

DOES SERVICES OFFSHORING CONTRIBUTE TO JOBS POLARIZATION?

Hildegunn Kyvik Nordås, OECD¹

This paper explores the relation between services offshoring through FDI or cross-border trade and the skills composition of labour demand, focusing in particular on its possible contribution to polarization of the labour market. It is found that outward investment does not shift jobs abroad. Linking economic stimulus packages to local production are therefore unlikely to protect local jobs. It is found that services trade does contribute to structural changes in employment, in particular a shift from low-skilled to high-skilled employment. However, contrary to what has been feared, services offshoring does not seem to hurt medium-skilled workers. Finally, reducing behind the border regulatory barriers is the most effective policy measure that would stimulate FDI and employment while improving labour productivity, although also this measure reduce demand for low-skilled labour.

JEL: F10, J31

1 . Hildegunn.Nordas@oecd.org. An earlier version of this paper has been published as chapter 4 in OECD Trade Policy Working Paper no 107.

Introduction

This paper studies the relationship between trade in services and labour demand by skills category. It builds on and updates previous OECD work in this area (Hill et al., 2007), using the same methodology on new data. A rising skills premium and stagnating average incomes in some countries, notably the United States, have raised concerns and globalisation has been partly blamed in the popular press. In particular, offshoring of services and the slicing up of value chains within international production networks is widely perceived as “sending jobs abroad”. The academic literature on the other hand, tended to focus on skills-biased technical change as the major explanation for polarisation of the labour market, arguing that labour market developments did not conform to the predictions of trade theory.² More recently, however, the trade explanation has gained more prominence also in the academic literature (e.g. Blinder, 2009; Grossman and Rossi-Hansberg, 2006; 2008)

Although offshoring of services has featured high on the agenda in the policy debate, empirical research on the relation between trade and labour markets has largely focussed on trade in goods. This is understandable due to vastly better quality and coverage of trade statistics for goods. Nevertheless, services trade and FDI data for the OECD countries have improved in recent years, which allows us to undertake empirical analysis with reasonable confidence in the robustness of the results.

Long established international specialisation based on comparative advantage in final goods is widely accepted as a source of mutually gainful division of labour, but deepening specialization affecting new sectors and exposing additional occupations and skills categories to international competition raise some anxiety. Over the past few years, the policy debate has focussed on an apparent shift in employment from medium skilled clerical and blue collar jobs towards low-skilled manual tasks in services on the one hand and high-skilled services jobs on the other in major OECD economies. A rising skills premium has

2 . See for instance Keller (2004) for a recent review.

coincided with this polarisation of the labour market, suggesting that demand for skills has outpaced supply in spite of a steady increase in educational attainment in the G20 countries. During the great recession this pattern was reinforced, at least in the United States, where employment of professionals and technicians on the high-skills end - and personal care services on the low-skill end increased during the period 2007-2009, while employment in all other categories declined (Autor, 2010).

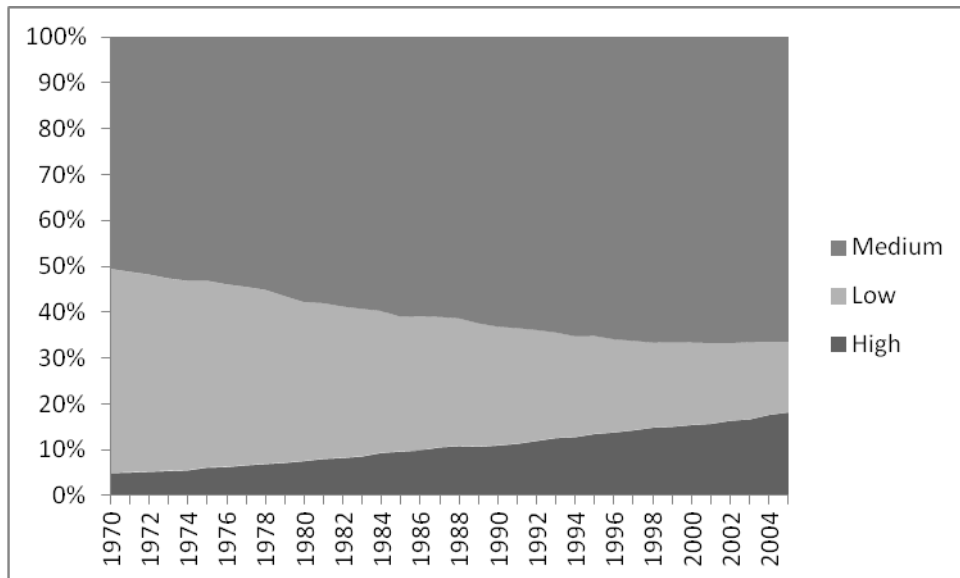
Medium skilled workers and medium skilled jobs have traditionally constituted the largest share of employment and the major livelihood for middle class bread winners. Any developments to the detriment of this group raise concerns. To what extent services trade liberalisation accelerates or dampens polarisation of the labour market is therefore an important question that is left largely unanswered. One reason for the surprising absence of empirical analysis of the relation between services trade and recent labour market developments is lack of data. Fortunately, a recently developed database (EU KLEMS) contain comparable information on employment and wages of three skill levels for the EU Member countries, Australia, Canada, Japan, Korea and the United States. This information is used first, for a description of recent trends in services trade and investment as well as labour market developments. Second, the relation between services trade and investment and employment by skills category is explored.

