Measurement of Morocco's participation in the Automotive Global Value Chain

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In the late 1990s, Morocco launched an industrialization plan focused on developing new activities in high value-added sectors such as electronics, aerospace and automotive. These policies included incentives for foreign direct investment (FDI), and by 2015, these new sectors were contributing nearly 1 billion US dollars to Morocco's exports. Export growth in the automotive industry has been especially strong. This was due to a significant increase in the final assembly of motor vehicles. Whereas the final assembly generates some employment and income, this paper explores in more detail what the export growth in the automotive industry means in terms of value-added, employment, skill development, and income. To answer these questions, the paper uses the Global Value Chain (GVC) approach as the basis for a new measurement framework developed for international trade and economic globalization. This approach attempts to construct a full picture of imports and exports of automotive parts, combined with FDI, employment, and domestic value added statistics. Especially important is to determine the lead firms of the automotive value chain. Once these facts are known, Morocco's evolving role in the industry can be better understood, as can the impact of recent developments on Morocco's development. The results show how Morocco fits in the automotive GVC, which economic activities are provided in Morocco and what that means in terms of exports and employment. The GVC approach gives some insights on how Morocco could improve its position in the automotive industry.

Keywords: global value chain measurement; economic globalization statistics; automotive industry; Morocco.

1. Introduction

In the late 1990s, Morocco launched an industrialization plan primarily focused on developing new activities in high value-added sectors such as electronics, aerospace and automotive, while consolidating its position as an exporter of products derived from phosphates, food processing and textiles. These policies included incentives for foreign direct investment (FDI), and by 2015, these new sectors were contributing significantly to Morocco's exports[1]. Export growth in the automotive industry has been especially strong, spurred by an increase in the final assembly of motor vehicles. The largest market share of final products of the motor vehicle industry consists of passenger vehicles and light trucks.[2] Whereas the final assembly of passenger vehicles generates some employment and income[3], this paper explores in more detail what the export growth in the automotive industry means for the Moroccan economy in terms of value-added, employment, skill development, and income. To answer these questions, the paper uses the Global Value Chain (GVC) approach[4] as the basis for a new measurement

[1] Strong contribution were made to the trade balance (2008-2016), especially trade in goods, namely automotive sector (+ 3.5 billion USD), and aeronautics and electronics (+ 0.6 billion USD).
[2] The largest global market segment is passenger vehicles (nearly 80%), followed by light and heavy commercial and industrial vehicles for on- and off-road use (about 20%), and finally buses (less than 1%).
[3] The production of automotive parts accounts for about 70% of the value of each passenger vehicle (CAR, 2012)
[4] See for example Gereffi and Fernandez-Stark (2016) "Global Value Chain Analysis: A Primer, second edition"

framework developed for international trade and economic globalization[5]. This approach attempts to construct a full picture of imports and exports of automotive parts, combined with FDI, employment, and domestic value added statistics. Especially important is to determine the lead firms of the automotive value chain. Once these facts are known, Morocco's evolving role in the industry can be better understood, as can the impact of recent developments on Morocco's development.

This paper provides a description of the automotive GVC in section 2 and elaborates on the automotive GVC in Morocco in section 3. Section 4 looks into how the Moroccan automotive GVC is governed and what this may mean for economic upgrading possibilities. Some conclusions are drawn in the final section with respect to the measurement of GVCs and how it can inform the policy discussion.

2. The automotive GVC

GVCs are generally defined by a broad class of end products, for example, the automotive GVC refers to the production of passenger vehicles and light trucks[6], and the apparel GVC to the production of clothing. A fully delineated value chain encompasses all the forward and backward linkages in the chain organized by lead firms[7] and including other enterprises in their supply chains. For the automotive GVC, for example, lead firms (sometimes referred to as Original Equipment Manufacturers or OEMs) correspond to automakers such as Toyota, Volkswagen, General Motors, Renault and Peugeot, and are responsible for overall vehicle design and development, final assembly, and typically produce the most important sub-assemblies, namely car bodies and drive train components (especially engines) in their own factories, which could be located in other countries.

It is thus important to have an understanding of the structure of these inter-firm linkages. "Lead" firms in GVCs initiate the activities of the value added chain. This first-mover status gives them "power in the chain" because they tender contracts, place orders and select suppliers. However, lead firms also hold the ultimate financial risk, as they are contractually (or otherwise) obligated to compensate suppliers and service providers for their work. Lead firms often provide the specifications for the production of parts and components that are inputs into the final product. They may also impose a host of other transaction-specific requirements on suppliers, including financing, cost, delivery, location, and utilization of specific ICT systems and approved vendors[8].

