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FINANCING EXPORTS OF GOODS: A CONSTRAINT ON GREEK ECONOMIC GROWTH

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Abstract

This paper assesses the effect of financing conditions on exports of goods in Greece during the last decade. Controlling for reverse causality which is feasible with the Johansen multivariate cointegration technique (1988) we have adopted, we estimate a reduced form of exports showing the existence of a relationship between companies' ability to access bank financing and exports of goods both in the long and in the short-run. Robustness is established by estimating alternative specifications producing comparable results using absolute or relative prices and allowing for cyclical effects. More specifically, we show that during an economic crisis (given that for large part of the sample period credit has been declining) a 10 percent drop in firm financing leads to a decline in export growth by 6 to 9 percent in the short-run and by 2 to 4 percent in the long-run. Additionally, a similar increase in bank financing during an economic recovery is expected to produce a 6 to 9 percent increase in exports a result which will lead to an approximate increase of 1 to 2 percent to current GDP and economic growth.

Keywords: Exports, bank financing, economic growth.
JEL classification codes: F10, F14, C32

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1. Introduction

There has been an extensive discussion recently regarding the degree to which the limited access to financing facing Greek exporters imposes a constraint on their performance in international markets and, consequently, on the return of the economy to positive rates of growth. In the World Economic Forum's report on competitiveness in the section entitled "the most problematic factors for doing business in Greece", the limited access to financing of firms emerges as the second most problematic factor that has worsened due to the ongoing recession.[1] This paper assesses the effect of bank financing on exports of goods in Greece during the last decade using various specifications to ensure robustness. Given that the period under review incorporates the Greek crisis we are able to examine the impact of the increasingly limited access of Greek exporters to bank financing. Finally, given that bank lending is unlikely to pick up quickly in Greece, we offer a measure of the contribution of bank financing to export performance and, consequently, growth.

2. The necessity for export finance

Most firms need external capital along with their own internal cash flows to finance investment in new capital equipment, research and development expenses, payments to workers and intermediate input purchases. It is only natural, therefore, that, a number of empirical studies examine the impact of credit tightening for exporters[2] and some papers introduce "financial accelerators" in export demand equations. Thus, according to Chor and Manova (2012) and Muûls (2008), exporting firms depend more on external financing compared to domestically producing firms for a number of reasons.

[1] See World Economic Forum (2012), and The Global Competitiveness Report 2012-13 in the website http://www.weforum.org/issues/golbal-competitiveness. The construction of the index measuring firms' access to financing is based on a questionnaire where firms are asked to identify five (from a list of sixteen) most problematic factors for doing business in the country, ranking them from one to five.

[2] There is a consensus among economists that during a financial crisis credit to firms is tightened. Information on trade credit per se, however, is limited. A survey conducted by the International Monetary Fund and the BAFT-IFSA presented in an IMF study shows that trade finance tightening during the 2008-9 crisis occurred mostly in large banks that suffered most from the financial crisis and which, in order to overcome the burden, increased the cost of borrowing in trade-related credit and letters of credit. (See Asmundson et al. 2011).

They suggest that export activity involves "sunk costs [3] that must be paid before any profits are made abroad". Foreign activities are often considered more risky than domestic ones because it is more difficult for the exporter to deal with foreign payment systems that may be unknown and, in the case of default, to collect the payment sometimes through intricate or obscure procedures. In addition, since there is a time lag between shipment and payment, the exporting firm has a greater need for working capital and turns to the banking system for financing, for guaranteeing payment and for providing export insurance. Accordingly, banks have developed various instruments to provide so-called trade finance.

A usual bank-intermediated way to ensure that exporters have access to sufficient working capital is for the bank to extend loans to them before shipments using as collateral the letter of credit by which the bank guarantees payment for the imports. Of secondary importance is the documentary bill. The importer's bank issues a letter of credit to ensure that the exporter is paid upon submission of certain documents like invoices and bills of landing. In the case of Greece the Bank of Greece collects data on credit extended to non-financial corporations that include credit extended to exporting firms. In the present study we use credit to manufacturing firms since the bulk of exports of goods is recorded in this sector.

