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Identification of high-growth episodes and related trade patterns

The different role of manufacturing and commodities exports

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Abbreviations

ADF	Augmented Dickey–Fuller Test
EU	European Union
GDP	Gross domestic product
LDC	Less Developed Country
LIC	Low income country
MIC	Middle income country
OLS	Ordinary Least Square Model
UMIC	Upper-middle income country
VAR	Vector Autoregressive Model
VECM	Vector Error Correction Model
WTO	World Trade Organization

1 Introduction

In this paper, carried out under the DFID Economics and Private Sector Professional Evidence and Applied Knowledge Services (EPS-PEAKS) framework, we seek to identify a group of countries which have made a quick transition from a LIC-MIC status thanks to high-growth episodes, examining the performance of different economic sectors and focusing in particular on their exports.

In particular, in this study we identify a population of countries and examine the relative performance of different economic sectors, including export sectors during the periods of high growth. To define this population we look at countries which started from a level of low and middle income economies in the post-second world war period and which have experienced rapid growth episodes (with an average GDP growth rate of at least 7% for at least 20 years) starting from a GDP per capita below USD 3,000 in current prices. The final objective would be to identify a subset whose high growth episodes, and in particular exports, were clearly linked with export of hard commodities or agricultural products and not with export of manufacturing industries.

To do that we employ GDP and trade data at the sectoral level from 1960 from the World Bank and the UN COMTRADE International Trade Statistics. Applying a vector error correction model (VECM) we are able to estimate the long-run relationship between sectoral exports and the sustained high growth episodes, identifying in each country in the sample those export sectors which were correlated with the higher sustained GDP per capita growth.

Following this methodology, we distinguish between countries that have experienced sustained GDP growth thanks to manufacturing exports and those whose performance depended on the primary sector. The results show that most of the economies related with manufacturing exports are Asian countries, mainly located in the South-East. On the contrary, most of the countries in our sample whose high economic growth has been linked with non-manufacturing exports are geographically located in Africa and in the Middle East. In addition, it appears that Middle East countries' economic growth relied uniquely on the export of hard commodities, mainly oil and mineral fuels, while for the African countries in most of the cases both exports of agricultural products and of hard commodities have sustained the prolonged periods of high economic growth.

2 Exports and Economic Growth

2.1 Data and Methodology

To identify a group of countries that have made a quick and sharp transition from a low middle income (LMIC) to a medium (MIC) or high income (HIC) status we rely on a set of different data sources. First, we analyse the GDP growth rate since 1960 for all the countries which had a GDP per capita below USD 3,000 per year in current 2015 prices. We included in this way all the countries with a low and middle-income status in the post second world war period. Information about total and per capita GDP growth are available from the World Bank Development Indicators. Among these countries, we identified a sample of LIC-MIC countries[1] which have experienced high and sustained growth episodes in the post-war period, defined as an average GDP growth rate higher than 7% for a period of at least 20 consecutive years. Thus, we are able to identify 40 countries which have grown at an average rate of 7% or more for 20 years or longer since 1960 from a starting point of USD 3,000 GDP per capita per year or less.

Table 1: Countries which experienced high growth episodes between 1960 and 2014.

Country	Av. GDP Growth	Period High Growth		GDP per capita (start/end)		Country	Av. GDP Growth	Period High Growth		GDP per capita (start/end)	
Angola	7.29	1993	2013	464.78	5783.37	*Iraq*	10.97	1961	2013	245.00	6862.50
Algeria	7.60	1963	1982	222.72	2176.92	*Israel*	7.34	1961	1981	1595.86	5863.58
Azerbaijan	8.25	1994	2013	436.19	7811.62	*Jordan*	15.99	1961	1993	412.92	1435.29
Bhutan	13.91	1981	2013	328.66	2362.58	*Kenya*	7.01	1962	1981	100.60	405.56
Bosnia	20.80	1995	2013	343.17	4661.76	*Laos*	7.10	1994	2013	324.89	1660.71
Botswana	11.93	1961	2002	61.30	3006.59	*Lebanon*	7.43	1972	2009	1050.12	8274.14
Brazil	7.35	1961	1980	203.19	1930.54	*Liberia*	8.73	1991	2013	168.44	454.34
Cabo Verde	8.45	1962	2013	406.44	3767.12	*Malaysia*	7.18	1961	1997	287.42	4593.67
Cambodia	9.10	1975	2013	251.43	1006.84	*Maldives*	10.13	1984	2012	617.92	6243.85
Chad	7.41	1994	2013	174.65	1053.66	*Malta*	9.99	1961	1993	828.44	7428.48
China	7.26	1962	2013	70.12	6807.43	*Mozambique*	7.37	1993	2013	136.15	605.03
Congo	7.28	1964	1985	164.83	1039.42	*Oman*	23.46	1961	1998	80.78	6487.56
Cyprus	12.01	1961	1995	976.33	14212.05	*Rep. Korea*	8.88	1961	2005	91.48	18657.46
Eq. Guinea	7.17	1976	2013	453.57	20581.61	*Saudi Arabia*	12.91	1961	1988	781.00	5841.76
Ethiopia	7.66	1993	2013	165.50	505.05	*Singapore*	9.22	1961	2007	448.96	39223.53
Gabon	8.08	1961	1984	332.77	4427.91	*Swaziland*	7.11	1962	1992	125.58	1415.02
Hong Kong	7.88	1961	1996	483.18	24818.15	*Syria*	8.08	1961	1988	199.31	901.73
India	7.03	1988	2013	361.93	1497.55	*Thailand*	7.65	1961	1997	107.61	2506.21
Indonesia	7.09	1967	1997	56.63	1078.47	*Uganda*	7.03	1990	2012	245.48	652.75
Ivory Coast	7.18	1961	1980	171.64	1231.09	*Vietnam*	7.10	1988	2011	401.88	1543.03

