

IZA DP No. 8648

**Workforce Segmentation in Germany:
From the Founding Era to the Present Time**

Werner Eichhorst
Michael J. Kendzia

November 2014

Workforce Segmentation in Germany: From the Founding Era to the Present Time

Werner Eichhorst

IZA

Michael J. Kendzia

*Zurich University of Applied Sciences
and IZA*

**Discussion Paper No. 8648
November 2014**

IZA

P.O. Box 7240
53072 Bonn
Germany

Phone: +49-228-3894-0
Fax: +49-228-3894-180
E-mail: iza@iza.org

Any opinions expressed here are those of the author(s) and not those of IZA. Research published in this series may include views on policy, but the institute itself takes no institutional policy positions. The IZA research network is committed to the IZA Guiding Principles of Research Integrity.

The Institute for the Study of Labor (IZA) in Bonn is a local and virtual international research center and a place of communication between science, politics and business. IZA is an independent nonprofit organization supported by Deutsche Post Foundation. The center is associated with the University of Bonn and offers a stimulating research environment through its international network, workshops and conferences, data service, project support, research visits and doctoral program. IZA engages in (i) original and internationally competitive research in all fields of labor economics, (ii) development of policy concepts, and (iii) dissemination of research results and concepts to the interested public.

IZA Discussion Papers often represent preliminary work and are circulated to encourage discussion. Citation of such a paper should account for its provisional character. A revised version may be available directly from the author.

ABSTRACT

Workforce Segmentation in Germany: From the Founding Era to the Present Time^{*}

Despite a more recent debate about ever deeper segmentation, we argue that since industrialization, Germany has continually experienced a dual labor market. One segment contains the primary segment of better paid and more attractive jobs, while the secondary segment encompasses rather low paid, less stable and less attractive jobs. It has been argued that this dualization is the result of firms which are likely to hire full-time and long-term workforce for its core activities performed by the core workforce while relying on more flexible forms of employment for other activities. Based on an in-depth examination of the structure of the workforce since the founding of the German state, this paper seeks to explore the factors which account for the origin, evolution and the peculiarities of the country's core workforce. It will be shown that a non-negligible part of the working population has always been subjected to marginalization, but that the dividing line between the two segments has changed over time as has the character of the respective groups.

JEL Classification: N34, J42

Keywords: workforce segmentation, industrialization, core workforce,
peripheral workforce

Corresponding author:

Michael J. Kendzia
ZHAW School of Management and Law
Zurich University of Applied Sciences
Stadthausstrasse 14
CH-8401 Winterthur
Postfach
Switzerland
E-mail: kend@zhaw.ch

^{*} We are grateful to Madeline Werthschulte for excellent research support.

Introduction

In recent political discourse, the marginalization of a part of the workforce is discussed either as a menacing phenomenon that looms large over the past decades (Vosko 2000; Kalleberg 2009; Ross 2009) or as a much needed mechanism to increase a firm's flexibility (Saint-Paul 1996; Kalleberg 2001). However, research on employment indicates that the workforce has always been subjected to some sort of segmentation (Blossfeld/Mayer 1988; Pollert 1988) and that, from a historic perspective, the discourse on the use of a core and a peripheral workforce appears exaggerated (Gallie et al. 1998). That said, this paper seeks to examine the factors contributing to the emergence and change in the demarcation of a core workforce and its counterpart since the founding era (Gründerzeit), beginning with the establishment of the German Reich in 1871, to the present time in Germany. The investigation of the workforce is carried out according to two basic segmentation theories which will be presented in the next section. Despite the later rise and diversification of employees, the investigation focuses entirely on workers employed in industrial companies. Flagship industries, such as chemical, electrical, and metal and machinery, not only have constituted the core pillars of the German economy, but they have by far accounted for the largest occupational group in Germany since industrialization.

Theoretical background

According to Reich et al. (1973), the segmentation process inside the labor market can be described as a historical process, whereby political-economic forces promote the division of the market into segments. Those segments, in turn, differ by certain labor market characteristics as well as behavioral rules (Reich et al. 1973: 359).

Referring to further literature on this issue, Loveridge (1983) examines the labor market dichotomization between a core and a peripheral workforce. According to him, the primary segment of the labor market is marked by long-term and stable earnings, whereas the secondary segment is characterized by unstable earnings. Likewise, Hakim (1990) notes that the central workforce of a company consists of jobs related to a primary internal sector. According to her, those jobs are permanent, full-time and associated with firm-specific skills and result in long-term, stable earnings. Conversely, the secondary external sector comprises rather seasonal, casual and short-term contract work, work from home as well as some unskilled work (Hakim 1990: 160).

Large parts of the labor market are regulated by institutions (Piore 1983: 251). One important example is labor market regulations, which are shaped by the bargaining power of workers and union power (Blanchard/Giavazzi 2001). That is, union power, union coverage as well as the degree of coordination of wage agreements (Layard et al. 2005: XV) significantly impact labor market legislation, including for example employment protection legislation. By applying the institutional theory, one can analyze how relevant actors, such as unions, employers and the state, influence the emergence of a peripheral and a core workforce (Layard/Nickell 1999).

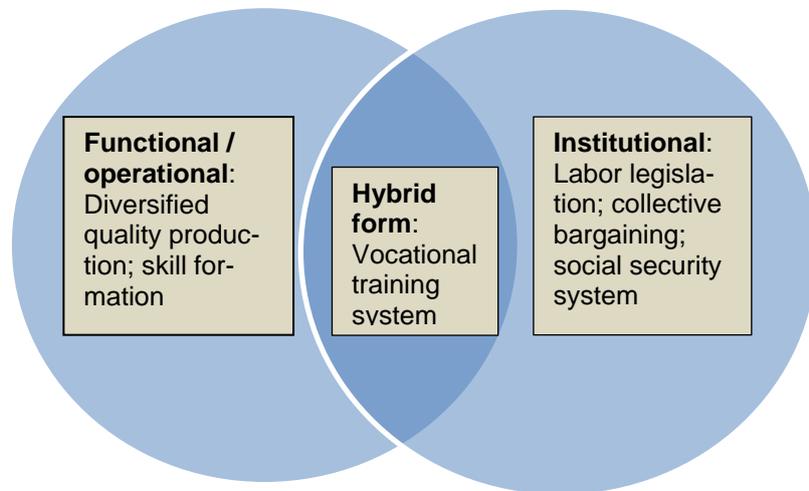
Advocates of the functional theory (Doeringer/Piore 1971, 1975; Dickens/Lang 1985, 1988), however, claim that labor market segmentation arises mainly because it is functional. That said, the segmentation process is caused by a change in the production strategy of firms for economic efficiency reasons.

Closely linked with functional theory is the concept of skill formation. In this approach, a firm's staff can be divided into two groups based on either high or low skill levels. Core activities require high and firm-specific skills that enhances a company's competitiveness (Friedman 1977). This kind of qualification can be achieved through training and further education (Hall/Soskice 2001: 6-7; Emmenegger 2009). The other group belongs to the periphery, comprising rather unskilled work. As Williamson (1985) has amply demonstrated, skill specificity exposes the owner of the skills to ex post opportunism. Therefore, workers need assurances that they can remain in the company for a long enough period to reap the returns on such skill investments (Estevez-Abe et al. 2001). Consequently, jobs including core activities are usually paired with long-term contracts. This is also advantageous for the companies themselves because firm-specific qualifications might be lost in the fluctuation between different factories (Lutz 1973: 58-59). This implies that even with very flexible and universal labor market institutions, some sort of workforce segmentation emerges for functional or rather operational reasons.

