Appendix for
Enduring the Great Recession: Economic Integration in the EU

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Contents

A1 Regional and Country Variables **A-2**
A1.1 Gross Value Added Data A-2
A1.2 The 2008-2009 Shock Variable A-3
A1.3 Specialization Calculations A-6
A1.4 Eurozone Membership A-7
A1.5 Basic Controls A-7
A1.6 Fiscal Controls A-7
A1.7 "Bailout" Controls A-8
A1.8 Political Controls A-8
A1.9 Summary Statistics and Temporal Trends A-9

A2 Supplemental Results **A-14**
A2.1 Regional Deviation Analysis and Results A-14
A2.2 Miscellaneous Robustness Checks A-16
A2.3 Sectoral Specialization A-20

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A1 Regional and Country Variables

Appendix A1 provides details on all data used in our analysis.

A1.1 Gross Value Added Data

We obtain gross value added (GVA) data from Eurostat (ESA10) for the years 2000-2013 and fill-in missing years for Poland using its national database. Gross Value GVA is defined as the net result of output valued at basic prices less intermediate consumption valued at purchasers' prices. Values are reported in accordance with the European System of Accounts (ESA 2010).[1] All data is reported at the sector (1-digit NACE Rev. 2) and region (NUTS-2[2]) level, and converted to constant 2005 euros using the GDP price deflator (2005=100).[3]

Countries included: (no. of regions in parentheses), years included. Each country reports data on the following industries (unless specified): A, B-E (except manufacturing, C), C, F, G-I, G-J, J, K, K-N, L, M-N, O-Q, O-U, R-U, Total.

- Austria (9), 2000-2013
- Belgium (11), 2003-2013
- Bulgaria (6), 2000-2013
- Czech Republic (8), 2000-2013
- Denmark (5), 2000-2013
- Finland (5), 2000-2013. In 2010, Eurostat changed Finland's NUTS-2 codes for the following regions: FI13 + FI1A→FI1D; FI18 (part)→FI1B (part); FI18 (part)→FI1C (part).
- France (22), 2000-2013. In 2013, Eurostat changed France's NUTS-2 codes for FR9_→FRA_.
- Germany (38), 2000-2013. In 2010, Eurostat changed Germany's NUTS-2 codes to the following: DE41 + DE42 → DE40 and established two new regions DED4 and DED5 by merging several partial NUTS-3 regions (e.g., DED1, DED2, DED3).
- Greece (13), 2000-2013. In 2010, Eurostat changed Greece's NUTS-2 codes to the following: GR_→EL_. In 2013, Eurostat changed Greece's NUTS-2 codes to the following: EL11→EL51; EL12→EL52; EL13→EL53; EL14→EL61; EL21→EL54; EL22→EL62; EL23→EL63; EL24→EL64; EL25→EL65.
- Hungary (7), 2000-2014.
- Italy (21), 2000-2013. In 2010, Eurostat changed Italy's NUTS 2 codes to the following: ITD_→ITH_; ITE_→ITI_.

[1] Source: Eurostat annual national accounts (`nama_10r_3gva`), `http://ec.europa.eu/eurostat/cache/metadata/en/nama_10_esms.htm`.

[2] Unless otherwise specified, the NUTS version used is NUTS 2013, in accords with Commission Regulation (EU) No. 1319/2013.

[3] Price index (implicit deflator), 2005=100, national currency. Source: Eurostat annual national accounts (`nama_10_gdp`), `http://ec.europa.eu/eurostat/cache/metadata/en/nama10_esms.htm`.

- Netherlands (12), 2000-2013.
- Poland (16), 2000-2013 (from national database[4]). Gross value added at current prices (millions of zloty; no base year) reported at the region level (NUTS-2) and by sector (PKD 2007; NACE Rev. 2).[5] Data is converted into euros using the official exchange rates from Eurostat.
- Portugal (7), 2000-2013.
- Romania (8), 2000-2013.
- Slovakia (4), 2000-2013.
- Spain (19), 2000-2013.
- Sweden (8), 2000-2013. Note that in 2005, the region of Smaland (SE21) in southern Sweden was hit by Cyclone Gudrun causing severe financial damage to the economy, especially the forest industry (A). The value added for this year was -184.76 million euros (the estimated damage to just the forestry industry was 2.4 billion euros (European Forest Institute, 2012)). This negative value affects our ability to transform our data and thus we are replacing the negative value with 0.[6]
- United Kingdom (37), 2000-2013, missing sectors G-J, K-N, O-U. Missing sectors are calculated by aggregating the available data—e.g., G-J = G-I + J. In 2010, Eurostat changed the UK's NUTS-2 codes to the following: UKD2→UKD6; UKD5→UKD7. In 2013, Eurostat changed the UK's NUTS-2 codes to the following: UKI1→UKI3; UKI2 (part)→UKI4 (part); UKI2 (part)→UKI5 (part); UKI2 (part)→UKI6 (part); UKI2 (part)→UKI7 (part).

Countries/regions excluded: (no. of regions in parentheses)

- Countries excluded from analysis due to insufficient number of regions: Croatia (2), Cyprus (1), Estonia (1), Ireland (2), Latvia (1), Lithuania (1), Luxembourg (1), Malta (1), Slovenia (2).
- Regions excluded from the analysis due to missing or insufficient data:
  - France: Guadalupe (FRA1), Martinique (FRA2), Guyane (FRA3), La Reunion (FRA4), Mayotte (FRA5)
  - Spain (autonomous islands): Ciudad Autonoma de Ceuta (ES63), Ciudad Autonoma de Melilla (ES64)

A1.2 The 2008-2009 Shock Variable

We include two variables in our data set that measure the severity of the 2008-2009 global financial crisis. The first is a binary dummy variable that equals one during the year 2008 and

[4]Source: "Local Data Bank" from the Central Statistical Office of Poland, `https://bdl.stat.gov.pl/BDL/dane/podgrup/tablica`.

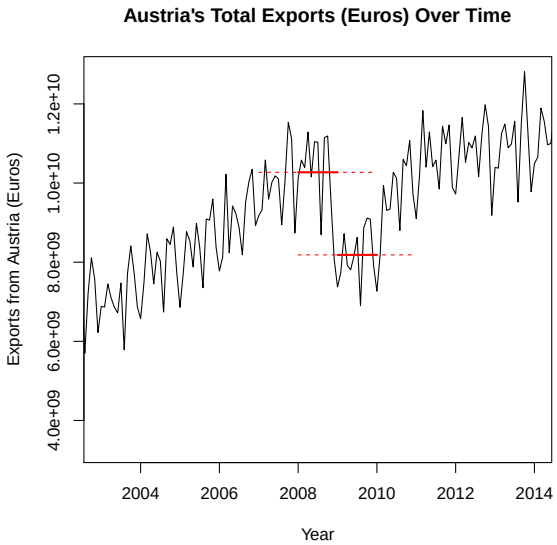
[5]PKD is Poland's national statistical classification of activities, which is comparable to NACE Rev. 2.

[6]Source: European Forest Institute. "Have Swedish forests recovered from the storm Gudrun?" *ScienceDaily*. ScienceDaily, 24 August 2012, `www.sciencedaily.com/releases/2012/08/120824082423.htm`.

