



**The fiscal impact of EU immigration on the tax-financed welfare state: Testing the 'welfare burden' thesis**

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## **Online appendix. “The fiscal impact of EU immigration on the tax-financed welfare state: testing the ‘welfare burden’ thesis”**

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### **Estimations of welfare service costs in Denmark, 2002–2013. A Note on Data Collection**

This note describes the procedures for data collection, including the calculation of the costs per unit of providing a given service within the public service sectors in Denmark: hospitalization, enrolment in daycare, elementary school, secondary education, studying at an institution of higher education, consultation with a general practitioner, consultation with a dentist, and the cost assessed for crime. To analyse a complete time series, estimates are extrapolated from the existing data through a simple linear extrapolation. As shown in Figure B1, the available data show a general linear tendency. This way, linear extrapolation seems feasible.

#### **Hospitalization:**

Data on the total hospital expenditures have been extracted from Statistics Denmark’s public expenditures section and cover the period from 2007 to 2013. The data can be found on the webpage, <http://www.statistikbanken.dk/ESSPROS1>, by following the path: ‘1.2 Sygehusvæsenet’ >> ‘Sociale Udgifter I Alt’. Data on number of hospitalizations are retrieved from <http://www.statistikbanken.dk/IND03>. The cost per unit estimate is total expenditures divided by number of hospitalizations. The same procedure is followed in Jacobsen, Junge and Skaksen (Jacobsen et al. 2011, 23).

#### **Daycare Enrolment:**

The cost per unit estimates of having a child enrolled in daycare (i.e., cover crèche, family daycare, nursery schools and age-integrated institutions) per year rely on the official estimates developed by the Ministry of Social Affairs and the Interior. The estimates can be retrieved at <http://www.noegletal.dk/>, by selecting ‘Alle kommuner’ >> ‘Dagtilbud’ – udgifter og tilskud’ >> ‘Udg. (brutto) til dagtilbud pr. 0-13-årige’.

### **Elementary School Enrolment:**

The cost per unit estimates per pupil enrolled in elementary school per year relies on the official estimates developed by the Ministry of Social Affairs and the Interior. The estimates represent the sum of the cost per 6- to 16-year-old's attendance of public or private elementary school. These estimates can be retrieved at <http://www.noegletal.dk/>, by selecting 'Alle kommuner' >> 'Undervisning' >> 'Udg. til folkeskolen pr. 6-16-årig' // 'Udg. til privatskoler, efterskoler m.fl. pr. 6-16-årig'.

### **Secondary Education Enrolment:**

The cost per secondary education enrolment per year is proxied by the rate the state pays to each secondary educational institution per full-time equivalent (FTE; i.e., 'Taxametertakst'). The data are retrieved from the Ministry for Children, Education and Gender Equality at <http://www.uvm.dk/Administration/Takstkatalog-og-finanslov/Takstkatalog/Tidligere-takstkataloger>. The estimates are an average across vocational schools, general upper secondary schools and vocational colleges. Data are available from 2007 onwards.

### **General Practitioner:**

The yearly total public expenditures to general practitioners have been extracted from the financial statement of the Regions and cover the years 2007–2013. The excel spreadsheet can be found at <http://www.regioner.dk/aftaler-og-oekonomi/udgifter-og-finansiering/regnskab>. The estimates are found under the header 'praksissektor ekskl. medicin'. The number of consultations per year is retrieved from Statistics Denmark, at <http://www.dst.dk/da/statistik/nyt/relateret?pid=1316>, ID: SYGK, and covers the same period. The cost per unit is calculated by dividing total expenditures by total number of consultations.

### **Dentist:**

Data on the total expenditures to dentistry specifically are extracted from Statistics Denmark's database, at <http://www.statistikbanken.dk/SYGUS>, by selecting 'Tandplejer – før 2007 histopatologiske undersøgelser' and 'Tandlægehjælp' under 'Ydelsesarter'. Data cover the period 2006–2013. The data on consultations are likewise found in Statistics Denmark's database, at

<http://www.dst.dk/da/statistik/nyt/relateret?pid=1316>, ID: SYGK, by selecting ‘Tandlæge and Tandplejer’ under ‘Ydelsesarter’. The cost per unit is calculated by dividing total expenditures by total number of consultations. The data are available from 2006 onwards.