To analyze the segmentation process of the workforce taking place in Germany from 1871 to the present time, we use the two previously mentioned explanatory approaches: firstly, the institutional arrangement of the labor market. This includes labor legislation and the role of interest groups, such as unions and employers associations as well as the insider-outsider problem. Secondly, the functional logic behind production strategies will be investigated. The latter allows considering investments in skill formation, which are attributed to the emergence of diversified quality production (Streeck 1991, 1997; Thelen 2004). For instance, long-term employment relationships guarantee that employers receive a return of investment to compensate their costly training effort. The formation of a skilled workforce inside a firm can therefore be considered as a measure to combat the poaching problem (Thelen 2007: 249).

The diversified quality production perspective has similarities to the system of flexible specialization. However, contrary to mass production, diversified quality production depends on a workforce with various levels of skills. This means that workers or employees are able to develop new technologies through intense and close cooperation with other workers or managers. This often includes long lasting and relatively stable relationships, or rather partnerships, between the economic actors within the firm and their external partners, such as suppliers and customers. In addition to this, specialized firms have to innovate constantly. To do so, they rely on training to create a skilled workforce (Hollingsworth/Boyer 1997: 22-25).

Figure 1: The different dimensions of the segmentation process



In addition to the previously explained approaches, we introduce another approach to address the vocational training system in order to analyze the upcoming scenario. The vocational training system entails elements of both the operational and institutional explanatory approaches. For example, on the one hand, from the functional perspective, it makes sense for a company to invest in training and development of the workforce to further innovate. On the other hand, from an institutional perspective, vocational training systems require the participation of social partners to initiate, maintain and agree to such a system. Furthermore, the government must invest in training facilities such as vocational training schools. Against this background, the vocational training system reflects a hybrid constellation, including elements of both views, as is seen by the overlapping circles in Figure 1.

To summarize, institutional and functional/operational approaches reveal diverging drivers of segmentation. Nevertheless, both perspectives can be combined. It is an empirical question of how the exact interplay between and extent to which institutional and functional factors shape the workforce in a dynamic perspective.

From the founding era until World War I: the development of social security systems and high fluctuation rates

From a broad economic perspective, the timeframe between the “founding era,” defined by the period just after the establishment of the German Reich in 1871, and World War I (1914-1918) was marked by the industrialization process. During this time, the general working conditions for the vast majority of the industrial workforce were poor, including long working hours, heavy physical work, and a general absence of social insurance institutions. Therefore, to first analyze the segmentation process within this workforce, it is necessary to define criteria according to which the workers can be divided into the core and peripheral workforce. In this respect, the duration of a worker within a specific company is chosen to serve as such a criterion for the differentiation of the workforce.

The first collective wage agreement in Germany was settled in 1873. Yet, the state refused to accept the agreement. It took until 1899 before collective agreements began to spread across Germany and other western European countries (Kendzia: 30). Prior to that time, wages were usually negotiated individually between the workers and their potential employers.

The first trade unions in Germany were installed in 1875 with the founding of the Social Democratic Party. Thereafter, employers set up the first employers’ associations to oppose the growing numbers of workers organized in unions (Weiss 2008: 27-30). In 1891, a law regarding employment protection included a ban on employment for school-children, the restriction of the maximum working day to 10 hours for young people and to 11 hours for women and the legal possibility to install work councils in factories. Through these regulations, the position of workers in the labor market was significantly strengthened. Also, the first decisive features of a later established standard employment relationship were created. Despite this, until 1899, collective agreements were not widely spread across Germany (Kendzia 2010a: 26-36).

Between 1883 and 1891, the social security system was politically introduced, including accident and health insurance, old-age and disability as well as the pension insurance. As such, the government responded formally to a phenomenon which already existed within firms through labor negotiations. Owing to the deep engagement of political as well as industrial actors, the line between the institutional and functional dimensions cannot be drawn precisely. This aggravates the assessment regarding the true driving forces behind the segmentation process. The implementation of the social security system constituted an appropriate mechanism to protect workers against risks in their working lives. By reducing the prevailing high fluctuation of the workforce during this time, it also seemed to be a useful instrument to stabilize the workforce. By doing so, it laid a solid foundation for the creation of a core workforce inside firms. Various companies, such as the those in the chemical industry, which experienced especially high fluctuation rates due to imminent health risks, introduced measures on a voluntary basis to attract and stabilize its workforce through a wide range of social services (Riemer-Schäfer without year: 111-155).

Phoenix Ironworks provides an example for the early German metal industry. Here, the core workforce was rewarded after a longstanding period of employment by guaranteeing job security and offering corporate social benefits. Another example is Alfred Krupp, who created a company health insurance fund (Kendzia 2010a: 16). As Table 1 indicates, the number of workers covered by all three branches of the social security system increased considerably during 1890 and 1913, with a significantly high number of workers covered by accident insurance right from the beginning.

Table 1: Number of members of the social security system (in millions)

Year	Accident insurance	Health	Retirement and disability insurance
1890	13.7	6.6	-
1895	18.4	7.5	11.8
1900	18.9	9.5	-
1905	18.7	11.9	13.9
1910	24.2	14	15.7
1913	25.8	14.6	16.3

Source: Kuczynski 1947: 228.

In the meantime, and in accordance with the functional explanatory approach, factories were established as the general organizational form of production form of organizations, out of which, larger companies developed (Vetterli 1979; Stolle 1980). Craftsmen with specialized knowledge formed a privileged group within the broad mass of workers. In order to keep those workers in the factories, employers attempted to create incentives for long-term employment relationships. This was realized, for instance, by higher wages for skilled workers, establishing occupational pension schemes and building apartments for a particular part of the permanent workforce. In contrast, the unskilled and semi-skilled workers still fluctuated between different factories to a high degree during this time.

Owing to the increasing technological requirements within the production process, large firms sought to form a core workforce to safeguard the availability of skilled workers. For this purpose, vocational training systems were established. Thus, the vocational training system can be interpreted as a hybrid form of the segmentation process where institutional aspects (interest of the government) and operational aspects (training of workers) converged. In the beginning, apprentices were often recruited from among the relatives of the already employed workers due to the expected positive effect on solidarity and stability in the workforce (Deutschmann 1985: 124-217).

This kind of procedure further reduced the fluctuation of the workforce (Harney/vom Hau 2010: 11-13). For example, MAN (Maschinenfabrik Augsburg Nürnberg) introduced its own institutionalized training workshop in the 1890s. By designing a training program which met the firm-specific needs, the company established a core of skilled workers (Schudlich 1994: 78-79).

Another example of this increased stability of the workforce in the machinery industry is provided by “Daimler-Motoren-Gesellschaft”. Assuming that a core worker is employed longer than two years in the same company, Table 2 indicates that in 1910, already more than 70 percent of the overall workforce belonged to the core group (Schudlich 1994: 78-79).

Table 2: Duration of employment at the “Daimler-Motoren-Gesellschaft” in Stuttgart-Untertürkheim in 1910, %

Duration in years	All workers	Locksmiths, toolmakers	Lathe operators	Shapers	Operatives, grinders
Less than 1	20.2	20.3	25.1	23.3	12.0
1-2	8.2	8.3	2.9	27.9	2.1
2-6	51.5	52.2	44.4	46.5	53.1
7-10	16.5	15.7	21.4	0.0	26.6
10-16	2.6	2.9	4.5	2.3	4.7
17-20	0.8	0.6	1.6	0.0	1.6
Total	99.9	100	99.9	100	100.1

Duration in years	Platers, plumbers, saddlers, coppersmiths, painters, varnishers	Blacksmiths, fine forging	Carpenters	Day laborers
Less than 1	19.7	18.2	34.3	17.6
1-2	4.1	11.0	6.1	10.5
2-6	55.1	37.9	45.5	61.3
7-10	19.0	21.2	10.1	9.0
10-16	1.4	0.6	3.0	0.9
17-20	0.7	0.0	1.0	0.6
Total	100	99.9	100	99.1

Source: Schuhmann 1911: 48-56.

