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The heterogeneity of world trade collapses

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Abstract

This paper analyses drivers of imports during the major world trade collapses of the Great Depression (1930s; 34 countries) and the Great Recession (1930s; 173 countries). The analysis deals with the first year of these episodes and develops a small empirical model that shows a significant impact of the development of GDP, the share of manufacturing goods in total imports and the political system. The analysis reveals substantial heterogeneity with respect to regional importance of these drivers.

Keywords

Trade collapse; heterogeneity; resilience; political system; Great Depression; Great Recession

1 Introduction*

The study of world trade collapses has many merits. A better understanding of the causes and impact of collapsing world trade is relevant for science because these unique "real world experiments" provide a useful (yet extreme) testing ground for theories. Policy makers will be interested because they can learn to improve resilience against trade shocks, including designing global institutions that can prevent or reduce the impact of such shocks. Following van Bergeijk (2009) and Constantinescu et al. (2015), this paper focuses on import demand, in particular on the country-level import experience during the first year of a collapse of a world trade. We will follow the usual approach and define a world trade collapse as an event of negative annual real growth of international merchandise trade that occurs both in the aggregate for world trade and in almost all countries for their individual imports and/or exports.[1] World trade collapses are relatively unique historical phenomena: in the period 1880-2010 only about 12 per cent of the real annual growth rates of world trade was negative and the overall trend of global trade with the exception of the 1930s has been positive (van Bergeijk 2010, pp 6-12).

Economists quickly understood that the 2008/9 world trade collapse stood out as an exceptional event. Eichengreen and O'Rourke (2009) estimated that the world trade collapse in the first year of the 2008−2009 trade collapse

* A preliminary version of this paper was presented at the workshop Heterogeneous resilience: what can we learn from the regional impact of shocks?, The Hague, October 2014. Comments by Steven Brakman, Paul Hilhorst and participants are gratefully acknowledged.

[1] A trade collapse (negative growth for world trade) is to be distinguished from the recent trade slow-down (see e.g. World Bank 2015) that referes to a sitution where trade is growing slower than the historical trend and slower than GDP.

was even stronger than the decline that occurred in the similar phase of the Great Depression. Araúlo and Oliveira-Martins (2009) pointed out the exceptionally synchronized character of this downturn. When the 2008/9 trade collapse progressed it became clear that its evolution differed in the sense that (compared to the trade collapse in the 1930s) a relatively quick restoration to pre-crisis levels of world trade could be observed. This paper takes a closer look at the first phase of global trade collapse. We think that it is necessary to focus on the first year because the policy errors in the 1930s led to a long-lasting and destructive episode. This is true in terms of both its duration (Figure 1) and its decline (Figure 2). The trade destruction in the Great Depression, however, came in later years mainly as a result of protectionism and inappropriate monetary policies (Kindleberger 1973). Focussing on the first year of the wold trade collapses will tell us something about the initial 'policy free' impact.

FIGURE 1
Duration of peak to trough movement of real and nominal export and trade in the 1930s and 2008/9

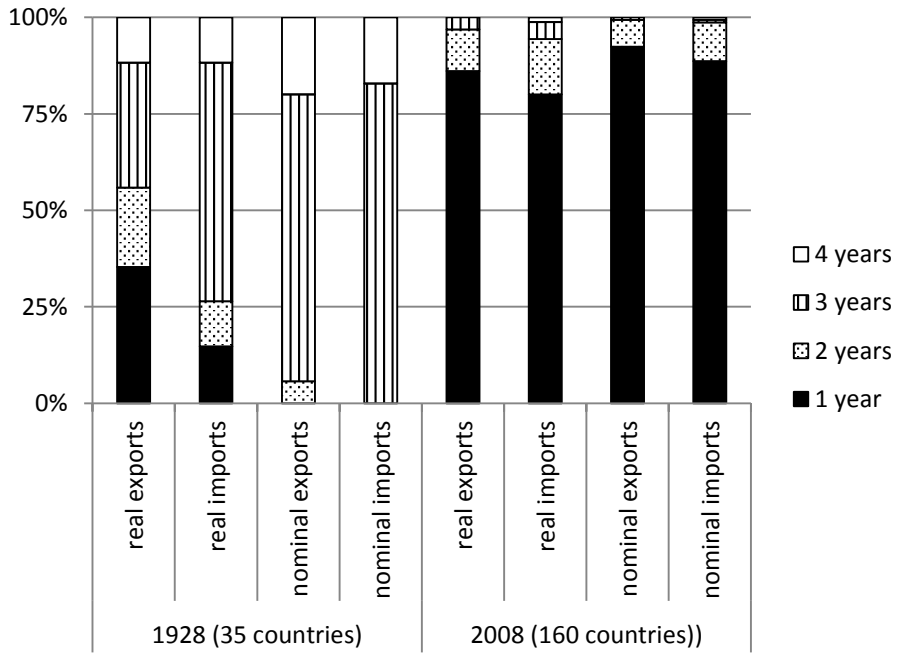
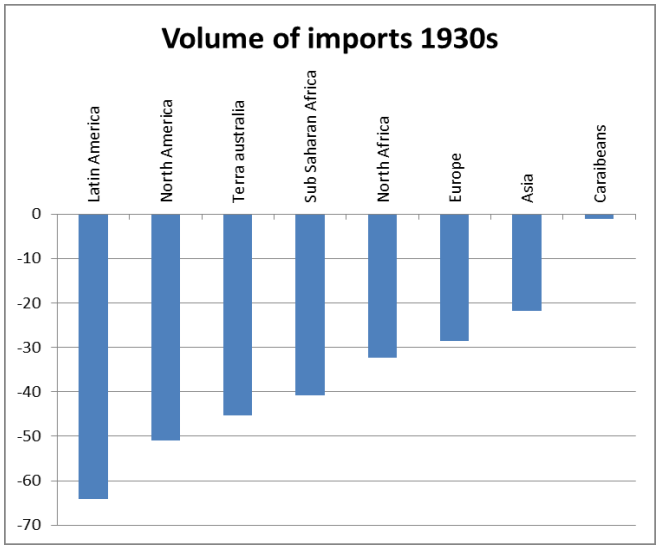
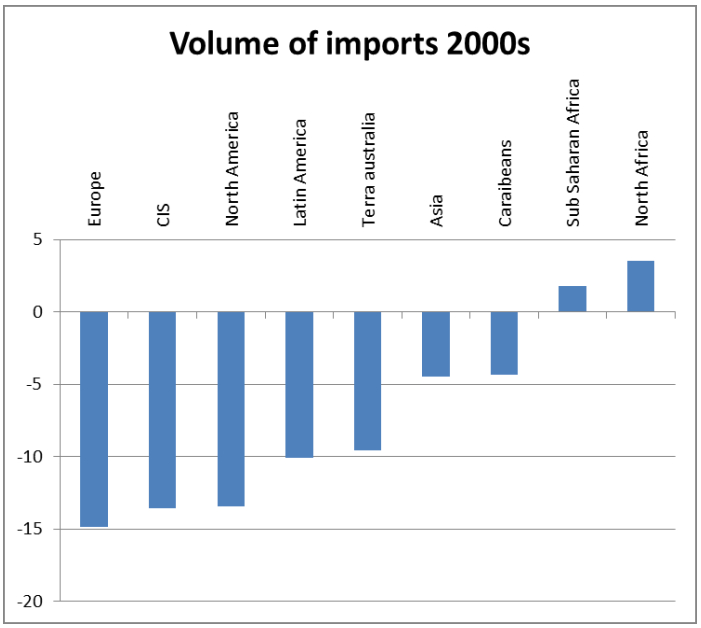


