

## CHAPTER 6

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# HOW MUCH DOES OFFSHORING MATTER?

*Evolution of Imports and their Relation to  
Profits, Labor, and Firms' Strategies in  
France, 1990–2009*

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## 1 INTRODUCTION

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This chapter assesses the evolution of offshoring and its socioeconomic impact in France over the period 1990–2009. The relationship between offshoring and employment is analyzed and we explore the links between globalization and financialization and their consequences for labor.

Offshoring may affect labor (employment and wages) through various channels and with ambiguous effects. Some authors (for example Cohen 2006; Amiti and Wei 2005; Mankiw and Swagel 2006) argue that the direct effects on employment are pretty limited and that they are more than compensated by the gains from international trade in terms of lower prices and new outlets. Winkler and Milber (2009) mention four links between offshoring dynamics and labor demand: the direct substitution effect and the productivity effect reduce labor demand for a given unit of output; however, the mark-up effect—which rises profits and potentially investment, productivity and output—and the scale effect—resulting from a higher demand for cheaper products—should lead to stronger labor demand. An important leakage in this virtuous circle comes from the possibility that the rise of profits does not lead to higher investment and stronger labor demand. Indeed, European countries and the United States have experienced an accumulation slowdown as firms favor dividends and stock buybacks (Stockhammer 2004; Orhangazi 2008).

In developed economies, international offshoring may allow firms to satisfy profitability claims made by financial markets. Offshoring would, therefore, contribute to a fall in the labor share of national income, as suggested in some empirical studies (Milberg and Winkler 2010a, 2010b; IMF 2007; Guscina 2006). Three mechanisms are involved. First, an increase in competition in end-products oligopolistic markets prevents firms from raising final goods prices but leaves them with the possibility of reducing inputs prices through effective management of the global value chain and a favorable market power position (Milberg 2008). Second, as offshoring shrinks the scope of productive activities and investments of firms, it favors higher returns of earnings to shareholders. Such an evolution is consistent with a shift of management behavior from “retain and reinvest” towards “downsize and distribute” (Lazonick and O’Sullivan 2000). Third, offshoring contributes to reducing the domestic cost of labor at the sectoral level or the labor share at the macro level. Indeed, “divide and rule” by transnational corporations plus a “race to the bottom” resulting from greater global labor expansion and a level playing field competition between various socio-productive systems may reduce workers bargaining power (Peoples and Sugden 2000; Glyn 2007; Freeman 2007). However, because of the destructive effect of increased competition on inputs and finished-products markets, the impact of offshoring on profitability should be heterogeneous: positive for companies and/or sectors that source cheaper inputs abroad or outsource abroad, but negative for local providers who suffer increased competition.

Moreover, because of the aforementioned deterioration of labor’s position and skill-biased technological change, lower social standards and underemployment tend to diffuse in the whole economy at the expense of low-skilled workers (Petit 2010; Goos et al. 2009). In OECD countries, offshoring is thus associated with wages and employment polarization between low-skilled and high-skilled workers. But semi-skilled and high-skilled workers appears to be more vulnerable also as offshoring evolves from manufacturing to services (Bardhan and Kroll 2003; Crinò 2010; Besson and Durand 2006; Lipsey 2006) and towards more and more complex activities (Geishecker 2008; Winkler 2009), including R&D activities (Bardhan and Jaffee 2005).

Our work explores to what extent the general mechanisms described above are relevant for the French case. We focus on the issue of employment and the distribution of value-added between labor compensation and profits, going beyond macro evidence to investigate the variety of industry dynamics. While we are aware of their importance in the offshoring debate, we have decided not to focus on skills and wage inequalities issues. Section 2 presents the state of the literature on offshoring in France and section 3 describes our data and our methodology. Section 4 assesses at the macro level the evolution of offshoring in France during the two past decades and offers preliminary findings of firms’ behavior in the context of the 2008–2009 financial crisis. Section 5 then proposes an econometric analysis of the relationship between offshoring, employment, and the share of labor in value-added. As aggregate results are often inconclusive, section 6 provides a more detailed outlook at the industry level. Section 7 summarizes our results and points out the policy implications of the analysis in the context of slow recovery and uncertainties on the economic prospects of high-income economies such as France.

## 2 LITERATURE

The academic literature on offshoring in France is quite limited, especially in terms of empirical quantification (see Table 6.1 below for an overview). For example, recent research (Demmou 2010) does not allow isolating the impact of the phenomenon; while analyzing the causes of French deindustrialization on the period 1980–2007, it points out foreign competition as one among other domestic factors explaining the loss of manufacturing jobs.

Most of the quantitative studies focus on the impact of international competition on employment and differ in many ways, especially in their empirical strategy and the construction of their sample (for a comprehensive survey, see Daudin and Levasseur 2005). The assumption is that the French labor market is more regulated than others, explaining why firms are keener on adjusting quantities (employment) rather than prices (wages).

Two studies quantifying the impact of offshoring on the French labor market should be mentioned. Based on firms' restructuring announcements since 2002, the first one, carried out by the European Monitoring Centre on Change (EMCC 2006), concludes that offshoring job losses account for 4.6 percent of French employment losses. However, the EMCC may underestimate the impact of offshoring because the study takes into account only firms with at least 250 workers and a minimal destruction of 100 jobs.

