

Regulatory Effects of the Amendment to the HwO in 2004 in German Craftsmanship

by

Davud Rostam-Afschar*

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Abstract: This study sheds light on the effects of the 2004 amendment to the German Trade and Crafts Code (Handwerksordnung, HwO) using three datasets. The focus is particularly on how employment, revenues and wages in German craftsmanship changed. Moreover, a unique dataset is used that provides evidence on changes in professional training of apprentices. In addition, the effects on service quality and general developments in German craftsmanship are discussed. Finally, suggestions for survey questions are provided to improve the evaluation of regulatory changes.

Keywords: Regulation, Firm entry, Employment, Service and Product Quality, Natural experiment, Craftsmanship

JEL Classification: L51, J24, I28, M13

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* Freie Universität Berlin (Free University Berlin) and German Institute for Economic Research, Berlin (DIW Berlin). davud.rostam-afschar@fu-berlin.de

Corresponding author: Davud Rostam-Afschar
Freie Universität Berlin
Fachbereich Wirtschaftswissenschaft
Boltzmannstr. 20
D-14195 Berlin
davud.rostam-afschar@fu-berlin.de

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Executive Summary

The European Commission wishes to understand the economic effects of regulation of professions. Germany is one of the countries in which a specific qualification is required in order to engage in self-employment. This requirement has been removed for 53 of 94 occupations in craftsmanship in an amendment to the German Trade and Crafts Code in 2004. For the other 41 occupations the requirement was only partly reduced.

This study has the following objectives:

1. Review the actual implementation of reforms in practice (i.e. when enacted and actually entered in force) and provide definitions of the periods before and after the amendment;
2. Measure changes in employment of the selected professions due to the reform;
3. Measure changes in prices/salaries due to the reform;
4. Document changes in quality of the services provided by the selected professions due to the reform;
5. Provide questions for a census supplement.

1. is addressed in section 2 of this report, 4 and 5. in sections 5 and 6. The quantitative results of this study are described in the following. First, however, it is important to recognize that there are only very few and limited datasets on key variables in German craftsmanship. In particular, evidence on the quality or prices of goods and services is not available. Moreover, data on bankruptcies for respec-

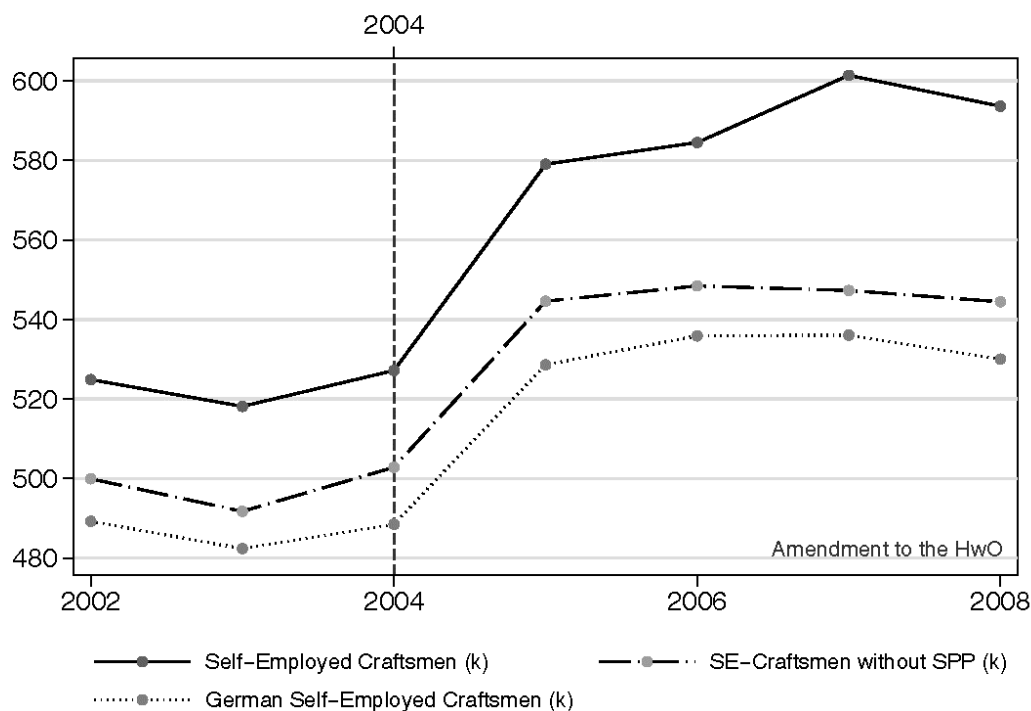
tive occupational groups could help to assess exits better. Even rather well documented variables like the stock of businesses, the number of workers or training of apprentices are quite different across datasets. Data on wages, unemployment after having completed an apprenticeship by occupation is not readily available. Thus, there remain open questions that this study cannot answer. For example, the reasons why some crafts occupations provide more training than the overall economy remain obscure. This study provides no evidence on the informal economy for the same reason.

Bearing in mind the limitations of the data, some effects of the amendment to the German Trade and Crafts Code in 2004 can be identified. First, the number of self-employed craftsmen increased strikingly as shown in Figure S1. This increase results from increases in entry rates. Exit rates have not been affected significantly in the dataset used which could be due to data quality as explained in section 3.1. Still, it is certain that exit rates did increase at most less than entry rates. Importantly, more self-employment than before the reform is observable more than five years after the reform. These results are robust with respect to variations of the definition of the period before and after the reform. The influence of other policies like subsidies for unemployed who try to set up a business or the enlargements of the European Union in 2004 and 2007 are accounted for.

Overall employment does not seem to have reacted to the reform much because most of the new businesses are one-person-businesses founded partly by former employees. However, these one-person-businesses are expected to grow in the future.

Figure S1: Craftmanship and entrepreneurship policies: total, unsubsidized (without SPP), and German self-employed craftsmanship in thousands.

Source: Own calculations based on the scientific use file of the German microcensus (2002–2008).



The natural consequence of reducing the requirement to obtain a Meister degree for setting up a business is that less self-employed hold a Meister degree. In turn, it is not surprising that mainly lower qualified persons start new businesses. Also, the deregulated professions are mainly low-skilled ones as shown in the report below. Another direct consequence is that with a larger number of one-person-businesses, the share of businesses that provide training recedes. However, a simple Difference-in-Differences calculation shows that training activity has only been reduced slightly due to the reform. Labor market dynamism increased after the reform, however, the indicators used do not show whether the higher dynamism is due to more instability or more growth. Wages, revenues, and investments do not seem to have been influenced by the reform.

These results have some interesting implications for policy making. First, it is unlikely that a further deregulation would lead to a higher number of businesses in the occupations which are still regulated. The reason can be seen from Table S1. The share of self-employed is higher in all groups of craftsmanship that still regulate entry (A1, A2, AC)¹ compared to the deregulated group (B1) and the overall economy (WP) in every year reported in the table. In fact, the regulation seems to be not economically binding, i.e. not to deter firm formation, in these occupational groups (A1, A2, AC).

Table S1: Self-employment rates in treatment groups and control group by year.

	B1	A1	A2	AC	WP
2002	7.88	15.20	12.41	19.26	11.17
2003	7.54	15.80	12.92	19.68	11.56
2004	8.20	16.98	13.38	20.91	12.00
2005	9.32	17.22	13.96	20.81	12.44
2006	9.48	17.39	14.20	18.49	12.27
2007	9.73	17.76	13.83	20.46	12.11
2008	9.78	17.24	13.69	19.30	11.95

Note:

Percentage share of self-employed among B1, A1, A2, and AC-occupations and percentage share of self-employed among working persons (WP).

Source:

Rostam-Afschar (2014) based on the scientific use file of the German microcensus (2002–2008).

¹ A1, A2, and AC refer to professions where firm entry was subject to obtaining a qualification and registering the firm before the reform. AC refers to professions where a firm is allowed to operate if the qualification requirement is met after the reform. A1 refers to professions where entry is allowed if 6 years of work experience, four of these in a decision-making position, in the prospective occupation is proven after the reform. A2 refers to professions regulated as A1 occupations which are observed to frequently use an exemption from the educational requirement which is granted for firms that commit to limiting the range of their activities to tasks that can be learned within 3 months after the reform.

However, there are several reasons to examine the entry requirement carefully. First, the entry regulation might suppress entries in the future and lead to adverse economic effects.

Second, quality guarantee and reducing quality uncertainty can be achieved by less invasive instruments like guarantees, brand-names, chains and consumer-based reputation systems which are already widely spread in German craftsmanship.²

Third, it is inefficient to have the same requirement for all occupations which are still regulated as regards entry (A1, A2, AC) despite the fact that consumer protection needs are very different in these occupations. There is no economic argument that justifies that a gunsmith should be regulated in the same way as a hairdresser. The former might require even stricter regulation than currently implemented, e.g. annual certification, while the latter might not need any form of regulation at all. Anecdotal evidence shows that quality of services can be achieved without the entry requirement: a prominent example is the hairdresser of Germany's former chancellor Gerhard Schröder and Germany's current chancellor Angela Merkel who does not have a Meister qualification but operates on the basis of an exception. A one-size-fits-all regulation does not recognize the heterogeneity of the crafts professions. The entire regulatory toolbox, e.g. licensing, annual or one-time certification, accreditation, registration, no regulation etc., needs to be examined for each profession separately.

² E.g. Djankov et al. (2002) do not find that stricter regulation of entry is associated with higher quality products but with sharply higher levels of corruption, and a greater relative size of the unofficial economy.

Moreover, a regulation is an invasive measure and should be subject to continuous tests of usefulness to be justified. Often the current situation is compared to the one of “freedom from licensing” in the American zone of occupation in Germany shortly after the Second World War (1948-1953) (see Lenger, 1988). However, this comparison does not allow the conclusion that the regulation is still beneficial (McChesney, 1987). Technological and structural change have changed the German economy significantly. Continuous evidence-based adjustment of the current legislation is necessary. For example, small changes in randomly chosen, regionally confined areas, e.g. on district level, and no change in a comparable area would give useful insights for general policy making. Leaving the regulation untested is, in turn, a potentially dangerous experiment involving an important part of the German economy.

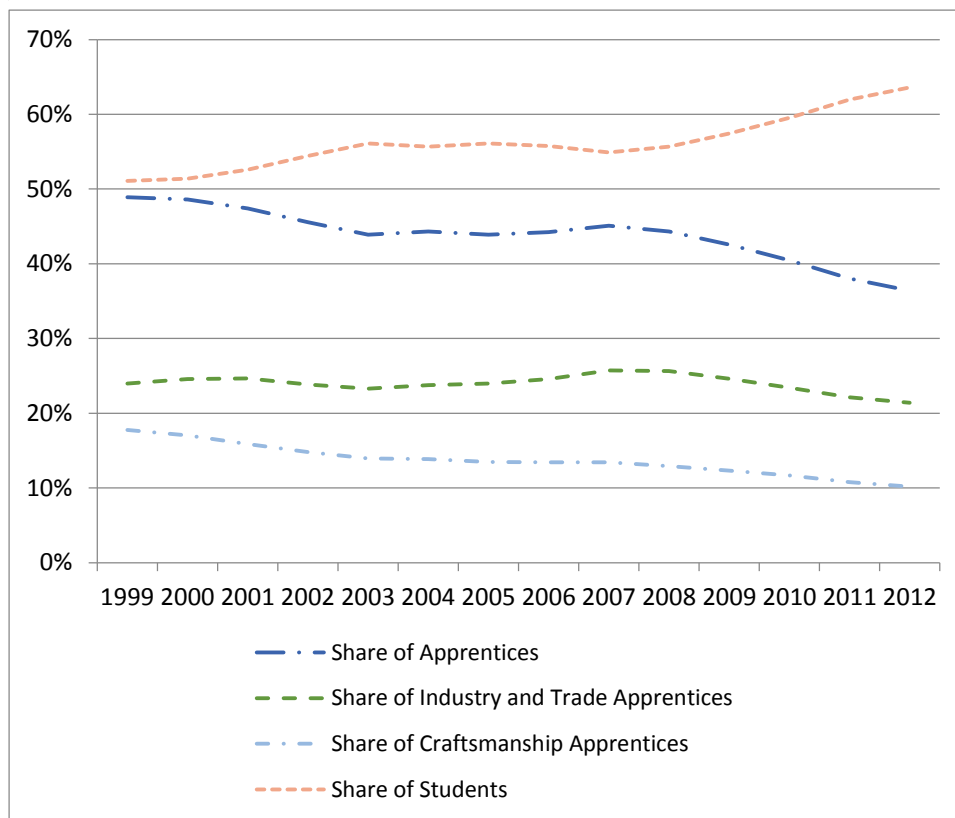
Another reason to evaluate the use of the current regulation is to learn from the experience of other countries in Europe. Hairdressers, for instance, are not regulated in some countries like the UK or Sweden³. This is the same for other occupations. The mutual evaluation/transparency requirement stemming from the Professional Qualifications Directive (Art. 59) requires reexamining the regulatory framework of German craftsmanship and the corresponding occupations in other countries.

³ To obtain a certificate as hairdresser (“Hantverksprogrammet, inriktning/område frisör”) in Sweden, a student can study at an upper secondary school or attain municipal education. The upper secondary school provides either school-based education or apprenticeship training for about three years.

Further, the decline in employment and apprentices in some sectors of craftsmanship might be due to structural changes and not due to the regulation. The fact that more Germans are eligible to study at universities is challenging some crafts professions because less young people decide to start an apprenticeship. Many crafts professions can be learned in closely related subjects at universities promising broader employment possibilities and higher wages. Therefore, as shown in Figure S2, craftsmanship competes increasingly against universities.

Figure S2: Share of Apprentices and Students in Germany.

Source: Own calculations based on Federal Statistical Office, Fachserie 11 Reihe 3 (1999–2012).



For occupations that do not require academic know-how, often similar occupations from industrial production compete with crafts professions. Shoemakers are one particular example.

In summary, two key recommendations follow from the conclusions of this study. First, collecting data on the quality (and prices) of goods and services of related professions in Member States would improve transparency, our understanding of where stricter or looser regulation is needed for consumer protection and provide a basis for more evidence-based policy making.

Second, European consumer protection organizations like “Stiftung Warentest” in Germany could be promoted. Such an organization with a focus on tests and comparisons of product and service quality across Member States is a direct instrument to reduce uncertainty about quality. The existing organizations like the Bureau Européen des Unions de Consommateurs or Consumers International could be encouraged to provide more reports on goods and services provided in a European context.

