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Adriana Peluffo *

Resumen

En la discusión pública y académica suele haber preocupación sobre la integración económica y sus impactos en el empleo. Aunque existen numerosos estudios para países desarrollados, los estudios para países en desarrollo son escasos.

El objetivo de este trabajo es analizar los efectos de la deslocalización sobre el mercado de trabajo a nivel de firma. Analizamos si existen efectos heterogéneos, para lo cual tomamos en cuenta el nivel de ingreso de los países de origen de los insumos, el nivel tecnológico del sector importador, y el carácter exportador de las firmas deslocalizadas.

Los datos para este estudio son un panel desbalanceado de firmas manufactureras del período 1998-2008 combinado con datos administrativos de la Dirección de Aduanas. Estimamos un modelo dinámico utilizando el sistema generalizado del método de los momentos que permite abordar las rigideces en el mercado de trabajo, así como la probable endogeneidad del modelo.

Como resultado emerge que las importaciones de bienes intermedios tienen un pequeño efecto en el empleo, y que cuando el origen es de países de ingresos altos o medios tiene un impacto positivo especialmente para las firmas de sectores poco intensivos en tecnología, mientas que las firmas exportadoras o intensivas en tecnología no se ven afectadas.

Palabras clave: Deslocalización, Empleo, Impacto económico de la globalización

Código JEL: F1, F6, J2

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Abstract

Usually, in public discussion and academia there is concern about increased integration in the world economy and its impact on employment. While there is a number of studies for developed countries for developing economies these studies are scarce.

The aim of this work is to analyze the evidence of offshoring on the labor market for an emerging economy at the firm level. We analyze if there are heterogeneous effects of offshoring. To this aim, we take into account the level of income of the countries of origin of foreign inputs, the technological level of the importing sector, and the export status of offshoring firms.

The data source for this work is an unbalanced panel of manufacturing firms for the period 1998-2008 merged to detailed administrative data from the Customs Direction. We estimate a dynamic model using a system generalized method of moments which allows to tackle with rigidities in the labor market as well as the likely endogeneity of the model.

The whole picture that emerges seems to be that intermediate imports have a small impact on employment, and when the source is high or middle income countries the impact is positive mainly for firms in low technology intensive sectors while exporting firms and firms in high technology sectors are not affected.

Keywords: Offshoring, Employment, Economic impact of globalization

JEL Classification: F1, F6, J2

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1. Introduction

Two issues have been a key concern for developing countries: increasing productivity in order to raise living standards, and employment creation. Also equity has been in the debate of the policy agenda in Latin America.

Usually, in public discussion and academia there is concern about increased integration in the world economy and its impact on employment. While there is a number of studies for developed countries for developing economies these studies are scarce.

Developed economies claim that import competition and offshoring from low income countries may cause important domestic job losses particularly for unskilled workers and low intensive technology sectors (O'Rourke and Sinnot, 2001; Scheve and Slaughter, 2001). Furthermore, it is widely accepted that technology progress is not neutral but implies a substitution of labor for capital and imported intermediates. Thus, technological progress is labor saving and capital intensive, affecting so employment levels and its composition[1].

Offshoring is defined as the reallocation of production processes abroad, leading to trade in intermediate goods across borders and increasing specialization at home[2]. In this work we will use the word offshoring and outsourcing as synonymous but there are some differences. Hûmmels et al. (2018) discuss the differences between offshoring, outsourcing, vertical FDI, and import competition. Thus, we refer to offshoring as the imports of intermediates by firms located in Uruguay.

The literature on offshoring has focused on developed countries and on the effect of offshoring on the skill composition of employment and its impact on wages, while the overall effect on employment and studies for developing countries has received less attention.

The aim of this work is to analyze the impact of offshoring, i.e. imported intermediates on total employment at the firm level for Uruguay, for the period 1998-2008. We contribute to the literature analyzing the impact on employment as well as whether offshoring has heterogeneous effects, according to the origin country of foreign inputs, and the technological level of the sector to which the offshoring firm belongs. Finally, we perform the analysis on the subset of exporting firms since results may vary due to the good performance of firms with a higher exposure to international markets. We use dynamic models that allows taking into account possible rigidities of the labor market as well as the endogeneity of some variables used in the analysis. Thus, we add evidence for a small middle income country: Uruguay.

This work structures as follows. After this introduction, in Section 2 we briefly comment some relevant works in the literature, Section 3 presents the data and some

[1] For an analysis of technology progress and its effects on the labor markets see Machin and Van Reenen (1998).

[2] There are also some studies that look at the effects of foreign direct investment on employment in the home country, such as Ebenstein et al. (2011).

descriptive statistics and the econometric model. In Section 4 we present the results and finally the main conclusions.

2. Literature review

As we mention above, offshoring is defined as the reallocation of production processes abroad, leading to trade in intermediate goods across borders and increasing specialization at home. Hûmmels et al. (2018) discuss the definition of offshoring and point out that the production of a final good or service consist of many tasks, such as research and design, component production and assembly marketing, and distribution. These tasks can be further split in more subdivisions. Tasks production can be disaggregated both geographically (within and across nations) and organizationally (within and across firms). Thus, offshoring can be thought off as the process of changing the geographic assignment of the mix of tasks needed to produce a single final good or service. Nowadays, fragmentation of production is a generalized phenomenon spur by development in communication and transportation technologies.

There are three key elements of offshoring: 1) is about intermediate inputs (or tasks) used for production, not final goods used for consumption; 2) offshoring is about imported inputs/tasks; 3) offshoring is about an input that could have been produced internally within the same firm.

Thus, offshoring is about input trade, so we disaggregate trade data into categories that represent trade in inputs, using the Broad Economic Categories (BEC) as we comment below.

Firms offshore due to comparative advantages at the task/input production level, due to technology or factor supplies. Nevertheless, this also depends on the interplay with trade and coordination costs. The literature mentions three channels to trigger offshoring. Firstly, firms may experience a reduction in trade and coordination costs (lower tariffs or improvements in shipping, information, and communication technologies) that lower the costs associated with disaggregating tasks from one product. Secondly, location comparative advantages for producing tasks/inputs may change. Finally, there may be changes in the ability of the firm to coordinate production at a distance or transfer technological advantages from one location to another.

As we mention above, one central question in empirical works has been how offshoring affects wages, employment, and its composition.

In industrialized countries the assumption is that labor intensive parts/tasks of production are reallocated abroad allowing production at home to focus on more capital or skill intensive production (Glass and Saggi, 2001). While with trade in final goods there is a process of adjustment of labor between sectors with offshoring the adjustment takes place within a sector or within a firm. Thus, a shift in the demand for skills within sectors or firms is expected in the developed country while a relative increased in the demand for unskilled labor is offshored to low income countries. This is the expectation in simple models such as Feenstra and Hanson (1996) and more recently Grossman and Rossi-Hansberg (2008).

