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Global trade finance, trade collapse and trade slowdown: a Granger causality analysis

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Abstract

This research paper provides a causality assessment on the linkage between declines in world trade finance and the world trade collapse in the period following the Financial Crisis of 2008 and 2009 as well as the ensuing global trade slowdown. The paper performs Granger Causality tests on two time series: World trade (volume data acquired from the CPB World Trade Monitor) and World trade finance (transaction data acquired from SWIFT), using global monthly data from January 2007 to May 2017. In the short run, Granger causality always runs one-way from world trade finance to world trade. We always find two-way Granger causality for lags longer than two years. Importantly Granger causality never runs one-way from world trade to world trade finance. Given the short-term nature of trade finance, we conclude that world trade finance Granger-causes world trade

Keywords

World trade, world trade collapse, world trade slow-down, trade finance, Granger causality, financial crisis, SWIFT.

JEL classification

F10, F34, F40, F65, G01, G21.

Acronyms

ADB	Asian Development Bank
BAFT	Bankers Association for Finance and Trade
BIS	Bank for International Settlements
CPB	CPB Netherlands Bureau for Economic Policy Analysis
EU	European Union
GDP	Gross domestic product
GPP	Gross Planet Product
ICC	International Chamber of Commerce
IFSA	International Financial Services Association
IMF	International Monetary Fund
L/C	Letter of credit
Max	Maximum
Min	Minimum
Obs.	Observations
OECD	Organization for Economic Co-operation and Development
Std. Dev.	Standard deviation
SWIFT	Society for Worldwide Interbank Financial Telecommunication

Global trade finance, trade collapse and trade slowdown: a granger causality analysis

1 Introduction

The global trade collapse that started in late 2008 (Baldwin, 2009) and the global trade slowdown that followed (Hoekman, 2015) is a topic for continued research. The concensus view identifies the fall in demand as the major cause of the downturn in trade flows is, for example, find that declines in total manufacturing demand account for more than 80 percent of the reduction in trade flows (see also Ahn et al. (2011), Bems et al. (2010), and van Bergeijk (2017)). Another key driver of the global trade collapse is omnipresence of international value chains, as illustrated by the increases of both the share of intermediate goods in world trade and the elasticity of world trade to GPP[1] have remarkably increased over the last few decades (see Freund (2009), Cheung and Guichard (2009), van Bergeijk (2013a), van Marrewijk (2009)). Besides, protectionism is often seen as an important main reason for trade destruction in the period after the trough of the world trade collapse in the Great Depression (Eichengreen & Irwin, 2010; Kindleberger, 1978). In addition, it is notably that movements to strengthen the openness of trade globally have stagnated especially in recent times which to some suggests a new wave of protectionism and deglobalization (van Bergeijk & Moons, 2018).

An important issue in the debate on the world trade collapse and the ensuing world trade slow-down is the role of trade finance which some authors are arguing that "a lack of trade finance has been one of the reasons for the decline in trade" (Auboin & DiCaprio, 2017, p. 11) while other authors argue the opposite, namely that the reduction of world trade led to lower demand for trade finance Clark (2014, p. 56) states that "changes in trade flows are the most important driver of changes in trade finance."

The resolution of this causality debate unfortunately is in an empirical sense substantially hindered by the fact that no time series exists for world trade finance. In 2004 the Bank of International Settlement (BIS) discontinued its trade finance series (co-produced with IMF, OECD and World Bank), because "the cost-to-quality ratio of these statistics led the agencies to discontinue this effort" (Auboin, 2009b, p. 11). As a consequence no data were available for private sector trade finance when world trade collapsed and, unfortuntely, the production of a time series still still has not started.[2] In this paper we therefore use an indirect measure of trade finance activity, namely the

[1] GPP is Gross Planet Product, see van Bergeijk 2013.