1 Introduction

Regulations of professional activity—mainly implemented in the labor or product market—can take many different forms and may exert effects in different directions. Often not just a single regulatory instrument is used for a specific aim but a package of regulations is at work at the same time. From the perspective of a researcher and of policy makers it is necessary to disentangle cause and effect which is quite a challenging task. It becomes even more difficult if the considered regulation is a “dual use” regulation like the one which is subject of this analysis. But what is a “dual use” regulation? A single regulation usually has a clearly determined effect if it is implemented in the form of a fee, quota or impediments for the market mechanism in a simplified world where external effects are absent, competition and information are perfect.

If however, a regulation that takes the form of, say, a one-time fee which would have positive effects on a worker’s productivity, then the effects of the regulation are ambiguous. Let us consider an example from the perspective of a worker or prospective entrepreneur. Suppose that in a certain branch a one-time fee of 10,000 Euro has to be paid without any service in return. Then the effect of this regulation has a clear direction on economic outcomes. If this fee would not be mandatory, no rational agent would choose to pay such a fee. Now consider the same one-time fee of 10,000 Euro. But this time the fee is paid to enhance a worker’s productivity over many years, for instance, because she gets training in return on how to run a sustainable business. This kind of fee does not have to be mandatory because agents will pay whenever it is beneficial for them. In fact, the overall effect depends on the relation of the (expected) rewards of higher productivity both in the labor market and product market to the magnitude of the fee and its effects

on allocation efficiency. If not mandatory, this kind of fee is not a barrier from a worker's perspective but rather an investment in human capital. If mandatory, it is of dual use. It might act as a barrier but it might also be an investment.

However, *mandatory* implementation of a regulation might be desired to enforce a certain level of skill and ultimately reduce a consumer's uncertainty about product or service quality. The degree of enforcement defines the following regulatory instruments: registration, accreditation, certification, and licensing (see Koumenta et al. 2014). Moreover, there are various ways to reduce quality uncertainty like guarantees, brand-name, chain stores or reputations systems, e.g. product and service ratings, where no government interference is necessary. From an economic perspective, these rating systems most efficiently ensure quality if organized independently by consumers not producers (see theorem II in Leland, 1979).

A regulation which combines the strongest type of entry restriction, namely licensing, coupled with registration is the German Trade and Crafts Code (Handwerksordnung, HwO). It imposes costs, i.e. time consuming courses and fees, claims to provide additional productivity, and to reduce quality uncertainty. Before its amendment in 2004, workers in 94 craftsmanship professions listed in the law were required to pay these costs and become a certified Meister before they were allowed to run their own business (licensing). Lacking data on how effective the courses to obtain a Meister degree are makes the analysis more difficult.

On top of this, there might be several sources of market failure present in German craftsmanship. Rent-seeking by limiting access to lucrative occupations has been a prominent argument against the entry requirement of the HwO from the times of medieval guilds to modern state certification requirements in German

craftsmanship (see, e.g. German Deregulation Commission 1991; German Monopolies Commission 1998, 2002). Again, it is not clear whether only the supply of craft services is reduced by the regulation or rather competence and quality is improved.

Moreover, fly-by-night tactics, i.e., workers setting up a company, doing business for a short period of time and then disappearing suddenly, are cited as an argument for an entry requirement that prevents low quality craftsmen to run a business in Germany. Such quality uncertainty might become manifest as a danger to health for consumers and can be reduced by certification, i.e. indicating the attainment of certain levels of proficiency (Akerlof, 1970).

However, there is no justification to use the heaviest form of regulation as a “one size fits all” regulatory instrument for 41 trades in craftsmanship which remained regulated in this very restrictive way after a first attempt to loosen the regulation in 2004. Using the very same regulation for these occupations means to ignore the very heterogeneous nature of these occupations. For instance, danger to health for costumers could be prevented using guarantees, brand-names, chain stores or reputations systems, e.g. product and service ratings for hairdressers, pastry cooks, stuccoists and similar trades. On the other hand, it might be more reasonable for opticians, hearing aid audiologist, etc. to operate under an accreditation system. To my knowledge, there exists no reliable data on service and product quality that focusses on craft occupations and thus changes in these variables could not be documented up to now. This means that arguments referring to quality uncertainty have to be examined very carefully. The burden of proof lies with the one who is making the claim that danger to health, for example from getting a haircut,

exceeds the welfare losses incurred through heavy regulation. Therefore, there is clearly a need to justify the current regulation on the basis of sound empirical evidence.

Supporters (e.g., German Confederation of Skilled Crafts 2003) of the entry regulation claim further that the regulation creates positive externalities because regulated businesses provide more professional training—even for the benefit of firms outside of craftsmanship. This is a classical red herring, i.e. the argument is seemingly plausible, though ultimately irrelevant for consumer protection because there are other arguably more efficient instruments to promote vocational training. Therefore, this argument has to be examined separately from the debate about consumer protection. I still use a dataset that has firm level information on apprenticeships to shed some light on the figures.

Overall, data availability on key variables of craftsmanship in Germany is limited—despite its importance for the German economy. In particular, reliable and representative data on service prices and quality are required to be able to assess the relevance of each of the arguments put forth. Fortunately, better data is available on employment and wages, and information on revenues makes it possible to get an idea of the service price levels. However, as will become clear in the main analysis, even variables considered as well documented as the number of businesses appear to vary considerably across datasets. Thus, I rather compare whether the different datasets provide similar patterns than to quantify precise effects.

Given these limitations, the main part of this study aims to disentangle the forces at play from the perspective of propositions established by economic theories to provide a clearer view on the effects of the HwO amendment in 2004 on

self-employment, the number of employees, wages, revenues and professional training activity. Three main sources of data are used and compared to data provided by the German Confederation of Skilled Crafts. I use information on businesses, employment, and revenues from the census of crafts (Handwerkszählung) and on individual occupational status from the German microcensus (Mikrozensus, MZ), both of which are provided by the Federal Statistical Office. Moreover, I use information on employees, revenues, professional training activity from the Establishment Panel of the Institute for Employment Research (Institut für Arbeitsmarkt- und Berufsforschung, IAB) which is a representative survey of establishments that covers a wide range of questions related to employment policy.

Evidence collected on the effects of the deregulation in 2004 that are discussed in the core part of this paper and from arguments drawn from economic propositions (Akerlof, 1970; Leland, 1979) and empirical findings (Djankov et al., 2002; Müller, 2006, 2008; Prantl and Spitz-Oener, 2009; Prantl, 2012; Müller, 2014; Rostam-Afschar, 2014) show that the HwO amendment in 2004 did not have negative effects on the different labor and consumer market outcomes. The results presented in this paper suggest that there might be efficiency gains in some crafts, while in most no changes in economic trends might result if the regulation is changed to have a non-mandatory character. In particular, the self-employment rate is unlikely to rise after loosening further entry restrictions. Naturally, a deregulation of the qualification requirement will lead to a lower level of qualification but should not affect training activity much in the long run. The main conclusion is that the heavy regulation in German craftsmanship should be justified by clear empirical evidence.

In this paper, I study the particular case for Germany. The methodology I use, however, can be applied to other countries with similar regulations and availability of data as well. Examples are Austria and Luxembourg. Moreover, I emphasize that caveats that come with this analysis could become obsolete once better measurement of key variables, like service quality, is available. Then, future research might be able to come closer to a rigorous welfare analysis of the effects of this reform.

2 Regulation of Craftsmanship: The 2004 amendment to the HwO

2.1 Institutional setting in Germany

The regulatory institutions in German craftsmanship took different forms in different times⁴. The register of self-employed craftsmen (Handwerksrolle) lists each business that receives a permission to operate. Müller (2006) argues, however, that the actual stock of businesses is about 15% lower than the reported stock due to registered but non-active businesses. The register is administrated by the Chambers of Crafts and Trade (Handwerkskammer), regional institutions introduced in 1897, which are also responsible for exam regulations.

A relatively lax form of regulation in craftsmanship is the small proof of competence (Kleiner Befähigungsnachweis), which restricted training of apprentices to craftsmen who hold a Meister certificate. This institution was introduced in 1908 after a period of the so called freedom of trade (Gewerbefreiheit, introduced in

⁴ See Lenger (1988) for a broader overview over the institutional background.

1871) in the German Reich. However, the small proof of competence was not required to start a business. The greater proof of competence was reintroduced in 1935 and in 1953 (Großer Befähigungsnachweis) and required that craftsmen obtain a Meister certificate in order to train apprentices and have a new business listed in the register.

Since 1965, legislation has distinguished between restricted regular craftsmanship (Vollhandwerke), occupations which require a greater proof of competence, and unrestricted trades similar to crafts (Handwerksähnliche Gewerbe), referred to in this study as A-occupations and B2-occupations, respectively.⁵ In 1990 the legislation was extended to Eastern Germany. As in Rostam-Afschar (2014), in this study the focus is on craftsmen in A-occupations before 2004 who remained regulated by a form of the greater proof of competence, in contrast to those in B2-occupations.

2.2 The Meister certificate as entry regulation

The Meister title is the highest professional degree in craftsmanship. To attain it, a person must complete the qualification level called Geselle after having served a two or three year apprenticeship. Then, under the greater proof of competence regulation, a craftsman could choose to apply as an employee in a business under a Meister or continue on to obtain an own Meister degree.

⁵ The respective occupations are listed in the Annex of this report and in Annex B/B2 in the HwO.

The costs to obtain a Meister certificate vary by occupation. Full-time courses to prepare for the exam take 1–3 years. The overall costs range, according to the Chambers of Crafts and Trade, from 4,000 to 10,000 Euros in 2010. The Meister exam usually has four parts. Two parts test the occupation-specific theoretical and practical skills. A third part tests general education in law, business and commercial knowledge. Finally, the exam contains a pedagogical part, because holding a Meister degree makes the craftsman eligible to train apprentices. After having passed the examination and determination of the legal form of the prospective business, each new self-employed craftsman is recorded in the register (a one-time fee of about 80 to sometimes more than 200 Euro has to be paid) and subject to compulsory membership with the Chamber of Crafts (depending on revenues, an annual fee of about 150 to more than 500 Euro has to be paid, sometimes a proportion of revenues, e.g. 0.9%, has to be paid in addition).⁶ Prior to the HwO amendment only in rare exceptional cases a craftsman might have been recorded in the register without a Meister degree. The Meister degree is valid for lifetime, i.e. it is not required to obtain an additional proof of qualification after technological or legal changes or a certain age.

2.3 Regulated and deregulated professions after 2004

On January 1, 2004, a substantial amendment to the HwO came into effect, in the context of a series of reforms aimed at the German social system and labor market

⁶ The amounts are rough illustrations based on information provided by the Chambers of Crafts and Trade.

called Agenda 2010. This amendment is based on two laws, the greater amendment to HwO (Drittes Gesetz zur Änderung der Handwerksordnung und anderer handwerksrechtlicher Vorschriften) and the small amendment to HwO (Gesetz zur Änderung der Handwerksordnung und zur Förderung von Kleinunternehmen). The reform proposal was announced for the first time in March 2003 (cf. Müller 2006), resulting in a relatively short time for workers to adjust and change occupations in anticipation of the policy change. In particular, it was not clear which occupations would be affected. When the amendment entered into force, it redefined 53 of the 94 former A-occupations to be exempted from the requirement to obtain a Meister degree as a requirement to set up a business, the degree Geselle suffices. Training of apprentices, in contrast, hitherto still requires the Meister degree. This group is referred to in this text as B1-occupations. A full list of all professions and their regulatory status after the reform is given in the Annex. Table 1 summarizes the changes due to the 2004 reform.

In contrast to the 53 B1-occupations, a part of the remaining 41 occupations remained unaffected with respect to the entry and training requirement. These, in particular health related or dangerous occupations, namely chimney sweeps⁷, optometrists, hearing aid, audiologists, orthopedic technicians, and dental technicians are grouped as AC-occupations.

⁷ Note that the law the “Gesetz über das Berufsrecht und die Versorgung im Schornsteinfegerhandwerk” came into effect in 2013, replacing the “Gesetz über das Schornsteinfegerwesen”.

The 35 remaining A-occupations were not entirely unaffected by the reform but were still subject to a substantially stricter entry requirement compared to the B1-occupations. In fact, workers in these occupations could apply for permission to start a business without a Meister degree after having reached the qualification of a so called Altgeselle, i.e. a Geselle having proved 6 years of work experience as a Geselle, four of these in a decision-making position, in his or her prospective occupation. This Altgesellen rule defines the third treatment group (A1-occupations), which includes professions such as roofers, surgical instrument makers, gunsmiths, plumbers, gas and water fitters, joiners, and pastry cooks.

But not all of these professions are referred to as A1-occupations where the data allows to define subgroups of A-occupations. 27 professions are defined as A1-occupations for the following reason. Müller (2006) identifies 8 occupations that frequently use a rule that permits workers in A1-occupations to start a business without providing proof of any qualification, provided they commit to limiting the range of their activities to tasks that can be learned within 3 months. In contrast to businesses of all other groups, businesses using this rule do not have to be listed in the register. This rule aims particularly at supporting the establishment of small businesses. However, for a prospective entrepreneur who plans to carry out the full range of activities, obtaining vocational training according to the Altgesellen rule is still mandatory. Occupations that frequently make use of this rule according to Müller 2006 are masons and concreters, painters and varnishers, metalworkers, motor vehicle body and vehicle construction mechanics, bike mechanics, information electronics technicians, vehicle technicians, and butchers. In this study these occupations are referred to as A2-occupations. Note that the entry require-

ment did not require the owner of a business to hold the Meister degree after 2004 in A-occupations. Employing a manager who holds this degree suffices.

Another group of occupations that was not affected by the HwO amendment in 2004 are the unregulated trades similar to crafts referred to as B2-occupations. Table 11 in the Annex lists these occupations. Unfortunately, workers in these professions are hardly observed in the data. Therefore, I exclude them from some parts of the analysis.

Table 1: The amendment to the HwO in 2004.

Requirement before 2004	Requirement after 2004	Number of professions
A (Meister)	AC (Meister)	6
A (Meister)	A1 (Altgeselle)	27
A (Meister)	A2 (Altgeselle, no requirement*)	8
A (Meister)	B1 (No requirement)	53
B2 (No requirement)	B2 (No requirement)	57

Note:

This table shows the requirement before and after the reform in descending order of a priori assessed intensity of entry regulation. The occupational groups B1, A1, A2, and AC are defined to be mutually exclusive. However, non-craft occupations and B2-occupations within these groups cannot always be identified.

* For A2-occupations, no requirement is imposed after the reform if a prospective entrepreneur commits to limit the range of the activities of his firm to tasks that can be learned within 3 months.

