Service Export Sophistication and Europe's New Growth Model

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Abstract

Technology has changed the nature of service activities and made them more productive, tradable and fragmented in the global supply chain. Has Europe's growth been benefiting from the ongoing globalization of services? Services dominate growth in EU-15 countries and, to a lesser extent, in New Member States (NMS) and Accession (ACC) countries. Except in the ACC

region, Europe has maintained specialization in service exports. Service productivity, tradability, and exports of modern services are high in EU-15, growing fast in NMS while at a lower pace in ACC. Service export sophistication is important for growth across the region, but especially in NMS.

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SERVICE EXPORT SOPHISTICATION AND EUROPE'S NEW GROWTH MODEL

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1 INTRODUCTION

Europe is the world's most integrated, sophisticated and largest commercial services exporter. The region accounts for more than half of global services trade. Europe's economic growth is also increasingly services driven. The world in the mid-1990s saw two seemingly separate but related developments: the revolution in information and communication technology; and the rapid developments in those global forces often referred to as the 3Ts—technology, transportability, and tradability (Ghani and Kharas, 2010). Those two developments had a profound impact on the nature, productivity, and tradability of services. They resulted in rapid growth of what can be called “modern impersonal progressive services,” such as information technology, business processing services, education services, entertainment, production services, designing, marketing and the growing internationalization of innovation. These services differ significantly from traditional personal services that demand face-to-face interaction. A rising number of services can now be stored and traded digitally (“intangible goods”) similar to manufacturing goods. These sophisticated service-exporting sectors provide for broad based growth and an opportunity for relatively innovative, high-tech job creation. The purpose of this paper is to better understand the developments of service exports sophistication in Europe and to what extent different groups of countries have taken advantage of the globalization of services.

Previous literature shows that the performance of the service sector across European countries is heterogeneous, despite patterns of convergence. The contribution of services to GDP growth for Eastern Europe and Central Asia was below 50 percent of GDP in 1990. Since then however it has been catching up, with the Baltic countries making the most significant progress (over 60 percent of GDP growth). This post-transition shift towards services within Eastern and Central Europe has contributed to an increase in aggregated productivity (World Bank, 2008). Furthermore, countries in Eastern and Central Europe that made progress in terms of productivity-enhancing service reforms, such as reforms toward financial and infrastructure services, have attracted more FDI and had higher economic growth (Eschenbach and Hoekman 2006). The difference in the service productivity gap between EU-15 and Eastern Europe, including the Baltics, is shrinking due to the latter groups catching up (Fernandes 2009). On the sector-level we see that service sub-sectors that have achieved higher results in terms of policy reforms have exhibit higher growth. This effect is stronger for sub-sectors further from the technological frontier, suggesting liberalization of the service sector can affect the speed of catching up. Moreover, Fernandes (2009) shows that service productivity growth has spillover effects in the rest of the economy.¹ However, these facts beg the question how far specialization in services can go in Europe, given the globalization of services and competition not least from Asia. The development of modern service exports has changed the directions of global trade, challenging Central and Eastern Europe as an effective competitor of Asia. For example, geographic proximity is important for construction services but is negligible for computer-related services (Kandilov and Grennes, 2010). However, the relative quality of legal institutions and single market efficiency is important for trade across a range of both traditional

¹ The external effects on the rest of the economy are different for different service categories, presumably larger for services with higher sophistication.

and modern services.

There are two aspects of this new channel for growth – specialization within service exports and the sophistication of service exports – of which the latter has been less studied. A key component of economic development and the growth process is an increase in the sophistication of a country’s production (of good and services), and in particular of its exports. What a country produces and exports matters for growth: ‘... not all goods are alike in terms of their consequences for economic performance. Specializing in some products will bring higher growth than specializing in others’ (Hausmann et al, 2007, henceforth HHR; see also Lall et al, 2005). Some products may yield greater knowledge spillovers, have a greater potential for backward and forward linkages, or offer an easier pathway toward other products with such characteristics. Ultimately, some products are more sophisticated, in the sense that they are associated with higher productivity levels, and HHR shows that those countries that latch on to such products will perform better. To examine this phenomenon for service exports, Mishra, Lundstrom, and Anand (2011) created an index for service exports sophistication, ‘Service EXPY’. The empirical results suggest that exports’ quality in services is positively associated with economic growth. The results further suggest that this phenomenon is growing in importance over time. While growth in manufacturing is still an important track for many countries, service exports and an increase in their sophistication may be an additional or even alternative channel for sustained high growth.

The paper begins with motivating the analysis by showing some stylized facts in Section 2, concluding that services dominate growth in Europe and that service productivity, tradability, exports of modern services are high in EU-15, growing fast in NMS while at a lower pace in ACC. In Section 3 we start by presenting the methodology of the Service EXPY index and then show the components and evolution of service export sophistication across European countries. We present regression results in Section 4, demonstrating the link between service export sophistication and growth, especially strong in NMS. Section 5 concludes that service export sophistication will continue playing a critical role in Europe’s future growth.