The various economic activities and products, which make up the automotive GVC, are described in Figure 1 below. Each activity is mapped to an ISIC code and each good or service produced by these activities is mapped to an HS or CPC code. Lead firms of the automotive industry are most closely associated with main economic activity ISIC 291, which stands for "Manufacture of motor vehicles". However the lead firms may carry out many other activities in the automotive GVC, including finance, distribution, and repair. A possible breakdown of the automotive GVC in terms of economic activities is given in Annex I. The link between these activities and the corporate structure of the enterprise is a direct indication of control of the lead and therefore important for GVC analyses.

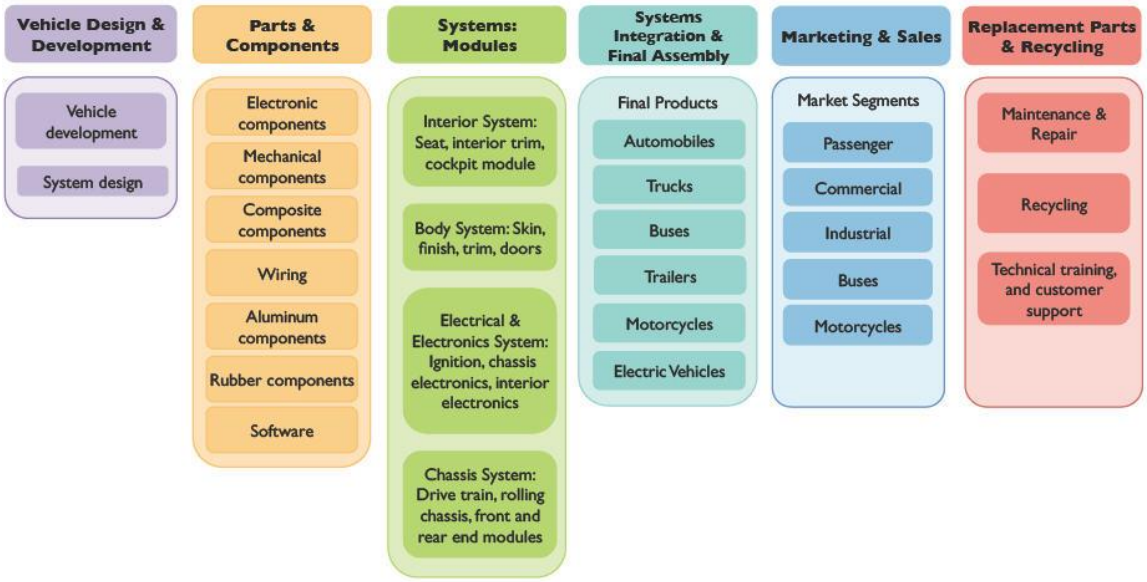
[5] See https://unstats.un.org/unsd/trade/events/2017/luxembourg/default.asp

[6] The motor vehicle industry is comprised of four final product categories: passenger vehicles and light trucks (such as pick-ups), motorcycles and scooters (including three wheelers), commercial vehicles, and industrial vehicles.

[7] Firms that initiate the activities of the chain and take responsibility for selling end products

[8] See Timothy Sturgeon, Jack Daly, Stacey Frederick, Penny Bamber and Gary Gereffi (2016), Frederick and Gereffi (2011)

Figure 1: GVC for the automotive industry



Source: Timothy Sturgeon, Jack Daly, Stacey Frederick, Penny Bamber and Gary Gereffi (2016) *The Philippines in the Automotive Global Value Chain.*

An approximation of all HS product codes belonging to the automotive GVC is given in Table 1[9]. The products are divided by the value chain stage and by whether they are generally produced by lead firms or by suppliers. It is important to note that the economic activity codes of Annex 1 and the product codes of Table 1 could more or less be placed inside the boxes of Figure 1 providing in that way a direct link between the GVC model and the data on firms and products as recorded in official statistics (such for employment, investment and trade)