It is important to keep in mind the high degree of heterogeneity in German craftsmanship in the analysis below. Rostam-Afschar (2014) reports that the A2 group has almost no female workers, while the majority of B1 jobs are done by women. Another prominent difference is that craftsmen working in a B1 vocation rarely start own businesses in comparison to other groups. As discussed below in more detail, this group of occupations has a lower propensity to engage in self-employment compared to all other groups of craftsmanship and the overall German economy. Therefore, with respect to firm entry, the amendment to the HwO in

2004 targeted the group which promised the highest potential to increase this variable. Moreover, B1-occupations have on average less qualified workers. At the same time, this group has on average a higher number of workers per firm.

2.4 Identification of professions in the datasets

The data from the census of crafts provided by the Federal Statistical Office provides only aggregate information unlike the other datasets I use in this analysis. However, it provides an excellent reference for the validity of the microdatasets.

A dataset like the German microcensus, which is also provided by the Federal Statistical Office, asks the current profession and classifies it according to the three-digit classification of occupations (e.g., issue 1992, Klassifizierung der Berufe, Ausgabe 1992, KldB92)⁸. I matched each reported occupation of an individual in the German microcensus with the respective occupation listed in the law. From this information, I constructed the four occupational dummies that reflect the different intensities of the treatment, as outlined in Table 1.

I repeated the same procedure using the IAB Establishment Panel⁹, waves 2000-2010. I accessed the data on-site at the “Forschungsdatenzentrum der Bundesagentur für Arbeit im Institut für Arbeitsmarkt-und Berufsforschung“ (FDZ) in Berlin (project number 782). Instead of matching occupations, I used information on membership in a Chamber of Crafts and matched branches according to the

⁸ The classification of occupations and of economic activities is available at <https://www.klassifikationsserver.de/>.

⁹ See Fischer (2009) and Ellguth et al. (2014).

classification of economic activities. This is feasible for most professions of craftsmanship because at the five digit level (not available for 2002), the economic activities are identical to the branches. For instance, “Erection of frames and constructional timber works” are done by carpenters, while a roofer’s activity is exactly “Erection of roofs, roof covering”. Similar to the classification of occupations, not every profession has a perfect match and some B2-occupations are hardly observed at all. Moreover, there are some A1-occupations which are very similar to other groups, say, B1-occupations. To account for potential biases, I exclude ambiguous occupations in robustness checks. I leave for future research to use the same dataset and combine it with external data, e.g. the SIAB (Stichprobe der Integrierten Arbeitsmarktbiographien) dataset provided by the IAB that uses both three-digit classification of occupations and five-digit classification of economic activities, to identify businesses of craftsmanship more precisely. Also to separate the four degrees of regulatory intensity is left to future research. With the additional information described above one could identify businesses similar to crafts businesses and classify them into industry and trade businesses. This would generate another interesting comparison group as the legislative framework of the HwO does not apply to trade businesses albeit some engage in the very same activities.

2.5 Timing of the reform: Definition of "before" and "after"

Different definitions of the date at which the experimental change occurred could lead to different conclusions, in particular if the natural experiment had been pre-announced, adjustment effects could induce self-selection. This is not the case in this study because the different treatment groups are distinguished by a law that was proclaimed for the first time in March 2003 (cf. Müller (2006)). Therefore,

workers did not have enough time to adjust and change occupations. This view is supported by the data. For example, using the German microcensus Table 11 in Rostam-Afschar (2014) shows that different definitions of the periods before and after the reform do not change the main results. The three different procedures include omitting the year 2004 from the sample, defining 2004 as belonging to the post-policy period, and defining 2004 as pre-policy period. Recall, that the amendment to the HwO came into effect at the beginning of 2004. However, it is important as well to check robustness of results by varying starting year defining the period before 2004 and the last year of the period after 2004 to exclude the effect of other events (see Subsection 3.3).

3 Trends and Effects on Employment

3.1 How many craftsmen ran own businesses?

To assess the impact of the amendment to the HwO in 2004 it is useful to examine how the number of businesses in the German craftsmanship developed over time. Table 2 shows the stock of businesses at the end of the years 1995 and 2008 to 2011. Unfortunately the census of crafts is not available for the years between 1995 and 2007. Therefore, it is impossible to measure the effects of the amendment to the HwO in 2004 using this dataset. However, it provides an excellent source for comparison. Information on B2-occupations is not available in later years of this dataset. Nonetheless, it is possible to see that the number of businesses in A-occupations remained roughly constant from 1995 through 2011. The number in B1-occupations, however, has risen already quite strongly between 1995 and 2008. This expansion continues until 2011.

Comparing the data of Table 2 to the same variable presented in Table 3 shows how severe the need for reliable data is, even for well documented measures like the number of businesses. Table 3 (see below) shows that in 2008 602,605 A-businesses were registered. The difference between this number and the 485,787 A-occupations recorded for 2008 in Table 2 might reflect businesses with revenue less than 17.500 Euro which are not recorded in the census of crafts. Still, Table 3 also shows that the number of A-businesses remained quite constant. These businesses amount to less than 90 percent of the total number of A and B1 crafts (in Table 2 only somewhat over 80 percent).

Table 2: Stock of businesses at the end of the year.

Year	A		B1		Total
1995	472,828	83.95%	77,791	13.81%	563,204
2008	485,787	84.14%	91,598	15.86%	577,385
2009	478,077	83.39%	95,234	16.61%	573,311
2010	476,556	82.67%	99,923	17.33%	576,479
2011	476,290	82.06%	104,127	17.94%	580,417

Note:

Data from 1996 to 2008 is not available. Data in 1995 is measured at the end of September 1994. There are several caveats to be taken into account when comparing the data. First, data from 1995 is based on survey data while from 2008 on register data is used. Second, from 2008 on businesses with revenue less than 17.500 Euro are excluded.

Source:

Own calculations based on data from the census of crafts provided by the Federal Statistical Office.

The increase in B1-occupations from 2004 onwards is striking in Table 3 below. The number of B1 businesses more than doubles from 2002 to 2008 such that B1-occupations take up a share of about 23 percent in 2008.

In Table 2 this share is only about 16 percent. The reason might be again that one-person-businesses are not likely to appear in the database. Table 3 also shows data on B2-occupations. The share of these trades is roughly constant from 2002

through 2008 at about 20 percent. To sum up, the number of A and B2 businesses remained virtually constant, while the number of B1 businesses increased dramatically from 2004 onwards. This suggests that the HwO amendment in 2004 encouraged new entries. At the same time, the increase in the number of businesses implies that these entries were sustainable. If for each new entry, one new bankruptcy would have occurred, the number of B1 businesses would have remained constant. As this is not the case and we know that entries increased, exits must have increased less than entries. Rostam-Afschar (2014) cannot find significant increases in exit rates.

Table 3 Stock of businesses at the end of the year.

Year	A		B1		B2		Total
2002	590,146	89%	76,044	11%	177,471	21%	843,661
2003	587,762	89%	74,940	11%	183,886	22%	846,588
2004	595,309	85%	102,568	15%	189,216	21%	887,093
2005	600,287	82%	129,591	18%	192,805	21%	922,683
2006	603,443	80%	149,981	20%	193,474	20%	946,898
2007	603,757	78%	166,015	22%	191,434	20%	961,206
2008	602,605	77%	175,557	23%	188,526	20%	966,688

Note:

The actual stock of businesses is about 15 % lower than the reported stock due to registered but non-active businesses. The first percentage refers to the sum of A and B1 businesses, the second to the sum of A, B1, and B2 businesses.

Source:

Rostam-Afschar (2014) based on data provided by the German Confederation of Skilled Crafts.

This might be due to the fact that questions regarding the measurement of entries and exits are voluntary, while questions from the core part of the microcensus are mandatory to answer. Item non-response is likely to be higher for psychological reasons. Moreover, persons working as self-employed in the shadow economy

might consider themselves as still active whereas they might appear as inactive in other sources. However, there is no piece of evidence suggesting that potentially increasing exit rates increased more than entries after the reform accounting for the effects of the financial crisis which might have hit B1 businesses harder than A-occupations.

Table 4 shows how many of the businesses are represented in the IAB Establishment Panel after excluding businesses that are ambiguous, i.e. businesses that operate in activities regulated by more than one of the groups A, B1, and B2, businesses which could not be identified uniquely, or businesses which are operating in activities not regulated by the HwO (Mischbetriebe).

Table 4: Stock of businesses represented in the IAB Establishment Panel.

Year	A		B1		B2		Total
2000	368,671	91%	28,786	7%	7,565	2%	405,022
2001	359,946	91%	32,064	8%	5,304	1%	397,314
2003	326,389	92%	22,376	6%	6,645	2%	355,410
2004	311,255	93%	20,109	6%	4,922	1%	336,286
2005	299,293	92%	21,428	7%	5,036	2%	325,757
2006	294,159	91%	20,513	6%	8,938	3%	323,610
2007	286,186	90%	24,569	8%	5,497	2%	316,252
2008	282,967	90%	24,153	8%	7,039	2%	314,159

Note:

Businesses without employees who are subject to social security contributions are not included in the database.

Source:

Own calculations based on the IAB Establishment Panel.

The IAB Establishment Panel is a survey comprising more than 16,000 businesses which contracted at least one employee who is subject to social security contributions. Therefore, one-person-businesses are not observed in this dataset.

This leaves us with only a fraction of the businesses reported in the previous tables. Similar to above, the share of A-occupations and B2-occupations (of which only very few could be identified) remained roughly constant throughout.

The rise of the number of B1 businesses is not observable in this dataset. This might reflect that new entrepreneurs are mainly setting up one-person-companies. In fact, this would be no surprise as it is usual that businesses are very small at the beginning of their activity and expand only after a while.

Figure 1: Craftsmanship and entrepreneurship policies: total, unsubsidized (without SPP), and German self-employed craftsmanship in thousands.

Source: Own calculations based on the scientific use file of the German microcensus (2002–2008).

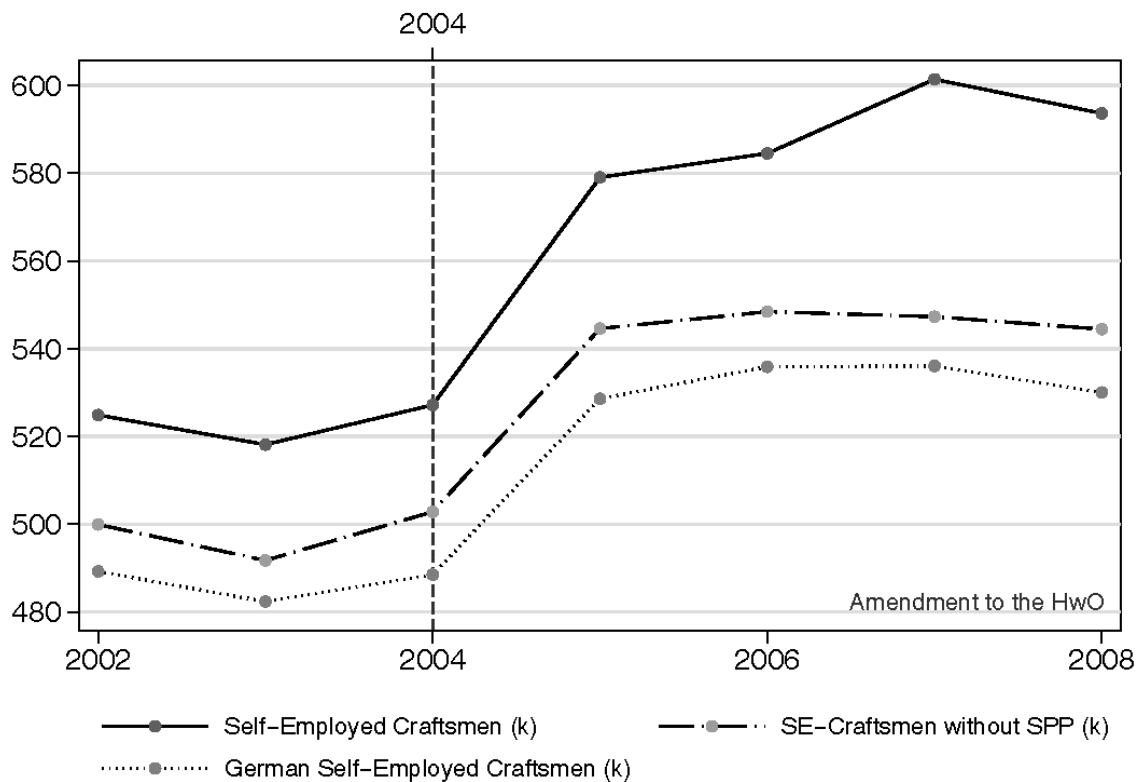


Figure 1 shows how the number of businesses changed according to data from the German microcensus. In this dataset, the number of businesses seems to be quite well represented. The figure shows three lines representing the number of

businesses in total, of self-employed indicating German citizenship, and of self-employed who indicate not having received public payments (SSP). It is important to decompose self-employment into these groups because other policies like start up subsidies, changes in legislation regarding the freedom of movement for workers, etc. could have influenced these trends at the same time. In 2004 the total number of businesses increased by about 11 percent. The fact that the other two lines show virtually the same trajectory suggests that public payments or the enlargement of the European Union (EU) in 2004 are not likely to have had any impact on the number of businesses. Note that this is not true for 2007.

The total number of businesses rises, while the number of German craftsmen and craftsmen not receiving public payments remain constant. This suggests that the enlargement of the European Union in 2007 (Bulgaria and Romania) might have had an effect on the number of self-employed. A more formal analysis that attempts to disentangle the effects of the reform to the HwO from other policy events is presented in Rostam-Afschar (2014). The results of a Difference-in-Differences analysis show that the probability of being self-employed increased significantly due to the reform among B1- and A1-occupations. The positive effect fails to achieve significance for the A2-vocations, however. The group of B1-craftsmen shows the strongest relative increase which amounts to more than 40%.

In A2-occupations, the results indicate weaker, but still positive relative effects. Repeating the Difference-in-Differences procedure for entry and exit rates show that these increases are caused by significant increases to the probabilities of entry across all three groups, whereas the probabilities of exit from self-employment remained virtually unaffected by the policy change. The increase in

the propensity to engage in entrepreneurship seems to be persistent. In fact, Müller (2014) shows that the ratio of new businesses in overall craftsmanship to the workforce is in each year after the reform (2004-2012) higher than in each year before the reform (2000-2003).

Figure 2: Self-employment among B1, A1, A2, and AC-occupations in thousand (k).

Source: Own calculations based on the scientific use file of the German microcensus (2002–2008).