### **Higher Education:**

Data on the cost per unit for higher education are proxied by the rate the state pays to each higher education institution per FTE (i.e., ‘Taxametertakst’). The data are available at the Ministry of Higher Education and Sciences’ webpage: [http://ufm.dk/en/education-and-institutions/higher-education/danish-universities/the-universities-in-denmark/economics-of-university-sector?set\\_language=en&cl=en](http://ufm.dk/en/education-and-institutions/higher-education/danish-universities/the-universities-in-denmark/economics-of-university-sector?set_language=en&cl=en). The estimates represent an average over the rates of university students, thus omitting short-term and medium-term higher education because of data shortages. However, a comparison of the university estimates with the estimates of short- and medium-term higher education for the available years 2012 and 2013 (retrieved from <http://ufm.dk/uddannelse-og-institutioner/videregaende-uddannelse/erhvervsakademier/okonomi/tilskud>) indicates that the estimates represent the total higher education system well.

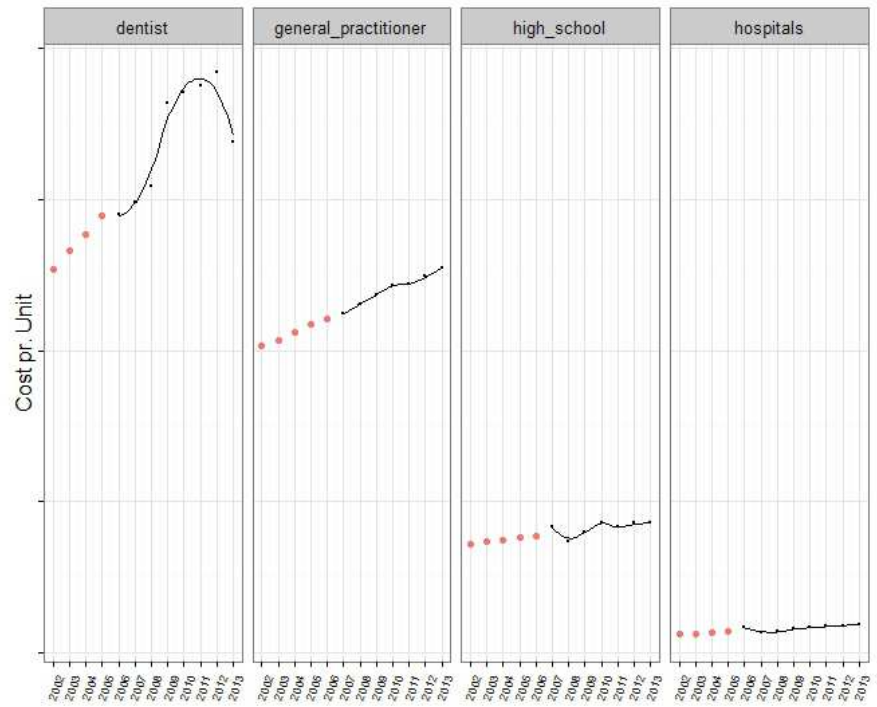
### **Crime:**

For the unit cost of criminal charges, we base our estimates on the 2009 estimate in Jacobsen, Junge and Skaksen (Jacobsen et al. 2011, 23). The 2009 estimate is used for the whole period under investigation. Their cost per unit of crime is estimated to be 49.500 DKK, i.e., 6653 Euro per criminal ruling. Register data provide us with information on the number of charges, the cost of which we approximate by the cost per unit of a criminal ruling. Our estimates are thus expected to be upper-bound estimates compared to the actual expenditure.