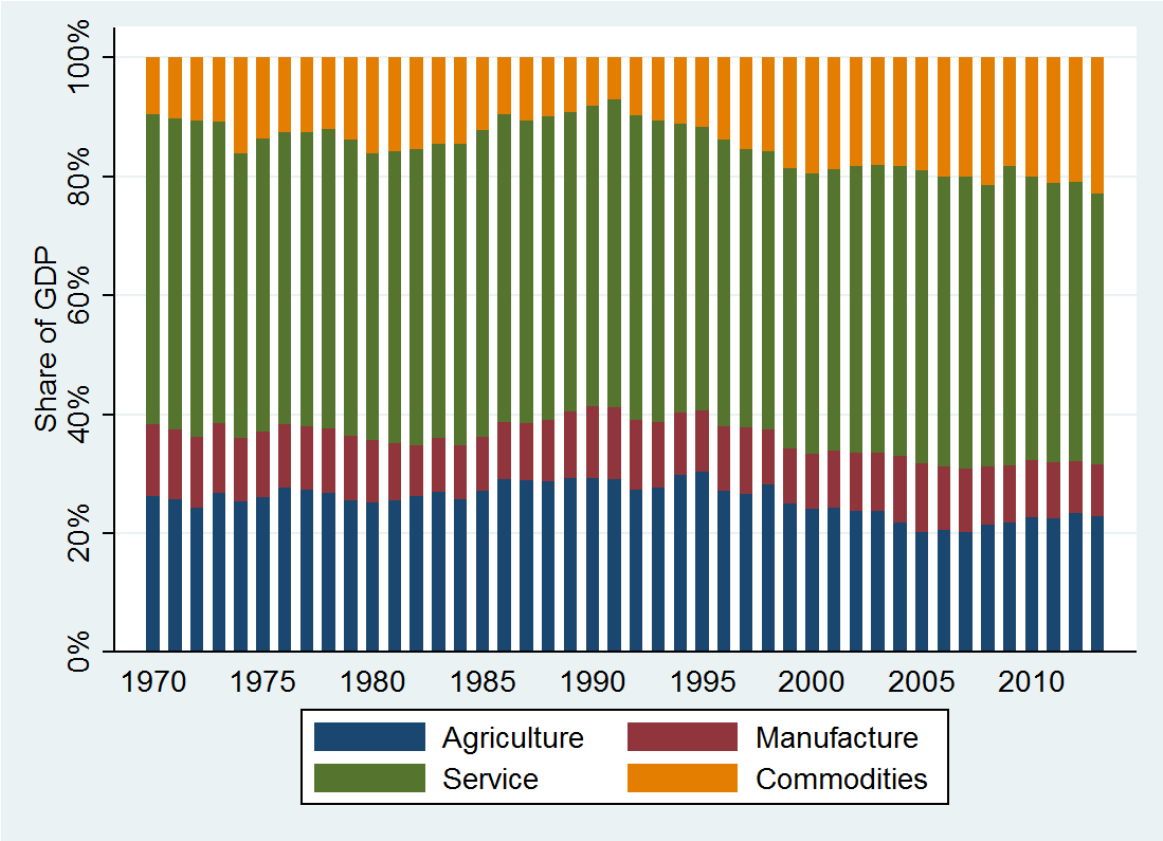
Source: Elaboration based on WB Development Indicators data.

Table 1 reports the list of 40 countries included in our sample which satisfy our criteria, providing information about the length of the high growth episodes, the average GDP growth rate during these periods and the GDP per capita in each country at the beginning and the end of growth period. The sample shows remarkable heterogeneity. Most countries are located in Africa (15), followed by 14 countries in Asia, 8 in the Middle East, 2 Europeans and just Brazil from Latin America. Most of them have experience their rapid economic growth episodes in an early stage of the period analysed: the 60s and the 70s, when independence from their respective colonial masters was achieved. A relatively smaller sample, just 11 countries, instead experienced high growth rates in the last 20

[1] The World Bank classifies a country as low-income if the GNI per capita is $1,035 or less, while as a low-middle income if the GNI per capita is between $1,036 and $4,085.

years, and these are mainly Asian countries. In addition, the sample is also heterogeneous in term of size. Countries with a population of more than a billion (China and India) are included together with tiny states with a population of less than a million (Cabo Verde, Malta, Cyprus, Bhutan and Swaziland). Moreover, even the outcomes of these high growth episodes differ widely across countries in the sample. Looking at the final GDP per capita it is possible to notice that only 5 of the 40 economies in our sample (Cyprus, Hong Kong, Rep. of Korea, Malta and Singapore) reached the status of high-income country at the end of the rapid economic growth, with a final GDP per capita higher than USD 12,000 in current prices.

Figure 1: Average sectoral composition of GDP in the countries in our sample between 1970 and 2013.



Source: Elaboration based on UN National Accounts Database.

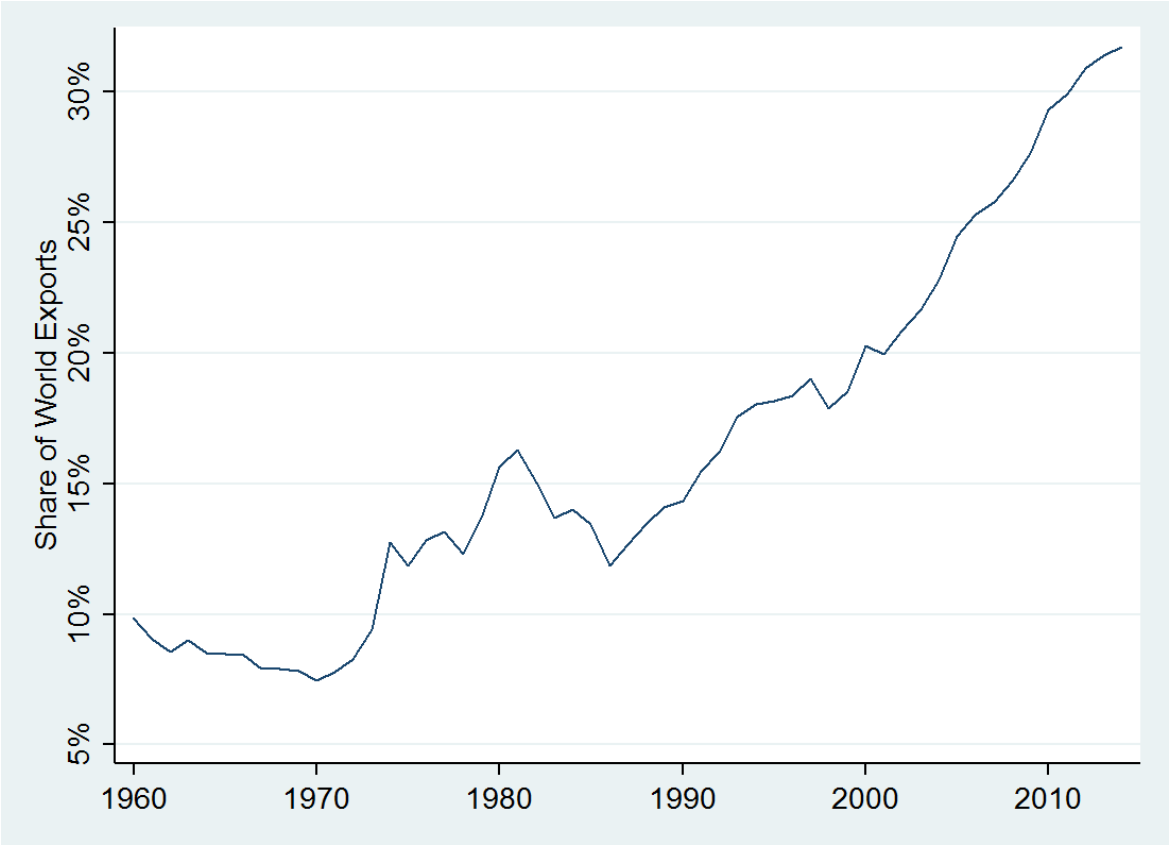
The countries identified are also particularly diverse regarding their sectoral composition. After identifying the population of the sample, we decomposed the annual GDP according to the contribution of the different sectors, in order to examine their relative performance. The UN National Accounts Database, which provides information on the sectoral composition of the GDP for all countries since 1970, has been used to classify the different GDP components into four aggregate industrial sectors. In particular, we are interested in looking at the different role played by the domestic and export-oriented sectors, considering separately agriculture, manufacturing, services and other hard commodities[2]. As a matter of fact, the previous literature has shown as the resources sector includes a diverse set of commodities with very different production profiles in terms of technology required, production scale, input factors and infrastructure intensities and shelf life, with important implications for the linkage with development (Spence et al. 2008; Morris et al.