2 STYLIZED FACTS

This section will present some stylized facts in terms of services, trade and growth in Europe, in relation to the rest of the World. The idea is to capture the growing importance of services and its changing nature, and to what extent Europe has followed these trends. We present the result for three groups: EU-15, EU New Member States (NMS) and EU Accession countries (ACC), as defined in Table 1.

Table 1: Country groups: EU-15, NMS and ACC.

	Countries
EU-15	Belgium, Greece, Luxembourg, Denmark, Spain, Netherlands, Germany, France, Portugal, Ireland, Italy, United Kingdom, Austria, Finland, Sweden.
NMS (EU New member states)	Poland, Czech Republic, Cyprus, Latvia, Lithuania, Slovenia, Estonia, Slovakia, Hungary, Malta, Bulgaria and Romania.
ACC (EU Accession countries)	Albania, Croatia, Macedonia, Montenegro and Turkey

Note: These groups stay the same throughout the analysis even though some of them have changed their formal country group categories during the time period studied.

To start out we see that the share of service value added as a percentage of GDP is very high in EU-15 and NMS, while it is lower in ACC (Figure 1, see also Figures A1-3 in the Appendix for reference to specific countries). This is expected given their income levels, but many NMS countries have even higher than expected service shares and ACC lower than expected. Figure 2 (and Figures A4-6) shows GDP growth - controlling for initial income levels and initial levels of services value added as a share of GDP - for 127 countries over 2000-07, against service value added growth. EU-15 grew slower than the other groups, both in terms of overall growth and growth in service value added, which partly is explained by a catching up effect in NMS and ACC that start out at lower initial levels. However, most European countries have a higher than expected GDP growth than suggested by their service value added growth. Perhaps there is a higher share of services being exported or the sophistication is higher, resulting in a larger growth impact of their service value added share?

Figure 1. Share of service value added as a percentage of GDP vs GDP per capita, 2009.

Source: World Development Indicators, World Bank, 2010 and authors' calculations.

Figure 2. GDP growth versus service value added growth, 2000-07.

Source: World Development Indicators, World Bank, 2010 and authors' calculations.

To better understand the link between services and growth in Europe we will look closer into the following questions: (1) Is there a growing importance of services in growth? (2) Is productivity of services increasing? (3) Is there an increasing tradability of services? (4) Is Europe's service exports evolving from traditional to modern? (5) Does Europe have specialization in service exports? (6) What are the trends in terms of direction of Europe's service exports?

2.1 The growing importance of services for general growth

The sectoral contribution of services to GDP growth has risen for most countries in the world and the services share in global production has increased considerably. Looking specifically at EU-15, we see that it has a very high level of service domination in recent growth (82 percent), similar to USA and other advanced countries (see Figure 3, and Figures A7-9 for specific countries). As shown earlier, growth in services is somewhat lower than expected, even when taking the relatively low GDP growth in EU-15 into account, but the share of services in GDP is so significant that it is still the dominating sector for overall growth. Only with the exception of Finland and Germany, growth in EU-15 is increasingly service dominated when comparing the two periods, 1995-99 and 2000-08. Expectedly, growth in NMS and ACC is less service driven but again, the trend is an increasing dominance of services for growth – the contribution rose from 50 to 60 percent in NMS and 49 to 64 percent in ACC. Maybe more surprisingly, ACC is – albeit only slightly - more services driven than NMS. However, the next question is what type of services Europe and the different country groups are producing and in particular exporting. We will see that the type of service growth in ACC is very different.

Figure 3: Sectoral contribution to growth in 1995-99 and 2000-08.

Source: World Development Indicators, World Bank, 2010 and authors' calculations.

2.2 Services have become more productive

Service productivity is many times higher in EU-15 than in NMS and ACC (see Table 2). This may either be explained by a more efficient service structure and work force in EU-15, but also by the type of services produced in EU-15. Service productivity has increased globally over the period 00-07, even for already high productivity countries such as EU-15. NMS's growth in service productivity is high, while ACC is only slowly catching up with higher income countries.

Table 2. Productivity levels and growth in the service sector, 2000-2007.

	Productivity level in service sector, 2007	Growth in service productivity, 2000-07
EU-15	54,538	7%
NMS	15,616	23%
ACC	14,009	15%
High income countries	59,135	7%
USA	74,678	9%

Note: For ACC the period chosen is 2002-07. Productivity in USD per worker.

Source: World Development Indicators, World Bank. 2011.

2.3 Services are becoming more tradable

No more than 10 percent of service value added is currently exported, which could be compared to 90 percent of goods exports in industrial value added. However, growth in service tradability has been considerable (Mishra, Lundstrom and Anand, 2011). There are now a host of new services that can be traded, and more countries are taking advantage of the globalization of services. NMS has been the very successful in growing its service exports, especially since mid-2000s (see Figure 4). It is still far from star performers such as Indian and China but is doing well compared to the rest of the world. EU-15 has also made progress while ACC is falling behind the rest of the world.