Nevertheless, offshoring not only may affect the level of employment or its composition in terms of the share of skilled workers, but also offshoring jobs may translate into increased productivity and more efficient operation, with an expansion of sales and increasing employment. This is the scale effect of offshoring. While the direct effects impact only the enterprise engaging in offshoring there can be indirect effects of two forms. First, if as a consequence of offshoring a firm can provide its services to other firms at lower costs, so they may be able to expand activity and employment. Second, if offshoring results in lower prices to final consumers their real income increases, and some proportion of that real income may be spent on domestically produced goods and services again raising overall employment. These effects are predicted by theory (Glass and Saggi, 2001). Moreover, a number of empirical studies (Amiti and Wei, 2006; Görg et al., 2008; Görg and Hanley, 2011) show that offshoring leads to productivity improvement and foster innovative activities in firms.

Arndt (1997) argues that by shedding "their less competitive operations" companies become "more effective competitors in world markets for end products". There is evidence that offshoring contributed to changes in industry productivity and product prices (Feenstra and Hanson, 2001). Nevertheless, whether offshoring raises productivity depends on both sector and firm characteristics. Thus, offshoring can have indirect positive effects on employment and productivity. As Bottini et al. (2007) point out, while greater productivity could induce a firm to downsize its workforce in the short run, in the long run more productive firms should grow and ultimately to hire new workers. Hence, a higher productivity could increase employment in the long run. Grossman and Rossi-Hansberg (2008) decompose the impact of offshoring on wages, in three components: the labor supply effect, the relative price effect, and the productivity effect. These researchers show that while the first two components exert a negative impact on wages, productivity has a positive influence that can out-weight the others. Therefore, offshoring of low or high skilled tasks can raise the wage of domestic workers who perform the other tasks.

We should note that there are other factors that may affect employment such as technology progress, the cost of labour, changes in consumers' tastes, changes in the origin of imports and cyclical changes in economic activity which may impact on job destruction and creation.

There is a number of works for developed countries that study the effect of offshoring in the skill composition of employment and the wage gaps between skilled and unskilled labor. More recently, also the impact of offshoring on total employment at the firm level has been analyzed[3].

The literature describes a variety of theoretical mechanisms through which offshoring could affect labor demand and wages (Hûmmels et al., 2018; Crinò (2009).

[3] Görg (2011) and more recently Hûmmels, Munch and Xiang (2018) reviews the effects of offshoring on labor markets. Moreover, Koopman, Wang and Wei (2014) provide further refinement and generalization of offshoring measures.

We can identify three waves of the literature related to offshoring: those using industry data, followed by studies using firm level data, and more recently researchers started to analyze matched worker-firm data (Hûmmels et al., 2018).

Most of the empirical evidence of the effects of offshoring is based on analyses at the sector level (Amiti and Wei, 2005, 2009; Bertie, 2008; Crino, 2010, Falzoni and Tajoli, 2008). Generally, these studies find negative but modest impacts on employment at the sector level.

Usually, the argument to explain labor destruction is that the increasing availability of cheap intermediate inputs from low labor cost countries will reduce the demand for labor in the importing country. Nevertheless, along with the increasing fragmentation of production, firms in developing countries can offshore to take advantage of other comparative advantage of trade partners and to increase quality of the inputs used in production.

A second wave of studies focus on plant or firm level data, such as Görg and Hanley (2005), Hijzen et al. (2007), Wagner (2011), Lo Turco and Maggioni (2012). Görg and Hanley (2005) using plant level data for the electronic industry in Ireland for the period 1990-1995 find that offshoring leads to reductions in employment levels in offshoring plants in the short run. This study only considers the direct effects of offshoring and neglects possible indirect effects. Hijzen et al. (2007) using data at the firm level for 39 service sectors and the period 1997-2004, find that firms that outsource service provision foster employment growth. Wagner (2011), works at the firm level data for Germany for the period 2000-2006, and he analyses whether firms that start offshoring reduce employment in Germany. This researcher uses matching and difference-in-differences. The main findings are that offshorers are larger, more productive and more export intensive. This researcher finds no significant effects of offshoring on employment and positive effects on productivity due to scale effects. Lo Turco and Maggioni (2012) work for a panel of Italian manufacturing firms. They find negative effects of offshoring attributable to imports of intermediates from low income trading partners mainly for firms operating in traditional low technology intensive sectors. They find no statistically significant effects of imports from high income countries.

Mion and Zhu (2013) use Belgian firm level data from 1996 to 2007 to estimate how offshoring and import competition affect firms outcomes such as employment growth, survival probability, and the fraction of skilled workers. These researchers also distinguish import penetration and offshoring by source countries into four groups: OECD, China, other low-wage countries and the rest of the world. They use Instrumental Variables (IV) methodologies and instrument for offshoring. The main findings are that offshoring to China and the rest of the world both increase firms' survival probability. Second, the effects for China are more pronounced than for other source country groups, both import competition from China and offshoring to China increase the fraction of non-production workers.

Hûmmels et al. (2014) using firm panel data for Denmark find that more productive firms do more offshoring and pay higher wages.

More recently, research on this subject has focused on worker-level data in order to examine whether offshoring has any impact on job security or wages. While this approach has a number of advantages since allows controlling for worker characteristic we do not have access to employee-employer data in Uruguay due to confidentiality reasons.

Summing up, it seems from the literature that offshoring may have some effects on employment in line with expectations, where low-skilled workers may be more likely to lose and high skilled workers more likely to benefit, in developed countries. Less studied has been the impact of offshoring for developing countries. Moreover, the effect of offshoring on employment are likely to be very small.

As we commented above, productivity and employment has been a major preoccupation in developing countries dealing with technological progress and trade liberalization. These processes are often interlinked as trade liberalization increases competition forcing firms to incorporate technology to survive. In the 1970s Uruguay initiate a trade liberalization process that was deepened during the 1990s and combined a gradual unilateral tariff reduction with the regional integration in the framework of the Southern Common Market (MERCOSUR).

In Uruguay, trade liberalization during the 1990s was associated with increasing productivity, as firms responded to the reductions in trade barriers incorporating capital intensive technologies. There was also significant job destruction and wage dispersion (Casacuberta et al., 2004). Nevertheless, there are no studies on the impact of offshoring on labor demand, skill composition of employment, and wages. In this work due to space reasons we focus on the effect of offshoring on total labor demand at the firm level.

Uruguay provides an interesting framework to study the impact of offshoring on employment and its composition for a small Latin American country. Moreover, we have a long time span of data with the first years signed by the Brazilian devaluation in 1998 followed by the recession in 2002, the recovery from the 2002 crisis, and the beginning of economic growth in the country from 2004 until the last year of the sample (2008).

We should note that offshoring can induce international technology transfer for a country like Uruguay, and trade with countries where technological innovations are generated (high income countries) can be a major channel for knowledge acquisition. Nevertheless, we do not know which will be the impact of offshoring on the labor market and skill composition of the labor force. Thus, this work contributes to the existing literature by analyzing the impact of offshoring and its various sources (high income and low income countries) on total employment at the firm level.