[2] The only remaining source for time series after 2004 was the Berne Union data base which only covers a specific part of the industry, namely (public) trade credit insurance.

amount of messages that are exchanged via the network of the Society for Worldwide Interbank Financial Telecommunication (SWIFT). This network is the global standard in the private sector's trade finance exchange. It "capture[s] a large range of administrative or technical messages related to the processing of L/Cs [Letters of Credit] and documentary collections" (Clark, 2014, p. 32).[3] Our use of SWIFT data lines up with Clark's limiting definition of trade financeas "bank products that are specifically linked to underlying international trade transactions (exports or imports)" (Clark, 2014, p. 3). In other words, trade finance refers to bank-intermediated financial instruments for international trade.[4] The SWIFT data have been used before in research on the world trade collapse (e.g. Chauffour et al. (2010) and van Bergeijk (2010)). The SWIFT data indeed is a relevant indicator of trade finance activity as banks in different jurisdictions need to communicate with each other about the conditions and financial arrangements related to letters of credit, documents, payments, etc. Obviously this is not a perfect measure, but given the data paucity regarding actual trade finance transactions at the global level the use of an indirect observtion is necessary.[5]

Figure 1 illustrates the co-movement in world trade finance and world trade since the Financial Crisis of 2008 and 2009. Therefore many authors have argued that a lack of world trade finance is one of the plausible explanations for world trade collapse.

The major contribution of this paper is the time series analysis of the question whether trade finance Granger-causes reductions in world trade growth or that the relationship is the other way round. A linear Granger causality analysis is a well-established test for the direction of bivariate causality. This issue has so far not been investigated in the literature. Analyzing the causality relationship between world trade finance and world trade over the period from January 2007 to April 2017, we find a two-way Granger causality relation between world trade finance and world trade over a two year period

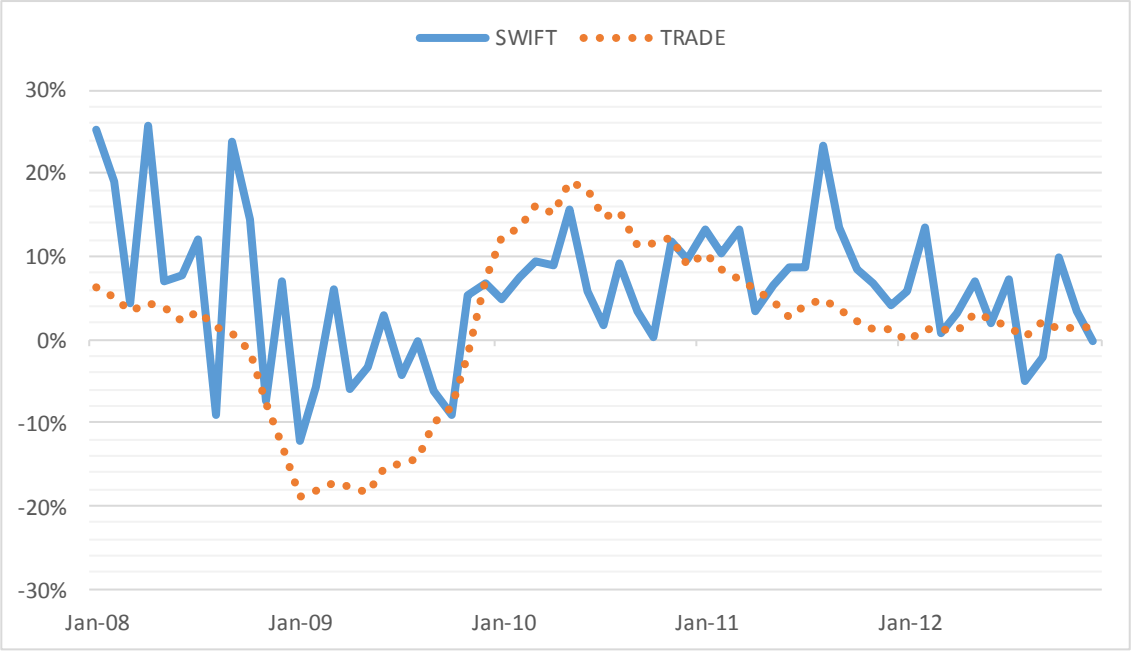
[3] Letters of Credit and documentary collection are the main vehicles of trade finance.

[4]As such, trade finance is important for both exporters and importers to secure their transactions. However, considering long-term business relationships in which the business partners have gained great knowledge about each other, trade finance becomes costly and less preferred. In such cases, exporters and importers tend to provide trade credit to their partners as a way to strengthen their trading relationship, improve their competitiveness and reduce transaction costs (IMF/BAFT, 2009). So, trade credit, an alternative to trade finance, is an inter-firm financing of trade with almost no bank intermediation. Data on intra-firm and inter-firm credit are even more difficult to obtain. Therefore, we restrict ourselves to the causality relationship between trade finance and trade collapse in late 2008 also because we want to investigate the importance of the international banking system in the context of the collapse and recovery in global trade.