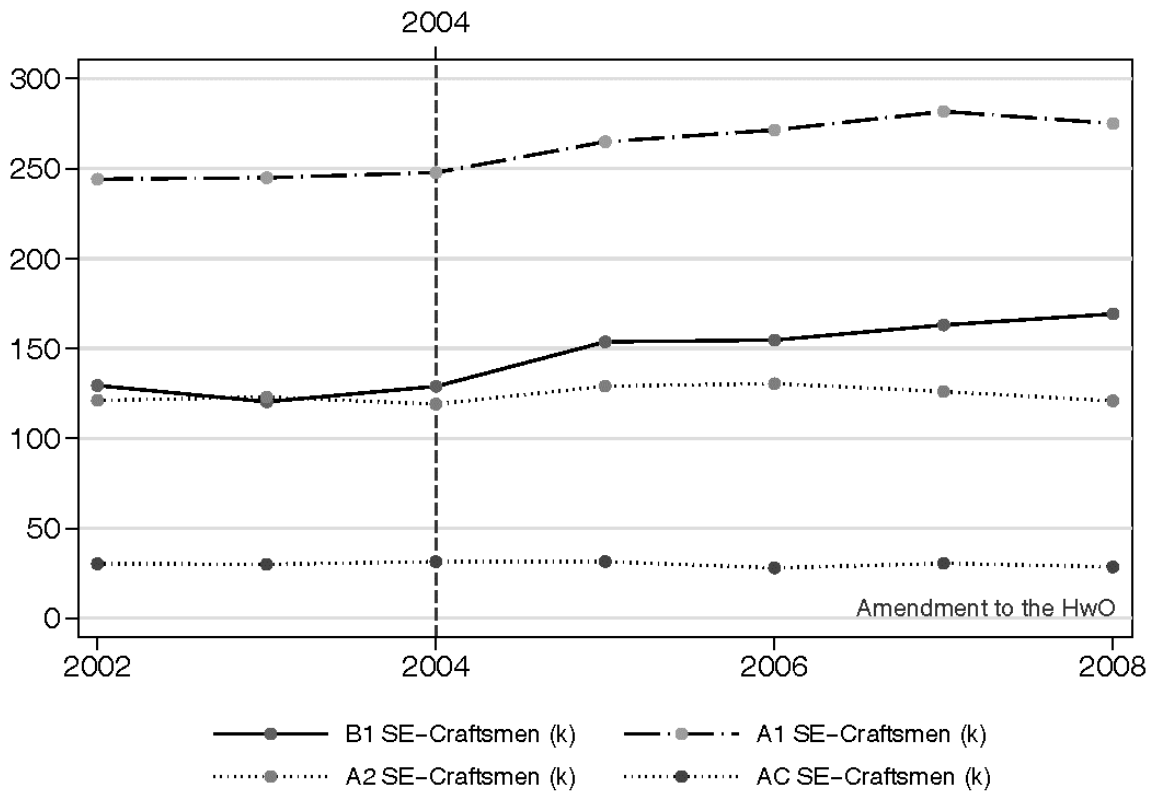


Figure 2 presents the number of self-employed for B1, A1, A2, and AC-occupations separately. B1 and less so A1-occupations show an increase in this number. This increase begins in 2004 hinting again at the rising number of self-

employed due to this reform. Even though legislation subsumes very heterogeneous trades as A, B1 or B2-occupations, these three groups clearly differ in the propensity to engage in entrepreneurship.¹⁰

Table 5 shows that only about 8 percent of craftsmen in B1-occupations were self-employed before the reform and less than 10 percent after the reform. In A1-occupations the share of self-employed increased as well but starting from a much higher level, namely about 15 percent. The share of self-employed among A2 and AC-occupations remained roughly constant.

Table 5: Self-employment rates in treatment groups and control group by year.

	B1	A1	A2	AC	WP
2002	7.88	15.20	12.41	19.26	11.17
2003	7.54	15.80	12.92	19.68	11.56
2004	8.20	16.98	13.38	20.91	12.00
2005	9.32	17.22	13.96	20.81	12.44
2006	9.48	17.39	14.20	18.49	12.27
2007	9.73	17.76	13.83	20.46	12.11
2008	9.78	17.24	13.69	19.30	11.95

Note:

Percentage share of self-employed among B1, A1, A2, and AC-occupations and percentage share of self-employed among working persons (WP).

Source:

Rostam-Afschar (2014) based on the scientific use file of the German microcensus (2002–2008).

The AC-occupations have the highest self-employment rate; compared to the self-employment rate of the total working population this number is almost twice as high. This suggests that it is unlikely that the number of self-employed will in-

¹⁰ Rostam-Afschar (2014) shows other dimensions along which these groups differ systematically. In particular, B1 occupations have a large share of females and are on average less qualified, as around 1/3 report no professional qualification.

crease in a further deregulation in occupations where the share of self-employed is already quite high.

In summary, evidence from different sources points in the same direction: the number of businesses increased in the occupations where the entry requirement has been deregulated. This finding is consistent with the literature. Müller (2006) finds a strong increase of start-ups. At the same time he finds increased exit rates implying that businesses are less long-living.¹¹ Moreover, the owners of these start-ups are less qualified. Rostam-Afschar (2014) provides evidence that indeed less qualified persons engage into craftsmanship. However, this is no surprise given that entry required a relatively high level of education before the reform. It is important to note that Rostam-Afschar (2014) controls for effects of other policy changes which occurred simultaneously to the HwO amendment. In particular, the enlargement of the EU seems to have had effects on the number of businesses in Germany (cf. Müller (2008)).

3.2 How many craftsmen were employed in a business?

Evidence from the census of crafts shows that the average number of total employees was about 9 in all groups of craftsmanship (see Table 6). This number did not change systematically over time except for 1995 where it was 11. Focusing on A-occupations, the average number of employees seems to have declined somewhat below the total average but it is not clear whether this is due to business cycle ef-

¹¹ Providing recorded the number of bankruptcies in the specific occupations of craftsmanship to the general public would shed further light on how exit rates responded to the reform.

fects, technological progress, or a policy change. B1 trades seem to have shrunken their personnel over time, finally arriving at the level of A-occupations in 2011.

Table 6: Number of craftsmen employed at the end of the year (Total, per business).

Year	A		B1		Total	
1995	4,833,995	10	1,171,693	15	6,005,688	11
2008	4,021,013	8	895,375	10	4,916,388	9
2009	4,008,641	8	898,807	9	4,907,448	9
2010	4,040,309	8	938,381	9	4,978,690	9
2011	4,093,354	9	956,825	9	5,050,179	9

Note:

Data from 1996 to 2008 is not available. No information on businesses with revenue less than 17.500 Euro and on B2 businesses was used in this calculation from 2008 on.

Source:

Own calculations based on data from the census of crafts provided by the Federal Statistical Office.

Table 7 shows that a large part of employees, as recorded in the data of the census of crafts shown in Table 6, is represented in the IAB Establishment Panel. Indeed, according to this set of data the average number of employees is also 9 (not reported in Table 7) for A trades in all years. While the fraction of one-person-businesses, i.e. without employees, is relatively large in B1 trades, in this group, the businesses which do employ personnel tend to have a number of employees which is around 4 to 6¹² in the IAB data. Most importantly, business size in craftsmanship measured in the number of employees is quite constant over time for both A-occupations and B1-occupations once the one-person-businesses are accounted for. Müller (2006) does not find a clear result regarding the number of employees but suggests that both A and B1 trades experienced a decline in the number of em-

¹² This number represents the median, the mean is 20 and seems to be driven by outliers.

ployees which might have been overcompensated by the increase in the number of self-employed in the B1-occupations.

Table 7: Number of craftsmen employed and median number of employees represented in the IAB Establishment Panel.

Year	A		B1		B2		Total
2000	3,499,502	5	696,030	6	57,395	6	4,252,927
2001	3,418,716	5	608,911	6	27,076	3	4,054,703
2003	3,030,307	5	486,329	5	37,561	4	3,554,197
2004	2,725,181	5	408,115	6	34,242	4	3,167,538
2005	2,598,608	5	461,596	4	35,018	4	3,095,222
2006	2,782,381	5	430,403	6	59,513	4	3,272,297
2007	2,709,218	5	538,714	4	24,503	3	3,272,435
2008	2,742,964	5	490,237	6	28,047	3	3,261,248

Note:

Businesses without employees who are subject to social security contributions are not included in the database.

Source:

Own calculations based on the IAB Establishment Panel.

3.3 How many apprentices were trained?

The IAB data show that the share of low qualified craftsmen is substantially larger in B1-occupations compared to A-occupations.¹³ Rostam-Afschar (2014) finds large differences as well; however, the share of employees with no formal professional qualification is for B1-occupations only about one third. In both groups this share declined steadily. The reform seems not to have had any impact on this de-

¹³ The percentage share refers to employees with no formal professional or obsolete qualification (“Un- und Angelernte”). The shares are likely to be driven by outliers. The median share for B1 occupations is about one third.

velopment (cf. Table 2 in Rostam-Afschar (2014) for a before-after comparison). Why is it important to consider the share of low qualified craftsmen? Discussing the regulatory requirements in German craftsmanship with respect to consumer protection should not involve separate issues that are misleadingly tied together in the Meister degree. However, passing part IV of the Meister exam grants eligibility to train apprentices. To see that market entry and training of apprentices is already *de facto* and *de jure* separate, note that it is possible to obtain eligibility to train by passing an exam equivalent to the Meister exam, in particular a *Ausbildereignungsprüfung* (§ 30 Abs. 5 des Berufsbildungsgesetzes). Thus, in fact part IV of the Meister is just an additional burden to pass the exam. A prospective entrepreneur who does not want to train apprentices must still pass all parts of the exam. A person who does not have a Meister degree but wants to train apprentices, may do so after having passed the *Ausbildereignungsprüfung*.

Figure 3 shows movements of the growth rate of the number of new apprentices over time based on data from the German Confederation of Skilled Crafts. It is important to note that both growth rates for A and B1-occupations are on average below zero before and after the reform in 2004. Both growth rates follow a similar cyclical pattern due to business cycle effects. After the reform in 2004, the growth rates increase and become even temporary positive. A clear effect of the reform on the number of new apprentices is not apparent from this graph. This shows how important it is to account for business cycle effects when assessing the effects of the reform.

Figure 3: Growth Rate of New Apprentices.

Source: Own calculations based on ZDH data.

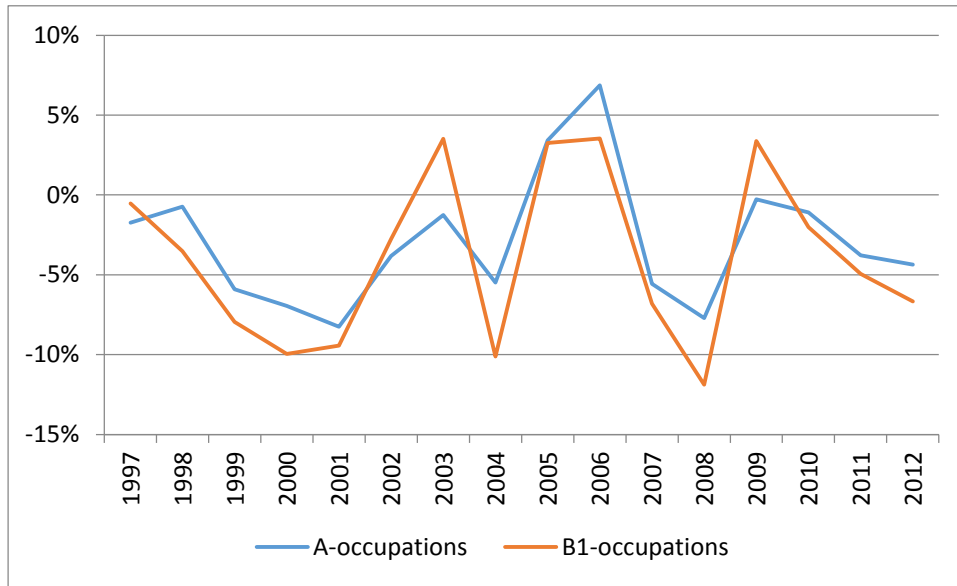
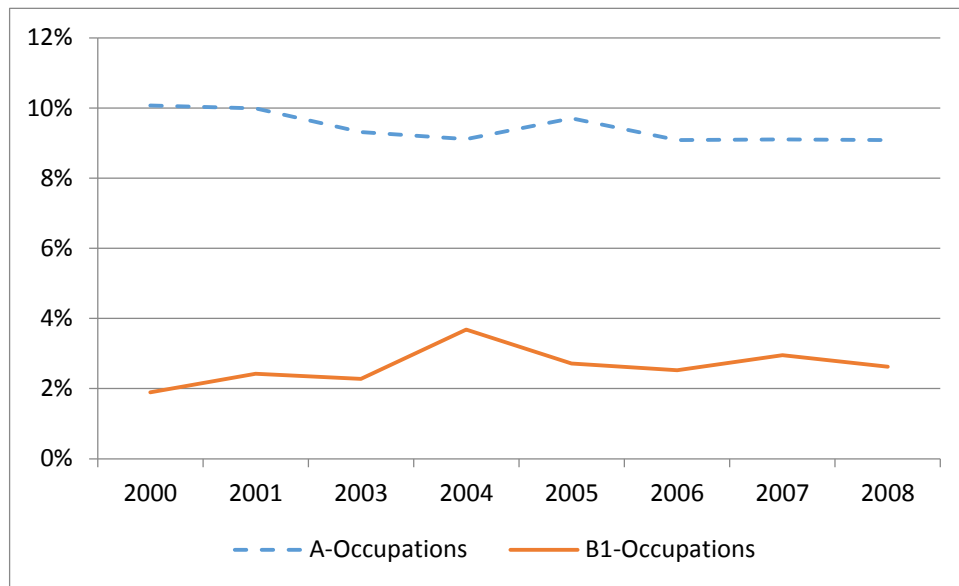


Figure 4 shows a related variable, namely the share of apprentices using IAB data. This variable is lower compared to A-occupations before and after the reform. Bearing in mind that one-person-businesses are missing in this figure, according to the IAB data, the share of apprentices is higher in the post-reform period for B1-businesses, while it is on average declining in the A-occupations. This is not true for the number of *new* apprentices in the ZDH data. This number is declining for both B1 and A-businesses.

With these findings and the large difference between A and B1-occupations in terms of skills, consider the claim that a mandatory Meister exam provides incentives to train apprentices. This claim has several problems. First, a simple comparison between A and B1-occupations does not imply that compulsion to obtain a Meister degree is causing these differences. Indeed, B1 and A-occupations are very heterogeneous with respect to their propensity to train apprentices.