Figure 4: Development of Service Export (1998=100).

Source: Balance of Payments, IMF. 2011.

Figure 5: Service exports as a share of service value added (%), 1990-2007.

Source: Balance of Payments, IMF and World Development Indicators, World Bank. 2011.

In Figure 5, we present the development of services tradability (as proxied by service exports in service value added) for EU-15, NMS and ACC, between 1990 and 2007.² First, it is worth noticing that they all start off at about the same level around 1990. Service tradability in EU-15 has then followed a smooth increasing trend and traded services of a value equal to about 15 percent of its service value added in 2007. Interestingly, the NMS and ACC doubled their tradability in the early 1990s. However, this may be explained by a very limited service sector value added after the transition. Given the relatively limited opportunities domestically for these countries at that moment, an expansion of exported services had a large effect on this tradability measure. Since the mid-1990s service tradability has been more or less constant in NMS at as high as 17 percent in 2007, while service tradability in ACC has decreased to about 11 percent. Again, this decrease in ACC is more likely to be related to a domestic service expansion, such as in construction, rather than a drop in service exports.³

2.4 Evolution of services from traditional to modern

The 3T's have changed the very nature of services from traditional to modern. These modern services (such as financial services, information processing services, business services, computer and information services etc.), which are digitally tradable and impersonal ("intangible goods"), take advantage of ICT, globalization, and scale of economies. However, there is also ample scope for traditional service (such as tourism, education, musicians, entertainment production media etc. which require face to face contact) to absorb productivity gains, knowledge spillovers, tradability and fragmentation from ICT, so the previous patterns we have seen does not necessarily mean that there has been a move from traditional to modern services.

Figure 6 shows how annual growth in modern and traditional services differ for the period 2000-08. Modern services have been growing faster as a world average and EU-15 and NMS both follow the global pattern. NMS is growing faster than the rest of Europe in modern services, as well as traditional services. ACC are growing their traditional services, but modern services are even contracting. Looking back at Figure 3 on the higher contribution of services to growth in ACC than NMS we now suspect that this growth is mainly in traditional services resulting in the low productivity growth for ACC presented in Table 1.

² Compare with goods tradability in Figure A10.

³ This jump in early 1990s did not happen for NMS and ACC when looking at goods tradability as domestic production (see Fig A10 in the Appendix).

Figure 6: Annual growth in modern and traditional services, 2000-08.

Notes: Modern Services include communication, insurance, finance, computer & information, royalties and license fees and other business services. Traditional service are Transport, Travel, Construction, Personal, cultural and recreational services.

2.5 Europe's comparative advantage in service exports

Next we study the revealed comparative advantage (RCA), as defined by the share of a particular export in a country's export basket compared to the share of that export in the global export basket, in the three European groups.⁴ EU-15 has RCA in services and the gap between goods and services is increasing. NMS has also a comparative advantage in services (see Figure 7). The gap to goods was large in the 1990s but has now decreased to the same level as in EU-15. ACC did have a comparative advantage in services until early 2000s when it dropped and has since had a comparative disadvantage in services.

Figure 7: Revealed comparative advantage in services and goods, for EU-15, NMS and ACC, 1990-2007.

Source: Authors' calculation using Balance of Payments, IMF. 2011.

⁴ Formally, the RCA index for country C and product J is defined as: $RCA = (E_{CJ} / E_{CT}) / (E_{WJ} / E_{WT})$, where E denotes exports, T denotes all products, and W denotes the world.

2.6 The direction of European service trade

The nature of modern service exports has affected the direction of global trade and the global centers of growth. This raises the question to what extent Central and Eastern Europe can be an effective competitor to Asia. For example, geographic proximity is important for construction services but is negligible for computer-related services (Kandilov and Grennes, 2010). We are here interested in looking at the direction of commercial services exports in modern and traditional activities. Given the limitation of such data, we compare modern and traditional service exports to EU-15 from India, EU-15 itself and NMS, in 2002 and 2004. As seen in Figure 8, modern services exports from India to EU-15 grew rapidly whereas the growth in traditional and construction services shrunk. In the case of exports from NMS to EU-15 both modern and traditional service exports have increased, but traditional more so. No hard conclusions should be made as we do not have recent enough data, but at least in the beginning of the 2000s, India seems to have made a more radical change in their exports to EU-15 following the new opportunities in modern service exports. Given NMS's geographical proximity, it most likely made sense to first reap the benefits from specializing in traditional service exports to EU-15, but future services growth will more likely lie in further developing modern service exports.

Figure 8: Share of commercial modern and traditional service exports to EU-15, by origin, in 2002 and 2004 [LHS], and Growth from 2002-04 (%) [RHS].

Source: EuroStat, Direction of Trade Statistics. 2011.