[2] Typically, hard commodities refer to natural resources that must be mined or extracted (gold, rubber, metals, minerals, oil, gas, etc.), whereas soft commodities usually include agricultural products or livestock (corn, wheat, coffee, sugar, soybeans, pork, etc.).

2012). For this reason, we decided to consider separately agricultural products and hard commodities to analyse their different contribution to the high-growth episodes.

Figure 1 presents a simple sectoral breakdown of the GDP along these lines, averaging together all the countries in our sample from 1970 to 2013. It is possible to notice that the share of agriculture contribution to the GDP has steadily decreased between 1970 and 2013, partially substituted by an increased importance of commodities. Manufacturing and services instead seem to be constant across the whole period, representing together almost 60% of the whole GDP.

Figure 2: High growth countries' share of world exports 1960-2014.



Source: Elaboration based on UN COMTRADE International Trade Statistics.

As stressed by Spence et al. (2008), a common characteristic shared between rapidly growing emerging economies in the last decades is their successful integration in the global economy. In particular, they have been able to exploit the increase in aggregate global demand, fuelling their GDP growth with the export of competitive products in the international market. Nevertheless, not all countries in our sample followed the same export patterns. The main objective of this work is in fact to identify a subset of countries whose high growth episodes, and in particular their exports, were not characterised by manufacturing exports but by trade in agricultural goods or natural resources. To explore this, we used trade data at the sectoral level from the UN COMTRADE International Trade Statistics and from the UNCTAD trade statistics database. These two sources provide data about the total value of exports for all the countries in our sample since 1960[3]. In addition,

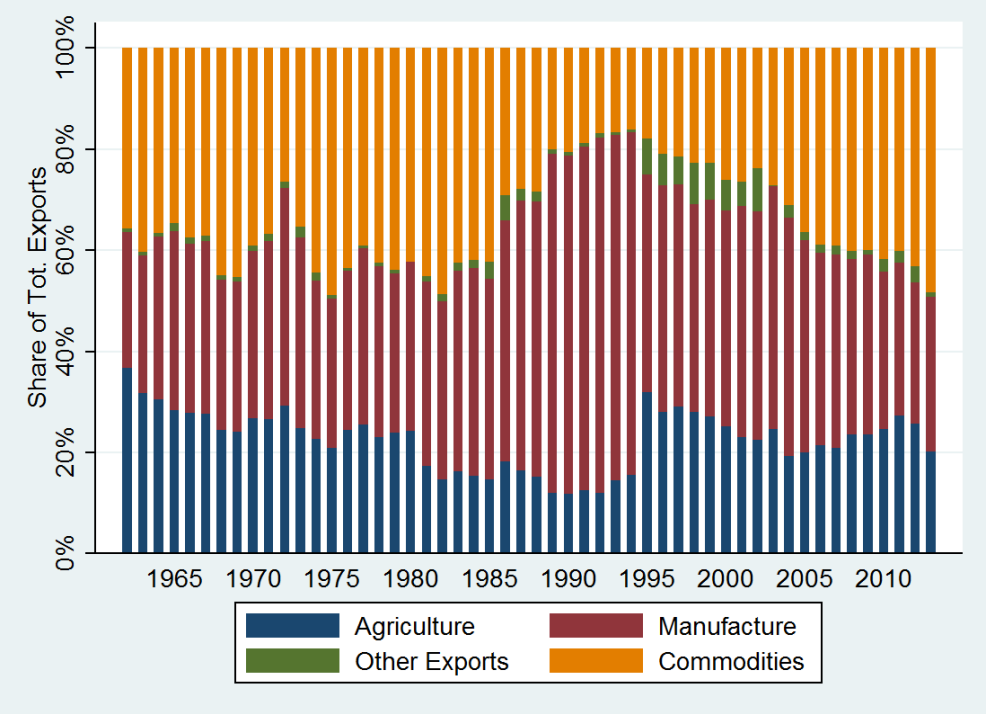
[3] Unfortunately, due to gaps in the trade data we are not able to provide an econometric analysis for the following countries which are part of our sample of economies which have experienced high growth episoded: Botswana, Congo, Cabo Verde, Algeria, Gabon, Iraq, Kenya, Saudi Arabia, Swaziland and Syria. Nevertheless, we will provide a qualitative analysis of the main export sectors drinving the economic growth of these countries.

it is possible to disaggregate at the sectoral level in order to differentiate between exports of agricultural products, manufacturing and other hard commodities[4].

From figure 2 it is possible to notice the increasing importance of the countries in our sample in the global economy. These countries accounted for less than 10% of the global flows of exports until mid-70s. From this period onwards their share of world exports has slowly increased and, after the mid-80s, has drastically surged, mainly thanks to the contribution of Chinese exports, representing more than 30% of world trade in 2014.

Figure 3 shows instead the average sectoral distribution of exports in the countries part of our sample for the period 1960-2013[5]. It is possible to notice how in the period between 1960 and the 1990s the share of exports in agricultural products and natural resources has steadily decreased in favour of exports of manufacturing products. Nevertheless, this trend seems to have been reversed starting from the mid-90s. In fact, since 1995 the share of exports of manufacturing products from our sample of countries to the rest of the world has started shrinking, replaced by an increasing volume of natural resources, agricultural products and hard commodities.

Figure 3: Sectoral composition of exports between 1960 and 2013.



Source: Elaboration based on UN COMTRADE International Trade Statistics.

We can further disaggregate our analysis looking at the development of the productive structure in two different sub-samples, the first formed of economies driven by manufacturing sectors, and the second by countries mainly focused on the export of hard commodities and agricultural products[6]. Figure 4 clearly highlights two completely different patterns of industrial development when distinguishing between the two samples. In particular, it is possible to notice that in countries with a high economic growth characterised by the export of manufacturing goods, this sector has experienced a steady

[4] We are not able to include trade in services in our analysis since the data for low-middle income countries during the periods of interest are particularly limited.

