

# Technological stagnation in an open economy: the case of the Republic of Macedonia

**Technological stagnation is not necessarily related to policies of import substitution. It is possible also in conditions of highly liberalized foreign trade, i.e. open economy, which builds its competitive advantages without national technological strategy and policy**

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## 1. Introduction

The Macedonian economy has been experiencing high current account deficit and this has raised the issued of sustainable BOP position many times. External imbalances would become a concern for the macroeconomic stability (Milesi-Ferreti and Razin, 1996) unless they have been partially offset by the sizable private transfers from abroad, which in certain years reached 10% of GDP.

Still, this does not relieve the economic policymakers from the obligations to closely monitor the external deficit. Low growth and the unfavorable commodity export structure on one hand and the growing import that would be discouraged by the gradual liberalization of the trade with the EU on the other, point to the fact that the support to the microeconomic restructuring deserves to be placed high on the economic priority agenda. The responsibility is much greater if we take into account that the export potentials of the Macedonian economy rely on few traditional comparative advantages, increasingly clashing with the technological and information break-

throughs of the new economy. This article is based on the technological content of the traded goods in Macedonia as one of the possible criteria for distinguishing the "old" and the "new" economy.

The text below refers to the technological content of the import of goods in Macedonia and its final destination. Furthermore, it analyses the technological gap of the Macedonian economy in relation to a group of advanced economies and identifies the relative importance of certain export-oriented sectors in the



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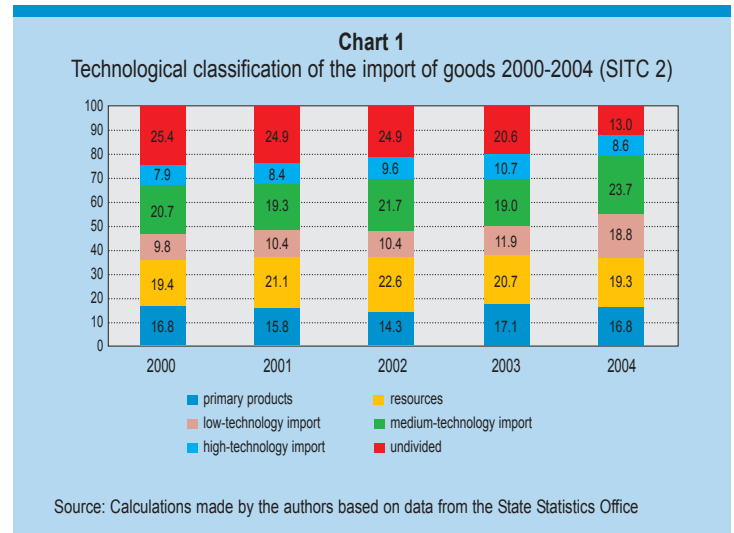
Macedonian industry from the aspect of the factor-intensity of their production. The last section of this article refers to conclusions and recommendations for the economic policymakers.

## 2. Gains of the new economy and the Macedonian growth model

The Macedonian economy has relatively favorable technological structure of import of goods compared to other economies in transition. In the past five years, around 30% of imported goods, on average, fell into the group of medium- and high-technology import, according to the Standard International Trade Classification (SITC 2) of the United Nations.

Still, the analysis of the disaggregated data on imported goods (on three-digit level, according to the aforementioned classification) shows different picture. The Macedonian economy, via import, absorbs modern technology, mainly in the area of consumption. For example, in 2004 even 30% of the medium-technology import falls within only four categories: Import of motor oils (781), electricity and non-electric household appliances (775), soap and cleaning items (554) and perfumes, cosmetics etc. (554), while at least 40% of the high-technology import comprises the following: pharmaceuticals (542), medical and pharmaceutical products (541), TV equipment (761), electro-diagnostic machines for medical purposes (774) and cameras and equipment (881).

The gains from the new economy in this case, the modern technologies, are insufficiently em-



bedded as an import component in the investment activities of the business sector. Due to this, one should not be surprised by the fact that since the mid 1990s the prices and quality of the Macedonian export goods have been constantly declining as a result of the technological lag in the growth of the labour productivity and of the technological progress (Loko and Tuladhar, 2005). At the same time, against a background of technological stagnation of the real sector and modest supply of domestic products (especially those involving higher technology components, i.e. greater value added), the continuous growth of the import of consumer goods is quite understandable.

Accordingly, high foreign trade deficit "feed" the private consumption, rather than the investment activity of the real sector. In the medium and long run, it threatens the sustainability of the BOP position. Even under an optimistic scenario, acceleration of the economic growth on medium term would mean further deepening of the current account deficit due to the higher investment needs of the economy.