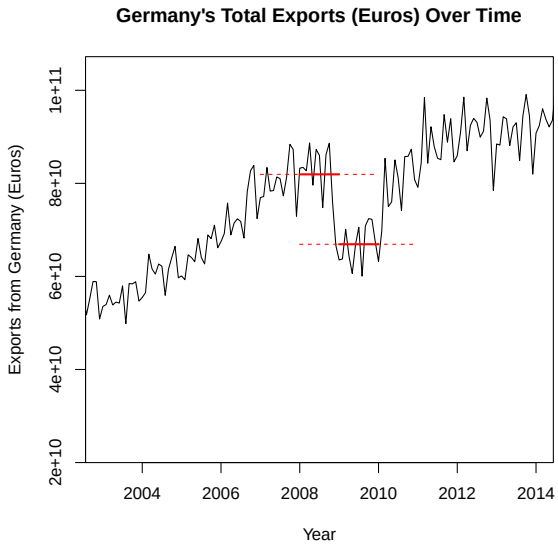
zero otherwise. The second is a continuous measure that measures the difference between a region's gross value added and the long-term trend of that region's gross value added, which we obtain using the Hodrick-Prescott (HP) filter. In the paper we show that the economic contraction between 2008 and 2009 was unique to our sample period, 2000-2013. The decision to classify 2008 as the shock year is further validated by time trends in trade, which reveal a significant drop in demand. This is clearly seen in the export time-series figures for Austria, Germany, Sweden, and the United Kingdom below:

Figure A1: Total Exports (Euros) in Austria, Germany, Sweden, and the UK

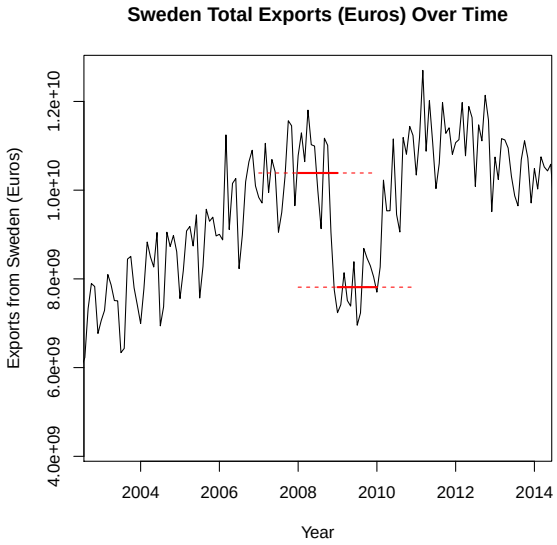
(a)



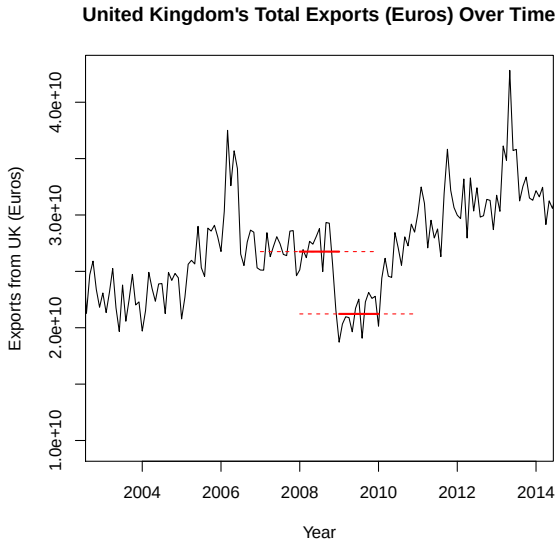
(b)



(c)



(d)



A1.3 Specialization Calculations

Absolute Gini Index: measures the inter-sectoral heterogeneity *within* regions:

$$Specialization_j = \frac{2\sum_{i=1}^{n} iy_i}{n\sum_{i=1}^{n} y_i} - \frac{n+1}{n}, \quad \text{where} \quad y_i = \frac{\text{GVA}_{ij}}{\sum_{i=1}^{n} \text{GVA}_{ij}}.$$

Relative Gini Index: measures the inter-sectoral heterogeneity *between* regions. A similar measure to the *absolute gini index* except here the y_i takes into account the average value added in sector i over the entire EU:

$$Specialization_j = \frac{2\sum_{i=1}^{n} iy_i}{n\sum_{i=1}^{n} y_i} - \frac{n+1}{n}, \quad \text{where} \quad y_i = \frac{\frac{\text{GVA}_{ij}}{\sum_{i=1}^{n} \text{GVA}_{ij}}}{\frac{\text{GVA}_{i,EU}}{\text{GVA}_{EU}}}.$$

Krugman Index: measures the share of gross value added at the region level needed to relocate in order to achieve a sector structure equivalent to the average of the entire EU:

$$Krugman_j = \sum_{i=1}^{n} |y_i - \bar{y}_i|$$

Hirschman-Herfindahl Index: measures the level of economic diversity within a region. This is the standard measure for market concentration used in industrial economics. We use a value of $\alpha = 2$, which gives more weight to smaller sectors in a region:

$$HHI_j = \sum_{i=1}^{n} y_i^{\alpha}$$

Sector Share: measures the share in value added of the top three sectors in a region over the total value added.

$$Sector\ Share_j = \frac{\sum_{i=1}^{n=3} \text{GVA}_{ij}}{\sum_{i=1}^{n} \text{GVA}_{ij}}, \quad \text{where} \quad i = 1,\ldots,n, \text{ the sectors ranked in descending order}$$

Table A1: Cross-Correlation of Specialization Measures

Variables	Abs. Gini	Rel. Gini	Krugman	HHI	Sector Share
Absolute Gini	1.000				
Relative Gini	-0.172	1.000			
Krugman Index	0.952	-0.291	1.000		
Hirschman-Herfindahl Index	0.957	-0.021	0.905	1.000	
Sector Share Index	0.962	-0.163	0.950	0.916	1.000

A1.4 Eurozone Membership

We assign a binary value to each country for the years in which they are members of the monetary union (Eurozone = 1), and zero otherwise. Below we list the countries and years in which the euro was adopted, through 2013:

1999: Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain

2001: Greece

2007: Slovenia

2008: Cyprus, Malta

2009: Slovakia

2011: Estonia

A1.5 Basic Controls

Population Density: the ratio between the annual average population and the land area of the NUTS-2 region (persons per km^2), 2000-2013. There are 282 missing values which are interpolated via linear interpolation using *population* as the independent variable. Data from Eurostat.

Productivity: Gross value added per employee (ages 20 to 64), by region, 2000-2013. Data from Eurostat.

Intra-EU Exports: Exports of total goods to other EU member countries (29) as a share of national GDP, by country, 2000-2013. Data from Eurostat.

