OECD publishing

Please cite this paper as:

De Backer, K. *et al.* (2016), "Reshoring: Myth or Reality?", *OECD Science, Technology and Industry Policy Papers*, No. 27, OECD Publishing, Paris.
http://dx.doi.org/10.1787/5jm56frbm38s-en

OECD Science, Technology and Industry Policy Papers No. 27

Reshoring: Myth or Reality?

Koen De Backer, Carlo Menon,
Isabelle Desnoyers-James,
Laurent Moussiegt

FOREWORD

The news that (manufacturing) companies in OECD economies are increasingly bringing manufacturing activities back home has attracted much attention in recent years. Headline cases of a number of large multinational companies have given increased visibility to the phenomenon of reshoring in the (economic) press, academic research and policy discussions. The debate on re-shoring is very lively, but considerable disagreement exists about how important this trend actually is. Different terms such as reshoring, back-shoring, near-shoring and onshoring are often used interchangeably and largely contribute to the confusion surrounding this new phenomenon.

This paper brings together the available evidence, not in an attempt to prove who is right or wrong in the discussion - the issues raised by reshoring will most likely not be settled for quite some time - but rather to understand how important reshoring is, not only as regards its impact on individual companies but also from a more aggregate economy-wide view. The paper also discusses the phenomenon of reshoring in more detail, by unpacking the concept itself and analysing the different motivations why companies choose to reshore activities. In doing so, the paper aims to help guide the policy discussions on reshoring in light of the actions and plans that haven been taken by some governments in OECD countries.

This paper was written by Koen De Backer, Carlo Menon, Isabelle Desnoyers-James and Laurent Moussiegt of the OECD Secretariat.

The Committee on Industry, Innovation and Entrepreneurship (CIIE) approved this report in October 2015 as part of its work on the “Next Production Revolution”.

Note to Delegations:
This document is also available on OLIS under the reference code:
DSTI/IND(2015)8/FINAL.

TABLE OF CONTENTS

EXECUTIVE SUMMARY 4

RESHORING: MYTH OR REALITY? 5

1. A growing attention for reshoring 5
2. A closer (theoretical) look at reshoring 7
   2.1 Setting the terminology straight 7
   2.2 The rationale for reshoring 8
3. The evidence on reshoring: limited and mixed 11
   3.1 Survey results – anecdotal evidence 11
   3.2 Aggregate trade data: the share of imports in domestic demand 15
   3.3 Aggregate data on the activities of Multinational Enterprises (MNEs): the geographical distribution of productive resources 16
   3.4 Firm-level evidence on MNEs: econometric evidence on reshoring 19
4. The policy discussion on reshoring 24
   4.1 Policy initiatives and actions aimed at supporting reshoring 24
   4.2 Managing expectations? 25
   4.3 Is ‘regional’ the new ‘global’? 27

NOTES 30

REFERENCES 32

EXECUTIVE SUMMARY

The offshoring of activities and jobs has been an important element of the discourse on manufacturing in developed economies over the past decades. However, in recent years reshoring has attracted growing attention since manufacturing companies in OECD economies are increasingly reported to transfer activities back to their home country (back-shoring) or to a neighbouring country (near-shoring). The eroding cost advantage of emerging economies, the underestimation of the full cost of offshoring, the need for production to be close to markets and innovation, the protection of intellectual property and the need to balance cost savings and risk dispersion are all factors that have been proposed on why reshoring has become more important in recent years.

The aim in developed economies is for reshoring to create value added and jobs in OECD manufacturing, and help regain competitiveness of OECD economies in global manufacturing. In addition to the more general policies in place to increase their attractiveness for investment, a number of OECD countries have undertaken specific initiatives and actions to support reshoring.

The debate on re-shoring is ongoing and considerable disagreement exists about how important this trend actually is. Some predict that reshoring will become a fundamental trend in the early 21st century, while more sceptical voices point to the small number of companies that are bringing activities and jobs home. This paper shows that the phenomenon of reshoring needs to be put in perspective. While company surveys and anecdotal evidence suggest the growing importance of the reshoring trend, the more aggregate evidence developed in this paper indicates that the effects on national economies are (still) limited. Claims that reshoring will result in a large number of extra jobs at home are not supported; instead reshoring rather leads to additional capital investment in the home country but also in neighbouring countries. Because of these extra investments e.g. in robotics, the expectation is that reshored production will create only a limited number of additional jobs and that these jobs will increasingly be high-skilled.

The phenomenon of reshoring does not mean the end of offshoring nor is it expected to bring back all the activities that have been offshored during the past decades and restore manufacturing in OECD economies back to its level of the 1970s or 1980s. Offshoring is still taking place at the same time that reshoring is picking up and the current evidence tends to suggest that offshoring is still more important. Proximity to markets is a major reason for international investment and the attractiveness of emerging economies is also explained by their large size and the strong growth of their markets.

But after years of large-scale offshoring and outsourcing, companies increasingly seem to look for more diversified sourcing strategies and consider more options in structuring their production processes. The length and complexity of GVCs have exposed companies to large levels of supply risk in the event of adverse shocks and has made them less agile to respond to changing preferences in consumer demand. A regional rebalancing of (some) GVCs seems to be on the horizon which will make the topography of production more varied and distributed.

In addition to global hubs in GVCs, production is expected to be become increasingly concentrated in regional/local hubs closer to end markets both in developed and emerging economies. Changes in cost structures, demand factors as well as technologies may result in production and manufacturing becoming increasingly regional. For some products low (labour) costs and long value chains will continue to form important competitive advantages for some time, but for other goods and services production will become increasingly organised at the more regional level.

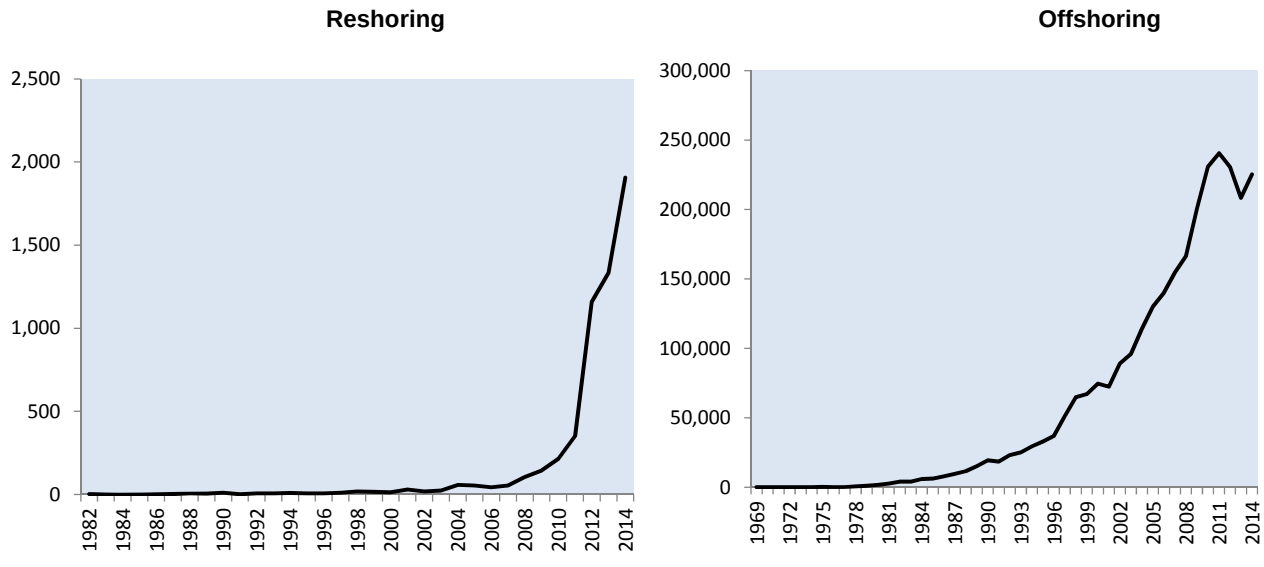
RESHORING: MYTH OR REALITY?

1. A growing attention for reshoring

The offshoring of activities and jobs has been an important element in the discourse on manufacturing in developed economies over the past decades. But the emerging news in recent years is that manufacturing companies in OECD economies are increasingly bringing manufacturing activities back home. Headline cases of a number of large multinational companies (e.g. Apple, General Electric, NCR, Ford Company) have given increased visibility to the phenomenon of reshoring, and accordingly, reshoring has recently gained increasing attention in the (economic) press, academic research and policy discussions. The debate on re-shoring is ongoing and considerable disagreement exists about how important this trend actually is. Some predict that reshoring will become a fundamental trend of the early 21st century, while more sceptical voices point to the small number of companies that are currently bringing activities and jobs home.

A recent White Paper on Reshoring by Cranfield University (2015) counting the number of media articles referencing to reshoring and offshoring illustrates the different attention offshoring and reshoring have attracted. Figure 1 shows the growing importance of offshoring already since the end of the 1980s and the beginning the 1990s, and its decreasing attention in more recent years. In contrast, reshoring is a much more recent phenomenon (a negligible number of articles made a reference to reshoring before 2000) and the media coverage has only taken off in the last four years. Nevertheless the number of media articles referencing reshoring is only a fraction of those mentioning offshoring.

Figure 1. Count of media articles referencing to reshoring and offshoring



Source: Cranfield University (2015).

Reshoring increasingly features in policy discussions across OECD countries, in particular in the ongoing debate on the future of manufacturing. In addition, the reshoring of jobs back home is considered important in times when OECD countries are confronted with high and growing levels of unemployment. The main argument – and hope - is that reshoring will create value added and jobs in OECD manufacturing, and will help regain the competitiveness of OECD economies in global manufacturing.

The reshoring policy debate is especially prominent in the United States with reshoring expected to result in a manufacturing renaissance in the country. At the start of his second term, President Obama hosted a forum at the White House focused on the growing number of companies choosing to "insource" jobs and make new investments in the United States. In a first study on the topic, the Boston Consulting Group reported for example that more than half of 200 US companies surveyed with sales greater than USD 1 billion were moving jobs back to the United States, or were planning to do so within the next two years (Boston Consulting Group, 2011). The same consulting company projected that re-shored production, coupled with rising exports, may create between 2.5 million and 5 million jobs in the United States by 2020 (Boston Consulting Group, 2013).

The reshoring discussion is less prominent in Europe. One reason is that in contrast to the United States, European manufacturing overall has been less affected by the offshoring of activities, especially to China. Nevertheless, in a number of countries reshoring has emerged on the policy agenda in recent years but often because of different reasons. The United Kingdom, for example, has identified reshoring as a phenomenon that may help to rebalance its economy, while Germany, a manufacturing powerhouse, considers reshoring as an important factor for its manufacturing sector of the future (including the so-called *Industrie 4.0*). The discussion on reshoring in Italy centres rather on the "100% Made in Italy" branding in motivating Italian companies to bring production activities back to Italy. The Ministry for Industrial Renewal in France has recently also developed initiatives on reshoring, complementing its policy measures which discourage offshoring by French companies.

Even more recently, the reshoring discussion in a number of countries has extended beyond manufacturing to services (e.g. a number of companies have relocated call centres activities because of problems with language skills). In contrast to manufacturing where activities are principally reshored from China, service activities are reported to come back mainly from India and to a lesser extent from the Philippines. Services reshoring seems to be in an even more premature stage than manufacturing reshoring as the numbers of companies and jobs involved in services reshoring are more limited than in the reshoring of manufacturing. One reason is that services offshoring has not really taken off as some predicted in the past (see for example Blinder (2007)). Furthermore, there seems to be a slowdown in the offshoring of services activities with some arguing that the 'easy' parts in services value creation have been offshored but that the remaining elements are much harder to offshore (because of specialised knowledge, proximity to customers, etc.).