The second study on the impact of offshoring in France is a research by Aubert and Sillard (2005), which is based on firms and groups data. It has been actualized by the French National Institute of Statistics and Economic Studies (INSEE) in 2007 (Barlet et al. 2007). Their work proposes an original definition of offshoring based on two cumulative criteria: (1) there is a significant decrease of employment in the firm for a short period of time (a decrease of at least 25 percent<sup>1</sup> of the initial level of employment in a period of three consecutive years) or the definitive closure of an establishment; and (2) there is a significant increase of imports for the same kind of goods by this firm. According to this methodology, offshoring would explain between 10 and 20 percent of the industrial job losses between 1995 and 2001. More precisely, 95,000 manufacturing jobs have been lost in France and offshored to foreign countries, that is to say 13,500 on average per year. This number has increased in the subsequent period, with a yearly average of offshored jobs amounting to 14,975 for the period 2000–2003.

This work also points out that developed countries are hosting a majority of offshored French jobs—around 53 percent (the main destination countries are: Spain, 16 percent; Italy, 15 percent; and Germany, 14 percent—i.e., EU neighbors—followed by the United States, 13 percent) suggesting that offshoring is related to the general restructuring of multinational firms rather than to strategies focused on the reduction of labor costs. Regarding developing countries, China is without surprise the main receiving economy, accounting for 30 percent of the jobs offshored (Eastern European countries, 19 percent, and North African countries,<sup>2</sup> 16 percent).

Table 6.1 Overview of the literature quantifying the impact of offshoring in France

Reference	Results	Methodology	Sectors
SESSI (Mathieu 1997)	1.9% of industrial production in 1993 (from 0.2% [printing, mineral products, mechanics] to 10.9% [clothing, leather])	Direct imports from emerging and low wages countries compared to domestic production	Manufacturing industry, firms with at least 20 workers
Bouhol (2004: 174)	0.15% of industrial employment in average by year between 1970 and 2002	Econometric analysis of the impact of imports from emerging countries	Manufacturing industry
SESSI (De GimeI, 2005, p. 174)	1.3% of industry production in 1993; 2.4% in 1999; 2.7% in 2002	Ibid (Mathieu 1997)	Ibid (Mathieu 1997)
CAE (Fontagné and Lorenzi 2005: 60)	1% of industrial employment (maximum), less of 0.5 percent of total employment from 1999 to 2002	Balance of employment	Ibid (Mathieu, 1997)
INSEE (Aubert and Sillard 2005)	0.35% of industrial employment in average by year between 1995 and 2001, meaning 13500 jobs by year (between 9000 and 20,000 jobs). 0.25% of industrial employment by year in average when some indirect effects of offshoring are taken into account (positive effects, reassignments), meaning around 10,000 jobs by year	Statistical simultaneity of two conditions on a given period: (i) reduction of employment at least of 25% or closure of establishment; (ii) increase of imports from a given country, for the same type of good (+100% or less depending on whether labor costs of the foreign country are comparables or inferiors to French ones)	Manufacturing industry except energy sector, all firms
Sénat (Arthuis 2005)	0.1 percent to 2.6% of employment according sectors, meaning sum-total 8000 job threaten by offshoring in 2006 in the commercial service sector and 42,000 on the period 2006–2010	Estimations based on 100 individuals interviewes of managers in January-March 2005 extrapolated with the evolution of sectoral imports	Commercial service sector
European Restructuring Monitor (ERM 2006)	34 cases of registered offshoring for France (for 443 cases of restructurations) between 2002 and 2005	Inventory from an expert informants network (for France: IRES)	Cases of restructurations which: lead to a decrease of at least 100 jobs; or are related to production sites with at least 250 workers and at least 10% of workers; or lead to the creation of at least 100 jobs

(Continued)

Table 6.1 (Continued)

Reference	Results	Methodology	Sectors
INSEE (Bartlet et al. 2007)	On the period 1995–1999, 12,952 industrial jobs have been offshored each year, including 4858 toward low-wages countries. On the period 2000–2003, 14,975 industrial jobs have been offshored each year, including 8850 toward low-wages countries	Ibid (Aubert and Sillard 2005)	Ibid (Aubert and Sillard 2005)
Chanteau (2008)	0.15% of the establishments by year in average in 1993, 1997 and 2003	Inventory of confirmed cases by cross-checking of firms statements, experts investigations and professional and administrative resources	All sectors (except agricultural sector and non-profit service sector), firms with at least 20 workers in Rhône-Alpes
Kramarz (2008)	The relation between unions bargaining power, firms' response by outsourcing and the impact on workers' wage and employment is estimated. On the period 1986–1992, the firms that faced strong unions increased offshoring and decreased employment when the rest of the firms saw their relative employment increase and appeared to have used outsourcing much less intensively	Econometric analysis based on firm-level data (imports and wages) and data on unions activity and bargaining agreements	Most firms, subject to the fiscal report called the "Bénéfices industriels et commerciaux." All sectors, except the public sector, are covered
Jabbour (2010)	The impact of offshoring on firms' performance (productivity and profitability, and not on employment) is estimated. Offshoring corresponds to a profit-maximising strategy and does not necessarily answer to the objective of enhancing productivity. It has a positive effect on productivity but a more substantial impact on profitability	Econometric analysis based on the "International Intra-Group Exchanges" survey, which provides information on offshoring activity by French manufacturing firms for the year 1999, and on the annual firm survey <i>Enquête Annuelle d'Entreprises</i> (EAE), produced by the French Ministry of Industry (SESSI)	Industrial sector. Firms affiliated to an industrial and international group, with more than one million euros of trade flows, or more than 500,000 euros of trade flows towards emerging countries