Labour market developments and services trade

During the past four decades there has been a steady shift in employment from low-skilled to medium and high skilled labour categories as indicated in Figure 1.

Figure 1. Employment by skills level, share of total

Shares, pooled data, 14 countries



Source: Calculated from EU KLEMS as the average of Australia, Austria, Belgium, Denmark, Finland, France, Ireland, Italy, Korea, the Netherlands, Sweden the UK and USA. These are the countries for which long time series data are available.

Clearly, the share of low-skilled workers has been squeezed from both an increase in the share of medium and high-skilled workers. Since the late 1990s, however, the share of medium skilled workers has stagnated, and in some countries the rising trend of this category has been reversed whereas the share of unskilled labour has stabilized or slightly increased (Autor, 2010). Structural changes in the labour market to some extent follow naturally from improvements in educational attainment. According to the World Bank Development indicators the enrolment rate in tertiary education increased from 5% to 6% in low-income countries, from 13 to 24% in middle income countries and from 39 to 67% in high-

income countries from 1985 to 2008.³ Structural changes in the labour market should therefore provide an increasingly skilled workforce with jobs that match their skill levels.

If this was the whole story, relative wages of the three skills categories should be expected to remain fairly stable. However, in most countries for which data are available, the relative wages of skilled workers have been rising, suggesting that demand for highly skilled workers has increased even faster than supply or that productivity of high-skilled labour has increased faster than average, for instance due to skills-biased technical development; or both. It is well known that trade affects relative factor demand, and this will be explored in the next section focussing on services.

Structural changes in the skills composition of employment has gone hand in hand with structural changes in employment by sector, with a rising share of employment in services. In high-income countries for instance, the share of services (excluding construction) in total employment has increased from 63.5% in 1991 to 72.2% in 2007.⁴ A snapshot of the role of services in employment and production in the G20 shows that services account for about 65% of GDP of the G20 group, ranging from 32% in Saudi Arabia to 71% in USA in 2007.⁵ Services are even more important for employment with the

3 . Data for earlier years than 1985 is only available for middle-income countries where the tertiary enrolment rate was only 3% in 1970.

4 . Source: World Bank Development Indicators. Employment shares are only available for high-income countries as a group in this database.

5 . The exceptionally low share in Saudi Arabia stems from the high share of petroleum in GDP. Employment in services was about 75% of the total in 2007, according to World Bank figures. Note also that in World Bank data construction is not included in the services sector.

employment share ranging from 40% in Indonesia to 78% in USA.⁶ Furthermore as noted services employment held up much better during the crisis than employment in other sectors.

The exposure of services industries to international competition has increased over the past few decades, but it is still way behind goods producing sectors. Perhaps surprisingly, trade in services account for a much larger share of services value added in developing countries than in developed countries as Figure 2 illustrates. The corresponding ratios for trade in goods relative to goods value added range between 1.17 in middle income countries to 1.82 for high-income countries in 2007.⁷ With the shift of employment towards services, which are much less exposed to trade than manufacturing, it can be argued a declining proportion of the labour force is directly exposed to cross-border trade.⁸

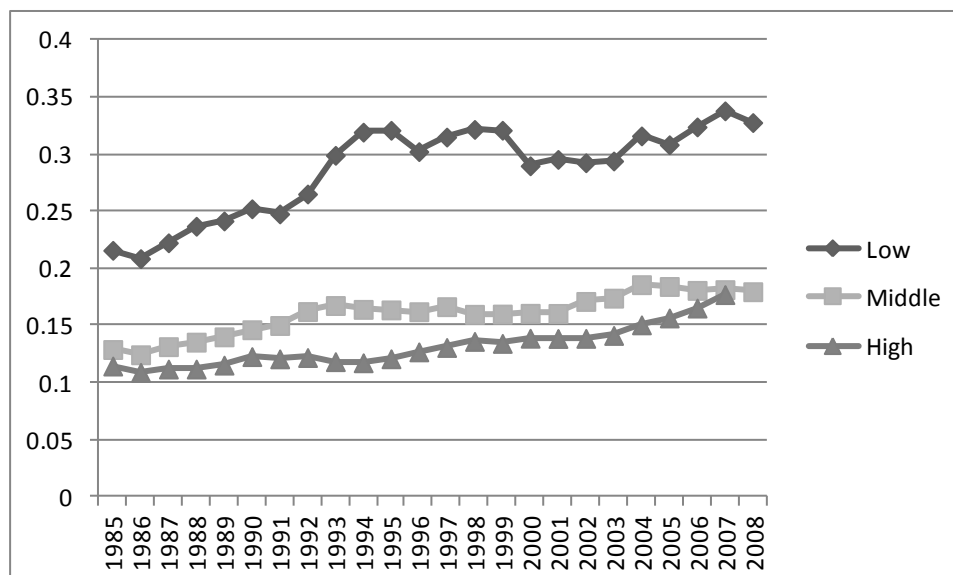
6 . Figures calculated from the World Bank World Development indicators.

