INSTITUTE FOR

WORLD ECONOMICS

HUNGARIAN ACADEMY OF SCIENCES

WorkingPapers

No. 132 November 2002

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FOREIGN TRADE FLOWS AND ECONOMIC ACTIVITY IN SLOVENIA: CAUSALITY PATTERNS FROM A TRANSITION EPISODE

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SUMMARY

The paper employs conditional causality technique to identify the possible empirical relationship or relationships between exports, imports and economic growth in the transition period of the Slovenian economy. Four main conclusions can be drawn from the analysis.

First, the evinced bi-directional causality between exports and variables of economic activity in aggregate data, in manufacturing as a whole and in the majority of the sub-sectors (industries) examined, suggests that any characterization of a small country's growth as export-driven may be perfunctory at least. The results imply that there are no trade-offs between pursuing a growth strategy of structural reforms for internal competitiveness and following the goal of higher domestic growth followed by increasing exports, or of following trade policies of improving international competitiveness and enabling the economy to respond quickly to foreign demand.

Secondly, on a level of aggregate data, imports of goods and services are clearly governed by domestic incomes. In manufacturing as a whole, the causality runs from goods imports to domestic production, whereas in most sub-sectors, the causality between the variables observed runs in both directions.

Thirdly, neither aggregate-level data nor total manufacturing provide any support for the modernization hypothesis, since exports of goods (and services) drive the corresponding import flows. In individual manufacturing industries, the number of cases with bi-directional causality is roughly balanced by the number where export flows generate sub-sectoral import demand. The modernization argument cannot be validated for individual industries without considering the relevant feedback causality from export supply towards imports.

Fourthly, causality estimates of sub-sectoral exports, imports and production suggest that the majority of manufacturing industries display a circular causality, in which the endogeny of the variables observed leaves only limited scope for policy engagements. These empirical results show why the Slovenian economy's success in creating a robust export base has to be explainable primarily by its appropriate import structure and by emulation pressures arising from external demand (mainly in EU markets), FDI, *etc.*, not by direct stimulation of exports through various supply-side policies.

1) INTRODUCTION*

Investigation of the causal relations between foreign-trade flows and economic growth is not new. However, it remains topical, as recent re-evaluations and sensitivity tests (Giles and Williams, 2000a; 2000b) on some classic causality studies on export-led growth debate (Oxley, 1993; Henriques and Sadorsky, 1996) have shown. The role of exports and imports in the process of economic growth is gauged primarily as a way of supporting the dominance of export-led growth strategy over the import-substitution concept of growth. The link between export flows and economic growth has been empirically investigated in a large number of studies using a wide range of estimation techniques (Marin, 1992; Dutt and Ghosh, 1994; Ahmad and Harnhirun, 1995; Pomponio, 1996; Riezman *et al.*, 1996; Hatemi and Irandoust, 2000). However, these cause-and-effect analyses do not reveal any uniform relations between export flows and real output. Furthermore, even the many theoretical models constructed to support various causality channels are not capable of fully explaining or reconciling the diversity of empirical outcomes.

Theoretical studies usually offer one of three different expositions for the causal nexus of exports and output. According to the export-driven growth hypothesis, exports, analogously with investment in the closed economy model, represent the autonomous component of demand in the orthodox Keynesian theory of export-led growth (Beckerman, 1962; McCombie and Thirlwall, 1994). The theory advocates the following growth circle: foreign demand–acceleration of investment activity–domestic production–increasing returns to scale–growth of exports–new imports–growth of output. By contrast with the export-led growth models, technology theories and product and profit-cycle theories (Vernon, 1966; Hirsch, 1967; Markusen, 1985) propose a causal link that runs from domestic activity and imports to exports, rather than *vice versa*. In these models, sharp competition in export markets is attributed to market power established through innovation and development of new products. While product-cycle theory and its model reformulations suggest a one-way growth link between real output and exports, the third group of theories – the new international trade theory, relying on regularities of intra-industry trade – assumes a two-way causality (Krugman, 1979; 1980). The theory involving imperfect competition, economies of scale and product differentiation argues that economies of agglomeration and concentration provide large-scale gains, whereas an increase in productivity enables the development of new technologies. The latter then leads to pronounced product differentiation, and through realization of economies of scale, to further productivity gains, and finally, to enlargement of exports. As already stated, the theoretical explanations of causal links between export growth and the growth of domestic production are often at odds with the results of empirical tests. With few exceptions (*e.g.* Riezman *et al.*, 1996), the causality analyses and their theoretical explications fail to address the role of imports in the exports–output relationship.

One of the important deficiencies in empirical studies is in detailed examination of the growth consequences of exports in individual transition countries. Such examination seems reasonable, because the transition countries and their foreign trade show two special characteristics that do not necessarily follow the logic and conclusions deduced from standard growth theory, as regularly applied to developed market economies. First, rapid and mainly success-

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ful reorientation of foreign trade, accompanied by sometimes pronounced structural upgrading, has been executed, based on 'training-ground theory' in these countries. The development pattern of foreign trade in transition economies has not, therefore, followed the Latin American route from national via regional import substitution towards scanty or non-existent global competitiveness. It has been more similar to the East Asian model of swift opening up inducing mechanisms to invigorate the country's external competitiveness. The second characteristic is that the growth of transition countries has been shaped mainly by rising import demand. The accelerating expansion of imports, especially of intermediate goods and equipment for investments, can be seen as a direct consequence of these countries' modernization needs, facilitating domestic restructuring in the corporate sector and the overall process of economic development. Massive growth in imports of goods and services due to modernization requirements is often identified as a contributor to deterioration in these countries' external positions.[1]

This article attempts to fill the described gap in the causality literature, by focusing exclusively on Slovenian aggregate data and on data at the level of manufacturing. The latter approach seems particularly important, all the more so because few causality applications (Giles *et al.*, 1993) have widened the analysis of data to more disaggregated forms.

Rapid reorientation of domestic production capacities from the former single Yugoslav market towards international markets after mid-1991 was one of the pronounced factors shaping the structure of domestic export supply and enhancing Slovenia's inclusion in the global economy. Such rapid, large-scale integration inevitably raises questions about the empirical nature of the exports–output nexus. Furthermore, at least from the economic growth point of view, it is important to detect the prevailing causal links between trade development and economic growth in Slovenia's case, for two reasons. One is that vigorous output growth provides the necessary sustainability of currently executed or planned structural reforms. The other is that strong domestic growth also fosters the process of catching up with the EU countries. To shed light on this issue, this paper seeks to identify in the Slovenian economy the possible empirical relationship or relationships between exports, imports and economic growth in the transition period.

The paper examines next the pace of the process of transition to a market regime, in the light of key macroeconomic aggregates. Parts 3 and 4 present the relevant testing methodology for unit roots and causality. The last two sections present the empirical results and the conclusions.

2) Macroeconomic transition in the Slovenian economy

Slovenia became an independent state in June 1991, with the break-up of former Yugoslavia. The disintegration of the single Yugoslav market triggered two parallel processes in Slovenia: a need to reorient production and trade towards international markets and to cope with the ensuing transformational depression. The latter was caused by substantial losses of export markets and by the contraction of inappropriate production structures inherited from the Yugoslav economic system.

