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One is not enough!
Understanding world trade collapses

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Abstract

In order to put the mainstream narrative for the recent world trade collapse into a consistent economic-historic framework, this paper builds a comparable data set for the analysis of world trade collapses consisting of 72 periods of import decline (27 in the 1930s; 45 in 2008-10). The empirical analysis explains about three quarters of cross-country variance and supports the emerging professional consensus that identifies the decrease in domestic demand and the share of manufacturing trade as key determinants of the severity of a world trade collapse, but the paper also reveals significant differences between the 1930s and the 2000s. Both the demand shock and the composition effect are comparatively speaking less important in the recent trade collapse. The paper identifies country-specific determinants (level of development, political system and openness) that have not (yet) been considered in the mainstream narrative for the recent world trade collapse. In line with the theory of trade uncertainty (van Marrewijk and van Bergeijk 1993, van Bergeijk 2010), I find that more democratic, more open, and wealthier countries reduced their imports to a smaller extent.

Keywords

World trade collapse, deglobalization, economic history, value chains, 1930s, 2008-2010.

One is not enough![1]
Understanding world trade collapses

1 Introduction

> ... the same combination of factors (financial constraints coupled with a demand slump) have been central to the great trade collapse (Iacovane and Zavacka, 2009).
>
> Trade with virtually all parts in the world decreased by a similar order of magnitude (Levchenko, Lewis and Tesar, 2010).
>
> We do not yet have all the facts, but the two leading explanations of the sharp contraction in trade are the widespread use of international supply chains, and the drying up of short-term trade credit. (Baldwin and Evenett 2009).
>
> The extent of the sharp contraction in global trade in 2008–09 is mainly attributable to compositional effects, global supply chains, and reduced availability of trade finance and credit (Gregory, Henn, McDonald and Saito, 2010).

The world trade collapse that started in October 2008 and reduced global trade by some twenty per cent in only a few months time remains one of the most puzzling economic phenomena of the last decade. In mid-2009 a consensus amongst trade economists emerged: the recent world trade collapse was essentially a demand shock multiplied by a composition effect (the 2009 edited volume by Richard Baldwin is an example). The other dominant view in the profession (of which the WTO in 2009 is a clear example) extends this narrative by other factors, sometimes using different wording. It argues that the trade collapse was caused by protectionism, lacking trade finance and a demand shock that was enlarged by the fragmentation of production in international value chains (the latter, incidentally, is also seen to be a driver of composition effects).

The main problem with either representation of the consensus is that the underlying analysis is based on empirical analyses of post Second World War data only.[2] Economists typically do not include the Black Swan of the 1930s in their analysis. They compare the usual fluctuations in international trade (as observed in the post second world war period) to the exceptional trade collapse in 2008-9. This would seem to be simply inappropriate for the analysis of the phenomenon of world trade collapse essentially because this phenomenon is thus implicitly treated as a unique event and actually

> 'such events can only be explained historically as they defy the laws of economics' (Rothermund 1996, p. 1).[3]

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[1] Preliminary versions of this paper were presented at the European Trade Study Group (Lausanne September 10, 2010) and the Peterson Institute (November 29, 2010). Comments by Jan-Luiten van Zanden and participants of both meetings are gratefully acknowledged.

[2] A notable exception is Eichengreen and O'Rourke 2009.

[3] Rothermund is of course referring to the 1930s.

The literature that deals with the trade collapse in the 1930s has also generally speaking not taken earlier episodes of declining global trade volumes into account. The literature in the past of course could not (yet) consider the trade collapse of the 2000s, 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 available multi-country sources do not cover years prior to 1913; see Loveday 1921). In addressing this methodological problem I study the drivers of import collapses in the wane of two world trade collapses. The econometric analysis explores the substantial amount of cross-country variations in the decline of nations' import volumes. This procedure provides a sufficient number of observations as the data set covers 27 economies in the 1930s and 45 economies in the 2000s. For these 72 cases a set of relevant variables was identified for which reliable and comparable data could be collected.[4] (Note, however, that the country coverage is not complete for all explanatory variables.)

The main contribution of this paper is thus that it analyses two world trade collapses (that of the 1930s and that of the 2000s) in a consistent framework. Since I want to cover two periods in time that are very distinct, I do not have much choice of comparable data and thus use a simple parsimonious model that uses essentially seven variables. I relate the depth of import collapse of individual countries (peak to trough) first of all to the two forces that play the main role in the emerging mainstream consensus: the demand shock (the peak to trough movement in their GDP) and the share of manufactures in their international trade flow. These variables have been collected from different sources as detailed in Section 2 of the paper. To this 'core' I add a number of country-specific variables for which data have been reported that where constructed using a consistent framework so that their comparability over time is much less problematic. In particular I use the development level (proxied by per capita GDP), the political system and a set of variables that controls for country size and openness. The findings support the emerging professional consensus where that identifies the decrease in domestic demand and the share of manufacturing trade as key determinants of the severity of a world trade collapse. However, as will become clear, the demand shock and the composition effect are comparatively speaking less important in the recent trade collapse than in the 1930s. Note, however, that my point is not that these factors would not matter in a comparison of the world trade collapse in the 2000s with the usual fluctuations in international trade. My point is simply that the applicability of the narrative is better for the 1930s. In addition I find that institutional factors are important for both periods (this is a factor that is completely lacking in the mainstream narrative). In particular I find that the decline of imports is stronger in centralized autocratic economies.

The remainder of this paper is organized as follows. The next section introduces and discusses some aspects of the trade collapse and the main

[4] The requirement of reliability and comparability of the data has an important implication as I thereforedo not include China in the analysis of the recent trade collapse.

narrative in order to motivate the selection of explanatory variables that will later be used in a quasi-postulated reduced form equation. Section 2 is devoted to measurement. I discuss content and reliability of sources and additional calculations that were necessary to construct my database (the full dataset is reproduced in the Appendix). The data are presented graphically offering partial analyses of import decline *vis-à-vis* GDP decline, manufacturing trade, per capita GDP and indicators for the political system, country size and openness. Section 3 provides the detailed multivariate regression analysis that tests inter alia for differences in the impact of the variables in the 1930s *viz.* the 2000s. The final section draws conclusions and discusses some implications.

2 World trade collapses

The phenomenon that is studied in this paper is the collapse of world trade – that is: an event of negative real growth of international trade that occurs both in the aggregate for world trade and in almost all countries for their individual imports and/or exports. World trade collapses are relatively unique: in the period 1880-2010 only about 12 per cent of the real annual growth rates were negative and the overall trend with the exception of the 1930s has been positive. In the period 1951-2008 in less than seven per cent of the years a negative real annual growth rate for world trade was registered (namely in 1958, 1972, 1980 and 1982).[5]

The study of world trade collapse has merit on its own account. It is also highly relevant from a policy perspective since the concurrence of declining imports in a great many countries during the two world trade collapses implies a reduction of global import demand so that an export led recovery (that is: the 'usual policy recipe' to grow out of a financial crisis[6]) is difficult to conceive for individual countries (and for the world as a whole for that matter). Moreover, a better understanding of the causes of the world trade collapse and its impact is relevant both for science because this unique "real world experiment" provides a useful (yet extreme) testing ground for theories and for policy as this could provide the information that is necessary for the design of institutions that can prevent or reduce of this manner of disruption.

Figure 1 illustrates that the recent world trade collapse hit both emerging economies and the advanced countries showing the differences in the pattern (timing, speed, extent) of collapse and (partial) recovery. 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). So while trade fell everywhere, the extent to which it fell showed a lot of variation and these differences may provide clues about the determinants of trade collapse.

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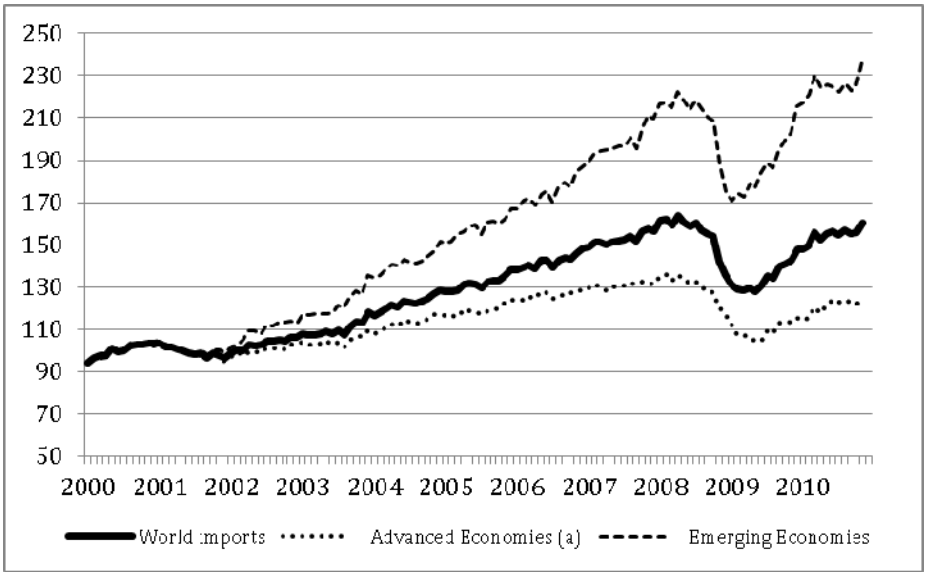
[5] Van Bergeijk (2010, pp. 6-12) provides a detailed discussion also of some data series with different periodicity and/or level of aggregation.

[6] An example is IMF (2009, p. 112): 'one key factor that helped economies recover from a recession associated with a financial crisis was the fact that they were able to benefit from strong external demand. This suggests that disruptions to the supply of credit may not matter much for firms that are highly dependent on outside funding if they produce goods that are highly tradable.'

FIGURE 1
The world trade collapse in the 2000s (index numbers world import volume 2000=100)



Source: CPB World Trade Monitor (www.cpb.nl) accessed Jan. 24, 2011

Consider Figure 2a that illustrates that imports in the 1930s fell by an astonishing eighty per cent in Chile and by a comparatively modest ten per cent in the United Kingdom and Japan. The peak to trough movement in 2008-2009 (Figure 2b) varied between more than forty per cent in Iceland, Bulgaria, Thailand, Venezuela and Argentina to some ten per cent in Switzerland and the Netherlands. It is this heterogeneity in country experiences that this paper explores. Essentially I treat these observations as an unstructured panel (and accordingly, I use appropriate time dummies later on in the econometric analysis).