In the metal, electrical and chemical industry even more examples can be found, which proves the importance of loyalty towards a firm. For example, within the metal industry, the founder of a German harmonica manufacturer considered his core workforce as a guarantee of superior quality. Their income and premiums increased with the duration of employment (Berghoff 1997: 167-190). Within the largely expanding electric industry, high employment fluctuation was common among young workers and even skilled workers, of which many aimed at becoming self-employed (Bienkowski 1910: 19-20). In contrast, within the chemical industry, the most important criterion to climb up the career ladder was long employment in the same company (loyalty) rather than the achievement of additional qualifications.

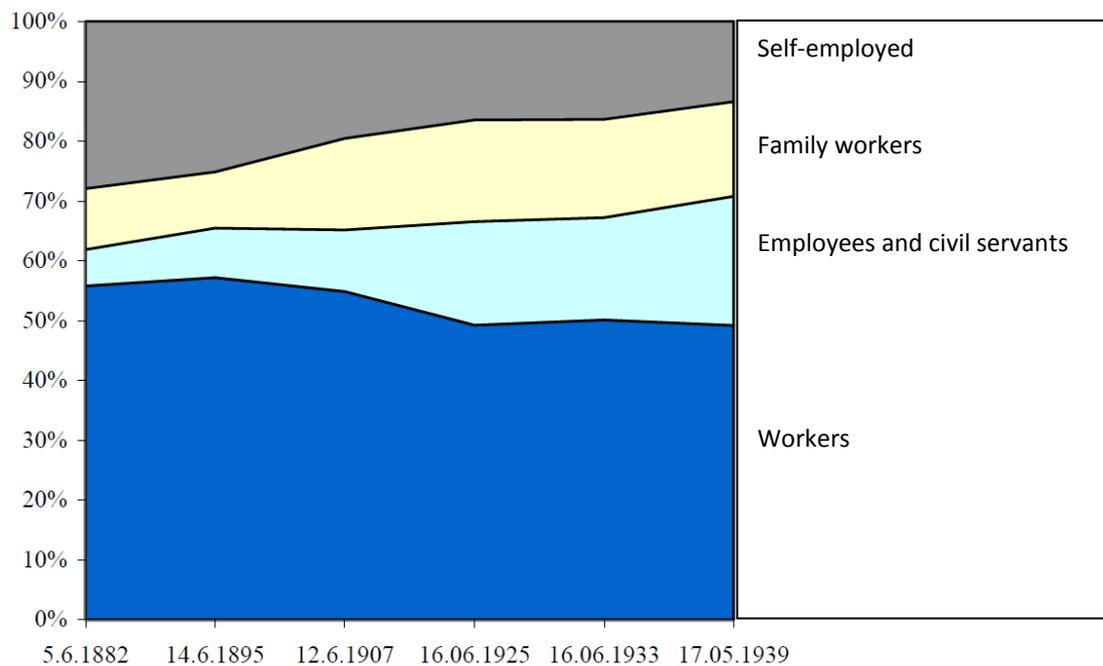
Referring to Schulz (1978) and Schäfer (1979), the parallel development of both high fluctuation and increasing steadiness for some workers emphasizes the existence of a core workforce and a fluctuating peripheral workforce. And yet, the early core workforce could not be identified by certain qualifications. Instead, the loyalty to the employer, in the form of a long duration of employment, was of the most importance. That is, the early differentiation between the core and peripheral workforce during industrialization depended on the duration the individual was working for the same firm. Thereafter, coverage by the social security system added a second criterion to the segmentation process.

A further criteria for the formation of a core workforce emerged by the spread of collective agreements at the turn of the century. Prior to the outbreak of the First World War, already more than 12,000 agreements existed for somewhat less than 200,000 firms employing 1.8 million workers. Surprisingly, these agreements were being conducted within the context of heavy state repression of the worker's movement between 1890 and 1900. Despite these repressions, the workers' movement grew continuously, amounting to 2.5 million unionized workers in 1914.

At the same time, employers began forming associations, resulting in meetings between workers and employers at the association level. Despite this, the state did not allow any party greater legislative involvement in the process of fixing wages and thus did not approve collective agreements. This remained to be the case even though the Supreme Court of the German Reich decided to consider those collective agreements as legally binding in 1910 (Kendzia 2010a: 30-31).

Around the year 1895, as Figure 1 displays, the proportion of workers related to all occupational groups peaked. After this, the groups of employees and civil servants as well as the family workers began to grow, whereas the amount of the self-employed decreased. In other words, until the beginning of World War II, workers constituted the dominating occupational group.

Figure 2: Occupational groups according to the profession census



Source: Federal Statistical Office 1972: 142.

The First World War and the Weimar Republic: stabilized working relationships due to sectoral bargaining and diversified quality production

The First World War and the mobilization of the armed forces in 1914 constituted a tremendous challenge for the labor market. On the one hand, employees' institutions, such as work councils and trade unions, became more influential. On the other hand, firms advanced vocational training to stabilize the working relationships of workers with firm-specific knowledge. The labor market segmentation that was taking place during this period was mainly caused by institutional factors.

Conscription into the armed forces had several effects on the workforce. Following the conscription of male workers, the unemployment rate among women rose strongly. In particular, the conscription of skilled workers led to the closure of many establishments, or parts thereof, which resulted in lay-offs of unskilled workers. Additionally, the conversion into the war economy and the decline of some branches, especially those employing a large amount of female workers, such as the textile industry, further deteriorated the situation of the generally low-skilled female wage workers. In the course of the war, more and more women replaced men in the essential industries of the war economy, including the metal, mechanical engineering, electrical, and chemical industries (Daniel 2011: 28-44).

During World War I (1914-1918) itself, market mechanisms were largely replaced by regulations imposed by the state (Kendzia 2010b: 9). Among those regulations, the appreciation of trade unions, the establishment of work councils and legislation concerning female employees will be discussed in more detail.

Within the unions, more unskilled workers started to become members, and thus a significant drop of the proportion of skilled workers occurred. Compared to their role during industrialization, trade unions acquired more power, and workers' rights were strengthened significantly as collective bargaining and collective agreements became the basis for the organization of work. Already in 1916, in the wake of the Auxiliary Service Act (Hilfsdienstgesetz), the state accepted the unions as legitimate representative of the workforce. And by 1924, the coverage of collective bargaining amounted to roughly 61.2 percent of the entire German workforce, whereas in 1913, coverage was only 20 percent. Similarly, as job-hopping was reduced, industry-wide bargaining had a very positive impact on the decrease of the fluctuation rate (Thelen 2004: 68-79). Consequently, sectoral bargaining contributed to stabilizing employment relationships.

At the end of the war, the collective actors, such as the unions and employers' organization had great influence on the regulation of the labor market. Through the revolutionary events of the November Revolution of 1918-1919 and the establishment of the Weimar Republic, the bargaining power of the employers was severely weakened. Employers were not in the position to oppose the current revolutionary tendency and feared the expropriation of their establishments (Kendzia 2010b: 9-18).