7 . These ratios are calculated from the World Development indicators, dividing trade/GDP by sector/GDP, which should give trade/sector value added.

8 . In competitive labour markets the wage rate is, however, determined by the value of the marginal product of workers, regardless of whether or not the output produced is directly exposed to international competition.

Figure 2. Trade in services as share of services value added

High, middle and low income countries



Source: World Bank, World Development indicators

Foreign direct investment is the most important channel through which services are traded. A commonly cited figure is that about 56% of services trade is through commercial presence. In addition in the countries for which information is available, about a quarter of cross-border trade in services is intra-firm (OECD, 2010) and about half is transport and travel. Furthermore, when analysed at firm level, manufacturing and perhaps surprisingly, mining and oil companies are among the most active traders in services.⁹

The figures presented in this section suggest that services are essential parts of national economies as well as global production networks. In fact, technological developments in services, particularly communication, have made the recent wave of globalisation possible. Furthermore, the diffusion of ICT technology and its adoption in sectors that support trade such as transport, finance and distribution has

9 . The cited firm level analysis is from the UK (see Breinlich and Criscuolo, 2010)

been facilitated by comprehensive trade and FDI liberalisation, particularly in telecommunications and finance.

There is ample evidence that exposure to international trade and investment improves productivity. For instance, recent research has found that exposure to imports from China has boosted the adoption of ICT in import-competing industries raising productivity and competitiveness substantially.¹⁰ Skills upgrading has gone hand in hand with the introduction of ICT. About 75% of traded services are intermediate inputs (Miroudot et al., 2009). Therefore, services trade and investment contribute to productivity gains not only in the services sectors but also in downstream industries. Furthermore, services trade contributes to the competitiveness of manufacturing industries and not least to enhancing value added in natural resource extracting sectors, creating upstream and downstream jobs related to natural resources.

Barriers to trade and investment in services

Few services can be traded across borders without complementary movement of either the services provider to the premises of the customer or the other way around. Even the services that can be transmitted over electronic networks more often than not need support from a local office or frequent business travel to support the customer. Thus, Infosys one of India's most prominent services exporters, has offices and development centres in China, Australia, the Czech Republic, Poland, UK, Canada and Japan.¹¹

The need for direct interaction between services providers and customers led policy makers as well as modellers to consider services as non-tradable in the past, and as a consequence, there are few explicit

10 . See Bloom et al. (2009) for further discussion.

11 . See Infosys webpage: <http://www.infosys.com/about/what-we-do/pages/index.aspx>

policy-induced barriers to cross-border trade in services. However, as the Infosys example illustrates, whereas cross-border trade in services may be relatively frictionless, there is a host of policy induced barriers to the movement of services providers across borders. Table 1 depicts OECD indicators of barriers to foreign investment in services for the G20 countries.

Table 1.OECD FDI restrictiveness indices G20, 2010

0 denotes fully open; 1 fully closed

FDI RR INDEX 2010	AVERAGE ALL*	OECD	NON-OECD	AUS	CAN	FRA	DEU	ITA	JPN	KOR	MEX
<i>Manufacturing</i>	0.041	0.029	0.063	0.075	0.100	0.000	0.000	0.000	0.077	0.000	0.103
<i>Electricity</i>	0.123	0.118	0.133	0.075	0.100	0.000	0.000	0.000	0.000	0.417	0.100
<i>Construction</i>	0.055	0.027	0.111	0.075	0.100	0.000	0.000	0.000	0.000	0.000	0.100
<i>Distribution</i>	0.062	0.029	0.128	0.075	0.100	0.000	0.000	0.000	0.000	0.000	0.150
<i>Transport</i>	0.252	0.228	0.300	0.225	0.267	0.150	0.200	0.150	0.667	0.500	0.542
<i>Hotels & restaurants</i>	0.047	0.030	0.082	0.075	0.100	0.000	0.000	0.015	0.000	0.000	0.100
<i>Media</i>	0.221	0.168	0.328	0.200	0.700	0.048	0.025	0.363	0.000	0.400	0.625
<i>Communications</i>	0.134	0.107	0.188	0.400	0.600	0.000	0.000	0.000	0.500	0.500	0.350
<i>Financial services</i>	0.078	0.046	0.142	0.133	0.067	0.054	0.005	0.018	0.000	0.020	0.133
<i>Business services</i>	0.109	0.075	0.178	0.103	0.100	0.003	0.000	0.000	0.000	0.000	0.103
FDI INDEX TOTAL	0.114	0.091	0.159	0.127	0.164	0.038	0.023	0.073	0.257	0.131	0.225

Table 1 cont.