A financial crisis can create problems in banks' ability to raise funding, as interbank lending dries up and banks are forced to limit loans granted, including those to exporters. This characterizes the situation faced by exporters in Greece at the present time.[4] In more technical terms, such an environment offers considerable potential for the introduction of a financial accelerator as a significant determinant in an export equation.

3. Related literature

Kletzer and Bardhan (1987) provide a starting point with their finding that the development of the financial sector can determine a country's comparative advantage

[3]A term introduced by Krugman (1989) referring to irrecoverable costs to the exporter incurred to enter foreign markets that involve investing in equipment or knowledge regarding the characteristics of the markets.

[4]Greek exporting firms in trying to avoid financing constraints, are transferring their headquarters to countries with more healthy economies and higher ratings (recent examples include Viohalco, Coca-cola and Fage, all during 2013).

especially in those industries that rely on it more. Beck (2002) and Svaleryd and Vlachos (2005) empirically verify Kletzer and Bradhan's hypothesis. They show the importance of the development of the financial sector for trade and exports for a number of countries and that exporting firms in countries with better financing conditions tend to rely more on external finance.

Theoretical contributions that develop models introducing financial constraints into the firm's decision to participate in an export market include Melitz (2003), Chaney (2005), Manova (2013, 2008) and Muûls (2008). Melitz using elements of "new trade theory" highlights the importance of sunk costs in the firm decision to start exporting and the dependence of these costs on financial variables. Chaney adds liquidity constraints to Melitz's model and shows how they may affect the probability of a firm becoming an exporter.[5] Manova explicitly models financial constraints of firms in the framework set by Chaney and shows that the role of financing varies i) across different industries depending on whether they rely more or less on external financing and ii) across different countries. Financially developed countries tend to be export-oriented and presence in export markets is more pronounced in the case of industries that are able to access less expensive credit. Muûls finds that credit constraints are important in determining the number of exporters and that lack of firm financing prevents firms from entering foreign markets without, however, affecting the size of sales of existing exporters. An empirical assessment of Chaney's model is provided by Berman and Hericourt (2010) who use survey data for nine developing and emerging economies. They show that firms' access to finance affects the decision to enter export markets, but better financial health does not guarantee that the firm will necessarily survive in an export-market environment.

A number of recent empirical studies analyze the effects of a financial crisis on exports. For example Amity and Weinstein (2009) relate the declining bank health during the crisis in the 1990s and 2000s in Japan, with the consequent drying up of finance, to firms' export performance. They match Japanese exporters and the Japanese banks from which they borrowed and they construct market-to-book values for all large Japanese banks. Amity and Weinstein find large differences across banks in these measures that represent bank health. They establish a causal link from distressed banks to exporters that

[5] He examines the effect of financial variables on sunk costs associated with entering a market.

borrowed from them and show that exporters connected to distressed banks reduced their exports faster than those who borrowed from healthier banks.

While the above studies show that financial development matters for export growth it can be argued that an increase in the number of exporters of a country can improve the health of the financial sector in this country (see Greenaway et al., 2007 and Do and Levchenko, 2007). The presence of endogeneity in the export-finance relationship suggests that in the estimation we need to control for any possible reverse causality effects.

4. The empirical specification

Since Greece is a small country it is acceptable to estimate a reduced form which is derived combining the demand and supply of exports (see Goldstein and Khan 1986, Athukorala and Suphachalasai 2004, Jongwanich 2009, Esteves and Rua 2013, and Belke, Oeking and Setzer 2013). The determinants of export demand are traditionally export prices, prices in competitors' countries and a scale variable that represents foreign income usually approximated by the demand from the rest of the world for the given product.[6] A variant often employed uses relative prices assuming perfect substitution or homogeneity of degree zero with respect to prices. The supply side of exports includes income and price variables and capacity utilization a variable which is frequently adopted and concerns cyclical effects (see Goldstein and Khan 1985 and Faini 1994). The reduced form which is estimated in the absolute and relative price versions in log-linear form augmenting with bank credit is as follows:

$$x^d = a_1 wd + a_2 px + a_3 pcomp + a_4 cu + a_5 credit \quad (1)$$

$$x^d = b_1 wd + b_2 prel + b_3 cu + b_5 credit \quad (2)$$

where x^d refers to the volume of exports demanded, *wd* is world demand, *px* and *pcomp* are prices of exports and competitors' prices respectively, *prel* the ratio of these prices, *cu* capacity utilization and *credit* a variable representing private credit by banks to nonfinancial manufacturing. This variable is assumed to approximate financial conditions in exporting firms. Better financing conditions are expected to cause export growth and