The role of imported intermediates on productivity has been more studied. Some works have evaluated the impact of imports on Uruguayan firms' productivity. Peluffo (2008), working at the firm level for the period 1997-2001, finds considerable productivity gains from using imported intermediates, results that are also confirmed for the period 1988-2005 (Peluffo, 2012). Zaclicever and Pellandra (2012) carry out a firm-level analysis for the period 1997-2008, finding a productivity--enhancing effect of foreign intermediate inputs, which is positively related to the number of varieties imported and the technology embodied in them. They also find evidence that the effect on firms' productivity is stronger for inputs imported from advanced economies, while inputs from other origins (particularly those from MERCOSUR countries) exhibit a weaker and less robust impact. Finally, Peluffo, Zaclicever and Blanchard (2019) add the absorptive capacity dimension to the evaluation of import-related technology diffusion, finding that skilled labour helps to absorb technology embodied in intermediate inputs and translates into increased productivity.

As regards the source country there may exist heterogeneous effects according to the income level of the source countries (Görg and Hanley, 2005; Moser et al., 2009, Lo Turco and Maggioni, 2012). Foreign input flows may differ across partners' countries and also the effects on firm's performance may vary (Harrison and Mac Millan, 2007). Inputs from developed countries are likely to have a higher technological content and quality than imports from less developed countries. Thus, imports from high income countries can have different effects on employment compared to imports from low income countries. Moreover, the effects of offshoring may differ according to the technology intensity of the sector and to the skill level of the workforce of the firm. For developed countries usually is belief that imports for low income country may have a negative effect on employment. Nevertheless, for less developed country this issue has been less studied, while imports from high income countries can have positive effects on firms' performance since can have a higher technological content and quality. Firms belonging to high or low intensive technology sectors could behave differently regarding to several dimensions of performance among which employment among which employment is one of them. Imports of intermediates can have a different effect according to the technological intensity of the sector to which the firm belongs. Firms performing low tech intensive activities may find an opportunity to restructure the production process through imports from low income countries while this may not affect firms in high intensive technological sectors. Moreover, we analysis the impact of imports of intermediates on the subset of exporting firms since imports could affect firm productivity and competitiveness in international markets.

In order to design appropriate policies, it is needed to analyze the theoretical arguments and the empirical evidence, on the employments effects of globalization in general and offshoring in particular.

In this work we follow Lo Turco and Maggioni (2012) who analyze the impact of offshoring on total employment at the firm level, taking into account not only the intensity of offshoring but also the level of income of source countries. Next, in line with that work we also analyse the interplay of offshoring and the technological intensity of the sectors and the level of skilled workers at the firm level, discriminating in firms with high and lower level of skills.

Finally, we perform some robustness checks such as the estimation of the model only on the subset of exporting firms since they are more exposed to higher competitive pressure than domestic firms.

3. Empirical strategy

3.1. The data

We use two data sources to perform our analysis, firm-level data and administrative customs information.

Firm-level data come from the Annual Economic Activity Surveys (EAAE; *Encuesta Anual de Actividad Económica*) from 1998 to 2008, carried out by the National Institute of Statistics (INE, *Instituto Nacional de Estadística*). The EAAE records firm activity and characteristics using a stratified sampling with probabilistic samples representative of economic sectors of the International Standard Industry Classification (ISIC). The exception is for the stratum of largest firms in terms of income or employment for which a census is performed. In the year 2006 only firms of compulsory inclusion were surveyed.

The survey covers firms that perform an economic activity related to industry, commerce or services in Uruguayan territory, except for those establishments in Export Processing Zones (EPZ). It does not include industries related to agriculture and livestock, extractive industries, construction, or financial services controlled by the Central Bank, among others. Since there is no data on trade on services we restrict the analysis to manufacturing firms.

The customs data is collected by the National Customs Service (DNA, *Dirección Nacional de Aduanas*). This data is available from 1997 to 2008 at the transaction level from Customs declarations. The database provides information on imports CIF values traded in current US dollars by firm, product, and country of origin.

Both databases were merged using an identification of the firm so the data cover firms' characteristics and imports.

We applied the Broad Economic Classification (BEC) to the Customs import data to discriminate imports of intermediates. Then we measure the amount in values of imports of intermediates by source country according to the level of income of the origin country. We use the classification of the World Bank (2005).

We take the data in value to constant Uruguayan pesos with base year 2005 using the implicit deflator for gross product at the 3-digit level and wages were deflated using the consumer price index (IPC).

The offshoring indicator is split according to the level of the income of the source countries (high, middle and low income countries). This allows taking into account the existence of heterogeneous effects according to the characteristics of the trading partners, since the reasons to offshore may differ across trade partners and also the effects on the offshoring firms could differ (Harrison and McMillan, 2007). Offshoring is measured as firms imports of intermediates according to the BEC definition except for energy material. We measure offshoring as imported inputs over total intermediate purchases of the firm and as a share of total sales. We report the results for imports of intermediates over total intermediate purchases due to space reasons[4].

3.2. Descriptive statistics

In Table 1 and Figure 1 we present total intermediate imports by geo-economic region. We can observe that during the period imports of intermediates come mostly from high-income countries and Mercosur partners'.

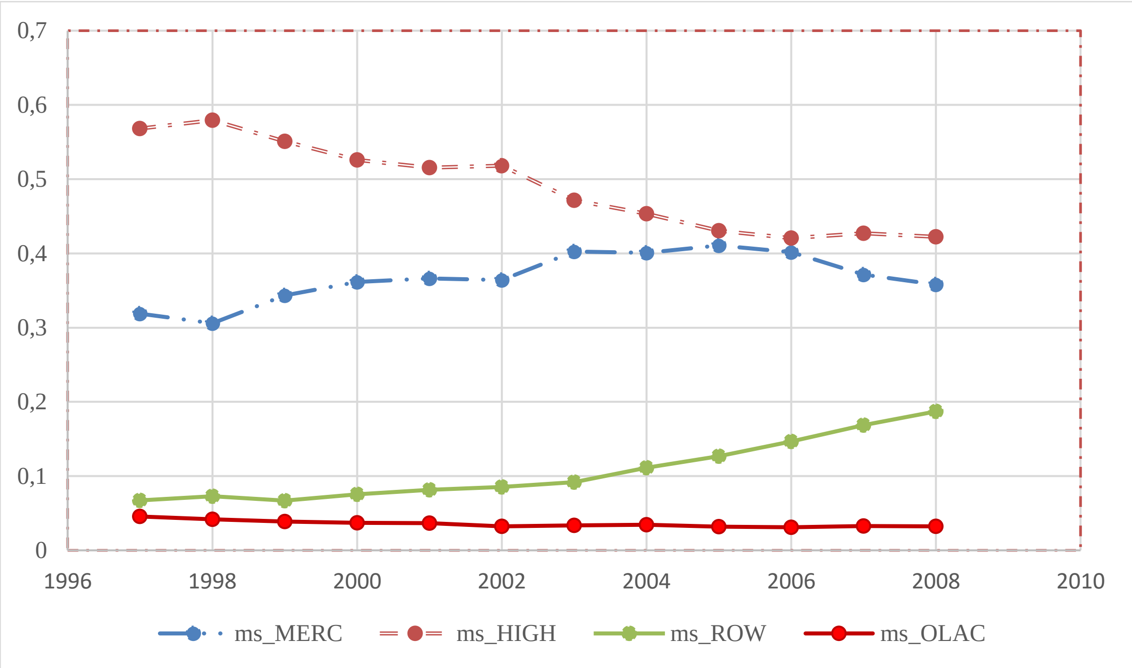
Table 1: Share of firms' imports of intermediates by geo-economic region

