

# Occupations, Barriers to Entry, and Structural Change\*

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February 14, 2015

## Abstract

We study the role that barriers to entry into occupations play for the reallocation of labor across sectors and for hours worked in the market in the US and Germany. We document that relative to the US, Germany has stricter degree requirements in many occupations and has lower employment shares in occupations in which it has stricter education requirements. We quantify the implications of such barriers to entry into occupation for labor market outcomes in an overlapping-generations model in which individuals choose their sector and occupation. We calibrate the model to match the US structural transformation and the changes in the distribution of the employment shares of occupations. We then feed the stricter German degree requirements into the otherwise unchanged model. We find that as a result Germans in the model work considerably fewer hours than Americans in the service sector in particular and in the market in general.

*Keywords:* Entry Barriers; Occupations; Structural Change.

*JEL classification:* E1; J4.

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\*For helpful comments and suggestions, we would like to thank Edward Prescott, Richard Rogerson, and the audiences at the IIES in Stockholm. Herrendorf thanks the Spanish Ministry of Education for research support (Grant ECO2012-31358). Duernecker thanks the Institute for International Economic Studies for its hospitality during 2014. All errors are our own.

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# 1 Introduction

It is well known that average hours worked in the market differ widely across developed countries even though their labor productivities are rather similar. Specifically, Americans work the highest number of hours in the market whereas Continental Europeans, in particular the French and the Germans, work the lowest number. The resulting cross-country differences in average hours worked in the market amount to around 300 hours per working age person in 2005. These facts have important implications for the growth and size of GDP in particular and welfare in general, and so they have given rise to a growing literature that aims to understand why countries with similar labor productivities have such different labor market outcomes.

One prominent explanation for the different labor market outcomes is that there are important differences in taxes [?], and in particular that tax increases in Continental Europe discouraged people from working in the market and encouraged them to work more at home and to take more leisure. ? went one step further and documented that the differences in hours worked in the market are concentrated in the service sector. He then argued that the reason for this is that people can avoid paying the higher taxes by working less in the market and more at home, thereby producing substitutes for market services. While this story has a lot of intuitive appeal, it faces the challenge that most of the employment differences between the US and Continental Europe are in service industries the output of which does not have close home produced substitutes [Christopher Pissarides, Presidential Address, European Economic Association Annual Meetings, Oslo, 27 August 2011]. We conclude from this observations that cross-country tax differences are not likely to be the whole story in the context of labor market outcomes. This conclusion presents the challenge to identify the set of policies or institutions other than taxes that have quantitatively important consequences for hours worked.

In this paper, we study the role that barriers to entry into different occupations play for the reallocation of labor across sectors and for hours worked in the market in the US and Germany. There is a plenty of anecdotal evidence that such barriers exist and matter to different degrees in the two countries. Consider for example a pest control worker: in the US a pest control worker has to have a high-school degree and a few months of training, but a German “Schädlingsbekaempfer” needs to have completed a three-year apprenticeship in addition to a high school degree. Our thesis is that such differences in education and training requirements interfere in quantitatively important ways with the reallocation of labor during the process of structural transformation, and that this depresses German employment in the service sector in particular and the market in general.

A first contribution of this paper is to systematically document that entry barriers to occupations exist and matter to different degrees in the US and Germany. We start by establishing that in Germany most occupations require apprenticeships, a professional degree, or a college degree. In contrast, in the US half of the occupations require only a high school degree or

even no degree. We then document for the period 1984–2010 that the occupations in which the US had relatively higher employment shares tended to be those in which only Germany had a formal education requirement; the occupations in which the Germany had relatively higher employment shares tended to be those in which both countries had the same requirements (either no degree requirement or the same degree requirement). We continue by documenting that the occupations in which only Germany has a degree requirement tend to be those that have most or all of their employment concentrated in the service sector. This fact is important in our context because, as we stressed above, the overall difference in hours worked is mostly concentrated in the service sector.