The beginning of economic transformation was reflected mainly in shocks to foreign trade. From 1990 to 1993, cumulative exports and imports of goods and services by Slovenian enterprises declined in

[1] A growing body of research (Mencinger, 1996; Landesmann and Pöschl, 1996; Mencinger, 2002), emphasizes that countries further ahead in their structural reforms especially face a danger of growth limitations being imposed by their balance-of-payments movements.

real terms by 48.3 and 32.5 per cent respectively. The biggest falls in this period were recorded in exports and imports to and from other parts of former Yugoslavia: 87.9 and 85.9 per cent respectively in real terms. In 1990, former Yugoslavia accounted for 61.8 per cent of Slovenia's commodity and service sales, whereas in 1993, the proportion fell to 16.4 per cent, so that the value of goods and services exported to non-Yugoslav markets increased by 45.4 percentage points in three years. By 1992–3, the re-orientation of Slovenia's foreign-trade flows towards international, predominantly European, markets had largely ended. From 1986 to the end of 1995, the EU proportion of Slovenia's total goods exports increased from 20 to 67 per cent. Similar figures can be found for import flows: from 25 per cent in 1986 to 69 per cent in 1995 (*Table 1*).

The developments in foreign trade had a pronounced effect on the growth trend of Slovenian GDP. This fell by a cumulative 14.4 per cent in 1991–2. However, the climb out of the transformation depression began as early as 1993, when annual GDP growth reached 2.8 per cent. In subsequent years, economic growth gained momentum, so that in 1996 the GDP reached its pre-independence level. This resurgence of domestic growth was accompanied by progressively lower inflation and stabilization of the unemployment rate (Table 1). This economic recovery and the continuation of market-oriented economic reforms[2] were facilitated after 1993 by a favourable international environment. Robust foreign demand in Slovenia's main export markets[3] and improving terms of trade (Table 1) allowed policy makers to continue macroeconomic stabilization without endangering the recovered economic growth.

Strong orientation of production towards international markets in the transition period was one of the crucial factors shaping the composition of exports. It enhanced the dependence of the economy on foreign-trade performance. The extent to which output growth is influenced by foreign demand, *i.e.* Slovenia's ability to expand foreign trade, is shown by the economy's high degree of openness: the foreign trade-output ratio in 1998 amounted to

Table 1
Selected macroeconomic indicators for the Slovenian economy

	1992	1993	1994	1995	1996	1997	1998
GDP per capita (US$)	6275	6366	7233	9431	9481	9163	9878
Rate of inflation (CPI)	207.3	32.9	21.0	13.5	9.9	8.4	8.0
Standardized rate of unemployment (ILO)	8.3	9.1	9.0	7.4	7.3	7.4	7.9
Domestic exports to EU (% of total exports)	60.8	63.2	65.6	67.0	64.6	63.6	65.5
Domestic imports from EU (% of total imports)	60.0	65.6	69.2	68.9	67.6	67.4	69.4
Terms of trade[a]	103	111	105	103	102	100	103
Exports of goods and services (real growth in %)	-23.5	0.6	10.5	1.0	3.3	11.3	6.8
Imports of goods and services (real growth in %)	-22.9	17.6	10.7	11.6	2.4	12.2	9.7
Current account balance (USD mn)	926	192	573	-99	31	11	-147

[a] The indices are calculated from USD values, exports and imports without processing; Fisher-type indices; average of previous year = 100.
Sources: Bank of Slovenia, *Monthly Bulletin*, various issues (Ljubljana); Institute of Macroeconomic Analysis and Development, *Slovenian Economic Mirror*, various issues (Ljubljana); Statistical Office of the Republic of Slovenia, *Statistical Yearbook of the Republic of Slovenia*, various issues (Ljubljana); author's calculations.

[2] For a comprehensive review of the macroeconomic stabilization measures and subsequent structural and institutional reforms adopted in this period, see Mrak *et al.* (2002).

[3] The correlation coefficient between the growth of real exports and import growth for 1992/1998, as a weighted average of import demand from eight Slovenian trading partners (Germany, France, Italy, Austria, the Netherlands, Switzerland, the UK and the US), reached 0.872. In 1998, these countries took 64.4 per cent of Slovenia's exports and supplied 67.0 per cent of its imports.

1.15. The macroeconomic picture presented leads to the need to analyse the empirical nature of the link between foreign-trade flows and output. Due to problems with data collection before 1992 and to avoid any breaks in the time series caused by the introduction of VAT in July 1999, the examination in the following sections concentrates mainly on the period described briefly in the present section.

3) TESTING FOR THE UNIT ROOT

Following the standard estimation procedures for causality tests, the empirical assessment was made in two stages. The first involved establishing the order of integration for each variable, using the augmented Dickey–Fuller (ADF) test (Dickey and Fuller 1979). To provide the balance between sufficient order of ADF and disposable time series, the orders of augmentation were set to five periods for all tests of unit root. A two-stage procedure was necessary since the true order of augmentation of the Dickey-Fuller test is unknown *ex ante*. In the first stage, various model-selection criteria were used to detect the order of the ADF regression, while the actual test of the unit root was performed in the second. Experience with different methods of choosing the length of lag in the ADF test and extensive comparisons if these, surveyed in Maddala and Kim (1998), suggest that information-based rules and sequential rules should be used. The former favours the role of Schwarz's Bayesian Criterion (SBC), whereas Hall's sequential method is preferred in the latter. In the present study, the selection of the order of augmentation in ADF regression has been based on the Akaike Information Criterion and SBC.

The ADF tests were executed on 4 aggregate and 45 sub-sectoral variables. The latter covered 15 manufacturing industries listed by NACE classification Rev. 1 (*Nomenclature statistique des activités économique dans la Communauté Européenne*). To obtain precise information about which industry is the end-user of imported goods and which industry is the final exporter of a registered product group, exports and imports were sorted into NACE sub-sectors according to the industry to which each product belongs. The variables utilized and descriptions of them appear in the Appendix. All primary data employed were obtained from the databases of the Bank of Slovenia. The ADF regressions of log-level data (absolute values) included an intercept and a linear trend, whereas no trend was included for data in difference form. The ADF integration tests for the logarithms of the relevant time series in levels and in differences are detailed in *Tables 2–5*.

Neither lag-selection criterion gave results to make it more preferable. We therefore relied in the analysis of causality on the results recorded by the Akaike Information Criterion. Based on these results, all variables entered the causality test at least in first difference form, denoted D, except exports in the manufacture of other non-metallic mineral products (DI), industrial activity in the manufacture of food products, beverages and tobacco (DA), and industrial activity and imports in the manufacture of rubber and plastic products (DH).

4) SPECIFICATION OF THE CAUSALITY MODEL

After establishing the properties of the times series and removing the non-stationary attributes from the data, the second phase of analysis consisted of testing for causality. Since the use of cointegration and error-correction methodology has already been employed in Slovenia for detecting the exports–output relation (Bekó, 2000a), it was decided to make extended, in-depth checks with conditional-causality techniques, using

Table 2
Augmented Dickey–Fuller tests for selected aggregate variables, 1st quarter 1992–1st quarter 1999[a]

Variables	AIC (Order)	Levels/ absolute values	SBC (Order)	Levels/ absolute values	AIC (Order)	Differences	SBC (Order)	Differences
log EXCOMSER	31.2170(4)	-2.1745	27.0292(1)	-1.1849	26.7975(1)	-3.6313*	24.6944(3) 23.1591(2)	-1.8681 -5.3623*[b]
log FORDEMAND	84.4086(1)	-2.1898	78.9022(2)	-1.4581	101.8059(4)	-8.4517*	99.4827(2)	-5.6143*
log GDP	65.8393(5)	-2.8133	56.1454(2)	-5.8492*	58.8502(2)	-10.7345*	56.6681(2)	-10.7345*
log IMCOMSER	30.1469(5)	-1.0632	26.4313(2)	-1.5693	27.5116(4) 23.7630(2)	-2.4401 -4.5626*[b]	25.7879(1) 21.9330(1)	-2.5914 -5.2634*[b]

Notes:[a] A (*) indicates significance at the 0.05 level. [b] Second difference.