FDI RR INDEX 2010	TUR	GBR	USA	ARG	BRA	CHN	IND	IDN	RUS	SAU	ZAF
<i>Manufacturing</i>	0.000	0.023	0.000	0.000	0.025	0.252	0.026	0.075	0.197	0.180	0.060
<i>Electricity</i>	0.000	0.023	0.222	0.000	0.025	0.608	0.000	0.110	0.250	0.180	0.060
<i>Construction</i>	0.000	0.023	0.000	0.000	0.025	0.265	0.000	0.310	0.183	0.180	0.060
<i>Distribution</i>	0.000	0.023	0.000	0.000	0.025	0.238	0.420	0.685	0.183	0.243	0.060
<i>Transport</i>	0.208	0.114	0.550	0.042	0.292	0.665	0.174	0.416	0.375	0.430	0.227
<i>Hotels & restaurants</i>	0.000	0.023	0.000	0.000	0.025	0.250	0.000	0.248	0.348	0.180	0.060
<i>Media</i>	0.250	0.248	0.300	0.500	0.675	1.000	0.600	0.716	0.383	0.590	0.060
<i>Communications</i>	0.000	0.023	0.010	0.000	0.025	0.800	0.425	0.410	0.283	0.305	0.060
<i>Financial services</i>	0.000	0.024	0.042	0.000	0.025	0.610	0.273	0.143	0.533	0.263	0.093
<i>Business services</i>	0.125	0.023	0.000	0.000	0.025	0.138	0.500	0.560	0.308	0.305	0.385
FDI INDEX TOTAL	0.074	0.061	0.084	0.025	0.116	0.457	0.223	0.331	0.350	0.350	0.085

* All 49 countries included in the database

Source : OECD

From this table it is noted that barriers to investment is significantly higher in services than in manufacturing for almost all countries. It is also noted that on average OECD countries have lower barriers than non-OECD countries. The lowest overall index among the G20 countries is found in Germany, while the highest is observed in China. The most restricted sectors are transport, media and communications, but also distribution services and business services (accounting, architecture, engineering and legal services) have high barriers, particularly in non-OECD countries. Transport and communications provide services that are essential to a well-functioning economy. In contrast, uncompetitive transport and communications services raise transaction costs for all business, whether directly exposed to international markets or not. While protection of these services may conserve jobs in the sector in question, it may impose a cost on all other sectors and thereby dampen job creation.

The FDI restrictiveness index is broken down on equity restrictions, screening and approval of foreign investments; and restrictions on nationality or residency of managers and board members.

Whereas non-OECD countries score higher (are more restrictive) on equity restrictions and restrictions on key personnel, non-OECD countries score lower on screening. Screening has a much lower weight in the index than equity restrictions, which is reasonable. However, the restrictiveness of screening depends on its implementation, in particular to what extent there are clear criteria for approval and a fair and effective procedure. If there is considerable uncertainty related to the timing and outcome of the screening process that by itself is a serious barrier to foreign entry.

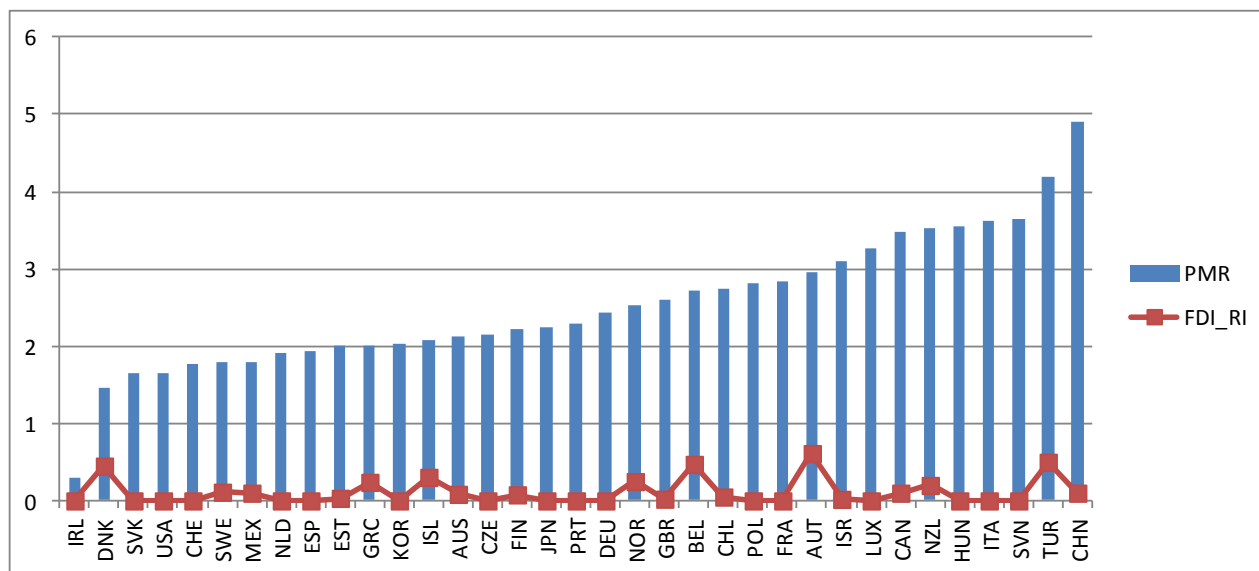
Foreign equity restrictions, screening and nationality requirements for key personnel and the board of directors are the major entry barriers facing foreign services providers. However, there is a host of behind the border regulation that also affect the ease at which services can be provided to foreign customers. The professional services are a case in point. A licence is typically required in order to provide e.g. legal services, accounting, medical services, engineering and architecture. The criteria for obtaining a license are typically education requirements, practice and an exam or test, often administered by the professional association. Many of these criteria were introduced during a period when the markets for professional services were mainly national, and as a result, it can be quite difficult for foreign professionals to obtain a license.

