

# Overtime Work in Germany

## DISSERTATION

zur Erlangung des akademischen Grades  
doctor rerum politicarum  
(Doktor der Wirtschaftswissenschaft)

eingereicht an der

Wirtschaftswissenschaftlichen Fakultät  
der Humboldt-Universität zu Berlin

von

Diplom-Volkswirtin Silke Anger  
(geb. am 04.08.1975 in Böblingen)

Präsident der Humboldt-Universität zu Berlin:  
Prof. Dr. Hans Jürgen Prömel (in Vertretung)

Dekan der Wirtschaftswissenschaftlichen Fakultät:  
Prof. Dr. Joachim Schwalbach

Gutachter: 1. Prof. Michael C. Burda, Ph.D.  
2. Prof. Robert A. Hart, Ph.D.

Tag des Kolloquiums: 7. Dezember 2005



Berichte aus der Volkswirtschaft

**Silke Anger**

## **Overtime Work in Germany**

The Investment Character of Unpaid Hours

Shaker Verlag  
Aachen 2006

**Bibliographic information published by Die Deutsche Bibliothek**

Die Deutsche Bibliothek lists this publication in the Deutsche Nationalbibliografie; detailed bibliographic data is available in the internet at <http://dnb.ddb.de>.

Zugl.: Berlin, Humboldt-Univ., Diss., 2005

Copyright Shaker Verlag 2006

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior permission of the publishers.

Printed in Germany.

ISBN 3-8322-4917-6

ISSN 0945-1048

Shaker Verlag GmbH • P.O. BOX 101818 • D-52018 Aachen

Phone: 0049/2407/9596-0 • Telefax: 0049/2407/9596-9

Internet: [www.shaker.de](http://www.shaker.de) • eMail: [info@shaker.de](mailto:info@shaker.de)

## **Acknowledgements**

I would like to thank Michael C. Burda for his supervision, and Bob Hart for his advice and comments on earlier versions of my thesis.

Many thanks to Guido Heineck and Johannes Schwarze who were always prepared to help with encouragement and instructive comments. I'm especially indebted to Ronald Bachmann, Ralf Brüggemann, Michael Kvasnicka, and Carsten Trenkler for proofreading parts of my thesis. Their valuable suggestions have clearly improved the quality of this work.

This thesis has benefited from numerous comments from seminar participants at Humboldt- University Berlin, Bamberg University, Stirling University, and the Berlin Network of Labor Market Research. Furthermore, I'm thankful for comments made by Reinhold Sackmann, and for fruitful discussions with participants at the First International SOEP Young Scholars Symposium, the SOEP User Conference, the workshop "Deutschland Regional", the Cologne-Bonn Colloquium on Personnel Economics, and the 6th IZA Summer School in Labor Economics. Helpful suggestions were also made by participants at the annual meetings of the AEA, EALE, ESPE, SOLE, and the "Verein für Socialpolitik".

I owe many of our current and former students a special debt of gratitude for their excellent research assistance and help in the collection of data. For reasons of data protection, parts of the analyses have been conducted at the DIW in Berlin. My thank goes to Katharina Spieß and Gundolf Knies for making sensitive data available.

A special thank you to all my friends, inside and outside the academic life for their support and the pleasant diversions. My most special thanks to Sebastian for his patience throughout, and to my parents, for all what they have given to me.