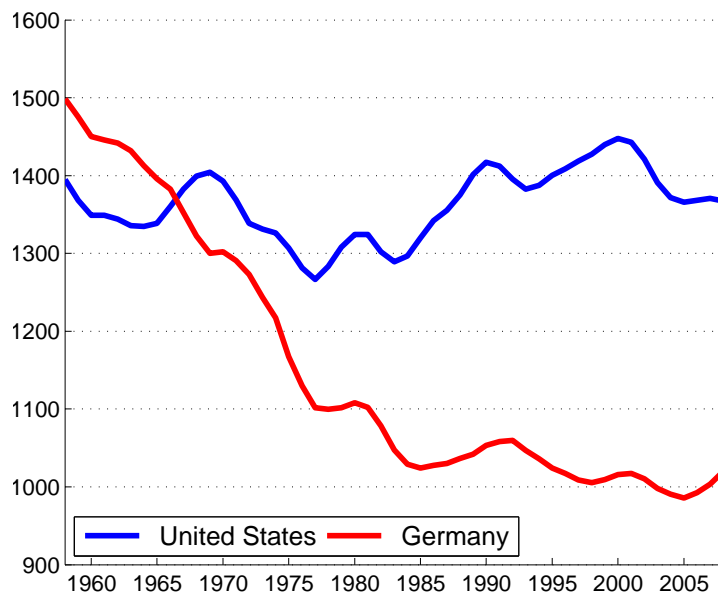
To quantify how large the implications of barriers to entry are for labor market outcomes, we build an overlapping-generations model in which individuals choose in which sector and in which occupation they want to enter. Motivated by the facts that we documented above, we assume that entering some of the occupations requires the payment of an entry cost whereas the other occupations can be entered without paying any entry costs. We specify the preferences and technology of our model in such a way that in equilibrium labor is reallocated from agriculture and industry to the service sector, that is, structural transformation occurs. Moreover, as in the work of ?, growth in the service sector is associated with growth in high-skilled occupations. We calibrate the model to match the US structural transformation after the Second World War and the changes in the distribution of the employment shares of occupations. We then feed the stricter German degree requirements into the otherwise unchanged model. We find that this dampens the process of structural transformation considerably, and that as a result, Germans in the model work considerably fewer hours in the service sector in particular and in the market in general than Americans.

## 2 Facts

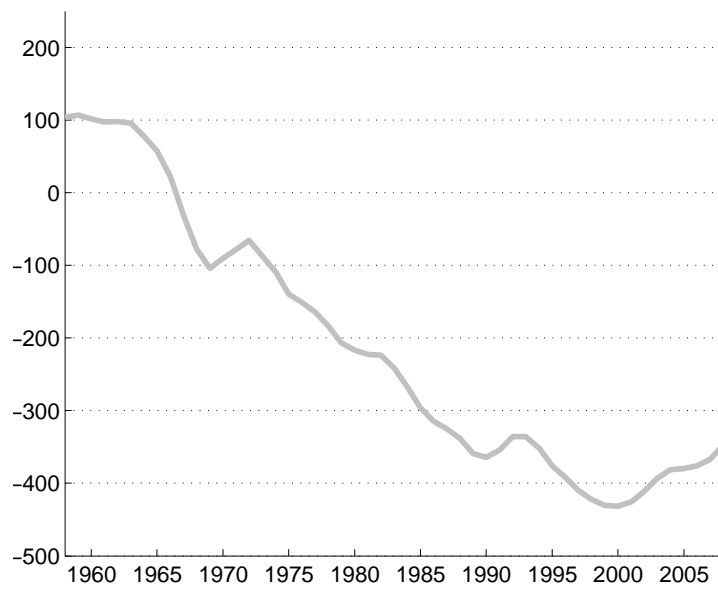
### 2.1 Takeaway

- Reallocation of workers in Germany not as smooth as in the US
- German workers who lost jobs in industry and agriculture were not all absorbed by growing service sector
- Non-employment rate increased by more than 10% between 1960 and 1985
- **Structural change was delayed in Germany/Europe**
- This paper suggests an explanation