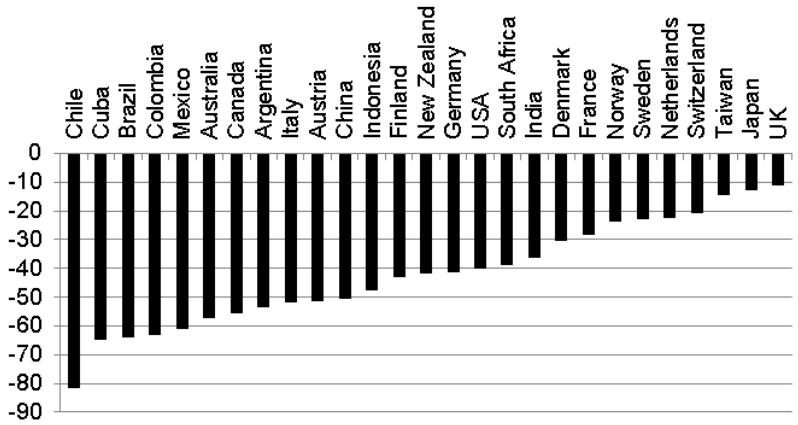
2.1 The drivers of trade collapse

The scientific narratives for the 1930s and 2000s produced a long list of factors that were shown or assumed to have caused or aggravated the world trade collapse (see Estevadoreal 2003, Freund 2009, Baldwin and Evenett 2009, WTO 2009). These narratives agree on two key drivers that will also be the variables of special interest in this working paper: a demand shock and a composition effect.

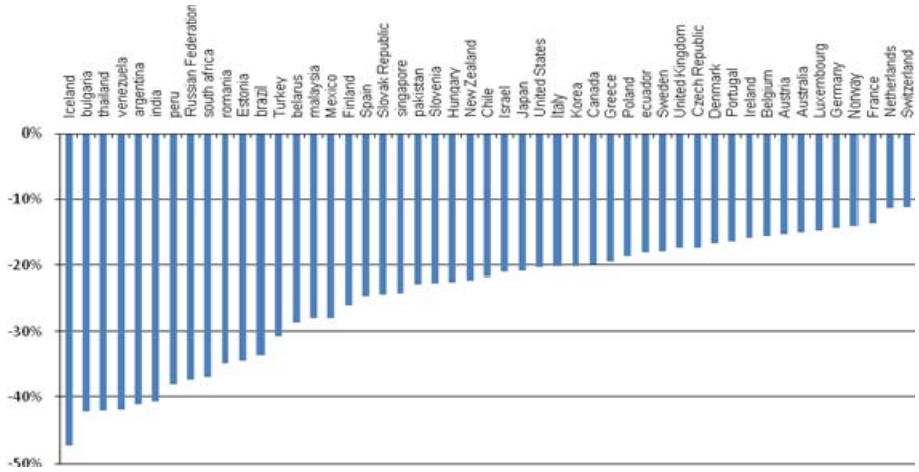
First of all the most important driver of the collapse of trade is seen to be the reduction in Gross Domestic Product (representing macroeconomic demand). Typically and for many reasons the change in trade is expected to be a multiple of the change in GDP (Baldwin 2009, Freund 2009, WTO 2009). First, the share of services in GDP is much larger than in international trade and services are less volatile than goods. Second, the share of consumer goods and investment in trade is much larger. This is relevant because a demand reduction will in general be especially felt in these products:

The compositional effect turns on the peculiar nature of the demand shock. The demand shock was very large, but also focused on a narrow range of domestic value-added activities – the production of 'postponeable' goods, consumer durables and investment goods. This demand drops immediately, reducing demand for all related intermediate inputs (parts and components, chemicals, steel, etc). The compositional-effect argument is founded on the fact that postponeables make up a narrow slice of world GDP, but a very large slice of the world trade (Baldwin 2009, p. 7).

FIGURE 2
a) Heterogeneity of import decline in the 1930s (peak to through decline in per cent 1928-1937)



b) Heterogeneity of import decline in the 2000s (peak to through decline in per cent 2008Q1-2009Q4)



Third, trade relates to turnover and GDP is based on value added. A turnover number typically is a multiple of a value added number (but the rate of change of course is not). Fourth, in as far as industrial trade consists of international composites it is relevant that products in different stages of production may cross borders many times and international trade will thus be double counted every time that a (component of a) product moves from one country to another.

Yet another aspect of manufacturing trade is the international division of labour, in particular the organization of production in international value chains. In particular regarding the recent trade collapse it was argued from the start that the existence of a network of international value chains could explain both the propagation of shocks (and thus the simultaneity of the trade collapse in many countries) and the severity of the trade shock (the fact that the percentage reduction of trade was a manifold of the percentage reduction in GDP). This value chain argument mainly rests on the observation that the share of intermediate products in international trade and the elasticity of world trade to GDP increased significantly over recent decades. Therefore observers such as Freund (2009) and Cheun and Guichard (2009) have assumed a causal relationship between the two. Fragmentation of production is thus seen as a driver of the world trade collapse.

Potentially counterbalancing effects however are also likely. Bénassy-Quéré et al. (2009) relate the overshooting of trade to omitted variables. Van Marrewijk (2009) finds in his equations for the decline and steepness of the trade collapse that a little bit more than half the coefficients for intra-industry trade are negative and significant at the usual confidence level of 90 per cent and better and speculates that this is because value chains spread the trade shocks over many countries providing a cushion. Other examples of such effects would be the larger trust among repeat buyers and the use of non-bank-intermediated trade credit (van Bergeijk 2010). The upshot is that the direction of the impact of global value chains on trade during a global crisis is not a priori clear and essentially an empirical matter. Empirical studies that analyze the relationship between value chain activities on the one hand and world trade and/or openness on the other hand are, however, contradictory (see for a critical review Van Bergeijk 2010). These studies use quite different approaches including partial analyses (such as Tanaka 2009 and van Marrewijk 2009), single country analyses (such as Levchenko et al. 2009 and Robertson 2009) and calibrated simulation models (for example, Bénassy-Quéré et al. 2009 and Bems et al. 2010) and methodological differences may thus explain contradictions. It is, however also quite possible that the contradictory effects are due to the fact that counteracting forces are at play. One contribution of this paper is that it provides a multi-country perspective and the first test of this hypothesis in a cross-country setting for the 1930s and the 2008-9 trade collapse and for the full sample of the two trade collapses.

2.2 Country specific factors

Given the focus in most analyses on the development of world trade in a time series perspective, it is quite understandable that the previous literature has not paid a lot of attention to country-specific factors. Since the present paper deals

with cross-country variation it is important to take these factors on board. It will be sensible to control for a number of other country specific aspects that could explain the variation in import decline.

Level of development (per capita GDP)

A first important aspect is the level of development as already illustrated by different patterns of the trade cycle in Figure 1 for the advanced economies and the emerging markets. On the one hand one might expect that trade at low levels of development trade consists of essential goods with low elasticity so that reductions of imports would be comparatively speaking limited. On the other hand, financial leeway is often limited for developing countries so that they have to act more quickly and reduce imports if the prospects for export turn sour. All in all it is important to include per capita GDP as a control variable.

Political institutions

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). 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. Van Marrewijk and van Bergeijk (1990 and 1993) point out a coordination failure in decentralized economies. 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 footnote 39) note:

> One might plausibly think that countries with authoritarian political regimes would be more likely to resort to exchange controls; restrictions on political freedom tended to go together in this as in other periods

Country size and openness

A third important aspect is the size of a country. Typically large countries with monopsonistic market power could improve the terms of trade by reducing their demand on the world market. Also large countries generally speaking have more and better opportunities for substitution and be thus better able to reduce their imports than small countries. One problem with country size is that it increases over time when population and production increase. Additionally, (market) power is a relative concept and typically a country would derive power from its share in the world economy. Country size is therefore defined as a share in global economic activity, in particular the shares in global population, production and trade are considered.

Finally, openness matters. Open economies are more vulnerable to the reactions of other countries. But they also know and rely on the benefits of

international trade and will have specialized to a larger extent than more closed economies. Therefore they can be expected to be less inclined to reduce the volume of imports. The measure for openness is defined in relative terms by the ratio of the share in world trade to the share of world production.

2.3 Consequences – not causes: protectionism and trade credit

Protectionism and a sharp contraction of trade credit were 'usual suspects' in the initial phase when the speed and severity of the trade collapse became apparent (WTO 2009, Auboin 2009), but it appears more probable that increases in protectionism and reductions in trade-related finance are consequences rather than causes of world trade collapse. Regarding the 1930s there is wide agreement that the trade collapse was not sparked by an increase in protectionism, which Madsen (2001), Estevadeordal et al. (2003) and Eichengreen and Irwin (2009) all date around 1931−32 (so four years into the crisis). The 2008−09 world trade collapse took place at a moment in time when trade policies were generally speaking liberal. There is some evidence that protectionist pressures have been building up during 2009 and 2010, but not that protectionism played a role in the early phase of the trade collapse (van Bergeijk 2010, Gregory et al. 2010). All in all, the following quote from Bénassy-Quéré et al. (2009, p. 10) would seem to neatly summarize the profession's verdict on the role of protectionism before, during and following the onset of the trade collapse:

> Emerging protectionism is unlikely to have contributed to the collapse of world trade observed at the end of 2008, but it may have a sizeable impact in 2009 and 2010, when the social consequences of the crisis in the real economy (...) will be felt and subsequent demands for protection can be expected. So far, it must be said that the monitoring process performed by the WTO seems to have kept such risks under tight control.

Causality is also dubious in the case of trade-related finance, at least for 2008-09.[7] The mainstream analysis is that a reduction in the availability of finance and credit due to the problems in the banking sector triggered the trade collapse. This ignores that a reduction in trade will reduce the demand for trade finance and credit. The timing of events suggests that the causality runs from trade to finance since trade started to decline before trade credit did (Van Bergeijk 2010, pp. 62-70 and Niculcea et al 2011).[8]

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[7] Kindleberger (1978, p. 72) notes that lending on imports in 1929 'seems to have come to a complete stop', but provides no further details.