This paper discusses the phenomenon of reshoring in more detail, by unpacking the concept itself and analysing the different motivations why companies choose to reshore activities. The paper brings together the available evidence, not in an attempt to prove who is right or wrong in the discussion - the issues raised by reshoring will most likely not be settled for quite some time - but rather to understand how important reshoring is, not only as regards its impact on individual companies but also from a more aggregate economy-wide view. In doing so, the paper aims to help guide the policy discussions on reshoring in light of the actions and plans that haven been taken by some governments in OECD countries. In framing the reshoring phenomenon into the broader developments of the rebalancing of production across the globe including the tension between global and regional value chains, the paper contributes to the OECD project on the Next Production Revolution.

2. A closer (theoretical) look at reshoring

2.1 Setting the terminology straight

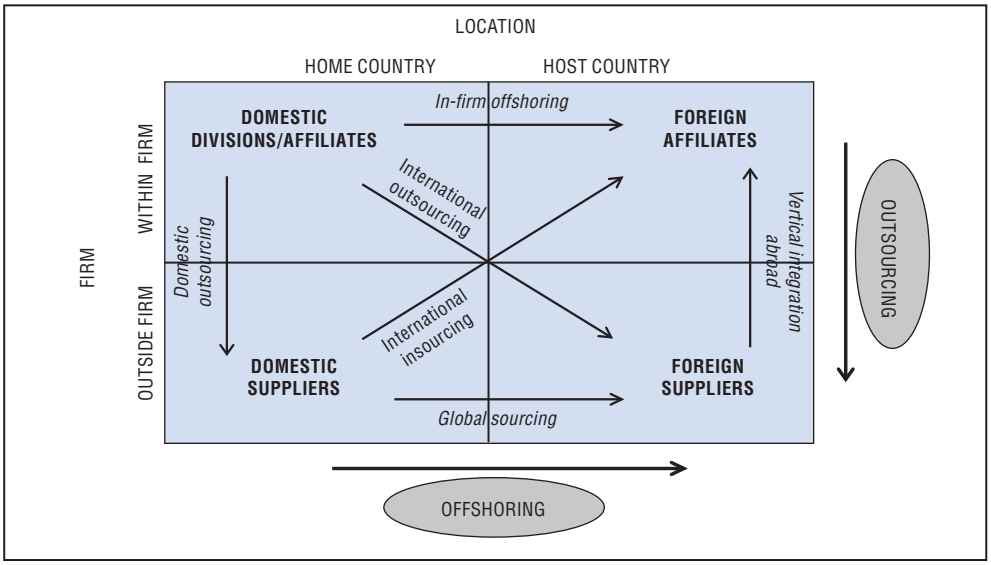
In the current (policy) discussion on reshoring different terms are used interchangeably (such as reshoring, backshoring, nearshoring, onshoring) while it is not always clear if these terms have the same meaning. The academic literature provides some guidance but still shows disagreement over the exact terminology. Ellram (2013) defined re-shoring as "moving manufacturing back to the country of its parent company', but others have described reshoring merely as a generic change of location with respect to a previous off-shore country (Fratocchi et al., 2014). 'Backshoring' has been described in the literature as the 're-concentration of parts of production from own foreign locations as well as from foreign suppliers to the domestic production site of the company" (Kinkel and Maloca, 2009) and 'the geographic relocation of a functional value creating operation from a location abroad back to the domestic country of the company" (Holz, 2009).

In contrast, near-shoring has been described as the decision to relocate previously offshored activities not necessarily back to the home country of the company, but rather to a neighbouring country of the home country. For example, Bogar and Holmes (2013) discussed the growing attractiveness of Mexico for offshored activities of US companies given its proximity to US markets, which gives it a large degree of flexibility. Likewise, Klier (2013) argues that Mexico has become an attractive location particularly for the automotive industry because of its low labour costs but also because of improvements in its training and infrastructure and changes in its trade policy. For example, the Boston Consulting Group (2014) reported that Mexico's manufacturing cost structure (including wage costs, exchange rates, labour productivity and energy costs) has significantly improved over the past years: Mexico is estimated to be 4 percentage points cheaper than China for manufactured goods.

The concepts of reshoring, backshoring as well as nearshoring refer all to the reverse of offshoring. The phenomena of re-/back- and near-shoring are not completely new; there has always been some movement of activities back to the home country typically because of disappointing experiences with production abroad. But the (apparent) growing importance of reshoring seems to suggest a departure from past international strategies and investment by companies. The change from an integrated production process in one place to the dispersed production networks within global value chains (GVCs) has resulted in a move of manufacturing activities, especially to emerging economies.

Indeed, offshoring and outsourcing have transformed previously nationally based manufacturing sectors for decades and have resulted in the emergence of GVCs (OECD, 2013). Outsourcing concerns the purchase of intermediate goods and services from outside specialist providers (i.e. the make or buy decision); whereas offshoring refers to purchases by firms of intermediate goods and services from foreign providers (i.e. the location decision). Offshoring includes both international outsourcing (where activities are contracted out to independent suppliers abroad) and international in-sourcing (the transfer of particular tasks within the firm to a foreign affiliate) (Figure 2).

Figure 2. Firms' strategies of outsourcing and offshoring



Source: OECD (2013).

In terms of putting forward a working definition for this paper and further analysis, re-shoring can be described as the reverse decision with respect to a previous off-shoring process resulting in the transfer of activities to the home country (back-shoring) or neighbouring country (near-shoring) of the company. Reshoring does not necessarily involve the repatriation or closure of all the previously offshored activities. For example, US companies may decide to backshore production activities from China back to the United States (or nearshore to Mexico), while at the same time continue production in China to serve the local/regional market. Reshoring is fundamentally concerned with the location of the activities (just like offshoring)[1] and this is irrespective of the ownership mode (activities can be performed in-house or outsourced to independent suppliers). Examples of reshoring include a German company moving the production of intermediates by independent suppliers in the Czech Republic back to Germany and another German company moving production back from its Czech affiliate.

On-shoring has a slightly different meaning than the concepts of re-/back- or near-shoring, as it relates to the decision to locate production activities close to market demand. As such, onshoring can be the same as reshoring (the US company relocating its production from China back to the United States) given that reshoring is to a large extent motivated by market proximity (see below). But onshoring can also take the form of offshoring, and an example is an US company locating new production activities in China to respond to the large and growing demand in China.

Other terms used from time to time in the discussion on reshoring are international divestment and de-globalisation/internationalisation. While the concepts are clearly related, there are again some - subtle – differences between the terms. As mentioned above, reshoring does not necessarily imply the (total) closure of activities abroad, hence reshoring can but does not need to go together with (complete) international divestment. Likewise, reshoring does not necessarily result in de-globalisation/internationalisation, or the decrease in global exposure of companies, as the international/global activities of the company in question may remain unchanged.

2.2 The rationale for reshoring

As re-/back-/near-shoring are fundamentally concerned with where (manufacturing) activities are performed, the reshoring debate boils down to a discussion of the attractiveness of countries for

investment. OECD (2011) showed that a multitude of factors play a role in the decision of companies where to locate activities including the size and growth of the local/regional market, (wage) costs, the availability of resources, human capital, the presence of suppliers and scientific infrastructure. These location factors tend to vary in importance across industries and activities along the value chain (production, distribution, R&D, etc.). The fact that reshoring is gaining in importance implicitly means that developed countries are becoming more attractive for some production activities after decades of losing production activities to emerging countries. Several reasons have been put forward why location factors in developed countries have become relatively attractive (again). Reflecting the considerable disagreement about the importance of the reshoring phenomenon, these reasons are categorised as 'myths' or 'realities'.

a) Changing cost structure in emerging countries

Since companies have offshored activities to low-cost emerging countries in the 1990s and early 2000s, production costs have significantly increased in these countries. China for example has witnessed an average hourly wage increases of 15-20% per year which has significantly eroded its cost advantage in labour-intensive activities. While the average hourly wage in emerging economies was estimated to be around 2% of the Unites States average in 2000, this is expected to rise to 9% in 2015 (World Economic Forum, 2012). In addition, energy costs and building costs in some emerging economies are reported to have risen dramatically in recent years.

More sceptical voices like to downplay this increase in wage costs and argue that productivity increases have offset these wage increases, with unit labour costs - i.e. labour costs adjusted for productivity - increasing less strongly.[2] Another argument is that companies in search of low labour costs will seek to invest in other low-cost countries and regions (including in Western China) in line with the 'flying geese' pattern[3] (Akamatsu, 1961; Ozawa, 2008). Often, however, these countries lack the transportation infrastructure, supply networks and scale that has underpinned the rise of a country like China, in addition to having lower levels of skills and productivity in the labour force. At the same time, it is important to note that (labour) costs are only one factor in the decision to invest in countries like China; the size and growth of the local market are other important factors making companies wanting to onshore new production activities in these countries or wanting to continue existing production locally.

b) Growing digitalisation of manufacturing in OECD economies

Emerging digital technologies such as sensors, machine-to-machine communication (M2M), data analytics and artificial intelligence are gradually transforming production. Some argue that the growing use of these new information and communication technologies will make (labour) costs relatively less important for competitive advantage in a number of manufacturing industries. For example, increased automation of production processes through the growing use of robots may erode the labour cost advantage of emerging countries as labour costs will represent a smaller share of total costs. The growing digitalisation is expected to increasingly allow for lower-cost and high-quality production in developed economies, thus discouraging offshoring from these countries and favouring reshoring. Some preliminary results of forthcoming OECD work suggest a negative link between robot use and offshoring across countries and industries (OECD, 2015).

c) Miscalculation/underestimation of 'full costs'

Management, logistical and operational problems have often resulted in significant 'hidden' costs (i.e. costs which were not taken into account in the decision to offshore) and have in some cases made offshoring un profitable (Porter and Rivkin, 2012; Boston Consulting Group, 2014). Companies increasingly appreciate that the pecuniary cost of monitoring, communication, and coordination between distant affiliates and headquarters are high and can be greater than initially envisaged.

In the heydays of offshoring, companies often copied the offshoring behaviour of their competitors without thoroughly thinking through all the consequences. In deploying this behaviour (Mckinsey, 2005), companies traditionally focused on 'out of factory costs' instead of full costs and did, for example, not always take into account the cost of shipping their products to the final customer. Limited shipping capacity coupled with high oil and gas prices has since confronted companies with rapidly rising transport costs. In addition, given the length and complexity of GVCs, a lot of working capital has been tied up in safety stocks and inventories trapped in slow transport flows. The plunging oil and gas prices during recent years have however provided some relief for offshoring companies.

As a result of these factors, the cost savings of offshoring have in many cases been less than expected. In addition to disappointing cost savings, several companies have also encountered problems with the quality of offshored products. The below standard quality necessitated new production runs and recalls of deficient products, thereby further pushing up the total cost of offshoring.

d) The co-location of R&D, innovation and production[4]

In discussing the importance of co-location between different activities along the value chain, arguments have been put forward that in a number of industries – typically more engineering industries - innovation may slow down as production becomes separated from R&D and innovative activities (Pisano and Shih, 2009). Given the sometimes important feedback effects between both activities in the value chain, innovation and product changes are generally easier to manage in a short supply chain. Slower rates of innovation risk hollowing out the competitive advantage of companies, particularly when they consider manufacturing as a pure cost centre without taking into account its contribution to R&D. Instead of also offshoring R&D and innovation activities as this might bring other risks (see below), some companies have brought manufacturing back home closer to their R&D and innovation centres. .

e) Potential threats to intellectual property when offshoring

When offshoring innovative activities to emerging countries (for example, to adapt products and processes to the local market), companies often learn that the protection of the related intellectual property is not always at the same level as at home. Companies fear that local suppliers may become competitors if they gain insights into the production process. Less developed legal systems of intellectual property rights, and particularly weaker enforcement, have made companies reconsider their offshoring strategies and resulted in move of some activities closer to home.

f) Balancing costs savings and risk dispersion

The more that firms have spread their operations around the globe, the more vulnerable they have become to disruption from unexpected events such as natural disasters and political unrest. Supply chains have often become so complex and extensive that a breakdown in one part of the chain may quickly have detrimental effects throughout the supply chain (OECD, 2013). Events like the 2011 earthquake/tsunami in Japan, the 2011 floods in Thailand and the volcano eruption in Iceland in 2012 have clearly demonstrated the fragility of GVCs. To diversify the risks inherent in their supply chains, companies increasingly consider alternative GVCs for the same product thereby adding some redundancy in their supply chains. To further increase the resilience of their supply chains, companies sometimes also opt for shorter GVCs and may bring production closer to the market.

g) Proximity to the market can support flexibility

Other advantages of moving production in the proximity of markets are the shorter lead times and the faster time to market it offers for companies. Particularly for customised and fashion products, companies need to respond quickly to changing demand and deliver new products on short notice. Flexibility and

agility have often been ignored in offshoring decisions which were primarily driven by cost savings. By bringing production centres closer to the end markets, companies want to regain flexibility in the competitive process.

h) A weakening dollar and the shale gas/oil revolution in the United States

Reshoring to the United States, in particular, is considered to have benefited from the weakening dollar and the growing importance of shale gas. There is some evidence suggesting that falling energy costs as a result of the increased availability of shale gas and tight oil (in combination with the rising energy costs in emerging economies) have contributed to the reshoring of activities in energy-intensive industries such as chemicals, cement, fertilizers, etc. For other industries, in which energy costs make up only a small fraction of the total production costs, the impact is however much more limited.