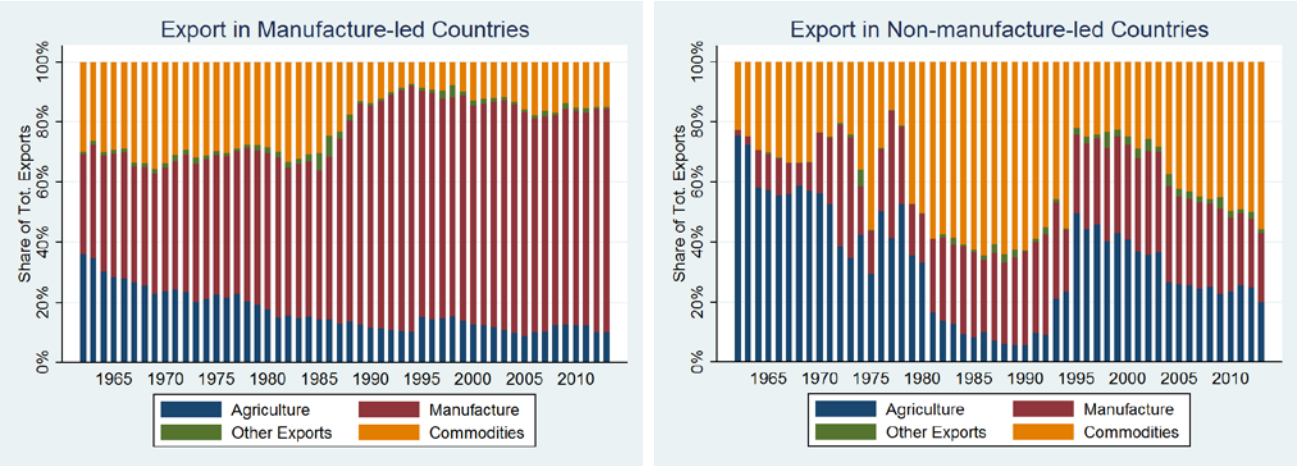
[5] Due to the lack of detailed sectoral-level exports statistics, the data about sectoral exports of a small number of countries are available just from the 1990s onwards.

[6] We define as "manufacture-led" countries those economies in which the share of manufacturing as percentage of total exports during the high-growth period is significantly higher than overall share of exports of agricultural products and hard commodities.

growth since the 1960s, becoming dominant in respect to the remaining sectors, accounting for almost 70% of total exports in 2010 in respect to an initial share of just 25%.

The industrial development of commodity-led economies instead has followed a completely different pattern. As a matter of fact, the manufacturing industry in most of these countries was almost not present at all in the 1960s when most of them acquired the independence from the colonial powers. In particular, their exports were almost completely focused on the supply of agricultural goods (almost 80% of total exports) followed by 20% of exports of hard commodities. Nevertheless, during this period of development, their share of agricultural exports has decreased dramatically, substituted by the infant manufacturing sector and, more relevant, by exports of natural resources and other hard commodities. From figure 4 it is possible to identify a break in this trend around the 1990s, when exports of agricultural products became relevant again, mainly in commodity-led economies. This evidence could be explained by two main factors. The first one is related to a statistical issue, since some of the commodity-led economies for which agriculture was the predominant exporting sector provided available data just from 1995 onwards. Secondly, in the second half of the 1990s these countries might have benefited from the increase in agricultural products prices and by the upgrading of the non-reciprocal trade preferences agreed between LDCs and the EU under the WTO framework, which provided duty-free access to the EU market especially for the export of agricultural products from less developed countries. Nevertheless, it is possible to notice that this effect lasted for a very short period, with the share of exports of agricultural products from commodity-led economies which has started shrinking again, replaced mainly by an increasing value of exports of natural resources and other hard commodities.

Figure 4: Exports sectoral composition between 1960 and 2013 in manufacture and commodity-led economies



Source: Elaboration based on UN COMTRADE International Trade Statistics.

It is possible to analyse some preliminary statistics on the relationship between exports and economic growth for these countries from figure 5. This graph presents the trend of the share of exports over GDP for the countries in our sample during the period 1960-2013. It is possible to notice that total exports became increasingly important for the economic growth of these countries, moving from less than 10% in the 1960s to almost 40% during the last decade and representing a predominant share of the national economy.

In order to examine the relative importance of different industries and export sectors in affecting the GDP per capita growth we decide to apply two different econometric techniques.

First, to estimate the relationship between different export sectors and the overall economic performance we follow the previous literature and begin with a basic OLS model to consider the within-country variation:

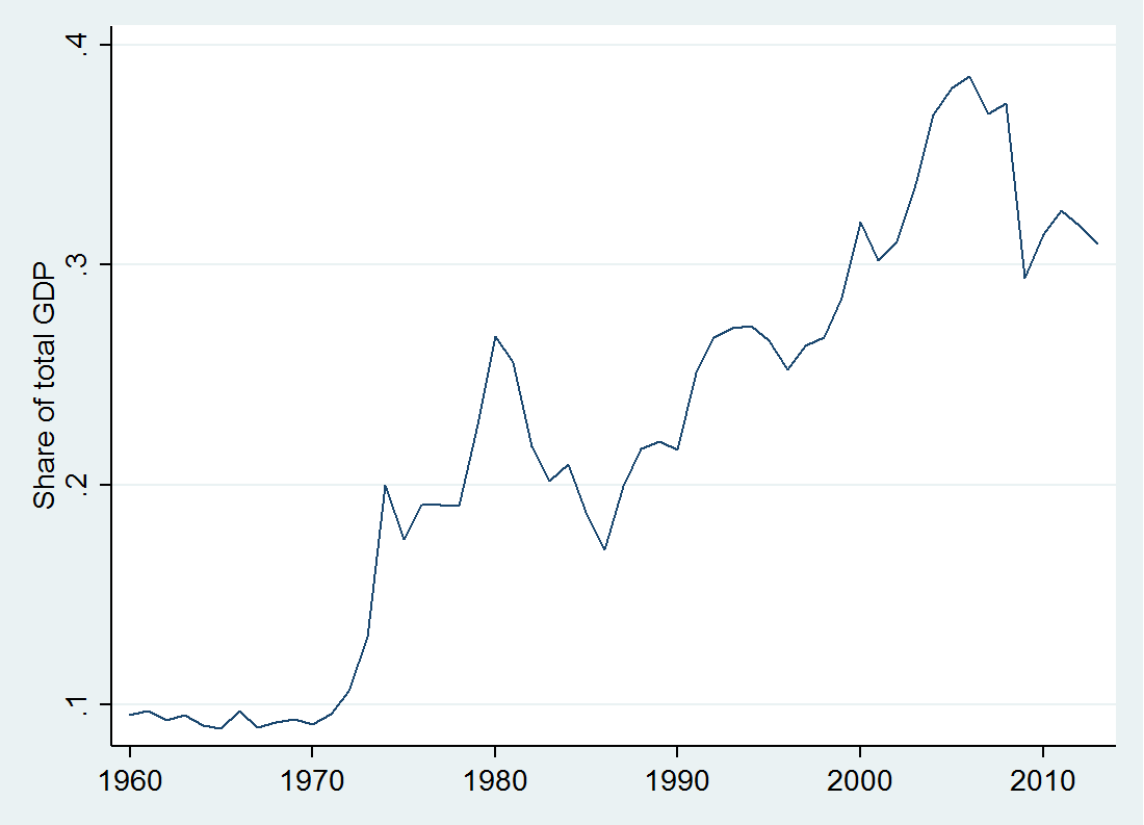
$$\Delta GDP_{it} = \Delta EXP_{it-n} + k_t + k_i + \varepsilon_t$$