**Figure 1: Hours worked: Germany and US**



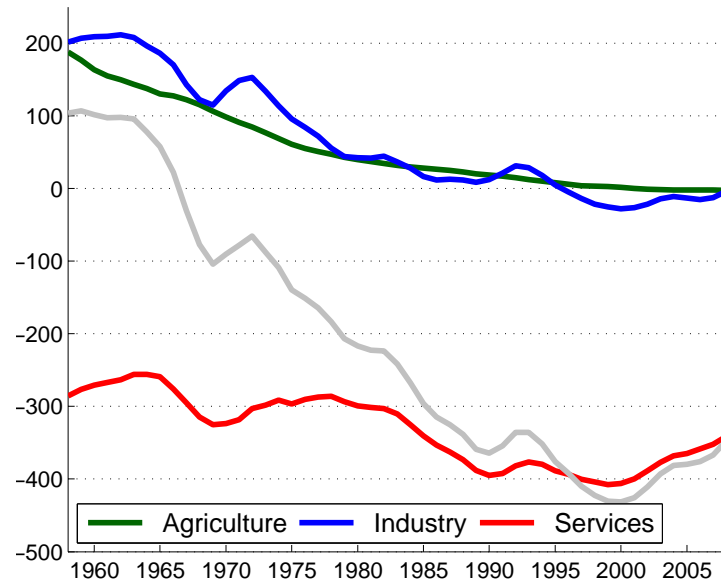
**Figure 2: Difference in hours worked: Germany - US**



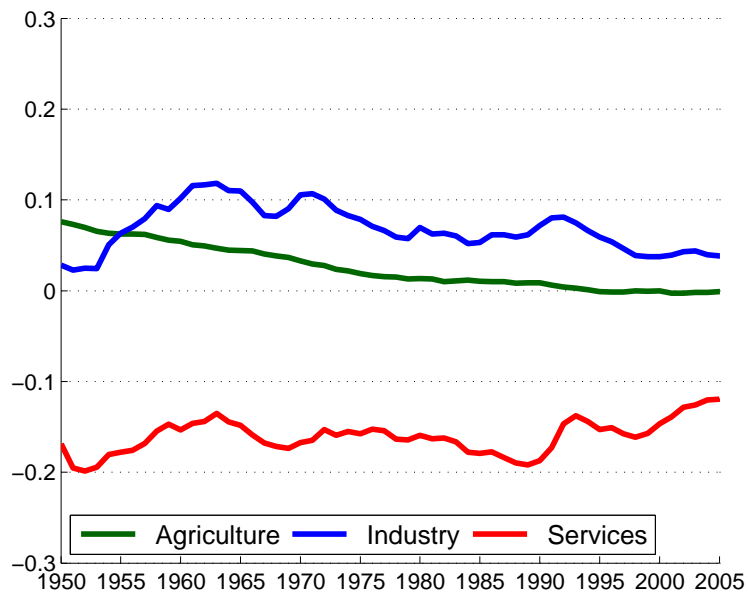
## 2.2 Existing work

- Hours worked: US vs Europe
  - ?, ?, ?, Dürnecker and Herrendorf 2014
- Sectoral employment

**Figure 3: Sectoral difference in hours worked**



**Figure 4: Service employment has not caught up (sectoral employment over working-age population)**



?, ?, Buera et al. 2013

- Sectoral employment in US and Europe

?, Rendall 2014

## 2.3 This paper: barriers to sectoral labor reallocation

- Occupation-specific qualification requirements differ vastly between Europe and US
- Qualification requirements are a barrier to entry into an occupation
- Germany: shortage of workers with required qualification to fuel growth of service sector