A1.6 Fiscal Controls

Core Government Spending: The amount spent by the federal government net of interest and transfer payments. This separates automatic and discretionary acyclical spending, such

as unemployment benefits and large capital transfers used to bail out banks. Calculated using the following variables from Eurostat:

$$\texttt{gov_core} = \texttt{TE - (D41PAY + D62_D632PAY + D7PAY + D9PAY)},$$

where the variables are defined as

`TE`: Total general government expenditure

`D41PAY`: Interest payments

`D62_632PAY`: Social benefits other than social transfers in kind and social transfers in kind purchased market production

`D7PAY`: Other current transfers

`D9PAY`: Capital transfers

Social Transfers: The amount spent by the federal government on social transfers in kind.

$$\texttt{gov_transfer} = \texttt{D62_632PAY + D7PAY}$$

Unemployment Benefits: Measured as the initial net rate of replacement—i.e., the proportion of net income in work that is maintained after job loss—for a household with one wage earner, two children, they are in the income group that is 100 per cent of the average wage, and their family does not qualify for cash housing assistance or social assistance "top ups". Years: 2001-2013. Source: OECD, Tax-Benefit Models, `http://www.oecd.org/els/soc/benefits-and-wages.htm`.

A1.7 "Bailout" Controls

Government Assistance to Banks: The amount spent by the federal government to bail out the banks. `D9PAY` from above.
EIB Loans: European Investment Bank (EIB)[7] Loans are measured as the amount of loans from the EIB reported by the recipient country receiving the loan, 2000-2013. We also report this variable by sector to be used in the sectoral analysis. Source: EIB, `http://www.eib.org/about/index.htm`.

A1.8 Political Controls

Electoral System: The electoral system is categorized as proportional representation, majoritarian, or mixed. Source: Database of Political Institutions (Keefer, 2012).

[7]The EIB is the largest multilateral borrower and lender by volume in the European Union. The European Economic Recovery Program (EERP) required the EIB to increase its annual interventions by approximately €15 billion for 2009 and 2010.

District Magnitude: The district magnitude is the number of representatives elected in a district, a key factor influencing the proportionality in an elector system. We use the value for the year 2008. Source: Bormann and Golder (2013), with author updates for Germany and Hungary.

Government Party Orientation: Party orientation of government (`execrlc`) from the Database of Political Institutions. The variable is coded by Keefer (2012) using the following criteria:

- Right: parties that are defined as conservative, Christian democratic, or right-wing.
- Center: parties that are defined as centrist or when party position can best be described as centrist (e.g. party advocates strengthening private enterprise in a social-liberal context). Not described as centrist if competing factions "average out" to a centrist position (e.g. a party of "right-wing Muslims and Beijing-oriented Marxists")
- Left: parties that are defined as communist, socialist, social democratic, or left-wing.

A1.9 Summary Statistics and Temporal Trends

Table A2: Summary Statistics of Variables

Continuous Variables	Mean	St. Dev.	Minimum	Maximum
NUTS-2 Region, Year				
ΔGVA*	0.9	5.6	−26.9	28.2
Specialization	0.377	0.066	0.146	0.660
Population Density (per km^2)	298	661	3.3	7248†
Productivity (€10,000 per employee)	4.71	2.15	0.46	15.1
Country, Year				
Exports (to EU28, % GDP)	25.8	18.5	2.13	94.4
Unemployment Benefits (% replacement)	0.600	0.142	0.250	0.890
Core Government Spending (% GDP)	24.7	5.76	9.77	45.4
Social Transfers (% GDP)	25.5	5.72	4.58	43.6
Govt. Assistance to Banks (% GDP)	1.54	1.37	0.10	23.6
EIB Loans (% GDP)	0.570	0.512	0.003	5.99
District Magnitude	21.6	34.9	1.00	150.00

Categorical Variables		Observ.
Country		
Electoral System	Proportional	20
	Majoritarian°	3
	Mixed	4
Country, Year		
Government Orientation	Right	115
	Center	51
	Left	118

Note: *Change in gross value added (GVA) is measured as the one-year difference in logged units which approximates percentage change. In all regressions, we use 0.01 to denote 1%.

In the main manuscript we note that the more deeply integrated countries of the EU have more specialized regions, on average, than those countries with shallower integration. We can measure the depth of integration in a couple ways. First, there are *core* members of the EU – states which joined earlier in the EU's lifespan, before the major 1995 enlargement – and *peripheral* members which joined in 1995 or in subsequent expansions. The former are more deeply integrated into the EU than the latter group, as their economies have experienced more years to adapt to the single market. Second, there are deeply-integrated Eurozone members and states that remain outside the monetary union with somewhat shallower integration.

Indeed, this bears out clearly in the data. We calculate simple averages of specialization, measured by the Gini index, for regions in each category of countries. Core states are more specialized, on average, than peripheral states. Eurozone states have more specialized regions, on average, than non-EMU states. The differences in means are statistically significant at conventional levels according to t-tests. Table A3 summarizes those averages.

Table A3: Average Regional Specialization by Country's Depth of Integration

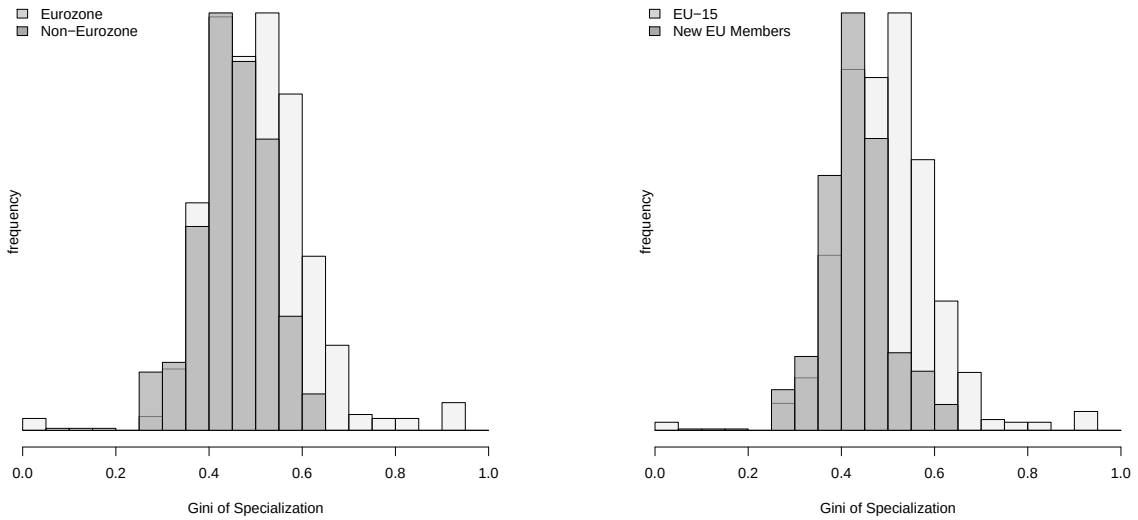
	Mean Specialization		
	Deep Integration	*Shallow Integration*	*Expectation Confirmed?*
Measure of Depth			
Eurozone v. Non-Eurozone	0.384	0.364	Yes
Core v. Periphery	0.390	0.342	Yes

Table A3 categorizes countries as follows. Core countries are Belgium, Denmark, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, and the UK. Peripheral countries are Austria, Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, Finland, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, Slovenia and Sweden. Eurozone members and non-members are listed above. The Eurozone calculations account for the year a state joined the Eurozone. Table A3 is almost exactly the same if we limit our sample to the nineteen countries analyzed in the main manuscript. We also calculated weighted averages accounting for the number of NUTS-2 regions in a country and found similar results.