[5] An additional argument for the validity of use of the SWIFT data is the 'natural experiment' provided by the EU and US sanctions against Iran that banned from the use SWIFT and had a significant impact on trade (van Bergeijk 2015).

across different levels of lagged values. Granger causality never runs one-way from world trade to world trade finance. Given the short-term nature of trade finance, we conclude that world trade finance Granger-causes world trade.

Figure 1
Trade finance and trade (Year-on-Year rates of growth, 2008 – 2012)



Source: SWIFT (World trade finance) and CPB World Trade Monitor (World trade)

The remainder of this working paper is organized as follows. Section 2 gives an overview of the debate on trade finance and the development of world trade since the Great Recession illustrating the inconclusiveness of the debate regarding the importance of trade finance as a (potential) driver of world trade developments. Section 3 discusses our data series on trade finance and and their properties. Next Section 4 introduces Granger Causality tests and our research strategy. Section 5 reports and discussed the empirical findings. The final section concludes and offers suggestions for further research.

2 Literature review

Many studies on the trade collapse argue that the fall in demand is largely responsible for the decline in international trade flows. Using a global input-output framework for trading data of the US and EU countries, Bems et al. (2010, p. 1) conclude that "demand alone can account for 70 percent of the trade collapse." Ahn et al. (2011) simulate a relatively high GDP – trade elasticity and find that standard economic models, which do not take into account financial shocks, explain about 70 to 80 percent of the trade collapse in 2008 and 2009. This result is supported by Eaton et al. (2016) who utilize a multilateral general equilibrium model to analyze the world trade data and argue that manufacturing demand shocks are responsible for more than 80 percent of the decline in trade. Therefore, the concensus is that a major share of the world trade collapse is explained by demand conditions, but also that this explanation is not complete so that other factors also need consideration. Table 1 reports recent studies on the determinants of the world trade collapse.

Table 1 illustrates not only the interest in the topic of the trade collapse, but also the hetrogeneity of the country samples, data frequencies, the levels of aggregation of the data (firm/industry/maco) and research design characteristics (such as single versus multi-country analyses and included variables). Some authors work with a theoretical framework or research design that does not allow for considering financial constraints (the input-output analyses are an example). Other authors by necessity are unable to consider trade finance and trade credit because the relevant data are not available for their research period (van Bergeijk 2017 who investigates both the Great Depression of the 1930s and the Great Recession of the 2000s is an example).

Possibly due to these heterogeneities, the literature is not conclusive. On the one hand, authors argue that trade finance is an important driver of the world trade collapse. Using firms data, Amiti and Weinstein (2011) find that trade finance is responsible for about 20 percent of declines in Japanese exports during the financial crisis in 2008 and 2009. In France, considering dependency on external finance as a proxy for trade finance, Bricongne et al. (2012) find that sectors, that were more dependent on external finance, had been most intensely hit by the crisis. In addition, the authors observe exports in these sectors had dropped more significantly than other sectors with less dependency on external finance. Also using external finance as a proxy, Manova (2012) argues that the cost of external finance could prevent export-qualified firms in the US from engaging in exporting. On the other hand, authors report insignificant or inconclusive effects of trade finance on the 2008/9 trade collapse, starting with the seminal study by Levchenko et al. (2010) who measure trade finance by a proxy for dependence on financing of firms in the US. They report that financial factors play no role in the 2008 – 2009 trade collapse. Behrens et al. (2013) analyze micro (firm-level) data from Belgium finding that credit availability has no effect on exports while