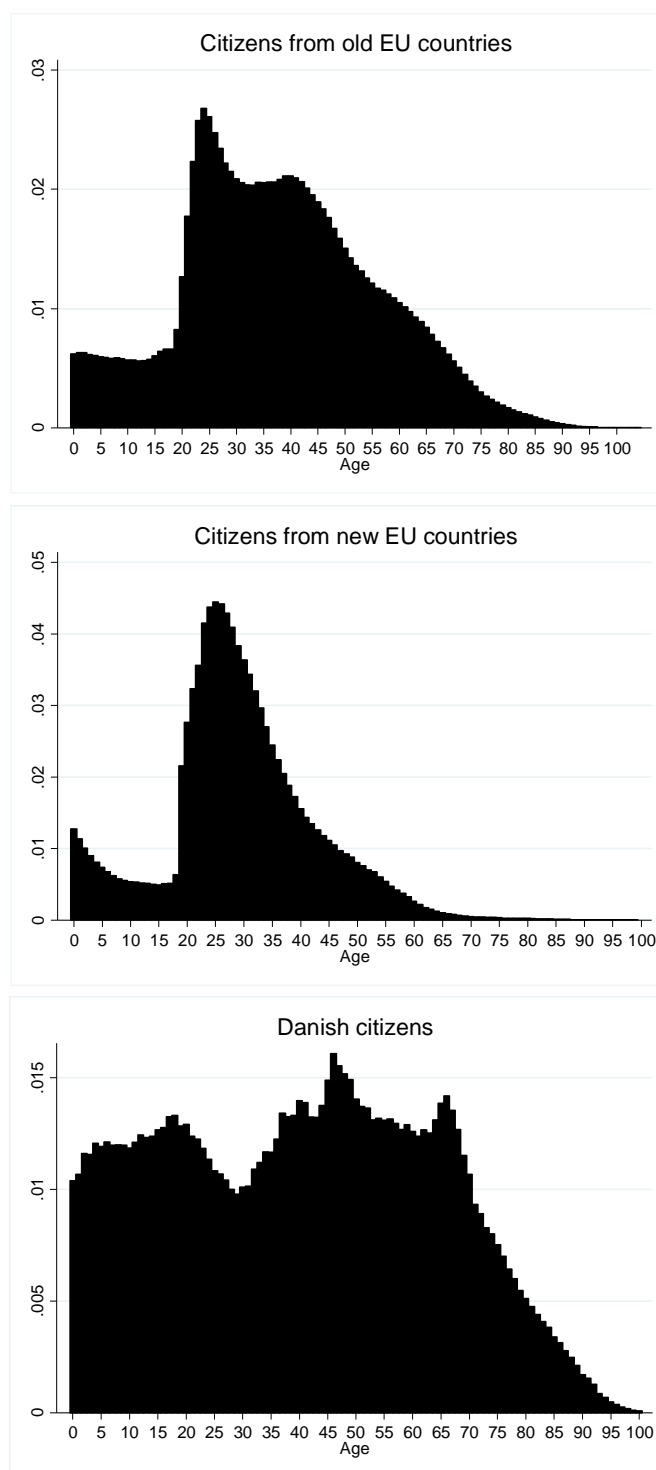
**Table A1: Estimates**

Cost per Unit (FTEs, €)	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
<b>Elementary School</b>	6.695	6.937	7.182	7.399	7.673	7.819	8.188	8.673	8.700	8.516	8.609	8.532
<b>Daycare</b>	4.834	4.966	5.123	5.285	5.466	5.593	5.789	6.213	6.428	6.306	6.364	6.377
<b>Hospitalization</b>	1.598	1.672	1.747	1.821	2.268	1.703	1.860	2.064	2.205	2.292	2.390	2.465
<b>Upper Secondary</b>	9.652	9.829	10.006	10.183	10.360	11.129	9.920	10.698	11.486	11.171	11.507	11.566
<b>Higher education</b>	8.866	8.760	7.751	11.480	8.669	8.250	8.616	9.022	9.280	9.273	9.291	9.122
<b>Dentist</b>	34	36	37	39	39	40	42	49	50	50	52	45
<b>GP</b>	27	28	28	29	30	30	31	32	33	33	33	34

**Figure A1: Linear Extrapolation**



**Figure A2.** Age distributions of EU citizens in Denmark, by citizenship



*Notes:* The histograms reported in both panels are constructed on the basis of age distribution among the population of EU citizens from both groups of countries during the period 2009–2013.

**Table A2.** Descriptive Statistics on EU Citizens in Denmark, 2002–2013

	All	2002	2013	Under 3 years since migration	At least 3 years since migration
<b>Percentage of citizens from Old EU (%)</b>	69	100	54	53	77
<b>Average age</b>	35	38	34	28	39
<b>Percentage aged 0-16 (%)</b>	11	12	11	9	12
<b>Percentage aged 17–24 (%)</b>	15	9	16	30	6
<b>Percentage aged 25-44 (%)</b>	46	44	48	51	44
<b>Percentage aged 45-64 (%)</b>	22	28	19	8	30
<b>Percentage aged at least 65 (%)</b>	6	7	5	1	9
<b>Percentage women (%)</b>	47	45	47	45	48
<b>Average number of children in the family</b>	0.7	0.9	0.7	0.4	0.9
<b>Average years since migration</b>	5.5	5.5	5.6	0.8	9.3
<b>Percentage with study support (%)</b>	2	2	3	1	3
<b>Percentage employed (%)</b>	68	66	68	63	72
<b>Percentage passive unemployed (%)</b>	2	3	3	0.9	3
<b>Percentage other unemployed (%)</b>	2	2	2	1	2
<b>Percentage with social assistance (%)</b>	3	4	3	1	4
<b>Percentage visiting GP or specialists (%)</b>	58		66	41	68
<b>Percentage hospitalization (%)</b>	13	11	11	6	17
<b>Percentage with criminal charges (%)</b>	3	3	3	2	4
<b>Average Fiscal Impact (€2013)</b>	12777	13876	12378	6488	16259
<b>Average Contribution (€2013)</b>	7388	7104	6698	2549	10067
<b>Average Expenditure (€2013)</b>	5389	6772	5680	3939	6192
<b>Observations</b>	1207098	53782	159857	430750	776348