Simple averages might obscure important information about the distributions. Therefore, we also plot the distribution of regional specialization in the years leading up to the financial crisis. Figure A2(a) shows histograms of regional specialization in the years prior to the financial crisis for Eurozone and non-Eurozone countries. Regional specialization is higher in the Eurozone. Likewise, we can split EU members into the core countries—the EU-15 that joined up through the 1995 expansion—to peripheral countries admitted later. A2(b) shows histograms of regional specialization for these two groups in the years leading up to the crisis. Regions in the EU-15 (core) are more specialized as well.

Figure A2: Deeper Integration Generates Higher Regional Specialization

(a) Eurozone v. Non-Eurozone (b) EU-15 v. Newer Members



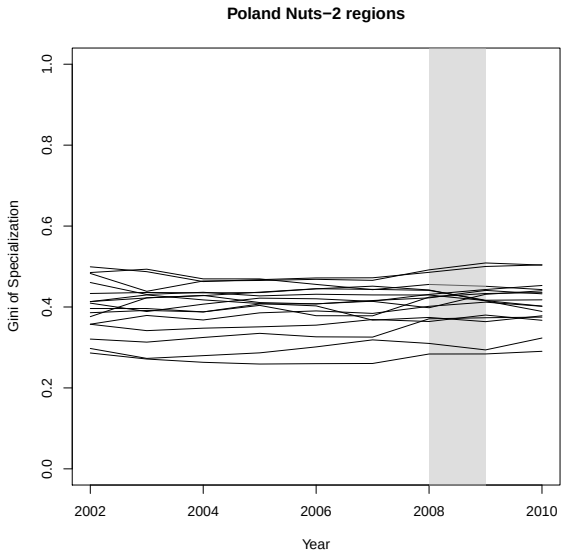
Note: Histograms of Gini of regional specialization in years 2002 to 2007.

Additionally, we assess the pre-crisis trends in GVA to ensure the most or less specialized regions are comparable. Specialization remains quite steady over the years in the study. Poland, for example, has the lowest mean specialization across its nuts-2 regions (0.397), followed by Hungary (0.413). Greece, by contrast, has the highest mean specialization across its nuts-2 regions (0.542), followed by Sweden (0.536).[8] This can be seen in Figure A3. Our research design implicitly assumes that absent the crisis, more specialized regions and the less specialized regions are comparable with respect to their economic trends. Their GVA follows similar trends in the pre-crisis period, as shown in Figure A4. The steadiness of specialization over time, combined with the parallel trends in GVA in more or less specialized locations reassures us that the baseline assumptions in our research design are satisfied.

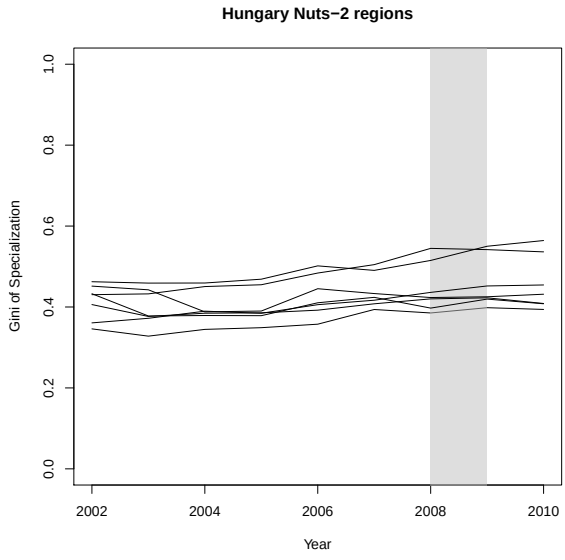
[8]Lowest and highest values are for countries containing at least 4 nuts-2 regions and thus entering our regression analysis.

Figure A3: Specialization over Time for Nuts-2 Regions Steady Over Time

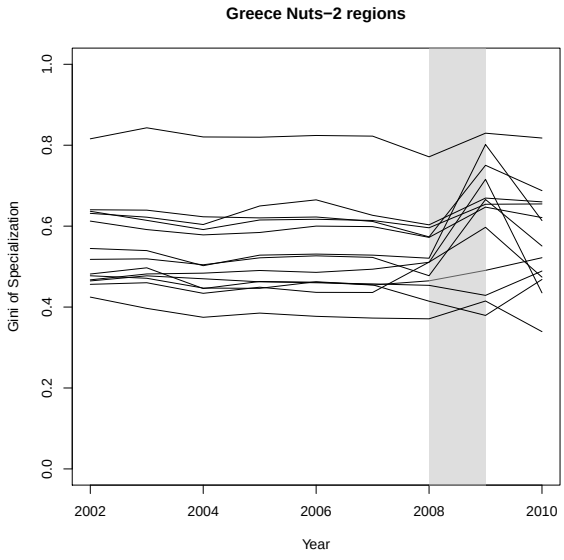
(a)



(b)



(c)



(d)