Against this backdrop, an “alliance of purpose” between industry and the unions was built, resulting in the so-called Stinnes-Legien-Agreement (taking the names of the main negotiators) of 1918, which recognized trade unions for the first time as a bargaining agent of workers. Hugo Stinnes was then the leading industrialist from the Ruhr, a heavy industrialized region in the western part of Germany, while Carl Legien was chairing the general commission of the free trade unions. The agreement constituted a breakthrough for the unions, as collective agreements became legally binding and the employers approved unions as social partners from that day on. In 1920, the Works Council Act (“Betriebsrätegesetz”) was adopted, allowing councils to co-determine the terms of social and personnel affairs within companies. Furthermore, dismissals were restricted and the first regulation of severance pay was laid down (Kendzia 2010b: 9-18).

This restriction of “hiring-and-firing” practices had a positive impact on the emergence of internal labor markets. In 1927, the so-called “standard employment contract” of the core workforce encompassed dismissal protection, accident insurance, health insurance, pension insurance as well as unemployment insurance. These social benefits provided incentives to invest in skills by guaranteeing income for highly skilled workers in the case of possible layoffs. As a result, more and more workers were covered by the benefits of the social security system, as Table 4 shows.

Table 4: Coverage of the social security system (in percentage of the workforce)

Type of insurance	1885	1895	1905	1915	1925	1935
Accident insurance	17	76	69	71	72	76
Health insurance	22	34	41	43	57	52
Pension scheme	-	54	51	57	66	68
Unemployment insurance	-	-	-	-	-	35

Source: Alber 1982: 236-239.

When many men lost their jobs as a result of the economic crisis in 1929, the acceptance of working women dramatically decreased. This rejection was aimed especially towards women not working for subsistence but for pocket-money, called “Doppelverdiener”. Since women were mainly working within the stable consumer goods industry and received lower wages than men, their recruitment increased indeed. The impression was that women were crowding men out of their jobs. As a consequence, the national socialist government implemented a marriage loan scheme in 1933 which gave loans to women who resigned from their job after marriage and reduced dismissal protection for “Doppelverdiener” (Stephenson 1975: 75-90). In general, the female workforce faced considerable lower wages than their male counterparts (Kendzia/Zimmermann 2013: 413).

As firm specific knowledge became increasingly important for employers, the application of apprenticeships proved to be a useful instrument to stabilize the employer-employee relationship (Kendzia 2010b: 22). Within the chemical and metal industry, concentration processes contributed to this development. As an example, the creation of the IG Farbenindustrie AG in 1925 consolidated several chemical firms into one firm in order to rationalize the capacities of the different firms. In the steel industry, large producers (e.g. Krupp and Thyssen) purchased new industries which led to higher concentration. In 1930, the Vereinigte Stahlwerke (Vestag) achieved a market share of almost 50 percent of the German steel market. The machinery industry faced fragmented product markets, which contributed to further specialization and emphasis on quality production due to a stagnating domestic market and increasing international competition. Hence, production relied heavily on a skilled workforce. Another remarkable feature of the machinery industry was the diversified quality production, which motivated employers to keep their skilled workers instead of reducing the workforce during an economic downturn (Herrigel 1996: 67-104).

This means that the growing demand for skilled workers, both in by the machinery industry and the German production model itself, including an increasing degree of specialization and high-quality production, had a strong impact on the emergence of the core workforce.

Thus, during the Weimar Republic, market segmentation was determined by stabilized working relationships. Those workers who were already employed within firms were protected by trade unions, sectoral bargaining, dismissal protection, diversified and large-scale production as well as firm-specific knowledge gained by vocational training. At the same time, though, these protections limited the access to the labor market of those workers who were not yet employed.

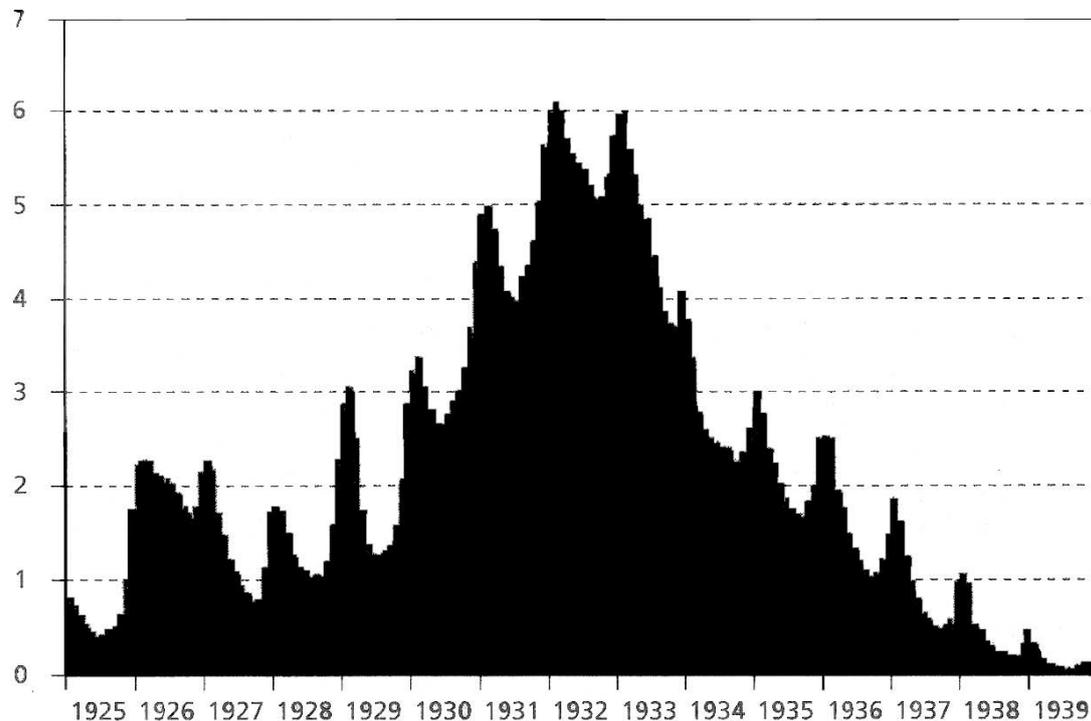
Compared to the industrialization era, institutional arrangements became more crucial in determining labor market segmentation. Moreover, the valuation of skills by employers increased due to more diversified quality production and international competition. Consequently, coverage by collective bargaining and the diversified quality production model, including skill formation through apprenticeships, promoted the segmentation process across Germany.

The end of the Weimar Republic and the Third Reich: ideological conceptions and non-specialist workers

The global economic crisis, starting in 1929, led to a tremendous increase of the unemployed. Following the National Socialist takeover on January 30, 1933, the situation of the labor market and the general employment system changed fundamentally. By freezing both prices and wages, the economy changed towards a planned economy. Yet, owing to a positive development of the world economy, rationalization successes during the 1920s and early 1930s as well as a massive armament by the new regime, unemployment decreased significantly (Kendzia 2010b: 24-25).

As part of the act of establishing the order of national labor, the collective agreement procedures from 1918 and the works council act of 1920 were dissolved. The core of the employer-employee relationship was no longer determined by the collective agreement. Instead, the concept of a collective company (Betriebsgemeinschaft) was created, which established the entrepreneur as leader of the company and the workers as their followers (Gesetz zur Ordnung der nationalen Arbeit) (Kendzia 2010b: 24-25).

Figure 3: Unemployment development (in millions) in Germany 1925-1939



Source: Tocze 2007: 72.

Although apprenticeship programs were enlarged (Kutscha 1993: 19), workers were mostly recruited via forced labor. Additionally, as mentioned above, the role of working women in Nazi society was characterized by sharp ambivalence. On the one hand, the national socialist ideology restricted women to the role of mothers and housewives. As a result, to discourage female employment women, different 'protective' laws were introduced (Stephenson 1975: 95-111). On the other hand, resulting from labor shortage as a consequence of the war, female employment grew rapidly from 1942 on. Lastly, in 1943, obligatory work for women was introduced (Kendzia/Zimmermann 2013: 413).