In summary, the stylized facts show that services dominate growth in EU-15 countries and to a lesser extent in NMS and ACC. Service productivity is many times higher in EU-15 than in the other two groups but at least NMS are starting to catch up. Highest growth in “service tradability” is recorded for NMS followed by EU-15 while ACC are falling behind. Both EU-15 and NMS have revealed comparative advantage in services, but this is not the case for ACC. Moreover, growth in modern services outweigh growth in traditional services in EU-15 and NMS, while modern services are even shrinking in ACC. Hence, EU-15 and NMS do seem to change the nature of their services while for ACC - even though the contribution of services to growth is strong in ACC - it seems to be less due to an improved quality of services. We next turn to the sophistication of services. After a short description of the methodology, we will present some descriptive statistics for Europe that may help us further understand the patterns in Europe that we have just observed.

3 SERVICE EXPORT SOPHISTICATION

3.1 The Service Export Sophistication Methodology

We build upon the Hausmann, Hwang and Rodrik framework, which uses a goods export sophistication measure *Goods EXPY* as a proxy for the most productive set of goods the country can produce at a given time. They argue that export data is the best way to reveal this production frontier as we can expect countries to export those goods in which it is most productive. Along the same reasoning and as described below we will construct a *Service EXPY* to proxy the service production frontier of a country, by and large following the methodology developed by HHR.

We start by constructing so-called *PRODY*'s for each category of goods exports, reflecting the income/productivity level associated with each good, and we do the same for each category of services. $PRODY_j$ is the income value associated with the service j , and is constructed by using the service export (x) share of a country i in world's export of service j , divided by the sum of shares of j in world exports of j across all countries exporting that service.⁵ These ratios are multiplied by the exporting countries' respective per capita income level (Y) and the result is summed up across all countries. In other words, the *PRODY* becomes the weighted average of per capita GDPs, where the weights represent the revealed comparative advantage in service j for each country.⁶ *PRODY*s are constructed for each service category, for each year of available data, and are by construction the same for all countries.

$$PRODY_j = \sum_i \frac{\frac{x_{ij}}{X_i}}{\sum_i \frac{x_{ij}}{X_i}} Y_i$$

EXPY is then the weighted income value of services exported by a country, computed as the sum of *PRODY*s using as weights the share of the particular service in the country's total service export basket. *EXPY*s are constructed for each country and for each year with available data.

$$EXPY_i = \sum_j \frac{x_{ij}}{X_i} PRODY_j$$

The trade data come from the IMF Balance of Payments statistics, which has data available for over 190 countries from 1990 to 2007. Due to data being reported inconsistently on service exports, we end up with a sample of approximately 100 countries 1990 to 2007. GDP per capita data is taken from the World Bank Indicators database. Before describing the *service EXPY* we would like to discuss two of its characteristics that differ from preexisting goods index – the need for *dynamic PRODY*s and the high level of aggregation.

First, the *Goods EXPY* was constructed using *static PRODY*s (the *PRODY* for each good is held constant at the average value 1999-2001). This means that any increase in *Goods EXPY*

⁵ $\frac{x_{ij}}{X_i}$ is hence the value-added share of commodity j in the country's overall export basket.

⁶ The rationale for using revealed comparative advantages as weights is to control for country size when ranking the services.

measures a country's jump from a low *PRODY* product to a high *PRODY* product (that is the share of high *PRODY* good in the export basket increased). However, in the case of *Service EXPY* we will use what we call *dynamic PRODYs*, i.e. the *PRODY* values of a certain service export may vary year to year. Hence, an increase in *dynamic EXPY* can be due to (i) an increase in the *PRODY* of a service and/or (ii) an increase in the share of high *PRODY* products in the export basket. This is important for two reasons. First, it gives us an opportunity to capture the effect of changes in *PRODY* on *EXPY*. We do not only want to measure the fact that countries are getting more and more engaged in higher value service export, but also that the service exports themselves are increasing in sophistication due to improvements in ICT and 3T's. In fact many richer and high-skilled countries are engaged in service exports boosting the *PRODYs* of some service export categories.⁷ Secondly, since the data is much less disaggregated for services, using *static PRODY* fails to capture the movements to higher *PRODY* service exports that are only sub-categories of the broader categories captured by the Balance of Payments data.

A second characteristic, and just mentioned, is that service export data are not collected in the same detailed manner as goods export data. This means we will end up with only ten broad categories of service exports. They are different enough to make the analysis interesting, but it of course limits the extent to which we can understand the mechanisms in play. For example, if a country – within the same service export category - move from a sub-category of services with presumed low *PRODY*, to a sub-category of services with presumed high *PRODY* that would not show up at all in the *static EXPY*. As mentioned, the *dynamic EXPY* would however capture this as it allows for the *PRODYs* to change over time. Unfortunately though, even when comparing the *static EXPY* and the *dynamic EXPY*, due to the high aggregation of data it would be impossible to know if the increase in the *dynamic EXPY* was created by a higher share of high *PRODY* services in the basket or an increase in the *PRODYs* themselves as the *static EXPY* fails to capture changes in the subcategories of the export basket.