FIGURE 2
Real import decline (peak to trough decline in per cent)

a) 1930s



b) 2000s



The first contribution of this paper is that it provides a data set for the 1930s and 2000s that is used to develop a succinct empirical model that describes the first year of two world trade collapses reasonably well. This is relevant because the underlying analysis of the 2008/9 trade collapse is by and large based on

empirical analyses of post Second World War data only. There are a few studies that deal simultaneously with both the 1930s and 2000s world trade collapse, but these studies are either descriptive (Eichengreen and O'Rourke 2009 and updates), based on very preliminary data (Campbel et al 2009) or deal with only a handful of bilateral trade relations in the 1930s so that it is difficult to see how this can be generalized to the world trade collapse phenomenon in general (Eaton et al. 2011). The vast majority of the available studies do not attempt to cover the 1930s and essentially compare the usual fluctuations in international trade (as observed in the post second world war period) to the exceptional trade collapse in 2008-9 and derive stylized facts from the recent past only, even when the stated objective is to provide a 'historical perspective' (e.g. Freund 2009 and Hong, Lee and Tang 2009). The literature that deals with the trade collapse in the 1930s has also generally speaking not taken other episodes of declining global trade volumes into account. The literature in the past of course could not (yet) consider the trade collapse of 2008-9, but even so a detailed analysis of earlier episodes is not available (one obvious reason is that the collection of comparable data on international trade started in the 1910s and the multi-country sources available at the time of that research did not cover years prior to 1913; see Loveday 1921). Recent studies that include the 1930s also by choice appear to neglect the 2008-9 period (e.g. Jacks et al. 2011). The motivation for this paper is to analyse the two major world trade collapses simultaneously, rather than treating each of them as a unique event. While this is a clear contribution to the literature it also comes at a cost (as we will discuss in more detail later on)

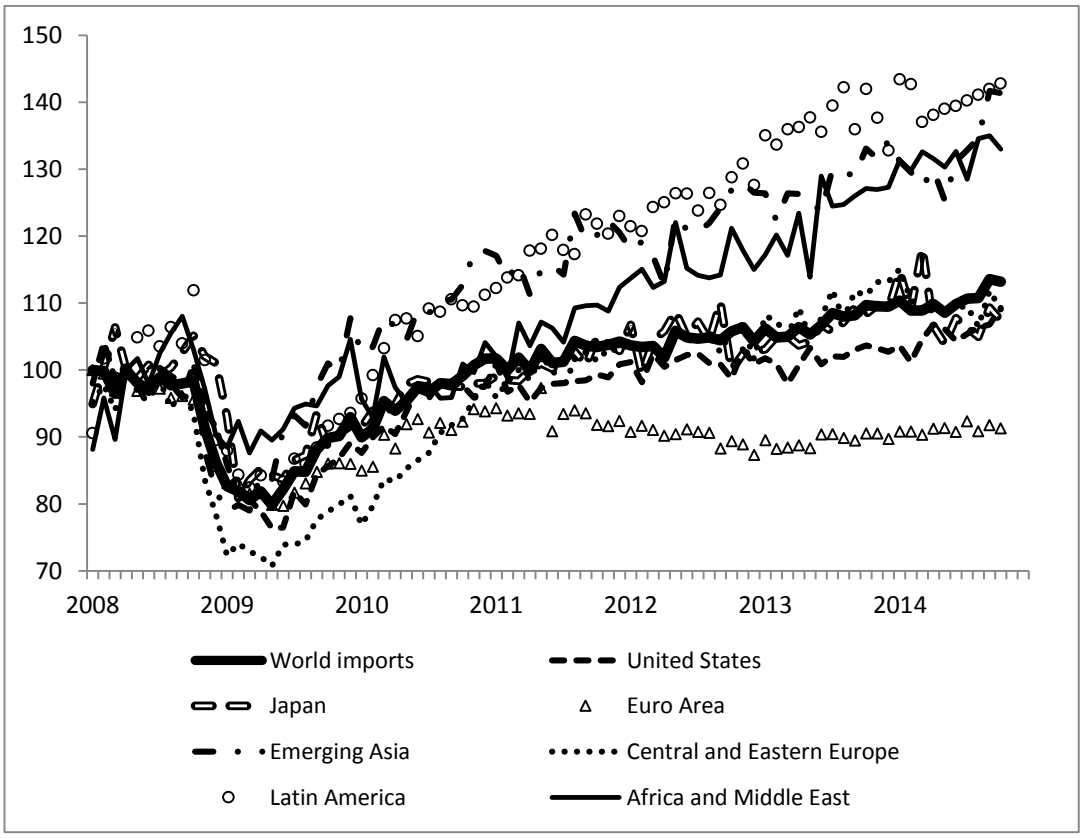
because it has an impact on methodology, in particular the level of analysis which can only be macro in nature due to the available data.[2]

The empirical analysis will explore the substantial amount of cross-country variations in the decline of nations' import volumes. Our procedure provides a sufficient number of observations as the data set covers 34 economies in the 1930s and 173 economies in the 2000s. For these 207 cases a set of relevant variables was identified for which reliable and comparable data could be collected.[3] Since we want to cover two periods in time that are very distinct, we are limited in our choice of comparable data. We relate the development of individual countries to three variables: the development of demand (the movement in their GDP), the share of manufactures in their imports and the political system. The second contribution of this paper is thus that we analyse heterogeneity induced by region and country specific drivers of the two major world trade collapses.

Indeed, one of the eye-catching aspects of the world collapses is the quite different impact on individual countries (Tanaka 2009, Levchenko et al. 2010). At the aggregate level the most recent world trade collapse that reduced real global trade by some twenty per cent in only a few months appears to have been a short term phenomenon: by November 2011 real world imports had reached the April 2008 peak level again. This general picture clearly hides substantial heterogeneity, as illustrated in Figure 3. The trade recovery of Latin America and Emerging Asia was swift and import volumes in these regions by

[2] See for examples of relevant analyses of the 2008/9 that use firm level data:
[3] Note, however, that the country coverage is not complete for all explanatory variables; in general we will work with up to 173 observations of which at least 23 pertain to the 1930s.

FIGURE 3
Real import development (monthly index numbers)



Source: CPB World Trade Monitor

October 2014 exceeded the previous peak by a good forty per cent contrasting the European Union and other advanced economies that remained about five to ten percent below the previous peak. The development of imports of the USA, Japan and Eastern Europe is characterized by stronger fluctuations and slower trade recovery to a level in October 2014 of about ten per cent in excess of their previous peak levels. Africa and the Middle East experienced both a smaller import collapse and a stronger trade recovery exceeding the previous peak by about thirty per cent in October 2014.