# Contents

<b>I.</b>	<b>Introduction .....</b>	<b>1</b>
<b>II.</b>	<b>An Overview of Overtime.....</b>	<b>7</b>
<b>1.</b>	<b>Introduction .....</b>	<b>7</b>
<b>2.</b>	<b>Overtime: Definition and Emergence in the Economy.....</b>	<b>8</b>
2.1.	The Household's Perspective.....	9
2.1.1.	The Supply of Overtime Hours by Workers .....	9
2.1.2.	Implications of Working Overtime for Workers.....	12
2.2.	The Firm's Perspective .....	14
2.2.1.	The Demand for Overtime Hours by Employers .....	14
2.2.2.	Short-Term Fluctuations in Labor Demand .....	15
2.2.3.	Persistent Demand of Overtime Hours: Fixed Labor Costs.....	16
2.2.4.	Labor Market Institutions: Employment Protection.....	17
2.2.5.	Implications of Overtime for Firms.....	20
2.3.	Overtime From the Perspective of Policy Makers.....	21
2.3.1.	The Work-Sharing Debate.....	21
2.3.2.	The Reduction in Overtime .....	24
<b>3.</b>	<b>Regulation of Overtime Work.....</b>	<b>27</b>
3.1.	Supranational Working Time Regulation .....	28
3.2.	Working Time Regulation in Germany .....	29
3.2.1.	Overtime Regulation in Germany .....	29
3.2.2.	The Overtime Premium .....	30
3.2.3.	Working Time Accounts .....	31
3.3.	An International Perspective.....	32

3.3.1.	The U.S. Fair Labor Standards Act (1938) .....	33
3.3.2.	Overtime Regulation in Europe.....	34
3.3.3.	An International comparison .....	36
<b>4.</b>	<b>Data Availability and Measurement .....</b>	<b>37</b>
4.1.	Administrative Data on Overtime in Germany.....	37
4.2.	Survey Data on Overtime in Germany.....	38
4.3.	The German Socio-Economic Panel Study (SOEP).....	40
4.4.	International Data on Overtime Hours.....	42
4.5.	Measurement Problems .....	43
<b>5.</b>	<b>Descriptive Evidence.....</b>	<b>45</b>
5.1.	Standard Working Time in Germany.....	45
5.2.	Overtime in the Official Statistics.....	46
5.3.	Overtime in the SOEP .....	48
5.4.	International Comparison of Overtime .....	58
<b>6.</b>	<b>Conclusion.....</b>	<b>62</b>
<b>III.</b>	<b>What the Theory Predicts .....</b>	<b>65</b>
<b>1.</b>	<b>Introduction .....</b>	<b>65</b>
<b>2.</b>	<b>The Neoclassical Theory of Labor Supply.....</b>	<b>66</b>
<b>3.</b>	<b>The Neoclassical Theory of Labor Demand .....</b>	<b>68</b>
<b>4.</b>	<b>The Real Option Theory .....</b>	<b>73</b>
<b>5.</b>	<b>The Theory of Equalizing Differences .....</b>	<b>77</b>
<b>6.</b>	<b>Implicit Contracts .....</b>	<b>81</b>
<b>7.</b>	<b>Wage-Hours Contract Model.....</b>	<b>85</b>
<b>8.</b>	<b>Efficiency Wage Theory.....</b>	<b>88</b>

<b>9. Real Business Cycle Theory .....</b>	<b>91</b>
<b>10. Conclusion.....</b>	<b>94</b>
<b>IV. Regional Unemployment and Overtime in Germany .....</b>	<b>97</b>
<b>1. Introduction .....</b>	<b>97</b>
<b>2. The Investment Character of Overtime.....</b>	<b>98</b>
2.1. Previous Research.....	99
2.2. Theoretical Considerations .....	100
<b>3. Data.....</b>	<b>104</b>
3.1. Sample Description and Dependent Variable .....	104
3.2. Regional Unemployment Variables.....	105
3.3. Control Variables .....	106
<b>4. Actual Hours, Overtime Work, and Desired Working Time .....</b>	<b>108</b>
<b>5. Econometric Analysis.....</b>	<b>114</b>
5.1. Tobit Model.....	114
5.2. Predictions of the Model.....	115
<b>6. Results.....</b>	<b>117</b>
6.1. Control Variables .....	117
6.2. Pooled Tobit Model .....	118
6.3. Random Effects Tobit Model.....	121
6.4. Linear Fixed Effects Model .....	122
6.5. Interaction Terms .....	123
<b>7. Robustness Checks and Extensions .....</b>	<b>128</b>
7.1. Unemployment Measures and Reversed Causality .....	128
7.2. Unpaid Overtime as Deviation from the Mean.....	130