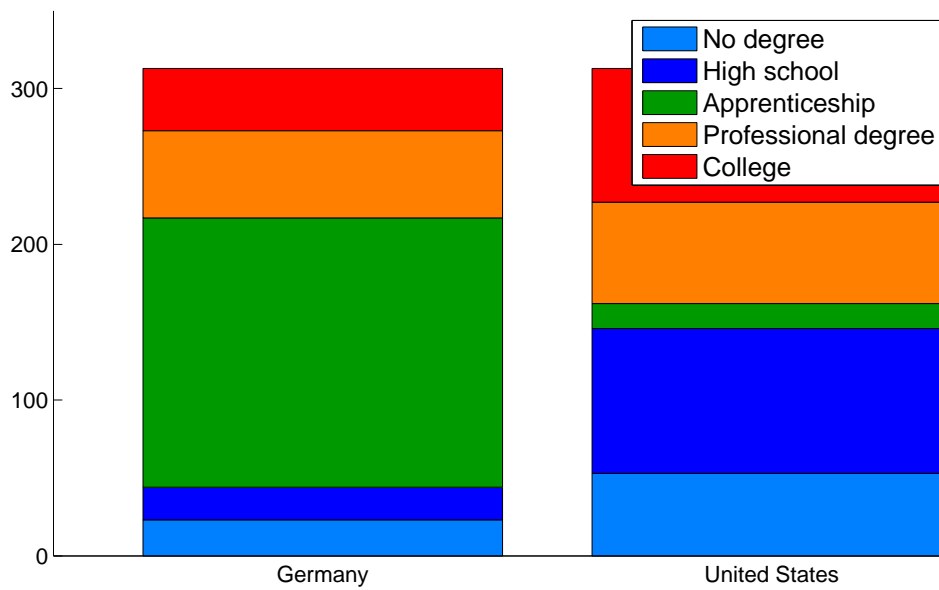
## 2.4 Qualification requirements

- New dataset for Germany and US
- 313 occupations (4-digits)
- Information of interest: **"How to become a ... in the US/Germany"**
  - 1 Required degree, training, experience, license, certificate, approbation
  - 2 Duration until education is completed
- Sources (US): BLS, US Department of Labor, Employment and Training Administration
- Sources (Germany): Bundesinstitut für Berufsbildung, Bundesagentur für Arbeit, Bundesministerium für Wirtschaft und Energie

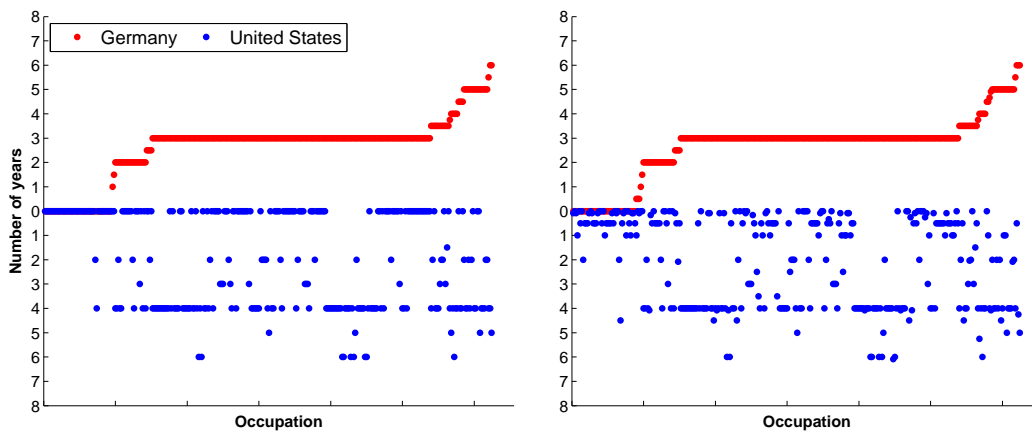
## 2.5 Snapshot

- Pest control worker / Schädlingsbekämpfer (6113)
  - . US: high school + short-term training
  - . Germany: high school + apprenticeship (3 years) + membership in *Deutscher Schädlingsbekämpfer-Verband e.V.*
- Police officer (5162)
  - . US: high school + academy (3-4 months) + exam
  - . Germany: high school + training (2.5-3.5 years) + exam
- Cleric (2460)
  - . US: high school + short-term training
  - . Germany: college (3 years)