Table 3
Augmented Dickey–Fuller tests for exports in manufacturing, 1st quarter 1992–1st quarter 1999[a]

Variables	AIC (Order)	Levels	SBC (Order)	Levels	AIC (Order)	Differences	SBC (Order)	Differences
log EXD	38.1442(4)	-2.7597	34.1700(4)	-2.7597	33.1843(2)	-3.0040*	31.0648(1) 27.7322(2)	-2.4360 -4.7665*[b]
log EXDA	16.5799(4)	-2.0898	13.0662(2)	-3.5632	14.8339(2)	-5.9504*	12.6518(2)	-5.9504*
log EXDB	39.5458(2)	-2.5292	36.7071(2)	-2.5292	36.6043(1)	-3.3830*	34.9678(1)	-3.3830*
log EXDC	21.0493(4)	-2.9055	19.2050(1)	-2.3883	17.9494(1)	-3.7618*	16.3128(1)	-3.7618*
log EXDD	23.0526(4)	-2.3589	19.0784(4)	-2.3589	19.0624(4) 17.4738(2)	-1.7391 -8.4169*[b]	16.3296(3) 15.3847(2)	-1.3253 -8.4169*[b]
log EXDE	27.7002(1)	-1.9081	25.4292(1)	-1.9081	23.8618(1) 19.8586(1)	-2.8832 -5.2441*[b]	22.2252(1) 18.2918(1)	-2.8832 -5.2441*[b]
log EXDF	-12.1873(1)	-2.7182	-14.4583(1)	-2.7182	-14.6528(1)	-3.6528*	-16.1695(1)	-3.6528*
log EXDG	28.7560(4)	-2.4385	24.7818(4)	-2.4385	22.2669(2)	-4.0735*	20.3752(3) 20.5352(2)	-1.7261 -7.2455*[b]
log EXDH	29.4287(1)	-1.0305	27.1577(1)	-1.0305	29.0051(2)	-3.3144*	26.8230(2)	-3.3144*
log EXDI	36.4298(4)	-3.6278*	32.4551(4)	-3.6278*	33.3865(2)	-4.6270*	31.2045(2)	-4.6270*
log EXDJ	32.6518(1)	-1.8724	30.3808(1)	-1.8724	29.3824(1)	-3.2300*	27.7458(1)	-3.2300*
log EXDK	28.2431(2)	-2.5839	25.4044(2)	-2.5839	24.7374(2)	-3.6999*	23.0237(1)	-3.5066*
log EXDL	22.9775(2)	-1.7389	21.4212(1)	-1.6992	29.4730(3) 32.3438(2)	-1.2819 -13.5790*[b]	26.7454(3) 30.2547(2)	-1.2819 -13.5790*[b]
log EXDM	13.8951(4)	-2.5661	9.9209(4)	-2.5661	11.8485(2)	-6.5245*	9.6664(2)	-6.5245*
log EXDN	30.2490(4)	-1.8948	26.2748(4)	-1.8948	28.9295(2)	-5.9093*	26.7474(2)	-5.9093*

Notes:[a] A (*) indicates significance at the 0.05 level. [b] Second difference.

Table 4

Augmented Dickey–Fuller tests for industrial production in manufacturing, 1st quarter 1992–1st quarter 1999[a]

Variables	AIC (Order)	Absolute values	SBC (Order)	Absolute values	AIC (Order)	Differences	SBC (Order)	Differences
log INDD	43.0087(2)	-2.6918	40.7186(1)	-2.3268	38.8116(2)	-4.1036*	36.6295(2)	-4.1036*
log INDDA	31.9530(2)	-10.3634*	29.1142(2)	-10.3634*	27.0247(2)	-13.6126*	24.8426(2)	-13.6126*
log INDDB	35.9122(5)	-2.7588	34.2642(1)	-4.9236*	32.8784(2)	-6.6032*	30.6963(2)	-6.6032*
log INDDC	33.6689(3)	-3.3385	30.8284(2)	-3.203	28.7331(4)	-3.2289*	26.9193(1) 23.6271(1)	-2.1672 -4.0621*b
log INDDD	17.8102(1)	-2.2051	15.5392(1)	-2.2051	15.1545(1)	-4.0582*	13.5179(1)	-4.0582*
log INDDE	31.4784(4)	-2.0928	28.0559(3)	-1.7231	24.9115(3) 25.2347(5)	-1.9934 -4.4694*b	22.1839(3) 21.5789(5)	-1.9934 -4.4694*b
log INDDF	-18.9897(1)	-2.9485	-21.2607(1)	-2.9485	-20.5786(1)	-4.4076*	-22.2152(1)	-4.4076*
log INDDG	31.2025(3)	-1.4659	28.0794(1)	-2.4136	28.5781(2)	-4.9155*	26.3960(2)	-4.9155*
log INDDH	33.8733(5)	-3.7691*	29.8495(4)	-4.0162*	21.2978(1)	-3.8049*	20.1052(2)	-4.2047*
log INDDI	27.5087(5)	-2.8412	23.3527(3)	-1.9972	24.4195(2)	-14.7369*	22.2374(2)	-14.7369*
log INDDJ	33.5682(5)	-3.1879	30.4106(1)	-2.2783	29.0338(1)	-4.3091*	27.3972(1)	-4.3091*
log INDDK	18.3663(1)	-2.1232	16.0953(1)	-2.1232	17.1609(1)	-4.6399*	15.5243(1)	-4.6399*
log INDDL	20.4823(4)	-1.16	16.9261(3)	-0.7166	18.8876(2)	-5.4345*	15.7625(1)	-4.9775*
log INDDM	10.4731(4)	-0.8342	7.8332(1)	-1.801	10.1432(3) 8.6510(4)	-1.9885 -4.5916*b	7.4156(3) 5.6821(2)	-1.9885 -8.4389*b
log INDDN	26.2121(1)	-2.3428	23.9411(1)	-2.3428	23.4663(1)	-3.4764*	21.8297(1)	-3.4764*

Notes: [a] A (*) indicates significance at the 0.05 level. [b] Second difference.