Note: Based on Chanteau (2008).

Offshoring to low-wage countries is concentrated in low-value-added activities. At best, it explains 14 percent of the decrease in employment in these sectors (textiles and home equipment). On the other hand, offshoring to developed countries in pharmaceuticals, aeronautics, and the automotive industry explains more than 20 percent of job decreases. Offshoring to developed countries is not limited to manufacturing industries: innovative services activities are also more and more offshored (for example the research and development activities in the computers, electronics, and pharmaceuticals sectors). These offshoring strategies generally emerge between key regions of industrialized countries with the objective of reinforcing the technological capabilities of the firm. The interest is to reinforce the technological advantage of the firm in its country of origin, with a focus on excellence rather than low labor costs. Regional systems of innovation are more and more open to globalization but still in patterns involving developed countries even if the weight of Asian developing economies is becoming more important (Bardhan and Jaffee 2005; Ernst 2006). Moreover, in the case of North-North offshoring, the localization of multinational firms can also be driven by horizontal strategies that aim at accessing new markets with through foreign direct investment (Mouhoud 2006). Brainard (1993) built a theoretical model to explain why FDI involves mostly developed countries and why there is a trade-off between concentration and proximity that can explain firms' investment decisions. This model, together with others (Markusen 2002; Cogneau et al. 2000), points out that when transport costs between countries are high, it is less costly for a firm to create a subsidiary in the targeted market. The firm loses the benefits of the production in a single place (the scale economies) but does not have to bear the high trade costs. Empirically, a study on the localization of 3,902 foreign firms in France over the period 1985–1995 highlights the relevance of cluster dynamics in the strategies of localization and differences in the behavior of firms according to their country of origin (Crozet et al. 2004).

However, it should be stressed that the study of Aubert and Sillard (2005) finds no direct relationship between job losses in a specific industry and the volume of offshoring. Kramarz (2011) analyzes a panel of manufacturing firms over the period 1995–2004 and also finds no obvious pattern in the sign of the relationship between changes in imports and job creation or destruction.<sup>3</sup>

Departing from the common focus on the labor market, Jabbour (2010) assesses the impact of offshoring on firms' productivity and profitability and controls for variables influencing offshoring strategies. She shows that firms' economic performance depends strongly on governance, organizational forms (outsourcing appears generally to be more efficient than vertical integration), and the importance of imported inputs. This study follows previous empirical work (Jabbour 2008) in showing that the choice of offshoring by French firms depends on the kind of inputs and on market thickness.

Furthermore, another study (Chanteau 2008) assesses the determinants of foreign relocations using a new dataset of 15,000 establishments owned by firms with more than twenty employees. Comparing the data for three years (1993, 1997, and 2003), the study shows that foreign relocations are again quite marginal, with no more than 0.15 percent of firms involved yearly. The study then analyzes the determinants of offshoring decisions by French firms and highlights three strategies that are motivated not solely by

differences in labor costs: offensive, defensive, and structural foreign relocations. While at the macroeconomic level no difference can be found in the impact of inward and outward offshoring, foreign relocations are not without consequences for the dynamic of firm strategies. Past offshoring may accelerate the international expansion of firms and lead to increased production abroad. For the author, foreign relocations can be considered as an adjustment variable for firms facing the challenges of globalization.

Finally, from a theoretical point of view, Kramarz (2008) constructs a bargaining model to show that offshoring can have a direct impact on wages by altering firms' threat point and thus changing the share of the rent between firms and workers. Offshoring appears to be a strategy for firms (especially for the ones facing strong unions) to decrease the size of the quasi-rent to discipline workers. Using French firm-level data, Kramarz shows that firms facing stronger unions increased offshoring and decreased employment, rents and wages.

In summary, as illustrated in Table 6.1, the literature suggests that in France offshoring is a limited phenomenon, which has a significant—but minor—direct negative impact on employment and which affects heterogeneously sectors and workers depending on their qualifications. Moreover, this phenomenon is not limited to developing countries, as developed countries are an important destination of offshored jobs. Finally, offshoring appears to be one of the factors that favor firms' productivity and profitability.