Table 1 Studies on drivers of world trade collapse

Author	Year	Methodology	Data level	Period	Major cause identified	Impact of financial factor
Clark	2014	Generalized Method of Moments	National data (Australia, Brazil, France, Germany, Hong Kong, India, Italy, Korea, Spain, UK, and USA)	1999 to 2012	Reduce in global demand for capital goods and consumer durables ***Trade finance disruptions***	Account for up to one-fifth of trade volumes fall, only in the aftermath of the Lehman bankruptcy
Bems et al.	2010	Input-output	55 countries	2008-Q1 to 2009-Q1	Demand shock	
Ahn et al.	2011	Exports-imports model with crisis dummy	57 countries (expor-ting to US), 71 coun-tries (import from US)	January 2007 to July 2010	Demand shock ***Liquidity contractions***	Prices of goods shipped by sea, which tend to be affected by trade finance contractions, rose disproportionately
Eaton et al.	2016	Combination of input-output and gravity model	23 countries	2006-Q1 to 2009-Q4	Manufacturing demand shock	
Behrens et al.	2013	Difference-in-differences	Belgian firms	First semes-ter of 2007, 2008, 2009	Demand shock	
Del Prete and Federico	2014	OLS with firm-time fixed effects	Italian matched bank-manufac- turing firms	2006 to 2010	***Constraints of supply of credit***	Significant role in the trade collapse
Paravisini et al.	2014	TLST with IV	Peruvian exporting firms	July 2007 to June 2009	***Credit shortages***	Negative shocks to credit only reduce exports of firms maintaining same products or markets
Levchenko et al.	2010	Multiple linear regression	U.S. disaggregated sectoral imports and exports	2008-Q2 to 2009-Q2	Vertical linkages Compositional effects[a]	
Asmundson et al.	2011	Descriptive studies of IMF/BAFT-IFSA Trade Finance Surveys	93 banks in 53 countries	Surveys in March 2009, July 2009, March 2010	***Shocks to trade finance***	Not the major force in hindering the decline in global trade
Korinek et al.	2010	Descriptive studies of IMF/BAFT-IFSA Trade Finance Surveys	44 banks in 23 countries	Surveys in March 2009, July 2009	Demand shock ***Drops in short-term trade finance***	Significant impact, but not as much as the impact of fall in demand
Chor and Manova	2012	Difference-in-differences	US imports (disaggregated by partner country and sector)	Nov. 2006 to Oct.2009	***Trade credit contraction***	Important in transmitting the effects of financial crisis to international trade flows
Amiti and Weinstein	2011	Matching banks with firms	Japanese exporting firms	Financial crises 1990s[b]	***Trade finance***	Account for about 1/3 of Japanese exports fall in the 1990s financial crises
Bricongne et al.	2012	Matching exporters with firm-level credit constraints	French firms	January 2000 to April 2009	Shocks in demand ***Credit constraints***	Limited impact
Manova	2012	Heterogeneous-firm model with countries at different levels of financial development and sectoral vulnerability	107 countries	1985 to 1995	***Financial frictions through three channels: selection into domestic production, selection into exporting and firm-level exports***	Sizeable real effects
Auboin and DiCaprio	2017	Analyzing ADB trade finance gap survey data	ADB survey (791 firms from 96 countries)	ADB trade finance gap survey 2014	***Trade finance gaps***	Small and Medium Enterprises in developing countries face lasting challenges in global trade
Van Bergeijk	2017	OLS, panel with fixed period effects	173 countries	1930s and 2000s	Demand shock	

Notes:

a "Sectors that are used intensively as intermediate inputs, and those with greater reductions n domestic output, experienced significantly greater reductions in trade." (Levchenko et al., 2010, p. 2).

b Assumption: there are similarities between the 1990s and 2008 crises.

having only a marginal negative effect on imports.[6] Matching Italian export firms with banks, Del Prete and Federico (2014) find that during the crisis, shocks to bank funding activities damaged exports, but according to their findings this was due to reduced access to long-term loans rather than constrained trade finance. Regarding the linkages between credit supply shocks and exports in Peru, Paravisini et al. (2014) report that credit supply shocks have negative effects on exports mainly because of the constraints on access to working capital ad not due to a lack of trade finance.

In the early phase of the world trade collapse international organizations organized a series of bank surveys into trade finance market conditions (Clark, 2014). The widely cited April 2009 *Trade Finance Survey* of the International Monetary Fund and the Banking Association For Trade (2009) reported a meaningdul decrease in the value of letters of credit only. It pointed out little change in other trade finance product lines (including Export Credit Insurance and Short-term Export Working Capital). van Bergeijk (2010) notes that 73% of the responding banks reports declining trade activities as the major reason for declining trade finance, but that this *Survey* is frequently cited for the finding that the trade finance was the number two cause for the trade collapse (57% of the respondents). Indeed, it was observed that the majority view was that "lower credit availability contributed to declining trade earlier in the crisis, but this share fell in later surveys" (Mora & Powers, 2009, p. 121). Utilizing data from these surveys, Asmundson et al. (2011) argue that shocks to trade finance did play a role in reductions in international trade although they were not the major driver in trade collapse. At the macro level, Korinek et al. (2010) find that a decline in short-term trade finance played a significant role in the fall in trade.[7]

[6] Note that this is a finding for credit in general of which trade finance is only a component.