3. The evidence on reshoring: limited and mixed

3.1 Survey results – anecdotal evidence

Despite reports on high-visible cases of reshoring, the quantitative evidence on reshoring is still fragmented and often of an anecdotal nature, making it very difficult to assess the importance and analyse the characteristics of the phenomenon (Frattochi et al., 2014). Just like in the case of offshoring, the decision to re-/back- or near-shore activities is part of the corporate strategy which companies prefer not to disclose in great detail. But in contrast to offshoring and the political pressures it caused, companies bringing activities back home are not scared to create (positive) publicity around this. There is, therefore, a potentially relatively smaller downward bias in reporting on reshoring relative to offshoring.

Also the use of (official) secondary data is not straightforward as the unit of analysis of reshoring is often below the plant and enterprise level. Nevertheless, some secondary data have been collected often based on reporting in the (business) media on individual reshoring decisions, coupled with other information coming from a variety of sources. Alternatively, recent empirical research increasingly relies on survey data, which have become available for a number of countries. A problem with this data is, however, that the representativeness of the survey sample has not always been assessed.

Longitudinal data for German companies from the German Manufacturing Survey (between 1 450 and 1 650 observations in the individual surveys waves in 1997, 1999, 2001, 2003, 2006, 2009 and 2012) allows us to conclude that, by extrapolation, around 400 to 700 German companies per year have backshored activities. The most recent data show that about 2% of all German manufacturing companies have been active in backshoring between 2010 to mid-2012; a percentage that seems, surprisingly, to be decreasing. Also, the number of German manufacturing companies' offshoring activities abroad shows a steady decline, but is nevertheless four times larger than the number of backshoring companies in German manufacturing. The majority of repatriations of production activities by German companies originate in Eastern European countries, with shares close to 50% of all reshoring cases. The data also seem to suggest that backshoring by German companies can be characterised as a short/mid-term correction of a prior location decision, since around 80% of the backshoring cases followed with a 3-5 year lag after the previous offshoring decision (Kinkel, 2014).

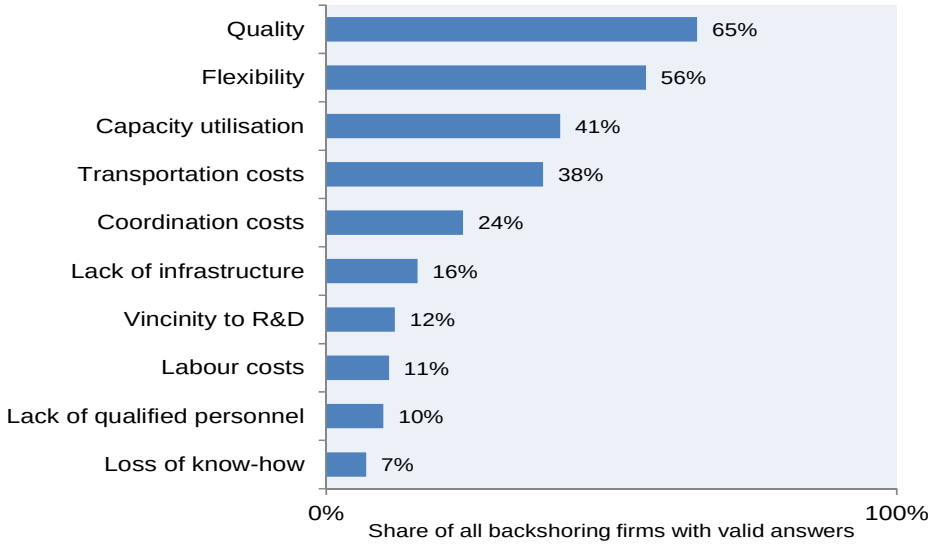
Data for other European companies based on the European manufacturing survey[5] have also become available recently, but only for the period between 2010 and mid-2012 (Dachs and Zanker, 2014). The data for the available countries (Austria, Switzerland, Germany, Denmark, Spain, France, Hungary, Portugal, Netherlands[6], Sweden and Slovenia) show that around 4% of firms in the survey sample have moved production activities back home. This is much lower than the 17% of firms which have offshored activities in the decade before. Also in the same time period of 2010-2012, offshoring is found to be more important

than backshoring. For every backshoring company, there are basically more than 3 offshoring companies (some of them offshoring and reshoring activities during the same time period).

Analysing the characteristics of backshoring within Europe, the results also show that (Dachs and Zanker, 2014):

- Backshoring is more frequent among large companies (above 150 employees) and the propensity for reshoring increases with firm size;
- The number of backshoring cases is lowest in low technology manufacturing sectors, and more frequent in high technology sectors;
- Comparing the propensity for backshoring and offshoring at the industry level, the results do not lend support to a strong tendency for re-industrialisation in Europe; the rubber sector is the only one where the propensity to backshore is larger than the propensity to offshore;
- Other EU countries (Western as well as Eastern Europe) represent almost two-thirds of the source countries for backshoring by EU companies although China, India and the United States have become more important over time (following the increased offshoring by EU companies to these countries in the decades before);
- Motivations for backshoring are to a large extent related to problems with the quality of goods produced abroad and the loss of flexibility (to respond quickly to demand changes and unexpected events). Innovation related factors like the loss of know-how and qualified personnel seem to be less important in the backshoring activities by EU companies; labour costs are also found to play only a minor role (Figure 3).

Figure 3. Reasons for backshoring production, 2010-mid 2012



Note: Results for Austria, Switzerland, Germany, Denmark, Spain, France, Hungary, Portugal, Netherlands[7], Sweden and Slovenia
Source: Dachs and Zanker (2014)

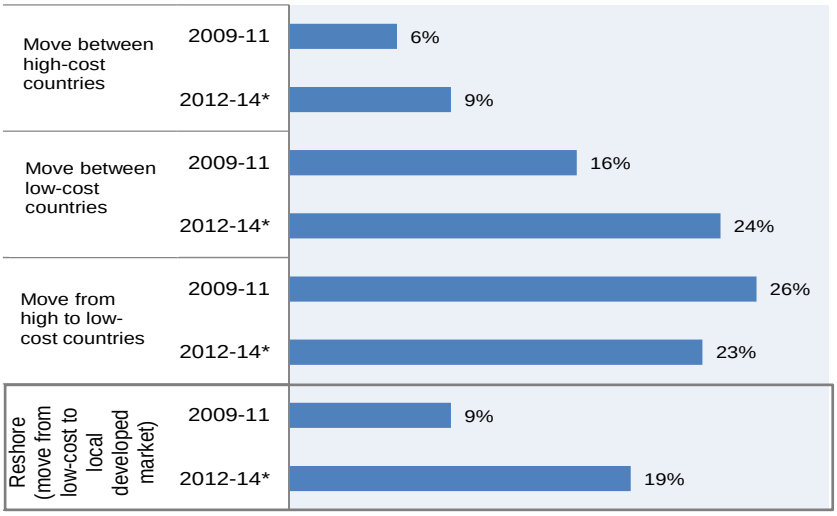
Evidence on backshoring to the United Kingdom is available from a variety of surveys, as discussed by Bailey and De Propris (2014). A first survey by Business Birmingham in 2013 indicated that one-third of manufacturers expected to source more domestically over the coming years. However, several surveys focusing on companies actually engaged in backshoring (Bailey et al., 2013; Manufacturing Advisory Science, 2013; EEF – The Manufacturers' Organisation, 2013) reported that (only) about 15% of respondents were engaged in backshoring. The surveys elicited information on different motivations for backshoring in line with the results from the European Manufacturing Survey for other EU countries, but also identified barriers for further backshoring like energy costs, regulation, access to finance, skills gaps, etc. On the other hand, a study by PricewaterhouseCoopers in 2014 estimated that backshoring has the potential to raise manufacturing output by GBP 6-12 billion in the United Kingdom and create 100 000 to 200 000 jobs by the mid-2020s.

A similar report from 2011 by another consultancy company - 'Made in America Again' by the Boston Consulting Group - stimulated the discussion on reshoring in the United States. In this work and follow-up work undertaken in later years, the Boston Consulting Group estimated that US manufacturing could create 2.5 to 5 million factory and related services jobs by 2020. Particularly focusing on the deteriorating cost competitiveness of China[8], the Boston Consulting Group argued that several US industries are close to a 'tipping point' after which more and more US manufacturers will increasingly backshore activities to the United States. In addition to very detailed cost calculations of total (landed) costs, the Boston Consulting Group surveyed about 200 US companies with sales greater than USD 1 billion; the results indicated that in 2013 54% of executives were planning to or considering reshoring some activities (against 37% in 2012). Furthermore, more than 20% of the respondents in 2013 - twice as many as in 2012 - indicated that they were actively undertaking backshoring or will move manufacturing to the United States in the near future. The Boston Consulting Group predicts that, although the reallocation of global manufacturing is in its very early phases, the reshoring of activities from low (labour) cost countries will contribute to the revival of US manufacturing. Such predictions have come under scrutiny very rapidly and, maybe not surprisingly, other reports have questioned the arrival of a manufacturing renaissance in the United States (see for example Nager and Atkinson, 2015; Goldman Sachs, 2013; Morgan Stanley, 2013).

The debate on reshoring is ongoing in the United States with strong views put forward by proponents as well as adversaries of the reshoring phenomenon. Another source of (positive) evidence on reshoring in the United States is the Reshoring Initiative (2015), which put forward estimates showing that the number of jobs created by reshoring (but also by Foreign Direct Investment) in 2014 was slightly higher than the jobs lost due to offshoring. On the other hand, AT Kearney (2014) took a more sceptical stance on reshoring to the United States, reporting on about 300 individual cases of reshoring in 2014. While this number is still growing over time, AT Kearney argues that the growth in reshoring cases seems to have slowed down in recent years. This, in combination with the large number of companies' offshoring activities abroad, cast doubts according to AT Kearney on the impact of reshoring on aggregate indicators like production and jobs.

Another interesting study, particularly in relation to the relative importance of offshoring and reshoring, is analysis undertaken by the Hackett Group in 2012. Based on survey data of global sourcing strategies of large companies, one of the major conclusions of this work was that the net amount of manufacturing capacity coming back to developed countries barely offsets the amount that continues to be sent offshore. Looking at sourcing strategies from a global perspective, the results indicated that offshoring from high to low-cost countries will overall remain more important than the move from low-cost to high cost countries, even if reshoring is expected to accelerate (Figure 4). The Hackett Group foresees a strong reallocation of manufacturing capacity among low-cost countries with particularly China losing a considerable share of capacity to other emerging economies, while the share of developed countries in global manufacturing capacity is expected to stay roughly the same.

Figure 4. Percent of manufacturing capacity impacted by change in sourcing strategy



Source: The Hackett Group (2012).

