

Contents

List of Figures	11
List of Tables	12
List of Abbreviations	14
Introduction	19
1 The Brain Drain: An Exposition of Causes and Consequences of Highly Qualified Migration	23
1.1 Introduction	23
1.2 The Brain Drain as a Problem	25
1.2.1 Brain Drain and Market Failure	26
1.2.2 The Social Welfare Function	29
1.3 Causes of the Brain Drain	31
1.3.1 The Decision to Migrate	31
1.3.2 Incomplete Information	34
1.3.3 Externalities from Human Capital	35
1.3.4 Governmental Activity	36
1.3.5 Unemployment	38
1.3.6 Indivisibilities	38
1.3.7 Migration and Trade	39
1.3.8 Empirical Findings and Conclusions	41
1.4 Static Effects of the Brain Drain	45
1.4.1 Income	45
1.4.2 Inequality and Unemployment	50
1.4.3 Public Sector	53
1.4.4 Conclusions	54
1.5 Dynamic Effects of the Brain Drain	57
1.5.1 Developmental Effects	57
1.5.2 Neoclassical Growth Theory	67
1.5.3 New Growth Theory	76
1.5.4 Conclusions	82
1.6 Conclusions	84

2	On Brain Drain, Brain Exchange, and Economic Growth	87
2.1	Introduction	87
2.1.1	Migration and Economic Integration	87
2.1.2	The Idea of the Brain Exchange	92
2.2	The Closed Economy	94
2.2.1	Static Perspective	94
2.2.2	Dynamic Perspective	107
2.3	The Open Economy in a Static Perspective	113
2.3.1	Free Trade	114
2.3.2	Factor Mobility	116
2.4	The Open Economy and the Dynamic Effects of Migration	123
2.4.1	The Model with Migration	123
2.4.2	Migration and Convergence	130
2.5	Conclusions	147
3	European Integration and Mobility: Some Stylised Facts	153
3.1	Introduction	153
3.2	Data Source and Methodology	156
3.3	Mobility within the Single European Market	163
3.3.1	Trade, Direct Investment and Migration	164
3.3.2	The EU Mobility Pattern	167
3.3.3	Instantaneous Skill Ratio and Net Migration According to Countries	175
3.3.4	Cumulated Skill Ratio According to Nationalities	180
3.4	Mobility within the Single European Market	188
3.4.1	Qualificational Composition	188
3.4.2	On the Self-Selection of Immigration	191
3.5	Macroeconomic Effects of Mobility	197
3.6	Conclusions	208
4	Estimation of the Model	211
4.1	Introduction	211
4.2	Methodology and Data	213
4.2.1	The Model's Estimation Equation	213
4.2.2	Data Sources and Definitions	217

4.3	EU(12) Country level	227
4.3.1	The EU(12) Country Sample	227
4.3.2	Econometric Analysis	234
4.3.3	Conclusions	242
4.4	Nuts1 Regional Level	244
4.4.1	The NUTS1 Sample	244
4.4.2	Econometric Analysis	254
4.4.3	Conclusions	267
4.5	Nuts2 Regional Level	268
4.5.1	The NUTS2 Sample	268
4.5.2	Econometric Analysis	276
4.5.3	Conclusions	284
4.6	Conclusions	285
5	Implications and Policy Recommendations	287
5.1	Calibrating the Long Run Effects of Migration	287
5.1.1	Calibrating the Central Model Parameter	287
5.1.2	Inner-European Migration: Brain Drain, Brain Gain and Brain Exchange	292
5.1.3	Immigration into the EU: Brain Drain, Brain Gain and Brain Exchange	296
5.1.4	Migration and Convergence	301
5.2	Policy Implications and Outline for Further Research	305
5.2.1	Brain Drain and Brain Exchange Beyond the Model	305
5.2.2	Implementing a Tax on Brains or Transfer Payments?	308
5.2.3	Highly Qualified Mobility and the Organisation of Governmental Activity	312
5.2.4	Migration Policy in the Age of Locational Competition: A Need for International Co-ordination?	316
6	Annex	323
6.1	ANNEX CHAPTER 2	323
6.1.1	Annex 2-1: Intersectoral Allocation and Aggregation	323
6.1.2	Annex 2-2: Linearisation around the Equilibrium	325
6.2	ANNEX CHAPTER 3	329
6.2.1	Annex 3-1: Construction of the EU Migration Index for 1983-93	329
6.2.2	Annex 3-2: Skill Ratios According to Countries for the EU(12), 1992-94	330