2 Drivers of world trade collapse

It is important to distinguish between on the one hand, the trigger of the world trade collapses and on the other hand, country or region specific factors that explain why the impact of that specific trigger has been heterogeneous.[4] It is generally agreed that the most important country specific driver of the collapse of imports is the reduction in Gross Domestic Product (representing macroeconomic demand). Typically, the change in trade is expected to be a multiple of the change in GDP (Baldwin 2009, Freund 2009, WTO 2009). An important country specific determinant of this multiplier is the composition effect of international imports that is reflected by the different shares of manufacturing in trade and production. In addition to these two factors recent studies have linked the trade collapses to uncertainty (Grossman and Meissner 2010, van Bergeijk 2010, Bloom 2014, Novy and Tailor 2014). It is not straight-forward to analyse uncertainty in the context of the two world trade collapses. In earlier and related literatures, the relationship between trade and uncertainty has been modelled as a tax on trade (Anderson and Marcouiller 2002) or as quantitative uncertainty (Bhagwati and Srinivasan, 1976, van Marrewijk 1992). Both approaches have clear merits but are difficult to operationalize in the context of the two events that we study. We therefore will follow a somewhat different approach and assume that country specific characteristics determine

[4] Many factors have been suggested as triggers, including the negative demand shock, a rise in protectionism, a lack of trade finance and an increase in uncertainty (Auboin 2009, Baldwin 2009, WTO 2009, van Bergeijk 2010). The evidence for protectionism and lacking trade finance as causes for the trade collapse is weak (Bénassy-Quéré et al. 2009, p. 10, Estevadoreal 2003, Freund 2009, Baldwin and Evenett 2009, Estevadeordal et al. 2003, Eichengreen and Irwin 2009, Niculcea et al 2011). Likewise, the fragmentation of production does not seem to have played a great role in the first phase of the 2000s trade collapse (Boz et al. 2014, van Bergeijk, 2013).

the differential impact of a global trade uncertainty shock, be it in the Great Depression or the Great Recession. This is the motivation to take a closer look at the institutional country specific context which we will operationalize by the political system. This choice fits well into the approach followed by Van Marrewijk and van Bergeijk (1990 and 1993) and Di Malo and Valente (2013). Van Marrewijk and van Bergeijk (1990 and 1993) develop a comparative static model to analyse the impact of decision-making under uncertainty. They point out a coordination failure in decentralized decision-making that leads decentralized economies ceteris paribus too trade more than centralized economies. Di Malo and Valente (2013) extend the analysis of this coordination failure in a dynamic model with comparable results. As decentralized economies will ceteris paribus trade more, a decentralized economy will experience a stronger reduction of trade during a collapse. This effect is different from the developing literature on the impact of institutions on comparative advantage (see for a review Nunnand and Treflert, 2014) that argues that institutions can help to shape comparative advantage. The van Marrewijk - van Bergeijk - Di Malo - Valente argument is that the extent of decentralization in decision making determines the extent to which a country trades internationally; it is not about factors that shape comparative advantage but about the extent to which a country actually uses its comparative advantage to trade. This relationship between trade level and political institutions is also supported by other approaches. Democratic countries tend to have more liberal trade policies (Milner and Kubota (2005), which may reflect the voting power of labour in a democracy (O'Rourke 2006) but could possibly also reflect that 'trade is less threatening to individuals who have confidence in their country's political

institutions' (Mayda and Rodrik 2005, p. 1410). Moreover, several authors have pointed out that autocratic, centrally-planned economies, due to their centralized decision-making processes, will respond quicker and sharper to (potential) trade problems. Aidt and Gassebner (2007) develop an argument in which the possibility of a dictatorial ruler to extract rents by imposing trade distortions is the driving mechanism (and additionally they argue that control and monitoring of trade policies are less well developed in autocracies). Discussing the choice of instrumental variables in their study on the drivers behind the tariff escalation in the 1930s, Eichengreen and Irwin (2009, p. 26) point out that authoritarian political regimes can be expected to resort to restrictions of economic exchange.

In conclusion, the literature suggests three potentially relevant country specific drivers of import collapse that we can empirically test for the 1930s and 2000s: the change in GDP, the composition of imports and the political institutional system.

3 Measurement

As the purpose of this paper is to analyse two events that are far apart in time, special consideration needs to be given to the fact that the data need to be reasonable comparable over a period of eighty years. Moreover, some variables that may be relevant for the world trade collapse may not be available. An example is trade credit for which the series has been discontinued just a few years before the trade collapse in 2008 (Auboin 2009). It is also important to realize that measurement errors can be a serious problem in the present study. It is well known that many economic observations, in particular regarding the key variables of interest in the present study (volumes of imports and

production) are often measured imprecisely (Morgenstern 1950, Frederico and Tena 1991 and Van Bergeijk 1995). This is especially relevant because we use a blend of recent data and data from the 1930s that were collected with less advanced methods as compared to the recent data. As a practical way to reduce the extent of measurement error corruption we use aggregate trade data basically because this reduces misclassification by commodity and/or country (compare Eaton et al. 2011, Appendix A on their classification problems for the 1930s). Moreover, we use wherever possible sources that cover the full period or which have been constructed in the same 'tradition' of data collection and statistics production.[5]

3.1 Volume of imports[6]

Trade volume data for the 1930s are not readily available for all countries. Three data sources provide the necessary data for the annual volume of imports of individual countries. Our main source is a data set compiled by the UN Statistical Office (1962). The data set provides index numbers for the volume of trade, but not for all countries.[7] The UN's draft paper reports data on the volume of imports for: Australia (Table III), Austria (Table IV), Canada (Table VII), Chile

[5] An example is the League of Nation data on the manufacturing share (1931) that as discussed in section 3 are clearly related to the data in the UN (1962) draft paper that was published under the aegis of the UN division that is also responsible for the data source that we use for the manufacturing import share in 2008-09.

[6] These sources have also been used in the construction of Figures 1 and 2.

[7] It is also important to note that the official status of the data is unclear. An accompanying note states: This publication is only available as a draft paper and it is indicated that "The data contained in the present paper should be regarded as preliminary, it is requested that no use be made of them until final publication." Yet, the paper appears to be based on solid research and it is the best source for historical data available to us. Nevertheless this information is provided without assuming any responsibility for the accuracy of the data and only as a special service to interested users which can use this data under their own responsibility and according to their own judgment. Source: http://unstats.un.org/unsd/trade/imts/historical_data.htm, dated April 28, 2009.