Figure 4: Percentage share of apprentices among all workers in A, B1, B2-occupations.

Source: Own calculations based on the IAB-Establishment Panel (2000–2008) without 2002.



We saw that many jobs in B1-occupations are done by relatively less educated workers before and after the reform in 2004. At the same time a lower share of employees are apprentices and one-person-businesses are more common. A more convincing comparison would compare how the propensity to train changed in the B1 and A-occupations over time, respectively. Then, the difference in the changes would under certain assumptions give a hint of what the impact of the compulsion of the entry requirement is. A simple comparison does not suffice as it might confound the effects of the reform with structural differences between A and B1-occupations.

A comparison that allows a causal interpretation, provided several assumptions¹⁴ hold, is known as the Difference-in-Differences (DD) method. A very basic DD calculation based on pre and post averages of the aggregate share of new apprentices in B1 and A-occupations among all apprentices in these occupations, respectively, is given in Table 8. The average treatment effect on the deregulated occupations according to this calculation is -0.86 percentage points. In the hypothetical situation without the reform, the effect would have been $5.48 + 0.86 = 6.34$. Thus, the relative effect of the reform amounts to about $-0.86/6.34 = -13$ percent.

Table 8: Regulatory effects on the number of new apprentices.

	B1-Occupations	A-Occupations	Difference
Before 2004 (1997-2003)	5.91%	94.09%	-88.19%
After 2004 (2004-2013)	5.48%	94.52%	-89.04%
Difference	-0.43%	0.43%	DD: -0.86%
Before (2002/3)	5.69%	94.31%	-88.63%
After (2004-8)	5.67%	94.33%	-88.66%
Difference	-0.02%	0.02%	DD: -0.03%

Note:

This calculation uses the number of new apprentices grouped by B1- and A-Occupations.

Source:

Own calculations based on ZDH data.

¹⁴ In particular the common trends assumption, stable unit treatment value assumption, and the no effects pre-treatment assumption are required to hold.

However, it is not clear if all assumptions hold as there might be confounding events that are not controlled for. In particular, the HwO amendment in 1998 reduced the number of regular craftsmanship occupations from 127 to 94 which could have influenced training activity.

Moreover, training in some traditional occupations, such as blacksmiths and turners, ceased as of August 2002, superseded by more modern training structures with new fields of specialization. Further, the economic crisis which started in 2008 could have influenced training activities. Therefore, one can hope to exclude periods where the confounding influences were present by restricting the definition of the pre reform period to 2002/3 and the after reform period to 2004 to 2008. This, indeed, results in a different average treatment effect as reported in the lower panel of Table 8. The effect of the reform is only -0.03 percentage points and in relative terms only $-0.03/(5.67+0.03) = -0.5$ percent.

Returning to the discussion whether a mandatory Meister exam provides incentives to train apprentices a further point is that, if A-occupations provide on average more training than is demanded, one has to wonder what incentives drive A-occupations to overeducate. The Federal Employment Agency provides data on the number of persons who search a job and the number of vacancies. In many crafts professions, the number of job searchers exceeds the number of vacancies in 2013 and 2014. For example, there were 6,087 hairdressers in November 2014 searching for a job and 885 vacancies. From these numbers alone, it cannot be concluded that over-education occurred. A study focusing explicitly on unemployment in crafts occupations and transition into unemployment after having completed professional training is needed to shed light on this important question. Empirical-

ly, it is not clear what the reasons for a higher propensity to train are. Apprentices are a cheaper alternative to regular workers.¹⁵ However, it is claimed often, that training apprentices is very costly and in fact, training activity has to be subsidized.

This seems not convincing as there are clear incentives to use training as a vehicle to lower personnel costs. As shown in this section, the share of apprentices is much higher in A-occupations than in B1 occupations. Training of apprentices should pay off whenever costs for training are low and productivity of trainees is high. In many crafts occupations this seems to be the case because training is typically done on the job.

Another monetary advantage is the possibility to employ trainees after they completed their apprenticeship. Doing so leads to lower search costs and uncertainty about the quality of the new employee.

The argument that A-occupations are more irrational, i.e. make more errors in calculating production costs, risk bankruptcy to sustain some kind of habit or tradition, or hold beliefs about future economic developments that are systematically worse than the rest of the population, is not convincing. While a more detailed study needs to corroborate what the precise incentives are in German craftsmanship, there is no reason to believe that craftsmen run their business without care and awareness of the economic environment.

¹⁵ According to union wages, typically hourly wages of apprentices are lower than of regular employees.

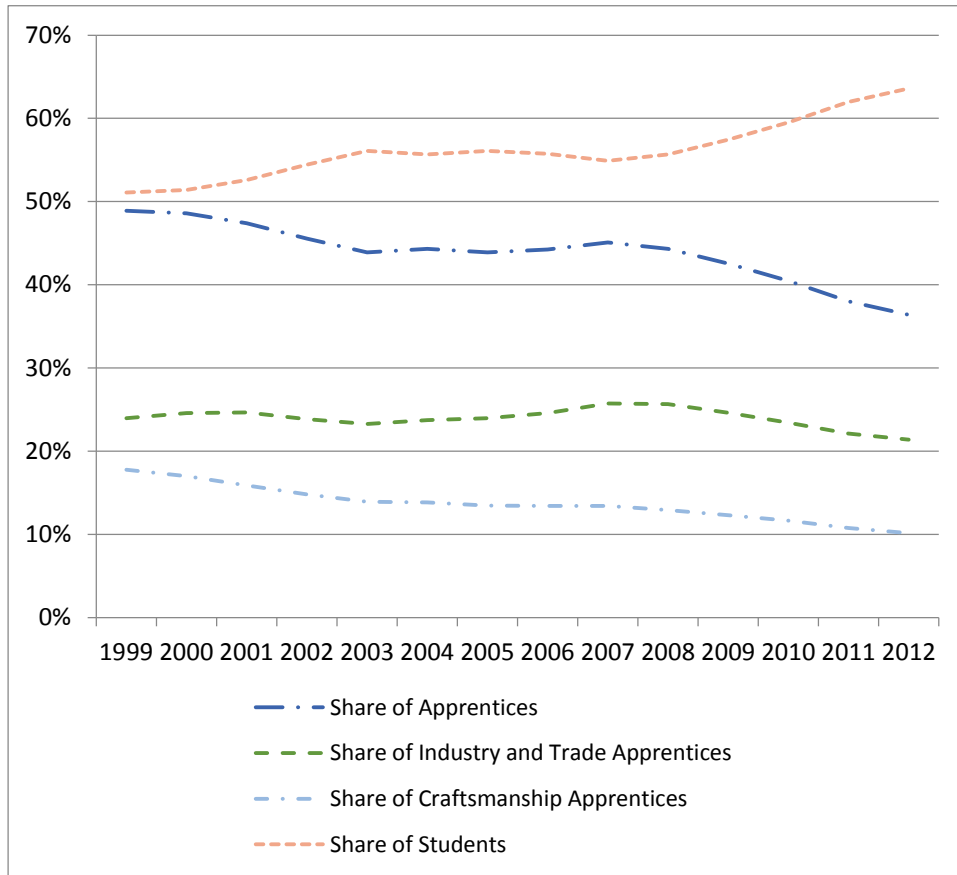
Economically, this question is, however, completely unrelated to the question whether the entry requirement should be mandatory or not. If the Meister degree would not be mandatory, for A-occupations, passing a *Ausbildereignungsprüfung* or a non-mandatory Meister degree would provide the same incentives.

Third, as Müller (2006) shows, the number of persons who start an apprenticeship declined in both A and B1-occupations already before the reform (see also Müller (2014)). The number of new apprentices declined by 4.1 percent on average in A-occupations and by 4.4 percent in B1-occupations from 1997 to 2004. This decline cannot be caused by the reform in 2004. Data from the German Confederation of Skilled Crafts shows that after the reform the number of new apprentices only increased in 2005 and 2006.

What is the reason that only few persons decide to start an apprenticeship in German craftsmanship? One explanation could be that other policies than the HwO amendment in 2004 influenced choice of education. Figure 4 shows strikingly that the share of students in institutions like universities (*Universität, Kunsthochschule, Fachhochschule, Verwaltungsfachhochschule*) among all persons who are currently in education increased from 1999 onwards, while the share of persons currently serving an apprenticeship declined. Splitting up apprentices in two categories, namely whether they serve an apprenticeship in craftsmanship or outside craftsmanship (industry or trade), shows that while the share of apprentices trained by craftsmen declined from 1999 onwards, the share of education delivered in industry or trade shrank only after 2007.

Figure 5: Share of Apprentices and Students in Germany.

Source: Own calculations based on Federal Statistical Office, Fachserie 11 Reihe 3 (1999–2012).



In comparison, professional training in craftsmanship seems to have become more and more unattractive to young persons. This might have two reasons. First, more young persons are eligible to study at universities in Germany. Second, some of the trades in craftsmanship use complex techniques which arguably can be learned better at universities. For instance, at university a young person can earn a Bachelor of Engineering (B.Eng.) or Bachelor of Science (B.Sc.) in the subject “Druck-, Medientechnik” which translates roughly to print and media techniques. This subject is a direct competitor to the trade of a printer. A person holding a Bachelor of Science from a university covering the subject optometry is a direct competitor of an optician/optometrist, etc.

Another example is part III of the Meister exam. The same topics are taught more generally and more extensively in business economics at universities. As eligibility to study at universities increases, it is straightforward to study at a university instead of serving as an apprentice in craftsmanship.

In summary, the claim that the compulsion of the regulation causes higher training activity is prone to several fallacies. First, this argument is a red herring, i.e. it is not relevant for the debate about quality uncertainty because there are other instruments to promote vocational training. Direct subsidies of training activity would be a arguably more efficient instrument. Second, even if a higher share of apprentices would be beneficial for consumer protection, a mandatory and a non-mandatory educational requirement would provide the same incentives to train apprentices. Third, a higher share of apprentices does not indicate higher quality of products and services. Instead it first and foremost seems to mean that costs for businesses are typically lower. Fourth, the comparison between A and B1-occupations without accounting for structural differences in these occupations is not permissible. B1-occupations require less qualification on average and have a large share of one-person-firms. Fifth, the reason for the decline in the number of apprentices in craftsmanship might be other policies; in particular an increasing propensity to study at universities might be an explanation.

3.4 How dynamic was craftsmanship in Germany?

To measure how dynamic mobility of workers¹⁶ was, I use the Labor-Turnover-Rate. This measure indicates employment changes independently of changes in the overall number of employees. These changes result for the following reasons. First, employees typically change their job with the aim to earn a higher salary, do different tasks, or to improve their work environment. Second, businesses fire employees because they are not satisfied with their work, fixed term contracts end, employees retire, etc. The Labor-Turnover-Rate is defined as follows.

$$\text{Labor-Turnover-Rate} = \text{hire rate} + \text{fire rate},$$

where hire rate = sum of all hires / total employment and

fire rate = sum of all layoffs / total employment.

Figures 6 and 7 show the hire rates for A and B1-occupations and the fire rates for A and B1-occupations, respectively. The hire rates in B1-occupations were almost half of those of A-occupations before the reform, while the fire rate was somewhat higher than in A-occupations. This changed after 2004, the hire rate increased and at the same time the fire rate dropped on average for B1-occupations.

¹⁶ All figures based on IAB data refer to every person contributing to the business.

Figure 6: Labor-Turnover-Rate.

Source: Own calculations based on the IAB-Establishment Panel (2000–2010) without 2002.



Figure 7: Labor-Turnover-Rate.

Source: Own calculations based on the IAB-Establishment Panel (2000–2010) without 2002.

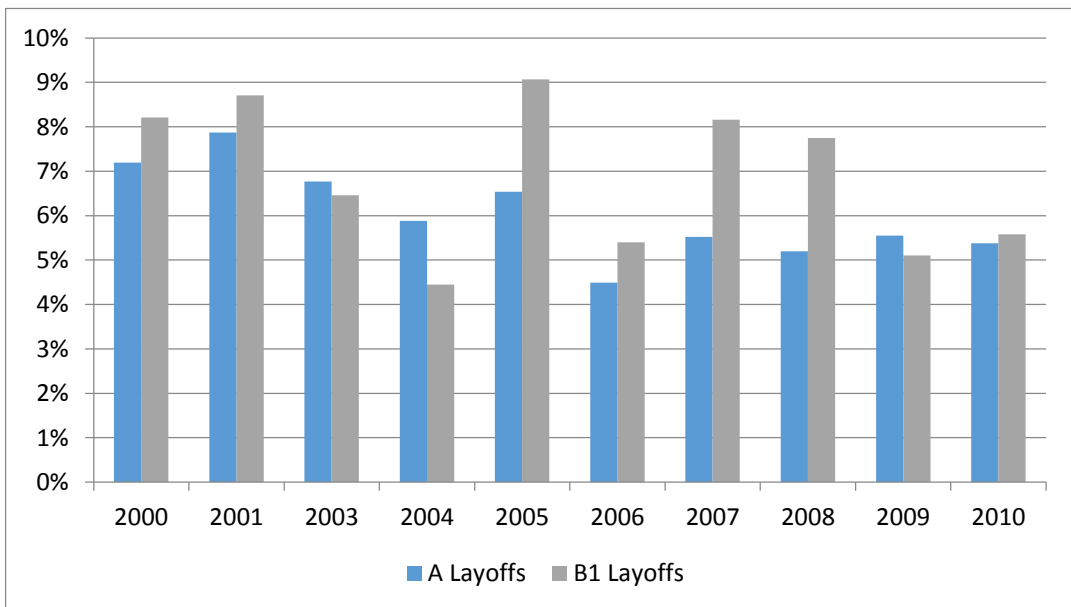


Figure 8 shows hire and fire rates along with the Labor-Turnover-Rate for A-occupations. For comparison, this figure also shows the Labor-Turnover-Rate of B1-occupations. Before the reform, this measure of employees' mobility was lower in B1-occupations compared to A-occupations. After the reform in 2004, it is higher for B1-occupations until 2009. The hire rate was somewhat under 6 percent both before and after the reform for A-occupations. The fire rate, however, decreased for A-occupations from more than 7 percent before to less than 6 percent after the reform.

Figure 8: Labor-Turnover-Rate.