[6]Goldstein and Khan (1985) and Stern Francis and Schumacher (1976) provide a starting point reviewing specification and estimation issues of trade equations.

the relevant coefficient should be positive. The coefficient on world demand is expected to be positive since an increase in world demand leads to an increase in a given country's exports. The coefficients α_2 and $b_{2,,}$ which correspond to own absolute and to relative prices respectively, should be negative given that an increase in these prices decreases the demand of exports. By contrast, a price increase in competing markets is expected to cause an increase in export demand and the corresponding coefficient should be positive. Finally, the sign of capacity utilization should be positive in the long run since increased capital utilization leads to higher investment activity that would create increased demand for capital goods. In the literature it has often been argued that the coefficient on capacity utilization in an export demand equation could be negative especially in the short-run since the high domestic demand resulting from an increase in capacity utilization creates an impediment in foreign export demand.

5. Estimation results

5.1 Data

The sample consists of quarterly data covering the period 2000-2012. As a proxy for firms' financing, we use an aggregate measure of bank credit to nonfinancial enterprises in manufacturing, provided by the Bank of Greece. Related studies have used various measures to proxy the availability of finance such as the credit of all financial institutions (banks and other financial intermediaries, Beck 2002), credit of deposit-taking banks or measures that refer to the size of activity on the stock market such as the stock market capitalization to GDP ratio (see Hur etal., 2006). We have chosen to use bank credit since in Greece credit provided by deposit-taking banks is the major source of financing.[7] In addition, given that Greek exports of goods consist largely of exports of manufactures, bank credit to manufacturing approximates credit directed to exporting firms.[8] Further, regarding the separate treatment of short-term and long-term credit, we use data on bank credit to nonfinancial enterprises up to one year to approximate the former and credit to nonfinancial enterprises over one year to approximate the latter.

[7] During the last 5 years non-bank financing to enterprises was on average about 8% of total firm financing (own calculations using data provided by the Bank of Greece Statistics Division).

[8] This measure includes securitized loans and securitized bonds. In addition, a correction for write-offs, foreign exchange valuation and reclassifications is implemented.

Exports are expressed in real terms, deflating the Bank of Greece series for exports of goods (excluding oil and ships) by the producer price index for exports (basis year=2000). The producer price index for exports excluding oil and ships (Bank of Greece) is used. We have constructed an index measuring competition from third countries and then we have removed seasonality with the method applied to the rest of the series since data on competitors' prices are provided by the Bank of Greece as seasonally adjusted (with a different method than the one we have adopted). The index is computed as a weighted average of quarterly unit labor cost indices and, if not available, consumer price indices for Greece's 28 major trading partners, extracted from OECD's main economic indicators database. The weights are based on imports and exports in manufacturing (5-8 digits of SITC classification). An index of euro area import volumes (basis year =2000) obtained from the CPB Netherlands Bureau for Economic Policy analysis database approximates world demand.[9] All data, except world demand (which is available seasonally adjusted), are seasonally adjusted with the ratio to moving average method.

5.2 Long-run export demand equations

We have adopted the two-step approach estimating cointegrating long-run relationships first and then the dynamic short-run equations. A requirement of the long-run estimation method is that all variables are integrated of order one. Table 1 shows the results of the Augmented Dickey Fuller tests for integration of order one. The levels of all the variables included in equations (1) and (2) have a unit root and their first differences are stationary.[10]

The Johansen procedure is applied for the long-run estimation. The advantage of this method is that it allows us to take into account endogeneity present in the exports-finance relationship[11] mentioned earlier. Given the strong positive association between these two variables in our sample (ie, their correlation coefficient is 0.67) by making bank finance endogenous we remove any reverse causality effects. In addition, world

[9] In the estimation we tried a variety of different world demand measures such as weighted GDP referring to OECD countries or Greece's 28 more important trading partners. Since these did not generate satisfactory results the above mentioned measure was finally adopted.