3.2 Descriptive Statistics

The *PRODYs* for each service category over time are presented in Table 3. The first four categories represent the traditional services (transportation, travel, communication and construction), while the last rows represent the modern services (insurance, financial, computer & information, royalties & license fees, other business services, and personal, cultural & recreational services). See the Appendix for a more detailed description of what is measured within each category. Our focus herein is on commercial service exports; therefore we do not include government services in our sample of measurement of *Service EXPY*.⁸ In general, the

⁷ One potential problem with the *dynamic PRODY* is that as developing countries starts getting engaged in the high *PRODY* services, the *PRODYs* themselves decreases due to the lower income of developing countries. However, at this point, the share of service exports of high *PRODY* value from developing countries is still too small to have an overall impact. The impact of a high *PRODY* service in the export basket of a small country can be significant for that country's *EXPY*, but the high *PRODY* export from that small country will not have an impact on the overall *PRODY* of that service, in the same sense that a small firm is a price taker in a large market.

⁸ We would like to highlight limitations to the interpretation of service exports and *Service EXPY* due to the way data is registered. First, the level of aggregation due to broad categories already mentioned is sometimes exacerbated by the further aggregation in what the countries report. Secondly, even though there have been no productivity improvements in a particular

PRODY of the modern services are higher and their growth has been stronger, despite the higher initial levels. The table also shows export share of the different categories for the world average and the three European groups. EU-15 has 43 percent of its export basket in modern services, while NMS has 26 percent and ACC only 11 percent, compared to the world average of 21 percent. As can be seen in Figure 9, due to the high *PRODYs* for modern services, EU-15 *EXPY* is to a large extent explained by the high share of modern services, especially financial services. For NMS the *EXPY* source is more evenly spread but still dominated by traditional services. ACC's *EXPY* is to a large extent explained by traditional services.

Table 3: *PRODYs*, 1990-95/1996-99/2000-07 and *PRODY* value and share by category by country group.

	World			2007 SERVICE EXPORT SHARE			
	1990-95	1996-99	2000-07	World	EU-15	NMS	ACC
TRADITIONAL SERVICES							
Transportation	8,161	9,629	11,990	21%	19%	32%	18%
Travel	7,433	7,851	8,999	41%	22%	30%	58%
Communication	6,261	6,320	7,584	4%	2%	3%	4%
Construction	14,510	10,534	10,464	2%	2%	3%	3%
Insurance	8,167	11,306	13,630	2%	2%	0%	1%
Personal Cultural and Recreational	14,510	10,534	10,464	1%	1%	3%	2%
MODERN SERVICES							
Financial	18,590	23,063	25,743	3%	9%	3%	1%
Computer and information	14,916	20,092	18,797	2%	5%	3%	1%
Royalties and license fees	10,263	13,293	14,707	1%	3%	1%	0%
Other business services	7,883	9,437	13,162	15%	26%	19%	9%

Source: Authors' calculations using Balance of Payments, IMF. 2011.

Figure 9: Share of service category in *EXPY*, by country group.

Note: Traditional services are in blue shades, modern in red.

Source: Authors' calculations using Balance of Payments, IMF. 2011.

service that a country export, they may still register and increased *PRODY* for that export if the broader category it belongs to have made productivity improvements.

Figure 10 shows the evolution of *Service EXPY* over time. Interestingly, all groups start out with more or less the same level of *Service EXPY* in the beginning of the 1990s, diverge in late 1990s and from 2000 they keep the differences between each other and grow in parallel. EU-15 made the largest jump in late 1990s while the NMS continued an already strong trend albeit at a lower level than EU-15. An interesting pattern arises when looking at different countries within EU-15 (see Fig A12 in the Appendix). Northern EU-15 has a solid development of *Service EXPY*, while Continental EU-15 is less successful but high levels and growth in Luxemburg push up the average. Southern EU-15 though is lagging behind with no country standing out. ACC suddenly dropped in *Service EXPY* in late 90s and has since not been able to catch up with the rest of Europe. This graph would hence suggest that EU-15 has been most successful in latching on to the globalization of services, followed by NMS, while ACC has not benefitted from this global trend. It remains however, to analyze to what extent these groups have managed to turn higher service sophistication into economic growth.

Figure 10: Service EXPY, 1990-2007.

Source: Authors' calculations.

Figure 11 shows log *Service EXPY* against log GDP per capita, for 1992 and 2007 respectively. For both time periods, the scales have been kept constant as we also want to bring attention to the shifting paradigm of service exports globally. In order to look at the evolution of service export sophistication over time, we contrast the level correlation in 1992 with the correlation in 2007. The relationship is positive at each point in time, i.e. richer countries have typically a higher sophistication of services, and the three European groups are generally in line with this pattern.

Figure 11: log Service EXPY against log GDP per capita, for 1992 and 2007.

Source: Authors' calculations.