[8] The trade finance argument often suffers from counterintuitive empirical problems. In the Cheung and Guicard (2009) global trade model that features a measure for financial tightness forecasting errors increase when the forecasting horizon decreases. Levchenko et al. find no evidence at the firm level that either exports or imports were reduced more strongly in sectors where trade credit is relatively important. They observe a contraction of trade credit at the firm level but more importantly median accounts receivable and payable are only one to two per cent lower than the peak level of 2007 while their simulations actually suggest a counterintuitive increase of imports

2.4 A priori expectations

We can summarize the above discussion in a number of a priori expectations about the signs of the relationship between trade decline and the explanatory variables.

GDP decline (demand shock)

Effective demand will be reduced when national income decreases and thus imports follow the development of GDP. In addition to the sign of the relationship and the estimated coefficient, however, its size is also relevant and it will be useful to check if it exceeds the value of 1. Freund (2009) and WTO (2009) argue that the growing importance of international value chains results in a trade multiplier in excess of 1 (so that it magnifies fluctuations in income). O'Rourke (2009), however pointed the argument would require that marginal trade consists of relatively much vertically disintegrated production (and if not, the argument will actually work out in the opposite direction and yield a multiplier smaller than 1).[9]

Manufacturing import share (composition effect)

I use the share of manufactures before the start of the crisis to proxy the composition effect. Trade in manufactured goods would be especially vulnerable during trade collapses as these goods constitute the vast majority of the international composites. The test is direct for the 'pure' composition effect but can only act as an indirect test for the value chain hypothesis as this variable is a crude measures of the potential presence of value chains and does not reflect the intensity and extent of fragmentation per se.[10] I expect a priori that a larger share of manufactured goods will be associated with a stronger import reduction.

Country specific factors

From the discussion above unambiguous expectations follow regarding Polity and Country size. A stronger import decline is expected a priori for both larger and less democratic countries. Regarding the level of development and openness expectations are ambiguous and thus essentially an open empirical question.

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due to the somewhat lower level of trade finance. These ambiguities also indicate that the trade finance argument suffers from a causality problem.

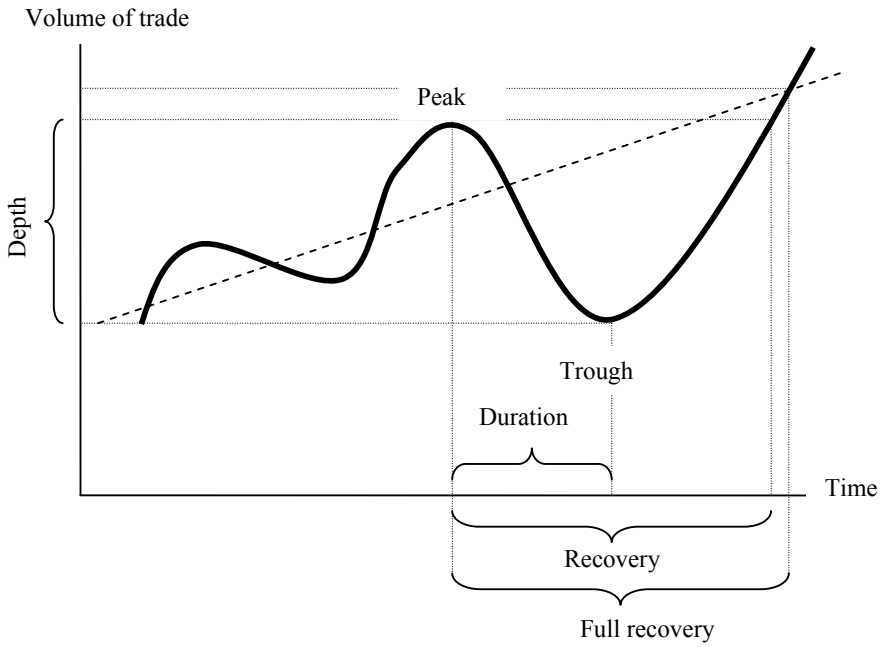
[9] The trade multiplier has been analyzed using time series, but not yet in a cross-section setting as in this paper. A cross-section perspective provides a tool to test for the relevance of O'Rourke's caveat.

[10] In van Bergeijk (2010) I also use the share of vertical specialization in trade as an alternative measure which is of course more directly related to the issue at stake, but I can do so at an obvious cost only: the data are only available for the 2000s and even then the number of observations reduces from 45 to 34 countries when I use this explanatory variable. Van Marrewijk 2009 uses an alternative (but also indirect) measure – the Grubel-Lloyd index for intra-industry trade – to test the value chain argument for the 2008-09 trade collapse with comparable findings.

3 Measurement

I use the standard apparatus for the analysis of business cycles to analyse the development of imports (and also for GDP). Figure 3 illustrates the standard methodology and the key measurement items regarding the trade collapse.

FIGURE 3
Peak, trough, depth, duration, recovery and full recovery



Notes: – Actual development of the volume of trade
--- Trend development of the volume of trade in the absence of the trade collapse

The trade cycle shows the usual cyclical pattern around an increasing trend (the dotted line). At some point in time the curve reaches its maximum (the peak) at which point the positive growth rate becomes negative. This is the start of the trade collapse. At the end of the trade collapse (the trough) the decline of the volume of trade ends and trade starts to grow again (although from a much lower level than its peak value). Note that a positive growth rate for the volume of trade does not imply that the *status quo ante* has been restored as that would require a substantial number of positive growth rates until the previous peak level has been reached again. This period is labelled 'Recovery'. It could, however, be argued that full recovery may take even longer, namely until the trend level of world trade has been reached again (so exceeding the previous peak). Referring to Figure 1, recovery has not occurred for world trade, in particular due to the performance of the advanced economies, while full recovery has not yet occurred for the emerging economies.

As the purpose of this paper is to analyze 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 occurrence, depth and duration of 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 imprecise (Morgenstern 1950, Frederico and Tena 1991 and Van Bergeijk 1995). This is especially relevant because I use a blend of recent data that have not yet been revised 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 I use aggregate trade data basically because this reduces misclassification by commodity and/or country. Moreover I use where possible sources that cover the full period or which have been constructed in the same 'tradition' of data collection and statistics production.[11]

3.1 Volume of imports

Throughout this paper I focus on the development of imports rather than on exports because import contractions can also be compared to individual financial crises (van Bergeijk 2009, 2010), essentially because the development of exports to a large extent is exogenous and – given the often mercantilist view of policy makers – may be sheltered from any negative consequences of the financial crisis. The impact of an individual financial crisis may thus be observed more accurately and directly when one studies the development of the volume of imports. During a global crisis (a world trade collapse) all countries experience contractions of their effective demand and thus global import demand contracts as well. In this case the short side rule applies: the size of world markets during a global crisis is not determined by supply but by demand, that is: world trade is determined by the imports of all countries.

Trade volume data for the 1930s are not readily available for all countries. Two data sources provide the necessary data for the annual volume of imports of individual countries. My 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. It is also important to note that the official status of the data may be problematic. 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

[11] An example is the League of Nation data on the manufacturing share (1931) that as discussed in Section 2.3 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 I use for the manufacturing import share in 2008-09.

> interested users which can use this data under their own responsibility and according to their own judgment.[12]

The UN's draft paper reports data on the volume of imports for: Australia (Table III), Austria (Table IV), Canada (Table VII), Chile (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, Cuba, Indonesia and Mexico.

For the 2000s I also rely on two data sources. The main source is the OECDs National Accounts data base from which I use quarterly seasonally adjusted index number for the volume of imports for Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Israel, Italy, Japan, Korea (South), Mexico, the Netherlands, New Zealand, Norway, Poland, Portugal, Russia, Spain, Sweden, Switzerland, Thailand, Turkey, the United Kingdom, the United States.

The second source is the IMFs International Financial Statistics (IFS). For Ecuador, Pakistan, Singapore and Thailand the IFS provides quarterly seasonally adjusted indices for the volume of imports that are comparable to the OECD quarterly National Accounts. For other countries no seasonal adjustment is available and here I use the reported National Accounts data that I deflated by the GDP deflator (Argentina, Belarus, Bulgaria, India, Indonesia, Malaysia, Peru, Romania and South Africa) or the import wholesale price index (Venezuela).

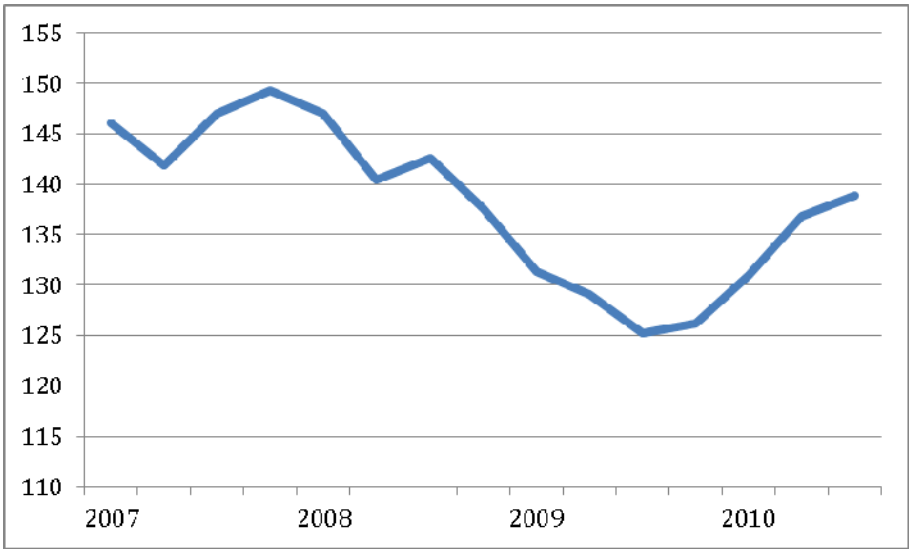
I date the peak and the trough in a fixed time frame, both for the 1930s where I use annual observations over 1929-1937 (I exclude 1938 and 1939 since in these pre-war years data are suppressed and if available unreliable) and for the 2000s where I use quarterly data over the period 2008Q1-2009Q4.[13] Figure 4 illustrates the dating of the peak and trough for the case of the Irish import volume. The peak of the curve is in 2007, actually just before the breakout of the financial crisis, but the period of measurement is by design restricted to 2008Q1-2009Q4 (when the trade collapse actually occurred) and thus the peak is dated at 2008Q1 and the peak value is set accordingly. The figure also clarifies that fluctuations may temporarily pose as troughs until new data become available (like the local minimum in 2008Q2. However, given the

[12] Source: http://unstats.un.org/unsd/trade/imts/historical_data.htm, dated April 28, 2009.