The potential trade restrictiveness of licensing procedures, qualification requirements and standards is recognised in the General Agreement of Trade in Services (GATS) Article VI, which mandates negotiations on disciplines on such domestic regulation. These are not included in the FDI restrictiveness indicators reported above, but are captured in the OECD Product Market Regulation Index. It is interesting to compare the two indices for professional services as depicted in Figure 1:¹²

12 . The PMR indices for business services include information on licensing, education requirement and quotas and economic needs tests.

Figure 3. PMR 2008, FDI restrictiveness index 2010, Accounting services

The PMR ranks between 0 and 6; the FDI restrictiveness between 0 and 1



Source : OECD

The example of accounting services illustrates nicely the difference between the two indicators. While more than half of the countries in this sample have no direct restrictions on FDI in accounting; licensing, lack of recognition of equivalent foreign qualifications and lengthy procedures (captured by the PMR) are prominent. Ireland is the most liberal country as measured by both indices, but otherwise there appears to be little correlation between the two indices in this sample.¹³ It should be underscored that licensing and education requirements per se are not necessarily a barrier to trade and investment. However, if countries have similar levels of qualification requirements, but do not recognise each other's qualifications, entry is much more difficult for a foreign services provider.

13. The correlation coefficient is only 0.15. Although there are two years between the data for the two indices, the time lag between them is unlikely to explain much of the difference.

In Dee et al. (2011) it is shown that in the sample of countries and sectors included in the study, where most countries have relatively low barriers to FDI, behind the border regulatory reforms would have a larger impact on inward FDI than further FDI liberalisation. This would in turn have a larger impact on employment as shown in the model simulations. This of course does not imply that FDI liberalisation is not important. It merely reflects the fact that the OECD countries as well as major emerging economies are already fairly open to FDI in services.

The impact of services liberalisation on productivity and labour demand

As noted, trade is an important factor determining industrial structure and employment patterns. In order to assess the relationship between services trade liberalisation and employment, standard labour demand functions are estimated empirically for all services sectors. The literature in this field distinguishes between conditional and unconditional labour demand. The former controls for the level of output and can therefore be interpreted as labour demand per unit of output, which is also a measure of labour productivity. Both demand functions are derived from the cost function for the sector in question, where labour demand is a function of factor prices, output prices; and variables that affect labour productivity, such as R&D expenditure, or competitive pressure e.g. from foreign services suppliers; and regulation or lack thereof, depending on the sector.¹⁴ The variables that are expected to affect productivity are introduced as shift parameters in the labour demand function.

To the extent that foreign market entry through trade or FDI increases competition or contributes to technology transfer to the host economy, one would expect that the impact on unit labour demand is negative. If so, it would help creating good jobs which support higher wages and the standard of living

14 . Market regulation has a positive impact on the competitiveness in sectors where there are significant entry barriers (e.g. telecommunications), but a negative impact in sectors that are inherently competitive.

that people have become accustomed to. It would also has a positive effect on employment if higher wages stimulated demand such that expansion of output more than compensates for the gain in productivity as far as labour demand is concerned.

The measures of openness to trade in services included in the labour demand functions are import penetration in the sector in question, inward FDI stocks and outward FDI stocks. These measures are outcomes of a number of factors such as market size, level of development, geography, cultural factors as well as the policy stance. In order to explore the impact of policy more directly, the OECD FDI restrictiveness index and the PMR are also introduced as shift parameters in the labour demand regressions. The labour demand regressions are based on the standard specification:

$$\ln L_{sjt} = \alpha_0 + \alpha_1 \ln w_{st} + \alpha_2 \ln K_{jt} + \alpha_3 \ln P_{jt} + \alpha_4 R \& D_{jt} + \alpha_s \ln y_{jt} + \alpha_6 z_{jt} + \varepsilon_{jt} \quad (1)$$

$$\ln L_{sjt} = \beta_0 + \beta_1 \ln w_{st} + \beta_2 \ln K_{jt} + \beta_3 \ln P_{jt} + \beta_4 R \& D_{jt} + \beta_5 z_{jt} + \mu_{jt} \quad (2)$$

Equation (1) represents conditional labour demand by skill category, denoted s , and time, denoted t . The variables included are wages, w , the capital stock, K , the output price index P , R&D intensity, $R\&D$, and output y . Sectors are indexed by j . The results are reported in Table 2.¹⁵

15. The final version will add regressions on employment shares by skills category using translog cost functions.

Table 2. Conditional labour demand in services, various shift parameters related to trade in services