In particular, we perform different estimations considering both export levels and growth rate EXP_{it}, or lagging the measures of sectoral exports in order to link past total exports at time *t-n* with present GDP per capita growth at time *t*. We include year and country fixed effects (k_t and k_i) in all specifications, in order to account for specific characteristics and to capture macroeconomic dynamics.

The classical econometric OLS theory is though based on the assumption that the observed data come from a stationary process, where means and variances are constant over time. However, both GDP per capita and exports evolve, grow and change over time. Thus, running a simple OLS regression will result in a biased estimation (Granger and Newbold, 1974; Nelson and Plosser, 1982). To avoid these problems we decide to follow the previous literature implementing a more advanced econometric technique more appropriate for the analysis of time series (Ogwumike and Ogunleye, 2008). For these reasons we follow a vector auto-regressive (VAR)-model and vector error correction-model.

Figure 5: Export share of high growth countries' GDP between 1960 and 2013.

Source: Elaboration based on WB Development Indicators and UN COMTRADE International Trade Statistics.



A vector-autoregressive model is a multi-variate technique of modelling time series, in order to explain them with their own past trends and those of the other series (e.g. GDP and exports explaining each other current values). First of all, in order to estimate a VAR-model properly, we need stationary data. To understand whether a linear combination of series is stationary or not a test for cointegration is normally used. A vector error correction-model is usually employed to analyse cointegrated variables, that is two or more non-stationary time series following a common long run path (or equilibrium). If two time series are cointegrated by a common factor (cointegrating vector) it is not possible

to use a standard VAR-approach. We need then to account for this possible relationship and use an error-correction model to obtain consistent results.

The first step is to test the order of integration. We use the Augmented Dickey–Fuller (ADF) test (Dickey and Fuller, 1981) to test for stationarity while allowing the chance of autocorrelation. Secondly, we need to test for cointegration so to establish the existence of a long-run equilibrium relationship between GDP per capita and sectoral exports. To do that we use a multivariate test based on the vector autoregressive representation of Johansen's maximum likelihood estimation approach (Johansen, 1988). In this way the cointegration test will indicate the presence of causal effects between the different series (Engle and Granger, 1987). Finally, we will be able to estimate the vector error correction model (VECM) in order to distinguish between short-run and long-run causality. For this empirical analysis we estimate the following model, investigating the long-run impact of sectoral export growth on the sustained high growth episodes:

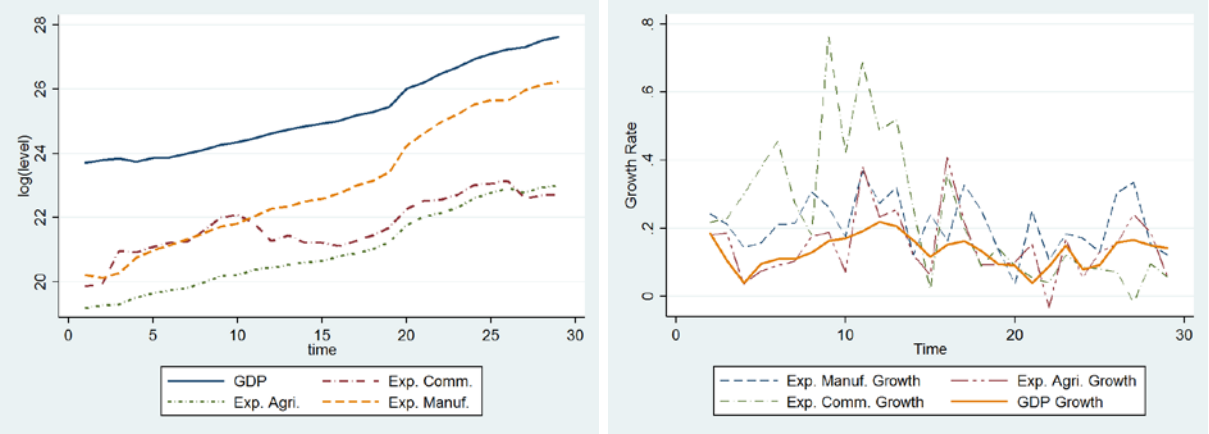
$$\Delta GDP_{it} = \alpha_0 + \alpha_1 \Delta EXP_{it-n} + \gamma ECM_{t-1} + \varepsilon_t$$

In which ε_t imply non-zero serially independent random error terms and are the error-correction term obtained from the long-run cointegration regression.

2.2 Results

We start our analysis looking at the overall trend of economic and sectoral export growth for all the countries in our sample during the sustained high growth episodes. As figure 6 shows, GDP per capita and sectoral export seem to be non-stationary in level but stationary in growth. In addition, most of them appear to have a common trend, especially export of manufacture and of agricultural products, suggesting that they may be co-integrated with the GDP per capita growth.

Figure 6: Average GDP per capita and sectoral exports in levels (left) and growth rate (right) for the countries in our sample during the episodes of high growth rate.