[13] For Chile 1930.

evolution in 2010 it seems reasonably save to work with the assumption that the trough is to be dated at 2009Q2.[14]

FIGURE 4
Import volume Ireland 2007Q1-2010Q3 (index numbers)



Source: OECD Quarterly National Accounts (www.oecd.org) accessed Jan. 24, 2011

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

For the peak to trough movement of real GDP in 2008-09 I use a comparable method (the dating of the peak and the trough is based on GDP data only and thus independent of the import volume ensuring the correct observation of the decline) and a comparable data set (based on OECD and IMF national accounts data) as for the dependent variable.[15] For the 1930s I rely on Maddison's historical series. 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

[14] It is, however, quite possible that data revisions may shift the dating of the Irish trough to 2009Q3 (here the difference is small). Data revisions are relatively frequent if seasonable adjustments are being made. The figure does, however, not indicate that it is likely that the import volume will fall below the 2009 trough again.
[15] No quarterly national accounts data are available from OECD or IMF for Ecuador, Pakistan and Venezuela.

which I was able to obtain the import volume indicators and for both periods. The level of *per capita* GDP is measured at the start of the trade collapse in 1928 and 2008 respectively.[16]

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.[17]

For the inter bellum two sources are available; both sources are based on the work of the statistical office of the League of Nations, but there are differences in the reported numbers and the number of countries covered. The first data source is the draft report by the UN Statistical Office (1962) that was already introduced in Section 2.1 and that provides the value for manufactured goods and the value of the total of merchandise imports for 21 countries, so that their manufacturing import shares can be readily calculated.[18] The second source to be considered is the League of Nations (1931, Table 95, pp.168-170) that reports percentage shares of trade by classes of commodities. The relevant class is Group IV "Manufactured Articles". The League of Nations covers 18 of the countries for which I have data on real import decline (see Section 2.1) and has an overlap with the UN draft report of 14 countries.[19] The statistical relationship between the two sources for the overlapping countries is highly significant and almost all variance is explained by a very simple regression (which suggests that the sources differ by a constant factor related to a definitional or measurement issue):

$$\textit{Manufacturing share} = 0.88 * \textit{Group IV} + 9.2 \quad R^2 = 0.98,\ F = 1074,\ N = 14 \qquad (1)$$

Using this equation, four additional observations can be predicted for the manufacturing share of China, Cuba, Indonesia and Mexico so that for the 1930s data are available for 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).

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[16] 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.
[17] For Cuba the year of observation is 1927, the last pre-crisis year for which a Group IV share has been published.
[18] 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.
[19] Austria, Chile, Denmark, France, Germany, Italy, Japan, the Netherlands, New Zealand, Norway, Sweden, Switzerland, the United Kingdom and the United States.

3.4 Political variables

The Polity IV dataset (http://www.systemicpeace.org/polity/polity4.htm) is used to describe the political system of the economy, although some authors (for example Taylor and Wilson 2006) also use the Polity 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 this paper I use the so-called Polity2 indicator which is based on the aggregate score for Democracy and Autocracy and defined as *Polity2 = Democracy – Autocracy*.[20] One problem with the Polity IV dataset is that it does not provide scores for colonies. This may be especially relevant since India and Indonesia were important trading nations in the 1930s. Several authors have encountered this problem and developed quite different ways to deal with it. Easterley (2005, p. 13), for example, uses the lowest democracy rating for the colonies in his sample and as an alternative runs regressions without colonies. I use a the third *ad hoc* solution and in order to investigate the sensitivity of the findings with respect to the exclusion of colonies in the 1930 I run regressions with and without this variable.[21]

3.5 Country size (shares in world population, world production and world trade) and openness

In order to classify countries by size using a measure that allows meaningful comparison between the 1930s and the 2000s, their shares in world population and world GDP were calculated for 1928 and 2008, respectively.[22] The data are from the Maddison data set that was discussed in Section 2.2. Since I want to be able to differentiate countries by their importance as international trading nations, global trade shares were collected. These shares are directly reported in League of Nations (1931, Table 96, pp. 172-173) for the year 1928 and were calculated from the reported values in UN (2010, Table A) for the year 2008.

Combining the trade and production shares, a relative and period-specific measure for openness was constructed as the ratio of a country's share in world trade over its share in world production. The larger the ratio, the more important is international trade and specialization.

3.6 Comparability between periods

For pre crisis *per capita* GDP, pre crisis GDP (used as input for calculating the share in global production), population and polity the data are available from one source so that the consistency and the comparability are less problematic for these variables. In all other cases several sources had to be used and although the sources measure the same economic concept and sensible

[20] Regressions based on either Democracy or Autocracy did not lead to qualitatively different conclusions.
[21] In addition as a check I also substituted a zero for the missing values, with no important qualitative differences in the findings.
[22] The data for China and Cuba refer to 1929, the earliest year in the inter bellum for which data are provided.

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 for one of the sources (the IMF's International Financial Statistic) two additional procedures had to be used to arrive at real imports since the preferred variable (the seasonable adjusted volume of imports) was not reported on the respective country pages. For the 1930s annual data were used so that there is no need for a seasonable correction (note, however, that the time span is longer for the 1930s and that the peak to trough measure is less precise and indeed typically an underestimate, if annual data are used).

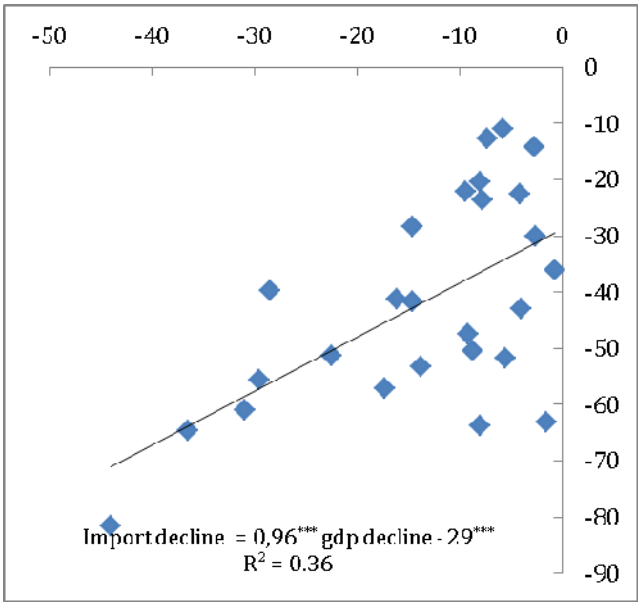
For the *change* in GDP three data sources were used. For the 1930s I calculated peak to trough movement from the annual data reported in the Maddison data set that was discussed in Section 2.5. South Africa is the only country for which I do not have the change in GDP in the 1930s. Since the last year in this data set presently available is 2008, a different procedure was followed for the 2000s and peak to trough changes in per cent are calculated, first, from the OECD quarterly National Accounts and, second (if unavailable from the OECD), from the IMF International Financial Statistics. This procedure has at least the merit that import and GDP declines in the 2000s are based on exactly the same source for each individual country.

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 the League of Nations procedures, definitions, data collection and coverage have changed. The shares reported in the two League of Nations sources as discussed in section 2.3 differ by a constant factor and show a high correlation so that I am 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. I do, however, not expect problems for the geographical pattern (so the share of a country's trade in world trade) other than the usual measurement errors.

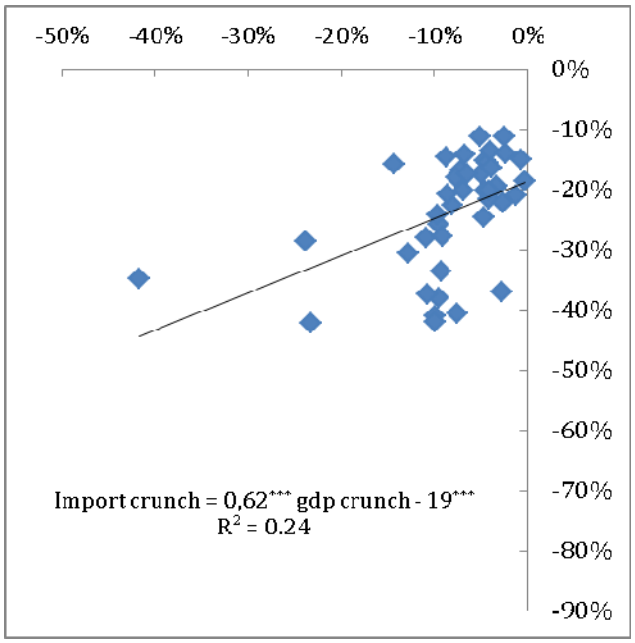
So while a lot of effort was put in collecting and/or constructing comparable data, it is still important to note that differences are likely and finding therefore need to be interpreted with caution. Therefor the research strategy investigates patterns for the whole data set and also takes a look at separate correlates for the 1930s and 2008-09, respectively. This will be done with two distinct methodologies. Section 2.7 presents the data in a series of graphs where the data are reported for the 1930s and 2008-9 and in Section 3 separate regressions are run for the full sample, the subsample of the 1930s and the subsample for 2008-09. This is a relevant approach because concepts are consistently measured in each separate period when uniform yet period-specific definitions and measurement methods were used. The separate regressions for the periods can also provide relevant information about the general cross-period pattern, in particular when the signs and significance of the estimated coefficients between the full sample and the subsample findings are in agreement. Indeed, such agreement could be seen as additional evidence on the robustness of the findings.