(Table VIII), Denmark (Table IX), Finland (Table X), France (Table XI), Germany (Table XII), India (Table XIII), Italy (Table XIV), Japan (Table XV), the Netherlands (Table XVI), New Zealand (Table XVII), Norway (Table XVII), South Africa (Table XIX), Sweden (Table XX), Switzerland (Table XXI), the United Kingdom (Table XXII) and the United States (Table XXIII). The second data source for the 1930s is Maddison (1995, Tables A6 and A12, p. 87 and p. 90) who provides index numbers for real imports for Argentina, Brazil, China, Colombia, Formosa (Taiwan), Indonesia and Mexico. The third data source is Birnberg and Resnick (1975) that provide trade data on Ceylon (Sri Lanka) (Table A1), Chile (Table A6), Cuba (Table A11), Egypt (Table A 16), India (Table A21), Jamaica (Table A26), Nigeria (Table A31), Philippines (Table A36) and Thailand (Table A46). For the 2000s, we use the 2008/9 percent decrease of real imports of goods (published in the *IMF World Economic Outlook Database October 2014*). We analyse imports of goods rather than imports of goods and services because the data for the 1930s relate to goods. The implication is that the analysis does not deal with the developments of trade in services which are important flows for many countries in the 2000s.

3.2 Real GDP (per cent change and pre-crisis per capita level)

For the percent change of real GDP in 2008-09 we use the local currency constant price GDP growth rates published in the *IMF World Economic Outlook*

Database October 2014. For the 1930s we rely on Maddison's historical series.[8] This is the data set of Angus Maddison's *Statistics on World Population, GDP and Per Capita GDP, 1-2008 AD* and an update from Maddison 2006. This source is also known as "Maddison's historical series" and is available from the website of the Groningen Growth and Development Centre www.ggdc.net. This source is also used for the pre-crisis level of GDP *per capita* (in 1990 international Geary-Khamis dollars) in the 1930s and the 2000s. The clear benefit of this procedure is that we have a consistent indicator for the level of development. Maddison is the only available source for internationally comparable per capita income that covers the countries for which we were able to obtain the import volume indicators and for both periods. The level of *per capita* GDP is measured in the year before the start of the trade collapse in 1928 and 2008 respectively.[9]

3.3 Manufacturing import share

The manufacturing share is measured in the year before the start of the trade collapse, so in 1928 and 2008 and the shares are based on values reported in international sources.[10] For the inter bellum two sources are available based on the work of the statistical office of the League of Nations: the draft report by the UN Statistical Office (1962) that provides the value for manufactured goods

[8] For South Africa and Egypt I used the Barro-Ursúa Macroeconomic Data set available at http://scholar.harvard.edu/barro/publications/barro-ursua-macroeconomic-data.
[9] For Cuba and China no data are available for 1928 so here the 1929 data where used. Maddison does not provide GDP for South Africa in the inter bellum.
[10] For Cuba the year of observation is 1927, the last pre-crisis year for which a Group IV share has been published.

and the value of the total of merchandise imports for 21 countries[11] and League of Nations (1931, Table 95, pp. 168-170) that reports percentage shares of trade for "Group IV Manufactured Articles". The League of Nations (1931) covers 18 countries for which we have data on real import decline (see Section 2.1) and overlap with UN (1962) for 14 countries.[12] The statistical relationship between the two sources for the overlapping countries is highly significant and almost all variance is explained by a simple regression (which suggests that the sources differ by a constant factor related to a definitional or measurement issue): *Manufacturing share according to UN = 0.88*Group IV according to LoN + 9.2* R^2*=0.98, F=1074, N = 14*. Using this equation, four additional observations can be constructed for the manufacturing share of China, Cuba, Indonesia and Mexico so that for the 1930s data are available for potentially 25 countries. For Colombia and Formosa (Taiwan) none of the necessary data are available. The data for the manufacturing share of imports in the 2000s are straight-forward and measured as the share of the categories SITC 6, 7 and 8 in total imports (in per cent and for the year 2008) and derived from United Nations (2010).

3.4 Political variables

We use the Polity IV dataset describes the political system of the economy (Marshall 2011, see http://www.systemicpeace.org/polity/polity4.htm). It is noteworthy that some authors, e.g., Taylor and Wilson 2006, also use the Polity

[11] Argentina, Australia, Austria, Brazil, Canada, Chile, Denmark, Finland, France, Germany, India, Italy, Japan, the Netherlands, New Zealand, Norway, South Africa, Sweden, Switzerland, the United Kingdom and the United States.
[12] Austria, Chile, Denmark, France, Germany, Italy, Japan, the Netherlands, New Zealand, Norway, Sweden, Switzerland, the United Kingdom and the United States.

data as indicators for the quality of institutions. Polity IV contains operational indicators of institutionalized authority characteristics and annually codes nine democracy and autocracy sub-indicators. In order to test robustness we will also use a second data: the Vanhanen data set (Vanhanen, 2011, http://www.prio.org/Data/Governance/Vanhanens-index-of-democracy/) that contains data on political participation and democratization. We use his Index of democratization that is defined as the product of these underlying indicators. One problem with these datasets is that they do not provide scores for colonies. This may be especially relevant since India and Indonesia were colonies (of England and the Netherlands, respectively) in the 1930s and important trading nations. Following Easterley (2005, p. 13), we will also use the lowest democracy rating for the countries in our sample as an alternative for the regressions without colonies in order to provide a check on robustness.

3.5 Comparability between periods

For pre-crisis *per capita* GDP, population and the political variables the necessary data are available from one source so that the consistency and the comparability for these variables is guaranteed. In all other cases several sources had to be combined and although the sources measure the same economic concept and sensible procedures were followed to arrive at comparable data still a number of potential problems should be flagged because they may be relevant for the interpretation of the findings in the next sections. Import volume changes have been taken from four sources and while methodologies to derive the change in import volume may have changed over time the data for the 1930s are from

authoritative sources and appear quite comparable. The manufacturing share in imports was derived from three sources and although all sources are from the statistical office of the United Nations and its predecessor at the League of Nations procedures, definitions, data collection and coverage have changed. The shares reported in the two League of Nations sources, as discussed, differ by a constant factor and show a high correlation so that we are confident about the use of the League of Nation data, but the comparability with the data for 2008 can cause problems given that many revisions of product classification have occurred over the past 80 years. So while a lot of effort was put in collecting and/or constructing comparable data, it is still important to note that differences are likely and finding therefore need to be interpreted with caution. Therefore extensive robustness checking is necessary and this will be provided in the next section.

4. Empirical findings

The aim of this section is to build on the reviewed literature in the previous section and to develop a small, but robust empirical model for the two trade collapses. The choice for a small model is motivated by the limited number of observations and by the availability of data for both periods. Table 1 and 2 report key statistics and the correlation matrix, respectively.