[10] The same estimations were performed for the time period 2002:1-2011:4 and the results were not much different from the ones presented. Adding the year 2012 to the sample led to estimates showing stronger response of exports to the finance variable. This provides an additional robustness check.

[11] See also Beck (2002) , Svaleryd & Vlachos (2005).

demand, capacity utilization and export prices are also considered endogenous since the joint test for their weak exogeneity takes the value 6.828 (p-value: 0.077) leading to the rejection of this hypothesis at the 5% level of significance. Similarly, the joint weak exogeneity of finance, world demand and capacity utilization in the relative price equations is rejected at 5% level of significance with a test statistic of 6.906 (p-value:0.075). Competitors' prices and relative prices were considered as weakly exogenous given that the corresponding chi-square test statistics failed to reject the null hypothesis of weak exogeneity taking values of 1.136 and 0.094, respectively.

The upper part of Table 2 reports the trace and maximum eigenvalue statistics to determine the cointegrating rank of the four specifications that result from (1) and (2) which differ in respect to the addition or otherwise of capacity utilization. A lag length of 2 is adopted. These statistics support the existence of one cointegrating relationship in all four cases at 5% level of statistical significance. The lower part of the table shows the estimated coefficients that have the correct sign and their size conforms to theory and to previous findings.[12] All coefficients with the exception of that of competitors' prices are significant at the 10% level. The hypothesis that bank credit has an effect on export performance is verified in all four specifications. It is shown that in the long run a 10% increase in bank credit induces a 4% growth in exports in three out of four specifications and 1% growth in the fourth. Table 3 presents the results of similar estimations including long-term bank credit. Out of the twenty three estimated coefficients some turn out to be insignificant, mainly those assigned to prices. The estimated elasticity of long-term credit is of a similar magnitude compared with the total credit elasticity and it ranges between 0.2 and 0.5 and is significant in all four equations.

5.3 Short-run dynamic equations

We can use the results of the previously estimated cointegrating vectors to determine the short-run relationships. We consider the same set of variables in the dynamic equations as in the long-run estimation deriving four specifications and we use a maximum of two lags. The results after dropping insignificant variables are presented in

[12] Dummy variables are included to take into account the effect of the 2009-12 financial crisis, the mark-up in raw material prices during 2006 and the 2004 Olympic games effect which prove to be significant in all specifications.

tables 4 and 5. The empirical validity of the estimations is confirmed using a variety of diagnostic tests presented in these tables and it is shown that there is no significant evidence of departure from standard assumptions. The adjusted coefficient of multiple determination ranges between 60-90 percent showing strong explanatory power. According to this criterion the best performing models are 1.3 1.3a and 2.3a the two of which are with absolute prices and capacity utilization.

The effect of bank credit on exports is stronger and more stable in the short run. The overall impact on export growth ranges between 0.6 and 0.9 and it should be noted that it is immediate (the level is significant in all equations). That is, it takes a quarter or three months for this effect to reach the above values. Accordingly, a 10% increase in bank credit will lead to a 6-9 % increase in export growth within three months.

The error-correction coefficient is the same in the two relative price specifications in table 4 (0.4). It is higher (0.8) in equations 1.3 and 1.3a and in the rest it averages 0.4. That is 40 percent Greece's export growth is attributed to disequilibrium existing during a quarter or it takes about two quarters or six months for export growth to return to its long-run equilibrium position which is a fast adjustment. Part of the disequilibrium is explained by the credit effect.