### 3 METHODOLOGY: HOW TO MEASURE OFFSHORING IN FRANCE

Offshoring refers to the geographical separation of production activities across countries. Firms relocate production abroad to seize the opportunity of differences in factor costs, resources, and in socioeconomic systems. The previous section has mentioned surveys where information on sourcing strategies is collected directly from firms. Our approach in this chapter is to work at a more macroeconomic level and to rely on national accounts and trade statistics to calculate offshoring indexes. This section first presents the data that we have collected and then explains the different offshoring measures that we have calculated to cover thirty-eight French industries over the period 1990–2009.

#### 3.1 Data sources for France

As France collects industry-level data according to a national classification (“nomenclature d'activité française,” NAF) that is slightly different from the European “nomenclature of activities” (NACE) and the International Standard Industrial Classification (ISIC), our analysis relies on the data provided by INSEE. The French office of statistics has recently released a consistent set of national supply-use tables for the period 1990–2009, based on benchmark year 2005. In this database, we can find time-series for

output, value-added, domestic consumption, labor compensation, imports, and exports. The data are disaggregated for thirty-eight industries covering both the manufacturing and services sectors. Services are especially well covered, with nineteen industries (this is where the French classification departs from European and international classifications). The other advantage of using supply-use tables is that we have matrices on the use of inputs by French industries on the basis of which we can calculate offshoring measures (in particular the Feenstra–Jensen offshoring index, see section 3.2).

National accounts data are complemented with trade statistics from the Organisation of Economic Co-operation and Development (OECD). Bilateral trade data on goods come from the International Trade by Commodity Statistics (ICTS) database and services data from the Trade in Services by Partner country (TISP) database. In addition, we use estimates of bilateral trade in intermediate goods and services from the OECD dataset compiled by Miroudot et al. (2009). We have developed a correspondence between the product classifications used in the trade data (HS and EBOPS codes) and the thirty-eight industries of the supply-use tables. It should be noted that supply-use tables, unlike input–output tables, are tables constructed by product and by industry (and not industry by industry tables). Therefore, we do not face the issue of matching products with industries.

The only variable that we do not have in the national accounts is the number of employees, but these data are also available from INSEE for the same industries.<sup>4</sup> While the supply-use tables include information on the gross fixed capital formation, the data are partly confidential for France and hence provided at a more aggregated level. We have reconstructed detailed investment time-series on the basis of the available data and more disaggregated data from the OECD STAN database. We have expanded the coverage of investment data to 1982 in order to calculate capital stocks for each industry using the perpetual inventory method (PIM). We have also estimated a price index for inputs (a variable needed for the econometric analysis) on the basis of the supply-use tables.

While all our data are available for thirty-eight industries, the rest of the analysis focuses on twenty-five industries where offshoring matters. We have excluded all industries where the share of imports in output was less than 2 percent. Many service industries (such as real estate, construction, hotels and restaurants, health, education, and public administrations) import a negligible value of inputs, and offshoring measures cannot be properly calculated or meaningfully interpreted. We have also excluded commodities (agriculture, extractive industries, coke, and refined petroleum products), where imports cannot be interpreted as the offshoring of activities. The list of industries kept in the analysis can be found in Table 6.2.

### 3.2 Offshoring indexes

There is no single measure of offshoring. Authors have used a variety of indicators and indexes to indicate to what extent firms turn to foreign rather domestic producers for the provision of inputs.<sup>5</sup> Following Feenstra and Hanson (1999), a proxy for offshoring is the share of imported intermediate inputs in the total purchase of nonenergy inputs.

Winkler and Milberg (2009) show that a limitation in the way this proxy is calculated is the assumption that an industry's import of each input, relative to its total demand, is the same as the economy-wide imports relative to total demand ("proportionality assumption"). To provide a more accurate indicator, Feenstra and Jensen (2009) use a direct measure of imported intermediate inputs. We have calculated a similar index for French industries over the period 1990–2009 (offshoring index 1).<sup>6</sup> For any industry  $i$  using intermediate inputs  $j$  from industry  $k$ , the offshoring index is:

$$\text{Offshore}_i = \frac{\sum_{k=1}^k \text{industry } i \text{ purchases of inputs } j \left( \frac{\text{imports of inputs } j}{\text{total domestic consumption of } j} \right)}{\sum_{k=1}^k \text{industry } i \text{ purchases of inputs } j}$$

In the above calculation, we take into account inputs from all industries. A "narrow" measure of offshoring is sometimes used in the literature, where only inputs from the same industry ( $I = k$ ) are included. In the case of France, we do not find the distinction between interindustry offshoring and intraindustry offshoring (i.e., narrow offshoring) very useful. In addition, when comparing industries, the two measures are influenced by the detail in the industry classification. For some sectors (e.g., wood, paper, and printing), most inputs are within the same industry code while for others inputs are in different industries (e.g., transport equipment, using inputs from "basic and fabricated metal products" and "rubber, plastic and other non-metallic mineral products" industries).

Moreover, because the Feenstra–Jensen index overlooks the offshoring of assembly activities, we use as a second measure (offshoring index 2) the share of imports from developing economies in total imports (following Milberg and Winckler 2010a). We cannot assume that all imports from developing economies correspond to the offshoring of assembly activities but this measure is useful to account for the fact that some offshoring is captured through final goods trade rather than trade in intermediate inputs. We have defined developing economies as low-income and middle-income countries in the World Bank classification. Most of the developing economies where offshoring happens are in the lower-middle-income (e.g., India and the Philippines) or upper-middle-income group (e.g., China, Tunisia, and Turkey). This is why we do not distinguish between middle-income and low-income countries, as the latter include mostly sub-Saharan African economies that are very marginal in world trade (especially for noncommodity trade).