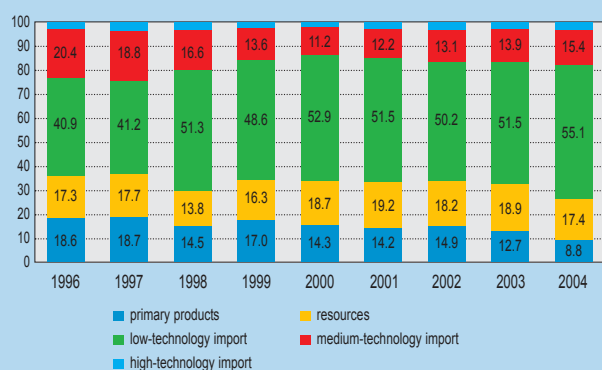
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Chart 2

Technological classification of the export of goods 1996-2004 (SITC 2)



Source: Calculations made by the authors based on data from the State Statistics Office

### 3. Technological contents and factor-intensity of the Macedonian export of goods

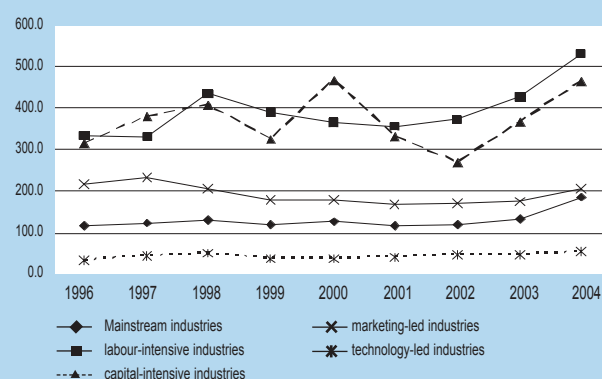
The analysis of the technological content of the Macedonian export of goods within the period 1996-2004 shows that around 80% of the export-related inflows are a result of primary products, resources and low-technology export (according to SITC 2). As of 2000, mild tendency is shown of growth of the share of the medium-technology export, but this can still be interpreted as a signal of technological modernization of the export-oriented sector in Macedonia.

Poor technological capacity of the export-oriented sectors of the Macedonian economy is a reflection of the slow progress of the structural reforms in the second half of the 1990s and absence of national policy of technological development. This is partly a result of the low level of FDIs. Recent empirical studies (Brada, Kutan and Yigit, 2004) confirm that in conditions of political instability, only few bold investors decide to invest their capital in these turbulent geographical locations.

Relevant conclusions on the technological content of the export potentials of the Macedonian economy can be drawn by time analysis of the export of the industrial sectors from the aspect of the factor intensity.<sup>1</sup> According to WIFO 1 taxonomy, designed by the Osterreichisches Institut fur Wirtschaftsforschung, only 3-4% of the export-related inflows resulted from the technology-led industries

Chart 3

Export activity of certain industries according to the factor intensity - WIFO 1 taxonomy (1996-2004), in US\$ million at 1996 prices



Source: Calculations made by the authors based on data from the State Statistics Office

tries in the period 1996-2004. In the indicated period, there was rapid decline in the share of marketing-led industries (from 21.3% in 1996 to 14.4% in 2004) and this share was taken over by labour-intensive and capital-intensive industries (Chart 3 and Table A.3). Competitiveness decline in the industries where marketing is a dominant activity, is a result inter alia, of the intensified competition on the liberalized markets in the former Yugoslav republics, where due to the traditional relationships, so far it was believed that innovation in marketing strategies is unnecessary.

Similar results are obtained from the analysis of the value added generated by the Macedonian economy. In the period 1997-2003<sup>2</sup> there was an evident decline in the share of the mainstream industries in the overall value added, i.e. they experienced decline from 3.1% in 1997 to 2.6% of GDP in 2003. At the same time, larger share in the creation of value added was experienced solely by the labour-intensive industry, where growth moved from 4.1% in 1997 to 5.3% in 2003. As a negative tendency and a proof of the technological lag of Macedonia are the trends present in other industries (capital-intensive, marketing-led industries and technology-led industries) which, throughout the eight-year period, with small variations, showed almost no change (Table A.4).

With regard to the fact that the export activity of some industries is highly dependent on import, more precise picture of their competitiveness can be gained by analyzing

1) According to the taxonomy made by the Osterreichisches Institut fur Wirtschaftsforschung - WIFO 1, industrial sectors are classified in five broader groups: mainstream industries, labour-intensive, capital-intensive, marketing-led and technology-led industries.