Instead of assessing the importance of reshoring for European and US economies, recent analysis by Fratocchi et al. (2015) has analysed the differences in reshoring to Europe and the United States. Using secondary data like newspapers, white papers by consultants, etc., 476 actual decisions to backshore – but also nearshore – have been identified with roughly equal numbers of reshoring cases by European and US companies:

- Backshoring seems to be a more common phenomenon than nearshoring, with the number of backshoring cases being more than 10 times larger than the number of nearshoring cases in the United States; nearshoring was found to be relatively more important in Europe[9] although backshoring is still seven times as large as nearshoring (number of cases);

- Source countries for reshoring by US companies are especially China and other Asian countries while for European firms, both Eastern and Western European countries have been affected;

- Reshoring in Europe goes back for a longer time than in the United States with a number of cases of reshoring to Europe dating back to the 1990s and even the 1980s; in contrast, reshoring by US companies is much more recent;

- Backshoring occurs across a broad range of manufacturing industries including lower technology intensive industries (clothing and footwear in Europe and furniture in the United States) and higher technology intensive industries (e.g. electronics, appliances); nearshoring seems to be more concentrated in a smaller number of industries, with a particularly high number of cases in the European textiles and clothing industry;

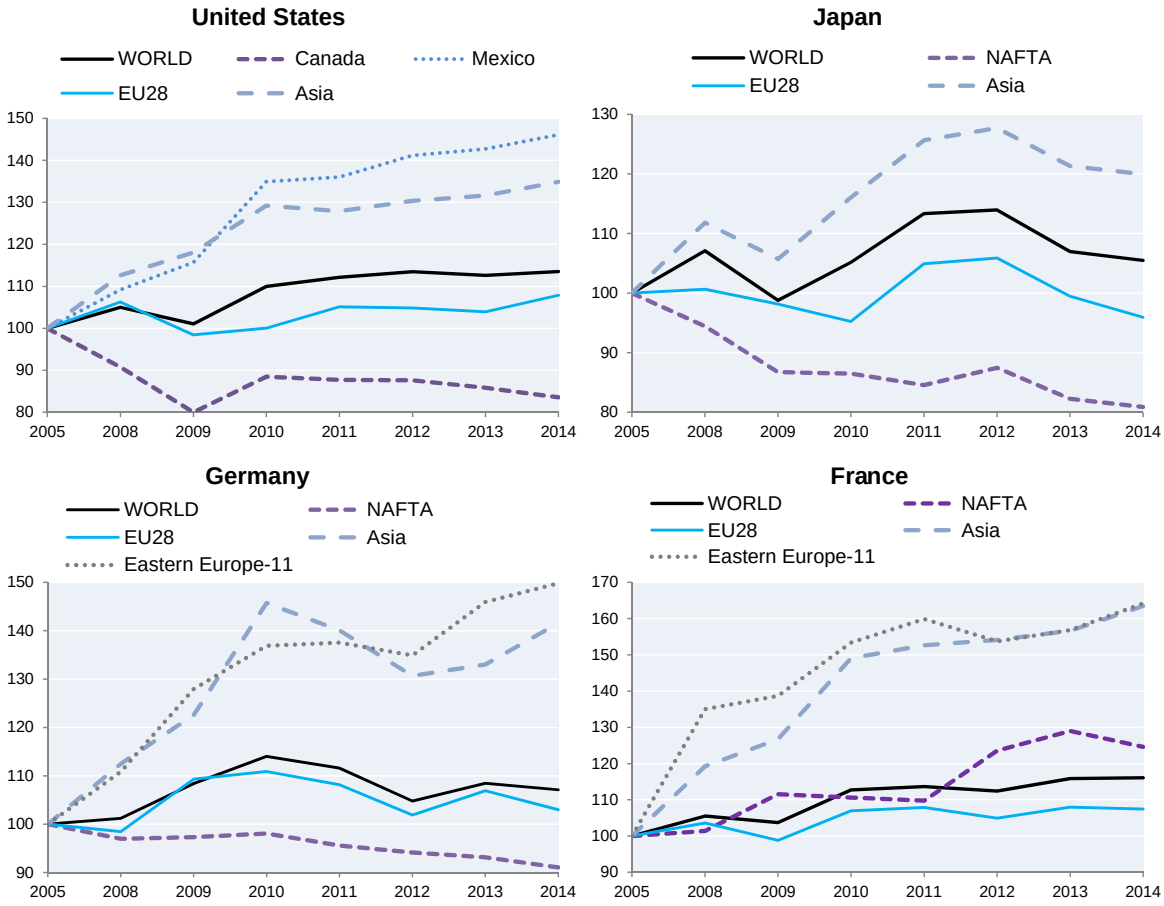
- Costs factors represent the most important motivation for reshoring, with especially labour costs and logistics costs being cited as major reasons. The narrowing of costs levels between emerging and developed countries seems to be more important for US companies;

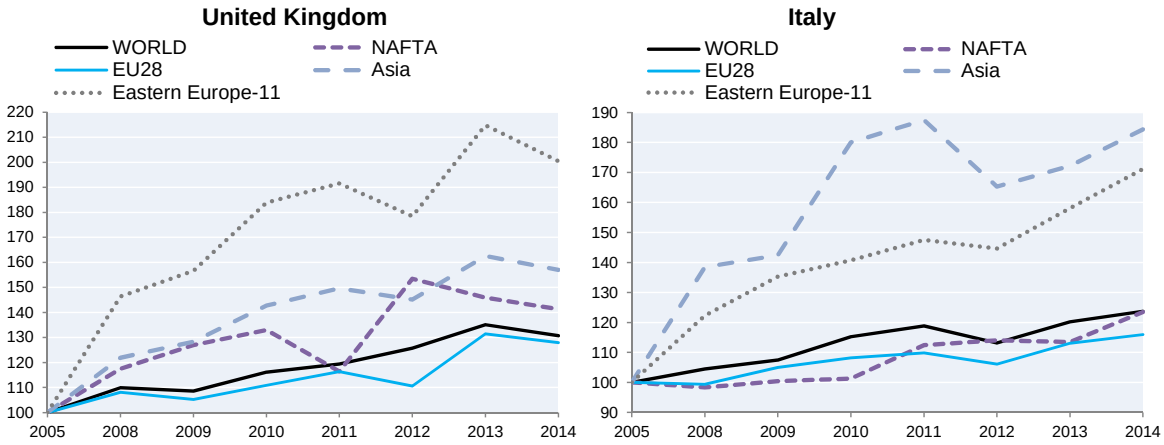
- In addition, to cost factors, the poor quality of offshored production and the exploitation of the "made in" reputation effect are two other major drivers for reshoring by European and US manufacturers.

3.2 Aggregate trade data: the share of imports in domestic demand

Sound policy making goes beyond limited survey results and anecdotal evidence on individual cases, hence there is the need for more evidence on the aggregate effects of reshoring. Notwithstanding data constraints as reshoring is not typically captured in official statistics, traditional economic data can be used to analyse - albeit indirectly - to what extent the reshoring by individual companies has resulted in changes on the wider economy level. A first natural indicator that can be used to feed into the reshoring discussion is the share of domestic demand that is served by imports. The idea behind this indicator is that if backshoring is becoming more important – for all the reasons discussed above, including the need to bring production in the proximity of final demand – it can be expected that domestic demand will shift from imports to domestic production over time.[10] Figure 5 presents the trend in the share of imports of domestic demand since 2005 for a number of countries. For example, Mexican imports serving final demand in the United States have increased almost 50% between 2005 and 2014.

Figure 5. Evolution in [imports/domestic demand], 2005-2014 (2005 = 100)





Note: Eastern Europe-1 includes Poland, Hungary, the Czech Republic, the Slovak Republic, Romania, Bulgaria, Estonia, Latvia, Lithuania, Slovenia and Croatia.
Source: Calculations based on different OECD databases (Bilateral Trade by Industry and End-use, Trade in Value Added, and Main Economic Indicators).

The results indicate that for most countries the growth in the imports' share of domestic demand has indeed slowed down in recent years, but the signs of a true reversal in the share of domestic demand that is met by imports are less solid. In countries like the United States, France and Italy, the share of domestic demand that is served by products from abroad is still increasing; in contrast, the share of imports of domestic demand has decreased in most recent years in Japan, Germany and the United Kingdom.

Looking in more detail at the origin of imports, the Asian region (Japan and Korea excluded) still shows an upward trend for most importing countries. This observation is somewhat at odds with the claims about the eroding cost competitiveness of a country like China, although the growing share of Asian imports might be explained by the shift of production from China to other countries in the region. Interesting to note is that in the United States, the share of Mexican imports has increased significantly in recent years, which may be the result of nearshoring of activities by US companies to Mexico. The results for European countries do not lend support for the backshoring of activities from Eastern to Western European countries, as the share of Eastern European imports increased until 2014; the United Kingdom is the only exception to this.

It should be stressed that the presented evidence does not argue against the existence/importance of backshoring, rather it shows that backshoring does not result (yet) in strong aggregate effects for national economies. More generally, the interpretation of such evidence has to be done with care, since reshoring is only one factor in the trends depicted in the graphs; other factors like the overall competitiveness of countries, the macro-economic context, etc. are also of importance.

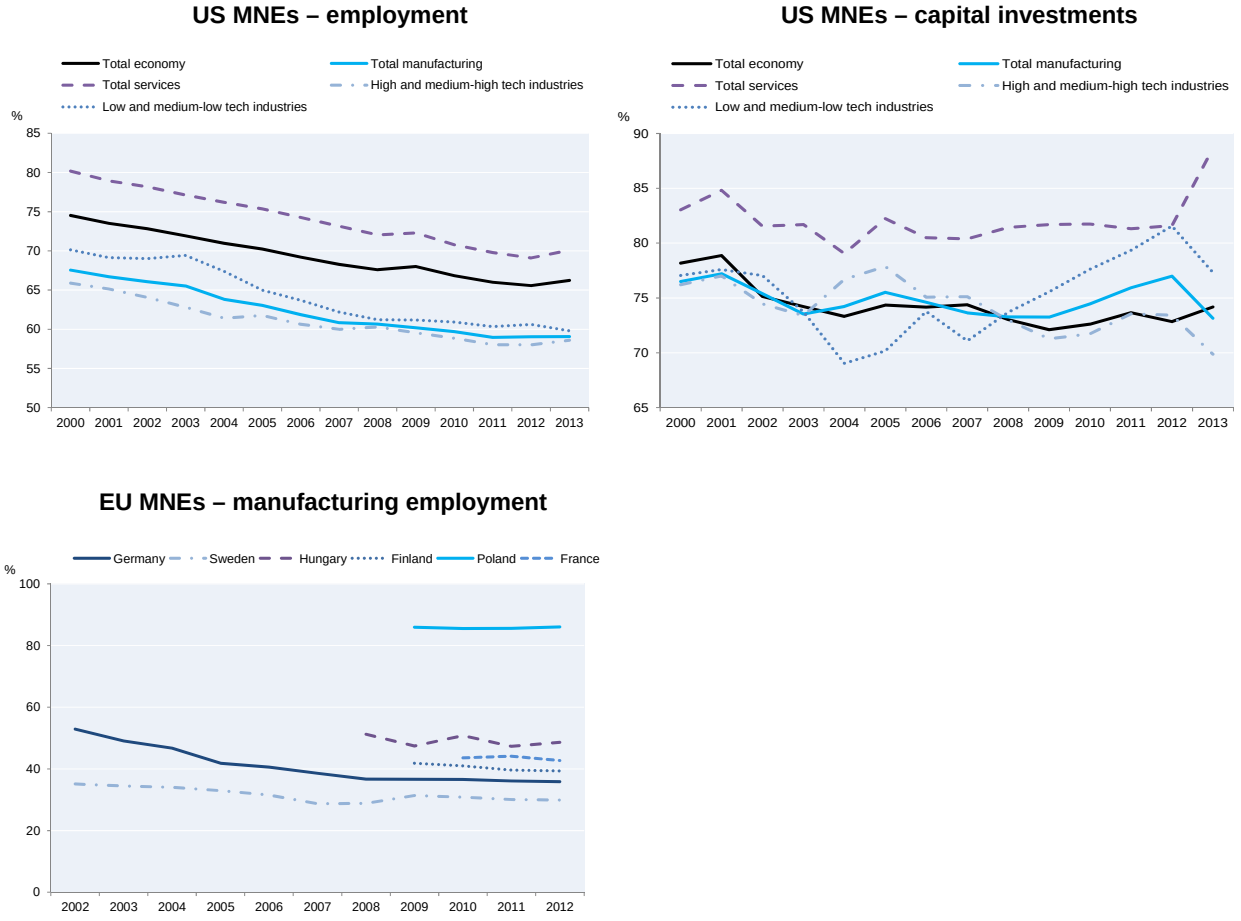
3.3 Aggregate data on the activities of Multinational Enterprises (MNEs): the geographical distribution of productive resources

A second source of data which may help point to the importance of reshoring at a more aggregate level is related to the geographical distribution of productive resources within multinational networks. If backshoring is becoming an important phenomenon also at the aggregate level, one would expect to see this reflected in the geographic distribution of MNEs' production factors; i.e. a growing share of productive resources will be deployed in the home countries of these companies. The results in Figure 6 show the trend in the home share of productive resources within multinational networks, using data of the OECD AMNE database for the United States, France, Germany, Sweden, Finland, Hungary and Poland.[11]

The data on US MNEs provide the greatest detail, allowing analysis of the geographic distribution of labour as well as capital (i.e. fixed capital investment in machines, buildings, etc.) within MNE networks.