## 4 AN ACCELERATION OF GLOBALIZATION UP TO THE CRISIS

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Some recent discussions have pointed to the consolidation of some global value chains, suggesting that at least in some sectors globalization is beginning to lose momentum (Cattaneo et al. 2010). In the case of France, however, the general picture

**Table 6.2 Main aggregates, by industry**

	Evolution of imports share		Evolution of offshoring		Evolution of employment		Evolution of labor compensation share		Evolution of investment rate		Gross output
	Percentage points 1990–94/2005–09	Imports share 2005–09	Index 1 change 1990–94/2005–09	Index 2 change 1990–94/2005–09 (1999/2009 for services)	Thousands 1990–94/2005–09	Employment 2005–2009	Percentage points 1990–94/2005–09	Labor compensation share VA 2005–09	Percentage points 1990–94/2005–09	Current Mio euros 2005–09	
Food products, beverages and tobacco	5.47	1864.6	9.27	-1.49	7	566	8.71	58	-0.96	140,015	
Textiles, textile products, leather and footwear	81.12	12842.1	7.79	20.16	-232	149	4.79	73	1.52	21,136	
Wood, paper, paper products and printing	6.89	3054.5	8.30	3.46	-90	246	1.75	71	-2.01	40,987	
Chemicals and chemical products	13.88	6216.1	57.80	1.87	-61	165	11.91	64	3.66	59,966	
Pharmaceuticals	43.31	6822.0	3.77	0.26	1	89	-2.15	46	-0.03	26,634	
Rubber, plastic and other non-metallic mineral products	9.42	3341.6	34.87	7.03	-42	330	-2.51	66	6.77	58,067	
Basic metals and fabricated metal products	10.39	3877.0	43.06	1.42	-87	440	1.78	71	1.46	92,574	
Computing products and electrical and optical equipment	76.46	15150.6	4.96	20.06	-37	160	16.31	79	18.04	27,068	
Electrical machinery and apparatus	27.96	6711.4	10.17	16.91	-36	133	16.70	75	1.44	26,350	
Machinery and equipment, n.e.c.	24.98	8790.3	8.17	9.04	-50	229	-0.33	69	1.79	40,080	
Transport equipment	12.38	5261.9	5.93	2.60	-44	393	4.37	80	-3.66	122,048	
Other manufacturing	12.08	3285.5	8.44	15.23	-91	317	-10.12	74	-0.66	52,612	
Collection, purification and distribution of water	0.87	441.0	3.09		85	174	-9.90	46	-6.99	31,731	
Transport and storage	-0.21	1435.5	0.17		174	1341	-2.73	69	2.02	166,603	

(Continued)

Table 6.2 (Continued)

	Evolution of imports share		Evolution of offshoring		Evolution of employment		Evolution of labor compensation share		Evolution of investment rate		Gross output 2005–09 Mio euros
	Imports share		Index 1 change		Index 2 change		Evolution of compensation share		Evolution of investment rate		
	2005–09	94/2005–09	1990–09	94/2005–09	1990–09	94/2005–09	1990–09	94/2005–09	1990–09	94/2005–09	
	Percentage points 94/2005–09	Percentage points 1990–09	Index 1 change 1990–09	Index 2 change 1990–09 (1999/2009 for services)	Thousands 1990–09	Thousands 1990–09	Percentage points 1990–09	Percentage points 1990–09	Percentage points 1990–09	Percentage points 1990–09	Current
	2005–09	94/2005–09	1990–09	94/2005–09	1990–09	94/2005–09	1990–09	94/2005–09	1990–09	94/2005–09	2005–09
	94/2005–09	94/2005–09	94/2005–09	94/2005–09	94/2005–09	94/2005–09	94/2005–09	94/2005–09	94/2005–09	94/2005–09	2005–09
Publishing, audiovisual and broadcasting	–4.85	994.7	–2.15	4.80	39	206	1.25	1.25	8.28	8.28	47,885
Telecommunications	1.76	263.9	2.17	–10.61	–5	170	–2.86	–2.86	–11.21	–11.21	58,285
Computer and related activities	1.14	257.3	–0.94	9.15	155	296	8.94	8.94	7.23	7.23	59,662
Financial intermediation	–0.79	279.0	–1.17	4.07	108	809	9.79	9.79	8.56	8.56	166,029
Legal, accounting, architectural and engineering activities	–2.92	553.0	–2.37	8.35	283	830	–15.36	–15.36	1.36	1.36	161,822
Research and development	1.56	995.2	1.71	8.40	25	151	13.71	13.71	18.35	18.35	36,812
Advertising, market research and other technical activities	0.49	579.2	0.46	12.96	47	245	4.93	4.93	5.09	5.09	29,697
Other business services n.e.c.	0.89	466.0	0.25	6.24	716	1594	5.45	5.45	7.62	7.62	168,798
Other service activities	1.37	246.3	–1.37		125	524	0.64	0.64	–0.26	–0.26	40,178

Source: INSEE Supply–Use tables 1990–2009, benchmark year 2005, INSEE employment statistics. The offshoring measure is the Feenstra–Jensen index (see Section 2).

does not confirm such an evolution: the indicators that we use point to a sustained and continuous increase in goods and services offshoring and even an acceleration since 2002.