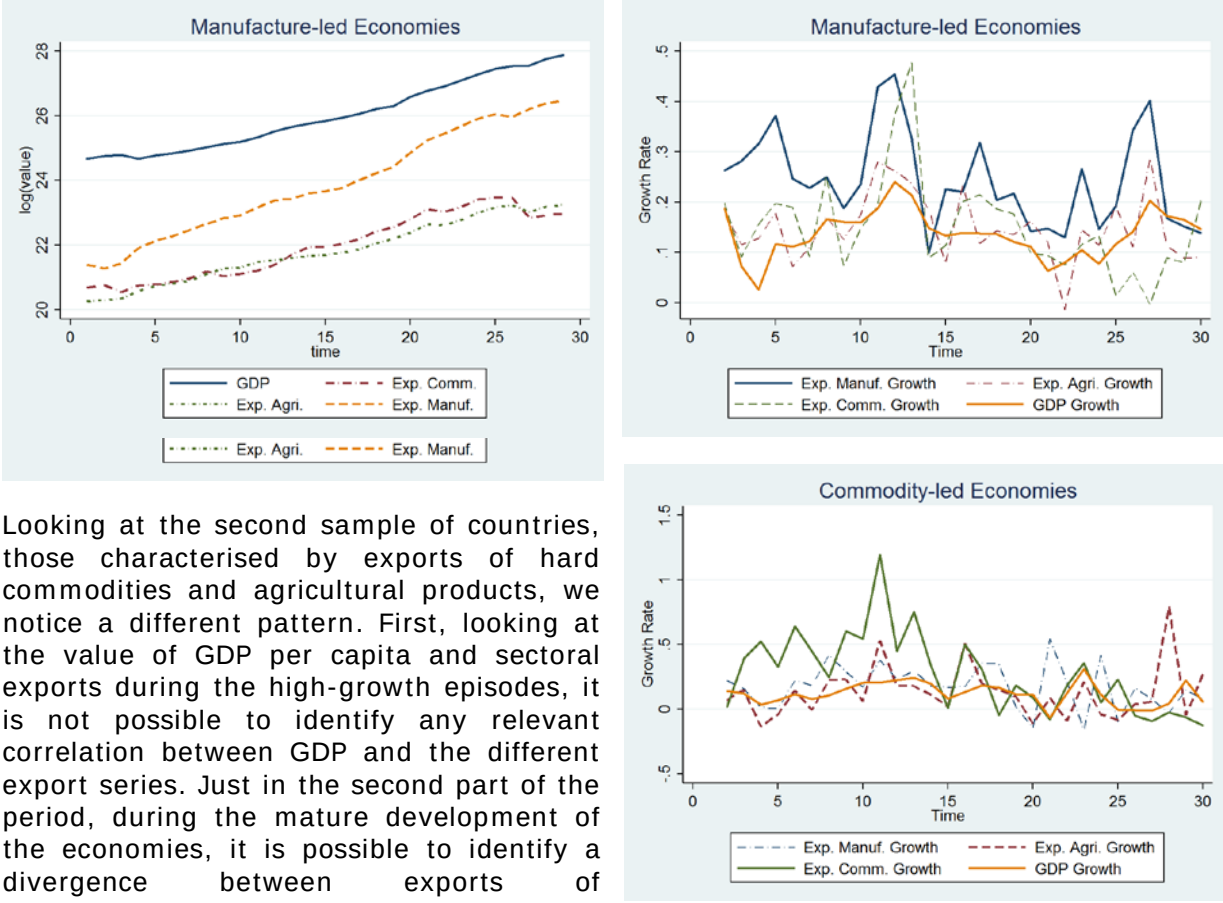


Again, it is possible to further improve our time-series analysis by having an in-depth glance at the differences between high-growth economies characterised by export of manufacturing goods and those countries in which instead exports of commodities were predominant. Figure 7 presents the trends of average values of GDP per capita and sectoral exports (in the left graphs) and their growth rate (in the right diagrams) for both manufacture and commodity-led economies in our sample during the high-growth periods.

Starting from the manufacturing-led economies, it is possible to notice that the common trend between exports of manufacturing goods and the level of GDP is even more marked than before, while the exports of commodities and agricultural products seem to follow a different time trend. This evidence is corroborated by the analysis of the growth rates of

these series. In fact, despite an initial slowdown of the economy during the incumbent period of the manufacturing sector, the growth rates of GDP per capita and manufacturing exports seem to follow the same trend. These results seem to suggest the presence of a possible cointegration in the sample of manufacture-led countries specifically between economic and exports growth. It is possible to notice as well a similar trend between GDP per capita growth and export growth of agricultural products.

Figure 7: Average GDP per capita and sectoral exports in levels (left) and growth rate (right) for manufacture and commodity-led economies in our sample.



Looking at the second sample of countries, those characterised by exports of hard commodities and agricultural products, we notice a different pattern. First, looking at the value of GDP per capita and sectoral exports during the high-growth episodes, it is not possible to identify any relevant correlation between GDP and the different export series. Just in the second part of the period, during the mature development of the economies, it is possible to identify a divergence between exports of manufacturing goods and commodities. In particular, the graph highlights an export substitution of manufacturing products with exports of commodities which seems to be correlated with a decrease in the value of GDP per capita. When looking instead at the time trend of the economic and sectoral exports growth in the commodity-led countries, it is possible to notice a clear common trend between their economic growth and the exports of agricultural and natural resources. In particular, agricultural exports and economic growth seem to overlap during most of the high-growth period, while exports of other hard commodities show a slightly more fluctuating growth pattern. This evidence might suggest a strong cointegration between agricultural exports and GDP per capita growth in this sample of countries which seem to be partially integrated as well with the export growth of other natural resources.

We proceed now applying a vector error correction-model in order to test the causal long-run impact of sectoral export growth on the sustained high growth episodes for each single country in our sample. In this way we will be able to identify the main export sectors linked with the high economic growth in each country, identifying in particular the subset in which the high growth episodes were clearly not related with manufacturing exports but with natural resources based industries or agricultural products.

Table 2 presents the results for countries in which the sustained GDP per capita growth was mainly linked with manufacturing exports while table 3 shows them for those related with agriculture or hard commodities export growth.

Table 2: Results of the VAR and VECM analysis between GDP per capita and sectoral exports growth: manufacturing export driven countries.

				Manufacturing Exports				
Country	*Exp. Sector*	*Estimation*	*Country*	*Exp. Sector*	*Estimation*	*Country*	*Exp. Sector*	Estimation
Bosnia	*Agriculture*	0.176	***India***	*Agriculture*	0.039	***Rep. Korea***	*Agriculture*	0.071
t = 19		(0.196)	*t = 26*		(0.187)	*t = 44*		(0.142)
	Manufacture	0.287*		*Manufacture*	0.788***		*Manufacture*	0.235***
		(0.155)			(0.227)			(0.080)
	Commodities	0.080		*Commodities*	0.125**		*Commodities*	0.176
		(0.072)			(0.055)			(0.104)
Brazil	*Agriculture*	0.224*	***Indonesia***	*Agriculture*	0.190	***Singapore***	*Agriculture*	0.086
t = 19		(0.129)	*t = 31*		(0.134)	*t = 46*		(0.098)
	Manufacture	0.190***		*Manufacture*	0.172***		*Manufacture*	0.235*
		(0.055)			(0.067)			(0.128)
	Commodities	-0.001		*Commodities*	0.075		*Commodities*	-0.036
		(0.069)			(0.117)			(0.076)
China	*Agriculture*	0.241	***Israel***	*Agriculture*	0.761***	***Thailand***	*Agriculture*	0.576
t = 30		(0.926)	*t = 20*		(0.274)	*t = 36*		(1.387)
	Manufacture	2.463***		*Manufacture*	0.233		*Manufacture*	1.657***
		(0.583)			(0.351)			(0.349)
	Commodities	-0.168**		*Commodities*	-0.224**		*Commodities*	2.310
		(0.063)			(0.128)			(3.935)
Hong Kong	*Agriculture*	0.151	***Malaysia***	*Agriculture*	0.404	***Vietnam***	*Agriculture*	0.354
t = 35		(0.090)	*t = 34*		(0.359)	*t = 17*		(0.270)
	Manufacture	0.440**		*Manufacture*	0.289***		*Manufacture*	0.586***
		(0.211)			(0.096)			(0.211)
	Commodities	0.016		*Commodities*	0.0743		*Commodities*	-0.108
		(0.053)			(0.138)			(0.081)