Table 1

	Mean	Median	Minimum	Maximum	Standard deviation
Autocracy score	1.8	0.0	0	10	2.8
Democracy score	5.9	7.0	0	10	3.8
Real GDP growth	-0.3%	-0.6%	-17.7%	20.6%	5.5
GDPPC in 1000$	11.9	4.3	0.2	112.4	18.2
GDP share	0.0%	0.08%	0.00%	0.24%	0.03
Import share	0.9%	11.6%	0.0%	15.1%	2.0
Manufacturing share in imports	62.3%	64.1%	22.8%	89.8%	13.6
Population share	0.00%	0.16%	0.00%	0.27%	0.03
Vanhanen index	16.7	16.1	0	44.9	11.9
Real import growth	-6.8%	-9.6%	-47.7%	129.0%	17.9

Table 2 Correlation matrix

	DEMOC	GDPGR	GDPPC	GDPSHARE	IMP SHARE	MANUF IMP SHARE	POLITY	POP. SHARE	VANHANEN	IMP GR
AUTOC	-0.83	0.27	-0.06	-0.05	-0.09	-0.02	-0.94	0.17	-0.66	0.22
DEMOC		-0.35	0.32	0.15	0.22	-0.03	0.97	-0.11	0.81	-0.31
GDPGR			-0.24	-0.19	-0.28	0.02	-0.33	0.11	-0.33	0.46
GDPPC				0.16	0.20	0.30	0.22	-0.11	0.54	-0.23
GDPSHARE					0.86	-0.28	0.11	0.45	0.13	-0.11
IMPORTSHARE						-0.37	0.18	0.35	0.20	-0.17
MANUFIMPSHARE							-0.01	-0.20	0.08	-0.09
POLITY								-0.14	0.78	-0.28
POPULATIONSHARE									-0.12	0.02
VANHANEN										-0.27

4.1 General results

The first step is to estimate the core model and test if the model is able to describe the trade collapse data for the 1930s and 2000s. Table 3 reports the findings of the model with (line 1) and without (line 2) a shift dummy for the 1930s. The value of adj-R^2 (corrected for degrees of freedom) is a bit low, but acceptable for this kind of research that covers historic and contemporaneous data for a large number of countries. Line (3) additionally reports the regression

without outliers, i.e. more than 20% change in import volume. Line (4) reports the findings with regional fixed effects). Importantly, the coefficients of the variables of interests are significant at the 95% level and better, and confirm to a priori expectations. The dummy variable for the 1930s turns out to be insignificant.[13] All in all, the model performs satisfactorily.

Table 3 OLS estimates of the basic model for two trade collapses and alternative political indicators.

	N	GDP growth	Manu-facturing share	Democ-racy score	Dummy 1930s	Constant term	R^2	R^2 adj	F
(1)	142	1.2***	-0.2*	-0.8**	-2.1	8.3	0.25	0.22	11***
		(4.8)	(-2.0)	(-2.3)	(-0.6)	(0.2)			
(2)	142	1.3***	-0.1**	-0.8**		6.3	0.24	0.23	15***
		(4.8)	(-2.1)	(-2.3)		(1.2)			
(3)	117	0.8***	-0.1**	-0.7***		5.4	0.33	0.31	20***
		(5.1)	(-2.4)	(-3.0)		(1.4)			
(4)	142	1.0***	-0.2*	-1.0*	-2.4	FE	0.31	0.25	
		(3.8)	(-1.7)	(-1.8)	(-0.7)				
				AUTOC					
(5)	142	1.4***	-0.1*	0.7		-0.1	0.23	0.21	14***
		(5.0)	(-1.9)	(1.3)		(-0.0)			
(6)	173	1.4***		1.3**		-8.5***	0.23	0.22	25***
		(5.2)		(2.8)		(-6.9)			
				POLITY					
(7)	142	1.3***	-0.1**	-0.4*		3.2	0.24	0.22	14***
		(4.9)	(-2.0)	(-1.9)		(0.7)			
(8)	173	1.3***		-0.6***		-3.7*	0.24	0.23	26***
		(5.0)		(-2.7)		(-1.9)			
				VANHANEN					
(9)	158	1.2***	-0.1	-0.2**		1.7	0.23	0.21	15***
		(4.7)	(-1.4)	(-2.3)		(0.4)			
(10)	192	1.3***		-0.3***		-2.2	0.22	0.21	26***
		(5.0)		(-2.9)		(-1.0)			

Notes
(White heteroskedasticity-consistent standard errors & covariance in brackets)
* 90% confidence level
** 95% confidence level
*** 99% confidence level

The next step is to test this model for the robustness of the inclusion of the political variable. Therefor the table reports results for alternative political

[13] See Table 6 below for a specification that includes slope dummies

variables: two variables that like the democracy score are based on the Polity IV data set (the Autocracy score and Polity, that combines the democracy and autocracy scores) and one variable from the Measures of Democracy dataset (the Vanhanen index). We report these variables with and without the share of manufacturing in imports; the latter helps us to increase the number of available observations from 142 to 173. (Table 4 clarifies that depending on the included variables the data set may vary and shows the countries included and excluded in the different subsamples.) It is noteworthy that these variables measure different aspects of the political system of a country (namely its position in the continuum from autocracy to democracy and the extent of political participation and competition, respectively). The findings therefore clearly show that the finding for the political system is robust (also note that the findings for the Vanhanen-index are obtained for different slightly samples and sample sizes).[14]

All in all the equation is able to explain 25% of the variation in the import collapse. The coefficients of the core variables are significant and the core model is significant in what it explains as shown by the F test. These findings appear to be robust for different measures for political systems. The next question is to take a closer look at the heterogeneity at the level of continents/regions.

[14] Vanhanen covers somewhat more small countries (all observations for the 2000s) Afghanistan, Bahrain, Barbados, Belize, Bosnia and Herzegovina, Cote d'Ivoire, Dominica, Iceland, Luxembourg, Maldives, Malta, Sao Tome and Principe, Seychelles, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines and Tonga.

Table 4 Data availability and (sub) samples

	1930s	2000s
All data available for both periods	Argentina, Australia, Austria, Brazil, Canada, Chile, China, Denmark, Finland, France, Germany, Italy, Japan, Mexico, Netherlands, New Zealand, Norway, Sweden, Switzerland, United Kingdom, United States	
All data available for one period	Cuba	Albania, Algeria, Armenia, Azerbaijan, Belarus, Belgium, Benin, Bhutan, Bolivia, Botswana, Bulgaria, Burkina Faso, Burundi, Cabo Verde, Cambodia, Cameroon, Central African Republic, Colombia, Costa Rica, Croatia, Cyprus, Czech Republic, Ecuador, Egypt, El Salvador, Estonia, Ethiopia, Gabon, Georgia, Ghana, Greece, Guatemala, Guinea, Guyana, Hungary, India, Indonesia, Ireland, Israel, Jamaica, Jordan, Kazakhstan, Kenya, Korea South, Kuwait, Kyrgyz Republic, Latvia, Lebanon, Lesotho, Lithuania, Madagascar, Malawi, Malaysia, Mali, Moldova, Morocco, Mozambique, Namibia, Nicaragua, Niger, Nigeria, Oman, Pakistan, Panama, Paraguay, Peru, Philippines, Poland, Portugal, Qatar, Republic of Congo, Romania, Russia, Rwanda, Saudi Arabia, Senegal, Singapore, Slovak Republic, Slovenia, South Africa, Spain, Sri Lanka, Sudan, Suriname, Syria, Tanzania, Thailand, The Gambia, Togo, Trinidad and Tobago, Tunisia, Turkey, Uganda, Ukraine, United Arab Emirates, Uruguay, Venezuela, Vietnam, Zambia, Zimbabwe
No data on GDP growth	Korea, Philippines, South Africa, Sri Lanka, Formosa, Thailand	Brunei Darussalam, Grenada, Kiribati, Palau, The Bahamas
No data on share of manufacturing imports	Colombia, Egypt	Angola, Bangladesh, Chad, Comoros, Democratic Republic of the Congo, Djibouti, Equatorial Guinea, Eritrea, Guinea-Bissau, Haiti, Honduras, Islamic Republic of Iran, Kosovo, Lao P.D.R., Liberia, Libya, Mongolia, Montenegro, Myanmar, Papua New Guinea, Serbia, Sierra Leone, Solomon Islands, Swaziland, Taiwan Province of China, Tajikistan, Turkmenistan, Uzbekistan, Yemen
No data on Democracy score	India, Indonesia	Afghanistan, Bahrain, Barbados, Belize, Bosnia and Herzegovina, Cote d'Ivoire, Dominica, Hong Kong SAR, Iceland, Luxembourg, Maldives, Malta, Sao Tome and Principe, Seychelles, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Tonga

4.2 Geographical heterogeneity

Before turning to the analysis geographical heterogeneity in the trade collapses, Table 5 for ease of exposition first repeats the results for the full sample.