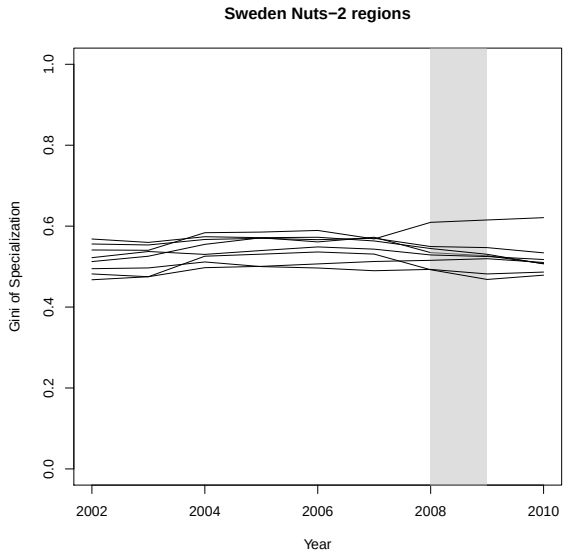
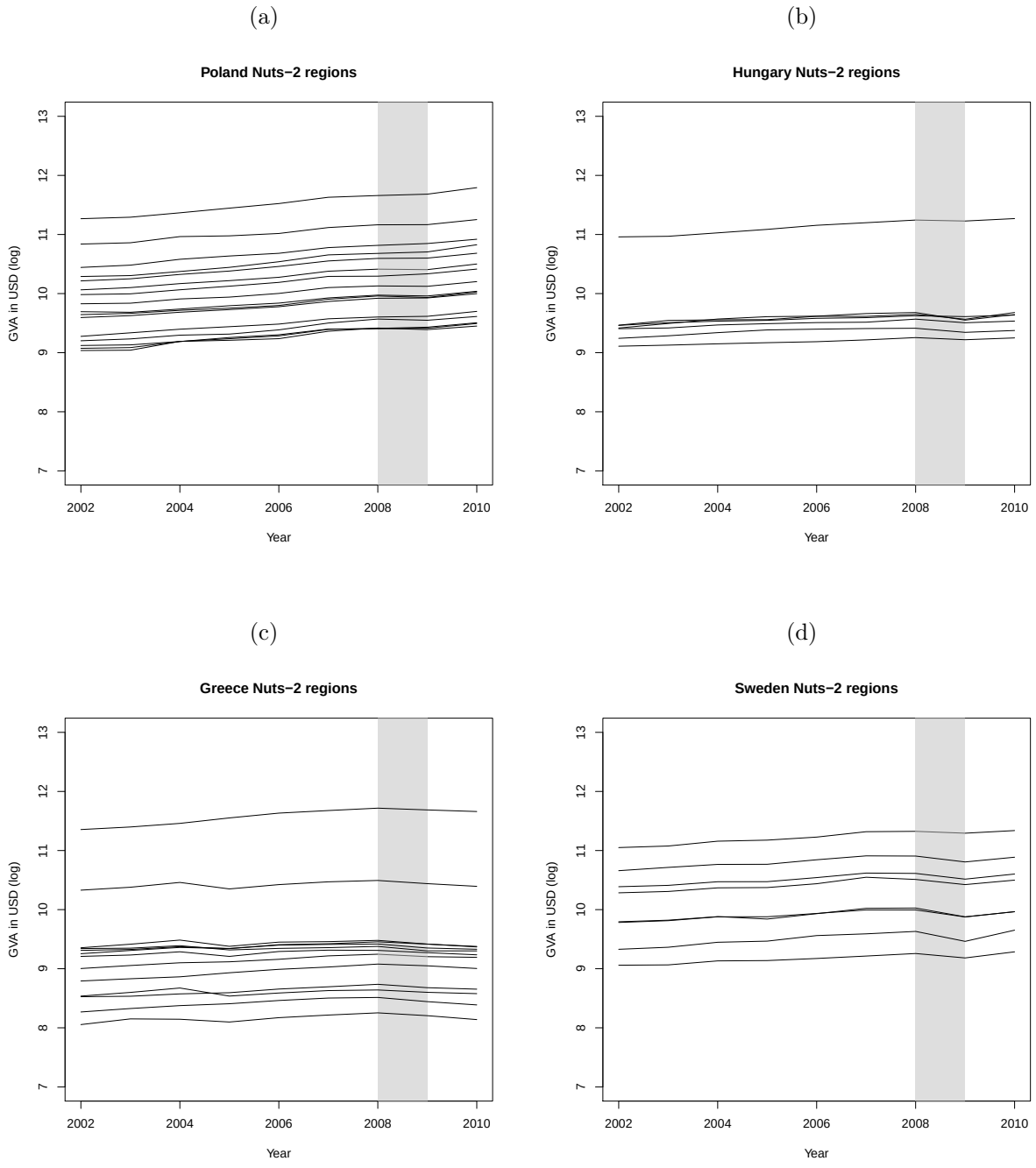


Figure A4: GVA over Time for Nuts-2 Regions Follow Similar Trends in Countries with Low Specialization (Poland, Hungary) and High Specialization (Greece, Sweden)



A2 Supplemental Results

A2.1 Regional Deviation Analysis and Results

In the main paper, we focused on the impact of specialization and the shock on changes in regional GDP. One might argue that asymmetry would manifest itself not in the *average* response of more specialized regions but instead in how much regions *deviated* from that average. An adverse shock might elicit no worse, or better, average response among specialized regions but more divergent responses, with some performing well and others badly; more diversified regions' response would be more uniform. To assess this possibility, we consider the extent to which NUTS-2 regions' performance deviated from EU-wide and own-country trends.

We first define the DEVIATION in regional performance as the absolute value of the difference between a region's growth rate in a specific year and that of the average EU region in the same year:

$$\text{DEVIATION in GDP}_{j,t \text{ to } t+1} = |\Delta \log GDP_{j,t \text{ to } t+1} - \Delta \log GDP_{EU,t \text{ to } t+1}| \qquad \text{(A1)}$$

Similarly, we compare each region's growth rate to the average rate of all regions in its own country, again taking the absolute value of the difference. The calculation is almost the same as the Gini calculation in the main text except that the reference group is the country—e.g., Central London's deviation from UK-wide growth rate.

Using both measures of regional deviation, we implement a series of regression models. Table A4 presents the results. The first two columns use the full sample of countries and random effects, comparing regional GDP growth to EU-wide GDP growth. Relative to EU performance, specialized regions tended on average to endure a less severe economic contraction. The positive coefficient on SPECIALIZATION indicates that specialized regions differed more from EU-wide trends in non-shock years. The interaction with SHOCK is not statistically significant: specialized regions deviated neither more nor less from EU-wide GDP growth during the crisis. Economic integration, on the other hand, as measured by the home country's reliance on exports to other member states, is associated with greater convergence to EU-wide trends: the more integrated regions are with countries other than their own, the more their economies rise and fall together.

In Table A4(3-4), we again restrict the sample of countries to only those with at least four NUTS-2 regions. We compare regions' change in GDP to the average trend within their own countries. Because our latter dependent variable accounts for country averages, we omit from these models country effects. Again, the more specialized a region, the more it deviated even in non-crisis years from the central tendency within its own country; but the significant positive coefficients on the interaction terms show that, during the crisis, the specialized regions deviated even more.

Table A4: Linear Regression of Regional Deviation in GVA on Asymmetric Shock

	Regional Deviation in $\Delta\text{GVA}^{\dagger}_{t \text{ to } t+1}$			
	Relative to EU		Relative to Country	
	(1)	(2)	(3)	(4)
Specialization×Shock	−0.017	−0.032	0.046***	0.037**
	(0.027)	(0.029)	(0.013)	(0.013)
Specialization	0.043***	0.060***	0.012**	0.013*
	(0.010)	(0.013)	(0.004)	(0.005)
Shock	0.028**	0.038***	−0.012*	−0.009
	(0.011)	(0.011)	(0.005)	(0.005)
Eurozone	−0.016***	−0.011*	−0.004***	−0.003***
	(0.004)	(0.005)	(0.0005)	(0.001)
$\text{GVA}^{\dagger}_{t}$	−0.002**	−0.001	−0.003***	−0.004***
	(0.001)	(0.001)	(0.0003)	(0.0003)
Intra-EU Exports‡		−0.031***		−0.001
		(0.004)		(0.0004)
Productivity†		−0.002		−0.0004
		(0.003)		(0.001)
Population Density†		−0.001		0.00002
		(0.001)		(0.0003)
Core Govt. Spending‡		−0.029***		0.002
		(0.008)		(0.001)
Social Transfers‡		0.026***		−0.002
		(0.007)		(0.001)
Govt. Assistance to Banks‡		−0.008***		−0.0004
		(0.002)		(0.001)
EIB Loans‡		0.001		−0.003***
		(0.001)		(0.0004)
Constant	0.045***	−0.019	0.046***	0.035***
	(0.007)	(0.030)	(0.002)	(0.006)
Country effects?	Random	Random	No	No
Sample	Full	Full	Restricted	Restricted
Observations	3,450	3,186	3,308	3,089
Countries	27	27	19	19
Log Likelihood	7,231	6,665		
Adjusted R^2			0.103	0.118
Std. Dev. (Intercept)	0.026	0.052	–	–

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$. † Logged units. ‡ Share of GDP, logged units.