Panel A. Total hours worked										
Shift variable	Import penetration		Inward FDI stock		Outward FDI stock		FDI restr. index		Sector specific PMR	
	Coef.	Std.	Coef.	Std.	Coef.	Std.	Coef.	Std.	Coef.	Std.
In wage	-0.396	0.089***	-0.563	0.033***	-0.533	0.033***	-0.516	0.034***	-0.524	0.028***
In net capital stock	0.089	0.058	0.137	0.021***	0.132	0.021***	0.122	0.022***	0.032	0.026
In output price	1.438	0.194***	0.601	0.112***	0.609	0.115***	0.345	0.136***	-0.133	0.048***
In output	0.284	0.058***	0.486	0.026***	0.485	0.026***	0.543	0.023***	0.264	0.021***
R&D intensity	0.062	0.021***	0.000	0.000	0.000	0.000	-0.014	0.015		
shift variable	-0.014	0.009*	-0.007	0.005	-0.006	0.004	-0.142	0.096	0.037	0.007***
N	309		1036		997		587		951	
R squared	0.9797		0.989		0.989		0.990		0.986	
Panel B. Low skilled hours worked										
	Coef.	Std.	Coef.	Std.	Coef.	Std.	Coef.	Std.	Coef.	Std.
In wage	-0.530	0.146***	-0.425	0.113***	-0.272	0.114**	-0.127	0.119	-0.26	0.07***
In net capital stock	0.977	0.304***	0.328	0.091***	0.376	0.091***	0.195	0.108	-0.30	0.08***
In output price	0.650	0.292**	0.516	0.406	0.353	0.420	0.552	0.552	-0.04	0.11
In output	-1.266	0.135***	0.286	0.094***	0.265	0.097***	0.638	0.107***	0.19	0.06***
R&D intensity	0.201	0.077***	-0.185	0.078**	-0.130	0.075*	-0.104	0.121		
shift variable	-0.011	0.014	-0.057	0.023***	-0.086	0.019***	0.531	0.871	0.19	0.02***
N	187		706		669		435		730	
R squared	0.978		0.925		0.932		0.920		0.910	

Panel C. Medium skilled hours worked										
	Import penetration		Inward FDI stock		Outward FDI stock		FDI restr. index		Sector specific PMR	
	Coef.	Std.	Coef.	Std.	Coef.	Std.	Coef.	Std.	Coef.	Std.
In wage	-0.250	0.080***	-0.540	0.088***	-0.439	0.091***	-0.305	0.084***	-0.518	0.028***
In net capital stock	-0.078	0.172	0.081	0.047*	0.059	0.046	0.043	0.045	0.074	0.035*
In output price	0.365	0.149**	0.578	0.261**	0.610	0.257**	-0.790	0.309***	-0.119	0.051***
In output	-0.074	0.111	0.479	0.046***	0.501	0.044***	0.531	0.054***	0.332	0.031***
R&D intensity	0.135	0.031***	-0.014	0.030	-0.008	0.032	0.034	0.038		
shift variable	-0.010	0.006	0.000	0.008	-0.004	0.007	-0.157	0.223	0.006	0.009***
N	187		706		669		435		730	
R squared	0.9917		0.9736		0.9741		0.969		0.9889	
Panel D. High skilled hours worked										
	Coef.	Std.	Coef.	Std.	Coef.	Std.	Coef.	Std.	Coef.	Std.
In wage	-0.116	0.093	-0.499	0.075***	-0.462	0.076***	-0.503	0.101***	-0.417	0.055***
In net capital stock	0.502	0.183***	0.282	0.056***	0.236	0.054***	0.263	0.067***	0.077	0.047*
In output price	0.737	0.196***	0.251	0.220	0.486	0.208**	-0.187	0.295	-0.681	0.191***
In output	0.416	0.104***	0.385	0.056***	0.433	0.053***	0.374	0.067***	0.516	0.053***
R&D intensity	0.169	0.040***	0.330	0.043***	0.233	0.045***	0.533	0.088***		
shift variable	0.024	0.011**	0.045	0.013***	0.052	0.010***	-0.670	0.467	-0.095	0.019***
N	187		706		669		435		730	
R squared	0.984		0.966		0.967		0.960		0.957	

Note: Total employment is available for more countries and sectors than employment by skills category, which explains why there are more observations in the total employment columns. Reported standard errors are robust standard errors; *, ** and *** signify 10, 5 and 1% levels of significance respectively. Sector and country fixed effects are included. The shift variable for each regression is denoted in the first column headings. The policy indices and import penetration are not logged and the coefficient thus represents the change in unit labour input following a one index unit change in the variable. FDI stocks are logged, and the parameters represent elasticities. R&D intensity is skipped from the last columns because it is not very significant, and there are only 116 observations for which data are available if R&D intensity and sectoral PMRs are included at the same time. This could lead to a problem with selection bias.

It is first noted that inward and outward FDI in services appears to have no discernible impact on overall unit labor demand as indicated in Panel A. Import penetration in the sector in question, however, has a significant effect on unit labor demand; a one percentage point increase in import penetration (as measured by imports over total domestic expenditure on the service) reduces unit labor demand by 1.4%. Behind the border regulation has a positive impact on unit labor demand, thus reducing labor productivity. A one index point reduction in the PMR sector-specific index improves labor productivity by 3.7% on average.¹⁶ Turning to the three skills categories, a higher level of regulation is associated with more inputs per unit of unskilled and medium skilled workers, but lower unit labor requirements for skilled workers.