Table 5

Augmented Dickey–Fuller tests for imports in manufacturing, 1st quarter 1992–1st quarter 1999[a]

Variables	AIC (Order)	Levels	SBC (Order)	Levels	AIC (Order)	Differences	SBC (Order)	Differences
log IMD	28.8336(1)	-1.4565	26.5626(1)	-1.4565	27.0023(1)	-3.8427*	25.3658(1)	-3.8427*
log IMDA	25.8157(4)	-1.7271	22.2885(1)	-2.2829	21.7332(2)	-5.0166*	19.5511(2)	-5.0166*
log IMDB	38.5081(5)	-1.5574	34.0153(2)	-2.5221	36.1458(4)	-4.2973*	32.8726(4)	-4.2973*
log IMDC	21.8514(3)	-1.1897	20.5441(1)	-1.4267	21.0831(1)	-3.5273*	19.4465(1)	-3.5273*
log IMDD	28.6815(2)	-3.3178	26.3738(1)	-3.0535	23.4272(2)	-3.4465*	21.7925(1)	-3.2698*
log IMDE	27.2739(2)	-2.4573	24.4352(2)	-2.4573	24.5929(5) 21.7328(4)	-1.7501 -3.1372^{*b}	21.3171(1) 18.5992(4)	-1.8890 -3.1372^{*b}
log IMDF	9.6876(1)	-0.5997	7.4166(1)	-0.5997	6.9669(1)	-3.4672*	5.3304(1)	-3.4672*
log IMDG	32.4543(4)	-2.7021	28.4800(4)	-2.7021	27.3627(4) 25.3691(2)	-1.6466 -10.8282^{*b}	24.0896(4) 23.2801(2)	-1.6466 -10.8282^{*b}
log IMDH	12.0227(2)	-4.9467*	9.1839(2)	-4.9467*	3.8878(4)	-4.0119*	1.4753(1)	-4.9114*
log IMDI	23.2508(3)	-1.2255	19.8443(3)	-1.2255	23.0219(3) 19.5812(2)	-2.3148 -12.3148^{*b}	18.8638(4) 16.2931(3)	-2.0829 -4.2191^{*b}
log IMDJ	24.4124(4)	-2.6874	20.4381(4)	-2.6874	19.6482(3) 17.9611(2)	-1.4441 -5.9414^{*b}	17.9842(1) 15.8724(2)	-2.8821 -5.9414^{*b}
log IMDK	19.9228(2)	-2.3767	17.4558(1)	-1.957	16.9301(1)	-3.7912*	15.2936(1)	-3.7912*
log IMDL	26.6713(3)	-0.8908	23.2648(3)	-0.8908	25.2923(2)	-8.0714*	23.1103(2)	-8.0714*
log IMDM	7.5574(3)	-1.8132	4.8595(1)	-4.5953*	7.0793(2)	-7.3225*	4.8972(2)	-7.3225*
log IMDN	24.5060(4)	-1.6306	21.0763(3)	-1.7353	21.8959(3) 18.3230(2)	-2.4406 -11.9690^{*b}	19.1683(3) 16.2339(2)	-2.4406 -11.9690^{*b}

Note: [a] A (*) indicates significance at the 0.05 level. [b] Second difference.

the Granger–Sims causality framework (Sims 1972), which keeps very close to the method introduced by Sargent and Wallace (1973). The Granger–Sims causality model, after incorporating conditionality, is defined by the following pairs of linear equations:

$$Y_t = \alpha + \beta\delta + \sum_{i=0}^{k} b_i X_{t-i} + \varepsilon_t \qquad (1),$$

$$Y_t = \alpha + \beta\delta + \sum_{i=0}^{k} b_i X_{t-i} + \sum_{j=1}^{l} c_j X_{t+j} + \nu_t \quad (2),$$

and

$$X_t = \alpha' + \beta'\delta + \sum_{i=0}^{m} b_i' Y_{t-i} + \varepsilon_t' \qquad (3),$$

$$X_t = \alpha' + \beta'\delta + \sum_{i=0}^{m} b_i' Y_{t-i} + \sum_{j=1}^{n} c_j' Y_{t+j} + \nu_t' \quad (4),$$

where y_t, $y_t´$, v_t, $v_t´$ are zero-mean, serially uncorrelated random terms, while ‘ represents a set of variables defined as exogenous and appearing as conditional factors in the causal relation.

The operation of causality within the conditional Granger–Sims model can be interpreted as follows:

* *X* causes *Y* if H_0:c_j=0, for *j*= *1*, *2*, ..., *l*, cannot be rejected and H_0:$c_j´$=0, for *j*= *1*, *2*, ..., *n*, can be rejected;
* *Y* causes *X* if H_0:$c_j´$=0, for *j*= *1*, *2*, ..., *n*, cannot be rejected and H_0:c_j=0, for *j*= *1*, *2*, ..., *l*, can be rejected;
* bi-directional causality exists if both H_0:c_j=0, for *j*= *1*, *2*, ..., *l*, and H_0:$c_j´$=0, for *j*= *1*, *2*, ..., *n*, can be rejected.

The main advantage of the specifications (1)–(4) is that they allow us to focus on the causal relationship examined, while enabling control of selected variables, which might otherwise affect the causality being investigated. The conditional Granger–Sims test also helps to avoid the ‘omitted variable’ and the ‘spurious-causality’ problem, and according to the tests so far executed on Slovenian data (Bole, 1994), should be particularly pertinent for short-time series analysis.

Since the detection of causality depends strongly on the number of lagged terms included (Thornton and Batten, 1985), a diagnostic procedure was carried out to identify the proper lag length, instead of assuming an implicit distributed lag system. The Akaike (1970) Final Prediction Error (FPE) criterion was used to determine the optimal lags, following the procedure suggested by Hsiao (1979; 1981). Because the feedback impact of causality model is tested in the reduced form, it is necessary to specify the conditional variables included in the model in advance. Furthermore, with the variable representing foreign demand (labelled FORDEMAND in the Appendix), we used the corresponding import variables as the second conditional factor, basically because of their reliable performance in the model of balance-of-payments constrained growth (Bekó, 2002). The causality between sub-sectoral exports and sub-sectoral production was tested by determining the influence of sub-sectoral imports and the effect of foreign demand. The causal relations between sub-sectoral imports and sub-sectoral industrial production were isolated from the effect of sub-sectoral exports and foreign demand, while in the third case, the impact of foreign demand and sub-sectoral industrial production on causal links between sub-sectoral exports and import flows was excluded.

5) Empirical results

The causality results on aggregate data, based on the conditional Granger–Sims model, appear in *Tables 6–8*. To ensure accurate treatment of the lag structure, the specification allowed extension of the model up to six lags.[4] The calculated *F* statistics are

[4] The calculations of optimal lag structures with FPE for all variables used in this article are available from the author on request.

used to test the hypothesis that coefficients for future values of the independent variable are jointly equal to zero. The Breusch–Godfrey LM test served as a detector of possible first order-serial correlation. The Cochrane–Orcutt two-stage procedure was employed to tackle the problem where autocorrelation emerged. The *F* tests on aggregate data reveal bi-directional causality between exports of goods and services and GDP, with causality running from exports of goods and services to imports of goods and services, and from GDP to imports of goods and services.

The results presented have at least two important 'information' drawbacks. First, the use of aggregated data implies that the estimates of causal channels are also valid for all sectors of the economy. To the extent that this is not the case, the trade-flow specification masks potentially useful information about sub-sectoral peculiarities. Secondly, conditional-causality tests at aggregate level may include the possibility of spurious association between exports and output, common in aggregate data. Thus a sub-sectoral decomposition of export and import flows within manufacturing was applied, to detect additional causality patterns.