[7] This argument is supported by Chor and Manova (2012) when analysing data from US trading partners.

3 Data

Although many authors thus consider trade finance to be vital and necessary for international trade, international statistical organizations and systems have, unfortunately, discontinued the time series keeping track of trade finance developments. Up until 2004, the IMF, World Bank, BIS and OECD had put a combined effort on a statistical series of trade finance, however, "the cost-to-quality ratio of these statistics led the agencies to discontinue this effort" (Auboin, 2009a, p. 4). The remaining sources for trade finance statistics data include the Berne Union data (public sector insured trade credit), survey-based data, national data, the ICC trade register data, and the SWIFT data. Survey-based data provides valuable information for banks activities but has limitations in covering the very large amount of international trade transactions and their supportive instruments since such information is viewed as "sensitive data". Next, national data is considered as not suitable for research that as in this paper considers global developments (national data is not available for a considerable number of countries around the world). The ICC trade register data covers a number of banks that are considered as world leaders in the trade finance market and includes even unpublished information on the flows of trade finance, which provides very useful insights into trade finance. However, this database only covers 21 banks (Clark, 2014).

This paper adrdesses these problems utilizing the monthly publications from SWIFT that report the number of trade finance messages worldwide[8]. Its monthly frequency, global scale, and public availability of data make this data the most suitable source for trade finance data in this paper. Unlike data on trade finance, data on world trade is quite comprehensive and easy to access. We obtain data from the CPB *World Trade Monitor* (accessed on 20 June 2017; see Ebregt (2016) for a description of the monitor). CPB provides monthly global trade volumes with consistent quality. Data on trade and trade finance was collected monthly from January 2007 to April 2017. The descriptive statistics are shown in Table 2. Besides, the stationarity test results are presented in Table 3. The first differences of *World trade finance* and *World trade* are introduced since the stationarity tests show that World trade finance and World trade are non-stationary.

[8] Monthly amount of FIN messages is collected from the *SWIFT IN FIGURES* publications retrieved from https://www.swift.com/about-us/swift-fin-traffic-figures/monthly-figures?tl=en#topic-tabs-menu. Data in 2013 was missing due to time gaps in data collection. So, we utilized the growth rates and Year-to-date FIN figures in 2014 to calculate monthly data in 2013 (see Appendix 2).

Table 2
Descriptivestatistics

Variables	Obs.	Mean	Std. Dev.	Min	Max
World trade finance	124	4001	89	250	630
Δ(World trade finance)	123	2.2	31	-96.6	97.6
World trade	124	105	8.3	83.7	120.6
Δ(World trade)	123	0.16	1.48	-6.0	3.3

Notes:
World trade finance: Numbers of trade finance messages, data from SWIFT (see Appendix 1).
World trade: Merchandise world trade volumes, seasonally adjusted, fixed base 2010=100, data from CPB World Trade Monitor (see Appendix 1).
Δ(World trade finance): The first differences of World trade finance.
Δ(World trade finance): The first differences of World trade.

Table 3
Stationarity tests

	World trade finance	Δ(World trade finance)	World trade	Δ(World trade)
ADF	0.718[b]	-6.740[a]	-0.989[b]	-3.703[a]
KPSS	1.290[a]	0.007[b]	0.720[a]	0.087[b]

Notes:
ADF: The Augmented Dickey-Fuller unit root tests, lags (5).
KPSS: The Kwiatkowski-Phillips-Schmidt-Shin stationary tests.
[a] The null hypothesis is rejected at the 1% level.
[b] The null hypothesis is not rejected at the 1% level.

As shown in Table 3, the Augmented Dickey-Fuller unit root test results for the World trade finance and the World trade series suggest that the null hypothesis of such tests are not rejected at the 1% level of significance, which means that both the time series have unit roots. In addition, the results of the Kwiatkowski-Phillips-Schmidt-Shin stationary tests of these two series confirm that the World trade finance and the World trade series are not stationary since the null hypothesis of the Kwiatkowski-Phillips-Schmidt-Shin test, that the data is stationary, is rejected at the 1% level of significance. Therefore, in order to conduct any further time-series analyses, we use the first differences of *World trade finance* and the *World trade*. The Augmented Dickey-Fuller unit root test and Kwiatkowski-Phillips-Schmidt-Shin stationary test results verify that the first differences series are stationary, so they qualify for conducting the Granger Non-Causality tests in the next section.