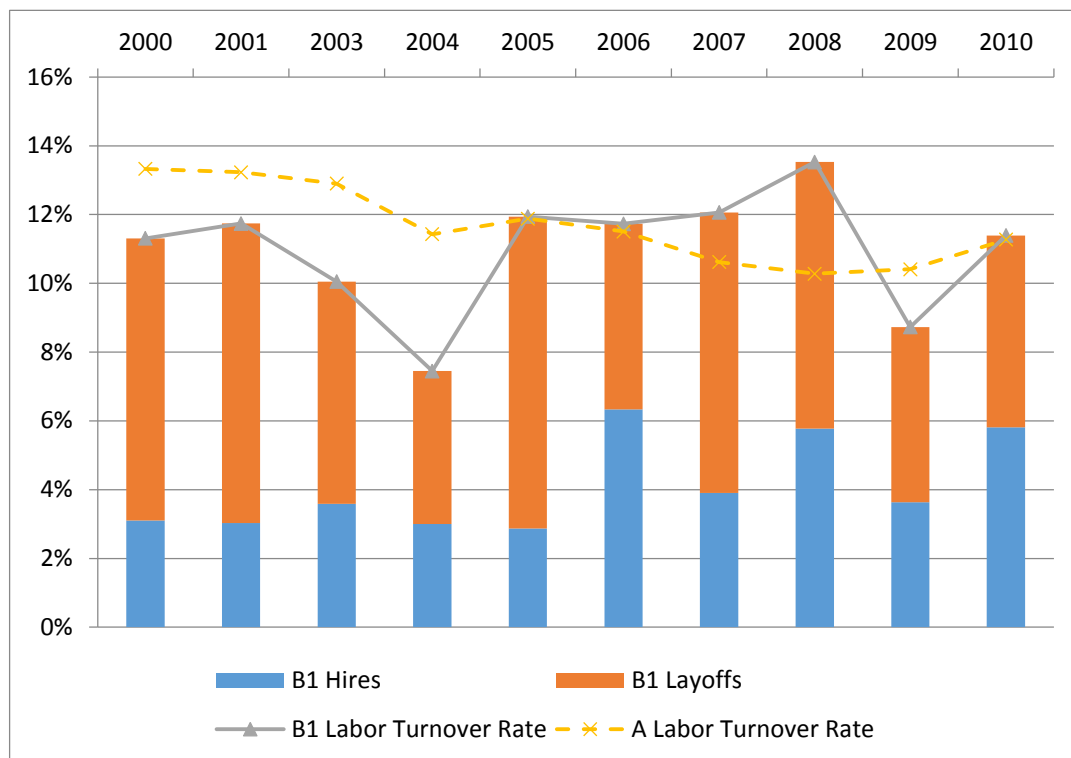
Source: Own calculations based on the IAB-Establishment Panel (2000–2010) without 2002.



Figure 9 shows hire and fire rates along with the Labor-Turnover-Rate for the B1-occupations. In summary, this indicator suggests that the B1-occupations were affected in a way which can be deemed as positive. Higher mobility resulted from increased hires and not increased layoffs.

Figure 9: Labor-Turnover-Rate.

Source: Own calculations based on the IAB-Establishment Panel (2000–2010) without 2002.



Another indicator for mobility without employment effects is the Churning-Rate which is calculated as

$$\text{Churning Rate} = (\text{hires} + \text{layoffs} - |\text{hires} - \text{layoffs}|) / \text{number of employees.}$$

The Churning-Rate is a measure of how many of the layoffs are replaced by new hires. If all layoffs are filled with new hires, the Churning-Rate is large. If none of the layoffs are filled with new hires or if there were only hires and no layoffs, the Churning-Rate is zero. Suppose that for example a firm has 10 employees, hires 2 and fires 4 in a given year, then the Churning Rate would be $(2 + 4 - |2 - 4|)/10 = 0.4$. Figure 10 shows that the Churning-Rate was lower on average before the re-

form for B1-occupations, while both groups show a shrinking Churning-Rate in this period. From 2004 onwards, the Churning-Rate increased in both groups, but more severely in the B1-occupations. This suggests different degrees of labor market permeability. However, it is not clear whether 2009 is an outlier and permeability improved in the long run.

Figure 10: Churning-Rate.

Source: Own calculations based on the IAB-Establishment Panel (2000–2010) without 2002.



A final indicator of labor market mobility is the Job-Turnover-Rate which in contrast to the measures shown before is designed to measure job creation and job destruction. The Job-Turnover-Rate is constructed as follows.

$$\text{Job-Turnover-Rate} = \text{job creation rate} + \text{job destruction rate, where}$$

job creation rate = sum of all new jobs created in growing businesses / total employment,

job destruction rate = sum of all jobs destroyed in shrinking businesses / total employment.

The higher the Job-Turnover-Rate the more dynamic is the labor market. Figure 11 shows that the Job-Turnover-Rate is on average almost -2 percent before the reform, while it is slightly above zero after the reform for A-occupations. For B1-occupations a similar pattern is observed. In A-occupations the job creation rate is on average more than 5 percent both before and after the reform. The job destruction rate, however, changes from more than -7 percent to more than -5 percent on average.

Figure 11: Job-Turnover-Rate.

Source: Own calculations based on the IAB-Establishment Panel (2000–2010) without 2002.

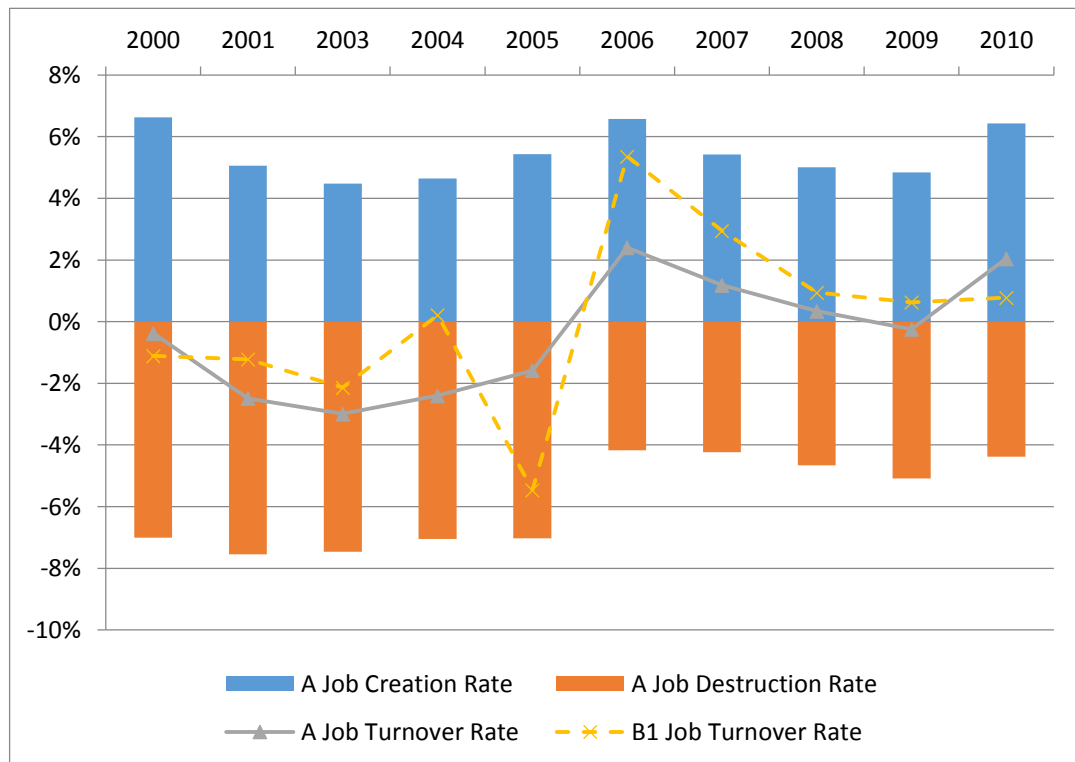


Figure 12: Job-Turnover-Rate.

Source: Own calculations based on the IAB-Establishment Panel (2000–2010) without 2002.



Figure 12 shows the same figures for B1-occupations. In contrast to the A-occupations, the job creation rate rises by about one percentage point on average after the reform. At the same time the absolute value of the job destruction rate shrinks by more than 1 percent on average. Higher mobility, however, can reflect both politically favored developments like innovation or growth and at the same time higher instability. Of course, this does not describe the entire situation of craftsmen in Germany, one-person-businesses arguably contribute substantially to labor market mobility but are not observed in this dataset.

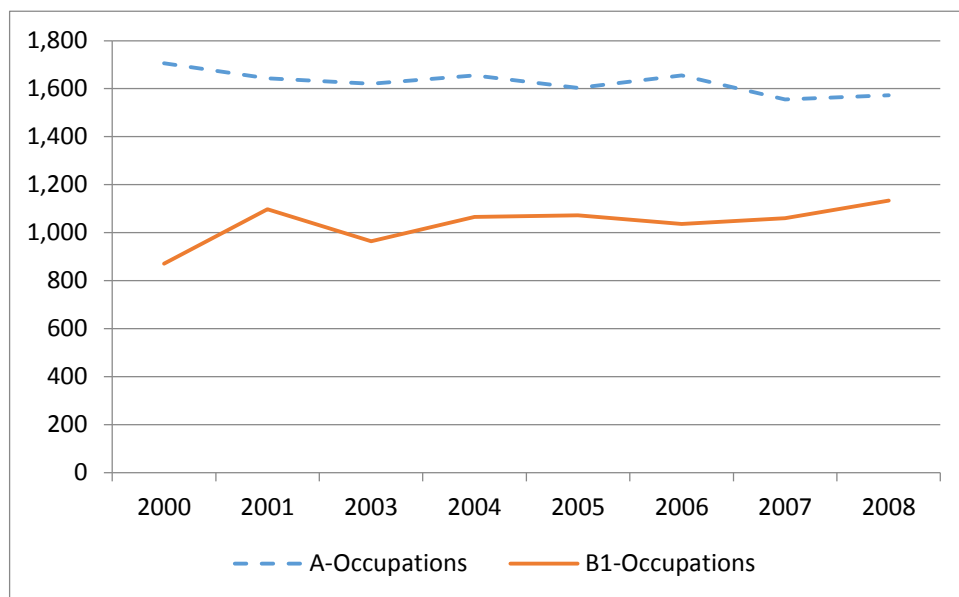
4 Trends and Effects on Monetary Outcomes

4.1 How much did workers earn?

If the entry barrier to craftsmanship generated rents for incumbents who have been shared with employees, lower gross wages would be expected after the reform in 2004. Figure 13 suggests that while monthly gross incomes in 2002 prices remained roughly constant for B1-occupations, the same variable declined slightly for A-occupations. This comparison does not suggest any effect of the HwO amendment in 2004.

Figure 13: Average monthly gross incomes in 2002 Euros.

Source: Own calculations based on the IAB-Establishment Panel (2000–2008) without 2002.



Using the method of Difference-in-Differences, Haupt (2004) finds based on data from the German Socioeconomic Panel that the reform reduced gross wages on average by about 5 percent in B1-occupations at a significance level of 10 percent. Note that wages in craftsmanship are generally very low which is even more so the case in this presentation because average monthly incomes are calculated not for

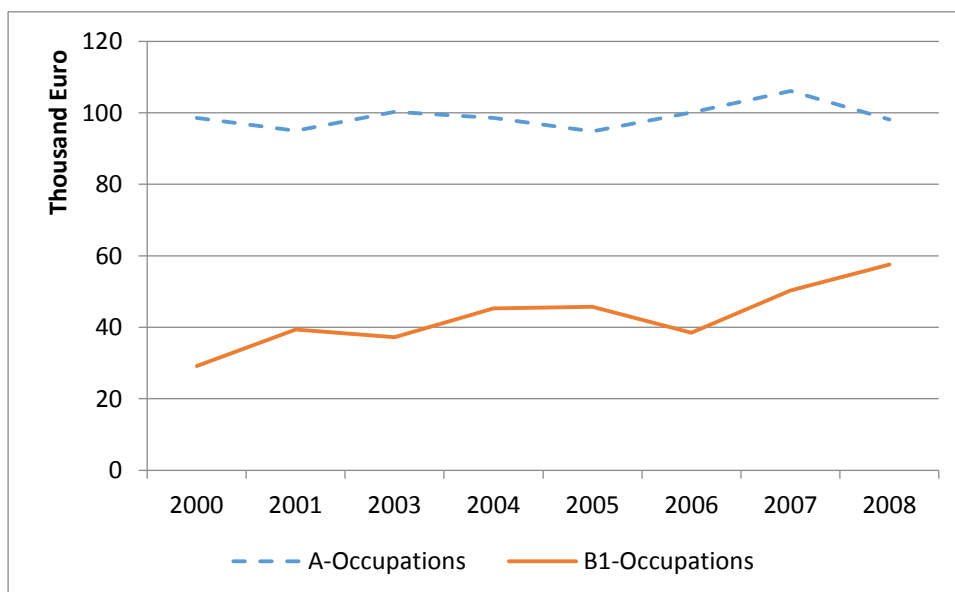
each worker subject to social security contributions but by dividing the overall sum of incomes paid per firm by the total number of employees, including apprentices, family workers, etc. In 2014 most of the occupations subject to minimum wages are crafts occupations. Most of the crafts occupations subject to minimum wages, in turn, are A-occupations, e.g. roofers, hair dressers, scaffolders, chimney sweeps, painter and varnisher, stonemasons and sculptors, building cleaners. This adds another dimension to the intensity of regulation in German craftsmanship. Bachmann et al. (2008) show that a minimum wage would lead to substantial layoffs, in particular of hair dressers.

4.2 How large were businesses' revenues?

Another variable that measures the size of businesses is annual revenues per worker. For the businesses represented in the IAB, this figure for B1-occupations is less than half compared to A-occupations.

Figure 14: Annual revenues per worker in 2002 Euros.

Source: Own calculations based on the IAB-Establishment Panel (2000–2008) without 2002.