A2.2 Miscellaneous Robustness Checks

In this section we consider several additional robustness checks noted in the main manuscript. Specifically, we:

- End our sample in 2010, well-before the sovereign debt crisis,
- Use the *relative* Gini index in place of the *absolute* Gini index,
- Control for the duration of EU membership, and
- Use the years 2008 *and* 2009 as the shock.
- Use country-level data and a simple linear regression.

Results are presented in Table A5. None of these robustness checks alter our findings.

In addition, we consider political control for electoral institutions and party ideology. Political controls are important because they could affect the capacity and motivations of governments to respond to asymmetric shocks. Whether the voting system is majoritarian or proportional is thought to impact the form of intervention. Electoral systems have long been understood to shape the allocation of limited government resources, especially under times of economic hardship (Lijphart, 1984; Rogowski, 1987; Rogowski and Kayser, 2002). Countries with proportional representation might direct more spending (or protection) to distressed areas, thus mitigating regional disparities. Majoritarian systems, by contrast, target regions with the greatest political leverage ("swing" districts), potentially exaggerating inter-regional disparities in the wake of any downturn. We control for the degree of proportionality in districts as well. Finally, we account for whether the incumbent government leans to the left, center, or right (Beck et al., 2001). It is reasonable to suppose that left- and center-leaning governments would intervene more strongly than conservative ones.

The results of the political controls robustness checks are in Table A6. To assess the political factors, we consider two subsets of data: (1) the shock year 2008 and the ensuing change in GVA and (2) the post-shock years, 2009 to 2012. Those subsets are shown in Models 1 to 4 and 5 to 8 respectively. We find little evidence that a country's electoral system explains the economic performance of its regions in either period. Nor do we find an indication that in 2008, countries with left or center-leaning governments were any harder hit than right-leaning ones. We do find evidence that economic rebound in the years following the shock was weaker among left governments. Ideological orientation is not a significant factor in years preceding the financial crisis (results not shown).The inclusion of these political controls does not alter our main findings.

Finally, we consider the possibility that regional asymmetries matter little; that countries are the only salient unit of analysis. Table A7 shows the results of a simple linear regression where the unit of analysis is the country-year. The outcome variable is the one-year percentage change in national GDP. We measure specialization as the average of the regional Gini coefficients of specialization and shock remains the 2008 dummy variable. Control variables are measured at the national level. Models 1 and 2 examine all countries without and with country fixed effects, respectively. Model 3 looks just at the subset of countries containing four or more NUTS-2 regions to ensure comparability to our main analysis. Models 4, 5, and 6 include for control variables for economic factors thought to impact vulnerability to and responses to the shock. The correlations we find are largely consistent with our main analysis. It appears that the most specialized countries fared somewhat better in the wake of the crisis although the results differ depending on the control variables used.

Table A5: Robustness Tests – Regression of Change in Regional VA on Asymmetric Shock

	Percentage Change in Value Added$_{t \text{ to } t+1}$			
	(1)	(2)	(3)	(8)
Specialization×Shock	0.009	−0.033	0.005	0.064
	(0.068)	(0.065)	(0.066)	(0.046)
Specialization	0.019	0.010	0.019	0.010
	(0.016)	(0.009)	(0.014)	(0.017)
Shock	−0.112**	−0.091**	−0.105**	−0.067**
	(0.019)	(0.008)	(0.019)	(0.016)
Eurozone	−0.026**	−0.036**	−0.025**	−0.024**
	(0.008)	(0.007)	(0.007)	(0.007)
Years in EU†			−0.012**	
			(0.002)	
Constant	0.033**	0.038**	0.057**	0.029**
	(0.009)	(0.007)	(0.009)	(0.009)
Gini Index	Absolute	Relative	Absolute	Absolute
Shock Year(s)	2008	2008	2008	2008-09
Observations	2,794	3,308	3,308	3,308
Years:	2000-10	2000-12	2000-12	2000-12
Countries	19	19	19	19
Log Likelihood	4,625	5,483	5,520	4,996
Std. Dev.: (Intercept)	0.025	0.024	0.025	0.021
Std. Dev.: Spec.×Shock	0.186	0.244	0.181	0.061

Note: $^{**}p < 0.01$, $^{*}p < 0.05$. Models use country random intercepts and slopes on interaction term. † Log units.

Table A6: Regression of Change in Regional VA on Asymmetric Shock with Political Controls

	Percentage Change in Value Added$_{t \text{ to } t+1}$							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Specialization	0.037	0.037	0.037	0.049	0.012	0.013	0.014	0.011
	(0.028)	(0.028)	(0.028)	(0.030)	(0.019)	(0.019)	(0.019)	(0.020)
Majoritarian	−0.020				0.009			
	(0.048)				(0.015)			
Mixed	−0.056				−0.019			
	(0.037)				(0.011)			
Majoritarian (binary)		−0.007				0.013		
		(0.049)				(0.015)		
District Magnitude			0.0004				0.0001	
			(0.0003)				(0.0001)	
Center Party				0.008				−0.003
				(0.073)				(0.007)
Left Party				0.007				−0.014**
				(0.036)				(0.004)
Constant	−0.080**	−0.094**	−0.105**	−0.100**	−0.0003	−0.005	−0.006	0.002
	(0.020)	(0.019)	(0.020)	(0.028)	(0.009)	(0.009)	(0.009)	(0.009)
Observations	257	257	257	224	771	771	771	690
Years:	2008	2008	2008	2008	2009-12	2009-12	2009-12	2009-12
Countries	19	19	19	19	19	19	19	19
Log Likelihood	532	533	529	466	1,578	1,580	1,575	1,438
Std. Dev.: (Intercept)	0.063	0.066	0.064	0.067	0.019	0.020	0.020	0.020

Note: $^{**}p < 0.01$, $^{*}p < 0.05$. Models use country random intercepts. For electoral system controls, omitted category is proportionate representation. For party orientation, omitted category is Right. All models use absolute Gini for specialization.

Table A7: Regression of Change in Country GDP on Asymmetric Shock

	Percentage Change in Country GDP$_{t \text{ to } t+1}$					
	(1)	(2)	(3)	(4)	(5)	(6)
Specialization×Shock	−0.154	−0.062	0.564*	0.489**	0.394*	0.466**
	(0.660)	(0.665)	(0.255)	(0.173)	(0.171)	(0.173)
Specialization	0.590**	−0.682	−0.354	−0.262	0.208	−0.208
	(0.211)	(0.715)	(0.262)	(0.187)	(0.233)	(0.196)
Shock	−0.060	−0.094	−0.307**	−0.288**	−0.254**	−0.279***
	(0.246)	(0.248)	(0.094)	(0.064)	(0.064)	(0.065)
Eurozone	−0.019	−0.032	−0.063*	−0.035*	−0.041*	−0.034*
	(0.020)	(0.050)	(0.025)	(0.014)	(0.019)	(0.014)
Intra-EU Exports‡				−0.006	0.021	0.004
				(0.033)	(0.041)	(0.033)
Core Govt. Spending‡					−0.141	
					(0.121)	
Social Transfers‡					−0.175	
					(0.107)	
Unemployment Benefits					−0.091	
					(0.060)	
Govt. Assistance to Banks‡						−0.163
						(0.171)
EIB Loans‡						−0.569
						(0.406)
Constant	−0.173*	0.306	0.216*	0.156*	0.133	0.139
	(0.075)	(0.270)	(0.102)	(0.070)	(0.089)	(0.072)
Country F.E.	No	Yes	Yes	Yes	Yes	Yes
N	348	348	244	347	268	341
Countries	27	27	19	27	24	26
R^2	0.055	0.119	0.383	0.418	0.510	0.426

Note: *p<0.05; **p<0.01. Models use country-wide averages of specialization. ‡Share of GDP.