**Figure 5: Degree requirements across occupations**



**Figure 6: Duration of degree (and training)**



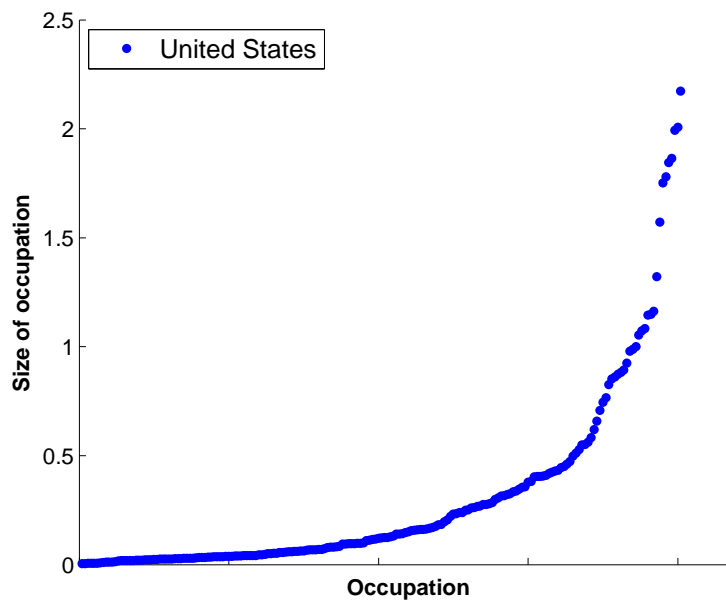
## 2.6 Occupations and employment

- Which occupations account for US-Germany gap in employment?
- What are the qualification requirements in these occupations?
- Consider 350 occupations (4-digits) between 1984-2010
- ISCO-88 classification
- Data sources: SOEP and CPS

**Table 1: Occupations and employment, 2005**

	USA	GER	$\Delta$
Managers	13.7	3.2	<b>10.5</b>
Professionals	13.4	9.8	<b>3.6</b>
Technicians and associate professionals	13.2	14.1	-0.9
Craft and related workers	9.7	10.2	-0.5
Service workers, shop and market sales workers	8.1	7.9	0.2
Clerks	6.8	7.6	-0.8
Plant and machine operators and assemblers	4.5	5.1	-0.6
Elementary occupations	4.3	5.2	-0.9
Skilled agricultural and fishery workers	0.5	0.9	-0.4
Total	74.2	64.0	10.2