2) Data on 2004 were not published when this article was written.

ing the changes that occur in the index of **Revealed Comparative Advantage**.<sup>3</sup> The value of this index varies from -1 to 1, whereby higher values mean greater competitiveness of products of certain sectors of the industry (Astrov, 2003). If the value is closer to -1, this means that

Production of products from other non-metal minerals (265), the capital-intensive industries as a whole did not particularly strengthened their competitive advantages.

Ultimately, the capacity of the economy to generate high-technology export is highly correlated to the level of economic development, expressed in GDP per capita (PPP). The comparison with several EU member states shows that there is only a modest catching-up potential in the Macedonian economy and that it still needs to face the challenge of technological revitalization.

#### 4. Conclusions and recommendations

At the beginning of the 21 century, in the new economy, the lack of raw materials and energy sources, the quality of land, the population numbers, the geographical distance and other traditional production resources are no longer a serious and limiting factor for the economic growth. Instead, key factors are human knowledge, managerial and organizational skills, access to and management with new technologies and information.

Breakthrough on the global market shows that much more active efforts are necessary by the economic policymakers in order to introduce national policy of technological development. For example, the national system of metrology, standardization and accreditation should be upgraded sooner so as to protect the national market from low-quality import products, and at the same time, to provide strong technical infrastructure for certification of the quality of the Macedonian export products, in accordance with the European standards.

Technological stagnation is not necessarily related to policies of import substitution. It is possible also in conditions of highly liberalized foreign trade, i.e. open economy, which builds its competitive advantages without national technological strategy and policy.

Strengthening of the competitive position of labour-intensive industries is no guarantee for sustainable BOP position. Positioning on the global market by supplying products with low value added, low technological content and by using low-skilled labour is in great contrast to the elements and gains of the new economy.

Establishment of functioning market economy, capable of dealing with external pressures in the EU requires abandoning the model of consumer-driven growth. With regard to micro-financing stability, this would mean miti-

**Table 1**

Index of Revealed Comparative Advantage (RCA) of certain industries

Year	Mainstream industries	Labour-intensive industries	Capital-intensive industries	Marketing-led industries	Technology-led industries
1996	-0.349	0.345	0.005	-0.297	-0.799
1997	-0.368	0.254	-0.064	-0.314	-0.683
1998	-0.377	0.591	0.159	-0.558	-0.717
1999	-0.417	0.545	0.094	-0.572	-0.769
2000	-0.396	0.533	0.235	-0.612	-0.789
2001	-0.402	0.574	0.120	-0.222	-0.719
2002	-0.405	0.516	-0.064	-0.591	-0.756
2003	-0.411	0.539	0.101	-0.618	-0.760
2004	-0.367	0.431	-0.105	-0.548	-0.773

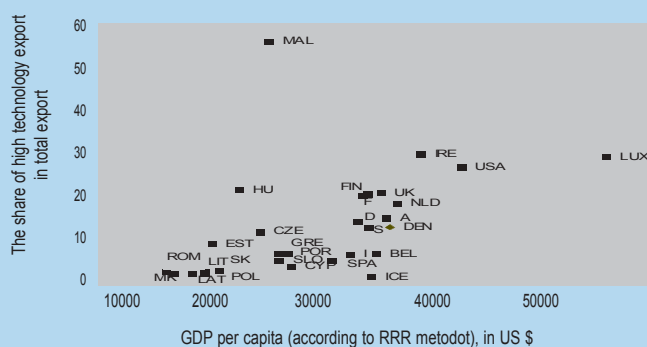
Source: Calculations made by the authors based on data from the State Statistics Office

these industries are (still) inferior on the international market.

The analysis of the time series of the index of Revealed Comparative Advantage in the period 1996-2004 shows that only labour-intensive industries strengthened their competitive position on the global market. This is mainly due to the fact that the export activity of the textile industry under the category Production of clothing items, additional processing and dyeing of fur (182), which relies on low-skilled labour.<sup>4</sup> On the other hand, despite the noted growth of export in the categories Production of base metals (273) and

**Chart 4**

High-technology export and GDP per capita (PPP) in certain countries (2003)



Source: Calculations made by the authors based on data from Eurostat Comext, UN-Comtrade, Human Development Report 2005 (WB) and data from the State Statistics Office

3) The Revealed Comparative Advantage index was calculated as  $RCA_i = (X_i - M_i) / (X_i + M_i)$ , whereby  $X_j$  is export of goods and  $M_j$  import of goods in the sector  $i$  the Macedonian industry. Calculations are made on three-digit level according to the Classification of Economic Activities in the European Community (NACE - 3 digit).