Another interesting question is the relationship between *Services EXPY* and *Goods EXPY*, and to what extent Europe is in line with the global pattern. Figure 12 shows that in general, countries with high Service EXPY have also high Goods EXPY, which is also true for Europe. Compared to the median for both categories, all European countries have higher sophistication.

Figure 12: Service EXPY vs Goods EXPY, 2008.

Source: Authors' calculations.

Finally, in Table 4 we compare export sophistication in different years, controlling for the stage of development and size, to check whether any one of the regions was significantly different from the global norm. We make the observation that ACC was a significant and positive outlier in service export sophistication in 1991. In more recent time, 2006, ACC is instead a significant negative outlier. Put another way, given the stage of development, ACC has a lower level of Service EXPY than expected.

Table 4: Regressions for Sophistication in Service Exports, 1991, 2000 and 2006

	(1)	(2)	(3)
	1991	2000	2006
log GDP per capita	0.588* (0.314)	0.0480 (0.221)	0.462 (0.545)
(log GDP per capita) ²	-0.0293 (0.0180)	0.00178 (0.0129)	-0.0202 (0.0305)
Control for size	Yes	Yes	Yes
EU15	0.0168 (0.0327)	0.0632 (0.0570)	0.0645 (0.0562)
NMS	-0.0210 (0.0313)	0.00358 (0.0282)	0.00881 (0.0277)
ACC	0.0834** (0.0356)	-0.0490 (0.0517)	-0.112** (0.0459)
Constant	5.785*** (1.365)	8.522*** (0.964)	6.784*** (2.429)
Observations	116	126	120
R-squared	0.380	0.306	0.428

Note: * Significant at 10% level ** Significant at 5% level *** Significant at 1% level. t-statistics are in parentheses. Size is population size.

With a descriptive picture of the level of service export sophistication in the three European country groups, we will now look at the extent to which their level of sophistication is associated with their level of economic growth.

4 RESULTS FROM GROWTH REGRESSIONS

We now turn to the analysis of the relationship between service export sophistication and growth, and in particular if there are any differences in how the level of sophistication affects growth in Europe compared to the rest of the world. Mishra, Lundstrom and Arnand (2011) analyses the relationship between *Service EXPY* and economic growth through a number of estimations using fixed effect panels and GMM techniques. The data includes up to 103 countries over the time span of 1990-2007, and the result show a strong positive association between service sophistication and growth. The result stands given a number of different model specifications.⁹ In this section we use the same approach but take a closer look at Europe.

The baseline empirical growth model consists, in addition to the variable of interest, of four determinants of economic growth - initial income level, rates of physical and human capital accumulation, trade openness and institutional quality. We use data on income per capita from WDI. To account for differences in human capital accumulation we use latest available data on years of schooling from Barro and Lee (2010). We use M2 (as percent of GDP) as a proxy for

⁹ Apart from the control variables presented in the base model, they control for Goods EXPY, test various time periods and country groupings and drop outlier such as India, and the result still holds.

financial development from WDI. Finally, we use a measure of Rule of Law from The World Bank's World Governance Indicators.

We use dynamic panel regressions based on three-year panel data for each country. The basic regression specification is the following:

$$y_{i,t} - y_{i,t-1} = \alpha y_{i,t-1} + \beta' SE_{i,t-1} + \varphi' GD_{i,t} + \mu_t + \vartheta_i + \varepsilon_{i,t} \quad (1)$$

where $y_{i,t}$ is the natural logarithm of GDP per capita, $y_{i,t-1}$ is the level of GDP per capita at the beginning of each three year period, $SE_{i,t-1}$ is the dynamic service export sophistication measure, $GD_{i,t}$ is the set of relevant control variables for growth determinants, μ_t represents time dummies, ϑ_i stands for country fixed effects and $\varepsilon_{i,t}$ is the error term.

We present the growth regression results in Table 5. In column 5, we add three European groups that we interact with *Service EXPY*, to see if there is a significantly different impact of service sophistication in EU-15, NMS or ACC compared to the rest of the world. The result is show that in the NMS case, there is a positive significant additional impact on growth. This means that service sophistication has a positive association with growth in all countries but the association – given a certain level of sophistication – is stronger in NMS than in other countries.

Table 5: Regression results with EU-15, NMS and ACC dummy, Fixed effect 3-year panel of growth in per capita GDP, 1990-2007.