3.7 Bivariate correlates of import collapse

FIGURE 5
a) Import decline versus GDP decline 1930s

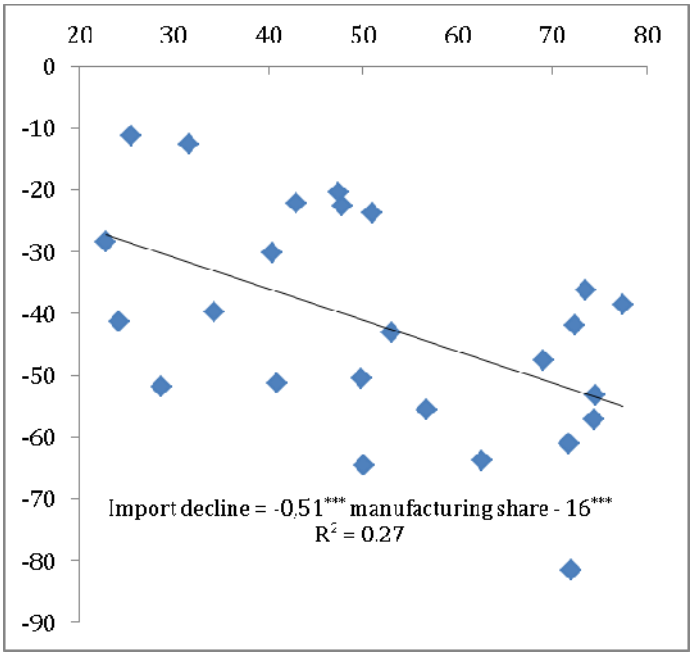


b) Import decline versus GDP decline 2000s

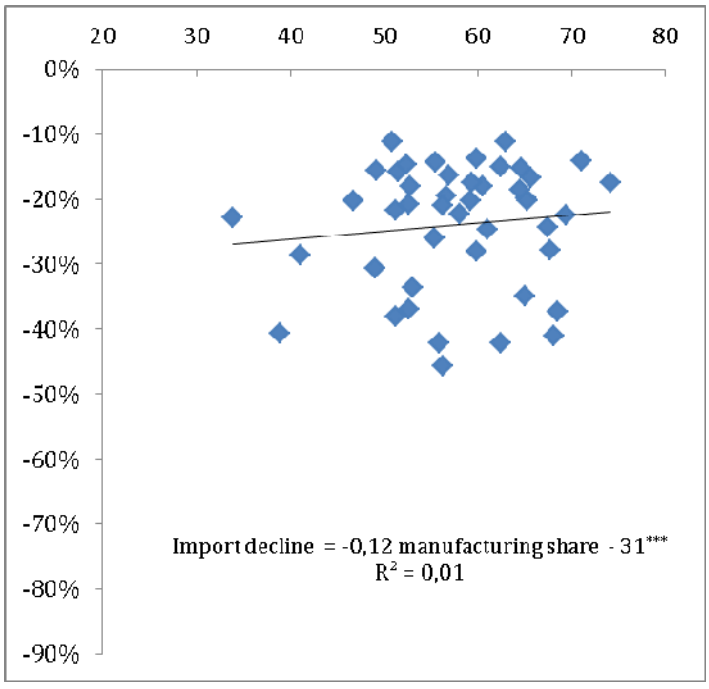


Note: significane levels: *90% **95% ***99%

FIGURE 6
a) Import decline versus manufacturing import share 1930s

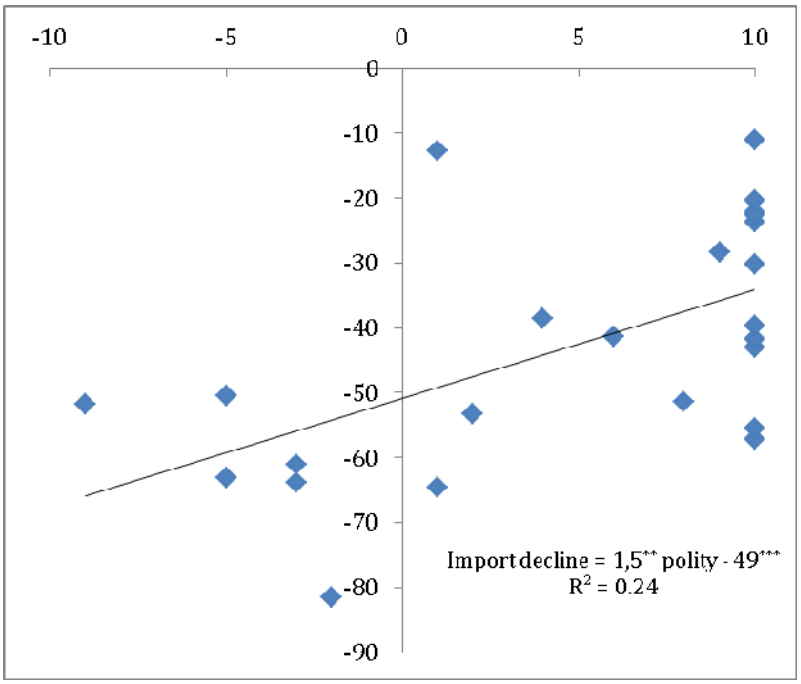


b) Import decline versus manufacturing share 2000s

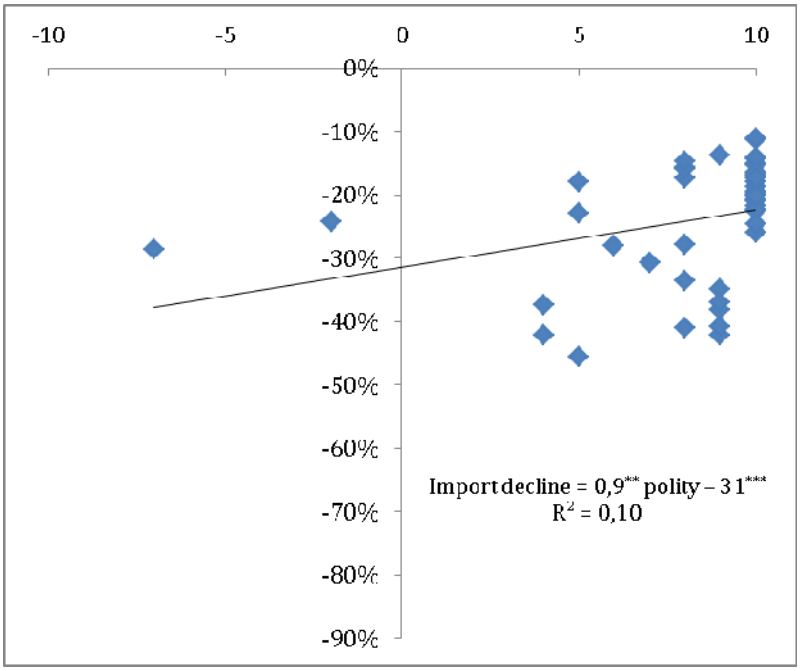


Note: significane levels: *90% **95% ***99%

FIGURE 7
a) Import decline versus pre-crisis polity 1930s

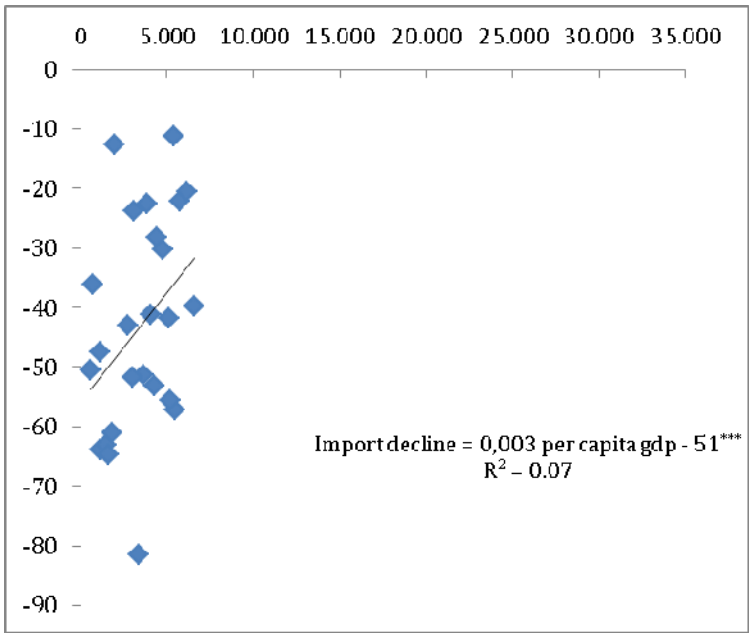


b) Import decline versus pre-crisis polity 2000s

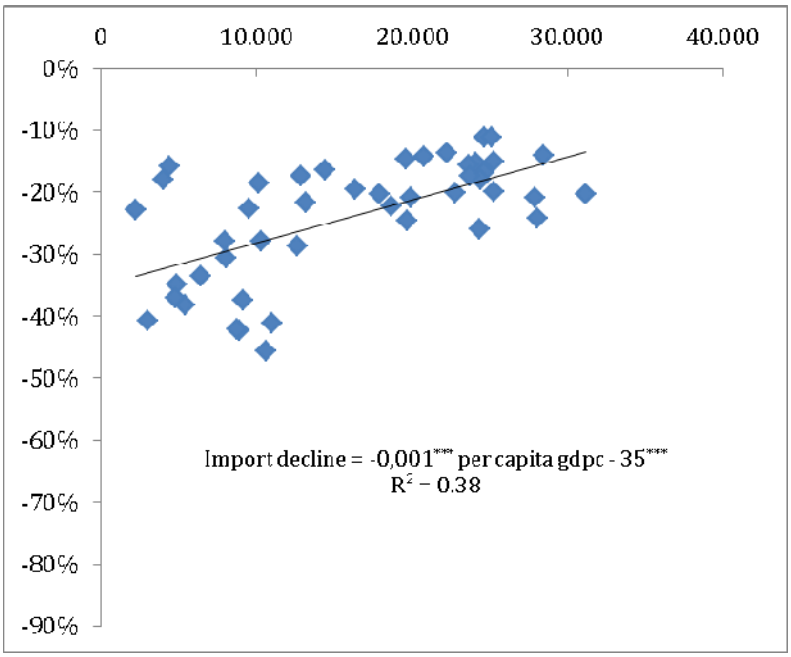


Note: significane levels: *90% **95% ***99%

FIGURE 8
a) Import decline versus pre-crisis GDP p.c. 1930s

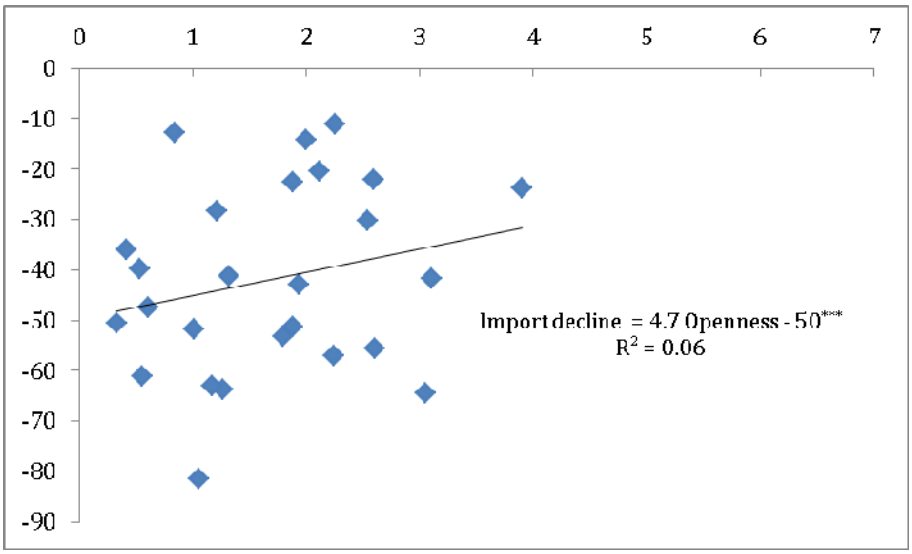


b) Import decline versus pre-crisis GDP p.c. 2000s

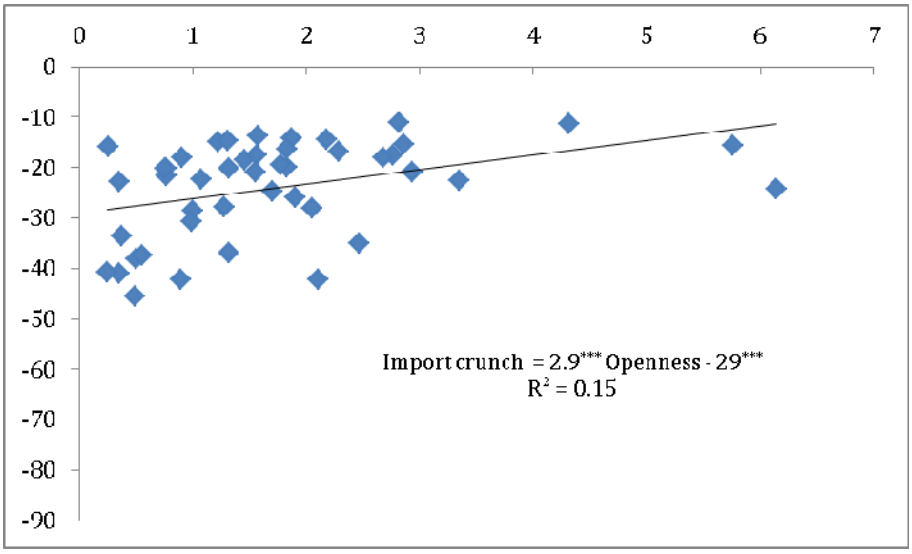


Note: significane levels: *90% **95% ***99%

FIGURE 9
a) Import decline versus openness 1930s



b) Import decline versus openness 2000s



Note: significane levels: *90% **95% ***99%

Figures 5 to 9 summarize the data in five scatter diagrams with the import collapse in per cent on the vertical axis and one of the explanatory variables on the horizontal axis (note that Appendix - Dataset provides the full data set). The graphs deal with GDP decline, manufacturing import share, pre-crisis Polity, pre-crisis per capita GDP and openness. The top panels of each figure show the data for the 1930s and the bottom panel for 2008-09. For ease of comparison, the scale of import decline (the vertical axis) is identical for all

figures. Horizontal axes are identical per explanatory variable (so for each top and bottom panel). Note that these figures use all data available for the respective explanatory variable. So for example for Figure 8 (trade decline versus openness) we have 72 observations available because there are no missing observations for openness. For other variables we have less than 72 observations and for that reason the number of observations in the regressions never exceeds 66 (we have 6 missing values for the variables of special interest: 4 for GDP decline and 2 for manufacturing trade share). The scatter diagrams suggest that the relationship between import decline and both GDP decline and the manufacturing share in trade was comparatively speaking stronger in the 1930s. In 2008-9 the effects of pre-crisis per capita GDP and openness are more pronounced. The effect of polity is quite comparable across period

Table 1 reports the key statistics of the regression lines that appear in Figures 4 to 8. It is useful to compare the t-values between the 1930s and 2008-09 since t-values are dimensionless variables and therefore less prone to measurement error and other time dependent distortions. Due to the differing amounts of available observations I use adj-R^2 for inter-temporal and intra-temporal comparisons.

TABLE 1
Partial correlates and t-values

	1930s			2008-09		
	N	t-value	Adj-R^2	N	t-value	Adj-R^2
GDP decline	26	3.7***	0.33	42	3.5***	0.22
Pre-crisis Manufacturing share	25	2.9***	0.27	45	0.7	-0.01
Pre-crisis polity	25	-2.7**	0.24	45	-2.2**	0.08
Pre-crisis per capita GDP	26	-1.3	0.03	45	-5.2***	0.37
Pre-crisis Openness	26	-1.2	0.01	45	-2.8***	0.13

Notes: N number of available observations for explanatory variable. t value for the explanatory variable. Adj-R^2 for equation that includes constant term as well * 90% ** 95% *** 99% significance levels

The first thing to note is that the *signs* of the estimated slope coefficients correspond although the sizes and significance levels may differ. The significance levels for GDP decline and for pre-crisis polity show the same pattern (but note that the explanatory power of their partial correlates is substantially larger for the 1930s). Importantly the two trade collapses significantly appear to differ with respect to the manufacturing import share, per capita GDP and openness.