In the early period of the war, workers between 18 and 45 were conscripted first. Workers in companies involved in the war industry and other indispensable workers above the age of 30 could continue their activities within the workforce. Later, after October 1944, the age group subjected to conscription was extended to the range of 16 to 60 (Puhani 2014: 3).

The enlargement of apprenticeship programs was created by a uniform and, after 1938, compulsory training system (Kutscha 1993: 19). Moreover, the school law included the obligation for industrial education for all school-leavers. Concerning the vocational training system, the National Socialists further standardized the system in order to enable better military production. Nevertheless, as a result of the huge demand for semi-skilled jobs within the armaments industry, the reserves of German male workers were soon exhausted. To overcome this workforce scarcity, foreigners became essential for the German working process (Gillingham 1985: 423-428).

After 1939, workers from occupied countries were recruited or forced to work within the German industry. First recruitment occurred on a voluntary basis, except for Polish workers who were forced from the beginning. As the war progressed, the voluntary contracts were converted into forced labor. Workers from Poland and Eastern Europe (Russia, Belorussia and Ukraine) constituted the majority of forced laborers, amounting to more than 66%. Among the forced laborers, different segments that faced different working conditions are distinguishable, with Polish and East European workers being exposed to the worst conditions. In general, forced laborers were confronted with low wages, more than ten hours of work a day, living within too small and disease-promoting accommodations, being exposed to the principal's arbitrariness and social isolation (Bräutigam 2009).

As the chemical industry was of major importance for the armaments industry, I.G. Farben cooperated closely with the Nazi regime. When the demand for workers increased, the company started to hire forced laborers. The office in Hüls (Chemische Werke Hüls) employed 27% of the workforce as forced laborers in 1944 (Kleineschulte 2003). Since there was still a need for more workers, I.G. Farben also constructed concentration camps close to Auschwitz to recruit workers (Schmaltz 2010). In the same vein, the metal and electrical industry recruited forced laborers. As an example, Siemens AG employed about one third of forced laborers in Berlin, mostly stemming from concentration camps. Within the metal industry, the amount of foreign, forced workers is estimated at 30 percent throughout Germany. Examples from the machinery industry who employed forced laborers include Daimler Benz AG and Deutsche Maschinen AG (DEMAG) (Fransecky 2003).

From a functional point of view, forced laborers and women were often appointed outside their skill area. This caused many concerns among German employers since investments were needed when engaging non-specified workers with lower productivity. Companies therefore aimed at regaining their core workforce. As the war progressed, the core workforce was not available, and more forced workers were used. In some factories they amounted to about 80-90%, with only specialists and foremen being German (Bräutigam 2009).

Furthermore, the needed increase of workforce also created a contradiction in the consumer goods industry because women, who had lost their jobs, now took over places in war industry. But as they were not previously trained in that kind of work, productivity declined (Stephenson 1975: 95-111).

Consequently, because forced laborers and women were less productive due to low working conditions and their placement in tasks outside of their trained skill area, they became part of the peripheral workforce. The peripheral workforce developed during the Nazi regime for political reasons according to ideological and racist criteria, which in turn caused frequent productivity decreases. As the changes and the development of the core workforce were to a large extent determined by political regulations, the segmentation process during this period took place in a historically highly exceptional environment.

From the end of World War II to the first oil crisis: collective agreements and a dualistic industrial structure

After World War II, the social market economy became the economic policy of the new political system in West Germany. The emergence of the welfare state developed in line with a cooperative and long-term production regime. This institutional fit between the production model and social policy determined the labor market segmentation in that era. To explain this development, the institutional aspects will be highlighted first, and secondly, by referring to the functional theory, the production model will be described.

Concerning institutional factors, especially important are the increasing power of work councils and collective bargaining. After World War II, codetermination was restored and expanded. The reason for the strong position of the workers and their representation at this time was that the occupying powers mistrusted the employers because of their close and intense cooperation with the Nazi regime.

The 1951 Codetermination Law in the Coal and Steel Industry (Montanmitbestimmungsgesetz) foresaw full-parity codetermination in the board of directors in companies employing more than 1,000 workers. Only one year later, in 1952, according to the Works Constitution Act (Betriebsverfassungsgesetz), each company with more than five employees had to install plant-level codetermination through works councils.

Since the 1950s, national and centralized collective bargaining rounds took place between trade unions and employers associations, such as Gesamtmetall in the metal industry. Those rounds negotiated the general working conditions as well as wage rates for the workforce. Due to this fact, the internal life of a firm was often influenced by labor legislation and collective agreements from outside (Streeck 2001: 11-16). In the aftermath, the status of essential participants within the production process was increasingly protected against the volatilities of the market and opportunistic behavior of other parties.

As regards functional factors, the self-governed vocational training system (with state participation) as well as the dualistic industrial structure became increasingly important. Owing to the implementation of Fordist methods in the German automobile industry, the skilled workforce was pulled out from the production line and shifted to surrounding activities such as maintenance, electrical work, tool making or other activities safeguarding the quality of the production.

Consequently, a large amount of semi- and unskilled workers entered the factory halls. For example, within the entire German automobile industry in 1940, the skilled workforce accounted for 38.7 percent, whereas the share was only 29 percent at the beginning of the 1970s. However, compared to plants in other countries, the proportion of the skilled workforce within the German automobile industry remained high. This can partially be associated with the Allied initiated expansion of the vocational training system. Thereby, the responsibility of the vocational training system was delegated to the self-government of both the handicraft sector and industry. Moreover, the costs of training for skilled workers were socialized. As a result, the attractiveness to employ apprentices enhanced (Herrigel 1996: 208-228).

In this way, a dualistic industrial structure emerged with a technology driven core of large firms surrounded by smaller technologically unsophisticated firms – the so-called “expanded workbench” (verlängerte Werkbank). After the war, firms like Grundig, AEG, Siemens, MAN and Audi moved into mass production and could rely heavily on suppliers. In particular, the large firms were in the position to provide relatively stable working relationships. In contrast, when a recession hit, the suppliers were the first to suffer and the last to recover. Thus, the employment relationships inside these supplier firms were as irregular as the production process. Regions with such supplier firms had high proportions of women, migrant or “guest” workers. For instance, in 1961, the total share of women of all manufacturing workers amounted to 45.4 percent in the Chamber of Commerce district of South Westphalia; most of them were employed in the iron and metal working industries (Herrigel 1996: 208-228). This indicates that suppliers tended to recruit a rather peripheral workforce instead of a core workforce. The risk – and thus the costs – of hiring and firing were shifted to the peripheral workforce.

From 1945 to the first oil crisis in 1973, the core workforce was mainly employed by large technology driven firms. By contrast, the peripheral workforce was rather unskilled and often employed by supplier firms. Similar to the periods analyzed above, the coverage by trade unions and labor legislation serves as a crucial criterion for the labor market segmentation.

After the first oil crisis until the present time: alternative employment relationships and firm-specific skills

During the 1980s and 1990s, a more sophisticated and flexible production process increased the demand for higher skilled workers and innovative organization forms, all of which changed the labor market and the institutions that dominated it for a long time. The institutional analysis therefore focuses on alternative employment relationships, whereas the functional analysis concentrates on skill formation. Both aspects caused labor market segmentation after the first oil crisis.