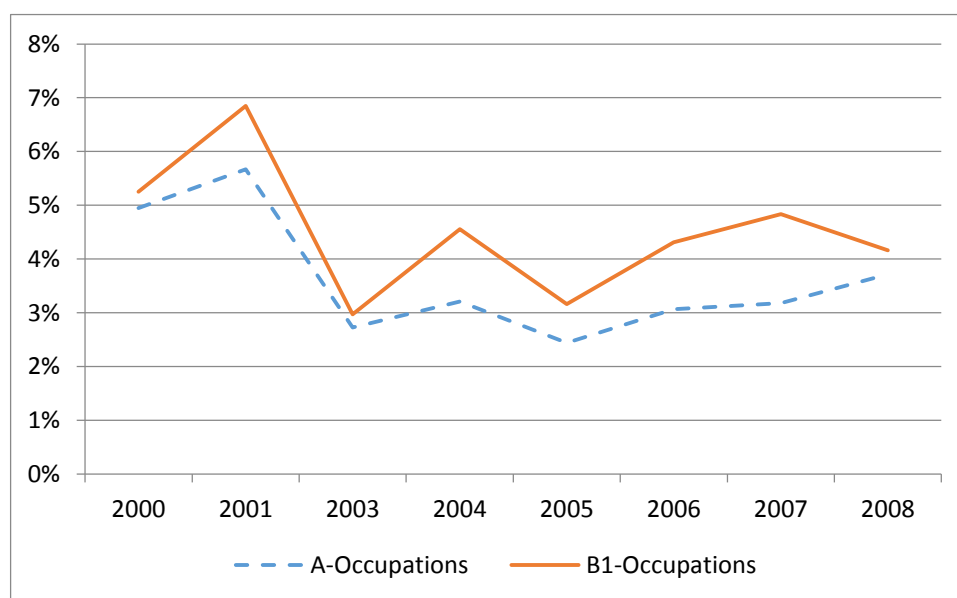
The development over time does not show any peak that could be attributed to the reform of the HwO in 2004. Instead, fluctuations seem to stem from business cycle effects.

4.3 How much did businesses invest?

The IAB survey asks each business how large the amount of total investments in a given year was. Using this information, a measure can be constructed of which share of revenue businesses invest. This measure gives a sense of the business intention to expand. In contrast to the total amount of revenues, the share spent on investments is higher in B1-occupations than in A-occupations before and after the reform in 2004. Again, the trajectory of this measure over time does not point to any influence that might have resulted from the amendment in 2004.

Figure 15: Euro of Investment per100 Euro of Revenue in 2002 Euros.

Source: Own calculations based on the IAB-Establishment Panel (2000–2008) without 2002.



In summary, all monetary variables show differences between A and B1-occupations. Average monthly real wages and average annual real revenues per

worker are higher for A-occupations, while the average number of employees per business is larger for the B1-occupations accounting for the larger share of one-person-businesses. This means that A-occupations are more capital intensive than B1-occupations as they require more sophisticated equipment etc. This is consistent to the finding that B1-occupations which are more labor intensive engage in activities that do not require personnel as highly skilled as A-occupations and pay lower wages.

Still, some A-occupations are struggling to compete with competitors engaging in very similar activities but not regulated by the HwO, e.g. shoemakers and/or subjects that are taught in university, e.g. opticians. These two examples show two different types of competitors. For shoemakers in craftsmanship, shoemakers working in the industry are direct competitors. For opticians in craftsmanship, instead, university trained opticians are competitors. While this data does not provide evidence that the markets craftsmen operate in need to be more competitive, keeping these occupations heavily regulated did also not strengthen the position of this important part of the German economy as e.g. training of new apprentices is still on the decline in regulated and unregulated occupations. Instead, even heavier regulation, in the form of minimum wages, was introduced to prevent worse conditions for workers.

It is dubious whether this is a more sustainable strategy than using a better tailored regulation also in some of the A-occupations. Better tailored regulation does not necessarily imply less qualification in all occupations, in fact, electricians and gunsmiths could be provided the opportunity to signal even more qualification than a one-time Meister degree does by annual certification, while for hairdressers qual-

ification on the Geselle level might be sufficient. The examples of such alternative ways of ensuring the quality include guarantees, brand-name, chain stores or reputations systems, etc. (see Akerlof, 1970).

5 Quality of Goods and Services

Given that more or less reliable evidence is only available for labor market outcomes which do not allow the conclusion that the educational requirement must be kept mandatory, it is no surprise that the debate is centered on arguments about unobserved effects. In particular, uncertainty about the quality of goods and services is put forth. The proponents of mandatory regulation claim that the quality of goods and services is higher when the Meister degree is mandatory.

First, the fact that the qualification requirement is a one-time requirement which does not involve, say, annual licensing and continuous training, makes the Meister requirement seem less a means of consumer protection than an instrument for other purposes.

Although the claim that the quality of goods and services is higher when the Meister degree is mandatory has no basis in fact (Djankov et al. 2002), what is known from how businesses work in practice does not support this view. A large portion of jobs is done by persons not holding a Meister degree. In practice, often (experienced) workers take responsibility for the quality of the work done.¹⁷ It is unusual that a Meister craftsman controls the quality if his employee fixed a pipe

¹⁷ Training apprentices is, according to anecdotal evidence, often delegated to experienced craftsman who do not hold a Meister degree.

leak or laid ceramic tiles. It is however, not clear why the quality of products and services should be lower if the same person who laid the tiles is self-employed instead. Incentives to gain a good reputation and increasing the number of customers should in contrast motivate the self-employed craftsman without Meister degree to provide better quality.

Moreover, it is not clear why the consumer should not have the choice to decide to contract with an entrepreneur who has a Meister or no Meister degree. Even if compulsory regulation could prevent consumers to get for instance bad haircuts, this government intervention may be disproportionate. Standard methods of quality management, guarantees, and reputation systems might be sufficient. Moreover, most durable products in craftsmanship already carry guarantees to ensure the buyer receives the quality claimed. Guarantees shift the risk from the buyer to the seller and generate strong incentives to deliver high quality products. Guarantees might obviate the need of entry regulation also in health-related trades.

As activities bearing high responsibility with regard to consumer protection like, in the case of opticians, determining the refractive error or practicing inserting and removing contact lenses with the consumer are often carried out by apprentices or more experienced craftsmen not holding a Meister degree, compulsion to hold this degree will not prevent these risks to health. Therefore, a debate is warranted whether other less invasive regulatory means or simply guarantees, etc. suffice.

There are various ways to establish a good reputation, for opticians as well as for other trades. The most obvious is brand names. In craftsmanship, brand names are already used widely, think e.g. of watchmakers. Brand names not only indicate quality but also give the consumer a means of retaliation if the quality does not

meet expectations because the consumer will curtail purchases in the future. Often, new products are associated with old brand names. This ensures the prospective consumer of the quality of the product.

Another way to signal quality, similar to brand names, is chains. For instance, different shops clearly marked to belong to the same chain of hair dressers or bakeries suggest that the quality and prices of products and services is similar in these shops. Of course there are online rating platforms and mouth to mouth propaganda which help to assess the quality. Accreditation systems as used for university accreditation or in risk management in the banking sector could be viable alternatives to licensing and registration. Moreover, to signal high quality, a self-employed craftsman in a B1 occupation who does not have a Meister degree is free to simply choose to obtain a Meister degree. Enforcement of legal liability is standard practice and discourages fly-by-night tactics. All of the listed ways to reduce quality uncertainty are used in craftsmanship in A-occupations as well as in B1-occupations and seem to work quite well.

One example for a consumer-based reputation system is “Stiftung Warentest” which was founded as an initiative of the German Bundestag. This organization publishes tests and ratings of products and services. Among those are, e.g., the quality of courses that prepare for the Meister exam. One could build on the experiences of this organization and promote a Europe-wide organization for consumer protection like the Bureau Européen des Unions de Consommateurs or Consumers International. In my view, using existing infrastructure and encouraging more European topics would be an efficient step ahead. Moreover, with a special focus on craftsmanship, various online reputation systems are well-established like

www.blauarbeit.de, www.jobdoo.de, www.my-hammer.de, www.quotatis.de, www.undertool.de, etc.

Indeed, these systems are much more likely to be responsible for the high quality of products and services in craftsmanship and not the fact that obtaining a Meister degree is mandatory in some occupations. Notwithstanding that the burden of proof lies with the supporters of the claim, more evidence on the level of quality and quality uncertainty is needed. With this information, policy making can be more evidence-based.

6 Suggestions for Survey Questions

The following list suggests questions that would help to better assess the effects of regulations of professions. The questions are suitable to be added to a census and are designed to be asked to each person in the labor force, the questions are not specific for craftsmen. However, some questions do not apply for all persons. Some questions ask about facts that can be easily looked up. However, the aim of these questions is not to test knowledge but to compare answers to the facts that are publicly available. If there is no difference between these two sources of information the conclusion would be that regulation *de jure* and *de facto* are identical. If, on the other hand, systematic differences are observable, e.g. in professions where bribes might be an unwritten rule as a prerequisite to engage in specific activities or in the shadow economy, the same regulation might mean another thing *de jure* than *de facto*.

Table 9: Sample questionnaire for regulated professions

1. What is your current occupation?

2. In which country do you work?
3. How long (in years) have you been working in your current occupation?
4. What kinds of regulations do exist in your current occupation? Multiple answers possible. Which of the regulations do you consider the most relevant impediment to your profession? Please provide a ranking (e.g. 1 (strongest impediment), 2, 3, ... (weakest impediment)). a. Legal Entry Regulation (fee, qualification requirement, etc.) to set up business. b. Legal Qualification requirement. c. Legal physical requirement or personal characteristic (eye-sight, gender, etc.). d. Restricted range of activities.
5. What body/agency grants licenses? Please include the name of the licensing agency. If more than one, please describe the respective licensing roles.

<p>6. How many days does it take to set up a business/extend your range of activities in your current occupation? Please provide two answers for setting up a business and extending your range of activities, respectively.</p>
<p>7. How much money (e.g. fees, gifts, etc.) is required to set up a business that is to be paid to regulatory institutions?</p>
<p>8. How many procedures are required to set up a business/extend your range of activities? Please provide two answers for setting up a business and extending your range of activities, respectively.</p>
<p>9. How much equity is required to start a business/extend your range of activities? Please provide two answers for setting up a business and extending your range of activities, respectively.</p>
<p>10. Minimum wage: Is there a legally required minimum wage in your current occupation? How much is it? How high is your actual wage?</p>

11. Did the regulation of your occupation have benefits or costs for you when you first started to work in your current occupation? If you are working in the same occupation for longer than five years: How did the benefits or costs for you change?

12. Did the regulation of your occupation or others influence your decision to work in your current instead of another occupation?

13. Do you think the regulation in your current occupation does change the following problems?

- a. Increases/decreases the information that I have about the products but the customer does not.
- b. Increases/decreases of dangers to health for me/for others.
- c. Increases/decreases the concentration of market power.
- d. Increases/decreases quality of the products.
- e. Increases/decreases prices of the products.
- f. Increases/decreases competition.
- g. Increases/decreases your own skills (additional training, courses).

h. Increases/decreases the quality of your own work.

i. Increases/decreases corruption.

j. Increases/decreases unofficial economy.

k. Increases/decreases environmental problems.

14. Are the regulatory requirements stricter/laxer for EU-Foreigners in your country?

15. Are the regulatory requirements stricter/laxer for None-EU-Foreigners in your country?

16. Did you ever consider working in another country because of regulatory reasons? Which country?

7 Conclusions

In this paper, I argue that the amendment to the HwO in 2004 did not cause adverse effects on key variables tested in this paper. I derive this view from the evidence I collected on the effects of the deregulation in 2004 that are discussed in the core part of this paper. Average monthly real wages and average annual real revenues

per worker are higher for heavily regulated occupations, while the average number of employees per business is larger for the occupations that do not have an entry requirement accounting for the larger share of one-person-businesses. This means that the regulated occupations are more capital intensive. This is consistent with the finding that the occupations which have been deregulated by the reform in 2004 and are more labor intensive engage in activities that do not require personnel as highly skilled as the occupations which are still regulated and pay lower wages. Accounting for the differences between these groups before and after the reform, there is no evidence suggesting that deregulation caused adverse effects on key variables. The number of businesses increased due to higher entry rates. At the same time the effect on exit rates is unclear. While it could be due to data quality that increasing exit rates cannot be found with the data used, one can be certain that exit rates did increase less than entry rates. Overall employment does not seem to show much reaction, because most of the new businesses are one-person businesses founded by former employees which might grow larger in the future. Of course, after the reform less Meister exams are taken, and lower qualified self-employed are observed. The effect on training activity is unclear; however, a simple Difference-in-Differences exercise shows that the effect was negligibly small. Labor market dynamic seems to have risen, however the indicators used do not show, whether this reflects more instability or more growth in the labor market. Wages, revenues, and investments do not seem to have been influenced by the reform.

Keeping some of the occupations heavily regulated seems, in turn, not to have strengthened the position of this important part of the German economy as shown by the steady decline in training of apprentices. Instead, even heavier regulation, in

the form of minimum wages, seemed to be necessary to prevent worse conditions for workers. Sticking to this rigid regulation is a potentially dangerous experiment involving an important part of the German economy. Whether this is a more sustainable strategy than implementing more flexible forms of regulation, such as accreditation, or relying simply on reputation systems taking other European countries as a model, remains dubious.

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Annex: Lists of Professions

Table 10: Professions that were affected by the liberalizing reform: A and B1-occupations.