7.3.	Unpaid Overtime and Unions .....	131
7.4.	Regional Unemployment and Commuting .....	133
7.5.	The Expectation of Job Loss.....	134
7.6.	Unpaid Overtime and Firm Closures .....	136
<b>8.</b>	<b>Overtime Hours and the Business Cycle.....</b>	<b>136</b>
<b>9.</b>	<b>Conclusion.....</b>	<b>141</b>
 <b>V.</b>	<b>The Effects of Unpaid Overtime on Wages, Promotions, and Layoffs ....</b>	<b>145</b>
1.	<b>Introduction .....</b>	<b>145</b>
2.	<b>Unpaid Overtime and Future Payoffs.....</b>	<b>146</b>
2.1.	Previous Research.....	146
2.2.	Theoretical considerations .....	147
3.	<b>Data.....</b>	<b>149</b>
3.1.	Sample and Variable Description .....	149
3.2.	Payoff Variables.....	151
4.	<b>Trends in Paid and Unpaid Overtime .....</b>	<b>155</b>
5.	<b>Econometric Analysis.....</b>	<b>162</b>
5.1.	Binary Choice Model .....	162
5.2.	Sample Selection Model .....	164
6.	<b>Results.....</b>	<b>165</b>
6.1.	Excess Earnings Growth .....	166
6.2.	Promotion Probability .....	168
6.3.	Layoff Probability .....	170
6.4.	Robustness Checks and Extensions .....	172
6.4.1.	Variations in the Sample .....	173

6.4.2. Variation in the Measure of Wage Growth .....	176
6.4.3. Unpaid Overtime as Deviation from the Mean .....	177
<b>7. Conclusion.....</b>	<b>178</b>
<b>VI. Overtime Work as a Signaling Device.....</b>	<b>183</b>
1. Introduction .....	183
2. Forward-Looking Labor Supply .....	184
2.1. Reasons for Unpaid Overtime.....	184
2.2. Unpaid Overtime and Future Returns .....	185
2.3. Overtime Signaling .....	186
3. Internal Signaling Game.....	188
3.1. Information Asymmetry in the Firm.....	188
3.2. The Signal of the Worker's Value .....	189
4. The Model .....	191
4.1. Model Set-Up.....	191
4.2. No Signaling Case.....	194
4.3. Signaling Case.....	195
4.3.1. Perfect Bayesian Equilibrium.....	196
4.3.2. Separating equilibrium .....	198
4.3.3. Pooling equilibrium .....	199
4.3.4. Welfare Analysis .....	201
4.4. Refinements.....	202
4.5. From Theory to Empirical Testing .....	204
5. Empirical Testing .....	206
5.1. Identification Strategy.....	206
5.1.1. Earnings Effects of Unpaid Overtime .....	206

5.1.2.	A Quasi-Experiment with Unpaid Overtime.....	208
5.1.3.	Econometric Strategy .....	210
5.1.4.	Treatment and Control Group .....	212
5.2.	Data .....	214
5.3.	Results .....	215
5.3.1.	“Raw” Estimates.....	215
5.3.2.	Difference-in-Difference Estimates.....	216
5.4.	Robustness Checks and Extensions .....	218
5.4.1.	The Endogeneity of Contractual Hours.....	218
5.4.2.	Variations in the Counterfactual.....	221
5.4.3.	Future Earnings and Deferred Compensation .....	223
5.4.4.	White-Collar Workers .....	225
5.4.5.	Workers with Short Tenure .....	226
5.4.6.	Alternative Testing Strategies .....	228
6.	<b>Conclusion.....</b>	<b>229</b>
<b>VII.</b>	<b>Concluding Remarks and Outlook .....</b>	<b>233</b>
<b>VIII.</b>	<b>Appendix .....</b>	<b>239</b>
<b>IX.</b>	<b>Bibliography .....</b>	<b>275</b>