Between 1990 and 2009, the share of imports in gross output for all the manufacturing activities (excluding commodities) has increased, sometimes dramatically (see Table 6.2). The same is true for most services industries, with the exception of “Publishing, audiovisual and broadcasting,” “Financial intermediation,” and “Legal, accounting, architectural, and engineering activities.” Regarding the measure of offshoring focusing on inputs (offshoring index 1), the only difference is that “Computer and related activities” and “Other service activities” also experienced a small decline.

This evolution is related to an increase in the import share from developing countries in the case of manufacturing industries, as seen on Figure 6.1. The two offshoring indexes (the first one calculated on the basis of the share of imported inputs in intermediate consumption and the second one based on the share of imports from developing countries in total imports) grow at a similar rate over the period 1990–2009. There is an acceleration in the second decade, showing that France does not follow the consolidation scenario previously mentioned. In the case of services, there is no significant trend in offshoring: the first index is a flat line at a low level. The index is however not as reliable as for goods because of the proportionality assumption in the use of inputs by services industries (in the absence of statistics on trade in intermediate services by using industry). Due to data limitations, we can calculate the second offshoring measure only from 1999 onward and the data show some volatility related to the poor quality of bilateral trade statistics on services. The result is, however, consistent with the first offshoring measure, as no particular increase or decrease can be seen between 1999 and 2009.

In terms of employment, the dynamics of manufacturing and services industries contrast sharply as well. There has been a decline in employment in all manufacturing industries, except “food, beverages and tobacco” (+7,000) and “pharmaceuticals” (+1,000), with a net loss of 762,000 jobs. On the other hand, there has been an increase in employment in all the services industries considered except “telecommunications” (–5000), with an overall net gain of 1,752,000 jobs. This huge shift in jobs allocation represents the major structural transformation of the French labor market, as jobs in manufacturing and services do not have necessarily the same characteristics. However, this phenomenon is partly due to the development of extra and intrafirm outsourcing and the reallocation of labor activities, with some services activities being separated from manufacturing firms. The same jobs that were previously performed in-house in manufacturing firms are now part of services industries. One should therefore not overestimate the scope of the job reallocation. But, as the rest of the chapter will highlight, there are also industries that have really disappeared or are in strong decline following the specialization of the French economy in services activities. Concerning the evolution of the labor compensation share, no general trend appears, with some significant increase and diminution in manufacturing and services activities that we will further analyze.

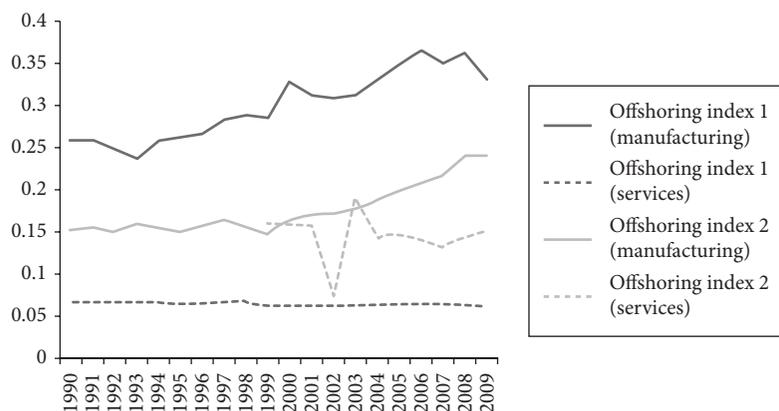


FIGURE 6.1 Offshoring indexes for France (1990–2009).

Comparing 1990–1999 and 2000–2008, a rapid look at the industry dynamics points out two elements (Tables 6.3 and 6.4). First, there is no sign of any significant slowdown in globalization. Between the two periods, the average compound annual growth rate (CAGR) of the import share has increased from 2.04 percent to 3.10 percent. An even clearer acceleration appears for the two indexes of offshoring, with a jump from  $-0.34$  percent to 1.28 percent (offshoring index 1) and from 2.74 percent to 5.31 percent (offshoring index 2). It is worth noting that the phenomenon is especially important for goods but that the trend is much less uniform for services. For example, there has been a decline in “telecommunications” but a further internationalization of sourcing for “other business services” and “advertising, market research and other technical activities.”

Second, in most of the sectors and on average, imports were more dynamic than exports in the second period. Consequently, there has been a deterioration of the trade balance (absolute or relative) for all manufacturing sectors, with the exception of “chemicals and chemical products,” and for a majority of services activities (Table 6.5).