Year	ms_MERC	ms_HIGH	ms_ROW	ms_OLAC
1997	0.3188	0.5684	0.0672	0.0456
1998	0.3059	0.5794	0.0728	0.0418
1999	0.3432	0.5511	0.0670	0.0387
2000	0.3614	0.5261	0.0754	0.0371
2001	0.3664	0.5154	0.0817	0.0365
2002	0.3642	0.5180	0.0853	0.0325
2003	0.4024	0.4717	0.0920	0.0338
2004	0.4009	0.4534	0.1114	0.0344
2005	0.4107	0.4304	0.1270	0.0319
2006	0.4015	0.4206	0.1468	0.0311
2007	0.3715	0.4271	0.1688	0.0327
2008	0.3581	0.4224	0.1871	0.0324
Total	0.3658	0.4881	0.1104	0.0357

Notes: ms_MERC: share of intermediates from Mercosur's partners; ms_HIGH: share of intermediate from high income countries, ms_ROW: share of intermediates from the rest of the world, ms_OLAC: share of intermediates from Other Latin American and Caribbean countries.
Source: Author elaboration from Customs administrative data

[4] Results of the measure of offshoring over total sales of the firm are available upon request from the author.

Figure 1: Share of firms' imports of intermediates by geo-economic region



Source: Author's elaboration based on customs administrative data provided by Uruguay XXI

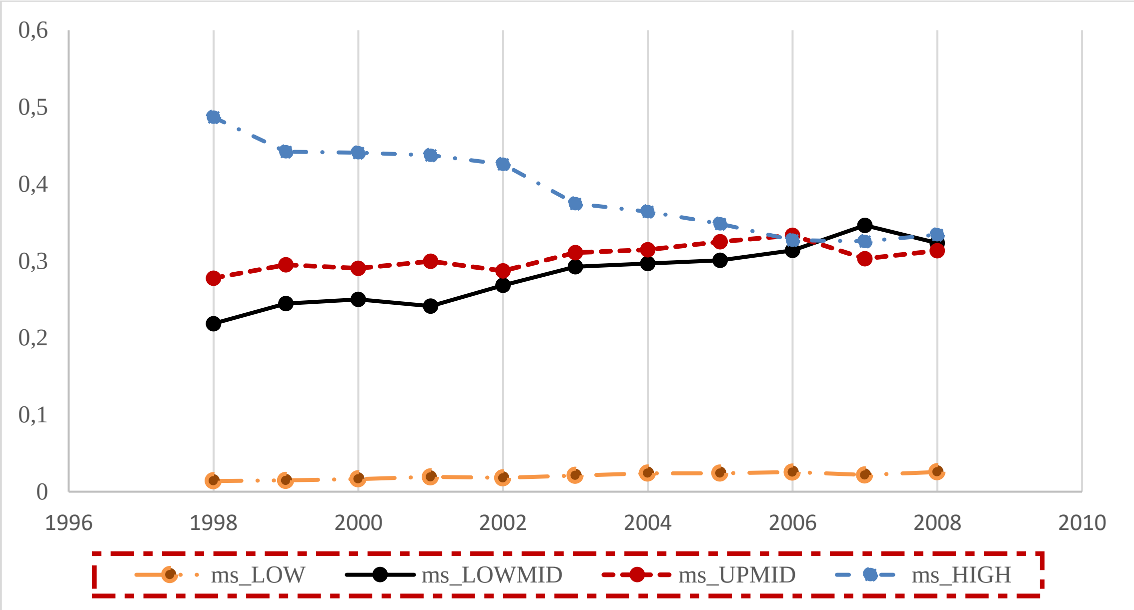
When we split the sample according to the income level of source countries we observe that most of intermediate imports are from high income countries followed by upper middle income countries.

Table 2: Share of intermediate imports by level of income of source countries in total intermediate imports: High, Middle and Low income countries

Year	ms_LOW	ms_LOW_MIDDLE	ms_UPPER_MIDDLE	ms_HIGH
1998	0.0139	0.2185	0.2777	0.4869
1999	0.0147	0.2447	0.2949	0.4420
2000	0.0165	0.2500	0.2903	0.4406
2001	0.0191	0.2413	0.2996	0.4376
2002	0.0179	0.2683	0.2870	0.4259
2003	0.0211	0.2927	0.3110	0.3747
2004	0.0240	0.2967	0.3146	0.3642
2005	0.0240	0.3008	0.3251	0.3482
2006	0.0254	0.3139	0.3333	0.3269
2007	0.0216	0.3463	0.3028	0.3255
2008	0.0256	0.3235	0.3133	0.3341
Total	0.0202	0.2799	0.3036	0.3942

Source: Author's elaboration from Customs administrative data, Uruguay XXI

Figure 2: Share of intermediate imports by level of income of source countries



Source: Author's elaboration from Customs administrative data, source Uruguay XXI

Then we define dummy variables for those firms that offshore, and present the share of offshoring firms in Table 3. In the sample of firms there are 63. 3 % of offshorers, and 53 % offshore to high income countries, while 49 % to middle income countries and only 9.6 % to low-income countries. We should keep in mind that one firm may offshore to various markets simultaneously. In Figure 3 we present the share of offshorers and offshorers to high and low income countries.

Table 3: Share of firms according to the level of income of source countries in the sample

Year	DOFF	DOFF_HIGH	DOFF_LOW	DOFF_LOWMID	DOFF_UPMID
1998	0.6368	0.5548	0.0709	0.4463	0.4961
1999	0.6064	0.5370	0.0762	0.4425	0.4676
2000	0.5800	0.5006	0.0829	0.4200	0.4350
2001	0.6051	0.5222	0.0724	0.4241	0.4498
2002	0.5705	0.4800	0.0705	0.4042	0.4137
2003	0.5851	0.4706	0.0851	0.4212	0.4454
2004	0.6354	0.5266	0.0995	0.4850	0.4919
2005	0.6293	0.5297	0.1131	0.4804	0.4994
2006	0.8540	0.7327	0.1906	0.7005	0.7550
2007	0.7332	0.6079	0.1239	0.5889	0.5933
2008	0.6853	0.5432	0.1315	0.5166	0.5232
Total	0.6332	0.5338	0.0956	0.4694	0.4902

Notes: DOFF: dummy for total offshoring firms; DOFF_HIGH: offshorers to high income countries, DOFF_LOW: firms offshoring from low income countries; DOFF_LOWMID: firms offshoring from low-middle income countries; DOFF_UPMID: firms offshoring from upper-middle income countries.
Source: Author's elaboration from Customs administrative data, Uruguay XXI.

We also look at firm export activity and find that the percentage of firms that offshore intermediates is higher than exporting firms. Moreover most exporters are also importers.

In Table 4 we present the share of firms by trading status: exporters, importers of intermediates and firms that export and import intermediates simultaneously (two-way traders). We find that for the whole period 37 % of firms are exporters, 63 % are importers of intermediates and 34 % are both exporters and importers of intermediate goods, so most exporters are also importers.