4 Research design and econometric findings

The partial correlations that were reported in Section 2.7 provide already some relevant information about the determinants of the depth of the import decline in the 1930s versus the 2008-9 trade collapse. This section takes the determinants simultaneously on board and also investigates the larger sample properties of the data set.

4.1 Research design

The analysis takes the form of a cross-section analysis of percentage decrease of the volume of imports that occurred between 1928 and 1938 in 27 countries and between 2008Q1 and 2009Q4 in 45 countries. The decrease is measured peak to trough. The set of explanatory variables consist of a group of country-specific variables (measured in the year before the world trade collapse started) and two variables for the demand shock and the composition effect. The research question aims at uncovering, first, a general relationship that describes the determinants of import collapse and, second, to test for differences between the two collapses (typically by running separate regressions including time specific dummy variables). I develop both a linear and a multiplicative (log-linear) set of regressions because I have no a priori information about the functional form and also to provide a test for the robustness of the findings.

Unlike the country-specific variables for which data are available that have been derived from sources with long time horizons (that also include the periods in which I am interested), the observations for trade decline, demand shock (GDP decline) and composition effect (Manufacturing trade share) have been derived from period-specific sources. It is therefor important to note at the start that it is possible that the additive (shift) dummy for the 1930s may pick up the fact that the data are from sources that – although describing the same economic concepts (import, production, industry products) – have deployed different methods and procedures for data collection and definitions as discussed in Section 2. In view of the fact that imports and GDP are expressed as percentage changes and manufacturing share as a percentage, however, differences in data collection would probably result in a shift of the relationship (so where the dummy variable for the 1930s is additive). These differences would not have an impact on slope parameters (so where the dummy variable for the 1930s is entered multiplicatively).

All in all a number of quasi-reduced form equations have been estimated that are based on the following specifications:

(1) $\textit{Import decline} = \alpha \textit{GDP decline} + \gamma \textit{Manufacturing share} + \theta \textit{Per capita GDP} + \psi \textit{Polity} + \lambda \textit{Country size} + \phi \textit{Openness} + \varepsilon$ (see Table 2)

(2) $\text{Log}(\textit{Import decline}) = \alpha \text{Log}(\textit{GDP decline}) + \gamma \text{Log}(\textit{Manufacturing share} + \theta \text{Log}(\textit{Per capita GDP} + \psi \text{Log}(\textit{Polity} + \mu) + \lambda \text{Log}(\textit{Country size}) + \phi \text{Log}(\textit{Openness}) + \textit{Constant term} + \varepsilon$ (see Table 3)

(3) *Import decline* = $(\alpha + \delta_{1930s}\,\beta)$*GDP decline*+$(\gamma + \delta_{1930s}\,\xi)$*Manufacturing share* + θ*Per capita GDP* + ψ*Polity* + λ*Country size* + ϕ*Openness* + δ_{1930s} + *Constant term* + ε (see Table 4)

with a priori expected $\alpha > 0$, $\gamma > 0$, $\psi < 0$ and $\lambda > 0$. For the other variables expectations are ambiguous (θ and ϕ) or not formulated because the parameters will be positive or negative depending on significant differences between the 1930s and 2008-09. The dummy variable $\delta_{1930s} = 1$ for the 1930s, else 0. In order to be able to take logs a constant μ was added in equation 2 so that the Polity scale became strictly positive. The error term ε has the usual properties.