Table 5 OLS estimates of the basic model for two trade collapses (Regional analyses)

	N	GDP growth	Manu-facturing share	Democracy score	R^2	R^2adj	F
(1)	142	1.3***	-0.1**	-0.8**	0.24	0.23	15***
		(4.8)	(-2.0)	(-2.3)			
(2)	161	1.4***	-0.1*		0.21	0.20	21***
		(5.1)	(-1.7)				
(3)	173	1.3***		-1.1***	0.24	0.23	26***
		(4.8)		(-3.0)			
Africa							
(4)	45	0.8	-0.2	-1.5*	0.08	0.01	1.2
		(1.1)	(-1.1)	(-1.8)			
(5)	49	1.0	-0.1		0.04	-0.00	0.9
		(1.2)	(-0.6)				
(6)	60	0.4		-1.4**	0.05	0.02	1.6
		(0.5)		(-2.0)			
Asia and Oceania							
(7)	20	0.5	0.1	-0.4	0.14	-0.02	0.8
		(1.0)	(0.5)	(-0.7)			
(8)	26	0.9***	-0.0		0.25	0.18	3.8**
		(3.1)	(-0.3)				
(9)	27	0.8		-1.4**	0.35	0.29	6.4***
		(1.6)		(-2.1)			
Europe							
(10)	37	1.7***	-0.0	-0.6	0.56	0.52	14***
		(4.7)	(-0.6)	(-1.1)			
(11)	41	1.4***	-0.1		0.63	0.61	32***
		(5.1)	(-1.0)				
(12)	40	1.7***		-0.7**	0.55	0.53	22***
		(6.5)		(-2.4)			
Latin America and Caribbean							
(13)	25	1.1	-0.4**	0.2	0.33	0.24	3.5**
		(1.1)	(-2.2)	(0.1)			
(14)	31	1.0	-0.3*		0.21	0.15	3.6**
		(0.8)	(1.8)				
(15)	28	0.8		1.3	0.18	0.12	2.7*
		(0.8)		(1.0)			

Notes

(White heteroskedasticity-consistent standard errors & covariance in brackets)
* 90% confidence level
** 95% confidence level
*** 99% confidence level
All equations were estimated with a constant term that is not reported here and was insignificant
White heteroskedasticity-consistent standard errors & covariance

An equation always includes as an explanatory variable the development of GDP in the first crisis year and a constant term. (The constant term is not reported; it is always insignificant at the 90% confidence level.) Line (1) provides the results if we include both the share of manufacturing imports and the Democracy score in the model. Line (2) provides the result if we only include the share of manufacturing imports. Finally, line (3) provides the model with the Democracy score only. This structure of 3 regressions for different samples is followed in the rest of the table

Next we proceed to investigate how the model performs at the regional/continental level. We take a look at Africa, Asia, Europe and Latin America and the Caribbean. These groupings provide sufficient observations for meaningful regressions. Looking at the findings by continent we see that at this level of geographical disaggregation no clear-cut evidence for the global trade model emerges. Even for the European continent, where adj-R^2 is relatively high, the model is not fully replicated as the coefficient of the manufacturing share in imports is not significant. In Africa the evidence suggests a significant impact of the Democracy score, but the explanatory power of the equation is poor. In Latin America and the Caribbean the manufacturing share is significant and in Asia and Oceania the evidence is mixed. The point of these exercises is to show that the mainstream explanation of the global trade collapse ignores that patterns differ quite substantially.

4.3 Level of development and other robustness checks

Table 6 provides a number of robustness checks. The first check (lines 1 to 5) relates to the level of development as measured by GDP per capita. If per capita GDP is added to the core model we find that its impact is insignificant (line 1). This is confirmed by lines (2) – (5) that report additional regressions for four per capita GDP intervals. Next lines 6 and 7 report an alternative country grouping where we combine the United States, Canada, New Zealand, Australia and Europe (line 6) and the rest of the world (line 7). Next we estimate regressions that either include the Democracy score or the manufacturing share in imports for a common sample (that is the observations for which we know the values of both variables) Lines (8) and (9) of Table 6 can be compared to lines (2) and (3) in Table 5. The final three regressions in Table 6 take a look at the differences between the 1930s and the 2000s. Line (10) provides a multiplicative specification where we take logs of all variables. Before we can take logs we need to make two transformations. First, we add an arbitrary small number to the democracy score (namely 0.000001) so that it becomes strictly positive. Second, we limit ourselves to cases where both imports and GDP *decrease* so that we can analyse strictly positive numbers (that is the import crunch and the GDP crunch). Due to the transformations, the number of observations decreases to 72. Lines (11) and (12) report the findings if we include colonies by assigning them the lowest democracy rating for the countries in our sample. Finally, we investigate the robustness across time. Line (13) reports a regression that includes shifts and slope dummies for the 1930s. The slope dummies are insignificant; the shift dummy is marginally significant at the 90% confidence

level. Line (14) reports the model for the 23 observations for the 1930s for which all data are available and line (15) does the same for the 2000s.

Table 6 OLS estimates of the basic model for two trade collapses (Sensitivity analyses)