These short-run dynamic equations deserve additional attention since they allow the separate inclusion of short-term and long-term bank credit as shown in Table 5. It is notable that both these variables are significant (as with total credit) in all four specifications.[13] They all exhibit high significance at 1% and their effect on exports is positive, robust to the alternative specifications and it ranges between 0.3 and 0.9 not very different from the previously estimated total bank credit effect on export demand. Regarding these estimations a result which appears consistently in the four specifications is worth highlighting. The positive and significant effect of long-term credit on exports is higher in the range of 0.9-0.7 than the effect of short-term credit, which ranges between 0.3 and 0.6. According to a recent study by Prete and Federico (2013) there is not much said in the literature about the reason why this may be the case and in addition there is little or no empirical work distinguishing the two effects The plausible explanation they

[13] In addition, significance is achieved in all the coefficients of the variables included in the four specifications, except for the export price coefficient in equation 1.4a which is marginally significant.

provide is that the effect of long-term loans is stronger because they usually finance investment and by this way lead to the expansion of the firms' capacity and higher exports. On the other hand, short-term loans are mainly used for liquidity management purposes to finance firms' working capital and raw material imports which affect to a smaller extend trade credit and exports.

6. Conclusions

This paper provides support for the hypothesis that firm financing has an impact on export performance, in line with the existing literature. Using data referring to the last decade for Greece we consider various specifications to ensure robustness. The relative and absolute price versions of a reduced form of exports of goods are used and short-term and long-term credit is treated separately. The main finding is that firm financing has a positive impact on export performance both in the long and short run taking into account reverse causality effects. This finding is also confirmed when short-term and long-term credit effects are treated separately in the short run. The estimated elasticity in the short run ranges between 0.6 and 0.9; that is, assuming a 10% drop in firm financing (given that during a large part of the sample period credit flows have been declining), export growth declines by 6-9%. By contrast, a 10% rise in firm financing would lead to a 6-9% increase in nominal exports; such a rise in exports would be expected to add approximately 1-2% to current GDP and consequently to economic growth.

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Table 1: p-Values of ADF Unit Root Tests

Variables	Levels			First Differences		
	No intercept or trend	Intercept	Trend and intercept	No intercept or trend	Intercept	Trend and intercept
x^d_t	0.852	0.235	0.240	0.000	0.000	0.000
wd_t	0.892	0.536	0.414	0.000	0.000	0.001
px_t	0.999	0.859	0.625	0.000	0.000	0.000
$pcomp_t$	1.000	0.866	0.712	0.212	0.000	0.000
$credit_t$	0.995	0.144	0.999	0.001	0.001	0.000
cu_t	0.106	0.916	0.762	0.000	0.000	0.000
$lrcredit_t$	0.941	0.068	0.980	0.058	0.173	0.027

Note: After first differencing p-values of testing for a unit root are zero or almost zero in all cases except for long-term credit for which they become zero after 2nd differencing. indicating the possibility of second order integration. This is however not very strong since the p-values of the hypothesis test for first differences are not very high.

Table 2

Cointegration analysis of export demand 2002:1 2012:4

Maximum likelihood tests								
Equations / Variables		**(1.1)**		**(1.2)**		**(2.1)**		**(2.2)**	
H_0:	H_1:	*trace*	λ_{max}	*trace*	λ_{max}	*trace*	λ_{max}	*trace*	λ_{max}
r=0	r=1	135.16**	79.07**	81.37	39.77**	115.61**	77.18**	95.64**	64.16**
$r\leq1$	r=2	56.09	30.49	41.60	23.47	38.43	19.65	31.48	17.35
$r\leq2$	r=3	25.60	10.39	18.13	11.26	18.78	9.88	14.13	8.97
$r\leq3$	r=4	15.21	8.84	6.87	5.70	8.89	5.32	5.17	5.17
$r\leq4$	r=5	6.37	5.39	1.17	1.17	3.58	3.58		
$r\leq5$	r=6	0.99	0.99						
Estimated cointegrating vectors									
x^d_t		1		1		1		1	
wd_t		1.689 (11.870*)		1.789 (6.625*)		1.180 (8.428*)		1.604 (8.578*)	
$px_t/pcomp_t$		-		-		-1.223 (-2.697*)		-1.488 (-3.081*)	
px_t		-2.447 (-7.052*)		-1.092 (-1.434)		-		-	
$pcomp_t$		3.826 (6.808*)		2.390 (1.835*)		-		-	
$credit_t$		0.302 (2.188*)		0.437 (1.859*)		0.132 (1.857*)		0.361 (2.081*)	
cu_t		0.182 (0.857)		-		0.484 (2.526*)		-	
Dummy		0.136 (17.000*)		0.138 (6.026*)		0.185 (12.857*)		0.164 (10.446*)	
log(trend)		-0.359 (-4.932*)		-0.466 (-3.328*)		-		-0.204 (-2.330*)	
Estimated weights									
α_1		-0.683		-0.550		-0.477		-0.512	
α_2		-0.060		-0.017		-0.047		-0.040	
α_3		-0.007		-0.007		-		-	
α_4		0.022		-0.023		-0.030		-0.035	
α_5		0.011		-		-0.017		-	