6.2.3	Annex 3-3: Inner-European Highly Qualified Emigration and Immigration According to Countries, 1988-94, in 1,000 Persons	330
6.2.4	Annex 3-4: Inner-European Total Emigration and Immigration According to Countries, 1988-94, in 1,000 Persons	332
6.2.5	Annex 3-5: EU(12) Cumulated Skill Ratio, 1992-94	335
6.2.6	Annex 3-6: Highly Qualified and Total Mobility Index for the EU(12), 1992-94	335
6.2.7	Annex 3-7: Share of Highly Qualified Nationals in all Nationals for the EU(12), 1992-94	336
6.2.8	Annex 3-8: Non-EU Immigration into the EU(7) and EU(12) According to Sending Regions, in 1,000 Persons	336
6.2.9	Annex 3-9: Non-European Immigration into the EU(7) and EU(12) 1988-94, in 1,000 Persons	338
6.2.10	Annex 3-10: Cumulated Skill Ratio for Non-EU Citizens Within the EU(7) and EU(12) According to Regions, 1992-94	339
6.3	ANNEX CHAPTER 4	340
6.3.1	Annex 4-1: The European Regions' Share in National Investment and Sample Formation	340
6.3.2	Annex 4-2: Capacity Utilisation Rate for the EU(12), 1988-94	343
6.4	ANNEX CHAPTER 5	344
6.4.1	Annex 5-1: The Net Welfare Effect of Inner-European Mobility for the EU(12) Countries (eshare12)	344
6.4.2	Annex 5-2: The Net Welfare Effect of Inner-European Mobility for the EU(12) Countries (esharet)	345
6.4.3	Annex 5-3: The Net Welfare Effect of Mobility into the EU(12) (eshare12)	346
6.4.4	Annex 5-4: The Net Welfare Effect of Mobility into the EU(12) (esharet)	347
7	References	349
	German Summery	371

List of Figures

Chapter 1

1.1	Brain Drain, Technological Progress and Development	66
1.2	Migration and Economic Growth in the Neoclassical Model	68

Chapter 2

2.1	Stages of Development and Monopolistic Competition	113
2.2	The Dynamics of Migration	129
2.3	The Effects of Migration in the Neoclassical Growth Case	135
2.4	The Effects of Migration in the Endogenous Growth Case	143

Chapter 3

3.1	The Relation between Inner-European Trade, FDI and Migration, 1984-94	166
3.2	The Volume and Composition of EU(7) Migration, 1988-94, in 1,000 Persons	168
3.3	The EU(7) Instantaneous Skill Ratio According to Countries, 1988-94	176
3.4	Relationship Between Net Highly Qualified and Net Unqualified Migration For the EU(7) Countries, 1988-94, per 1,000 Persons	179
3.5	Total and Highly Qualified Immigration Into the EU(7), 1985-94, in 1,000 Persons	189
3.6	Instantaneous Skill Ratio of Eastern European Immigration Into the EU(7) According to Countries of Origin, 1988-94	193

Chapter 4

4.1	Correlation Between the Income per Employee, the Capital Intensity and Employed Persons for the EU(12) Sample	228
4.2	Correlation between the Income per Employee and Possible Externalities from Highly Qualified Persons for the EU(12) Sample	230
4.3	Correlation between the Income per Employee and Other Possible Externalities for the EU(12) Sample	233
4.4	Correlation Between the Income Per Employee, the Capital Intensity and Employed Persons for the NUTS1 Sample	245
4.5	Correlation Between the Income per Employee and Possible Externalities from Highly Qualified Persons for the NUTS1 Sample	247

4.6	Correlation between the Income per Employee and Other Possible Externalities for the NUTS1 Sample	252
4.7	Correlation Between the Income per Employee, the Capital Intensity and Employed Persons for the NUTS2 Sample	269
4.8	Correlation Between the Income per Employee and Possible Externalities from Highly Qualified Persons for the NUTS2 Sample	270
4.9	Correlation Between the Income per Employee and Other Possible Externalities for the NUTS2 Sample	275

List of Tables

1.1	Effects of the Brain Drain on Welfare and the Public Sector	55
1.2	Brain Drain and Technological Progress	83
2.1	Substitutability of Intermediate Products and the Return to Capital	110
2.2	Classifying the Interaction of the Brain Drain and the Brain Exchange Effect	121
3.1	Number of Private Households Within the LFS According to Countries For Selected Years	158
3.2	Development of the Cumulated Skill Ratio, EU(12) and EU(7)	170
3.3	Qualificational Specific Mobility Indices, EU(7) and EU(12)	171
3.4	Share of Highly Qualified Nationals in all Nationals, EU(7) and EU(12)	172
3.5	Break Down of the Growth Rate of the European Cumulated Skill Ratio	173
3.6	Instantaneous Skill Ratios of Northern and Southern Countries, 1988-94	177
3.7	Development of the EU(7) Cumulated Skill Ratio, 1988-94	181
3.8	Highly Qualified Mobility Index According to EU(7) Nationalities, 1988-94	181
3.9	EU(7) Total Mobility Index According to Nationalities, 1988-94	183
3.10	Share of Highly Qualified Persons in the Population According to Nationalities, EU(7), 1988-94	184
3.11	Break Down of the Growth Rate of the EU(7)Cumulated Skill Ratio According to Countries	185
3.12	Break Down of the Growth Rate of the EU(12) Cumulated Skill Ratio According to Countries	186
3.13	Cumulated Skill Ratio for Eastern Europe, EU(7) 1988-94	195
3.14	Effect of Mobility on the Population Size for the EU(12), 1994, in 1,000 Persons	199
3.15	Effect of Mobility on the Population Size for the EU(7), 1988 and 1994, in 1,000 Persons	200