The results for US MNEs show no signs of an increasing home share in employment, but provide some evidence of a growing concentration of capital investment within the United States. For example, up to 2013 the US MNEs in low and medium-low technology manufacturing industries have deployed a growing share of capital investments in the United States. Also the rest of manufacturing industries show some indication of backshoring by US MNEs in capital investments up to 2013, while backshoring by US MNEs in the services sector seems to take off only in 2013. The overall evidence is thus, again, somewhat mixed and in addition casts some doubt on the employment effects of backshoring. In particular, backshoring by US MNEs does not necessarily translate into a growing number of jobs in the United States, but rather in a reversal of the decreasing number of manufacturing jobs. Looking at the absolute number of jobs behind these home shares for example shows that the growing backshoring in medium and medium-low technology manufacturing industries (up to 2013) did not result in growing employment in these industries.

Figure 6. Home country share in MNEs' deployment of productive resources



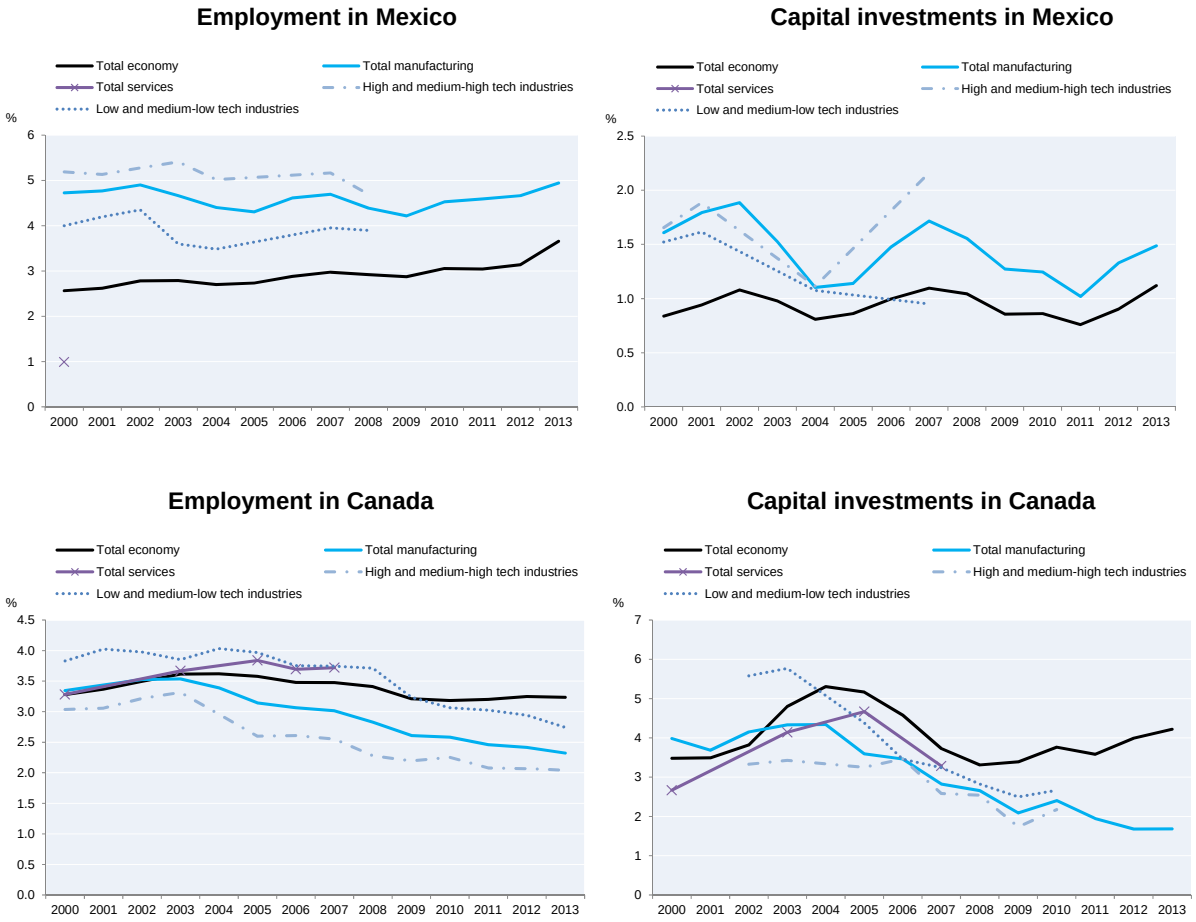
Source: Calculations based on the OECD AMNE database.

More detailed US data also allows to check for the possible emergence of nearshoring of US MNEs' activities (Figure 7). The evidence provides more support for nearshoring to Mexico than for backshoring to the United States. The share of both employment and capital investments deployed by US MNEs in

Mexico is clearly on the rise in manufacturing. Any nearshoring by US MNEs to Canada is however not supported by the data.

The data for European MNEs are much more limited (only for employment, with a limited number of years and no industry detail apart from manufacturing). In general, the geographic distribution of employment in French, German, Swedish, Polish, Hungarian and Finnish MNEs is not shifting towards the respective home countries. In contrast to US MNEs however, the home share in European MNEs' employment has been rather stable during the most recent years for which data are available, suggesting that employment reallocations through possible backshoring and further offshoring cancel each other out.

Figure 7. Share of US MNEs' employment and capital investments in Mexico and Canada



Source: Calculations based on the OECD AMNE database.

Again, it has to be stressed that this aggregate evidence should be interpreted carefully and provides only indirect evidence on (the lack of) reshoring. The fact that MNEs have increased (or decreased) their employment or capital investments at home more (or less) than abroad may be linked to other factors beyond backshoring. One important drawback is that AMNE data are only available up to 2013 (for the United States) which does not allow to capture the latest evolutions in reshoring. Furthermore, it has to be stressed that the data on MNEs only consider reshoring within the boundaries of the firm. Therefore, an MNE's backshoring activities such as changing from an independent supplier in China to the production of inputs by an independent supplier at home will not be taken into account in the results.

3.4 Firm-level evidence on MNEs: econometric evidence on reshoring

In order to look for more systematic evidence on the reshoring activities by MNEs, econometric analysis was undertaken using the BvD ORBIS database (2011 edition). The dataset contains detailed balance-sheet information (including employment and fixed assets) on millions of companies from many OECD and non-OECD member countries, combined with information on the ownership and group structure for the year 2009.

Despite the richness of the dataset, it also has some important limitations particularly related to the coverage and the comprehensiveness of the dataset. For example, it has been reported that the coverage of the ORBIS database is typically less comprehensive for small firms;[12] but given that the main focus is on MNE affiliates in this analysis - which are generally larger and older establishments than independent domestic companies - this drawback of the database should be less of a problem for this specific empirical exercise.

Around 20% of the companies in the ORBIS database are part of a group, but only a tiny share of those are part of a multinational group (i.e. a company with affiliates in different countries): the share of MNE affiliates is indeed ranging from 1.9 to 3.2% over the period (Table 1). Less than half of the affiliates within a multinational group are located in the same country as the head of group. Around half of the sample is composed by companies located in OECD high-income countries (although the share increases remarkably in the years 2009 and 2010, suggesting that the sample composition changes substantially in the last two years). The remainder of the sample is mostly composed of companies located in upper middle income countries (e.g. Brazil, China, and Russia), while around 4% of companies are located in lower middle income or in low income countries.[13]

Table 1. Sample composition

Year	Freq.	% Share Group	% Share MNEs	% MNE affiliates at home	% Share high income countries
2003	697,736	27.7	3.0	1.1	53.9
2004	932,330	23.6	2.7	1.0	43.8
2005	974,124	22.4	2.8	1.1	47.3
2006	1,178,676	24.6	2.6	1.0	47.4
2007	1,397,821	21.0	2.2	0.8	59.1
2008	1,639,852	18.8	1.9	0.7	52.6
2009	1,927,132	16.2	2.2	1.0	72.1
2010	700,489	11.9	3.2	1.8	88.5

Source: authors' elaboration on the BvD ORBIS database

The analysis starts with the estimation of a baseline model to assess if the findings on the geographic distribution of productive resources within MNE networks (using aggregate data as reported above) are confirmed. In order to analyse whether employment and fixed capital investments of MNE affiliates "at home" – i.e. headquarters and affiliates in the home country – show a distinctive trend over time as compared to MNE affiliates abroad, the following model was estimated:

$$y_{it} = YEAR_t + MNE_t + MNEHOME_t + averageemployment_{it} + FIRM\_FE_i + \varepsilon_{it} \qquad (1)$$

where the dependent variable is the one-year growth rate of total employment or in fixed assets. The subscript *i* indexes firms and *t* the years. The growth rate is calculated as in Desai et al. (2009), i.e., it is equal to the year-to-year variation in employment or fixed assets over the average value over the two years.[14]

$$Growth(y)_t = (y_t - y_{t-1})/[0.5 * (y_t + y_{t-1})]$$

The independent variables are a year dummy, year-specific MNE (equal to 1 if the company is part of a MNE group in a given year)[15] and MNEHOME (equal to 1 if the company is part of a MNE group in a given year and it is located in the same country as the group headquarter) dummies, the average firm employment over the full period interacted with the year dummy and a firm fixed effect. The MNE_t dummy thus corresponds to the average percentage difference of employment of MNE-affiliates with respect to non-MNE affiliates in the same country-year, expressed in difference from the baseline year 2003, keeping fixed all firms' time-invariant characteristics (e.g. sector). The value of the $MNEHOME_t$ dummy tells whether there is an additional effect specific for companies that are located in the same country as the MNE headquarter.

The results[16] of the interaction of the year dummies with the MNE dummies show that, as compared to independent companies, MNE affiliates have gained employment over the 2006-10 period (column 3 in Table 2). On top of that, the interactions with the MNEHOME dummy show that affiliates located in the home country show an additional "growth premium" from 2007 to 2009. The estimates of the MNEHOME dummies limited to the sample of firms located in high-income countries are almost never significant (column 4), implying that the "growth premium" for affiliates at home is not prevalently found in those countries.

The estimations with fixed assets as dependent variable show an overall similar pattern (columns 1 and 2), but with a few interesting differences. All the year dummies interacted with the MNEHOME dummy are significant and point estimates are larger in absolute value than in the model with employment growth rate as the dependent variable. Different from the estimations with employment, these estimates keep their magnitude and significance when we restrict the sample to high-income countries, suggesting that the phenomenon was more relevant in the high-income countries (which account for around 40% of the sample).