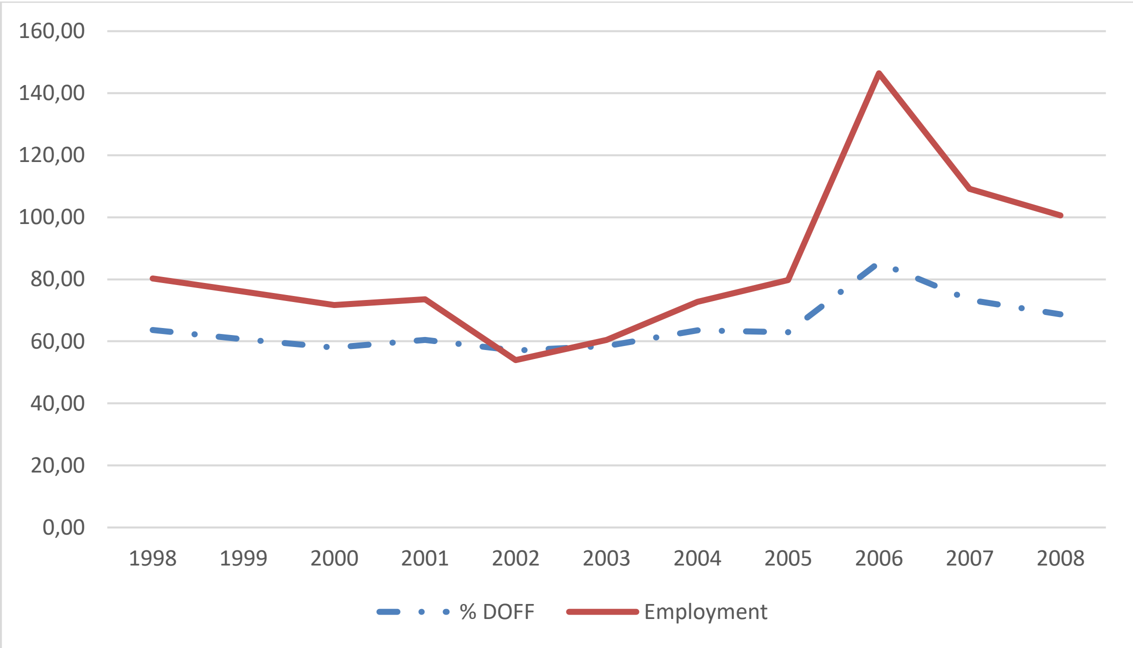
In 2006 we observe a higher share of offshorers but this is due to the fact that in the year 2006 the Instituto de Estadistica recorded only data for firms in the compulsory stratum this year, this is firms bigger than 100 workers and with a high value of sales. Moreover, we can observe in Figure 4 that the percentage of firms that offshores and average employment per firm (in number of workers) follow the same trend, with the lowest value when the economic crisis in 2002 hit the economy and the highest value when only bigger firms are considered in 2006.

Table 4: Share of firms by trading status

Year	Exporters	Importers Intermediates	Two-way Traders
1998	0.3842	0.6368	0.3655
1999	0.3754	0.6064	0.3484
2000	0.3580	0.5800	0.3318
2001	0.3624	0.6051	0.3287
2002	0.2333	0.5705	0.2176
2003	0.3142	0.5851	0.2881
2004	0.3698	0.6354	0.3433
2005	0.4013	0.6292	0.3645
2006	0.6044	0.8540	0.5676
2007	0.4470	0.7332	0.4122
2008	0.3822	0.6853	0.3582
Total	0.3702	0.6332	0.3431

Source: Author's elaboration from Customs administrative data, Uruguay XXI

Figure 3: Percentage of firms that offshore and average employment level per firm in terms of total workers



Source: Author's elaboration from Customs administrative data, Uruguay XXI

In Table 5 we present the share of offshorers by sector. We can observe that the three sectors which firms offshore the most are Tobacco products, Chemicals and chemical products and electrical machinery and apparatus. While in Tobacco all the firms in the sector offshore, in Chemicals 82,69 % of the firms offshore and in Electrical machinery the percentage of offshoring firms is 81,25 %.

Table 5: Share of Offshorers by income level of source countries and sector, period 1998-2008

ISIC	Description	DOFF	DOFF_HIGH	DOFF_LOW	DOFF_LOWMID	DOFF_UPPERMID
15	Food products and beverages	0.5242	0.4098	0.0221	0.3176	0.3708
16	Tobacco products	1.0000	1.0000	0.2083	1.0000	0.9583
17	Textiles	0.7763	0.6797	0.1746	0.6494	0.5512
18	Wearing apparel; dressing and dyeing of fur	0.7031	0.5717	0.1212	0.5683	0.5256
19	Tanning and dressing of leather	0.6006	0.4737	0.1331	0.4644	0.5046
20	Wood and of products of wood and cork, except furniture	0.4919	0.3851	0.0097	0.2783	0.3107
21	Paper and paper products	0.7358	0.6289	0.0755	0.5660	0.5660
22	Publishing, printing and reproduction of recorded media	0.5598	0.5179	0.0219	0.3386	0.4024
24	Chemicals and chemical products	0.8269	0.7733	0.3684	0.7206	0.7581
25	Rubber and plastics products	0.7822	0.6651	0.0843	0.6674	0.6651
26	Other non-metallic mineral products	0.5764	0.4582	0.0490	0.4697	0.4553
27	Basic metals	0.7980	0.6667	0.1111	0.7172	0.7172
28	Fabricated metal products, except machinery and equipment	0.5590	0.4633	0.0356	0.3653	0.4187
29	Machinery and equipment n.e.c.	0.5878	0.5306	0.0163	0.4204	0.4449
30	Office, accounting and computing machinery	0.7143	0.5714	0.2857	0.5714	0.3571
31	Electrical machinery and apparatus n.e.c	0.8125	0.6875	0.0521	0.7188	0.7188
32	Radio, television and communication equipment	0.7200	0.6400	0.0000	0.4000	0.2800
33	Medical, precision and optical instruments	0.6667	0.5818	0.1212	0.5455	0.5212
34	Motor vehicles, trailers and semi-trailers	0.7380	0.5989	0.0856	0.6471	0.6471
35	Other transport equipment	0.5979	0.5155	0.2165	0.3402	0.4330
36	Furniture; manufacturing n.e.c.	0.5659	0.5039	0.0465	0.4070	0.4535
37	Recycling	0.5556	0.5556	0.0000	0.2222	0.3333
Total		0.6332	0.5340	0.0956	0.4695	0.4904

Source: Author's elaboration based on data on the Economic Surveys and administrative Customs data
Notes: DOFF share of offshorers in the sample by sector.