It is possible to notice that most of the economies characterised by manufacturing exports are Asian countries, mainly the East Asian tigers (Hong Kong, Singapore and South Korea). The group also includes other Asian countries which joined the club of industrialised economies thanks to their manufacturing exports such as China, India, Indonesia, Thailand, Malaysia and Vietnam. China and Vietnam have been among the world's fastest-growing economies since economic liberalisation, relying largely on investment and manufacturing export-led growth. Hong Kong and Singapore instead started growing relatively sooner as the other Four Asian Tigers, rapidly developing from the 1960s to the 1990s and transforming their economy from manufacturing centres driven by exports to service-based economies at the end of the 1980s.

Also for Indonesia, Thailand and Malaysia the main export sector driving the rapid economic growth was the manufacturing industry, accounting in 2012 for almost half of the GDP. Thailand and Indonesia are also endowed with particularly vast natural resource reserves, including crude oil, natural gas, tin, copper, and gold. Nevertheless, looking at the results of the VAR VECM estimation, export of commodities from these two countries did not drive the economic growth during the high GDP growth rate episodes.

India's inclusion in this group of countries also depends on recent developments of its economy. According to the VAR and VECM estimation, its rapid economic growth has been mostly driven by the export of manufacturing products. The share of external trade in India's GDP stood at almost 25%, rapidly increasing from the 6% of the beginning of the high growth period in 1985. Major manufacturing exports include petroleum products,

textile goods, chemicals and growing exports from the automotive industry. Nevertheless, India's nominal GDP per capita which was estimated to be almost USD 1,500 in 2013, is still lower than those of other Asian developing countries such as Indonesia, Malaysia, Thailand and China.

In addition to the Asian industrialised emerging economies, the group of countries experiencing manufacturing export led growth includes Brazil and Israel.

Brazil is the only Latin American country in our sample of interest. Even if Brazil is currently achieving high GDP growth rates, the country has already experienced a sustained period of high economic growth for almost 20 years between the 1960s and the 80s. According to the VAR and VECM estimation, most of its rapid growth during that period has been linked with manufacturing exports, despite the relevant contribution of trade in agricultural products and that of its large natural resource endowment. In particular, Brazil has been the world's largest producer of coffee for the last 150 years, but other major exports include machineries and electrical equipment, automobiles, ethanol, textiles, footwear, iron, steel and meat. Nevertheless, despite the diversification of exports and the abundancy of natural resources Brazil stopped growing in the 1980s, losing its momentum. The main causes of this slowdown might be related to the increasing inflation and share of public debt experienced by Brazil in the early 1980s, coupled with the management of the internal industrial policies (Spence et al. 2008).

Also Israel's high economic growth during the period 1961-1981 has been largely dependent on the exports of high-tech manufacturing products. Leading exports included electronics, communications technology, medical equipment, pharmaceuticals, chemicals, military technology, but as well some commodities such as agricultural products and cut diamonds.

Table 3 presents the results for countries whose growth was linked with export of natural resource or agricultural goods according to the model. First of all, it is possible to notice that most of the countries where the growth episode was not characterised by manufacturing export are geographically located in Africa (Angola, Liberia, Ethiopia, Ivory Coast, Mozambique, Chad and Uganda) and in the Middle East (Jordan, Oman and Lebanon). In addition, table 3 shows that economic growth of countries in the Middle East relied uniquely on the exports of commodities, mainly oil and mineral fuels. For this group roughly 75% of budget revenues and 90% of export earnings come from the oil industry. In fact, most of the Middle East and Gulf countries have experienced their high growth episodes between the 1960s and the 1980s, during the boom of the oil demand from the United States and the rebuilding of European countries. In this list it is possible to include also Iraq, Saudi Arabia and Syria which have experienced a sustained growth in GDP for at least 20 years, although we cannot provide an econometric analysis due to the lack of updated trade data.

Nowadays, most of the Gulf countries in our sample are classified by the World Bank as "upper-middle income" countries (UMIC). Most of them, after a prolonged period of economic growth driven by oil exports, have been able to successfully diversify their economy in order to avoid the so called "Dutch disease", especially developing domestic sectors for finance and services, constructions and tourism.

Table 3: Results of the VAR and VECM analysis between GDP per capita and sectoral exports growth: agriculture and commodities export driven countries.

Agriculture and Commodities Intensive								
Country	*Exp. Sector*	*Estimation*	*Country*	*Exp. Sector*	*Estimation*	*Country*	*Exp. Sector*	*Estimation*
Angola	*Agriculture*	0.103	***Liberia***	*Agriculture*	-0.038	***Jordan***	*Agriculture*	0.098
t = 19		(0.131)	*t = 19*		(0.041)	*t = 30*		(0.118)
	Manufacture	0.126		*Manufacture*	0.101		*Manufacture*	-0.077
		(0.251)			(0.068)			(0.074)
	Commodities	0.693**		*Commodities*	0.044**		*Commodities*	0.160**
		(0.323)			(0.023)			(0.089)
Azerbaijan	*Agriculture*	0.230**	***Ethiopia***	*Agriculture*	0.439***	***Mozambique***	*Agriculture*	4.154***
t = 19		(0.109)	*t = 19*		(0.146)	*t = 19*		(0.846)
	Manufacture	0.091		*Manufacture*	0.097		*Manufacture*	6.656
		(0.106)			(0.073)			(4.351)
	Commodities	0.449*		*Commodities*	0.163***		*Commodities*	7.672**
		(0.243)			(0.058)			(3.262)
Bhutan	*Agriculture*	0.111***	***Ivory Coast***	*Agriculture*	3.052***	***Oman***	*Agriculture*	0.097
t = 21		(0.041)	*t = 19*		(0.573)	*t = 21*		(0.095)
	Manufacture	0.074**		*Manufacture*	9.970***		*Manufacture*	0.192
		(0.036)			(3.048)			(0.143)
	Commodities	-0.023		*Commodities*	-0.1760748		*Commodities*	0.678**
		(0.022)			(1.102)			(0.308)
Cambodia	*Agriculture*	3.217**	***Laos***	*Agriculture*	0.214**	***Uganda***	*Agriculture*	0.240**
t = 19		(1.536)	*t = 19*		(0.100)	*t = 18*		(0.097)
	Manufacture	1.248		*Manufacture*	-0.077		*Manufacture*	0.001
		(0.698)			(0.157)			(0.028)
	Commodities	1.3573**		*Commodities*	0.104***		*Commodities*	0.015*
		(0.553)			(0.026)			(0.008)
Chad	*Agriculture*	0.112	***Lebanon***	*Agriculture*	2.532			
t = 19		(0.069)	*t = 18*		(1.087)			
	Manufacture	-0.055		*Manufacture*	0.385			
		(0.062)			(1.746)			
	Commodities	0.056**		*Commodities*	2.691***			
		(0.028)			(0.992)			