The causality results on sub-sectoral data, covering aggregate manufacturing and 14 manufacturing industries, are listed in *Table 9*, *Table 10* and *Table 11*. In 15 groups created, the causal relations were scrutinized separately between sub-sectoral commodity exports and sub-sectoral industrial production, sub-sectoral commodity imports and sub-sectoral industrial production, and between sub-sectoral commodity exports and sub-sectoral commodity imports.

Table 6
Results of the conditional Granger–Sims causality test for DEXCOMSER and DGDP[a]

Direction of Causality	DGDP–DEXCOMSER	DEXCOMSER–DGDP
Optimal Lags:	k = 3; l = 2	m = 3; n = 5
F statistics:	(2, 19); 3.644*	(5, 9); 9.104***
Serial(1):	F(1, 18) = 2.592	F(1, 8) = 0.489

Notes: [a] Letter D before variables represents the first difference form. Numbers in parentheses are degrees of freedom. (*) and (***) indicate significance at the 0.10 or 0.01 level, respectively. DEXCOMSER–DGDP causality is conditional on foreign demand (DFORDEMAND) and imports of goods and services (DDIMCOMSER).

Table 7
Results of the conditional Granger–Sims causality test for DDIMCOMSER and DGDP[a]

Direction of Causality	DGDP–DDIMCOMSER	DDIMCOMSER–DGDP
Optimal Lags:	k = 2; l = 2	m = 1; n = 4
F statistics:	(2, 17); 8.037***	(4, 12); 0.812
Serial(1):	F(1, 16)=1.782	F(1, 11)=2.353

Notes: [a] Letter D before variables represents the first (second) difference form. Numbers in parentheses are degrees of freedom. (***) indicates significance at the 0.01 level, respectively. DDIMCOMSER – DGDP causality is conditional on foreign demand (DFORDEMAND) and exports of goods and services (DEXCOMSER).

Table 8
Results of conditional Granger–Sims causality test for DEXCOMSER and DDIMCOMSER[a]

Direction of Causality	DDIMCOMSER–DEXCOMSER	DEXCOMSER–DDIMCOMSER
Optimal Lags:	k=1; l=1	m=3; n=5
F statistics:	FPE (3, 0) < FPE (1, 1): one dimensional relation	(5, 9); 6.668***
Serial(1):	-	F(1, 8)=2.968

Notes: [a] Letter D before variables represents the first (second) difference form. Numbers in parentheses are degrees of freedom. (***) indicates significance at the 0.01 level, respectively. DEXCOMSER-DDIMCOMSER causality, conditional on foreign demand (DFORDEMAND) and gross domestic product (DGDP).

Table 9

Results of conditional Granger–Sims causality test by NACE sub-sectors

(variables: sub-sectoral exports – DEX, sub-sectoral industrial production – DIND) [a,b]

	DIND–DEX			DEX–DIND		
	Optimal Lags	F-statistics	Serial(1)	Optimal Lags	F-statistics	Serial(1)
D	k = 2; l = 2	(2, 17); 10.669***	F(1, 16) = 10.650***; F(1, 15) = 2.307	m = 4; n = 1	(1, 15); 29.526***	F(1, 14) = 0.908
DA	k = 0; l = 1	(1, 23); 4.024*	F(1, 22) = 9.491***; F(1, 21) = 1.832	m = 1; n = 2	(2, 19); 1.626	F(1, 18) = 0.277
DB	k = 0; l = 1	(1, 23); 4.369**	F(1, 22) = 1.674	m = 3; n = 3	(3, 13); 7.122***	F(1, 12) = 1.049
DC	k = 4; l = 4	(4, 9); 2.769*	F(1, 8) = 0.904	m = 0; n = 4	FPE (0, 0) < FPE (0, 4): one dimensional relation	-
DD	k = 0; l = 1	FPE (0, 0) < FPE (0, 1): one dimensional relation	-	m = 4; n = 6	(6, 5); 8.406**	F(1, 4) = 1.113
DE	k = 0; l = 5	(5, 14); 3.711**	F(1, 13) = 7.864**; F(1, 12) = 1.118	m = 0; n = 2	(2, 20); 1.545	F(1, 19) = 2.323
DF	k = 0; l = 3	(3, 19); 19.408***	F(1, 18) = 0.644	m = 5; n = 4	(4, 7); 5.460**	F(1, 6) = 0.095
DG	k = 5; l = 5	(5, 4); 8.905**	F(1, 3) = 0.258	m = 5; n = 1	(1, 13); 8.355**	F(1, 12) = 0.015
DH	k = 4; l = 3	(3, 11); 11.847***	F(1, 10) = 1.255	m = 5; n = 6	(6, 3); 60.893***	F(1, 2) = 0.019
DI	k = 0; l = 1	(1, 23); 0.054	F(1, 22) = 1.087	m = 0; n = 1	(1, 22); 5.154**	F(1, 21) = 1.974
DJ	k = 0; l = 4	(4, 16); 6.127***	F(1, 15) = 2.167	m = 2; n = 1	(1, 19); 20.474***	F(1, 18) = 0.002
DK	k = 4; l = 4	(4, 9); 12.724***	F(1, 8) = 0.254	m = 1; n = 4	(4, 15); 3.115**	F(1, 14) = 0.008
DL	k = 4; l = 1	FPE (4, 0) < FPE (4, 1): one dimensional relation	-	m = 5; n = 3	(3, 9); 3.839*	F(1, 8) = 1.298
DM	k = 3; l = 1	(1, 17); 9.562***	F(1, 16) = 5.889**; F(1, 15) = 0.861	m = 5; n = 6	(6, 2); 19.340**	F(1, 1) = 0.014
DN	k = 4; l = 1	FPE (4, 0) < FPE (4, 1): one dimensional relation	-	m = 1; n = 1	FPE (1, 0) < FPE (1, 1): one dimensional relation	-

Notes: [a] The letter D before the variables represents the first difference form. Numbers in parentheses are degrees of freedom. A (*), (**) or (***) indicate significance at the 0.10, 0.05 or 0.01 level, respectively. [b] D – Manufacturing (Total); DA – Manufacture of food products, beverages and tobacco, DB – Manufacture of textiles and textile products, DC – Manufacture of leather and leather products, DD – Manufacture of wood and wood products, except furniture, DE – Manufacture of pulp, paper and paper products; publishing and printing, DF – Manufacture of coke, refined petroleum products and nuclear fuel, DG – Manufacture of chemicals, chemical products and man-made fibres, DH – Manufacture of rubber and plastic products, DI – Manufacture of other non-metallic mineral products, DJ – Manufacture of basic metals and fabricated metal products, DK – Manufacture of machinery and equipment, DL – Manufacture of electrical and optical equipment, DM – Manufacture of transport equipment, DN – Manufacture of furniture n.e.c.