3.16	Effect of Mobility on the Stock of Human Capital for the EU(7), 1988 and 1994, in 1,000 Persons	202
3.17	Effect of Mobility on the Stock of Highly Qualified Persons for the EU(7), 1988 and 1994, in 1,000 Persons	203
3.18	Effect of Mobility on the Share of Highly Qualified Persons in the Population for the EU(12), 1994	204
3.19	Effect of Mobility on the Share of Highly Qualified Persons in the Population for the EU(7), 1988 and 1994	205
4.1	Estimated Average Growth Rates of the Capital Stocks of the EU(12) Countries, 1960-94	220
4.2	Identifying the Correct Econometric Model for the EU(12) Sample	235
4.3	Including the Share of Highly Qualified Persons in the Production Function of the EU(12) Sample	238
4.4	Including the Density of Highly Qualified Persons in the Production Function of the EU(12) Sample	240
4.5	Including the Number of highly qualified persons in the Production Function of the EU(12) Sample	241
4.6	Including Other Possible Externalities in the Production Function of the EU(12) Sample	242
4.7	Identifying the Correct Econometric Model for the NUTS1 Sample Excluding the UK-Regions	255
4.8	Identifying the Correct Econometric Model for the NUTS1 Sample Including the UK-Regions	257
4.9	Including the Share of Highly Qualified Persons in the Production Function of the NUTS1 Sample	258
4.10	Including the Density of Highly Qualified Persons in the Production Function of the NUTS1 Sample	259
4.11	Including the Number of highly qualified persons in the Production Function of the NUTS1 Sample	262
4.12	Including Other Possible Externalities in the Production Function of the NUTS1 Sample	263
4.13	Robustness of the Share of Highly Qualified Persons with Respect to the Capital Density for the NUTS1 Sample	264
4.14	Robustness of the Density of Highly Qualified Persons with Respect to the Capital Density for the NUTS1 Sample	265
4.15	Robustness of the Number of highly qualified persons with Respect to the Capital Density for the NUTS1 Sample	266
4.16	Identifying the Correct Econometric Model for the NUTS2 Sample	278
4.17	Including the Share of Highly Qualified Persons in the Production Function of the NUTS2 Sample	279
4.18	Including the Density of Highly Qualified Persons in the Production Function of the NUTS2 Sample	279
4.19	Including the Number of highly qualified persons in the Production Function of the NUTS2 Sample	280
4.20	Including Other Possible Externalities in the Production Function of the NUTS2 Sample	281

4.21	Robustness of the Share of Highly Qualified Persons with Respect to the Capital Density for the NUTS2 Sample	281
4.22	Robustness of the Density of Highly Qualified with Respect to the Capital Density for the NUTS2 Sample	283
4.23	Robustness of the Number of highly qualified persons with Respect to the Capital Density for the NUTS2 Sample	283
4.24	Implied Production Function Parameters of the Model for all Samples	286
5.1	Calibrating the Human Capital Effect of Inner European Mobility	289
5.2	Calibration of the Diversity Parameters for the EU(12) Countries	291
5.3	The Brain Drain Effect of Inner-European Mobility for the EU(12)	292
5.4	The Brain Exchange Effect of Inner European Mobility for the EU(12)	294
5.5	Long Run Effect of Inner-European Mobility on the Income Level	295
5.6	The Brain Drain Gain Effect of Mobility into the EU(12)	296
5.7	The Brain Exchange-Effect of Mobility into the EU(12)	298
5.8	Long Run Effect of Migration into the EU(12) on the Income Level	299
5.9	Evidence on the East European Brain Drain According to the Literature	300
5.10	Brain Drain and Brain Exchange Components	308

List of Abbreviations

1. Words

AR(1)	First-order autoregressive process
c.p.	ceteris paribus
BE	Belgium
DI	Direct investment
DK	Denmark
EC	European Community
EU	European Union
EU(7)	Belgium, Denmark, Germany, Greece, Ireland, Portugal, United Kingdom
EU(12)	Belgium, Denmark, France, Germany, Greece, Italy, Ireland, Luxembourg, the Netherlands, Portugal, Spain, United Kingdom.
FE	Fixed-Effects model
GER	Germany
GR	Greece
gdp	gross domestic product
HM1, HM2	Hausmann-tests
I	Italy
ILO	International Labour Office
IR	Ireland