	N	GDP growth	Manuf. import share	Democracy indicator	GDPpc	Slope GDP Growth 1930s	Slope Manuf. import share 1930s	Slope Democracy Indicator 1930s	R2	R2adj	F
(1)	142	1.3***	-0.1*	-0.7**	-0.0				0.25	0.22	11***
		(4.7)	(-1.6)	(-2.0)	(-1.2)						
GDPpc<$2500											
(2)	44	1.9**	-0.2	-1.7					0.17	0.10	2.7*
		(2.2)	(-0.9)	(-1.4)							
$2500≤GDPpc<$5000											
(3)	30	0.9***	0.0	-0.8**					0.23	0.14	2.6*
		(4.5)	(0.3)	(-2.1)							
$5000≤GDPpc<$30000											
(4)	42	1.4***	-0.0	0.1					0.40	0.35	8***
		(4.8)	(-1.5)	90.2)							
GDPpc≥$30000											
(5)	26	0.7***	-0.0	-0.4*					0.31	0.22	3.3**
		(3.7)	(-0.3)	(-1.8)							
North America, Europe, New Zealand, Australia											
(6)	45	1.4***	-0.1	-0.4					0.46	0.42	12***
		(4.0)	(-0.7)	(-0.80							
Rest of the World											
(7)	97	1.2***	-0.2**	-1.0**					0.20	0.17	8***
		(3.8)	(-2.0)	(-2.1)							
Common sample											
(8)	142	1.5***	-0.1						0.22	0.21	20***
		(6.3)	(-1.4)								
(9)	142	1.3***		-0.8**					0.24	0.22	21***
		(5.0)		(-2.1)							
Multiplicative specification											
(10)	72	0.4***	-0.8*	0.02**					0.33	0.30	11***
		(3.3)	(-1.8)	(2.1)							
Inclusion of colonies with zero value for democracy index											
(11)	144	1.3***	-0.1	-0.7**					0.24	0.22	15***
		(5.1)	(-1.5)	(-1.9)							
(12)	180	1.3***		-0.9***					0.22	0.21	25***
		5.1)		(-2.8)							
					Dummy 1930s						
(13)	142	1.1***	-0.2*	-1.1**	-27.1*	-0.1	0.2	1.7	0.26	0.23	7***
		(3.7)	(-1.7)	(-2.2)	(-1.7)	(-0.2)	(1.0)	(1.6)			
1930s only											
(14)	23	1.0*	0.0	0.6					0.32	0.21	3.0*
		(1.8)	(0.7)	(0.9)							
2000s only											
(15)	120	1.2***	-0.2**	-1.1***					0.25	0.23	13***
		(4.1)	(-2.1)	(-2.9)							

Notes: See Table 5

The conclusion of this section is that a small model for the two major global trade collapses identifies the demand shock, the manufacturing share in imports and the political system as significant determinants of the extent of import collapse. The empirical evidence is most conclusive for the demand shock that is highly significant (in view of line (7) in Table 6, the few exceptions in Table 5 in the regional disaggregation are most probably resulting from the small sizes of the sub-samples). Also for the democracy score the evidence is strong as it is often significant at the 95% level and better and robust with respect to different definitions and aspects of the political system. Finally, while the evidence regarding the share of manufacturing evidence is convincing at the global level, it is less robust than the other two variables. Heterogeneity is thus important for understanding the drivers of the global trade collapse.

5. Concluding remarks

Clearly this paper is only a first step to analyse the heterogeneity of trade collapses. Future research may address this issue also for the smaller trade collapses that occurred in between the two big one's that we studied in this paper. This paper provides support for the agreement amongst economists that the demand shock has been one of the main drivers of the world import collapses in the 1930s and the 2000s and in addition shows that this is an important factor that explains the heterogeneity that we observe in the import experiences of countries. Although the evidence is less clear for the trade composition effect (tested by the share of manufacturing in imports) in particular in the regional models, on balance the composition effect also seems

to be a relevant, but less significant, explanatory factor for the heterogeneity in observed import collapse heterogeneity.

This is to the best of our knowledge the first paper to investigate the vulnerability of different political systems in the context of trade collapses. We uncovered an empirical regularity: the more democratic a political system the stronger the reduction of its imports. We relate this finding to an emerging literature that relates the world trade collapse to increased (trade) uncertainty. Obviously this factor cannot be investigated at the level of world trade and this provides a further argument to look at lower levels of aggregation and to take the heterogeneity of country experiences seriously. We also have studied heterogeneity at different levels of analysis (by income level and by region) and find substantial differences (our findings suggest that geographical heterogeneity may be more important than heterogeneity due to different levels of development).

By focusing on the initial phase of the world trade collapses and providing a model that performs reasonable well, our findings provide corroborative evidence that the Great Depression and the Great Repression initially belonged to the same category but that different policy responses and global institutions made a difference. The optimistic implication is that world trade has perhaps become more resilient.

References

Aidt, T.S. and M. Gassebner, 2007, 'Do Autocratic States Trade Less?', *KOF Working Papers 175*, ETH: Zürich.

Anderson, J. E., and D. Marcouiller. 2002, 'Insecurity and the pattern of trade: an empirical investigation.' *Review of Economics and Statistics* **84** (2) 352.

Araújo, S. and J. Oliveira Martins, 2009, 'The great synchronisation: what do high-frequency statistics tell us about the trade collapse?', *Vox* (www.voxeu.org), July 8.

Auboin, M., 2009, 'Restoring Trade Finance During a Period of Financial Crisis: Stock-taking of Recent Initiatives', *WTO Staff Working Paper ERSD-2009-16*, WTO: Geneva.

Baldwin, R.E., 2009, 'Introduction: The great trade collapse: what caused it and what does it mean? In: R.E. Baldwin (ed.), *The Great Trade Collapse: Causes, Consequences and Prospects*, Vox.EU.org and CEPR: London.

Baldwin, R.E. and S.J. Evenett, 2009, *The Collapse of Global Trade, Murky Protectionism, and the Crisis: Recommendations for the G20*, A Vox EU publication: London.

Bartoli, F., G Ferri, P. Murro and Z. Rotondi, 2014, Bank support and export: evidence from small Italian firms *Small Business Economics* **42** (2), 245-264

Behrens, K., G. Corcos, and G. Mion, 2013, "Trade Crisis? What Trade Crisis? *Review of Economics and Statistics* **95**,(2) 702-709

Bénassy-Quéré, A., Y. Decreux, L. Fontagné and D. Khoudour-Casteras, 2009, 'Economic Crisis and Global Supply Chains', *CEPII Document du travail 2009 – 15*, CEPII: Paris.

Berg, M. van den, 2014, Regional heterogeneity and trade: Empirical evidence from the Netherlands, Conference paper presented at Heterogeneous Resilience: what can we learn from the regional impact of shocks?, The Hague October 2014

Bergeijk, P.A.G. van, 1995, 'The accuracy of international economic observations', *Bulletin of Economic Research*, **47** (1), pp. 1−20.

Bergeijk, P.A.G. van, 2009, 'Expected extent and potential duration of the world import crunch', *Kyklos*, **62** (4), pp. 479−87.

Bergeijk, P.A.G. van, 2010, *On the brink of deglobalization: An alternative perspective on the world trade collapse*, Edward Elgar: Cheltenham.

Bergeijk, P.A.G. van, 2013, 'The world trade collapse and international value chains: A cross-country perspective.' *International Economic Journal* **27** (1) 41-53.

Bhagwati, J.N. and T.N. Srinivasan, 1976, 'Optimal Trade Policy and Compensation under Endogenous Uncertainty: The Phenomenon of Market Disruption,' *Journal of International Economics*, **6**, 317-336

Birnberg, T.B. & S.A. Resnick, 1975, *Colonial development: an econometric study*, Yale University Press, New Haven and London.

Bloom, N., 2014, 'Fluctuations in Uncertainty'*, Journal of Economic Perspectives* **28** (2) 153-176.

Boz, E., M. Bussiere, C. Marsilli, 2014, Recent slowdown in global trade: cyclical or structural, *Vox*, November 12, 2014

Campbell, D.L., C.M. Meissner, D. Novy and D. Jacks, 2009, Explaining two trade busts: Output versus trade costs in the Great Depression and Today, *Vox*, September 19, 2009

Constantinescu, C., A. Mattoop and M. Ruta, 2015, 'The global trade slowdown: cyclical or structural? *WPR Working Paper WPS 7158*, World Bank; Washington DC.

