Examining the economic complexity of the Arab world to identify opportunities for new exports and generating jobs

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Synthesis

This report synthesizes the key findings of the project and reflects on its impact. Overall, this research project looks at selected Arab countries through the lens of their industrial sectors and export activities. The main conjecture is that Arab countries need to undergo structural transformation and diversify their products and exports in order to ensure inclusive and sustainable growth for their economies. The research uses the product space methodology to analyze the existing capabilities of selected Arab economies by locating the products they currently export and determine which path they should follow to be able to produce more sophisticated and strategic products. The findings and recommendations of the research will inform policy and determine strategic options these countries have, as well as their implications on growth and job creation.

Rationale and objective of the research

One of the major challenges facing the Arab countries post Arab spring is not only how to get their economies to grow but also to ensure that growth is inclusive and sustainable. In the decades prior to the Arab spring, Arab countries witnessed on average one of the lowest per capita growth rates in comparison to other parts of the world. But even when higher growth rates were registered in the first decade of the new millennium, this improvement tended to benefit the few elites at the expense of the rest of the population. In fact, the wage share of GDP declined substantially and household consumption fell by 9% in the last couple of decades.

Even though the manufacturing sector as a share of GDP increased by 2%, the sector is facing many constraints: Competition is low in the industrial sector, few firms have been created, and management has the lowest level of education qualifications compared to all other regions (ILO 2012). In addition, these trends are coupled with the predominance of micro and small enterprises (with less than 10 employees), weak clustering and “business to business” operations. Taking this further, exports (excluding oil) in the Arab world are low. Not only are exports as share of GDP low, they also have a low level of sophistication. Furthermore, the number of new products exported has not been up to par with other regions.

For Arab countries to have inclusive growth, they cannot produce more of the same products. In fact, they should produce different goods. To do so, they must undergo structural transformation by which companies move into new activities which have a higher level of productivity and pay higher wages. Structural transformation is in fact a prerequisite for growth and it is largely driven by exports. In fact, countries that have experienced high growth rates had several things in common: A larger and more diversified manufacturing sector that exports sophisticated products and they upgraded their production and move into more complex activities.

What policymakers need to do is support the development of such new and highly sophisticated products, provide incentives to produce new products, and target activities that have spillover effects whereby they crowd in other investments. Using the product space methodology, this project aims for the first time to analyze the existing capabilities of Arab economies by locating products they currently export and determine how far off they are from producing more sophisticated and strategic products. Analyzing these strategic options and the tradeoffs they entail has policy implications in terms of growth and job creation that ought to be examined and debated.
**Research findings**

This study assessed the complexity of Arab countries and addressed how they can improve their economic complexity in order to pave the way for sustainable and inclusive growth. It engaged the expertise of two scholars, Sebastian Bustos and Muhammed Yildirim, who are both former students of Professor Ricardo Hausmann, the key architect of the product space.

Countries in this report are separated between resource-rich and non-resource rich and additionally split into three groups: Those affected by war, those whose resource basket is dominated by oil, and others which already have a more diverse product basket.

**Methodology**

Until recently, research on growth strategies has not focused on diagnosing constraints to a country’s economic growth that could help formulate solutions suited to each nation’s specific economic and institutional conditions. Policy searches have concentrated on universal recommendations for growth while completely overlooking each country’s context, productive structure, or culture. This problem becomes even more challenging when examining policies to jump-start growth in countries that lack the necessary productive base and/or rely on natural resources. In other words, current macroeconomic descriptions underestimate the complexity of the world by describing countries based on a few aggregate factors without adequately taking into account the complexities in each country. This study addresses this issue and examines countries’ current productive capacity by assessing the building blocks of an economy using the Product Space Method, as opposed to comparing countries using rubrics which do not take into account the particular circumstances or capacities in a given state. This information is then used to question how current capacities can be expanded to create economic growth in the most feasible manner.

This in turn leads to the concepts of economic complexity, which is a measure of productive knowledge in a given country, and product complexity. Economic complexity determines the level of productive knowledge needed by a country to make a specific product. The frequency with which a product is made worldwide can in part determine how complex a product is, its product complexity, and what level of economic complexity is necessary for its production. Therefore, the Economic Complexity Index (ECI) is a number unique to each country that measures the amount of productive knowledge contained in a country. The Product Complexity Index (PCI) is a number unique to each product that captures how much productive knowledge the product requires. Countries with a high ECI are well diversified countries exporting, on average, “high-PCI products”. From this it can be determined that:

- The products that a country makes now condition the products it can make in the future.