Table 1: Automotive GVC HS codes

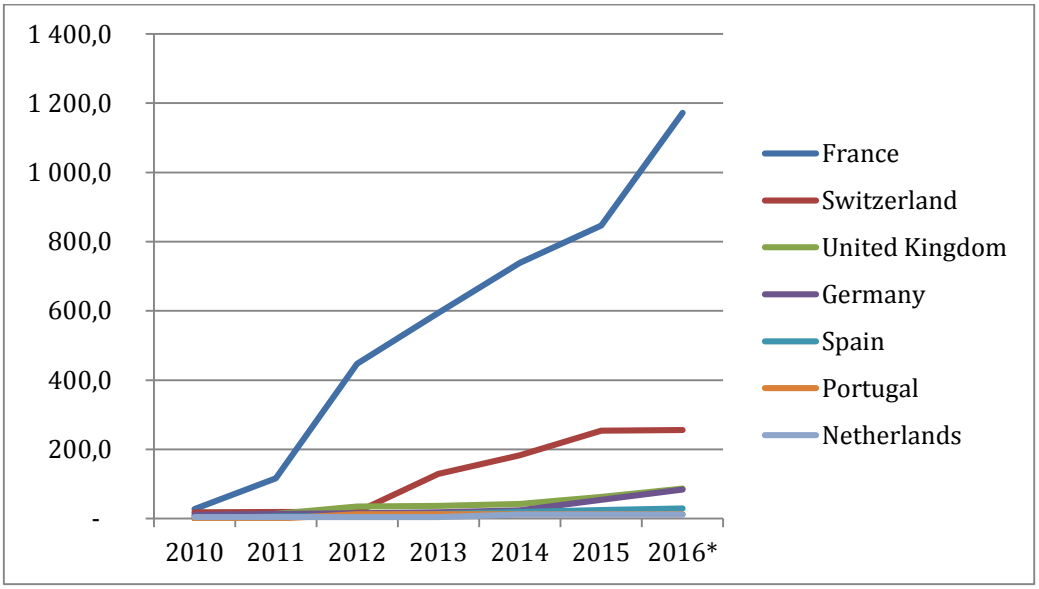
Value Chain Stage/ Subassembly	HS Codes (2002)	HS Code Descriptions	Producer
Passenger vehicles	8703	Passenger vehicles	**Lead Firms**
Drive train	840734 840820	Reciprocating piston engines used for the propulsion of vehicles of Chapter 87	**Lead Firms**
Body system (suspension) Body system (panels) Body system (front & rear end modules) Body system (interior)	630790 630499 8708 8707 7007	Tires, Brakes, Road wheels and parts, Suspension systems, Steering wheels, columns and boxes, Bodies, Laminated safety glass, Bumpers, Radiators, Silencers and exhaust pipes, Sealed beam lamp units, Seats, Safety seat belts, Instrument panel	**Suppliers**
Drive train / Electrical Equipment	8708 854430 854442 854449 8512	Parts/accessories of motor vehicles of headings 87.01-05; Gear boxes, Drive-axles with differential; Wireharnesses; Clutches, Ignition wiring sets, : Electrical lighting, windscreen wipers, defrosters, Air conditioning	

[9] The complete list of HS codes associated with the automotive GVC are given by Frederick and Sturgeon (2016)

3. Morocco's role in the automotive GVC

Since 2010, the investment in the Moroccan automotive industry has steadily increased, in which the share of the automotive sector in the cumulative investments rose from about 2% in 2010 to 7% in 2016. Figure 2 pictures the cumulative foreign direct investments (FDI) in the automotive sector by country of origin, and shows how dominant the investments of France in the automotive sector have been over the last 6 years.

Figure 2: Cumulative FDI in the automotive sector by country of origin (mln USD)



2016*= the FDI figures for 2016 are estimated

The exports of cars and car parts sector showed a similar increase. Table 2 shows that exports of passenger vehicles increased from 54 mln USD in 2008 to 2.4 bln USD in 2015, whereas the exports of auto parts increased over that same time period from 1.1 bln USD to 2.1 bln USD. Table 2 reveals that exports of 'electrical wire harnessing' was already strong in 2008, but almost doubled between 2008 and 2015. On face value, the exports of finished vehicles seems most impressive with 2.4 bln USD in exports in 2015, which further increased to 2.9 bln USD in 2016. However, the number of firms and employees are relatively low. More important for the Moroccan economy is the increase in the number of employees from 28,000 to 56,000 in the wire harnessing segment.

Table 2: Evolution of the main segments of GVC for the automotive industry in Morocco

GVC stage	2008 (mln USD)	2008 (# of firms)	2008 (# of employees)	2015 (mln USD)	2015 (# of firms)	2015 (# of employees)
Passenger vehicle	53.7	7	100	2,382.6	10	6,400
Electrical wire harnessing	926.6	37	28,000	1,752.7	80	56,000
Seats and seat belts	91.4	14	2,600	283.3	28	7,300
Body system/ Drive train & engine parts	51.5	24	8,400	61.5	28	10,500

Table 2 reveals key aspects of Morocco's role in the automotive GVC: as an assembler of finished vehicle and exporter of labor intensive items including wire harnessing and manufacturing of seats. The recent change of increased export share of finished vehicles to over 50% can for a large be attributed to the investment of a large lead firm in final assembly. Morocco also shows an increase in in the production and exports of electrical wire systems, electronics and ignition parts (wire harness assembly) as well as of car seats. This is important since it is accompanied by a large number of employees.

What this suggests is that vehicles assembled in Morocco mainly consist of imported parts and components (which are assembled for the finished vehicle), except for a few auto parts, which are produced in Morocco and are labor intensive, such as wire harnessing and seats. Typically, car seats are produced close to final assembly because they are bulky and easily scuffed in transport and sometimes require close sequencing in final assembly due to variations on seat features (e.g. power vs. manual adjustment) and color.

