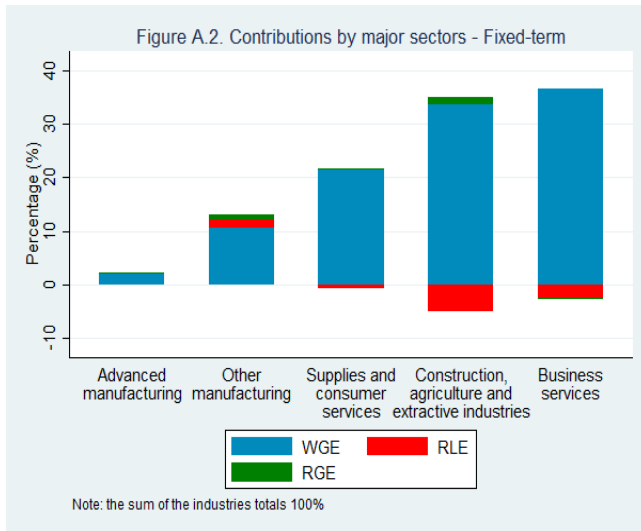
Table A.6. Classification of economic activities (WZ08) (continue)

Supplies and consumer services	Construction, agriculture and extractive industries
D Electricity, gas, steam and air conditioning supply	A Agriculture, forestry and fishing
E Water supply, sewerage, waste management and remediation activities	B Mining and quarrying
47 Retail trade, except of motor vehicles and motorcycles	F Construction
I Accommodation and food service activities	
65 Insurance, reinsurance and pension funding, except compulsory social security	
79 Travel agency, tour operator and other reservation service and related activities	

Source: own elaboration



Source: IAB establishment panel, own calculations



Source: IAB establishment panel, own calculations