- Countries that make products in the periphery of the product space face greater development challenges since they produce goods that do not open up new development opportunities as easily as for countries with more nearby and centered goods.

- The product space demonstrates that a country’s future exports are significantly more likely to be products which are close by in the network to products that a country was previously exporting, while it is quite difficult for production to shift to products far away.
- Proximity in the product space is a measure of relatedness between two products. However, countries have a productive base in many products. Hence, it is necessary to aggregate proximities to produce a distance measure between a country and a product.

If all proximities are added up from the products that are made by a country and divided by all the proximities to this product, a measure of how similar a country’s productive base is to that product is obtained. This is referred to as the “density” measure. When countries diversify, they can increase their immediate complexity by targeting higher PCI products. According to trade theory, countries will make products that they have a comparative advantage in. But it is impossible to measure the absolute comparative advantage without observing the efficiencies of countries in making products. Therefore, Revealed Comparative Advantage (RCA) is used in this study, which is an index used to calculate the relative advantage of disadvantage a country has in the export of a certain good.

The primary data used to map the product space is international trade data. In this study, two related versions are employed: Data at the Harmonized System four digit classification level (HS4 data) compiled by the Centre d’Etudes Prospectives et d’Informations Internationales (CEPII) and data at the Standard International Trade Classification four digit level (SITC4) published by the United Nations.

This data can then be used to determine how close a country is to making a given product, how well a country is positioned in the product space based on their current capacities, how the production of a given product will affect the country’s outlook, measuring how the production of a given product would affect the country’s outlook, and measuring trade outlook and potential.

There are a number of drawbacks to the data. First, the data covers exports of goods and not aggregate production. Second, countries may also export products they do not make. While many countries’ customs offices clean data from re-exports, not all do so with a high degree of accuracy. To circumvent this issue in this study’s analysis, a country is required to have a significant presence in a product to assume that it makes it. Finally, the data includes only goods and not services. This is an important drawback, as services are becoming a rising share of international trade and service exports are expected to make a significant contribution to overall export growth.

Policy Reports

For each of the twelve selected countries featured in our policy reports (Algeria, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libya, Saudi Arabia, Syria, Tunisia, United Arab Emirates, and Yemen), the following has been assessed:

- The evolution of their product complexity between 1995 and 2012
- The production structure of the country presented through the product space
- Recommendations for new strategic products based on the opportunity gain index and the product complexity index
- Export destinations of the country’s exports and their evolution
The findings of the report show the following initial diagnosis and recommendations for each country:

- **Algeria**: Algeria's product space is not highly diversified, and is highly dependent on natural resources, which makes it difficult for the country to develop more complex products. Algeria's export basket consists almost entirely of petroleum oils, crude and refined, and gases, amounting to 97% of the country's total export. The country's future path for development should focus on new opportunities in the chemical and food clusters.

- **Egypt**: In general, Egypt has increased the diversity of its production, but has not moved into more complex products. However, it is well-located in the product space and has, on average, shorter distances to more complex products, implied by its relatively high Complexity Outlook Index values. Egypt's future development opportunities lie mainly in the machinery, chemical, plastics, and foodstuff clusters.

- **Iraq**: Iraq has been in a state of war for many years, a situation that is clearly reflected in the GDP per capita of the country and its integration with the rest of the world. Not surprisingly, Iraq's exports are 99% oil. Given its limited diversification and strong dependence on oil, the country's future path for development should focus on new opportunities in the foodstuff and chemical clusters.

- **Jordan**: Despite Jordan's average low complexity, nearby complex products (captured by the complexity outlook index) could likely be developed using productive knowledge that already exists within the country. Its future path for development should focus on new opportunities in the machinery, electrical, chemical, and textile clusters.

- **Kuwait**: Kuwait's product space, in addition to not having a high average complexity, has few nearby opportunities for diversification. Industrial policy should focus on selecting a number of new industries or products at which to target public inputs. Kuwait's position in the product space suggests that the country's future path for development should focus on new opportunities in the chemical, plastics, foodstuff, and machinery-electrical clusters.

- **Lebanon**: Lebanon's product space, despite not being highly diversified, exports products that are in the vicinity of more complex products. Developing such products would improve the country's standing in terms of average complexity, impacting its future growth prospects. The country should focus on facilitating the development of products in the machinery-electrical clusters and a few products in the chemical community that are most attractive in terms of the tradeoff between distance and complexity or its potential strategic value to improve the position of the country.