Overall, this first set of results is quite in line with the aggregate evidence on MNE reshoring that was discussed above. MNE affiliates located in the home country, i.e. headquarters and affiliates in the home country, grow relatively faster (or shrink less rapidly) than other MNE affiliates. The fact that productive resources in home countries show a higher growth pattern than productive resources in affiliates abroad directly results in a growing concentration of productive resources at home in MNE networks. This seems to be true for both employment and investments, but the effect is stronger for investments; for the latter variable, the result is mainly driven by the sample of MNE affiliates located in high-income countries (in contrast to the insignificant result on employment for these MNE affiliates). The magnitude of the phenomenon appears to be somewhat stronger toward the final years in the sample.

Table 2. Econometric results baseline model

Dependent variable	Growth rate fixed assets		Growth rate employment	
Sample	All countries	Hi-income	All countries	Hi-income
YEAR=2005	0.125***	0.00478	-0.00621***	-0.00399***
	(0.00211)	(0.00383)	(0.000710)	(0.00101)
YEAR=2006	-0.0557***	-0.0380***	-0.0238***	-0.00498***
	(0.00191)	(0.00330)	(0.000692)	(0.000993)
YEAR=2007	-0.0653***	-0.0509***	-0.0388***	-0.0109***
	(0.00200)	(0.00336)	(0.000688)	(0.000983)
YEAR=2008	-0.0367***	-0.0409***	-0.0589***	-0.0407***
	(0.00193)	(0.00349)	(0.000717)	(0.00100)
YEAR=2009	-0.154***	-0.106***	-0.135***	-0.0900***
	(0.00347)	(0.00348)	(0.000918)	(0.00105)
YEAR=2010	-0.00704***	-0.00667*	-0.0910***	-0.0654***
	(0.00261)	(0.00344)	(0.00139)	(0.00146)
YEAR=2005 & MNE=1	-0.120***	-0.0126*	0.00342	0.00436
	(0.00596)	(0.00695)	(0.00411)	(0.00419)
YEAR=2006 & MNE=1	0.0334***	0.0195***	0.0150***	-0.000644
	(0.00610)	(0.00694)	(0.00396)	(0.00418)
YEAR=2007 & MNE=1	0.00890	8.93e-05	0.0253***	0.00751*
	(0.00622)	(0.00708)	(0.00396)	(0.00415)
YEAR=2008 & MNE=1	-0.0567***	-0.0444***	0.0211***	0.0177***
	(0.00655)	(0.00748)	(0.00396)	(0.00410)
YEAR=2009 & MNE=1	0.0256***	-0.0106	0.0369***	0.00307
	(0.00709)	(0.00738)	(0.00414)	(0.00423)
YEAR=2010 & MNE=1	-0.0513***	-0.0462***	0.0302***	0.0128**
	(0.0126)	(0.0130)	(0.00621)	(0.00630)
YEAR=2005 & MNEHOME=1	0.0163*	0.0279***	0.00871	-0.00125
	(0.00880)	(0.00901)	(0.00622)	(0.00609)
YEAR=2006 & MNEHOME=1	0.0215**	0.0214**	0.00975	0.00323
	(0.00911)	(0.00938)	(0.00619)	(0.00620)
YEAR=2007 & MNEHOME=1	0.0417***	0.0385***	0.0145**	0.00218
	(0.00921)	(0.00948)	(0.00616)	(0.00618)
YEAR=2008 & MNEHOME=1	0.0918***	0.0944***	0.0223***	0.00325
	(0.00972)	(0.0101)	(0.00618)	(0.00616)
YEAR=2009 & MNEHOME=1	0.0630***	0.0554***	0.0303***	0.0121*
	(0.00961)	(0.00984)	(0.00634)	(0.00633)
YEAR=2010 & MNEHOME=1	0.00827	0.00677	-0.00270	-0.0151
	(0.0208)	(0.0210)	(0.00946)	(0.00949)
Constant	0.106***	0.0826***	0.0525***	0.0338***
	(0.00137)	(0.00245)	(0.000525)	(0.000693)
Firm fixed effect	YES	YES	YES	YES
R-square	0.011	0.003	0.022	0.016
N	2,349,106	1,038,147	2,735,035	1,289,889

Note: Panel fixed effect estimation; the dependent variable is the one-year growth rate of employment (col 1-2) and fixed assets (3-4). Robust standard errors in parenthesis. Panel random effect estimation gave the same results

Source: Authors' elaboration on the OECD ORBIS database.

This result, however, does not necessarily imply that backshoring is effectively taking place, as it is compatible with a number of possible alternative solutions; for example, the results could also imply that MNE groups that have not offshored in the past were performing better than those who had done so in more recent years. Therefore, in a second analysis, the change in employment or capital investments of affiliates abroad is directly related to the change in employment or investments at home.

The second model is close in spirit to the one estimated by Desai et al. (2009) who reported a positive effect between employment changes at home and abroad. This econometric model assesses the link between the employment or fixed assets of MNE affiliates *at home* (i.e., located in the same country as the group head) with the aggregate value of the same variable in the same MNE group abroad:[17]

$$growth\_home_{git} = growth\_abroad_{pos}{}_{gt} + growth\_abroad_{neg}{}_{gt} + groupgrowth_{gt} + NACE_{it} + \varepsilon_{it}$$

where the employment or fixed assets growth rate at home of company i part of group g in year t is regressed over the aggregate growth rate of the same variable of affiliates abroad. The *growth_abroad* variable is split in two variables, depending on whether it takes a positive or negative value. This allows the change in growth rate at home to be different in sign and magnitude depending on whether affiliates abroad are growing or shrinking, respectively. If there is backshoring, the relationship is expected to be negative – i.e., an increase in employment or investment at home is associated with a decrease in employment or investments abroad. However, a negative association may actually be also a symptom of offshoring, i.e., a decrease in employment or investment at home is associated with an increase in employment or investments abroad. Therefore in this kind of analysis it is important to distinguish positive from negative changes in employment and fixed capital assets.

This is indeed what the results suggest. On average over the full period, the results show that there is a significant negative association of the negative growth rate in fixed assets abroad with the growth rate at home (column 1 in Table 3). The estimations show that, within individual groups, a reduction of investments abroad is associated with an increase of investments at home.[18] When the same variable is interacted with the year dummies, all the coefficients are insignificant (column 2), which suggests that the association is not changing in intensity over the period.

The coefficient on the positive growth rate abroad is instead not significantly different from zero, on average over the full period. This is rather unexpected, as one could reasonably assume that when a group is experiencing a period of rapid expansion, investments in fixed assets at home and abroad are both increasing and are therefore positively correlated.

Results with the growth rate of employment are largely inconclusive (columns 3 and 4), as both the coefficients and the positive and negative growth rates are not significant. The model is therefore unable to find a statistically significant association between the change in employment at home and abroad, respectively, within the same group. It is worth stressing, however, that the employment variable is likely to be measured with less precision than with respect to fixed assets. Workers are extremely heterogeneous in terms of skills, productivity, hours worked, etc., and these dimensions are not taken into account, as only the headcount is available. Fixed assets, instead, are measured at their book value which better reflects the real contribution to the production process.

Table 3. Econometric results – model on backshoring

Dependent variable	Yearly growth rate Fixed assets		Yearly growth rate Employment	
Growth abroad positive	-0.000741	-0.00358	-0.000934	-0.00577
	(0.00498)	(0.0113)	(0.00279)	(0.00935)
Growth abroad negative	-0.0329***	-0.0552	-0.0148	-0.0157
	(0.00901)	(0.0364)	(0.0100)	(0.0263)
Av. growth group 2003-9	0.986***	0.989***	0.962***	0.965***
	(0.0328)	(0.0330)	(0.0340)	(0.0342)
YEAR=2005 & Growth abroad pos.		0.0216		0.00742
		(0.0179)		(0.00992)
YEAR=2006 & Growth abroad pos.		-0.00406		0.00515
		(0.0155)		(0.0116)
YEAR=2007 & Growth abroad pos.		-0.00873		-0.00153
		(0.0166)		(0.0124)
YEAR=2008 & Growth abroad pos.		-0.0173		-0.00284
		(0.0170)		(0.0118)
YEAR=2009 & Growth abroad pos.		0.0297		0.0167
		(0.0200)		(0.0118)
YEAR=2005 & Growth abroad neg.		0.0184		0.0129
		(0.0431)		(0.0303)
YEAR=2006 & Growth abroad neg.		0.0478		0.0309
		(0.0427)		(0.0342)
YEAR=2007 & Growth abroad neg.		-0.00693		0.0116
		(0.0434)		(0.0328)
YEAR=2008 & Growth abroad neg.		0.0112		-0.0317
		(0.0416)		(0.0319)
YEAR=2009 & Growth abroad neg.		0.0461		0.000612
		(0.0398)		(0.0318)
Constant	-0.0182	-0.0206	-0.00361	-0.00189
	(0.0235)	(0.0224)	(0.0158)	(0.0171)
nace2-year FE	YES	YES	YES	YES
country FE	YES	YES	YES	YES
R-square	0.074	0.074	0.064	0.065
N	21,380	21,380	29,256	29,256

Note: Ordinary least-squares estimation; the dependent variable is the one-year growth rate of fixed assets (col. 1-2) and employment (col. 3-4) at home. Likewise, the independent variables are the one-year growth rates of fixed assets (col. 1-2) and employment (col. 3-4) abroad. The sample is limited to the MNE affiliates located in the same country as the group head. Robust standard errors clustered at group level in parenthesis.

Source: authors' elaboration on the OECD ORBIS database.

Summarising, the different lines of more aggregate evidence on reshoring converge to some overall effects of back- and nearshoring on the economy-wide level, but overall less substantial and convincing than what survey results and anecdotal cases seems to suggest. Also, it is interesting to note that reshoring is more important in terms of capital investments rather than in employment; basically the evidence

presented does not provide support for claims that backshoring will result in a large number of extra jobs at home.

4. The policy discussion on reshoring

4.1 Policy initiatives and actions aimed at supporting reshoring

Because reshoring is closely related to the attractiveness of countries for investment, policy measures that impact countries' location factors will also directly benefit reshoring. Reflecting the multitude and diversity of location factors, there are different policy domains that affect the investment attractiveness of countries (OECD, 2011). In addition to the more general policies in place to increase their attractiveness for investment, a number of countries have undertaken specific initiatives and actions to support reshoring. These policies might include 'obvious' support measures like subsidies and/or tax allowances but also measures such as e.g. special provisions in trade policies. The discussion below lists a number of examples of such policies and is heavily based on Frattochi et al. (2015), complemented with information from some other sources. The available information on this is however hard to collect and thus far from complete; one reason is that policy measures to support reshoring can be taken at different levels of government (national, regional and local) which makes the actual support granted to reshoring companies not always clear.

As already mentioned above, the policy discussion on reshoring is especially prominent in the United States and has attracted a lot of interest from the Obama administration. The "Blueprint for an America built to last" (The White House, 2012) put forward specific proposals favouring the backshoring of production activities, such as: financial support for companies (including tax deductions, tax credits and incentives), tougher trade enforcement and investments in logistics infrastructure. Not all proposals have been turned into legislation however, as the proposal of tax credits, for example, has encountered significant difficulties (Frattochi et al., 2015).

In addition, backshoring is benefitting from the increased attention US manufacturing has attracted recently, in particular from different initiatives around advanced manufacturing. In addition to increases in national budgets for advanced manufacturing R&D – which could indirectly favour backshoring, specific actions include a programme by the Manufacturing Extension Partnership to promote backshoring and the correct calculation of the total cost of ownership (to help companies make well-informed location decisions) and the "Make it in America Initiative" that rewards projects encouraging backshoring. In addition, the so-called "manufacturing universities" may benefit from special incentives to redesign their engineering programs and curricula related to targeted manufacturing industries. Lastly, individual cases of backshoring are reported to have benefitted from support by local administrations and state governments (e.g. through tax abatements, grants and other incentives).