Since labor policy underwent an inconsistent sequence of deregulatory and re-regulatory phases after the first oil crisis, reforms were characterized by short-term orientation and transformation through incremental change. However, the apprenticeship system was also subjected to reforms resulting from decreasing apprentice ratios which occurred during the structural change from the manufacturing sector to the service sector. These reforms aimed at enhancing the flexibility of the system and facilitating modernization (Thelen 2007: 254).

The modernization of the labor market occurred via a flexibilization at the margin. As the privileges of standard employment contracts needed to be preserved, the only viable option was establishing a secondary segment of atypical jobs, causing a dualization in terms of wages and employment security. These atypical jobs have had two effects: on the one hand, they stabilize the core workforce by relieving reform pressure on the overall system; on the other hand, as a cheap alternative, they constitute an immediate danger to regular employment. A more dynamic labor market would contradict core workers' as well as employers' interests, as incentives to invest in skills are still a prerequisite for the German production model (Eichhorst/Marx 2011).

Today, a stable core workforce combined with a limited use of temporary agency work is a typical pattern in manufacturing and chemical companies because it allows them to retain firm-specific knowledge in economic downturns (Eichhorst/Marx 2011). Even so, standard employment relationships are still the most prevalent contracts within the chemical, metal and electrical industries because the workers needed in these industries have high levels of craft skills and require stable employment to invest in their skills. Nonetheless, working time and pay have become much more flexible due to changes in collective agreements and shop-floor practices. Characteristics of these open-ended contracts consist of a long tenure and high collective bargaining coverage. Atypical employment is especially observable within the service sector since it differs from the diversified production model (Streeck 1991, 1997) used within the manufacturing sector and relies on more general skills, and part of the service sector acts as a supplier industry for manufacturing (Hassel 2014).

These general skills encompass both a high level of often tertiary education, in connection with project work or freelancers, and a low level from employees qualified for other occupations or (re-)entering the labor market, in connection with marginal employment or agency work. Independent of these skill requirements, the prevalent contracts are atypical and therefore consist of limited employment protection, a low tenure and high wage dispersion (Eichhorst/Marx 2009).

Thus, the service sector tends to more and differently segmented than the manufacturing sector, not only intersectorally but also intrasectorally (Eichhorst/Marx 2011). Consequently, from an institutional point of view the labor market is today segmented along the dividing line between standard and non-standard working relationships that are associated with different types of tasks and groups of workers. The rise of service sector jobs has contributed to a more segmented overall picture of the German labor market.

These institutional changes went along with a functional change towards a more flexible production process. Globalization and increasing international competition made firms more vulnerable of economic fluctuations. To remain competitive, superior quality, higher flexibility and lower costs were deemed necessary. Moreover, due to technological changes, broader skills were demanded (Thelen 2007: 250).

These requirements were met by the reforms mentioned above. Nevertheless, since the 1990s, an enlargement of performance-orientated systems can be observed, as Lutz et al. (2007) point out. While unspecific qualifications provide a general applicability, workers in classic employment relationships have firm-specific knowledge provided by long-term investments and are secured by stable employment. Thus, the core workforce can today be described by each employees' degree of firm-specific knowledge.

Consequently, highly-specified workers can be identified as the core workforce, which firms seek to bind to the company. In contrast, rather general tasks are outsourced to the peripheral workforce through alternative employment options. Compared to the periods analyzed above, where skills and performance were the most important, today the duration of employment within a firm is only of minor importance. Additionally, from an institutional point of view, various deregulations weakened the role of trade unions and work councils.

Conclusions

As correctly noted by Reich et al. (1973), the segmentation process in Germany constituted a historical process where political-economic forces were responsible for the division of the labor market. In the beginning of our analysis, from the founding era until World War I, the bargaining power of workers was heavily restricted, and at the same time, the fluctuation rates were high. Only over the course of time did this picture change as workers developed an increasing duration of employment for the same employer, primarily within the German metal, electrical and chemical industries.

In the same vein, and in accordance to the survey made by Loveridge (1983) and Hakim (1990), it was shown that through these processes the labor market could be characterized by a dichotomization between a core and a peripheral workforce. This became particularly evident when looking at the observed industries. Here, to a large extent the jobs were and – often still are – permanent, full-time and associated with firm-specific skills and long term stable earnings. In later periods, we found that suppliers often employed a peripheral workforce, including low or semi-skilled workers.

As Piore (1983), Blanchard/Giavazzi (2001) and Layard et al. (2005) show, large parts of the labor market are regulated by institutions. However, as shown by the investigation, the bargaining power of workers and union power has been changing over the course of time, depending heavily on the balance of power between workers and employers. This became particularly evident after World War II when the role of work councils and the power of the unions was strengthened. This has had a strong impact on explaining the segmentation process through the institutional approach.

According to functional theory (Friedman 1977; Layard/Nickel 1999; Emmenegger 2009; Hall/Soskice 2001), the segmentation process is influenced by a change in the production strategy of firms for economic efficiency reasons. This theory along with the concept of skill formation explains that core activities require high and firm-specific skills, which can be achieved, for instance, by a vocational training system. This system proved to be successful within the observed industries as both parties, employers and workers, were responsible for the creation and maintenance of the training system.

Moreover, we found broad evidence within the metal, chemical and machine chemical industries for the protection of skill investments by standard employment relationships, and thus the maintenance of a core workforce. This assumption made by Lutz (1973), Williamson (1985), Hollingsworth/Boyer (1997) and Esteve-Abe et al. (2001) stresses the importance of firm specific knowledge and highly specified workers. Those activities, including core activities for the production process of a firm, are today embedded into long-term contracts. This is particularly true for the manufacturing sector, where the service sector is more strongly segmented for various reasons.

While early on, the duration of employment served as the main instrument to assess the core or peripheral workforce, later, several criteria emerged such as the coverage by the social security system or by collective agreements. In addition to identifying a mixed system, namely the apprenticeship system, including elements following a functional and institutional logic, we found that during industrialization, a more functional approach segmented the labor market. Later, a shift towards a stronger institutional structuring of the workforce occurred. The latest development of the segmentation process is again marked by a more combined logic. This can be explained by the maintenance and adaptation diversified quality production in a more 'purified' manufacturing core still dominated by standard employment relationships (Streeck 1991, 1997; Thelen 2004), but not supported by a secondary segment of increasingly important atypical contracts in more peripheral activities and service occupations.

As a general conclusion we can argue that the labor market in Germany has always been segmented, but the dividing line between the primary segment of the employment system – the core – and the secondary segment – the margin – has been redefined over time. Functional considerations, but in particular political decisions regarding labor law and social protection led to the establishment of an increasingly institutionalized standard employment relationship that is still dominant for skilled workers. The size and the composition of the marginal workforce changed based on business restructuring, available labor supply and institutional options for employment deviating from the standard. Hence, it would certainly be wrong to assume that the dualization of the German labor market is a peculiar phenomenon of the last 20 to 30 years, but it is becoming more visible in the more prominent role of non-standard contracts in the service sector.