4 Granger non-causality test and research strategy

In order to investigate the causality between world trade finance and world trade, we conduct Granger causality tests for the first differences of World trade finance and World trade. Since the literature on the direction of causality is contradictory and inconclusive we run the Granger causality tests in both directions.

As originally specified in Granger (1969), considering a bi-variate model, a stationary time-series Let $P(X,\overline{U})$ be the probability distribution of X_t when using all the information in the universe accumulated since time t–1, while $P(X,\overline{U-Y})$ be the probability distribution of X_t when using all the information other than the past values of Y_t, then we conclude that Y Granger causes X if $P(X,\overline{U}) \neq P(X,\overline{U-Y})$. This well-known test consists of a linear vector autoregression estimation:

$$X_t = \sum_{j=1}^{m} a_j X_{t-j} + \sum_{j=1}^{m} b_j Y_{t-j} + \varepsilon_t \qquad (1)$$

$$Y_t = \sum_{j=1}^{m} c_j X_{t-j} + \sum_{j=1}^{m} d_j Y_{t-j} + \eta_t \qquad (2)$$

where ε_t, η_t are assumed to be uncorrelated have a mean of zero and constant variance. We conclude that Y Granger causes X if $P(X,\overline{U}) \neq P(X,\overline{U-Y})$. This requires that some b_j statistically differs from zero and X Granger causes Y if $P(Y,\overline{U}) \neq P(Y,\overline{U-X})$ so some c_j must be statistically different from zero.

We conduct the Granger non-causality tests for two periods. We will start with the period January 2007 to May 2017 (the most recent month for which data presently are available) that comprises both the pre-world trade collapse observations (strong growth of world trade), observations during the world trade collapse (sharp decline) and the world trade recovery (sharp increase) and observations during the ensuing world trade slow down (low growth of world trade). This period provides a comprehensive picture as it covers all phases of world trade development and can thus serve as a benchmark when we zoom in on the period sub-sample January 2007 to December 2012 (the latter is the date at which the start of the trade slowdown is commonly indicated). For both the long and the short research period we run the test using different number of lags (from 1 to 24 months) in order to investigate the causality in short to medium term and to get an indication of consistency of the estimated results.

5 Empirical findings

Table 4 reports the Granger causality test results for world trade finance and world trade over the period January 2007 to May 2017. The null hypothesis "world trade finance does not Granger cause world trade" is rejected while the null hypothesis "world trade does not Granger cause world trade finance" is not rejected at the usual significance level (1%, 5%) in the first 10 levels of lags. Therefore, it appears that in short and medium-run, the Granger causality runs

Table 4
Pairwise Granger Causality Tests (January 2007 to April 2017)

Number of lags	X=Trade finance Y=Trade	X=Trade Y=Trade finance	Obs.
1	7.472***	0.127	122
2	18.197***	3.918	121
3	14.065***	4.026	120
4	14.007***	5.840	119
5	20.622***	8.087	118
6	19.770***	9.520	117
7	20.595***	9.717	116
8	21.795***	12.284	115
9	21.910***	13.218	114
10	20.743**	15.569	113
11	20.722**	24.009**	112
12	22.834**	23.730**	111
13	24.027**	22.081*	110
14	24.881**	34.792***	109
15	31.108***	40.359***	108
16	26.345**	47.440***	107
17	28.798**	47.965***	106
18	31.794**	52.317***	105
19	50.154***	58.775***	104
20	50.180***	56.909***	103
21	50.100***	62.644***	102
22	85.333***	65.136***	101
23	66.304***	59.811***	100
24	95.128***	51.023***	99

Notes:
The null hypothesis is X does not Granger cause Y.
Trade finance: represented by the first differences of World trade finance.
Trade: represented by the first differences of World trade.
* The null hypothesis is rejected at the 5% level.
** The null hypothesis is rejected at the 2% level.
*** The null hypothesis is rejected at the 1% level.

one-way from world trade finance to world trade. However, when we investigate more than 10 lags in the vector autoregression estimations, a feedback relation from world trade to world trade finance appears to be significant and its significance becomes consistently stronger and after the 14 lags becomes as significant as the opposite causailty. Thus over a two year period we find a two-way Granger causality relation between world trade finance and world trade and the significance of such linkages is consistent across different levels of lagged values.