A2.3 Sectoral Specialization

Below we include maps of regional specialization in each sector, y_{ij}, averaged between the years 2000 and 2007. Sector A includes agriculture, forestry, and fishing. Sector B-E (B, D, E): mining, quarrying, electricity, gas, and water supply. Sector C: manufacturing. Sector F: construction. Sector G-J: transportation, hotels, publishing, audiovisual, telecommunications and in- formation technology. Sector K-N: finance, insurance and real estate; legal, management, architecture and engineering activities; scientific research; administrative services. Sector O-U: public administration and defense; education, health care and social work; arts, entertainment and recreation.

Figure A5: EU Map of Specialization in Sector A, by quantile

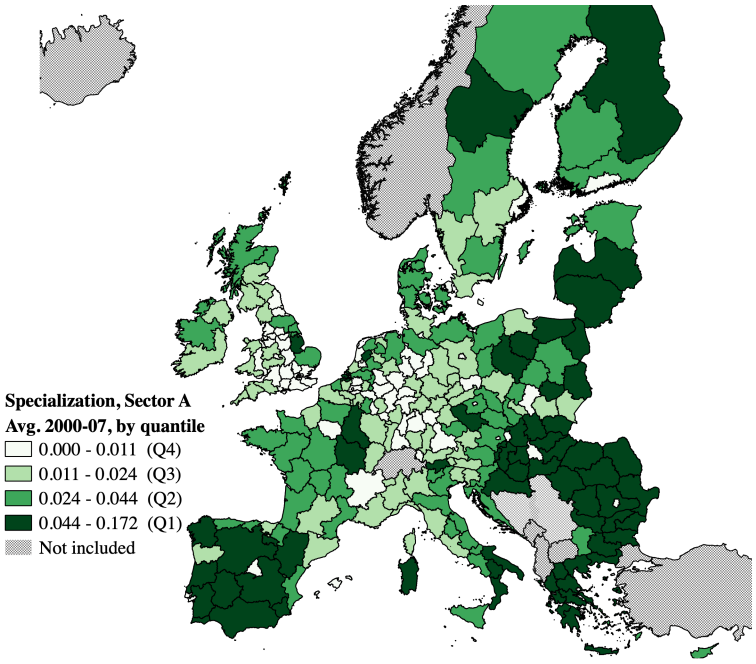


Figure A6: EU Map of Specialization in Sector B-E, by quantile

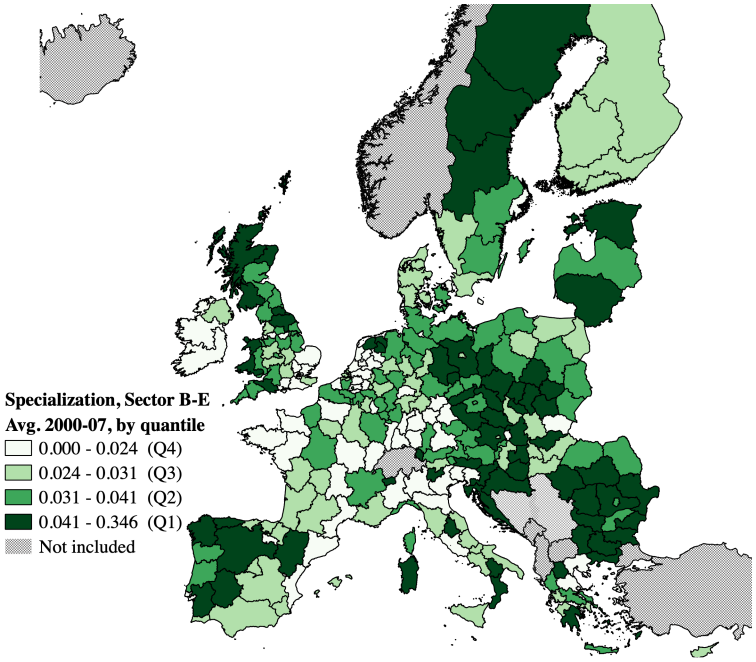


Figure A7: EU Map of Specialization in Sector C, by quantile

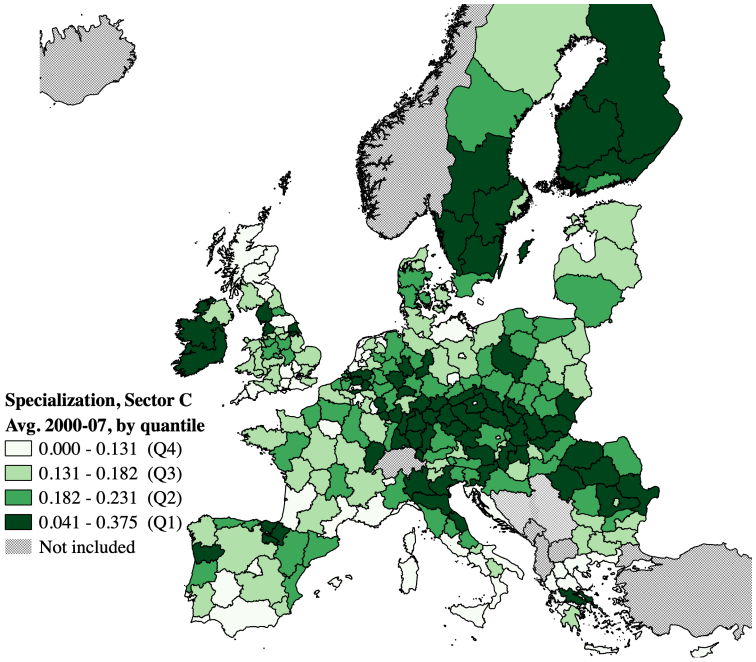


Figure A8: EU Map of Specialization in Sector F, by quantile

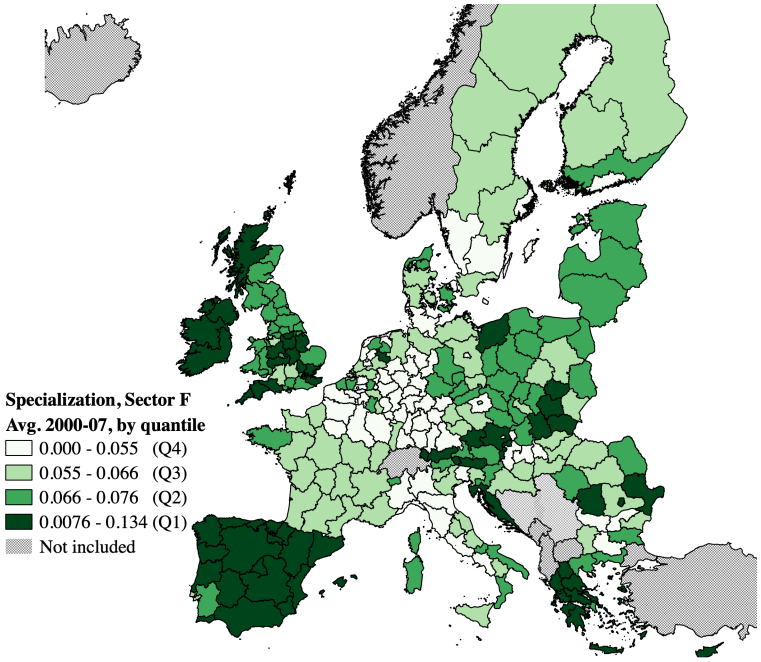