Note: * and ** denote significance at 10% and 5% respectively. The trace and the maximal eigenvalue statistics are adjusted for degrees of freedom. Numbers in parentheses are t statistics. Dummy is a dummy variable included to capture unusual occurrences and equals to one in the quarter where such an event is observed (as is described in footnote 11) and zero otherwise.

Table 3

Cointegration analysis of export demand 2003:3 2012:4

Maximum likelihood tests								
Equations / Variables		**(1.1a)**		**(1.2a)**		**(2.1a)**		**(2.2a)**	
H_0:	H_1:	*trace*	λ_{max}	*trace*	λ_{max}	*trace*	λ_{max}	*trace*	λ_{max}
r=0	r=1	150.75**	69.56**	107.77**	53.66**	117.62**	60.07**	65.68**	35.37**
$r\leq1$	r=2	81.19	32.73	54.11	25.93	57.55	26.97	30.32**	15.41
$r\leq2$	r=3	48.46	22.75	28.17	13.57	30.57	15.22	14.91	11.53
$r\leq3$	r=4	25.70	13.70	14.61	10.22	15.36	10.01	3.38	3.38
$r\leq4$	r=5	12.01	9.24	4.38	4.38	5.35	5.35		
$r\leq5$	r=6	2.77	2.77						
Estimated cointegrating vectors									
x^d_t		1		1		1		1	
wd_t		1.030(2.766*)		0.882(3.737*)		0.757(4.388*)		1.326(2.935*)	
$px_t/pcomp_t$		-				-1.329(-2.584*)		-0.589(-0.336)	
px_t		-3.757(-2.641*)		-2.706(-3.004*)		-		-	
$pcomp_t$		1.055(0.813)		0.206(0.150)		-		-	
$lrcredit_t$		0.512(1.835*)		0.366(2.245*)		0.175(4.358*)		0.323(3.024*)	
cu_t		0.656(0.901)		-		1.069(3.555*)		-	
Dummy		0.264(13.556*)		0.101(8.627*)		0.143(10.432*)		0.225(5.246*)	
Truncated trend		0.038(1.633)		0.039(3.491*)		0.024(4.044*)		-	
Estimated weights									
α_1		-0.339		-0.484		-0.591		-0.244	
α_2		-0.042		-0.078		-0.069		-0.000	
α_3		-0.003		-0.013		-0.027		0.012	
α_4		-0.022		-0.010		0.012		-	
α_5		-0.020		-		-		-	

Note: see note of table 2. The estimation sample starts at 2003:1 since there are limitations in the availability of the long-term credit variable. Truncated trend applies a trend to the quarters of the economic crisis and is zero otherwise.