4.2 Econometric findings

Tables 2 and 3 report the coefficients for the full sample and for the 1930s and 2008-9. Table 2 reports on the linear specification of the empirical model (equation 1) and Table 3 reports the multiplicative version (equation 2). Tables 2 and 3 are organized in the same way. The estimated coefficients in the linear model and the multiplicative model have a similar pattern in terms of signs and significance. Therefore the discussion does not deal with the tables separately.[23]

TABLE 2
Determinants of import collapse 1930s and 2008-10 (Linear model, OLS, White heteroskedasticity-consistent standard errors and covariance)

Linear	Full sample		1930s		2008-09
Number of observations	64	66	22	24	42
GDP decline	0.6***	0.7***	0.8***	1.0***	0.2
	(3.1)	(3.6)	(5.2)	(7.1)	(1.4)
Manufacturing import share	0.3***	0.3***	0.4***	0.4**	0.0
	(2.8)	(2.7)	(3.0)	(2.4)	(0.3)
Pre crisis Polity	-0.9**		-1.1		-0.5
	(2.6)		(-1.6)		(1.2)
Pre crisis per capita income	-0.7***	-0.8***	-0.4	-0.2**	-0.5***
	(4.5)	(-5.8)	(-0.2)	(2.1)	(3.6)
Openness	-1.0	-1.2	-0.0	1.7	-1.2
	(-1.3)	(-1.3)	(-0.0)	(0.9)	(-1.5)
Constant	24.5***	18.5**	17.6	21.9	35***
	(3.1)	(2.4)	(1.4)	(1.7)	(3.8)
R^2	0.71	0.66	0.78	0.70	0.56
Adjusted R^2	0.69	0.63	0.70	0.64	0.50
F	28.6***	29.2***	11.0***	11.3 ***	9.1***

Notes: (t- values in brackets) * 90% ** 95% *** 99% significance levels

[23] The only difference is the significance level of polity in the 1930s which is highly significant in the multiplicative model.

TABLE 3
Determinants of import collapse 1930s and 2008-10 (Multiplicative model, OLS, White heteroskedasticity-consistent standard errors and covariance)

Multiplicative	Full sample		1930		2008-09
Number of observations	64	66	22	24	42
GDP decline	0.2***	0.2***	0.3***	0.3***	0.1*
	(3.9)	(5.0)	(3.0)	(4.5)	(2.0)
Manufacturing import share	0.5**	0.4**	0.6**	0.6**	0.4
	(2.7)	(2.2)	(2.4)	(2.3)	(1.4)
Pre crisis Polity (transformation[24])	-0.1*		-0.3***		-0.2*
	(1.9)		(-3.6)		(-1.8)
Pre crisis per capita income	-0.3***	-0.3***	-0.1	-0.2*	-0.3***
	(-5.6)	(-7.5)	(-0.4)	(-1.7)	(-4.4)
Openness	-0.1	-0.1	-0.0	-0.1	-0.1
	(0.8)	(-0.9)	(-0.4)	(-0.8)	(1.1)
Constant	3.9***	3.7***	1.7	2.1	5.5***
	(4.0)	(3.6)	(1.2)	(1.4)	(4.2)
R^2	0.64	0.63	0.65	0.55	0.57
Adjusted R^2	0.61	0.61	0.54	0.46	0.51
F	21.0***	26.0***	5.9***	5.8***	9.4***

*Notes: (t- values in brackets) * 90% ** 95% *** 99% significance levels*

The first two columns of Tables 2 and 3 show the results for the full sample; the second column does not include pre-crisis Polity as an explanatory variable in order to take two colonies (India and Indonesia) on board for which no data are available. The third and fourth columns deal with observations for the 1930s and follow the same procedure regarding Polity. The final column summarizes the findings for 2008-09. The full sample model performs quite well in statistical terms and explains 63 to 71 per cent of the variance. The coefficients for GDP decline, manufacturing import share and pre-crisis trade have the a priori expected signs and are highly significant at the 95 per cent confidence level and better. Note, however, that the coefficient for GDP decline is not in agreement with the idea of a trade multiplier as it is less than 1. Openness is not significant (as are the country size indictors that were never significant in any regression and have thus been excluded). Pre-crisis per capita income has a negative and highly significant coefficient.

All in all the linear and the multiplicative model provide a reasonable good description of the two trade collapses. Comparing the full sample regressions and the regressions for the 1930s, we observe that the signs always agree, but notable differences occur with respect to the significance level of the estimated coefficients for pre-crisis Polity and pre-crisis per capita income in the linear model. The linear and multiplicative models contradict each other with respect to the explanatory power in the 1930s that approaches 78 per cent in Table 2, but deteriorates to 55 per cent in Table 3. For 2008-09 (last column) the signs

[24] In order to be able to take logs an arbitrary constant was added so that the scale became strictly positive.

of the coefficients also agree with the general model but typically their significance levels deteriorate (with the exception of per capita income and – in the multiplicative model – pre-crisis Polity).

The findings in the first place suggest that the mainstream narrative for a world trade collapse provides a reasonably good explanation of the drivers of the phenomenon in general, but also offer indications that the two collapses differ with respect to the importance of the demand shock and the composition effect. It is not likely that these findings are caused by measurement errors and differences in definitions, as the conclusions are based on independent cross section regressions for the 1930s and 2008-09.

TABLE 4
Determinants of import collapse 1930s and 2008-10 (Shift and slope dummies, OLS, White heteroskedasticity-consistent standard errors and covariance)

	(1)	(2)	(3)	(4)	(5)	(6)
Number of observations	64	66	64	64	66	66
GDP decline	0.7***	0.7***	0.6***	0.2	0.3*	0.6***
	(4.5)	(4.3)	(3.6)	(0.9)	(1.9)	(3.3)
GDP decline * dummy 1930s				0.6***	0.6***	0.3
				(2.8)	(2.9)	(1.2)
Manufacturing import share	0.4***	0.4***	0.4***	0.1	0.0	-0.1
	(3.3)	(3.4)	(3.7)	(0.4)	(0.3)	(-0.5)
Manufacturing import share * dummy 1930s				0.4**	0.4**	0.5**
				(1.9)	(2.1)	(2.4)
Pre crisis Polity	-0.8***		-0.8***	-0.8***		
	(-2.8)		(-2.8)	(-2.7)		
Pre crisis per capita income		-0.4**	-0.4**	-0.5***	-0.6***	
		(-2.4)	(-2.3)	(-3.6)	(-3.9)	
Openness	-2.9***	-2.1**	-1.9**	-1.3*	-1.5	
	(-3.5)	(-2.1)	(-2.5)	(-1.9)	(-1.5)	
Dummy 1930s	14.3***	10.4**	8.6**	-20.1*	-19.5*	-18
	(4.5)	(2.6)	(2.4)	(-1.8)	(-1.7)	(-1.2)
Constant	9.5	8.7	14.3*	37.6***	31.7***	24.7**
	(1.2)	(1.1)	(1.7)	(4.0)	(3.8)	(2.1)
R^2	0.73	0.70	0.75	0.79	0.75	0.66
Adjusted R^2	0.70	0.68	0.72	0.76	0.71	0.63
F	30.8***	28.4***	28.4***	26.4***	24.2***	23.6***

*Notes: (t- values in brackets) * 90% ** 95% *** 99% significance levels*

Table 4 uses the information of the full sample but incorporates an additive shift dummy for the 1930s as well as multiplicative dummies that test for differences in the slopes of GDP decline and manufacturing import share.

The first three columns only use the additive dummy for specifications that include and exclude pre-crisis polity and pre-crisis per capita income. The significant dummy variable reflects either that the trade decline was larger in the 1930s or measurement issues. In comparison to Tables 2 and 3 the

significance of all coefficients improves (in particular openness is now significant) as well as the explanatory power of the equation (as illustrated by the adjusted-R^2). Typically the results thus support the assessment that this simple quasi-reduced form equation provides a reasonably good description of the phenomenon of trade collapse.

The last three columns include both shift and slope dummies. Column 4 is the full sample model that includes all explanatory variables, column 5 excludes Polity (and thus additionally covers India and Indonesia in the 1930s) and column 6 is a version of the model that excludes all country-specific control variables. The estimates agree that the manufacturing import share in the 1930s was a much stronger factor than the average or full sample effect and thus *a fortiori* than in 2008-10. The same can be concluded on the basis of columns 4 and 5 with respect to GDP decline but not on the basis of the model that excludes all country-specific control variables.

4.3 Sensitivity analysis and robustness of the findings

As a first issue this paper considered in the previous section the functional form of the estimated reduced form equation. All specifications of the equations were estimated both in linear and log-linear form. The results of these exercises are comparable in terms of both the explanatory power of the equation and the signs of the estimated coefficients. The significance levels differ, but the crucial tests on the sign and size of the coefficients for GDP decline and the size of the manufacturing share in imports yield comparable results. Importantly, the changes in the sample size and country coverage, the pooling of the data and the use of different specifications do not change the main conclusions of this paper.

Table 5 provides yet another sensitivity analysis that sheds further light on the robustness of the findings. I reduce the period of observation in the interbellum to 1929-1932, because it can be sensibly argued that the policy environment in the 1930s changed dramatically after 1932 when protectionism did become important and countries differed dramatically in the key policy decisions (in particular regarding the adherence to the Gold Standard, Eichengreen and Irwin 2009). The cost of the reduced observation period is that we do not consider the full peak to trough movement; the benefit is that the data are probably better comparable.

The results in Table 5 overall confirm the earlier findings for the linear specifications reported in Tables 2 and 4.[25] I find smaller values for (adj.-)R^2, but the explanatory power of the estimated equations remains good. The shift dummy variable for the 1930s becomes insignificant in columns 3 and 4. This suggests that the data are better comparable due to the absence of policy responses after 1932 (the increased size and significance of openness also point into that direction). However, this may also simply reflect that we do not analyse the full peak to trough movement so that the values for the dependent variable are smaller by definition. For the same reason the interpretation of the shift dummy for the 1930s and the constant term in columns 5 and 6 is not

[25] For the log-linear specifications the differences are that Polity and Openness now become significant in the full sample at well, but only at the 90% confidence level.

straight-forward. Importantly, the crucial tests on the sign and size of GDP decline and the size of the manufacturing share in imports become even more convincing in this sensitivity analysis.