References

- Abelshausen, Werner (2003), Kulturkampf. Der deutsche Weg in die Neue Wirtschaft und die amerikanische Herausforderung, Berlin.
- Alber, Jens (1982), Vom Armenhaus zum Wohlfahrtsstaat. Analysen zur Entwicklung der Sozialversicherung in Westeuropa, Frankfurt am Main.
- Berghoff, Hartmut (1997), Unternehmenskultur und Herrschaftstechnik. Industrieller Paternalismus: Hohner von 1857 bis 1918, *Geschichte und Gesellschaft* 23, 167-204.
- Bienkowski, S.v. (1910), Untersuchungen über Arbeitseignung und Leistungsfähigkeit der Arbeiterschaft einer Kabelfabrik, in: *Schriften des Vereins für Socialpolitik*, Band 134: 3-45, Leipzig.
- Blanchard, O./Giavazzi, F. (2001), Macroeconomic Effects of Regulation and Deregulation in Goods and Labor Markets, NBER Working Paper No. 8120.
- Blossfeld, H.-P./Mayer, K.U. (1988), Labor market segmentation in the Federal Republic of Germany: an empirical study of segmentation theories from a life course perspective, *European Sociological Review*, Vol. 4, Issue 2: 123-140.
- Bräutigam, H. (2009), Entwicklung, Bedingungen und Formen von Zwangsarbeit im Dritten Reich, in: *Gedenkstättenrundbrief* 149, S. 3-17
- Daniel, U. (1989), Arbeiterfrauen in der Kriegsgesellschaft: Beruf, Familie und Politik im Ersten Weltkrieg, *Kritische Studien zur Geschichtswissenschaft*, Bd. 84, Göttingen.
- Deutschmann, C. (1985), Der Weg zum Normalarbeitstag, Die Entwicklung der Arbeitszeiten in der deutschen Industrie bis 1918, Frankfurt am Main/New York.
- Dickens, W./Lang, K. (1988), The reemergence of segmented labor market theory, *American Economic Review*, 782, 129-134.
- Dickens, W./Lang, K. (1985), A test of dual labor market theory, *American Economic Review*, 754, 792-805.
- Doeringer, P./Piore, M. (1975), Unemployment and the 'dual labor market', *The Public Interest*, 38, 67-79.
- Doeringer, P./Piore, M. (1971), *Internal Labor Markets and Manpower Analysis*, Cambridge, Mass.
- Eichhorst, W./Marx, P. (2011), Reforming German Labor Market Institutions: A Dual Path to Flexibility, *Journal of European Social Policy*, 21 (1), 73-87.
- Eichhorst, W./Marx, P. (2009b), From the Dual Apprenticeship System to a Dual Labor Market? The German High-Skill Equilibrium and the Service Economy, *IZA Discussion Paper Series*, No. 4220.
- Emmenegger, P. (2009), Specificity versus replaceability: the relationship between skills and preferences for job security regulations, *Socio-Economic Review*, No. 7, 407-430.
- Estevez-Abe, M. et al. (2001), Social Protection and the Formation of Skills: A reinterpretation of the Welfare State, in: *Varieties of Capitalism. The Institutional Foundations of Comparative Advantage*, New York, 145-183.
- Federal Statistical Office (Statistisches Bundesamt) (1972): *Ausgewählte Strukturdaten für Bund und Länder. Fachserie A: Bevölkerung und Kultur. Volkszählung vom 27. Mai 1970, Heft 1.*

- Fransecky, T.v. (2003), Zwangsarbeit in der Berliner Metallindustrie 1939 bis 1945: Eine Firmenübersicht. Eine Studie im Auftrag der Otto Brenner Stiftung, Berlin
- Friedman, A.L. (1977), *Industry and Labour. Class Struggle at Work and Monopoly Capitalism*, London.
- Gallie, D. et al. (1998), *Restructuring the Employment Relationship*, Oxford.
- Gillingham, J. (1985), The “Deproletarianization” of German Society: Vocational Training in the Third Reich, *Journal of Social History* 19: 423-432.
- Hall, P.A./Soskice, D. (2001), *Varieties of Capitalism: The Institutional Foundations of Comparative Advantage*, Oxford: Oxford University Press.
- Hassel, A. (2014), The Paradox of Liberalization — Understanding Dualism and the Recovery of the German Political Economy, *British Journal of Industrial Relations*, 52, 57-81.
- Harney, K./Hau, M.v. (2010), The institutional logics of human capital: Historical analysis of vocational education in Germany, FIAB-Arbeitspapier 14.
- Hakim, C. (1990), Core and periphery in employers’ workforce strategies: Evidence from the 1987 E.L.U.S Survey, *Work Employment & Society*, Vol. 4 No. 2: 157-188.
- Herrigel, G. (1996), *Industrial Constructions: The sources of German industrial power*, Cambridge (UK).
- Hollingsworth, J. R./Boyer, Robert (1997), Coordination of Economic Actors and Social Systems of Production, in: *Contemporary Capitalism. The Embeddedness of Institutions*: 1-47.
- Kalleberg, A.L. (2001), Organizing Flexibility: The Flexible Firm in a New Century, *British Journal of Industrial Relations*, Vol. 39, Issue 4: 479-504.
- Kalleberg, A.L. (2009), Precarious Work, Insecure Workers: Employment Relations in Transition, *American Sociological Review*, Vol. 74 No. 1: 1-22.
- Kendzia, M.J./Zimmermann, K.F. (2013), Celebrating 150 Years of Analyzing Fertility Trends in Germany, *Journal of Economics and Statistics*, 233(3), 406-422.
- Kendzia, M.J. (2010a), Herausbildung erster Wesenszüge des Normalarbeitsverhältnisses in Deutschland, *IZA Discussion Paper Series*, No. 5107.
- Kendzia, M.J. (2010b), Der Institutionalisierungsprozess des Lohnarbeitsverhältnisses vom Ersten bis zum Zweiten Weltkrieg in Deutschland, *IZA Discussion Paper Series*, No. 5231.
- Kleineschulte, S. (2003), *Das Rathaus in Marl: Zur Bedeutung der Architektur für die politische Sinnstiftung auf kommunaler Ebene*, Bochum.
- Kuczynski, J. (1947), *Geschichte der Lage der Arbeiter in Deutschland von 1800 bis in die Gegenwart*, Bd. 1. Berlin.
- Kutscha, G. (1993), *Soziale Dimension der Berufsbildungspolitik in der Bundesrepublik Deutschland*, Bonn-Bad Godesberg.
- Layard, R. et al. (2005), *Unemployment, Macroeconomic Performance and the Labour Market*, 2nd edition, Oxford and New York.
- Layard, R./Nickell, S. (1999), Labor market institutions and economic performance, *Handbook of Labor Economics*, Vol. 2 Part C: 3029-3084.
- Loveridge, R. (1983), Sources of Diversity in Internal Labour Markets, *Sociology*, Vol. 17 No. 1: 44-62.