Coulibaly, B., H. Sapriza and A. Zlate, 2013, Financial frictions, trade credit, and the 2008–09 global financial crisis*, International Review of Economics & Finance*, **26** 25-38

Easterly, W., 2005, *Reviving the '50s: the big push, poverty traps and take'-offs in economic development*, Center for Global Development Working Paper 65, Washington DC.

Eaton, J., S. Kortum, B. Neiman and J. Romalis, 2011, 'Trade and the Global Recession', *NBER working paper 16666, NBER*: Cambridge MA.

Eichengreen, B. and D. Irwin, 2009, 'The Slide to Protectionism in the Great Depression: Who Succumbed and Why?', *NBER Working paper 15142, NBER*: Cambridge, MA.

Eichengreen, B. and K. O'Rourke, 2009, 'A tale of two depressions', *Vox*, 1 September.

Estevadeordal, A., B. Frantz and A.M. Taylor, 2003, 'The rise and fall of world trade, 1870−1939', *Quarterly Journal of Economics*, **118** (2), 359−407.

Ferri, G. and P. Murro, 2014, Bank Lending Technologies and the Great Trade Collapse: Evidence from EU Micro-Data. Available at http://dx.doi.org/10.2139/ssrn.2535881

Frederico, G. and A. Tena, 1991, 'On the accuracy of foreign trade statistics (1909−1935): Morgenstern revisited', *Explorations in Economic History*, **28**, 259−73.

Freund, C., 2009, 'The Trade Response to Global Downturns: Historical Evidence', *Policy Research Working Paper 5015*, World Bank: Washington DC.

Gawande, K., B. Hoekman, and Y. Cui, 2015, 'Global Supply Chains and Trade Policy Responses to the 2008 Crisis', *World Bank Economic Review* **29** (1) 102-128.

Grossman, R. S., and C. M. Meissner, 2010, 'International aspects of the Great Depression and the crisis of 2007: similarities, differences, and lessons.' *Oxford Review of Economic Policy* **26** (3) 318-338.

Handley, K. and N. Limão, 2013, Trade and Investment Under Policy Uncertainty. NBER Working Paper 17790.

Hong, K., J.-W. Lee and H. C. Tang, 2009, 'Crises in Asia: Historical Perspectives and Implication', *ADB Working Papers Series 152*, Asian Development Bank: Manila.

Jacks, D.S., C.M. Meissner and D. Novy, 2011, 'Trade booms, trade busts, and trade costs', *Journal of International Economics* **83** (2), pp. 185–201.

Kindleberger, C.P., 1973, *The World in Depression 1929–1939*, Allen Lane The Penguin Press: London.

League of Nations, 1931, *Statistical yearbook of the League of Nations 1930/31*, League of Nations Economic Intelligence Service: Geneva. (available at http://digital.library.northwestern.edu/league/)

Levchenko, A.A., L.T. Lewis and L.L. Tesar, 2010, 'The Collapse of International Trade During the 2008–2009 Crisis: In Search of a Smoking Gun', *NBER Working Paper No 16006*, NBER: Cambridge MA.

Loveday, A., 1921, "The League of Nations and International Trade Statistics", *Annals of the American Academy of Political and Social Science* **94** (March), 156-9.

Maddison, A., 1985, *Two Crises: Latin America and Asia 1929−38 and 1973−83,* OECD: Paris.

Maddison, A., 2006, *The World Economy: Volume 1: A Millennial Perspective* and *Volume 2: Historical Statistics*, OECD: Paris.

Malo, M. di and M. Valente, 2013, 'Uncertainty, Specialization and Government Intervention' *Metroeconomica* **64** (2) 215-243.

Marrewijk, C. van, 1992, 'Trade uncertainty and the two-step procedure: The choice of numeraire and exact indexation.' *De Economist* **140** (3) 357-72.

Marrewijk, C. van and P.A.G. van Bergeijk, 1990, 'Trade uncertainty and specialization: social versus private planning', *De Economist*, **138** (1) 15–32.

Marrewijk, C. van and P.A.G. van Bergeijk, 1993, 'Endogenous trade uncertainty: why countries may specialize against comparative advantage', *Regional Science and Urban Economics*, **23** (4) 681–94.

Marshall, Monty G. (2011) *POLITY IV PROJECT: Dataset Users' Manual.* available at: http://www.systemicpeace.org/inscr/p4manualv2010.pdf

Mayda, A.M. and D. Rodrik, 2005, 'Why are some people (and countries) more protectionist than others'*, European Economic Review*, 49, pp. 1393−430.

Morgenstern, O., 1950, *On the Accuracy of Economic Observations*, Princeton University Press: Princeton.

Milner, H. V., and K. Kubota, 2005, 'Why the move to free trade? Democracy and trade policy in the developing countries.' *International organization* 59.01: 107-143.

Niculcea, I., I. Asmundson, T.W. Dorsey, A. Khachatryan and M. Saito, 2011, 'Trade and Trade Finance in the 2008-09 Financial Crisis', *IMF Working Paper No. 11/16*, IMF: Washington DC.

Novy, D. and A.M. Taylor, 2014, "Trade and Uncertainty", *NBER Working paper 19941*, NBER

Nunn, N. and D. Treflert, 2014, Domestic Institutions as a Source of Comparative Advantage*, NBER Working Papers 18851*, NBER

O'Rourke, K., 2006, 'Democracy and Protectionism' *IIIS Discussion Paper 191*, Institute for International Integration Studies: Dublin.

Rothermund, D., 1996, *The Global Impact of The Great Depression 1929−1939*, Routledge: London and New York.

Tamminen, S., 2014, Firm heterogeneity during the Great recession, Conference paper presented at Heterogeneous Resilience: what can we learn from the regional impact of shocks?, The Hague October 2014

Tanaka, K., 2009, 'Trade collapse and vertical foreign direct investment', *Vox* (www.voxeu.org), 7 May.

Taylor , A.M. and J.L.F. Wilson, 2006, international trade and finance under the two hegemons: Complementaries in the United Kingdom 1870-1913 and the United States 1920-30, *NBER working paper 12543*, NBER Cambridge, MA

United Nations Statistical Office, 1962, *International Trade Statistics 1900–1960*, UN: New York.

United Nations, 2010a, *The 2008 International Trade Statistics Yearbook Volume I - Country Pages*, UN: Geneva and New York.

United Nations, 2010b, *The 2008 International Trade Statistics Yearbook Volume II - Trade by Commodity*, published at http://comtrade.un.org

Vanhanen, T., 2011, Measures of Democracy 1810-2010. *FSD1289, version 5.0. Tampere: Finnish Social Science Data Archive.*

World Bank, 2015, What lies behind the global trade slowdown, *Global Economic Prospects*, World Bank; Washington DC.

World Trade Organization, 2009, *World Trade Report 2009 – Trade Policy Commitments and Contingency Measures*, WTO: Geneva.