TABLE 5
Sensitivity analysis: import collapse 1929-1932 and 2008-10 (Shift and slope dummies, OLS, White heteroskedasticity-consistent standard errors and covariance)

	(1)	(2)	(3)	(4)	(5)	(6)
Number of observations	64	66	64	66	64	66
GDP decline	0.7***	0.9***	0.7***	0.8***	0.2	0.3*
	(3.5)	(4.3)	(3.8)	(4.6)	(1.1)	(1.9)
GDP decline * dummy 1930s					0.7***	0.8***
					(3.2)	(3.7)
	0.4***	0.4***	0.5***	0.4***	0.1	0.0
	(4.0)	(3.9)	(4.6)	(4.1)	(0.5)	(0.3)
Manufacturing import share * dummy 1930s					0.5***	0.4***
					(2.6)	(2.6)
Pre crisis Polity	-0.7**		-0.7**		-0.7**	
	(-2.0)		(-2.1)		(-2.3)	
Pre crisis per capita income	-0.6***	-0.6***	-0.4**	-0.4**	-0.6***	-0.6***
	(-3.7)	(-3.7)	(-2.0)	(-2.0)	(-3.5)	(-3.9)
Openness	-1.8**	-1.8*	-2.5**	-2.3**	-1.7**	-1.6
	(-2.1)	(-1.8)	(-2.6)	(-2.1)	(-2.1)	(-1.5)
Dummy 1930s			6.4	-5.7	-31.6***	-30.3***
			(1.4)	(-1.2)	(-2.9)	(-2.9)
Constant	13.5*	9.2	6.8	3.8	36.2***	31.6***
	(1.7)	(1.4)	(0.8)	(0.5)	(4.0)	(3.8)
R^2	0.68	0.63	0.70	0.65	0.76	0.71
Adjusted R^2	0.65	0.61	0.67	0.62	0.73	0.68
F	24.8***	26.1***	21.8***	26.4***	22.0***	20.4***

*Notes: (t- values in brackets) * 90% ** 95% *** 99% significance levels*

5 Conclusions and implications

In order to put the mainstream narrative for the recent world trade collapse into a consistent economic-historic framework, this paper developed a comparable data set for the analysis of the two world trade collapses of the 1930s and the 2000s. The empirical analysis explains about 70% of cross-country variance in 72 periods of import decline (27 in the 1930s; 45 in the 2000s). The findings support the emerging professional consensus: the decrease in domestic demand and the share of manufacturing trade are key determinants of the severity of a world trade collapse.

In addition, the paper identifies other country-specific characteristics that impact on trade decline, including the level of development and the political system, that have not yet been considered in the mainstream narrative for the recent world trade collapse. Some evidence exists that openness is also

relevant, but here the evidence is only provided by the full sample estimates that include an additive shift dummy for the 1930s and never by the estimates for separate periods.

Importantly, the analysis shows important relative differences between the 1930s and the 2000s. Both the demand shock and the composition effect are comparatively speaking less important in the recent trade collapse than in the 1930s. This is a remarkable and exciting finding given the profession's early and outspoken conviction that supply chains were a (if not the) driver of the extraordinary trade developments in late 2008 and early 2009. The correlation between international value chain activity and globalization in the period before the trade collapse (that constitutes the basis for the main stream narrative on the impact of value chain activity on openness and international trade) may be genuine but in view of this paper's findings requires a different interpretation. Globalization is a firm driven process and fragmentation of production according to the available evidence has been associated with an increase in the world's trade-to-GDP-ratio. The underlying mechanism may, however, be quite different from the purely mechanical statistical relationship that relates to the different modes of measurement regarding GDP (value added) and trade (turn-over). Value chain interaction may bread trust amongst participating firms because of the repeated-buy character of the transactions and/or have external effects (such as demonstration effects, learning effects or network effects) which support globalization. If this is the case, there is no reason why this role should be asymmetrical (positive in upswings and negative in downturns) as assumed by the dominant narrative. This has important implications both for the analysis and for policy advice, in particular the idea of stabilizing economies by means or a reorientation towards domestic production. In contrast my findings imply that additional efforts are in order to increase trust in the trading system in particular by a firm commitment to the multilateral approach.

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Appendix - Dataset

TABLE A1
Data set

	Key economic variables			Polity		Control variables				
Country	Import decline	GDP de-cline	Manufac-turing trade share	democ	autoc	per capita GDP	World trade share	GDP share	Popula-tion share	1930s
Argentina	53.2	13.7	74.5	4	2	4291	2.3	1.3	0.5	*
Australia	57.1	17.3	74.3	10	0	5452	2.0	0.9	0.3	*
Austria	51.3	22.5	40.9	8	0	3657	1.3	0.7	0.3	*
Brazil	63.8	8.1	62.5	1	4	1158	1.3	1.0	1.5	*
Canada	55.6	29.6	56.6	10	0	5172	3.7	1.4	0.5	*
Chile	81.5	44.1	71.9	1	3	3332	0.4	0.4	0.2	*
China	50.5	8.7	49.9	1	6	562	2.5	7.5	23.3	*
Colombia	63.1	1.5	n/a	1	6	1490	0.4	0.3	0.4	*
Cuba	64.6	36.5	50.1	4	3	1638	0.6	0.2	0.2	*
Denmark	30.2	2.6	40.5	10	0	4785	1.3	0.5	0.2	*
Finland	43.1	4.0	53.0	10	0	2707	0.6	0.3	0.2	*
France	28.3	14.7	22.8	9	0	4431	6.1	5.0	2.0	*
Germany	41.3	16.1	24.2	6	0	4090	9.6	7.3	3.1	*
India	36.1	0.7	73.5	n/a	n/a	706	2.6	6.4	15.8	*
Indonesia	47.5	9.2	69.0	n/a	n/a	1130	1.2	1.9	2.9	*
Italy	51.8	5.5	28.7	0	9	3016	3.3	3.3	1.9	*
Japan	12.7	7.3	31.6	5	4	1992	2.9	3.4	3.0	*
Mexico	61.1	30.9	71.8	1	4	1857	0.5	0.9	0.8	*
Netherlands	22.2	9.5	42.9	10	0	5720	3.1	1.2	0.4	*
New Zea-land	41.8	14.6	72.4	10	0	5141	0.6	0.2	0.1	*
Norway	23.7	7.8	50.9	10	0	3106	0.8	0.2	0.1	*
South Africa	38.6	n/a	77.4	7	3	n/a	1.1	n/a	0.0	*
Sweden	22.6	4.1	47.8	10	0	3885	1.3	0.7	0.3	*
Switzerland	20.4	8.0	47.4	10	0	6171	1.5	0.7	0.2	*
Taiwan	14.2	2.7	n/a	n/a	n/a	1100	0.3	0.1	0.2	*
UK	11.1	5.8	25.5	10	0	5357	15.1	6.7	2.2	*
USA	39.7	28.5	34.3	10	0	6569	11.8	22.0	5.8	*
Argentina	41.1	9.9	68.1	8	0	10995	0.3	0.9	0.6	
Australia	15.0	0.8	62.4	10	0	25301	1.2	1.0	0.3	
Austria	15.3	4.6	64.6	10	0	24131	1.1	0.4	0.1	
Belarus	28.6	23.7	41.1	0	7	12607	0.2	0.2	0.1	
Belgium	15.6	4.2	49.2	8	0	23655	2.9	0.5	0.2	
Brazil	33.6	9.2	53.0	8	0	6429	0.9	2.5	2.9	
Bulgaria	42.2	23.2	55.9	9	0	8886	0.2	0.1	0.1	
Canada	19.9	3.4	65.2	10	0	25267	2.9	1.7	0.5	
Chile	21.7	4.0	51.3	10	0	13185	0.3	0.4	0.2	

TABLE A1
continued

Country	Import decline	GDP de-cline	Manufac-turing trade share	democ	autoc	per capita GDP	World trade share	GDP share	Popula-tion share	1930s
Czech Republic	17.5	4.9	74.2	8	0	12868	0.8	0.3	0.2	
Denmark	16.8	7.0	65.6	10	0	24621	0.7	0.3	0.1	
Ecuador	18.0	n/a	52.8	5	0	3987	0.1	0.1	0.2	
Finland	26.0	9.5	55.4	10	0	24344	0.6	0.3	0.1	
France	13.7	3.9	59.9	9	0	22223	4.4	2.8	1.0	
Germany	14.4	6.7	55.5	10	0	20801	7.4	3.4	1.2	
Greece	19.5	3.2	56.6	10	0	16362	0.5	0.3	0.2	
Hungary	22.6	8.0	69.4	10	0	9500	0.7	0.2	0.1	
India	40.7	7.4	38.9	9	0	2975	1.6	6.7	17.1	
Indonesia	15.9	14.2	51.5	8	0	4428	0.5	2.0	3.4	
Ireland	21.0	1.2	56.2	10	0	27898	0.6	0.2	0.1	
Israel	20.2	6.8	65.3	10	0	17937	0.4	0.3	0.1	
Italy	20.8	8.5	52.6	10	0	19909	3.6	2.3	0.9	
Japan	20.2	4.6	46.7	10	0	22816	4.3	5.7	1.9	
Korea South	14.8	8.7	52.4	8	0	19614	2.5	1.9	0.7	
Malaysia	28.0	10.9	59.9	6	0	10292	1.0	0.5	0.4	
Mexico	27.9	9.1	67.7	8	0	7979	2.2	1.7	1.6	
Netherlands	11.3	5.0	50.9	10	0	24695	3.5	0.8	0.2	
New Zea-land	22.3	2.7	58.0	10	0	18653	0.2	0.2	0.1	
Norway	14.1	2.3	71.0	10	0	28500	0.6	0.3	0.1	
Pakistan	22.9	n/a	33.8	5	0	2239	0.3	0.8	2.6	
Peru	38.1	9.6	51.3	9	0	5388	0.2	0.3	0.4	
Poland	18.6	0.3	64.5	10	0	10160	1.2	0.8	0.6	
Portugal	16.5	3.9	56.9	10	0	14436	0.5	0.3	0.2	
Romania	34.9	41.6	65.0	9	0	4895	0.5	0.2	0.3	
Russia	37.4	10.8	68.5	5	1	9111	1.4	2.5	2.1	
Singapore	24.3	9.6	67.4	2	4	28107	1.8	0.3	0.1	
South Africa	37.0	2.8	52.7	9	0	4793	0.7	0.5	0.7	
Spain	24.6	4.7	61.0	10	0	19706	2.7	1.6	0.6	
Sweden	18.0	7.7	60.5	10	0	24409	1.1	0.4	0.1	
Switzerland	11.2	2.5	63.0	10	0	25104	1.1	0.4	0.1	
Thailand	42.2	9.9	62.5	5	1	8750	1.0	1.1	1.0	
Turkey	30.7	12.8	49.1	8	1	8066	1.2	1.2	1.1	
United Kingdom	17.5	6.4	59.4	10	0	23742	4.4	2.8	0.9	
United States	20.3	4.1	59.2	10	0	31178	14.1	18.6	4.5	
Venezuela	45.6	n/a	56.2	5	0	10596	0.3	0.6	0.4	