Reshoring has been frequently included in recent communications of different EU institutions. For example, backshoring features as a goal in the "Renaissance of Industry for a Sustainable Europe Strategy" of the European Parliament This strategy is part of the Europe Strategy 2020 Program which aims to increase the share of manufacturing in EU GDP to 20%. A number of communications by the European Commission (e.g. "A stronger European Industry for Growth and Economic Recovery" and "For a European Industrial Renaissance") included explicit references to reshoring and the proposals for a renewed industrial policy by the Commission would directly aid reshoring. An 'opinion' by the EU Regional Development Committee supported reshoring initiatives specifically in the context of Europe's traditional industrial regions.

In individual EU countries, the UK government is participating in the launch of Reshore UK which provides expert strategic and technical advice to develop the business case for reshoring. SMEs may be eligible for financial support, while larger manufacturers can get access to high-value supply chain

opportunities through Reshore UK. In addition, the Advanced Manufacturing Supply Chain helps develop local suppliers around the UK's major manufacturers with a focus on automotive in order to promote new supplier reshoring back to the United Kingdom.

A 2013 survey by the Ministry of Industry Renewal in France revealed that 60% of the companies that have backshored activities, received support from the central government and/or local authorities. The Ministry also developed the "Colbert 2.0 tool" which - just like a similar initiative by the American Reshoring Initiative - helps companies to assess the feasibility of backshoring operations back to France.

The Dutch government presented its broad vision on reshoring to Parliament in August 2014 with a clear focus on creating a competitive business environment rather than implementing specific measures to support and promote reshoring. Just like in other European countries, the objective is to develop an attractive location for new investment from business - whether through reshoring, new inward foreign investment or expansion investments by those already located in the Netherlands.

4.2 Managing expectations?

It is very hard to predict what will happen but the (limited) positive news on reshoring runs the risk of creating very high and in some cases unrealistic expectations. Particularly, some of the estimated effects put forward by consulting companies hold out great hopes for re-industrialisation in OECD economies. Policy makers seem to hope and expect that reshoring will help to address the structural competitiveness problems of OECD manufacturing and at the same time solve the unemployment problem in OECD countries. But the phenomenon of reshoring needs to be put in perspective and its possible contributions to developed economies should be assessed accordingly.

First, in spite of the (headline) cases of companies reshoring certain activities, the evidence presented in this paper and in other studies remains mixed. Overall, the evidence at the more aggregate level suggest that reshoring is still rather 'a trickle than a flood'; reshoring initiatives that are often publicly launched do not always materialise in reality. Surveys of companies indicate a large discrepancy between companies that have reshored or are actually in the process of reshoring activities on the one hand and companies that have plans to reshore activities on the other hand; the last group seems to be consistently much larger.

Second, the phenomenon of reshoring does not mean the end of offshoring. Empirical evidence clearly indicates that offshoring is still taking place at times when reshoring is picking up, and this observation is valid on the level of national/regional economies, industries and even individual companies. Companies may indeed bring some activities back to serve home and neighbouring markets but at the same time still move other activities abroad to serve local markets. Proximity to markets is an argument both for reshoring and offshoring; it can be expected that companies will continue to be attracted to emerging economies because of the size and growth of their (consumer) markets.

There is a lot of discussion about the relative importance of both phenomena and the current evidence tends to suggest that offshoring is still more important. As discussed above, the attractiveness of emerging countries like China is to a large extent due to their large and growing markets, in sharp contrast to the stagnating markets in OECD countries. A new middle class is emerging in China and India, partly as a result of the strong increases in wages in these countries. While this middle class worldwide could rise from 1.8 billion to 3.2 billion by 2020 and to 4.9 billion by 2030, almost 85% of this growth is expected to come from Asia. In 2000, Asia (excluding Japan) only accounted for 10% of global middle-class spending, and this could reach 40% by 2040 and almost 60% in the long term.

Third, it would of course be wrong to expect that reshoring will bring back all the activities that have been offshored during the past decades. The simple reason is that reshoring is not feasible for all

(manufacturing) activities. For example, manufacturing products with a high labour content and destined for Asian markets are very unlikely to come back. Reshoring will not restore manufacturing back to its 1970s and 1980s-level in OECD economies, although reshoring may contribute to a better balance between manufacturing and services in a number of countries. Nevertheless, services will remain the largest sector in OECD economies.

Fourth and directly following from the previous observations, the estimation of possible employment gains of reshoring seem to be very high – typically those put forward by proponents of reshoring, but it is not very likely that reshoring will result in large employment gains at home[19]. Most OECD economies are experiencing a steady long-term decline in manufacturing jobs which is related to the strong productivity growth in manufacturing industries (De Backer et al., 2015; Pilat et al., 2006). Even acknowledging that reshoring is still in its early phases, it is clear that the time of large manufacturing employment will not come back because of reshoring. The smaller gap in wage costs between developed and emerging economies will most likely not be enough to move the most labour intensive activities (i.e. the ones with most employment potential) back 'home'. What about the expectation that increased automation will make the labour cost advantage of emerging countries even smaller with labour costs representing a decreasing share in total costs? This may indeed favour reshoring but at the same time, automation typically reduces the labour content of production and manufacturing, hence the job impact of reshoring will also be smaller. This is indeed what the empirical results presented above show: reshoring to OECD economies is particularly observed in terms of capital investments –automation could be one explanation for these extra investments, rather than in employment.

In general, it is expected that production will create fewer jobs in the future and that these jobs will increasingly be high-skilled. UK research has suggested that with rising productivity in manufacturing, reshored jobs were not in large numbers and were more likely to be highly skilled, technical and well paid (Bailey and De Propris, 2014). Reshored activities will not necessarily create a large number of jobs for lower skilled people as production will become more automated, digital, intelligent and technology intensive. The widening inequality on labour markets risks further wage increases for lower- and medium-skilled workers stabilising or even declining, while these of (some) higher-skilled people increasing in future production.

All this does not mean that policy makers should discard the phenomenon of reshoring as unimportant, but it clearly calls for qualified thinking on this new phenomenon. Reshoring can indeed help to re-invigorate manufacturing industries in OECD economies when the reshoring of individual companies develops into the reshoring of whole value and supply chains. Another positive factor is that the reshoring debate can help to put the attractiveness of countries for investment higher on the policy agenda. Equally positive is that it is no longer only about countries' attractiveness for foreign MNEs for which competition has increased in the past decade.

The decision to implement specific reshoring policies - the discussion above has shown that such policies can range from the mere generation and supply of information to providing financial support - depends on the national context but should be informed by realistic expectations regarding the possible benefits of reshoring. A policy regarding reshoring should be part of the broader framework for stimulating business investment and safeguarding (manufacturing) competitiveness of OECD economies. In that respect it is also important to stress that discretionary measures to support reshoring - in particular direct financial/tax support - may give rise to unfair competition: for example, why should a company receive extra support that another company does not get, just because the first company has offshored activities in the past?[20]

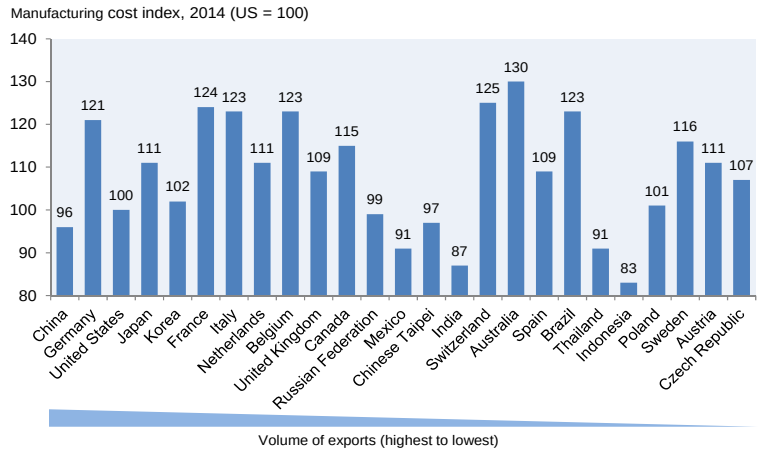
4.3 Is 'regional' the new 'global'?

The organisation of production in long and complex GVCs to take advantage of optimal location factors across the globe has shown its advantages in terms of productivity, efficiency, scale economies, etc. On the other hand, the length and complexity of these international production networks have exposed companies to large levels of supply risk in the event of adverse shocks and has made them less agile to respond to changing preferences in consumer demand. After years of large-scale offshoring and outsourcing, companies increasingly look for more diversified sourcing strategies and consider more options in structuring their production processes. Offshoring, nearshoring, backshoring, onshoring all feature in these new sourcing strategies; instead of focusing solely on reshoring, McKinsey (2014) prefers to call this development "nextshoring", while others refer to "right-" or "bestshoring" to describe the changes in location behaviour by companies.

As a result, a regional rebalancing of (some) GVCs seems to be on the horizon which will make the topography of production more varied and distributed. In addition to global hubs in GVCs, production is expected to be become increasingly concentrated in regional/local hubs closer to end markets both in developed and emerging economies. In designing the right policies for future production and manufacturing, policy makers will need to take into account these broader developments on the regional as well as the global scale.

First, changes in relative production costs across countries over the past decade may result in production and manufacturing becoming increasingly regional. In comparing the manufacturing cost in the top 25 export economies, the Boston Consulting Group demonstrated that costs have risen very differently across countries. For example, manufacturing costs in emerging countries like China, Brazil but also Eastern European countries have increased much more than in the United States and the United Kingdom, with the latter country becoming the lowest-cost manufacturer in Western Europe (Figure 8). The traditional distinction between the low-cost advantage of emerging economies and the high-cost character of developed economies has become increasingly blurred. Basically low-cost locations can be found in all regions across the globe and this will favour (regional) production closer to (regional) markets, as companies aim for a higher responsiveness to unexpected events within their value chains.

Figure 8. Manufacturing cost index of top 25 export economies, 2014 (United States = 100)



Source: The Boston Consulting Group (2014).

Second, as cost arbitrage becomes more difficult for companies, demand factors become increasingly important in future location decisions. While before the focus was (exclusively) on attaining the lowest

cost possible, companies want to respond more quickly to changes in demand and consumer preferences. The reconfiguration of supply chains with more localised production centres and to some extent duplication between different production centres will increase responsiveness when demand is volatile. A shift from a push-driven model to a pull-driven model with the consumer becoming much more of a driver in the manufacturing value chain is even being predicted; as economies and societies are expected to increasingly shift from mass markets to millions of niche markets[21], a growing demand for customised products is likely. Related to that, consumer awareness for the negative effects of the transport flows of intermediates and final products within GVCs is growing. As consumer demand for sustainable products is growing, regional production close to markets onshoring helps reduce logistics costs and carbon footprints.

It can be expected that the imperative of locating production in the proximity of demand will also impact the location of innovation. With the growing importance of more customised products, company performance will also become more dependent on the speed of innovation. This is not only about identifying and meeting local needs, but also the ability to adapt R&D, design, etc. to fluctuating conditions. Proximity between innovation and production/manufacturing will be key to shorten lead times and maximise feedback effects between production and R&D. Also the bundling of manufacturing and services is important in this respect as services are increasingly used to customise products.

As companies will need to serve highly diverse markets, innovation will become more diverse and dispersed as products for developed markets are not necessarily apt for emerging markets. Emerging economies will no longer only serve as centres of supply but also as centres of demand. The increasing wages and purchasing power give rise to a new class of consumers which differ from the 'traditional' consumer in the saturated markets in developed countries. However, it is not clear how far this dispersion of R&D and innovation will go and if it will move beyond the innovation to adapt products and processes to local needs. As discussed above, there are important forces at work that concentrate innovation at companies' headquarters (e.g. loss of IP).

Third, the advent of new technologies will make regional value chains more feasible. For example, the investment in industrial robots will make production possible also in higher (labour) cost environments. Advanced robotics will increasingly allow for the substitution of labour in more tasks as smarter robots are expected to make labour costs in the total cost structure of new products and production processes less important, hence making the offshoring of manufacturing activities to low labour cost regions less attractive.