Table 4

Short-run error correction estimation of export demand 2002:1 2012:4

Equations / Variables	1.3	1.4	2.3	2.4
Constant	-0.015 (-1.890*)	-0.009 (-1.041)	-0.002 (-0.313)	-0.034 (-2.658*)
Δwd_t	1.139 (4.995*)	1.617 (7.043*)	0.990 (4.328*)	1.794 (5.595*)
Δpx_t	-1.469 (-1.989*)	-	-	-
Δpx_{t-1}	-	-1.516 (-1.940*)	-	-
$\Delta pcomp_{t-2}$	1.717 (2.637*)	1.080 (1.319)	-	-
$\Delta px_t/pcomp_{t-1}$	-	-	-	-1.336 (-1.801*)
$\Delta px_t/pcomp_{t-2}$	-	-	-1.040 (-1.562)	-
$\Delta credit_t$	0.881 (2.977*)	0.767 (2.872*)	0.628 (2.021*)	0.946 (2.428*)
Δcu_{t-1}	1.528 (3.739*)	-	1.523 (3.349*)	-
EC_{t-1}	-0.826 (-4.766*)	-0.216 (-1.465)	-0.427 (-1.629)	-0.468 (-1.685*)
Dummy	0.079 (4.411*)	0.097 (7.138*)	0.064 (5.907*)	0.093 (3.489*)
Truncated trend	0.005 (3.210*)	-	0.003 (1.841*)	0.010 (2.569*)
$\mathbf{R^2}$	0.70	0.66	0.61	0.52
SER	0.033	0.034	0.036	0.041
Jarque-Bera	2.187	5.305	1.956	0.996
F(ARCH(4))	1.237	0.574	0.097	1.046
F(RESET)	6.248	1.463	0.461	6.275
LM(4)	0.465	1.662	0.786	1.502

Note: * is significance at 10%, Δ denotes first differences, t statistics are in parentheses. dtrend applies a trend to the years of the economic crisis and is zero otherwise. SER is the standard error of the regression.; Jarque-Bera is the chi-square normality test of residuals, F(ARCH(4)) is the F test for autoregressive conditional heteroscedasticity at 4th lag, F(RESET) is Ramsey's F test for functional form misspecification, F(HET) is White's test for heteroscedasticity and LM(4) is the LaGrange Multiplier F test for serial correlation at 4th lag. For the definitions of Dummy and Truncated trend see tables 2 and 3 respectively.

Table 5

Short-run error correction estimation of export demand 2003:3 2012:4

Equations / Variables	1.3a	1.4a	2.3a	2.4a
Constant	-0.033 (-4.844*)	-0.019 (-2.641*)	-0.004 (-0.953)	-0.021 (-3.083*)
Δwd_t	1.056 (5.501*)	1.328 (8.439*)	0.874 (6.383*)	1.209 (6.195*)
Δpx_{t-1}	-1.509 (-2.254*)	-	-	-
Δpx_{t-2}	-	-0.727 (-1.423)	-	-
$\Delta pcomp_{t-2}$	1.501 (2.841*)	1.388 (4.180*)	-	-
$\Delta(px/pcomp)_{t-2}$	-	-	-1.066 (-2.840*)	-0.669 (-2.693*)
$\Delta srcredit_t$	0.440 (2.310*)	0.392 (2.276*)	0.294 (2.023*)	0.589 (2.701*)
$\Delta lrcredit_t$	0.981 (6.115*)	0.694 (4.365*)	0.748 (5.628*)	0.277 (1.735*)
$\Delta lrcredit_{t-1}$	-	-	-	0.441 (2.023*)
Δcu_{t-1}	1.044 (2.811*)	-	0.948 (3.179*)	-
EC_{t-1}	-0.845 (-5.832*)	-0.434 (-1.959*)	-0.332 (-2.150*)	-0.463 (-2.763*)
Dummy	0.041 (2.984*)	0.052 (7.150*)	0.067 (8.101*)	0.045 (5.260*)
Truncated trend	0.009 (6.585*)	0.002 (2.112*)	0.007 (4.159*)	0.010 (3.852*)
R^2	0.79	0.86	0.90	0.77
SER	0.026	0.021	0.018	0.027
Jarque-Bera $\chi^2(2)$	0.240	1.818	0.649	0.128
F(ARCH(4))	0.672	0.764	0.830	0.526
F(RESET)	4.098	0.774	2.314	0.010
LM(4)	0.784	0.553	0.973	0.462

Note: see note of table 4.

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