Table 10
Results of conditional Granger–Sims causality test by NACE sub-sectors
(variables: sub-sectoral imports – DIM, sub-sectoral industrial production – DIND)[a,b]

	DIND □ DIM			DIM □ DIND		
	Optimal Lags	F-statistics	Serial(1)	Optimal Lags	F-statistics	Serial(1)
D	k = 0; l = 1	FPE (0, 0) < FPE (0, 1): one dimensional relation	-	m = 0; n = 1	(1, 23); 3.590^{*}	F(1, 22) = 0.188
DA	k = 0; l = 2	FPE (0, 0) < FPE (0, 2): one dimensional relation	-	m = 4; n = 1	FPE (4, 0) < FPE (4, 1): one dimensional relation	-
DB	k = 1; l = 1	(1, 21); 7.405^{**}	F(1, 20) = 0.253	m = 4; n = 4	(4, 9); 3.261^{*}	F(1, 8) = 1.797
DC	k = 5; l = 4	(4, 7); 5.803^{**}	F(1, 6) = 0.922	m = 4; n = 1	FPE(4, 0) < FPE(4, 1): one dimensional relation	-
DD	k = 0; l = 1	FPE(0, 0) < FPE(0, 1): one dimensional relation	-	m = 2; n = 1	FPE(2, 0) < FPE(2, 1): one dimensional relation	-
DE	k = 0; l = 5	(5, 14); 4.989^{***}	F(1, 13) = 1.538	m = 2; n = 1	(1, 18); 7.192^{**}	F(1, 17) = 0.284
DF	k = 5; l = 3	(3, 9); 21.574^{***}	F(1, 8) = 0.012	m = 5; n = 6	(6, 3); 66.199^{***}	F(1, 2) = 0.405
DG	k = 2; l = 3	(3, 14); 4.862^{**}	F(1, 13) = 0.600	m = 4; n = 1	FPE(4, 0) < FPE(4, 1): one dimensional relation	-
DH	k = 5; l = 3	(3, 9); 5.225^{**}	F(1, 8) = 0.006	m = 0; n = 5	(5, 15); 3.268^{**}	F(1, 14) = 3.660^{*}; F(1, 13) = 0.614
DI	k = 5; l = 1	FPE(4, 0) < FPE(5, 1): one dimensional relation	-	m = 5; n = 1	FPE(3, 0) < FPE(5, 1): one dimensional relation	-
DJ	k = 0; l = 1	FPE(0, 0) < FPE(0, 1): one dimensional relation	-	m = 4; n = 1	(1, 15); 20.967^{***}	F(1, 14) = 0.059
DK	k = 0; l = 1	FPE(0, 0) < FPE(0, 1): one dimensional relation	-	m = 2; n = 4	(4, 11); 2.569^{*}	F(1, 10) = 0.044
DL	k = 0; l = 1	FPE(0, 0) < FPE(0, 1): one dimensional relation	-	m = 0; n = 2	(2, 20); 6.422^{***}	F(1, 19) = 0.185
DM	k = 0; l = 6	(6, 12); 3.664^{**}	F(1, 11) = 1.272	m = 5; n = 6	(6, 2); 33.358^{**}	F(1, 1) = 0.030
DN	k = 4; l = 6	(6, 4); 14.480^{**}	F(1, 3) = 0.481	m = 1; n = 1	(1, 21); 3.103^{*}	F(1, 20) = 0.103

Notes: [a] The letter D before the variables represents the first difference form. Numbers in parentheses are degrees of freedom. A (*), (**) or (***) indicate significance at the 0.10, 0.05 or 0.01 level, respectively. [b]D – Manufacturing (Total); DA – Manufacture of food products, beverages and tobacco, DB – Manufacture of textiles and textile products, DC – Manufacture of leather and leather products, DD – Manufacture of wood and wood products, except furniture, DE – Manufacture of pulp, paper and paper products; publishing and printing, DF – Manufacture of coke, refined petroleum products and nuclear fuel, DG – Manufacture of chemicals, chemical products and man-made fibres, DH – Manufacture of rubber and plastic products, DI – Manufacture of other non-metallic mineral products, DJ – Manufacture of basic metals and fabricated metal products, DK – Manufacture of machinery and equipment, DL – Manufacture of electrical and optical equipment, DM – Manufacture of transport equipment, DN – Manufacture of furniture n.e.c.

Table 11
Results of conditional Granger–Sims causality test by NACE sub-sectors
(variables: sub-sectoral exports – DEX, sub-sectoral imports – *DIM)*[a,b]

	DIM DEX			DEX DIM		
	Optimal Lags	F-statistics	Serial(1)	Optimal Lags	F-statistics	Serial(1)
D	k = 0; l = 1	FPE(1, 0) < FPE(0, 1): one dimensional relation	-	m = 5; n = 1	(1, 13); 5.553**	F(1, 12) = 0.459
DA	k = 0; l = 1	FPE(2, 0) < FPE(0, 1): one dimensional relation	-	m = 2; n = 5	(5, 11); 8.240***	F(1, 10) = 0.126
DB	k = 5; l = 2	(2, 11); 18.112***	F(1, 10) = 0.060	m = 4; n = 6	(6, 5); 67.765***	F(1, 4) = 0.141
DC	k = 4; l = 1	FPE(5, 0) < FPE(4, 1): one dimensional relation	-	m = 2; n = 1	FPE(2, 0) < FPE(2, 1): one dimensional relation	-
DD	k = 5; l = 6	(6, 2); 5.987	F(1, 1) = 3.497	m = 5; n = 2	(2, 13); 10.605***	F(1, 12) = 0.130
DE	k = 5; l = 6	(6, 2); 6.836	F(1, 1) = 0.831	m = 0; n = 1	(1, 21); 4.490**	F(1, 20) = 1.106
DF	k = 5; l = 6	(6, 3); 22.715**	F(1, 2) = 0.003	m = 5; n = 3	(3, 9); 5.369**	F(1, 8) = 0.553
DG	k = 5; l = 1	FPE(5, 0) < FPE(5, 1): one dimensional relation	-	m = 4; n = 5	(5, 6); 15.846***	F(1, 5) = 0.001
DH	k = 4; l = 2	FPE(4, 0) < FPE(4, 2): one dimensional relation	-	m = 5; n = 1	(1, 13); 12.742***	F(1, 12) = 0.053
DI	k = 3; l = 1	FPE(3, 0) < FPE(3, 1): one dimensional relation	-	m = 0; n = 1	FPE(0, 0) < FPE(0, 1): one dimensional relation	-
DJ	k = 2; l = 1	(1, 19); 5.349**	F(1, 18) = 0.006	m = 3; n = 5	(5, 8); 43.892***	F(1, 7) = 0.953
DK	k = 2; l = 2	(2, 17); 3.153*	F(1, 16) = 0.260	m = 0; n = 1	FPE(0, 0) < FPE(0, 1): one dimensional relation	-
DL	k = 0; l = 2	(2, 20); 4.554**	F(1, 19) = 0.004	m = 4; n = 1	(1, 15); 7.207**	F(1, 14) = 0.008
DM	k = 4; l = 6	(6, 5); 6.683**	F(1, 4) = 0.112	m = 4; n = 4	(4, 9); 12.523***	F(1, 8) = 0.416
DN	k = 4; l = 1	(1, 15); 4.659**	F(1, 14) = 0.001	m = 5; n = 4	(4, 6); 5.176**	F(1, 5) = 1.190

Note: [a]The letter D before the variables represents the first difference form. Numbers in parentheses are degrees of freedom. A (*), (**) or (***) indicate significance at the 0.10, 0.05 or 0.01 level, respectively. [b]D - Manufacturing (Total); DA - Manufacture of food products, beverages and tobacco, DB - Manufacture of textiles and textile products, DC - Manufacture of leather and leather products, DD - Manufacture of wood and wood products, except furniture, DE - Manufacture of pulp, paper and paper products; publishing and printing, DF - Manufacture of coke, refined petroleum products and nuclear fuel, DG - Manufacture of chemicals, chemical products and man-made fibres, DH - Manufacture of rubber and plastic products, DI - Manufacture of other non-metallic mineral products, DJ - Manufacture of basic metals and fabricated metal products, DK - Manufacture of machinery and equipment, DL - Manufacture of electrical and optical equipment, DM - Manufacture of transport equipment, DN - Manufacture of furniture n.e.c.