Table 6: Technological intensity of the sectors

Table 6.1: High Technology intensive sectors, share of firms in the sample

ISIC	DOFF	DOFF_HIGH	DOFF_LOW	DOFF_LOWMID	DOFF_UPPERMID
15	0.5238	0.4096	0.022	0.3173	0.3715
16	1	1	0.2083	1	0.9583
22	0.556	0.5147	0.0216	0.3379	0.4008
24	0.8273	0.7737	0.3687	0.7212	0.7646
27	0.8039	0.6765	0.1078	0.7255	0.7255
31	0.8154	0.6923	0.0513	0.7231	0.7231
34	0.738	0.5989	0.0856	0.6471	0.6471
35	0.5979	0.5155	0.2165	0.3402	0.433
Avg	0.7328	0.6477	0.1352	0.6015	0.628

Table 6.2: Low Technology intensive sectors, share of firms in the sample

ISIC	DOFF	DOFF_HIGH	DOFF_LOW	DOFF_LOWMID	DOFF_UPPERMID
17	0.7714	0.6757	0.1757	0.6443	0.5471
18	0.7031	0.5717	0.1212	0.5683	0.5256
19	0.5969	0.4708	0.1323	0.4615	0.5015
20	0.4919	0.3851	0.0097	0.2783	0.3139
21	0.7358	0.6289	0.0755	0.566	0.566
25	0.7877	0.6644	0.0845	0.6667	0.6781
26	0.5764	0.4582	0.049	0.4697	0.4553
28	0.5619	0.4668	0.0354	0.3695	0.4226
29	0.5878	0.5306	0.0163	0.4204	0.4449
30	0.7143	0.5714	0.2857	0.5714	0.3571
32	0.72	0.64	0	0.4	0.28
33	0.6667	0.5818	0.1212	0.5455	0.5212
36	0.5659	0.5039	0.0465	0.407	0.4535
37	0.5556	0.5556	0	0.2222	0.3333
Avg	0.6454	0.5504	0.0824	0.4708	0.4572

We classify the sectors into high and low technological intensity according to the expenditure in innovation as a share of turnover (Aboal et al., 2011), and we observe that high-tech sectors have a higher share of offshoring firms and mainly from high income countries compared to low intensive sectors.

3.3. Econometric modelling

We now model offshoring using a log-linear model of labor demand in the same way that labor saving technological change (Feenstra and Hanson, 1996, 1999, Feenstra, 2015).

The baseline estimating equation is the following:

$$l_{ijr} = \propto_0 + \beta_0 l_{ijt-1} + \alpha_1 w_{ijt} + \gamma_1 w_{ijt-1} + \alpha_2 k_{ijt} + \gamma_2 k_{ijt-1} + \alpha_3 y_{ijt} + \gamma_3 y_{ijt-1} + \delta_1 Off_{ijt} + \theta_i + \rho_j + \tau_t + \varepsilon_{ijt}$$

We define as l the log of the number of workers of firm i in industry j and time t, w stands for the log of average wages paid by the firm, k represents the capital stock expressed in natural logarithm, y stands for the log of firm's real output, and θ_i stands for firms fixed effect (unobserved heterogeneity), ρ_j for sector fixed effect at the 2-digit level, and τ_t time fixed effects. ε_{ijt} represents the disturbance term. *Off* represents offshoring which is further split in offshoring to low income countries (Off_{Low}) and to high income countries (Off_{High}). These variables represent the share of imported inputs from low and high and middle income countries over total purchases of the firms. We also try as measures of offshoring imported intermediates by income of source countries over total sales, and over total row materials and materials used by the firm.[5]

Since it is likely the existence of endogeneity due to the nature of microeconomic data, unobservable shocks and the probable endogeneity of the offshoring measures we use a dynamic model that also is valuable in order to capture eventual rigidities in the labor Uruguayan market that have been described in the literature on the subject.

We estimate a dynamic model by means of system generalized method of moments (GMM-SYS) following the works by Arellano and Bond (1991); Blundell and Bond (1998) and more recently Roodman (2009, 2020). Roodman also has instrumented a recent command to estimate dynamic models (xtabond2). Since our panel is unbalanced to reduce the number of gaps we use orthogonal forward deviations. By means of dynamic models estimation we can deal with endogeneity of the regressors and analyze causal relations.

4. Results

4.1. Results for the whole sample

In Table 6 we present the results for the whole sample of firms merged with intermediate imports data for the period 1998-2008, using one-step SYS-GMM coefficient estimates with heteroscedasticity-robust standard errors.

In the first model we test total offshoring, this is total imports of intermediates over total purchases by the firm. We find that this variable has a slight significant positive effect on the demand for employment. Since the dependent variable is in logs and the explanatory variable is a share to obtain the elasticity we have to calculate: 100[expβ_{Toff3}

[5] Results are available upon request.

– 1]. Thus, an increase of 1 percent in offshoring would increase employment by 0.10 %. Moreover, lagged employment and current output have positive and significant effects. Current wages have a negative effect on the demand for labor but wage lagged one period has positive effect in three of out four models, pointing out to rigidities or persistency of the effect of past wages on current labor. The net –or long run- effect of wages is negative, of the order of 1.3 % in terms of elasticity of the labor demand. Hamermesh (1986) analyzing several studies of labor demand find that the wage elasticity of labor demand in the long run is about 0,15 and 0,75 in absolute value. Estimations for Uruguay are about -0.1 and -0.3 depending on the type of data and the methodology used (Porras and Melognio, 2012). We find that at the firm level this value is higher than these previous studies. While the effect of current output, namely the elasticity of employment to output is very low. The small number of works for the Uruguayan economy point out that this elasticity is 0.5, i.e. for each 1 % of growth in the product the employment growth is of 0.5 %. The stock of capital either current or lagged one period turn to be not significant in most of the specifications.

We observe that there is autocorrelation of order one but the autocorrelation of order two is not significant. The Hansen test allows us to accept that the instruments are exogenous, this is uncorrelated with the error term.

In model 2 we split the offshoring measures in high, middle and low offshoring measures according to the level of income of source countries. We test current values of these measures. We find that there are not significant effects of the measures of offshoring on labor demand. The rest of the variables are similar to model one.[6]

In model 3 we include the offshoring measures split by level of the income source in current values and lagged one period. We find similar results that in previous models except for current capital that has a significant positive effect, while the offshoring measures do not have significant effects on labor demand.

Finally, in model 4 we include export intensity (exports/total sales). We find that current export intensity has no effect on employment but export intensity lagged one period has a positive effect on labor demand. The rest of the results are similar to the previous ones. All the models seem to behave adequately according to the Hansen test of over-identifying restrictions.

[6] We also perform the estimations without Offshoring to Middle Income economies and we obtain similar results.