*Notes:* Percentage with study support denotes the fraction of EU citizens with study support for at least 6 months among citizens aged 16–64. Percentage employed denotes the fraction of EU citizens with positive wage earnings among citizens aged 16–64. Percentage passive unemployed is the fraction of EU citizens with unemployment insurance for at least 6 months among citizens aged 16–64. Percentage other unemployed is the fraction of EU citizens with unemployment insurance under active labour market policy programme, sickness benefit, parental leave or job leave for at least 6 months among citizens aged 16–64. Percentage with social assistance is the fraction of EU citizens with social assistance for at least 6 months among citizens aged 16–64. Percentage with criminal charges is the fraction of EU citizens with at least one charge for offense among EU citizens aged 15 and above. Percentage visiting GP or specialists is the fraction of EU citizens with at least one visit to a GP or a specialized doctor among all EU citizens. Percentage hospitalization is the fraction of EU citizens with at least one visit to a hospital among all EU citizens. The fiscal impact and their components are expressed in EURO from 2013, denoted €2013.



**Table A3.** Fiscal impact of EU citizens in Denmark by age, country of origin and years since migration, on average per individual, in euros.

Year	All	Age 0-16	Age 17-24	Age 25-44	Age 45-64	Age 65-	Old EU	New EU	Under 3 YSM	At Least 3 YSM
2002	7827	-5027	-797	12214	12948	-8503	7827		5862	10423
2003	7282	-5210	-1128	11710	12016	-8382	7282		5084	9927
2004	6057	-5431	-719	10065	10755	-8279	6815	1942	3306	8662
2005	6361	-5680	-579	10579	11416	-8531	7104	2850	3532	9549
2006	6011	-5725	-163	10243	10894	-9601	6650	3552	3955	9243
2007	5739	-6171	410	10022	10556	-12038	6265	4316	4357	9527
2008	5652	-6278	985	10223	9981	-14655	6066	4798	5324	9059
2009	4833	-6358	88	9644	9201	-16594	5294	3986	4399	8202
2010	3967	-6919	-652	8667	8990	-19353	4429	3213	3349	7492
2011	4120	-6741	-963	8662	9949	-18835	4769	3182	3042	7577
2012	5643	-6308	-527	9444	13180	-11107	7086	3766	3572	9200
2013	5680	-6440	-475	9290	13737	-11605	7302	3765	3847	9186
<b>2002-13</b>	5764	-6024	-377	10063	11135	-12290	6407	3537	4136	9004

**Table A4.** Contribution and expenditure by country of origin and years since migration, on average per individual, in euros

Year	Contribution					Expenditure				
	All	Under 3 YSM	At Least 3 YSM	Old EU	New EU	All	Under 3 YSM	At Least 3 YSM	Old EU	New EU
2002	14934	8189	16958	14934		7107	2328	6535	7107	
2003	14764	7592	16860	14764		7482	2508	6933	7482	
2004	13576	5558	16238	14438	8886	7518	2253	7576	7624	6944
2005	13651	5679	16939	14610	9125	7290	2147	7390	7505	6275
2006	13385	5967	17443	14546	8914	7373	2012	8200	7896	5362
2007	13388	6457	18152	14895	9306	7649	2100	8625	8630	4990
2008	13042	7559	17775	14902	9198	7390	2235	8716	8836	4400
2009	12565	7386	17190	14469	9068	7732	2987	8988	9175	5082
2010	12222	6566	16817	14350	8750	8254	3216	9326	9920	5536
2011	12058	5916	16396	14349	8751	7938	2873	8819	9580	5569
2012	12079	6020	16402	14537	8880	6436	2448	7202	7451	5114
2013	12378	6346	16708	15024	9254	6698	2499	7523	7722	5489
2002-13	13170	6603	16990	14651	9013	7406	2467	7986	8244	5476