Using the conditional-causality model on the sub-sectoral data allows the following judgements to be made:

* Considering total manufacturing only, the causality between exports and industrial production is bi-directional. The exports–production link is bi-directional, because domestic exporters adjust strongly the pace of their production to the trend in foreign orders, either by increasing production to meet accelerating foreign demand (in which case production in manufacturing stimulates exports) or by reducing production and running down stocks of products piled up in times of weak external demand (in which case exports drive domestic production). On the other hand, domestic production requires sufficient imports and the latter are possible only with adequate exports.
* The bi-directional causality between exports and industrial production is a prevailing pattern not just in general manufacturing, but at the sub-sectoral level as well. Of the 13 manufacturing industries where some type of causality was found, 7 showed such a bi-directional link. Of the 6 biggest Slovenian export industries[5] (manufacture of textiles and textile products – DB, of chemicals and chemical products – DG, of basic metals and fabricated metal products – DJ, of machinery and equipment – DK, of electrical and optical equipment – DL, and of transport equipment – DM), only in manufacture of electrical and optical equipment was there no evidence of bi-directional causality between exports and domestic production. Furthermore, the hypothesis of export-induced production is also confirmed in the manufacture of wood and wood products (DD) and in the manufacture of other non-metallic mineral products (DI). In the remaining three industries (manufacture of food products, beverages and tobacco – DA, of leather and leather products – DC, and of pulp, paper and paper products – DE), sub-sectoral production causes exports.
* Some form of causality between imports and industrial production is exhibited in 11 industries. Of these, 6 show bi-directional causality; in 3 cases, the causality runs from imports to production and in 2 the reverse causality holds. Considering only the 6 largest exporters, the production in the manufacture of basic metals and fabricated metal products (DJ), of machinery and equipment (DK) and of electrical and optical equipment (DL) is critically dependent on import demand. In manufacture of textiles and textile products (DB) and of transport equipment (DM), producers have some ability to adapt the sequence of their import demand to the needs of domestic production, since a two-way causality exists between imports and domestic production. In the observed group of the 6 biggest exporters, only the imports in manufacture of chemical products (DG) are exclusively governed by home production.
* The link between sub-sectoral exports and sub-sectoral imports is either bi-directional (6 industries) or runs from the former to the latter (5 industries). Of 12 relevant industries, only the results for the manufacture of machinery and equipment (DK) support the hypothesis that imports generate export supply. In the group of the remaining 5 main exporters, exports cause imports and *vice versa* in the manufacture of textiles and textile products (DB), of basic metals and fabricated metal products(DJ), of electrical and optical equipment (DL), and of transport equipment (DM), whereas in manufacture of chemical products (DG) exports induce import demand. The identified cases of two-way causality between exports and import flows reflect the fact that the industries contributing the biggest shares of total manufactured exports are also the largest importers.

[5] In terms of the proportion of a specific sector's exports to total exports and of a specific sector's exports to exports of total manufacturing.

* In the whole sample of 15 industries, some form of causality between exports, imports and industrial production could be established simultaneously in 10. Of these 10 cases, the causal relations between the three tested variables in 7 are mutual, which points to a mechanism of circular causality. In manufacture of chemical products (DG), the import demand is completely endogenous, while imports in manufacture of machinery and equipment (DK) are the most exogenous, and with manufacture of electrical and optical equipment (DL), industrial production is the aggregate with the highest degree of endogeny.

6) Conclusion: comments on empirical results and policy implications

The empirical tests conducted and presented in the previous section reveal several interesting conclusions.

First, the bi-directional causality evinced in the aggregate data between exports and the variables for economic activity, in manufacturing as a whole as well as in the majority of the sub-sectors examined, suggests that any characterization of a small country's growth as export-driven may be perfunctory. This empirical outcome means that the results conform with the group of studies conducted, for instance by Dutt and Ghosh (1996) and Halikias (1997), where similar relations were found for small economies. The causality in the exports–output link can be separated into two channels: (1) Growing GDP induces imports of goods and services, while at the level of manufacturing, import flows create possibilities for export expansion. (2) Exports provide foreign exchange to pay for the import content of the remaining components of final demand – consumption, investment and government expenditure. Bi-directionality reflects mainly the growing importance of intra-industry trade and the high geographical concentration of Slovenian foreign trade, which intensifies the frequency of export-import flows and the import requirements of exports.[6]

Secondly, on a level of aggregate data, imports of goods and services are clearly ruled by domestic income. This causal link is consistent with a range of estimates of import demand functions that suggest an increase in the income elasticity of aggregate imports after 1993 (Kožar and Strojan 1995; Cimperman *et al.* 1996; Bekó 1999). The increase in domestic purchasing power may therefore have helped to weaken the country's current-account position mainly through larger imports. This causality pattern originates from the process of liberalizing foreign trade in Slovenia and the subsequent penetration of the domestic market by imported products (covered by aggressive advertising), which caused a headlong rush towards Western consumption patterns and a surge of 'consumption imports'. Striking deviations from this causality pattern appear at the disaggregated level, however. In manufacturing as a whole the causality points from commodity imports to domestic production, whereas in the majority of sub-sectors, the causality between the observed variables runs in both directions. Such feedback causality at industry level reflects the working of two mutual channels: (1) The dynamics of commodity imports encourage domestic production, and with it, associated realization of economies of scale. (2) Production spurs commodity imports because a high proportion of imports consist of intermediate goods used in domestic production. The latter channel leads to a third conclusion, focused on the link between export and import flows.

Disparities between aggregate and sub-sectoral results can also be identified in the exports–imports causality link. At the aggregate level and in total manufacturing, no support is gained for the modernization

[7] For the empirical assessment of individual factors, see Strojan and Kotar (1998).

hypothesis (the need to acquire foreign inputs and know-how primarily through autonomous imports, to improve the quality of domestic production and allow export shares to increase), since the exports of goods (and services) are driving the corresponding import flows. At industry level, the number of cases with bi-directional causality (6) is roughly balanced by the number of cases where export flows generate sub-sectoral import demand (5) – the modernization argument cannot be accepted as valid for individual industries, without considering the relevant feedback causality from export supply towards imports. It can be concluded that an increase in imports of intermediate goods and equipment for investments does not cause significant deficit-worsening effects on the current account, even if substantial imports of capital goods are needed to create an industrial structure competitive in world markets. For these reasons, the potential current-account gap may arise from autonomous or connected operation of two factors: the growth of domestic income over accelerating imports (imports of consumption goods) and/or weakening of the export performance of Slovenian producers in foreign markets.[7]

The last conclusion has some implications for economic policy. The bi-directional causality between exports and economic activity implies that there are no trade-offs between whether to pursue a growth strategy of structural reforms for internal competitiveness, with the goal of higher domestic growth and afterwards increasing exports, or to apply a trade policy of improving international competitiveness and enabling the economy to respond quickly to foreign demand. This causality pattern, which argues against unilateral, exclusive and direct policy measures to foster domestic exports, can be complemented by another important piece of empirical evidence: exports of goods and services in Slovenia possess no super-exogenous properties (Bekó, 2000b). The lack of invariance revealed by super-exogeny tests indicates that agents' expectations would presumably change as policies targeting exports brought various interventions. Domestic policy makers should therefore be cautious in setting up strategies to promote export growth based on conditional policy simulations. They should at least consider the fact that changes in exports appear mainly through enforced reactions to development in foreign markets, although the linkages between exports and import flows should not be neglected either. In addition, causality estimates of sub-sectoral exports, imports and production suggest that the majority of manufacturing industries display circular causality, which, due to the endogenous nature of the observed variables, allows only limited scope for policy engagement.