	(1)	(2)	(3)	(4)	(5)
log lag initial GDP per capita	-0.481*** (0.0780)	-0.644*** (0.0895)	-0.650*** (0.0995)	-0.690*** (0.106)	-0.680*** (0.112)
log lag initial Service EXPY	0.315*** (0.0553)	0.221*** (0.0733)	0.223*** (0.0737)	0.199** (0.0793)	0.207** (0.0803)
years of schooling		0.108*** (0.0306)	0.110*** (0.0309)	0.0968*** (0.0344)	0.112*** (0.0355)
log financial development			0.00466 (0.0314)	-0.00529 (0.0333)	-0.00488 (0.0342)
external liberlization				0.00377** (0.00158)	0.00183 (0.00170)
EU15*Service EXPY					-0.318** (0.160)
NMS*Service EXPY					0.379* (0.212)
ACC*Service EXPY					-0.0278 (0.474)
Constant	1.504** (0.594)	3.008*** (0.710)	3.007*** (0.771)	3.491*** (0.819)	3.374*** (0.830)
Observations	702	582	579	533	524
R-squared	0.079	0.114	0.115	0.130	0.129
Number of countries	157	128	128	115	113

Note: * Significant at 10% level ** Significant at 5% level *** Significant at 1% level. t-statistics are in parentheses.

5 CONCLUSION

Our study shows that services dominate growth in EU-15 countries and, to a lesser extent, in New Member States (NMS) and Accession (ACC) countries. Except for ACC, Europe has maintained specialization in service exports. Service productivity, tradability, and exports of modern services are high in EU-15, growing fast in NMS but slower in ACC countries. Growth in modern services outweigh growth in traditional services in EU-15 and NMS, while modern services are even shrinking in ACC. Hence, even though the contribution of services to growth is significant in ACC, it seems to be less due to an improved quality of services.

Since the mid-1990s, EU-15 as well as NMS significantly increased their service export sophistication, while ACC first dropped and then only slowly grew during the 2000s. Our growth regression results confirm that sophistication in service exports is important for growth. Moreover, for a given level of export of sophisticated services, the growth impact is stronger in NMS than the rest of the world.

The results for Europe show that not only does export of services matter for growth but also what services are exported. NMS seems to be the group that currently is able to reap the most benefit from the globalization of services – it is still catching up with EU-15 in terms of the level of service sophistication, and for a given level of sophistication it has a stronger than average impact on growth. ACC however has yet to latch onto the globalization of services. On the other hand, that means it still has a strong growth potential through the sophistication of services.

Fundamentals are important, but do not uniquely determine what Europe, or any country, will produce and export. There is still room for the European region as a whole but especially in NMS and ACC to upgrade its sophistication in service exports. There are many policy tools - such as single market efficiency and common legal and business start-up market integration - to further pursue. In particular recent work also shows that information flows, access to modern technology, and highly skilled labor play a particularly critical role in sustaining increases in service exports sophistication – all aspects found in the European economy.

REFERENCES

- Barro, R., and J. Lee (1994). "Sources of Economic Growth," Carnegie-Rochester Conference series on Public Policy 40, pp 1-46.
- Eschenbach, F. and B. Hoekman (2006). "Service Policy Reform and Economic Growth in Transition Economies, 1990-2004." *CEPR Discussion Paper* No. 5625.
- Fernandes, A. (2009). "Structure and Performance of the Service Sector in Transition Economies." *Economics of Transition*, Vol 17(3), pp. 467-501.
- Francois, J. and B. Hoekman (2010). "Services Trade and Policy." *Journal of Economic Literature* 48, pp. 642-692.
- Ghani, E., and H. Kharas (2010). "Overview in The Service Revolution in South Asia," in *The Service Revolution in South Asia*, edited by Ejaz Ghani, Oxford University Press.
- Ghani, Ejaz ed., *The Service Revolution in South Asia*, Oxford University Press.
- Gwartney, James; Joshua Hall, Robert Lawson (2010). *Economic Freedom of the World: 2010*, Fraser Institute.
- Hausmann, R., J. Hwang, and D. Rodrik (2007). "What You Export Matters," *Journal of Economic Growth*, 12:1: pp. 1-25.
- Kandilov, I. and T. Grennes (2010). "The Determinants of Service Exports from Central and Eastern Europe." *Economics of Transition*, Vol 18(4), pp. 763-794.
- Lall, S., Weiss, J., and J. Zhang (2005), "The 'Sophistication' of Exports: A New Measure of Product Characteristics," *Queen Elizabeth House Working Paper* Number 123, Oxford University
- Mishra, S., Lundstrom, S. and R. Anand (2011). "Service Export Sophistication and Economic Growth." *World Bank Policy Research Working Paper*, no 5606. World Bank: Washington, DC.
- World Bank (2008). *Unleashing Prosperity: Productivity Growth in Eastern Europe and the Former Soviet Union*. The World Bank; Washington, DC.

APPENDIX

Additional Data Description.

External Liberalization and Hidden Import Barriers. Source: Gwartney et al. (2010). The index is based on the *Global Competitiveness Report's* survey question: "In your country, tariff and non-tariff barriers significantly reduce the ability of imported goods to compete in the domestic market." The question's wording has varied slightly over the years.

Mean Tariff Rate. Source: Gwartney et al. (2010). As the mean tariff rate increases, countries are assigned lower ratings. The rating declines toward zero as the mean tariff rate approaches 50%.