- **Libya**: Libya has been through a civil war recently, and not surprisingly, its productive structure has been adversely affected through the process. It will require a huge effort to develop sectors and become competitive in world markets without tackling market failures. Given its limited diversification and strong dependence on oil, the country's future path for development should focus on new opportunities in the foodstuff and chemical clusters.
• **Saudi Arabia:** The relatively low complexity of Saudi Arabia’s export basket, even taking into account the intensity of natural resources, coupled with the lack of presence in products well placed in the product space, complicates the transition to other new industries that use similar capabilities. The kingdom’s development path should focus on new complex products particularly in the machinery/electrical clusters and a few products in the chemical community that are most attractive in terms of the trade between distance and complexity or complexity outlook gain.

• **Syria:** Despite Syria’s average low complexity, Syria is well-located in the product space and has, on average, shorter distances to more complex products, implied by its relatively high complexity outlook index values. Syria’s position in the product space suggests that the country’s future path for development should focus on new opportunities in the chemical and food clusters.

• **Tunisia:** The study of Tunisia’s product space reveals that the increases in its exports were not associated with higher ECI, which suggests that the country was diversifying into less complex products or the country increased its exports in already existing products. The country should focus on facilitating the development of new complex products particularly in the machinery/electrical clusters and a few products in the chemical and in the plastic rubber communities.

• **United Arab Emirates:** The United Arab Emirates’ income and exports are dominated by oil price fluctuations. However, as the country’s exports peaked, driven by oil prices, the complexity of the UAE’s export basket decreased and only increased again as exports decreased. The country’s industrial policy should focus on providing support and public inputs to existing industries with the aim of improving their productivity and ability to jump to nearby opportunities. The country’s future path for development should focus on new opportunities in the chemical and foodstuff clusters.

• **Yemen:** Yemen’s position in the product space is a difficult one. Yemen’s ECI is relatively low, reflecting the low complexity of an export basket dominated mostly by natural resources and tropical corps. Given its limited diversification and strong dependence on oil, the country’s future path for development should focus on new opportunities in the foodstuff, chemical and mechanical/electrical clusters.

**Project outputs and dissemination**

LCPS is currently disseminating the findings of the project in the following way:

1. At a regional conference organized by LCPS for September 2016 on the Impact of Lower Oil Prices on the Middle East, we have organized a session on the challenges and prospects of economic diversification in the Arab world, in lieu of a roundtable, since LCPS has invited policymakers including MPs, ministers, government officials, and experts from the Arab world.

2. LCPS presented the recent findings to the minister of industry and the president of the Association of Lebanese Industrialists in order to stimulate discussion on industrial policy. Building on our previous engagements, we are using these findings to shape policy formulation through closed meeting discussions on how to improve the sector.
3. LCPS is disseminating the findings in 13 policy reports—one general that describes the methodology and 12 country policy reports. We believe it is more targeted and impactful and accordingly worked with a design company to produce a special design and lay-out for the 12 papers. We will be uploading the policy reports on our website and will disseminate them to our contacts, of which there are more than 10,000 individuals and institutions from Lebanon, the region, and worldwide. LCPS will also employ the use of social media to share the findings of the project. To this end, the policy reports papers will also be announced on LCPS’s Facebook page, which has more than 8,000 followers. They will also be promoted locally and regionally via Facebook advertisements. LCPS will also tweet the findings as we have more than 6,000 followers.

4. Since LCPS and the Natural Resource Governance Institute (NRGI) have set up a MENA Natural Resource Governance Hub that aims, among other things, to build the capacity of Arab CSOs through an eight day training that takes place once a year, LCPS will be disseminating the policy reports during the course as part of the session on economic diversification.

**Impact**

One of the key outcomes of this project is identifying the prospects of diversification in the Arab world. Building on this project, LCPS teamed up with LCPS Research Associate Professor Adeel Malik at Oxford University to determine how best to add insight into the product space by taking a political economy approach. The first outcome of our discussion is Professor Adeel’s policy brief on the “Diversification of Middle Eastern Economies is More a Political than an Economic Challenge” in both English and Arabic.