4) Index of Revealed Comparative Advantage of the textile industry remains positive even after an adjustment is made with the import of textile cloth.

gating BOP problems in the long run since productivity growth will raise the future path of the potential output both directly, but also indirectly by encouraging investments (Obstfeld and Rogoff, 2002). With regard to the economic growth, this points to the fact that the backbone of macroeconomic policy must be shifted towards supply encouraging policies, i.e. towards accelerating structural and institutional reforms.

A decisive shift in the economic policy is not only necessary, but also inevitable. Macedonian economy is not currently in a crisis, however, the achieved macroeconomic stability in the long run would become increasingly difficult to sustain, i.e. the country will find it increasingly difficult to catch up with the prevailing economic and development mainstreams in Europe.

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## ANNEX TABLES

**Table A.1** - Technological structure of import of goods in Macedonia (SITC 2), 2000-2004 (in %)

Category	2000	2001	2002	2003	2004
Primary goods	16.8	15.8	14.3	17.1	16.8
Resource exploitation	19.4	21.1	22.6	20.7	19.3
Low-technology import	9.8	10.4	10.4	11.9	18.8
Medium-technology import	20.7	19.3	21.7	19.0	23.7
High-technology import	7.9	8.4	9.6	10.7	8.6
Non-classified	25.4	24.9	21.4	20.6	13.0
<b>Total:</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

Source: Calculations made by the authors based on data from the State Statistics Office

**Table A.2** - Export structure according to the factor intensity - WIFO 1 taxonomy (1996-2004), in US\$ million at 1996 prices

Year	Mainstream industries	Labour-intensive industries	Capital-intensive industries	Marketing-led industries	Technology-led industries
1996	116,022,920	335,560,885	314,970,257	216,091,907	33,775,037
1997	124,887,694	331,737,274	380,541,527	233,468,605	43,367,693
1998	130,288,551	434,438,798	407,142,237	208,151,689	50,469,012
1999	120,854,675	389,077,787	324,878,192	178,612,938	36,657,924
2000	126,282,327	365,743,875	465,587,742	180,276,792	37,481,645
2001	117,707,395	356,667,817	330,538,877	168,756,124	40,587,654
2002	120,001,626	372,564,505	269,316,678	173,797,733	47,791,132
2003	134,928,784	427,871,629	363,993,657	174,502,920	46,670,269
2004	185,636,656	530,110,090	463,268,734	207,466,491	55,620,871

Source: Calculation made by the authors based on data from the State Statistics Office

**Table A.3** - Export structure according to the factor intensity - WIFO 1 taxonomy (1996-2004)

Year	Mainstream industries	Labour-intensive industries	Capital-intensive industries	Marketing-led industries	Technology-led industries
1996	11.4	33.0	31.0	21.3	3.3
1997	11.2	29.8	34.2	21.0	3.9
1998	10.6	35.3	33.1	16.9	4.1
1999	11.5	37.1	30.9	17.0	3.5
2000	10.7	31.1	39.6	15.3	3.2
2001	11.6	35.2	32.6	16.6	4.0
2002	12.2	37.9	27.4	17.7	4.9
2003	11.8	37.3	31.7	15.2	4.1
2004	12.9	36.8	32.1	14.4	3.9

Source: Calculation made by the authors based on data from the State Statistics Office

**Note:**

1) US\$ amounts are deflated by the index of producers' prices in the USA (1996 is base year).

2) The division is made according the taxonomy made by the Osterreichisches Institut fur Wirtschaftsforschung - WIFO 1.<sup>5</sup>

**Table A.4** - Value added by individual industries (1997-2003), in denar

Year	Mainstream industries	% of GDP	Labour-intensive industries	% of GDP	Capital-intensive industries	% of GDP	Marketing-led industries	% of GDP	Technology-led industries	% of GDP
1997	5,817	3.1	7,676	4.1	5,241	2.8	14,781	7.9	1,878	1.0
1998	6,809	3.7	8,535	4.6	4,497	2.4	14,373	7.7	2,043	1.1
1999	6,839	3.7	8,581	4.6	4,789	2.6	15,025	8.1	2,300	1.2
2000	6,137	3.3	9,436	5.1	6,325	3.4	16,273	8.7	2,440	1.3
2001	4,338	2.3	9,021	4.8	5,040	2.7	15,154	8.1	2,726	1.5
2002	4,990	2.7	8,417	4.5	4,275	2.3	16,265	8.7	2,707	1.5
2003	4,836	2.6	9,907	5.3	5,659	3.0	14,516	7.8	3,074	1.7

Source: Calculation made by the authors based on data from the State Statistics Office

5) WIFO = Wirtschaftsforschung.