All the empirical results itemized indicate why the creation of a robust export base for the Slovenian economy has to be sought mainly in an appropriate structure of imports (sufficient imports of capital goods) and in emulation pressures arising from external demand (mainly from EU markets), FDI, *etc.*, not in direct stimulation of domestic export supplies via diverse supply-side policies. Under such conditions, any actions and trends oriented towards precluding exporters from free access to the international market for purchases, including raw materials, processed products and technology, would weaken the growth of the economy. From the domestic policy-making point of view, the export-oriented growth concept found in Slovenia must be accompanied by stabilization measures, which need to be devoted to adjustment to the trends in domestic consumption and the pace of exports, so as to avoid excessive external deficits.

* * * * *

[7] For more on this argument, see Bole (1997).

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APPENDIX OF VARIABLES USED

EXCOMSER – exports of goods and services in USD at constant exchange rates (1995 = 100), f.o.b.

EXD – exports of goods in USD (manufacturing total) at constant exchange rates (1995 = 100), f.o.b.

EXDA – exports of goods in USD (manufacture of food products, beverages and tobacco) at constant exchange rates (1995 = 100), f.o.b.

EXDB – exports of goods in USD (manufacture of textiles and textile products) at constant exchange rates (1995 = 100), f.o.b.

EXDC – exports of goods in USD (manufacture of leather and leather products) at constant exchange rates (1995 = 100), f.o.b.

EXDD – exports of goods in USD (manufacture of wood and wood products, except furniture) at constant exchange rates (1995 = 100), f.o.b.

EXDE – exports of goods in USD (manufacture of pulp, paper and paper products. publishing and printing) at constant exchange rates (1995 = 100), f.o.b.

EXDF – exports of goods in USD (manufacture of coke, refined petroleum products and nuclear fuel) at constant exchange rates (1995 = 100), f.o.b.

EXDG – exports of goods in USD (manufacture of chemicals, chemical products and man-made fibres) at constant exchange rates (1995 = 100), f.o.b.

EXDH – exports of goods in USD (manufacture of rubber and plastic products) at constant exchange rates (1995 = 100), f.o.b.

EXDI – exports of goods in USD (manufacture of other non-metallic mineral products) at constant exchange rates (1995 = 100), f.o.b.

EXDJ – exports of goods in USD (manufacture of basic metals and fabricated metal products) at constant exchange rates (1995 = 100), f.o.b.

EXDK – exports of goods in USD (manufacture of machinery and equipment) at constant exchange rates (1995 = 100), f.o.b.

EXDL – exports of goods in USD (manufacture of electrical and optical equipment) at constant exchange rates (1995 = 100), f.o.b.

EXDM – exports of goods in USD (manufacture of transport equipment) at constant exchange rates (1995 = 100), f.o.b.

EXDN – exports of goods in USD (manufacture of furniture n.e.c.) at constant exchange rates (1995 = 100), f.o.b.

FORDEMAND – weighted average of imports of goods from eight largest Slovenian trading partners in USD (Germany, France, Italy, Austria, Netherlands, Switzerland, UK and US), with weights based on proportion of Slovenia's commodity exports directed to the group (1995 = 100).

GDP – gross domestic product at constant SIT prices 1995.

IMCOMSER – imports of goods and services in USD at constant exchange rates (1995 = 100), with imported goods valued c.i.f.

IMD – imports of goods in USD (manufacturing total) at constant exchange rates (1995 = 100), valued c.i.f.

IMDA – imports of goods in USD (manufacture of food products, beverages and tobacco) at constant exchange rates (1995 = 100), valued c.i.f.

IMDB – imports of goods in USD (manufacture of textiles and textile products) at constant exchange rates (1995 = 100), valued c.i.f.

IMDC – imports of goods in USD (manufacture of leather and leather products) at constant exchange rates (1995 = 100), valued c.i.f.

IMDD – imports of goods in USD (manufacture of wood and wood products, except furniture) at constant exchange rates (1995 = 100), valued c.i.f.

IMDE – imports of goods in USD (manufacture of pulp, paper and paper products, publishing and printing) at constant exchange rates (1995 = 100), valued c.i.f.

IMDF – imports of goods in USD (manufacture of coke, refined petroleum products and nuclear fuel) at constant exchange rates (1995 = 100), valued c.i.f.

IMDG – imports of goods in USD (manufacture of chemicals, chemical products and man-made fibres) at constant exchange rates (1995 = 100), valued c.i.f.

IMDH – imports of goods in USD (manufacture of rubber and plastic products) at constant exchange rates (1995 = 100), valued c.i.f.

IMDI – imports of goods in USD (manufacture of other non-metallic mineral products) at constant exchange rates (1995 = 100), valued c.i.f.

IMDJ – imports of goods in USD (manufacture of basic metals and fabricated metal products) at constant exchange rates (1995 = 100), valued c.i.f.

IMDK – imports of goods in USD (manufacture of machinery and equipment) at constant exchange rates (1995 = 100), valued c.i.f.

IMDL – imports of goods in USD (manufacture of electrical and optical equipment) at constant exchange rates (1995 = 100), valued c.i.f.

IMDM – imports of goods in USD (manufacture of transport equipment) at constant exchange rates (1995 = 100), valued c.i.f.

IMDN – imports of goods in USD (manufacture of furniture n.e.c.) at constant exchange rates (1995 = 100), valued c.i.f.

INDD – industrial production (manufacturing total, 1995 = 100).

INDDA – industrial production (manufacture of food products, beverages and tobacco, 1995 = 100).

INDDB – industrial production (manufacture of textiles and textile products, 1995 = 100).

INDDC – industrial production (manufacture of leather and leather products, 1995 = 100).

INDDD – industrial production (manufacture of wood and wood products, except furniture, 1995 = 100).

INDDE – industrial production (manufacture of pulp, paper and paper products. publishing and printing, 1995 = 100).

INDDF – industrial production (manufacture of coke, refined petroleum products and nuclear fuel, 1995 = 100).

INDDG – industrial production (manufacture of chemicals, chemical products and man-made fibres, 1995 = 100).

INDDH – industrial production (manufacture of rubber and plastic products, 1995 = 100).

INDDI – industrial production (manufacture of other non-metallic mineral products, 1995 = 100).

INDDJ – industrial production (manufacture of basic metals and fabricated metal products, 1995 = 100).

INDDK – industrial production (manufacture of machinery and equipment, 1995 = 100).

INDDL – industrial production (manufacture of electrical and optical equipment, 1995 = 100).

INDDM – industrial production (manufacture of transport equipment, 1995 = 100).

INDDN – industrial production (manufacture of furniture n.e.c., 1995 = 100).