While FDI appears to have little if any effect on average unit labor demand, it does effect the skills composition. Both inward and outward FDI reduces unit labor demand for unskilled and increases and increases unit labor demand for skilled labor, resulting in a more skills intensive production. A reasonable interpretation which conforms to existing literature is that outward services FDI is related to offshoring of low-skilled tasks, leaving home production more skills intensive. By the same token, inward FDI introduces more skills-intensive technologies to the host country. Medium skilled workers are, perhaps surprisingly, unaffected by FDI as far as unit labor demand is concerned.

While labor productivity (as measured by unit labor demand) is important for longer-term welfare considerations, the direct relationship between trade in services and the composition of employment by skills categories is more interesting for trade related labor market adjustments in the short run. That relationship is explored by estimating unconditional labor demand as reported in Table 3.

16 . Recall that the index ranks from 0 to 6 such that one index point represents quite significant reforms.

Table 3. Unconditional labor demand

Panel A Total hours demanded										
Shift variable	Import penetration		Inward FDI stocks		Outward FDI stocks		FDI restrictiveness index		PMR index	
	Coef.	Std.	Coef.	Std.	Coef.	Std.	Coef.	Std.	Coef.	Std.
In wage	-0.131	0.068**	-0.522	0.038***	-0.465	0.039***	-0.537	0.049***	-0.168	0.073**
In capital stock	0.238	0.050***	0.372	0.022***	0.364	0.023***	0.380	0.024***	0.352	0.032***
In price	1.170	0.174***	0.655	0.169***	0.632	0.168***	0.659	0.176***	0.407	0.173**
R&D intensity	0.016	0.019	-0.002	0.001***	-0.002	0.001***	-0.015	0.020	-0.143	0.028***
Shift variable	-0.005	0.008	0.032	0.007***	0.007	0.006	-0.317	0.159**	-0.045	0.012***
N	309		1036		997		587		201	
R square	0.977		0.984		0.983				0.997	
Panel B Low skilled hours demanded										
	Coef.	Std.	Coef.	Std.	Coef.	Std.	Coef.	Std.	Coef.	Std.
In wage	-0.852	0.176***	-0.471	0.115***	-0.313	0.113***	-0.261	0.124**	-0.149	0.066**
In capital stock	-0.437	0.356	0.462	0.079***	0.508	0.074***	0.513	0.088***	-0.157	0.056***
In price	2.253	0.268***	0.686	0.412*	0.507	0.420	1.016	0.543*	-0.248	0.112**
R&D intensity	0.389	0.076***	-0.185	0.083**	-0.141	0.081*	-0.075	0.125		
Shift variable	-0.064	0.018***	-0.029	0.022	-0.076	0.019***	0.353	0.986	0.161	0.017***
N	187		706		669		435		730	
R square	0.964		0.924		0.931		0.915		0.908	

Panel C Medium skilled hours demanded										
	Import penetration		Inward FDI stock		Outward FDI stock		FDI restr. index		Sector specific PMR	
	Coef.	Std.	Coef.	Std.	Coef.	Std.	Coef.	Std.	Coef.	Std.
In wage	-0.273	0.085***	-0.565	0.091***	-0.461	0.093***	-0.337	0.087***	-0.329	0.029***
In capital stock	-0.155	0.162	0.304	0.044***	0.308	0.046***	0.291	0.040***	0.340	0.030***
In price	0.458	0.128***	0.814	0.236***	0.842	0.232***	-0.391	0.296	0.463	0.045***
R&D intensity	0.147	0.024***	-0.026	0.036	-0.039	0.043	0.043	0.040		
Shift variable	-0.013	0.005***	0.045	0.010***	0.014	0.009	-0.250	0.280	-0.041	0.009***
N	187		706		669		435		730	
R square	0.992		0.969		0.969		0.961		0.985	
Panel D. High-skilled hours demanded										
	Coef.	Std.	Coef.	Std.	Coef.	Std.	Coef.	Std.	Coef.	Std.
In wage	-0.009	0.088	-0.483	0.077***	-0.442	0.077***	-0.507	0.098***	-0.206	0.152***
In capital stock	0.964	0.193***	0.463	0.045***	0.453	0.043***	0.436	0.057***	0.536	0.148***
In price	0.218	0.153	0.412	0.215*	0.655	0.207***	0.078	0.303	-1.144	0.347**
R&D intensity	0.107	0.033***	0.316	0.041***	0.203	0.048***	0.537	0.082***		
Shift variable	0.043	0.011***	0.081	0.012***	0.067	0.010***	-0.735	0.390	-0.178	0.017***
N	187		706		669		435		730	
R square	0.981		0.964		0.964		0.958		0.950	

Note: Total employment is available for more countries and sectors than employment by skills category, which explains why there are more observations in the total employment panels than the skills category panels. Robust standard errors are reported; *, **, *** signify 10, 5 and 1% levels of statistical significance respectively, sector and country fixed effects are included. The shift variable for each regression is denoted in the column headings. The policy indices are not logged.