	Job Title	Job Title in HWO	Job Title in MZ (KldB92)
Building and Construction Trades (Bau- und Ausbaugewerbe)			
1	A2 Mason and Concretor	Maurer und Betonbauer	Maurer, Feuerungs- und Schornsteinbauer, Beton- und Stahlbauer/innen
2	A1 Builder of Stoves and Air Heating Systems	Ofen- und Luftheizungsbauer	Kachelofen- und Luftheizungsbauer/innen
3	A1 Carpenter	Zimmerer	Zimmerer
4	A1 Roofer	Dachdecker	Dachdecker
5	A1 Road Builder	Straßenbauer	Straßenbauer
6	A1 Thermal and Noise Insulation Fitter	Wärme-, Kälte- und Schallschutzisolierer	Isolierer/innen, Abdichter/innen
7	A1 Well Builder	Brunnenbauer	Sonstige Tiefbauberufe
8	A1 Stonemason and Sculptor	Steinmetzen und Steinbildhauer	Stein-, Edelsteinbearbeiter/innen
9	A1 Stuccoist	Stukkateure	Stukkateur(e/innen)
10	A2 Painter and Varnisher	Maler und Lackierer	Maler/innen und Lackierer/innen (o.n.A., Ausbau)
11	A1 Scaffolder	Gerüstbauer	Gerüstbauer/innen
12	AC Chimney Sweep	Schornsteinfeger	Schornsteinfeger/innen
13	B1 Tile and Mosaic Layer	Fliesen-, Platten- und Mosaikleger	Fliesen-, Platten-, Mosaikleger/innen
14	B1 Cast Stone and Terrazzo Manufacturer	Betonstein- und Terrazzohersteller	Formstein-, Beton(stein)hersteller/innen
15	B1 Screed Layer	Estrichleger	Estrich-, Terrazzoleger/innen
Electrical and Metal-Working Trades (Elektro- und Metallgewerbe)			
16	A2 Metalworker	Metallbauer	Metallbauer/innen (Metallgestaltung) und Schmied(e/innen) (Handwerk)
17	A1 Surgical Instrument Maker	Chirurgiemechaniker	Werkzeugmechani-

				ker/innen (Instrumententechnik), Schneidwerkzeugmechaniker/innen, Metallfeinbauer/innen
18	A2	Motor Vehicle Body and Vehicle Construction Mechanic	Karosserie- und Fahrzeugbauer	Karosserie-, Fahrzeugbauer/innen
19	A1	Precision Machinist	Feinwerkmechaniker	Dreher/innen
20	A2	Bike Mechanic	Zweiradmechaniker	Kraftfahrzeug-, Zweiradmechaniker/innen
21	A1	Refrigeration Engineer	Kälteanlagenbauer	Kälteanlagenbauer/innen, und -installateur(e/innen)
22	A2	Information Electronics Technician	Informationstechniker	Kommunikations-, Büroinformationselektroniker/innen
23	A2	Vehicle Technicians	Kraftfahrzeugtechniker	Kraftfahrzeug-, Zweiradmechaniker/innen
24	A1	Agricultural Mechanic	Landmaschinenmechaniker	Landmaschinenmechaniker/innen, Metallbauer/innen (Landtechnik)
25	A1	Gunsmith	Büchsenmacher	Industriemechaniker/innen (Geräte- und Feinwerktechnik), Feinmechaniker/innen
26	A1	Plumber	Klempner	Klempner/innen
27	A1	Gas and Water Fitter	Installateur und Heizungsbauer	Gas-, Wasserinstallateur(e/innen)
28	A1	Electrical Engineer	Elektrotechniker	Elektrotechniker/innen
29	A1	Electrical Machine Maker	Elektromaschinenbauer	Elektromaschinenbauer/innen, Elektromaschinenmonteur(e/innen)
30	B1	Coppersmith	Behälter- und Apparatebauer	Anlagenmechaniker/innen (Apparatetechnik)
31	B1	Watchmaker	Uhrmacher	Uhrmacher/innen
32	B1	Engraver	Graveure	Graveur(e/innen) und verwandte Berufe

33	B1	Decorative Metalworker	Metallbildner	Industriemechaniker/innen (Geräte- und Feinwerktechnik), Feinmechaniker/innen, Graveur(e/innen) und verwandte Berufe, Edelmet- allschmied(e/innen)
34	B1	Electroplater	Galvaniseure	Galvaniseur(e/innen), Metallfärber/innen
35	B1	Metal and Bell Founder	Metall- und Glockengießer	Gießereimechaniker und andere Formgießerberufe
36	B1	Cutting Tool Mechanic	Schneidwerkzeug- mechaniker	Werkzeugmechani- ker/innen (Instrumen- tenttechnik), Schneid- werkzeugmechani- ker/innen, Metallfeinbau- er/innen
37	B1	Goldsmiths and Silver- smiths	Gold- und Sil- berschmiede	Edelmet- allschmied(e/innen)
Woodwork Trades (Holzgewerbe)				
38	A1	Joiner	Tischler	Tischler/innen
39	A1	Boat and Ship Builder	Boots- und Schiffbauer	Holz-, Kunststoffkon- struktionsbauer/innen
40	B1	Parquet Layer	Parkettleger	Raumausstatter/innen, Parkettleger/innen
41	B1	Sliding Shutter and Blind Maker	Rolladen- und Jalousie- bauer	Sonstige Metallbau- und verwandte Berufe
42	B1	Model Builder	Modellbauer	Modellbauberufe
43	B1	Turner (Ivory Sculptor) and Wooden Toys Builder	Drechsler (Elfenbein- schnitzer) und Holzspielzeugmacher	Berufe in der Holz-, Flechtwarenherstellung und in verwandten Berei- chen
44	B1	Wood Sculptor	Holzbildhauer	
45	B1	Cooper	Böttcher	Holz-, Kunststoffkon- struktionsbauer/innen
46	B1	Basketmaker	Korbmacher	Berufe in der Holz-,

Flechtwarenherstellung
und in verwandten Berei-
chen

Clothing, Textile and Leather Trades (Bekleidungs-, Textil- und Ledergewerbe)

47	A1	Ropemaker	Seiler	Spuler/innen, Zwir- ner/innen, Seiler/innen
48	B1	Tailor	Damen- und Her- renschneider	Oberbekleidungsschnei- der/innen
49	B1	Embroiderer	Sticker	Sonstige Textilver- arbeiter/innen
50	B1	Milliner	Modisten	Bekleidungszubehörfer- tiger/innen
51	B1	Weaver	Weber	Weber/innen
52	B1	Sailmaker	Segelmacher	Textilnäher/innen
53	B1	Furrier	Kürschner	Fellverarbeiter/innen
54	B1	Shoemaker	Schuhmacher	Schuhmacher/innen (Handwerk)
55	B1	Saddler and Fine Purse- maker	Sattler und Feintäschner	Sattler/innen, Täschner/innen
56	B1	Interior Decorator	Raumausstatter	Raumausstatter/innen, Parkettleger/innen

Foodstuffs Trades (Nahrungsmittelgewerbe)

57	A1	Baker	Bäcker	Bäcker/innen
58	A1	Pastry Cook	Konditoren	Konditor(en/innen)
59	A2	Butcher	Fleischer	Fleischer/innen
60	B1	Miller	Müller	Sonstige Berufe in der Lebensmittelherstellung
61	B1	Brewer and Maltster	Brauer und Mälzer	Brauer/innen und Mäl- zer/innen
62	B1	Cellarman	Weinküfer	Sonstige Getränkeherstel- ler/innen, Koster/innen

**Trades Related to Health and Hygiene, Including Chemical and Cleaning Trades
(Gewerbe für Gesundheits- und Körperpflege sowie der chemischen und Rei-
nigungsgewerbe)**

63	AC	Optician	Augenoptiker	Augenoptiker/innen
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64	AC	Hearing Aid Audiologist	Hörgeräteakustiker	Radio- und Fernseh- techniker/innen (Rundfunkme- chaniker/innen) und ver- wandte Berufe
65	AC	Orthopaedic Technician	Orthopädietechniker	Orthopädiemechani- ker/innen, Banda- gist(en/innen)
66	AC	Maker of Orthopaedic Footwear	Or- thopädieschuhmacher	Schuhmacher/innen (Handwerk)
67	AC	Dental Technician	Zahntechniker	Zahntechniker/innen
68	A1	Hairdresser	Friseure	Friseur(e/innen)
69	B1	Textile Cleaner	Textilreiniger	Textilreiniger/innen, - pfleger/innen
70	B1	Wax Chandler	Wachszieher	Chemiebetriebswerk- er/innen
71	B1	Building Cleaner	Gebäudereiniger	Gebäudereiniger/innen, Raumpfleger/innen

Glass, Paper, Ceramic and other Trades (Glas-, Papier-, keramische und sonstige Gewerbe)

72	A1	Glazier	Glaser	Glaser/innen
73	A1	Glassblower and Glas Apparatus Engineerer	Glasbläser und Glasapparatebauer	Glashersteller/innen
74	A1	Vulcanizer and Tyre Me- chanic	Vulkaniseure und Rei- fenmechaniker	Gummihersteller/innen, - verarbeiter/innen, Vulkani- seur(e/innen)
75	B1	Glass Finisher	Glasveredler	Glasbearbeiter/innen, Glasveredler/innen
76	B1	Precision Optician	Feinoptiker	
77	B1	Glass and Porcelain Painter	Glas- und Por- zellanmaler	Glas-, Keramik-, Por- zellanmaler/innen
78	B1	Gemstone Cutter	Edelsteinschleifer und - graveure	Stein-, Edelsteinbearbei- ter/innen, Gra- veur(e/innen) und ver- wandte Berufe, Edelme- tallschmied(e/innen)
79	B1	Photographer	Fotografen	Fotograf(en/innen), Kameraleute

80	B1	Bookbinder	Buchbinder	Buchbinder/innen
81	B1	Typographer and Letterpress Printer	Buchdrucker: Schriftsetzer; Drucker	Schriftsetzer/innen, Drucker/innen (Hoch-, Flach-, Tiefdruck)
82	B1	Screen Printer	Siebdrucker	Spezialdrucker, Siebdrucker
83	B1	Flexographer	Flexografen	Druckformhersteller/innen
84	B1	Ceramist	Keramiker	Keramiker/innen (Grob-, Feinkeramik)
85	B1	Organ and Harmonium Builder	Orgel- und Harmoniumbauer	Musikinstrumentenbauer/innen
86	B1	Piano and Harpsichord Maker	Klavier- und Cembalobauer	
87	B1	Maker of Reed-Organ Musical Instruments	Handzuginstrumentenmacher	
88	B1	Violin Maker	Geigenbauer	
89	B1	Bow Maker	Bogenmacher	
90	B1	Maker of Metal Wind Instruments	Metallblasinstrumentenmacher	
91	B1	Maker of Woodwind Musical Instruments	Holzblasinstrumentenmacher	
92	B1	Maker of Plucked Musical Instruments	Zupfinstrumentenmacher	
93	B1	Gilder	Vergolder	Warenmaler/innen, Warenlackierer/innen und verwandte Berufe
94	B1	Sign and Luminous Advertisement Maker	Schilder- und Lichtreklamehersteller	Schilder-, und Lichtreklamehersteller/innen

Table 11: Professions that were affected by the liberalizing reform: B2-occupations.

		Job Title	Job Title in HWO
Building and Construction Trades (Bau- und Ausbaugewerbe)			
95	B2	Steel Fixer	Eisenflechter
96	B2	Building Drying Trade	Bautrocknungsgewerbe
97	B2	Floorer	Bodenleger
98	B2	Asphalter (excluding road construction)	Asphaltierer (ohne Straßenbau)
99	B2	Gap (and Joint) Filler (excluding building construction)	Fuger (im Hochbau)
100	B2	Wood and Building Preservation Trade (Foundation protection and wood impregnation in buildings)	Holz- und Bautenschutzgewerbe (Mauerschutz und Holzimprägnierung in Gebäuden)
101	B2	Piling trade (Ramming in piles in hydraulic engineering)	Rammgewerbe (Einrammen von Pfählen im Wasserbau)
102	B2	Concrete Driller and Cutter	Betonbohrer und -schneider
103	B2	Theatre and Scenery Painter	Theater- und Ausstattungsmaler
Electrical and Metal-Working Trades (Elektro- und Metallgewerbe)			
104	B2	Manufacture of custom-made wire racks for decorative purposes	Herstellung von Drahtgestellen für Dekorationszwecke in Sonderanfertigung
105	B2	Metal Grinder and Polisher	Metallschleifer und Metallpolierer
106	B2	Hack-saw Sharpener	Metallsägen-Schärfer
107	B2	Tank Protection Firms (corrosion protection of oil tanks for heating systems without chemical process)	Tankschutzbetriebe (Korrosionsschutz von Öltanks für Feuerungsanlagen ohne chemische Verfahren)
108	B2	Vehicle Recycling	Fahrzeugverwerter
109	B2	Pipe and Drain Cleaner	Rohr- und Kanalreiniger
110	B2	Above-ground Cable Layer (excluding connection works)	Kabelverleger im Hochbau (ohne Anschlussarbeiten)
Woodwork Trades (Holzgewerbe)			
111	B2	Clogger	Holzschuhmacher
112	B2	Wooden Block Maker	Holzblockmacher
113	B2	Stave maker	Daubenhauer

114	B2	(Custom-made) Wood Ladder Maker	Holz-Leitermacher (Sonderanfertigung)
115	B2	Trough maker	Muldenhauer
116	B2	Wooden Ring Maker	Holzreifenmacher
117	B2	Wooden Shingle Maker	Holzschindelmacher
118	B2	Installation of Standard Building Components (e.g. windows, doors, frames, shelves)	Einbau von genormten Baufertigteilen (z. B. Fenster, Türen, Zargen, Regale)
119	B2	Brush Maker	Bürsten- und Pinselmacher
Clothing, Textile and Leather Trades (Bekleidungs-, Textil- und Ledergewerbe)			
120	B2	(Steam) Laundries for Men's Outer Clothing	Bügelanstalten für Herren-Oberbekleidung
121	B2	Decoration-like trades (excluding shop-window decoration)	Dekorationsnäher (ohne Schaufensterdekoration)
122	B2	Spot carpet manufacturer	Fleckteppichhersteller
123	B2	Bobbin-lace Maker	Klöppler
124	B2	Theatre Costume-like	Theaterkostümnäher
125	B2	Kilt burner	Plisseebrenner
126	B2	Trimmings Manufacturer	Posamentierer
127	B2	Cloth Painter	Stoffmaler
128	B2	Knitter	Stricker
129	B2	Textile Hand Printer	Textil-Handdrucker
130	B2	Decorative Potter	Kunststopfer
131	B2	Tailor for Alterations	Änderungsschneider
132	B2	Glove Maker	Handschuhmacher
133	B2	Simple Shoe Repairs	Ausführung einfacher Schuhreparaturen
134	B2	Tanner	Gerber
Foodstuffs Trades (Nahrungsmittelgewerbe)			
135	B2	Offal Butcher	Innerei-Fleischer (Kuttler)
136	B2	Ice Cream Manufacturer (including selling ice-cream with the usual accessories)	Speiseeishersteller (mit Vertrieb von Speiseeis mit üblichem Zubehör)

137	B2	Meat Processors, De-boners	Fleischzerleger, Ausbeiner
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**Trades Related to Health and Hygiene, Including Chemical and Cleaning Trades
(Gewerbe für Gesundheits- und Körperpflege sowie der chemischen und Reinigungs-gewerbe)**

138	B2	Dressers, Spongers	Appreteure, Dekateure
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139	B2	Dry Cleaner	Schnellreiniger
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140	B2	Carpet Cleaner	Teppichreiniger
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141	B2	Beverage Conduit Cleaner	Getränkeleitungsreiniger
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142	B2	Cosmetician	Kosmetiker
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143	B2	Make-up Artist	Maskenbildner
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Glass, Paper, Ceramic and other Trades (Glas-, Papier-, keramische und sonstige Gewerbe)

144	B2	Funeral Service	Bestattungsgewerbe
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145	B2	(Custom-made) Lampshade Manufacturer	Lampenschirmhersteller (Sonderanfertigung)
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146	B2	Piano Tuner	Klavierstimmer
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147	B2	Theatre Designer	Theaterplastiker
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148	B2	Props Masters	Requisiteure
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149	B2	Umbrella Maker	Schirmmacher
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150	B2	Lithographic printer	Steindrucker
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151	B2	Maker of Percussion Instruments	Schlagzeugmacher
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