ICT technologies will not only result in important efficiency and productivity gains, but also increase the responsiveness of companies to changing conditions, allow the integration of product design with manufacturing processes, change the delivery of products and services, etc. Rapidly reprogrammable machines should be able to manufacture multiple products according to different specifications based on digital modelling and simulation capabilities. The Internet of Things which is linked to advances in big data, cloud computing, machine-to-machine (M2M) communication, and advanced sensors and actuators will help companies to produce and innovate more efficiently while at the same time reduce the 'time to market'.

In general, growing digitalisation will drastically change production and manufacturing of the future thereby supporting a trend towards more regional value chains. Today manufacturers produce rather standardised and commoditised products as scale economies do not allow for different product specifications. It can be expected that digitalisation will make the scale of economies relatively less important in certain industries. By lowering the cost of producing smaller batches of a wider variety, regional production will become (more) economically feasible. Emerging technologies such as additive manufacturing, new materials, ICT and nanotechnology will reduce the cost of small-volume production and allow for more personalised products (and even 'manufacturing on-demand'). Additive manufacturing such as 3-D printing for example builds products from successive layers of material and allows products to be tailored to individual customers' needs.

It is clear that these changes in cost structures, demand factors and technologies will have differential effects across industries and products. While mass-produced products will continue to be manufactured according to more traditional - albeit more automated and flexible - methods, new ways of manufacturing will gradually enter the production methods of more advanced products. For some products low (labour) costs and long value chains will continue to form important competitive advantages for some time, but for other goods and services the production will become increasingly organised at the more regional level.

NOTES

1 In contrast, insourcing refers to the decision of companies to bring activities back in-house where they were before performed by independent suppliers.

2 BCG (2014) provides however some calculations/estimations that the gap between the United States and China also in unit labour costs has narrowed considerably.

3 The metaphor of the flying geese has often been used to describe industrial upgrading in Asia. One economy (e.g. Japan), like the first goose in a V-shaped formation, leads other economies (e.g. Korea) toward industrialisation, passing older technologies down to followers as it moves into newer ones. This process still seems to be happening, with countries such as Bangladesh, Cambodia and Viet Nam now becoming engaged in the textile and garment business previously undertaken inChina.

4 A separate project on the importance of co-location between innovation and production is currently underway.

5 The European Manufacturing Survey investigates technological and non-technological innovation in European industry. In contrast to the Community Innovation Survey, it is more focused on technology diffusion and organisational innovation (including offshoring and outsourcing, and recent reshoring). The survey is organised by a consortium of research institutes and universities and takes place every three years; more than 3 500 firms in 13 EU countries participated in the last survey in 2012.

6 Additional surveys for the Netherlands (TNS NIPO, Panteia, Nyenrode Business University) have reported even smaller numbers of reshoring companies (about 1 to 2%).

7 Additional surveys for the Netherlands (TNS NIPO, Panteia, Nyenrode Business University) have reported even smaller numbers of reshoring companies (about 1 to 2%).

8 In a follow up study “The Shifting Economics of Global Manufacturing”, the Boston Consulting Group (2014) included other emerging countries such as Brazil, India,, Russia, etc. in their detailed cost analysis.

9 This is most likely related to the small size of EU countries relative to the United States.

10 A similar rationale is used in constructing AT Kearney’s Reshoring Index, which compares US imports from abroad with US-based production.

11 While the AMNE database contains information on inward and outward investment by MNEs of 25 countries, the information on headquarters is much more limited and is only available for a limited number of countries.

12 ORBIS is not necessarily representative of the underlying business population within a country while coverage varies over countries and time without any clear patterns (Bravo-Biosca, Criscuolo and Menon, 2013)

13 The World Bank classification was used to classify economies as low-, middle- or high-income. Low-income economies are defined as those with a Gross National Income (GNI) per capita, calculated

using the World Bank Atlas method, of USD 1 045 or less in 2014; middle-income economies are those with a GNI per capita of more than $1 045 but less than $12 736.

14 This growth index has the nice property of being size-neutral and of being bounded between -2 and +2. For a detailed discussion of the properties of the growth index, see Haltiwanger, Jarmin and Miranda (2013).

15 The group definition is fixed over time, therefore the component that is allowed to change over time is only the effect on the outcome variable of being part of a MNE group.

16 Based on the sample of firms with at least 10 employees on average over the 2003-2010 period; more recent data are not available for the moment but will be included in the future in order to identify more recent effects of reshoring.

17 Since the analysis concerns the regression of the yearly growth rate of fixed assets/employment of MNE affiliates in the home countries on the yearly growth rate of aggregate fixed assets/employment of affiliates in the same group, the sample is now limited to MNE affiliates and is therefore significantly reduced.

18 Given the non-representative coverage of the database used for the analysis, it is not possible to quantify the extent of the phenomenon in terms of amount of investment or number of groups involved.

19 Some argue that the employment impact of reshoring will be limited as the original effects of offshoring on employment in home countries were found to be rather small. This is however not without discussion as several studies have shown that the employment effects of offshoring typically differ largely dependent on the motives of offshoring and the activities that have been offshored.

20 The rationale for granting (financial) incentives to foreign investors is typically based on the advantages these companies bring (in terms, of technology, knowledge, training, etc.) and their potential spillovers to the domestic economy. Such policy measures are however also not without discussion as the empirical evidence on spillovers is rather mixed (OECD, 2011).

21 For example, Anderson (2006) in his theory of ‘The Long Tail’ describes how economies will increasingly be shifting away from a focus on a relatively small number of "hits" (mainstream products and markets) at the head of the demand curve and toward a huge number of niches in the tail.

REFERENCES

Akamatsu, K. (1961), "A Theory of Unbalanced Growth in the World Economy", *Weltwirstschaftliches Archiv*, Vol. 86, pp. 196-217.

Anderson, C. (2006), *The Long Tail.*

AT Kearney (2014), *The Truth About Reshoring: Not What It's Cracked Up to Be!*

Bailey, D. and L. De Propris (2014), Manufacturing Reshoring and Its Limits: the UK Automotive Case, *Cambridge Journal of Regions, Economy and Society*, Volume 7 (3), pp. 379-395.

Blinder, A.S. (2007). Offshoring: Big Deal, or Business as Usual?, *CEPS Working Paper*, No. 149, June 2007.

Bogar, M.A. and M.D. Holmes (2013), *Made in Mexico, An Increasingly Viable Alternative to Chinese Outsourcing*, The Boston Company, June 2013.

Bravo-Biosca, A., C. Criscuolo and C. Menon (2013), What Drives the Dynamics of Business Growth?, *OECD Science, Technology and Industry Policy Papers*, No. 1, OECD Publishing.

Cranfield University (2015), *An Analysis of the UK's Capability to Reshore Production*, A White Paper by Cranfield University.

Dachs, B. and C. Zanker (2014), Backshoring of Production Activities in European Manufacturing, *European Manufacturing Survey Bulletin*, Number 3, December 2014.

De Backer, K., Desnoyers-James, I. and L. Moussiegt (2015), Manufacturing or Services? – That Is (Not) the Question, OECD Science, Technology and Industry Policy Paper, No. 19, OECD, Paris.

Desai, M.A., C. Foley and J.R. Hines Jr. (2009), Domestic Effects of the Foreign Activities of US Multinationals, *American Economic Journal: Economic Policy*, Vol. 1 (1), pp. 181-203.

EEF – The Manufacturers' Organisation (2013), *Backing Britain. A Manufacturing Base for the Future*, London.

Ellram, L.M. (2013), Off-Shoring, reshoring and the Manufacturing Location decision, *Journal of Supply Chain Management*, Vol. 49 (2), pp. 3-5.

Fratocchi, L., C. Di Mauro, P. Barbieri, G. Nassimbeni and A. Zanoni (2014), When Manufacturing Moves Back: Concepts and Questions, *Journal of Purchasing & Supply Management*, Vol. 20, pp. 54-59.

Fratocchi, L., A. Ancari, P. Barbieri, C. Di Mauro, A. Troiano, M. Vgnoli and A. Zanoni (2015), Manufacturing Back- and Near-Reshoring: A Comparison of European and North American Evidence in J. Stentoft, G. Vastag and A. Paula (eds), '*Research in the Decision Sciences for Innovations in Global Supply Chain Networks: Best Papers from the 2014 Annual Conference'*

Goldman Sachs (2013), The US Manufacturing Renaissance: Fact or Fiction?, *US Economics Analyst*, Issue No. 13/12.

Haltiwanger, J., R.S. Jarmin and J. Miranda (2013), Who Creates Jobs? Small Versus Large Versus Young, *The Review of Economics and Statistics*, Vol. 95(2), pp. 347-361.

Holz, R. (2009), *An Investigation into Off-Shoring and Back-Shoring in the German Automotive Industry*, PhD-thesis, University of Wales, Swansea.

Kinkel, S. (2014), Future and Impact of Backshoring – Some Conclusions from 15 Years of Research on German Practices, *Journal of Purchasing & Supply Management*, Vol. 20, pp. 63-65.

Kinkel, S. and S. Maloca (2009), Drivers and Antecedents of Manufacturing Offshoring and Backshoring – A German Perspective, *Journal of Purchasing & Supply Management*, Vol. 15, pp. 154-165.

Klier (2015), The growing importance of Mexico in North America's Auto Production, *Chicago Fed Letter*, The Federal Reserve Bank of Chicago, May 2013, Number 310.

Manufacturing Advisory Science (2013), *Quarterly Survey Results Q2 2013*, Available online at: http://www.mymas.org/news/mas-barometer-revealsquality-cost-and-delivery-are-prime-drivers-to-moveproduction

Mckinsey&Company (2005), Seizing the Emerging Global Labor Market, *The McKinsey Quarterly* 2005, No. 3.

McKinsey&Company (2014), Next-Shoring: A CEO's Guide, *The McKinsey Quarterly*, January 2014.

Morgan Stanley (2013), US Manufacturing Renaissance: Is It a Masterpiece or a (Head) Fake? *Morgan Stanley Blue Paper*, April 29, 2013.

Nager, A. and R.D. Atkinson (2015), The Myth of America's Manufacturing Renaissance: The Real State of U.S. Manufacturing, *The Information Technology and Innovation Foundation*, Jan. 12, 2015.

OECD (2011), *Attractiveness for Innovation: Location Factors for International Investment*, OECD Publishing, Paris.

OECD (2013), *Interconnected Economies: Benefitting from Global Value Chains*, OECD Publishing, Paris.

OECD (2015), *Robots in Manufacturing: A First Look at the Evidence*, forthcoming, OECD Publishing, Paris.

Ozawa, T. (2008), "History Repeats Itself: Evolutionary Structural Change and TNC's Involvement in Infrastructure OverSeas, Flying Geese Style", *Working Paper* 261, Centre on Japanese Economy and Business, Columbia Business School.

Pilat, D., A. Cimper, K. Olsen and C. Webb (2006), The Changing Nature of Manufacturing in OECD Economies, Science Technology and Industry Working Paper 2006/9, OECD, Paris

Pisano, G. and S. Shih (2009), Restoring American Competitiveness, *Harvard Business Review*, July-August 2009.

Porter, M.E. and J.W Rivkin (2012), Choosing the United States, *Harvard Business Review*, March 2012.

PricewaterhouseCoopers - PWC (2014), *Reshoring – A New Direction for the UK Economy*, London.

The Boston Consulting Group (2011), *Made In America Again, Why Manufacturing Will Return to the U.S.*

The Boston Consulting Group (2013), *Behind the American Export Surge: The U.S. as One of the Developed World's Lowest-Cost Manufacturers*.

The Boston Consulting Group (2014), *The Shifting Economics of Global Manufacturing, How Cost Competitiveness Is Changing Worldwide*.

The Hackett Group (2012), *Reshoring Global Manufacturing: Myths and Realities*.

The Reshoring Initiative (2015), *Reshoring Initiative Data Report*: Reshoring and FDI Boost US Manufacturing in 2014.

The White House (2012), *Blueprint for an America Built to Last*, Washington DC.

World Economic Forum (2012), *The Future of Manufacturing, Opportunities To Drive Economic Growth*, Geneva.