4. Who are the main partners of Morocco in the automotive GVC?

The five main trading partners for the imports of parts and components in the automotive sector account for 78% of total imports in that sector. Most imports come from Spain, including car engines, followed by France, Germany, Romania and Portugal. It would be important to know if those imports come from companies belonging to the same enterprise group, or not. In other words, the lead firms for the Moroccan automotive GVC originate in France, and it would be relevant to know if the firms in Spain or Romania, which provide inputs into the automotive industry in Morocco, would be subsidiaries of the French lead firm. Such information would need to be provided by the statistical agencies in France.

As shown in Figure 2, FDI in the automotive industry increased significantly over the last 6 years most of which was invested in final assembly with only a fraction invested in wire harnessing. It would be important to further differentiate the FDI not only by country of origin, but also by type of economic activity, which would give the Moroccan decision makers more evidence to guide their policy making.

5. Conclusions

This paper gives a look at the newly evolving automotive industry of Morocco through a GVC lens. It was shown that Morocco received major FDI injections, but mostly for final assembly of passenger vehicles. The automotive GVC model shows the many aspect necessary to move from initial design to manufacturing of many component to the final assembly of the car, plus the corresponding services of, for example, sales and marketing. Morocco had an established stake in the production and exports of wire harness assemblies, which is labor intensive. In parallel to the increase in final assembly, the wire harnessing increased both in terms of export value and in terms of number of employees (almost doubled in 7 years) making it a very robust part of the Moroccan economy. The manufacturing of car seats has emerged as an additional growth opportunity for Morocco.

By obtaining further differentiated information on imports, FDI and their governance, as well as more information on the partners on the receiving end of the exports of parts and finished vehicles, may give additional insights on opportunities for the Moroccan automotive industry. Finally, with the planned opening of another large automotive plant in Kenitra in 2019, Morocco will engage in new highly advanced industrial activities such as the manufacturing of car engines, which will allow for the development of a sector of research and development for the Moroccan automotive sector. This means that Morocco will develop a broader economic and social profile in the automotive GVC.

References

Timothy Sturgeon, Jack Daly, Stacey Frederick, Penny Bamber and Gary Gereffi (2016) *The Philippines in the Automotive Global Value Chain*
Gereffi and Fernandez-Stark (2016) *Global Value Chain Analysis: A Primer, second edition*

Annex I – Structure of automotive GVC

<table>
<tr><td colspan="2" rowspan="3">ISIC 72</td><td colspan="2" rowspan="3">ISIC 293, ISIC 2211, ISIC 2219, ISIC 2220, ISIC 2720, ISIC 2740, ISIC 2811, ISIC 2813, ISIC 4520</td><td colspan="2" rowspan="3">ISIC YYY ??
ISIC 292</td><td colspan="3">ISIC 291</td><td colspan="2" rowspan="3">ISIC 73
ISIC 451</td><td colspan="2" rowspan="3">ISIC ZZZ</td><td colspan="2" rowspan="3">ISIC XXX</td><td rowspan="4">ISIC 2829</td><td rowspan="4">Other ISIC</td></tr>
<tr><td colspan="3">System integration and final assmebly</td></tr>
<tr><td colspan="2">Large MNEs</td><td rowspan="3">others</td></tr>
<tr><td colspan="2">Research and development</td><td colspan="2">Parts and Components</td><td colspan="2">Systems: Modules</td><td rowspan="2">foreign owned</td><td rowspan="2">nationally owned</td><td colspan="2">Marketing and sales</td><td colspan="2">replacement parts and recylcing</td><td colspan="2">Logistic ??</td></tr>
<tr><td>lead firms</td><td>other</td><td>lead firms</td><td>other</td><td>lead firms</td><td>other</td><td>lead firms</td><td>other</td><td>lead firms</td><td>other</td><td>lead firms</td><td>other</td><td>lead firms</td><td>other</td></tr>
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Where:

ISIC 291	Manufacture of Motor Vehicles
ISIC 292	Manufacture of bodies (coachwork) for motor vehicles; manufacture of trailers and semi- trailers
ISIC 293	Manufacture of parts and accessories for motor vehicles
ISIC 2211	Manufacture of tires
ISIC 2219	Manufacture of rubber hoses and belts and other rubber products
ISIC 2220	Manufacture of plastic hoses and belts and other plastic products
ISIC 2720	Manufacture of batteries for vehicles
ISIC 2740	Manufacture of lighting equipment for motor vehicles
ISIC 2811	Manufacture of pistons, piston rings and carburetors
ISIC 2813	Manufacture of pumps for motor vehicles and engines
ISIC 2829	Manufacture of other special- purpose machinery
ISIC 4520	Maintenance, repair and alteration of motor vehicles
ISIC 72	Scientific research and development
ISIC 73	Advertising and market research
ISIC 451	Sale of motor vehicles