Table 5
Pairwise Granger Causality Tests (2007 to 2012)

Number of lags	X=Trade finance Y=Trade	X=Trade Y=Trade finance	Obs.
1	6.094**	0.573	71
2	12.137***	5.772*	70
3	10.492**	6.585*	69
4	12.389**	11.137**	68
5	19.330***	11.486**	67
6	18.918***	12.624**	66
7	23.123***	15.498**	65
8	24.690***	17.297**	64
9	25.397***	22.781***	63
10	25.313***	23.777***	62
11	28.378***	41.114***	61
12	36.736***	37.206***	60
13	41.211***	41.132***	59
14	47.645***	44.468***	58
15	50.032***	54.719***	57
16	48.000***	67.557***	56
17	55.598***	79.877***	55
18	72.744***	111.140***	54
19	78.699***	118.230***	53
20	77.657***	126.590***	52
21	138.880***	301.140***	51
22	231.680***	330.410***	50
23	141.030***	1675.500***	49

Notes:
The null hypothesis is X does not Granger cause Y.
Trade finance: represented by the first differences of World trade finance.
Trade: represented by the first differences of World trade.
* The null hypothesis is rejected at the 10% level.
** The null hypothesis is rejected at the 5% level.
*** The null hypothesis is rejected at the 1% level.

Next we zoom in on the shorter period 2007 to 2012 (Table 5). Starting with one lag only the conclusion would be that the Granger causality runs one-way from world trade finance to world trade, but this conclusion crucially depends on the fact that we use a one month only lag. The null hypotheses of

As shown in Table 5, when the number of lags increases the significance of a two-way Granger causality is improved greatly. For any level of lags longer than 8, this two-way Granger causality is significant at the 1% level. Hence, within 5 years from the trade collapse (2007 to 2012), world trade finance and world trade are strongly causally related in both ways.

6 Conclusions, discussion and issues for further research

We can summarize our findings as follows. The relationship is always positive: on average world trade and world trade finance move in the same direction. In the short run (one month), Granger causality always runs one-way from world trade finance to world trade. We do, however, always find two-way Granger causality for lags longer than one year. Importantly, Granger causality never runs one-way from world trade to world trade finance. The implication is that for our research period and at the global level it is less likely that demand factors caused the reduction (and later restoration) of world trade. Given the short term nature of trade finance (typically three monts) our verdict is that world trade finance Granger causes world trade.

The two-way causality results are unexpected and, since they occur in a year, this provides an interesting and relevant research puzzle. In combination with the literature reviewed in Section 2 this suggests that hetrogeneity may be hidden under the aggregate finding for trade and finance. Further research should be therefore be aimed at the level of individual countries for which better and more direct measures of trade finance are available. Another relevant extension of our research would be to increase the period under investigation: both by including more recent obervations and by adding monthly data before 2007.

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Appendices

Appendix 1

Data sources

Variable	Definition	Data source	Date of access
World trade	Merchandise world trade, fixed base 2010=100	*CPB World Trade Monitor*	20 June 2017
World trade finance	Monthly total FIN Messages	*Swift in Figures* (publications from SWIFT)	Monthly

Appendix 2

Calculating world trade finance data in 2013

	2014 YTD (A)	Growth (B)	2013 YTD	2013 monthly
Formula			(A)/(1+(B)/100)	
Jan	450,026,071	8.8	413,626,903	413,626,903
Feb	871,035,798	9.6	794,740,692	381,113,788
Mar	1,339,794,670	10.8	1,209,200,966	414,460,274
Apr	1,802,965,791	10	1,639,059,810	429,858,844
May	2,270,070,907	9.2	2,078,819,512	439,759,702
Jun	2,738,709,458	9.7	2,496,544,629	417,725,117
Jul	3,219,355,692	9.7	2,934,690,695	438,146,066
Aug	3,657,363,159	9.4	3,343,110,749	408,420,054
Sep	4,140,584,423	10.2	3,757,336,137	414,225,388
Oct	4,656,655,022	10.4	4,217,984,621	460,648,484
Nov	5,115,456,730	10.2	4,641,975,254	423,990,633
Dec	5,612,723,850	10.8	5,065,635,244	423,659,990