Turning our attention to the African continent, it is possible to notice that in most of the cases high and prolonged economic growth has been linked with exports of agricultural products and of commodities. This is the case in Ethiopia, Ivory Coast, Mozambique and Uganda. For instance, Ethiopia has been the fastest-growing non-oil-dependent African economy in the 2000s according to the IMF[7]. Agriculture accounts for almost 41% of the GDP and 80% of exports, mainly exporting to foreign markets (i.e. coffee, pulses, cereals and sugarcane). Other main export commodities are gold, leather products, and oilseeds. Uganda's economic growth has also been mainly driven by exports of agricultural products, including coffee, tea, fish and other commodities. Uganda has also substantial endowments of natural resources, including mineral deposits of copper and cobalt. Economic growth in Ivory Coast has also been driven by the exports of agricultural products, in particular cocoa beans, of which the country is the world's largest exporter.

The rest of the African countries which have experienced high and sustained economic growth seem instead to be characterised by exports of commodities and natural resources. This is the case for instance of Angola, particularly rich in subsoil resources, from diamonds to oil, from gold to copper and carbon fossils. Since independence, oil and diamonds have been the most important economic resources for the country. Recently, China became Angola's main trade partner, mainly exporting crude oil and diamonds, which account in general for almost 60% of Angola's economy and the dominant products for export. The 1993-2013 period of high economic growth following the end of the civil war has almost

[7] IMF (2015), Regional Economic Outlook: Sub-Saharan Africa, World Economic and Financial Surveys, Washington, D.C., April 2015.

been entirely driven by rising oil production which surpassed 2 million barrels per day in 2007.

Despite its very low GDP per capita of USD 454 in 2013, the third-lowest in the world, Liberia experienced high economic growth between 1991 and 2013, depending heavily on exports of natural resources such as iron ore, rubber and timber. The economy started growing particularly quickly after the end of the war in 2003 with an average GDP growth in this period of 8.7%, thanks to the strengthening of the agricultural sector led by rubber and timber, whose exports increased annually by 7.3% since 2011. The lifting of the UN sanctions on Liberian diamond exports in 2007 strongly revived the sector, contributing to the growth episode. Similarly, after the end of the civil war Chad started growing again at a sustained rate. Its economic growth has been mostly based on the export of commodities and natural resources, of which the country is particularly rich. Export of cotton remains a primary source of income, followed by sodium carbonate, gold-bearing quartz, and the recently started exploitation of oil reserves.

In addition to the African block, the VAR VECM approach identifies other countries which have experienced high economic growth episode linked with the exports of agricultural goods and other natural resources.

In central Asia, Azerbaijan, after gaining independence in 1991, experienced a period of more than 20 years of GDP growth at the average rate of 8.25% per year. This economic growth has been mainly relying on exports of oil and natural gas, gold, silver, iron, copper, titanium, chromium, manganese and cobalt. Nevertheless, Azerbaijan started showing some signs of the so-called "Dutch disease" because of the fast-growing energy sector, which causes inflation to spike making non-energy exports more expensive. The rest of the non-oil exports pushing the economic growth are agricultural commodities. Azerbaijan has the largest agricultural basin in the region, producing and exporting mainly grain, potatoes, sugar, cotton, tobacco and livestock and fish.

Bhutan's economy has rapidly grown since 1981 with an average growth rate of 13% based mainly on the exports of agriculture and the provision of hydroelectric power to India. Bhutan's exports focus principally on electricity, cardamom, timber, handicrafts, and precious stones and spices, mainly towards India, accounting for 58.6 percent of its exports. Similarly, Cambodia annual average GDP growth in the last 20 year was 7.7%, placing it in the top ten for highest annual average GDP growth. Also in this case, the main sectors driving the Cambodian growth were agriculture and commodities, mostly exporting rice, fish, timber and rubber. Laos has also grown quickly in the last 20 years, with an average GDP growth rate of almost 7.09%. The country is mostly rich in mineral resources with coal, gold, bauxite, tin, copper, and other valuable metals constituting its main exports.

Despite the lack of time series on exports needed to carry on an econometric analysis on the effect of sectoral export growth on the sustained high growth episodes, it is possible to include in this list of commodity-led economies other countries present in our sample. Botswana, for instance, had since the independence one of the fastest growth rates in the world (11% on average). The country holds large diamond reserves, as well as being endowed with gold, uranium, copper and gold, which together provides almost 40% of government revenues. Furthermore, economic growth of the DRC until 1985 has been largely based on petroleum, which substituted forestry as the main source of revenue for the economy. In addition, the country has a large untapped base metal, gold, iron and phosphate deposits. Algeria’s economic growth has been mainly relying on the exports of hydrocarbon, accounting for roughly 60% of budget revenues, 30% of GDP, and over 95% of export earnings. Lastly, Swaziland economic growth has been closely linked to the economy of South Africa, to which it sends about 70% of its exports, which are mainly apparel and sugar.

3 Conclusions

In this study we carried out an econometric analysis in order to identify a sample of high growth episodes in LIC-MICs associated with growth in exports, in particular by exports of hard commodities and agricultural products.

After identifying a population of countries and examining the relative performance of different economic sectors, we have analysed a subset of high growth episodes in which exports were associated with economic growth, differentiating between high growth episodes characterised by manufacturing or commodities exports.

Despite the heterogeneous sample of countries, the results have shown some clear patterns, in particular in terms of geographical and historical distribution of the growth episodes, and in the common development of sectoral exports. We think that the identification of these common patterns across countries might be helpful in order to derive the proper tailored-made policy implications needed to imitate the episodes of high economic growth linked with exports also in other low-medium income countries.

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