- Lutz, B. (1973), *Arbeitswirtschaftliche Modelluntersuchung eines Arbeitsmarktes, Zusammenfassung*, Frankfurt am Main.
- Lutz, B. et al. (2007), The German model of labour market segmentation – tendencies of change, *Économies et sociétés*, Série "Socio-Économie du Travail", AB, n°28, 6/2007, pp. 1057-1088.
- Piore, M.J. (1983), Labor Market Segmentation: To What Paradigm Does it Belong?, *The American Economic Review*, Vol. 73, No. 2, 249-253.
- Pollert, A. (1988), The 'Flexible Firm': Fixation or Fact?, *Work, Employment & Society*, Vol. 2, No. 3, 281-316.
- Puhani, P. (2014), Employment Industry and Occupational Continuity in Germany: From the Nazi Regime to the Post-War Economic Miracle, *IZA Discussion Paper Series*, No. 8372.
- Reich, M. et al. (1973), Dual Labor Markets: A Theory of Labor Market Segmentation, *The American Economic Review*, Vol. 63, No. 2, 359-365.
- Riemer-Schäfer, U. (without year), *Industrialisierung im Rhein-Main-Gebiet. Eine sozialstatistische, und sozialstrukturelle Analyse der Entwicklung von Gewerbegruppen, Unternehmungen und ihrer Arbeiterschaft zwischen 1870 und 1914. – 1. Teil: Sozialstatistik und Sozialstruktur der Städte des Rhein-Main-Gebietes. – 2. Teil: Die Unternehmungen und ihre Arbeiterschaften in den strukturbestimmenden Gewerbegruppen des Rhein-Main-Gebietes. Dargestellt am Beispiel ausgewählter Rhein-Main-Unternehmungen*, o.O.
- Ross, A. (2009), *Nice Work If You Can Get It: Life and Labor in Precarious Times*, Life and Labor in Precarious Times, New York.
- Saint-Paul, G. (1996), *Dual Labor Markets, A Macroeconomic Perspective*, Cambridge, Mass.
- Schäfer, H. (1979), Die Industriearbeiter, Lage und Lebenslauf im Bezugsfeld von Beruf und Betrieb, in: Pohl, H. (Ed.): *Berufliche Aus- und Weiterbildung in der deutschen Wirtschaft seit dem 19. Jahrhundert*, 143-216.
- Schmaltz, F. (2010), *The Buna/Monowitz Concentration Camp. Norbert Wollheim Memorial*, Frankfurt am Main.
- Schudlich, E. (1994), *Von der externen zur internen Arbeitsmarktpolitik – Zur Arbeitsmarktpolitischen Rationalisierung des Produktionsprozesses um die Jahrhundertwende, Studien zur Geschichte betriebsinterner Arbeitsmärkte in Deutschland, Teil 1*, Gelsenkirchen.
- Schumann, F. (1911), *Die Arbeiter der Daimler-Motoren-Gesellschaft Stuttgart-Untertürkheim; Schriften des Vereins für Socialpolitik*, Band 135.
- Schulz, G. (1978): Integrationsprobleme der Arbeiterschaft in der Metall-, Papier- und chemischen Industrie der Rheinprovinz 1850-1914, in: Pohl, H. (Ed.) (1978a): *Forschungen zur Lage der Arbeiter im Industrialisierungsprozeß*, Stuttgart, 65-106.
- Stephenson, J. (1975), *Women in Nazi Society*, London, 75-116.
- Stolle, U. (1980), *Arbeiterpolitik im Betrieb. Frauen und Männer, Reformisten und Radikale, Fach- und Massenarbeiter bei Bayer, BASF, Bosch und in Solingen (1900-1933)*, Frankfurt am Main, New York.
- Streeck, W. (2001), Introduction: Explorations into the Origins of Non liberal Capitalism in Germany and Japan, in: *The Origins of nonliberal capitalism: Germany and Japan*, Ithaca and London, 1-38.

- Streeck, W. (1997), *Beneficial Constraints: On the Economic Limits of Rational Voluntarism*, in: Hollingsworth, J. R./Boyer, R., *Contemporary Capitalism. The Embeddedness of Institutions*, Cambridge.
- Streeck, W. (1991), *On the Institutional Conditions of Diversified Quality Production*, in: Matzner, E./Streeck, W.: *Beyond Keynesianism. The Socio-Economics of Production and Full Employment*, Cheltenham: 21-61.
- Thelen, K. (2004), *How Institutions Evolve. The Political Economy of Skills in Germany, Britain, the United States, and Japan*, Cambridge.
- Thelen, K. (2007), *Contemporary challenges to the German vocational training system. Regulation & Governance 2007(1)*, 247-260.
- Tooze, A. (2007), *Ökonomie der Zerstörung. Die Geschichte der Wirtschaft im Nationalsozialismus*, München.
- Vetterli, R. (1979), *Arbeitssituation und Organisationsverhalten Schweizer Metallarbeiter*, in: Conze, W./Engelhardt, U. (Ed.): *Arbeiter im Industrialisierungsprozess, Herkunft, Lage und Verhalten*, 336-361.
- Vosko, L.F. (2000), *Temporary work: the gendered rise of a precarious employment relationship*, Toronto.
- Weiss, M. (2008), *Labour law and industrial relations in Germany*, Alphen aan den Rijn.
- Williamson, O.E. (1985), *The Economic Institutions of Capitalism. Firms, Markets, Relational Contracting*, New York/London.

Appendix:

Table 5: Identified factors segmenting the labor market in chronological order

	Core workforce	Peripheral workforce
Industrialization		
Social Security System	The social security system was used to attract and stabilize a permanent workforce. Thereby, the prevailing high fluctuation rates should be restricted.	The peripheral workforce was not covered by social security benefits as they were not employed permanently. Consequently, they were opposed to the daily risks.
Fluctuation Rates/duration	Although an expanded period of employment implied cumulated experience, the core workforce did not necessarily consist of a functional elite. Rather, the loyalty towards a firm, which employers sought to foster by income premiums or pension schemes, determined the core workforce.	The peripheral workforce fluctuated to a high degree since a large proportion was young or aimed at becoming self-employed.
WWI and the Weimar Republic		
Sectoral Bargaining	Industry-wide bargaining reduced the fluctuation rates as the possibility of poaching staff was restricted.	Sectoral bargaining, trade unions, work councils, apprenticeships and diversified production stabilized the working relationships.
Trade Unions	Trade unions became officially respected actors in the labor market. As a result, collective agreements were established. Moreover, the proportion of unskilled workers within unions increased, hence their position was strengthened.	
Work Councils	Since the power of work councils increased, dismissals were restricted and standard employment contracts were implemented. Thus, the attractiveness of investing in skills by education and training increased.	
Apprenticeships	Apprenticeships should form a skilled workforce and combat the poaching problem.	
Concentration processes and diversified production	Larger companies and a diversified production reduced the danger of an economic downturn and enabled the employer to keep the skilled workforce in the firm.	
Quality Production	High quality production increased the demand for skilled workers who constituted the core workforce.	
		As the German industry focused on high quality production, unskilled workers were less demanded.

The Third Reich and WWII		
Ideology	In the beginning of the Nazi regime, the core workforce was defined corresponding to the national socialist ideology as male German workers. This changed when the demand for labor increased in the course of the war.	Due to several restrictions regarding wages, working conditions, tenure and public acceptance, women (in the beginning) and (forced) foreign workers constituted a peripheral workforce.
Productivity	The core workforce, usually working as specialists and foremen due to labor shortage, owned firm-specific skills and was characterized by high productivity.	Forced laborer and women were less attractive for employers since they mostly worked outside their trained skill area and owned less firm-specific knowledge. Consequently, investments to employ them were needed, and productivity was expected to decline.
After WWII until the First Oil Crisis		
Collective Agreements	As the influence of work councils and collective bargaining was restored, working relationships were stabilized.	Due to collective agreements, insider-outsider problems exacerbated the entry of outsiders into the labor market.
Self-Governed Vocational Training System	The self-governed vocational training system increased the attractiveness to employ apprentices as the firms could form a skilled workforce according to their firm-specific needs. The skilled workforce was pulled out of the production line and shifted to surrounding activities.	Since more semi- and unskilled workers could find permanent employment on the production line, the status of the peripheral workforce was strengthened.
Dualistic Industrial Structure	The core workforce was employed within large technology-driven firms providing stable working relationships.	The peripheral workforce, specifically women and migrants, were employed by suppliers, which offered only unstable, irregular employment relationships.
After the first oil crisis until the present time		
Alternative employment relationships	Although labor market reforms were needed, the standard employment contract could be preserved for the core workforce, particularly with regard to the observed industries.	The peripheral workforce has been employed within alternative employment relationships, which offer a greater flexibility regarding wages and employment security.
Firm specific knowledge	Skilled workers, who own firm-specific knowledge, need incentives to invest in those skills and are hence employed within stable working relationships.	Tasks requiring general skills, both on a very high and low level, are outsourced to the peripheral workforce through alternative employment relationships.