Table 6: Results whole sample, employment per firm

VARIABLES	Model 1	Model 2	Model 3	Model 4
L.l	0.922***	0.929***	0.919***	0.911***
	(0.0240)	(0.0231)	(0.0223)	(0.0269)
W	-0.596***	-0.601***	-0.562***	-0.598***
	(0.124)	(0.131)	(0.128)	(0.131)
L.w	0.493***	0.482***	-0.0160	0.465***
	(0.105)	(0.111)	(0.0163)	(0.110)
K	-0.0216	-0.0126	0.453***	-0.00809
	(0.0168)	(0.0172)	(0.109)	(0.0169)
L.k	-0.0163	-0.0161	-0.0165	-0.0158
	(0.0111)	(0.0124)	(0.0119)	(0.0123)
Toff3	0.00787*	----------	----------	----------
	(0.00472)			
OffH3	----------	0.0316	0.0165	-0.0124
		(0.0474)	(0.0621)	(0.0605)
L.OffH3	----------	----------	0.0111	-0.00545
			(0.0501)	(0.0478)
OffL3	----------	0.0380	0.00916	0.0108
		(0.0557)	(0.0763)	(0.0727)
L.OffL3	----------	----------	-0.00150	0.0105
			(0.0667)	(0.0741)
OffMid3	----------	0.00414	0.00348	0.00564
		(0.00705)	(0.00728)	(0.00675)
L.OffMid3	----------	----------	0.00470	0.00611
			(0.00504)	(0.00484)
vab_d	3.99e-08***	3.96e-08***	4.32e-08***	4.29e-08***
	(1.34e-08)	(1.33e-08)	(1.35e-08)	(1.33e-08)
L.vab_d	----------	----------	-8.22e-09	-6.69e-09
			(7.09e-09)	(7.14e-09)
exp_int	----------	----------		0.0845*
				(0.0461)
L.exp_int	----------	----------		0.0383
				(0.0489)
Number of firms	834	834	783	783
Time Dummies	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes
AR(1)	7.07e-09	6.98e-09	1.57e-08	9.39e-09
AR(2)	0.381	0.389	0.245	0.242
Hansen p-value	0.904	0.901	0.842	0.848
Number Obs.	4,459	4,459	4,245	4,245

Notes: L.l: labor lagged one period; w: average wages per firm; L.w: average wages per firm lagged one period; K: current stock of capital; L.k: stock of capital lagged one period; Toff3: total imports of intermediates over total purchases per firm; OffH3: imports of intermediates from high income countries over total purchases; L.OffH3: imports of intermediates over total purchases from high income countries lagged one period; OffL3: imports of intermediates from low income countries over total purchases; L.OffL3: imports of intermediates from low income countries over total purchases lagged one period; OffMid3: imports of intermediates from middle income countries over total purchases; L.Mid3: OffMid3 lagged one period; vab:value added per firm; L.vab: value added lagged one period; R&D dummy: dummy that takes the value of one if the firm undertakes investments in R&D and zero otherwise; exp_int: export intensity define as exports over sales; L.exp_int: lagged export intensity; AR(1) test of autocorrelation of order one; AR(2): test of autocorrelation of order two. Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

4.2. Results for the sub-sample according to the technology intensity of sectors

We split the sample according to the technological content of the sectors defined as high and low technological intensity according to the expenditure in innovation as a share of turnover, as in Aboal et al. (2015).[7]

We find positive effects of employment lagged one period for both high and low intensive technology sectors. Model (2) for the high intensive technology sector is not adequate according to Hansen tests. For this sub-sample (high intensive in technology) the net effect of wages is negative for the four specifications analyzed. Total imported intermediates over total purchases is not significant in models (1) to (3). While in model (4) the net effect of offshoring to low income countries is positive and significant. The only difference between model (4) with the previous models is that in the fourth model we include export intensity which shows a positive and significant effect for its current value.

For both sub-samples, high and low intensive in technology we find positive effects of current production on employment but no effect of production lagged one period.

When we analyze low intensive technology sectors we find positive and significant effect of lagged employment, and a small negative net effect of wages. The effect of lagged capital shows a negative impact implying a possible substitution effect of capital by labor. The measure of total offshoring (model 1) show a positive effect on employment. Offshoring to high income countries (model 2) and lagged offshoring to middle income countries (model 4) show a positive significant effect on employment. Nevertheless, lagged offshoring to low income countries show a negative and significant effect (model 3 and 4). Thus, it seems that while total offshoring, and offshoring to high and middle income countries have a positive effect on employment in low intensive technology sectors, offshoring to low income countries have a deleterious effect on employment. Current output has a positive effect. We note that all the four model seems to be adequate according to the Hansen test.

From Table 6.1 and 6.2, we have observed that high technology intensive sectors undertake more offshoring that low intensive technology sectors (73 % high tech and 65 % low tech sectors) and mainly from high and middle income countries.

Finally, we also tested the classification of technology intensity using the OECD definition (OECD, 2011), and we find similar results.[8]

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[7] Sectors below equal to or below the median are classified as low-technological sectors, and those above the median are classified as high-technological intensive sectors.
[8] Results available upon request from the authors.

Table 7: Analysis of the effects of offshoring in high and low intensive sectors

	HIGH TECH SECTORS				LOW TECHNOLOGY SECTORS			
	(1)	(2)	(3)	(4)	(1)	(1)	(1)	(1)
VARIABLES	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
L.l	0.953***	0.932***	0.933***	0.916***	0.843***	0.839***	0.870***	0.865***
	(0.0178)	(0.0215)	(0.0224)	(0.0269)	(0.0613)	(0.0618)	(0.0482)	(0.0500)
w	-0.145*	-0.139	-0.0948	-0.102	-0.449***	-0.444***	-0.515***	-0.519***
	(0.0788)	(0.0888)	(0.114)	(0.112)	(0.144)	(0.142)	(0.119)	(0.118)
L.w	0.105	0.103	0.0607	0.0592	0.414***	0.410***	0.444***	0.437***
	(0.0689)	(0.0707)	(0.0880)	(0.0876)	(0.117)	(0.117)	(0.111)	(0.110)
k	-0.0134	-0.0101	-0.0112	-0.0116	0.00673	0.00575	0.00688	0.00811
	(0.0140)	(0.0133)	(0.0132)	(0.0133)	(0.0201)	(0.0197)	(0.0221)	(0.0230)
L.k	-0.00398	-0.00460	-0.00697	-0.00720	-0.0199**	-0.0206**	-0.0185*	-0.0187*
	(0.0100)	(0.0101)	(0.0116)	(0.0116)	(0.00947)	(0.00949)	(0.0106)	(0.0107)
Toff3	-0.00477	--------	--------	--------	0.0109**	--------	--------	--------
	(0.00940)				(0.00516)			
OffH3	--------	-0.0428	-0.00670	-0.0176	--------	0.112*	0.0545	0.0293
		(0.0357)	(0.0555)	(0.0561)		(0.0644)	(0.0718)	(0.0712)
L.OffH3	--------	--------	-0.0545	-0.0739	--------	--------	0.0419	0.0293
			(0.0485)	(0.0489)			(0.0717)	(0.0705)
OffL3	--------	0.192	0.0360	0.0509	--------	-0.00442	0.0566	0.0517
		(0.143)	(0.160)	(0.166)		(0.0704)	(0.0873)	(0.0874)
L.OffL3	--------	--------	0.206	0.267*	--------	--------	-0.112*	-0.111*
			(0.150)	(0.157)			(0.0613)	(0.0605)
OffMid3	--------	0.00996	0.00709	0.00755	--------	0.00864	-0.00141	0.000186
		(0.00631)	(0.00559)	(0.00534)		(0.0101)	(0.0118)	(0.0119)
L.OffMid3	--------	--------	0.00707	0.00688	--------	--------	0.0142	0.0157*
			(0.00961)	(0.00881)			(0.00889)	(0.00880)
vab_d	1.56e-08**	1.84e-08**	2.04e-08**	2.10e-08**	9.63e-08***	9.70e-08***	7.41e-08***	7.26e-08***
	(6.43e-09)	(7.18e-09)	(8.45e-09)	(8.71e-09)	(3.25e-08)	(3.26e-08)	(2.48e-08)	(2.46e-08)
L.vab_d	--------	--------	-2.45e-09	-5.42e-10	--------	--------	2.37e-08	2.24e-08
			(5.26e-09)	(5.27e-09)			(1.75e-08)	(1.75e-08)