Taxes on International Trade (percent of current revenue). Source: World Bank (2010). Taxes on international trade include import duties, export duties, profits of export or import monopolies, exchange profits, and exchange taxes. Current revenue includes all revenue from taxes and non-repayable receipts (other than grants) from the sale of land, intangible assets, government stocks, or fixed capital assets, or from capital transfers from nongovernmental sources. It also includes fines, fees, recoveries, inheritance taxes, and non-recurrent levies on capital. Data are for central government and in percent of all current revenue.

Capital Account Restrictions. Source: Gwartney et al. (2010). Index based on two components:

- (i) Beginning with the year 2002, this subcomponent is based on the question: "Foreign ownership of companies in your country is (1) rare, limited to minority stakes, and often prohibited in key sectors or (2) prevalent and encouraged". For earlier years, this subcomponent was based on two questions about "Access of citizens to foreign capital markets and foreign access to domestic capital markets".
- (ii) Subcomponent based on the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions, including different types of capital controls. It is constructed by subtracting the number of restrictions from 13 and multiplying the result by 10.

<i>Export Service Category</i>	<i>Explanation</i>
Transportation	Transportation covers all transportation (sea, air, land, internal waterway, space, pipeline, etc) services that are performed by residents of one economy for those of another and that involve the carriage of passengers, goods (freight), rentals of carriers with crew, and related supporting services.
Travel	Travel differ from the other categories in the sense that the consumer (traveler) moves to the location of the provider (a resident of the economy) and what is covered by the travel category are those goods and services acquired during the visit (less than a year). The international carriage of the traveler is covered under transportation. The measure can be interpreted as a proxy for international tourism, business travelling and international student (even if staying longer than one year).
Communication	Communication covers (i) telecommunication and (ii) postal and courier between residents and nonresidents international transactions.
Construction	These are construction services performed by employees outside the country of the location of the enterprise. It also includes the goods the employees bring with them abroad to perform the task. Expenditures for local good though are recorded under Other business services.
Insurance	Insurance services cover insurances provided by a resident to a nonresident and vice versa. It would often be freight insurances but also other direct services.
Financial	Financial services cover financial intermediary and auxiliary services (except those of insurance enterprises and pension funds) between residents and nonresidents. This could be fees related to letters of credit, lines of credit, financial leasing, foreign exchange transaction, transaction in securities, asset management, etc, etc.
Computer Information	Computer data and new-related service transactions between residents and nonresidents. These could be data bases, data processing, hardware consultancy, software implementation, maintenance and repair of computers, new agency services, etc.
Royalties & license fees	These are exchange of payments between residents and nonresidents for the use of intangible and nonfinancial assets or property rights such as patents, copy rights, franchising, manuscripts, films, etc).
Other business	Other businesses include (i) Merchanting (the purchase of goods by a resident from a nonresident and the subsequent resale to another nonresident, during which the good does not leave the compiling country), (ii) Operational leasing without operators covers resident-nonresident leasing, and charter without crew, (iii) Miscellaneous services, including (a) legal, accounting, management consulting, public relation services, (b) advertising and market research services, (c) research and development services, (d) architectural, engineering and other technical services, (d) agricultural, mining and on-site processing services, and (e) other services between residents and nonresidents.
Personal & cultural	These services are divided into (i) audiovisual (services and fees for motion pictures - including to actors and producers, radio and television programs and musical recordings) and (ii) other (services related to museums, libraries, sporting, correspondence courses, etc).

Additional Figures

FIGURE A1. SERVICE VALUE ADDED AND GDP, EU-15 - 2009

FIGURE A2. SERVICE VALUE ADDED AND GDP, NMS - 2009

FIGURE A3. SERVICE VALUE ADDED AND GDP, ACC - 2009

FIGURE A4. GDP GROWTH AND SERVICE OUTPUT GROWTH, 2000-08

Sum of serv_growth vs. sum of resid. Color shows sum of eu15. Shape shows details about sum of new. Details are shown for countryname. The marks are labeled by countrycode.

FIGURE A5. GDP GROWTH AND SERVICE OUTPUT GROWTH, 2000-08

FIGURE A6. GDP GROWTH AND SERVICE OUTPUT GROWTH, 2000-08

Sum of serv_growth vs. sum of resid. Color shows sum of accession. Details are shown for countryname.

FIGURE A7. DECOMPOSING GDP GROWTH BY SECTORS IN EU-15, 1990-99 AND 2000-08

FIGURE A8. DECOMPOSING GDP GROWTH BY SECTORS IN NMS, 1990-99 AND 2000-08

FIGURE A9. DECOMPOSING GDP GROWTH BY SECTORS IN ACC, 1990-99 AND 2000-08

FIGURE A10. GOODS EXPORTS AS A SHARE OF GOODS VALUE ADDED, 1990-2007.

FIGURE A11. SERVICE EXPORT SOPHISTICATION IN NORTHERN EU-15

FIGURE A12. SERVICE EXPORT SOPHISTICATION IN NMS

FIGURE A13. SERVICE EXPORT SOPHISTICATION IN ACC