**Figure 7: Employment share of occupations**



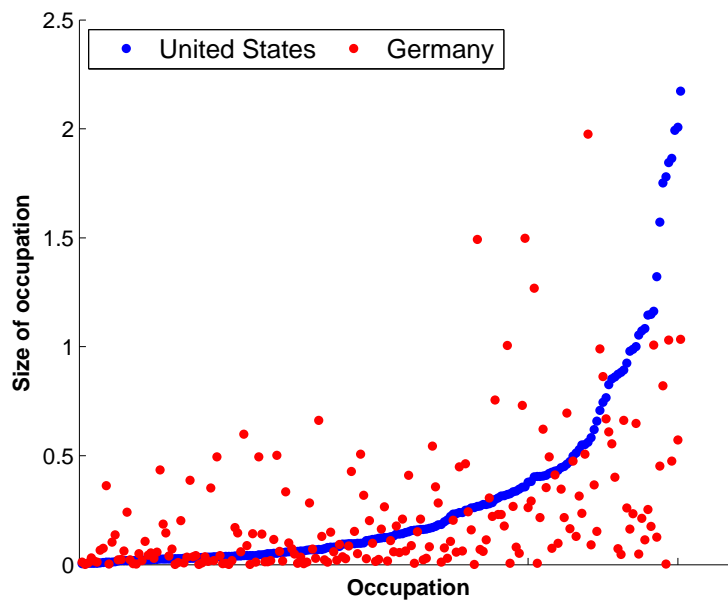
### 3 Work in Progress

- Data

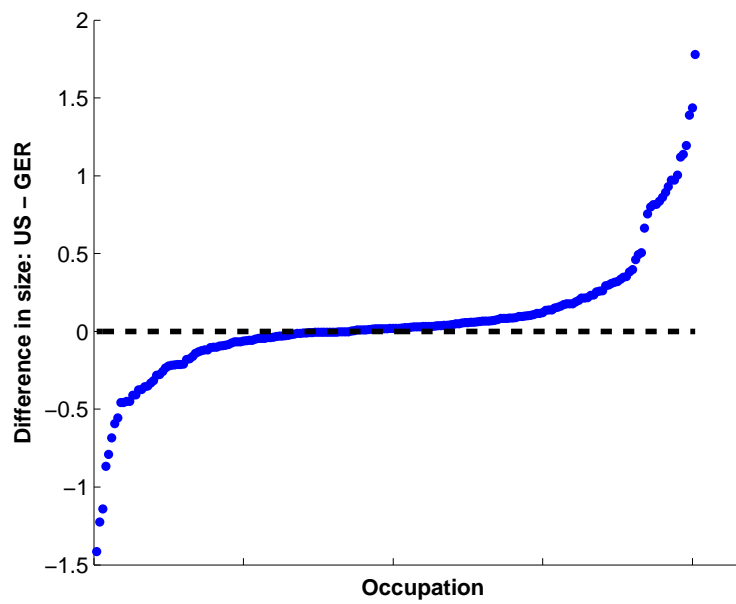
- . Use Census data to measure employment change across occupations
- . Measure skill mismatch between shrinking and growing jobs
- . Look at actual qualification to assess the de facto requirements
- . How persistent are the rules about qualification requirements



**Figure 8: Employment share of occupations**



**Figure 9: Difference in employment across occupations**

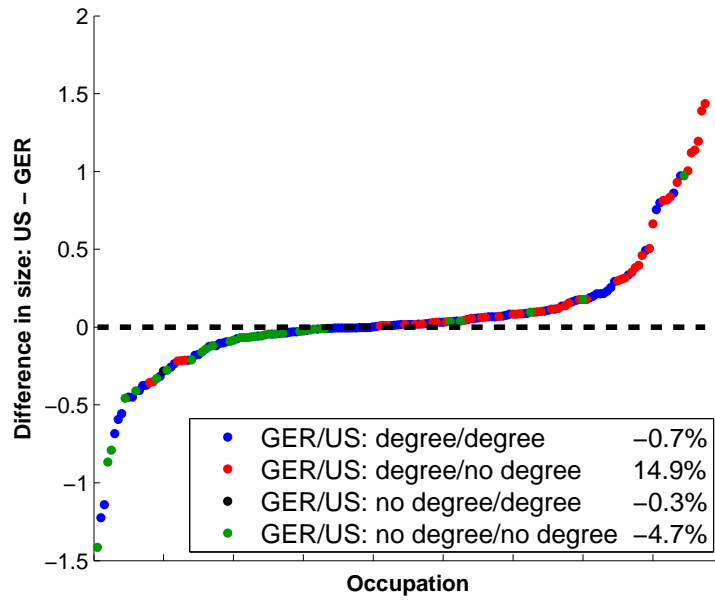


- Model

. OLG with education choice and structural change

## Appendix: Additional Material

**Figure 10: Qualification requirements and employment across occupations**



**Figure 11: Working-age population in Germany and U.S.**