Cont. Table 7: Analysis of the effects of offshoring in high and low intensive sectors

	HIGH TECH SECTORS				LOW TECHNOLOGY SECTORS			
	(1)	(2)	(3)	(4)	(1)	(1)	(1)	(1)
VARIABLES	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
exp_int	--------	--------	--------	0.123**	--------	--------	--------	0.0388
			--------	(0.0579)				(0.0620)
L.exp_int	--------	--------	--------	-0.00362	--------	--------	--------	0.0276
				(0.0625)				(0.0664)
Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AR(1)	0.00135	0.00116	1.90e-09	0.00162	3.23e-09	3.31e-09	1.32e-09	1.38e-09
AR(2)	0.649	0.659	0.420	0.394	0.394	0.390	0.370	0.368
Hansen	0.828	0.000206	0.871	0.808	0.824	0.826	0.920	0.936
Number Obs	2,461	2,461	2,322	2,322	1,975	1,975	1,901	1,901

Notes: L.l: labor lagged one period; w: average wages per firm; L.w: average wages per firm lagged one period; K: current stock of capital; L.k: stock of capital lagged one period; Toff3: total imports of intermediates over total purchases per firm; OffH3: imports of intermediates from high income countries over total purchases; L.OffH3: imports of intermediates over total purchases from high income countries lagged one period; OffL3: imports of intermediates from low income countries over total purchases; L.OffL3: imports of intermediates from low income countries over total purchases lagged one period; OffMid3: imports of intermediates from middle income countries over total purchases; L.Mid3: OffMid3 lagged one period; vab: value added/production per firm; L.vab: value added lagged one period; R&D dummy: dummy that takes the value of one if the firm undertakes investments in R&D and zero otherwise; exp_int: export intensity define as exports over sales; L.exp_int: lagged export intensity. All values are in constant Uruguayan pesos base 2005 and in logarithm (except for variables expressed as shares). AR(1) test of autocorrelation of order one; AR(2): test of autocorrelation of order two.
Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

4.3. Results for the subsample of exporting firms

Next, we estimate the models only on the set of exporting firms (Table 8). We find once again positive effects of lagged employment, negative net effects of current wages, and no effects of the stock of capital. All the offshoring measures were not significant.

The net effect of production is positive and significant only in model (3). We find a positive autocorrelation of order one but the no evidence of autocorrelation of order two as can be observed from the p-values of the autocorrelation tests (AR(1) and AR(2)). Finally, all models seem to be adequate according to the Hansen test.

Table 8: Exporting firms, employment per firm

VARIABLES	Model 1	Model 2	Model 3
L.l	0.799***	0.799***	0.822***
	(0.0600)	(0.0598)	(0.0598)
w	-0.469***	-0.475***	-0.499**
	(0.176)	(0.176)	(0.199)
L.w	0.414**	0.420**	0.448**
	(0.173)	(0.173)	(0.197)
k	0.0214	0.0221	0.0253
	(0.0270)	(0.0272)	(0.0298)
L.k	-0.00494	-0.00424	-0.00772
	(0.0126)	(0.0128)	(0.0152)
Toff3	0.00774	--------	--------
	(0.00797)		
OffH3	--------	-0.0675	-0.0116
		(0.0595)	(0.0915)
L.OffH3	--------	--------	-0.0724
			(0.0633)
OffL3	--------	0.0418	-0.114
		(0.157)	(0.249)
L.OffL3	--------	--------	0.133
			(0.212)
OffMid3	--------	6.16e-08	0.0172
		(3.77e-08)	(0.0215)
L.OffMid3	--------	--------	-0.000970
			(0.0160)
vab_d	6.22e-08	6.16e-08	1.48e-07**
	(3.79e-08)	(3.77e-08)	(5.96e-08)
L.vab_d	--------		-8.95e-08**
			(3.78e-08)
Number of firms	446	446	406
Time Dummies	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes
AR(1) p-value	4.82e-06	5.36e-06	1.13e-05
AR(2) p-value	0.490	0.506	0.947
Hansen p-value	0.827	0.844	0.636
Number Obs	1,666	1,666	1,523

Notes: L.l: labor lagged one period; w: average wages per firm; L.w: average wages per firm lagged one period; K: current stock of capital; L.k: stock of capital lagged one period; Toff3: total imports of intermediates over total purchases per firm; OffH3: imports of intermediates from high income countries

over total purchases; L.OffH3: imports of intermediates over total purchases from high income countries lagged one period; OffL3: imports of intermediates from low income countries over total purchases; L.OffL3: imports of intermediates from low income countries over total purchases lagged one period; OffMid3: imports of intermediates from middle income countries over total purchases; L.Mid3: OffMid3 lagged one period; vab:value added per firm; L.vab: value added lagged one period; R&D dummy: dummy that takes the value of one if the firm undertakes investments in R&D and zero otherwise; exp_int: export intensity define as exports over sales; L.exp_int: lagged export intensity. All values are in constant Uruguayan pesos base 2005 and in logarithm (except for variables expressed as shares). AR(1) test of autocorrelation of order one; AR(2): test of autocorrelation of order two.
Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

5. Concluding remarks

We observe that when we consider the whole sample only the share of total intermediate imports over total purchases has a positive effect on employment, contrary to the conventional wisdom. The measures of offshoring according to the income level of source countries have no significant effect.

In summary, the impact of offshoring on total employment at the firm level is not significant or small in most cases. High-tech sectors, and exporting firms seem to be not affected or less affected by offshoring. Low-tech sectors show evidence of positive effects of offshoring to high and middle income countries and negatives effects from offshoring to low income countries. It is likely that offshoring to high and middle income countries translate into intermediate inputs of higher quality and knowledge content, which remains to be tested and it is in the agenda. From this work we can only observe that the impacts from high and low sources are different.

Thus, the whole picture that emerges is that offshoring to high and middle income countries have positive effects on employment while offshoring to low income countries is similar to developed countries with negative effects, mainly for low intensive technology sectors.

Low technology intensive sectors are the sectors and firms respectively more likely to benefit from offshoring to high and middle income countries. Thus, the policy recommendation would be to promote imports of intermediates in particular in low technology intensive sectors from high and middle income countries.

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Appendix

Table A1: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Average total wage by firm	9062	1.55E+05	4.31E+05	0	1.84E+07
Average workers by firm	9062	79.59556	148.7457	0	2524
Average wage by worker and firm	9062	1619.23	1550.83	0	45333.53
Stock of Capital (average by firm)	9062	3.60E+07	3.59E+08	0	2.26E+10
Total intermediate expenditures (average by firm)	9062	9.31E+07	3.08E+08	0	6.75E+09
Sales	9062	1.37E+08	4.27E+08	0	1.13E+10
Value Added (average by firm)	9062	3.89E+07	1.71E+08	0	7.33E+09
Gross output (average by firm)	9062	1.32E+08	4.32E+08	0	1.38E+10

Source: Author's elaboration based on data on the Economic Surveys and administrative Customs data, values in constant pesos base year 2005.