It is first observed that import penetration in the services sectors have no effect on total labor demand, but contributes to a shift in employment from low-skilled to medium and high-skilled workers with the largest effect on high-skilled. The impact is quite significant with a one percentage point increase in import penetration being associated with a 6% lower employment of unskilled workers, 1.3% higher employment of medium skilled workers and 4.3% higher employment of high-skilled workers.

Turning to FDI, inward stocks contribute to overall job creation, and the impact is highest for high-skilled labor. The scale of the changes are, however, relatively modest. A 10% increase in the stock of FDI is associated by an overall increase in employment by 0.45% for medium skilled workers; and 0.8% for high-skilled. Foreign capital thus appears to complement high skills. Outward FDI on the other hand, does not seem to affect overall employment. In other words, outward FDI in services does not imply “moving jobs abroad”, although a shift in employment from low-skilled to high-skilled workers is observed. Medium skilled workers appear to be largely unaffected, but it is likely that some of the lost low-skilled jobs are replaced by medium-skilled jobs, while some medium skills jobs are replaced by high-skilled jobs, leaving total medium skilled jobs fairly constant.

A high level of behind the border regulation is arguably associated with the worst labor market outcome. First, as discussed above, a high level of behind the border regulation has a strong negative effect on FDI inflows. Second, although regulation is associated with higher unit labor demand (and lower labor productivity) it still contributes to reducing overall labor demand. Furthermore, a high level of regulation appears to protect low-skilled workers while contributing to lower demand for medium and high-skilled workers. Finally, it is noted that while FDI restrictions appear to affect the labor market mainly through the FDI channel, behind the border regulations affect the labor market both through FDI

and a direct effect, as the PMR is highly significant in most labor market regressions while the FDI restrictiveness index is not.¹⁷

During the economic crisis, discouraging outward FDI or relocation was one of the protectionist measures reported in the recent OECD study on Trade and Economic Effects of Responses to the Economic Crisis (OECD, 2010). The rationale for this policy is to make sure that the stimulus preserves local jobs to the largest extent possible. The results reported in tables 3 and 4 suggest that relocation of services does not reduce employment at home, but contributes somewhat to the shift towards more skills-intensive production and higher productivity.

Conclusion

This paper has explored the relation between services offshoring through FDI or cross-border trade and the skills composition of labour demand, focussing in particular on its possible contribution to polarization of the labour market. It was found that outward investment does not shift jobs abroad. Linking stimulus packages to local production are therefore unlikely to protect local jobs. Furthermore, keeping the local market open to trade and investment would contribute to net job creation. Services trade does, however, contribute to structural changes in employment, in particular a shift from low-skilled to high-skilled employment. Nevertheless, contrary to what has been feared, services offshoring does not seem to hurt medium-skilled workers. Finally, reducing behind the border regulatory barriers is the most effective policy measure that would stimulate FDI and employment while improving labour productivity, although also this measure reduce demand for low-skilled labour.

17 . When both FDI stocks and the policy indices are included in the same regressions (not reported), the PMR index is still significant, while the FDI restrictiveness index is not.

REFERENCES

- Acemoglu, D. and Autor, D. (2010) "Skills, tasks and technologies: implications for employment and earnings", NBER Working Paper No 16082, June.
- Autor, D. (2010), "The polarization of job opportunities in the U.S. Labour market", A paper jointly released by the Center for American Progress and the Hamilton Project;
www.americanprogress.com.
- Blinder, A. (2009), "How many US jobs might be offshorable?" *World Economics*, 10, 41-78.
- Breinlich, H. and Criscuolo, C. (2010), International trade in services: a portrait of exporters and importers", CEPR Discussion Paper no 7837.
- Grossman, G. and Rossi-Hansberg, E. (2006), "The rise of offshoring: it is not wine or cloth any more", in *The New Economic Geography: Effects and Policy Implications*, Jackson Hole Conference Volume, Federal Reserve of Kansas City, August, 59-102.
- Grossman, G. and Rossi-Hansberg, E. (2008), "Trading tasks: a simple model of offshoring", *The American Economic Review*, 98, 1978-1997.
- Hill, S., Leshner, M. and Nordås, H.K. (2007), "Trade and labour market adjustments", OECD Trade Policy Working Paper no. 64
- Keller, W. (2004), "International technology diffusion", *Journal of Economic Literature*, 42, 752-782.
- Michaels, G., Natraj, A. and Van Reenen, J. (2010), "Has ICT Polarized Skill Demand? Evidence from 11 Countries Over 25 Years", NBER Working Paper No. 16138 June.
- Miroudot, S., Lanz, R. and Ragoussis, A. (2009), "Trade in intermediate goods and services", OECD Trade Policy Working Papers no 93.
- OECD (2010), "Intra-firm trade: patterns, determinants and policy implications",
TAD/TC/WP(2010)27REV1.

ANNEX

Sources of data

Data on FDI in services are from OECD.stat; employment and wages by skills category is from EUKLEMS, the policy indicators are the Product Market Regulation index from the OECD/ECO and the Foreign Direct Investment Restrictiveness Index from OECD/DAF; data on output and prices are OECD.Stan supplemented by EUKLEMS.