Inspired by the findings, we are launching a study with Professor Malik that examines the deeper reasons for the variation in the product space between 1995 and 2012. More concretely, we notice that the economies of several Arab countries became less diversified when comparing the year 1995 to 2012. One possible explanation for this variation is change in oil prices. In 1995, oil prices were still relatively low and Arab governments were compelled to diversify their economy away from oil related products as a mere necessity to avoid political instability. However, as oil prices started to pick up, the incentive for diversification started to fade away rendering products less connected and sophisticated in 2012. In other words, lower prices initially implied less rents, which made policy makers less able to buy off their cronies, so they were incentivized to diversify and find other outlets for rents as evident in the 1995 product space.
Annex 1: Literature review

A key pillar to creating jobs is encouraging the private sector to produce new and highly sophisticated products. However, the development of manufactured goods is fraught with externalities and spillovers. Leaving this to market forces would not prove successful simply because the market cannot reveal the profitability of products that do not yet exist. This means that based on the right information and research, the government needs to step in to encourage the production of highly sophisticated export products. The two major obstacles that constrain diversification are coordination failures where markets are not complete, meaning that the return to one investment depends on some other investments being made. In other words, no industrialist will make new investments in areas where there is no electricity or proper transportation network. The second is information spillover, meaning that the process of finding the cost structure—discovering how low a new product can be produced for it to be profitable—of new goods is expensive and often is avoided. It is expensive because if the industrialist fails s/he will incur the full cost of her/his investment but if s/he succeeds, s/he will have to share the value of her/his discovery with other rivals. Entrepreneurs need the right incentives to ‘plunge’ and experiment in making new products.

Diversification of new products is highly correlated with economic development. According to Imbs and Wacziarg (2003), who examine the patterns of sectoral concentration in various countries and across time, economies become more diversified as their income increases. This process of diversification does not only hold when economies transform from agriculture to manufacturing but also within manufacturing as well as within countries across time. According to Rodrik (2006), enhancing the productive capabilities over a large range of manufactured goods—including the production of new ones—is an “integral” part of development. Building on the work of Haussman, Pritchet, and Rodrik (2005), Johnson, Ostry, and Subramanian (2006) find that growth accelerations are associated with structural changes in manufacturing. Manufacturing capabilities are not solely determined by factor endowments.

Countries with broad-based manufacturing sectors—where assets can be used in wide range of goods—are more likely to take advantage of new opportunities than ones with specialization in a few primary based products. Hausmann and Klinger (2006) make this point by mapping out a product space where the distance between any pair of goods A and B is based on the likelihood that a country producing product A also produces product B. The product space is not even or homogenous in terms of asset specificity. In other words, some activities require highly specific assets such as oil and primary products—which are found on the periphery of the product space—while others use or rely on assets that can be used for various products. Hence, they are found in the core of the product space. The manufactured products are found in the denser part of the product space. The ability of producing new products and undergoing structural transformation depends on how many products are in close proximity to the current product mix.
Producing new products requires a combination of specific private and public input. If the new product is in close proximity to the current basket of goods, the private sector may be able to exploit the existing capabilities—markets, physical and human assets, norms, and institutions that were set up for other pre-existing activities—on its own (Hausmann and Rodrik 2006). To produce new products that are further away from the current product mix would necessitate certain capabilities which will not emerge on their own due to coordination problems. The government’s intervention is crucial in providing complementary input—rules, organization, infrastructure, labor training, and others—that are specific to subsets of activities. In South Korea and Taiwan, they have taken the form of export subsidies; Singapore and Malaysia created an export processing zone; and the Chinese government set up special economic zones. What is evident is the fact that the intervention has to fit the specifics of the context and hence is not fully apparent ex ante.

To know what public input and capabilities the government must provide, two issues must be addressed. The first eliciting appropriate information from the private sector through a policy process founded on collaboration between the industrial sector and the government. In order to reduce the potential for rent seeking that may arise as a result of this close relationship, government agencies must maintain a certain level of autonomy; second, the government and its various agencies must have the appropriate incentives. Hausmann and Rodrik (2006) call
for a network-like arrangement with instrument base organizations that manage various policy instruments i.e. labor training, regulation, infrastructure, and coordinating entities that ensure the right mix of policy instruments are deployed by area of activities. Supporting the private sector in developing new products could face fewer or no obstacles since they do not encroach on the existing rents accrued by the current elite.

A proxy method of measuring the level of capability in an economy is the level of economic complexity developed by Hausmann, Hidalgo, et al (2011). Based on the above measure, it is evident that the Arab countries do not score very high on the economic complexity measure. According to table 1, there is high variation in terms of economic complexity in the Arab world: Lebanon, which is the highest among the Arab countries, is ranked 44th worldwide in terms of economic complexity compared to Sudan, which is ranked 126th in the world.

Table 1: Economic complexity measure, 2008

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<th>Economic complexity measure</th>
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References