Finally, in 2009, the evolution of trade in France is consistent with the collapse of global trade (see Table 6.5). We observe a dramatic fall in imports and exports in all the sectors except “chemicals and chemical products,” “telecommunications,” and “financial intermediation.” However, it is striking that in most sectors the decline of imports has been less severe than the decline of exports, resulting in further deterioration of the trade balance in most sectors (except four) and, contrary to the two previous periods, a negative overall trade balance. Concerning offshoring, there is a reduction of inputs offshoring (offshoring index 1) in all the industries except financial intermediation. However, the second offshoring index related to the share of imports from low- and middle-income economies progresses in most of the sectors and in some cases very significantly: in particular, the evolution of “computing products and electrical and optical equipment,” “transport equipment,” and “telecommunications,” but also services such as “computers and related activities” and

**Table 6.3 Industry dynamics of offshoring and international trade (1990–1999)**

	Offshoring index 1		Offshoring index 2		Import share	Imports CAGR	Exports CAGR	Total trade balance	Relative total trade balance
	CAGR	% of VA; CAGR	CAGR	% of VA; CAGR					
1990–1999									
Food products, beverages and tobacco	0.59	2.38	-3.05	2.40	3.10	57,674	13.77		
Textiles, textile products, leather and footwear	0.34	6.76	3.84	2.37	2.36	-52,867	-17.54		
Wood, paper, paper products and printing	-0.36	0.56	-0.82	1.02	3.16	-25,324	-16.00		
Chemicals and chemical products	-1.01	2.17	-1.18	2.51	5.41	30,111	6.41		
Pharmaceuticals	0.67	9.26	-1.79	12.78	12.34	15,397	13.00		
Rubber, plastic and other non-metallic mineral products	-0.80	2.57	6.99	2.88	3.79	5651	2.49		
Basic metals and fabricated metal products	-1.08	0.45	-1.09	0.14	0.37	7555	1.93		
Computing products and electrical and optical equipment	1.75	6.54	9.78	5.49	8.19	-48,052	-10.14		
Electrical machinery and apparatus	1.25	4.63	10.15	5.63	7.33	8924	4.47		
Machinery and equipment, n.e.c.	0.66	0.75	5.03	1.83	3.20	-7511	-1.78		
Transport equipment	0.58	2.67	-0.39	4.83	5.84	123,779	16.04		
Other manufacturing	0.67	2.19	5.43	2.62	4.16	-12,950	-7.97		
Collection, purification and distribution of water	-1.18	-2.24	n.a.	-0.43	-0.24	2592	15.32		
Transport and storage	-2.38	-1.61	n.a.	0.30	2.16	-12,231	-4.64		
Publishing, audiovisual and broadcasting	-1.18	-3.16	n.a.	0.04	4.64	-24,319	-37.11		
Telecommunications	0.03	16.15	n.a.	19.17	22.37	317	4.56		
Computer and related activities	-1.06	1.95	n.a.	5.82	29.69	-1218	-15.63		
Financial intermediation	-1.47	-2.38	n.a.	-2.07	-3.45	20,552	20.40		
Legal, accounting, architectural and engineering activities	-1.48	-0.69	n.a.	2.87	1.87	25,446	17.61		
Research and development	-0.40	0.34	n.a.	1.25	1.07	3403	7.43		

(Continued)

**Table 6.3 (Continued)**

1990–1999		Offshoring index 1	Offshoring index 2	Import share	Imports	Exports	Total trade balance	Relative total trade balance
Advertising, market research and other technical activities		-0.85	n.a.	0.95	4.06	4.50	-3434	-18.82
		CAGR	CAGR	% of VA; CAGR	CAGR	CAGR	Constant Euros	%; calculated with constant euros
Other business services n.e.c.		-1.19	n.a.	-0.98	1.90	2.99	-789	-1.12
Other service activities		-0.29	n.a.	-0.40	3.84	0.85	1446	20.34
average/total		-0.34	2.74	2.04	3.24	5.44	137,529	4.02
					CAGR imports > exports			

Note: Figures highlighted in gray are the ones illustrating the trend described in boxes at the bottom of the table. Relative total trade balance is calculated as (exports – imports) / (exports + imports).