Figure A9: EU Map of Specialization in Sector G-J, by quantile

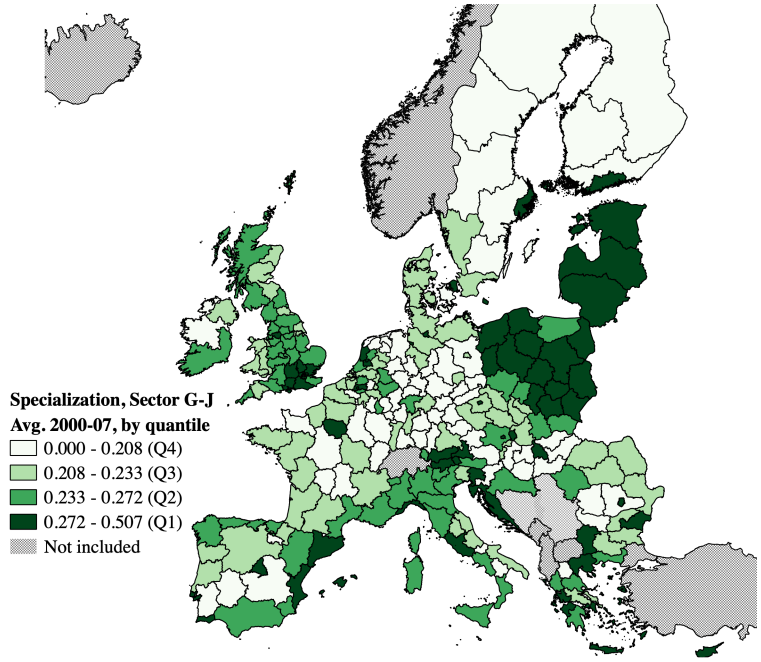


Figure A10: EU Map of Specialization in Sector K-N, by quantile

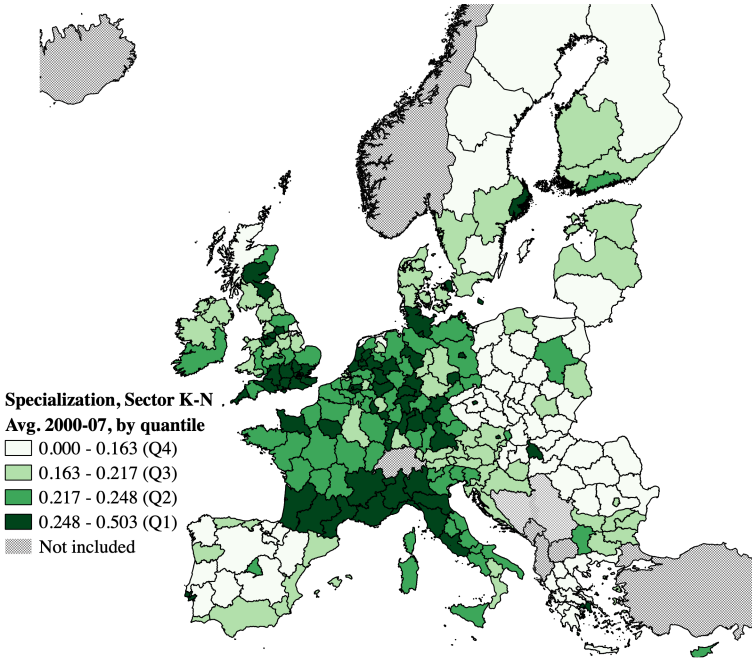
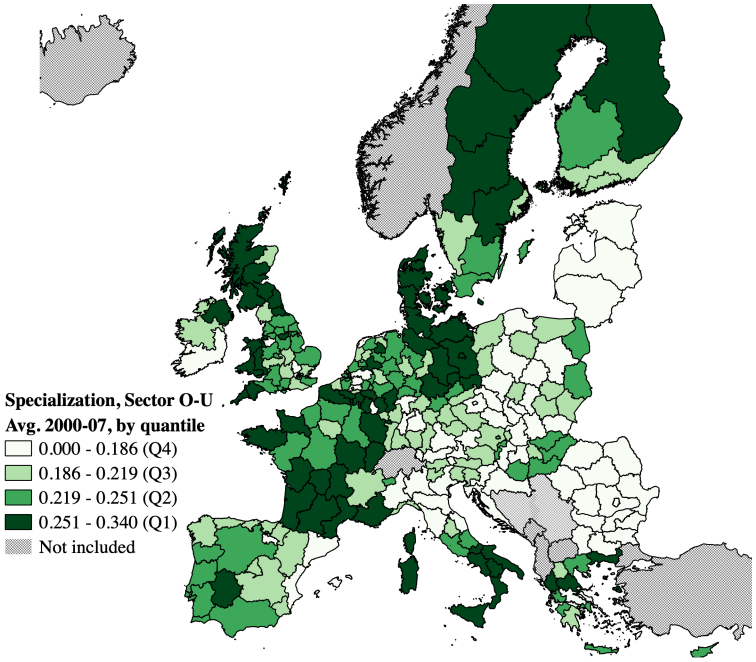


Figure A11: EU Map of Specialization in Sector O-U, by quantile



References

Beck, Thorsten, George Clarke, Alberto Groff, Philip Keefer, and Patrick Walsh. 2001. "New Tools in Comparative Political Economy: The Database of Political Institutions." *The World Bank Economic Review* 15(1): 165–176.

Bormann, Nils-Christian, and Matt Golder. 2013. "Democratic electoral systems around the world, 1946–2011." *Electoral Studies* 32(2): 360–369.

Lijphart, Arend. 1984. "Advances in the comparative study of electoral systems." *World Politics* 36(3): 424–436.

Rogowski, Ronald. 1987. "Trade and the variety of democratic institutions." *International organization* 41(02): 203–223.

Rogowski, Ronald, and Mark Andreas Kayser. 2002. "Majoritarian electoral systems and consumer power: price-level evidence from the OECD countries." *American Journal of Political Science* pp. 526–539.