**Table 6.4 Industry dynamics of offshoring and international trade (2000–2008)**

2000–2008

	Offshoring		Offshoring		Import		Exports		Total trade		Relative total
	index	CAGR	index 2	% of total	share	% of VA	CAGR	CAGR	balance	Constant	trade balance
			imports; CAGR		CAGR				Euros		constant euros
Food products, beverages and tobacco	5.54		1.56		3.60		2.86		51,757		11.30
Textiles, textile products, leather, and footwear	1.94		2.96		5.93		0.05		-74,107		-21.39
Wood, paper, paper products, and printing	2.93		3.01		2.13		-1.06		-28,866		-16.62
Chemicals and chemical products	7.46		5.47		4.12		1.94		57,151		9.23
Pharmaceuticals	-0.49		5.18		7.06		5.38		29,642		10.78
Rubber, plastic, and other nonmetallic mineral products	6.31		4.79		3.93		2.26		-11,992		-4.34
Basic metals and fabricated metal products	7.12		0.26		4.71		3.46		-22,052		-4.49
Computing products and electrical and optical equipment	-1.98		8.06		2.60		-3.64		-78,359		-12.92
Electrical machinery and apparatus	0.32		5.91		4.95		0.37		3847		1.41
Machinery and equipment, n.e.c.	1.17		16.01		2.33		1.48		-16,504		-3.15
Transport equipment	1.01		8.17		5.64		2.16		179,629		15.86
Other manufacturing	1.64		3.57		3.78		2.49		-35,177		-16.18
Collection, purification, and distribution of water	1.63		n.a.		4.11		7.99		10,904		31.81
Transport and storage	0.82		n.a.		1.33		3.82		-17,081		-5.41
Publishing, audiovisual and broadcasting	-0.69		n.a.		-2.22		-2.23		-12,030		-16.93
Telecommunications	-0.95		-5.11		1.71		4.80		6010		21.81
Computer and related activities	-1.43		n.a.		3.99		6.03		-281		-1.34
Financial intermediation	-0.92		9.16		-0.61		-1.64		3117		3.95
Legal, accounting, architectural, and engineering activities	-0.77		n.a.		-3.81		1.51		8641		5.69
Research and development	0.52		n.a.		3.83		3.92		-1809		-3.73

(Continued)

**Table 6.4 (Continued)**

2000–2008

	Offshoring index		Offshoring index 2		Import share		Imports		Exports		Total trade balance		Relative total trade balance	
	CAGR	% of total	% of total	% of VA	CAGR	CAGR	CAGR	CAGR	CAGR	Constant	Constant	Constant	%; calculated with	
			imports; CAGR	CAGR							Euros	constant euros		
Advertising, market research, and other technical activities	0.59	n.a.	n.a.	1.97	3.61	–3.82	–4968	–23.49						
Other business services n.e.c.	0.76	n.a.	n.a.	5.09	6.89	6.69	9495	8.61						
Other service activities	–1.91	n.a.	n.a.	8.15	9.11	1.99	–964	9.18						
Average/total	1.28	5.31	3.10	3.05	3.05	0.86	77,509	2.26						
	Acceleration: CAGR		CAGR imports > exports				Degradation:							
	2000–08 > 1990–99 > 0						balance 2000–08 < 1990–99							

Note: Figures highlighted in gray are the ones illustrating the trend described in boxes at the bottom of the table. Relative total trade balance is calculated as (exports – imports) / (exports + imports).

Table 6.5 Industry dynamics of offshoring and international trade (2009)

2009

	Offshoring		Offshoring		Import share % of VA; CAGR	Imports Annual % change	Exports Annual % change	Total trade balance Current euros	Relative total trade balance %; calculated with current euros
	index 1 Annual % change	index 2 Annual % change	index 1 Annual % change	index 2 Annual % change					
Food products, beverages, and tobacco	-13.46	-8.33	2.05	-5.02	2.05	-9.18	3379	5.39	
Textiles, textile products, leather, and footwear	-3.51	4.07	21.45	-6.72	21.45	-10.07	-10,384	-25.12	
Wood, paper, paper products, and printing	-9.75	-5.07	-3.24	-13.51	-3.24	-15.15	-3899	-20.32	
Chemicals and chemical products	-14.96	-13.11	0.79	-20.21	0.79	-16.67	7497	10.10	
Pharmaceuticals	-2.03	17.41	18.36	12.85	18.36	7.77	3914	8.23	
Rubber, plastic, and other nonmetallic mineral products	-17.48	1.88	-11.42	-13.13	-11.42	-18.11	-3942	-11.92	
Basic metals and fabricated metal products	-19.48	-3.32	-18.67	-31.44	-18.67	-30.23	-2673	-4.96	
Computing products and electrical and optical equipment	-4.38	8.96	4.00	-11.94	4.00	-15.95	-13,401	-22.70	
Electrical machinery and apparatus	-1.27	2.37	-5.06	-14.34	-5.06	-17.78	-197	-0.60	
Machinery and equipment, n.e.c.	-1.10	11.71	-11.96	-24.37	-11.96	-23.36	-1692	-2.86	
Transport equipment	-2.99	21.18	-8.22	-13.71	-8.22	-16.45	10,483	8.06	
Other manufacturing	-3.35	2.38	-4.76	-3.89	-4.76	-0.88	-5033	-16.37	
Collection, purification, and distribution of water	-14.57	n.a.	-39.97	-47.88	-39.97	-39.35	1589	40.55	
Transport and storage	-3.11	n.a.	-16.04	-17.31	-16.04	-18.27	-3743	-9.36	
Publishing, audiovisual, and broadcasting	-5.33	29.23	-6.74	-5.79	-6.74	-5.64	-1718	-22.01	
Telecommunications	-0.15	36.43	28.35	25.41	28.35	7.57	637	13.58	
Computer and related activities	-3.05	99.39	-1.66	-3.79	-1.66	-8.63	-325	-12.35	
Financial intermediation	0.42	-17.06	-11.47	6.84	-11.47	3.03	527	5.59	
Legal, accounting, architectural, and engineering activities	-3.40	-2.29	-1.00	-3.89	-1.00	-0.63	-92	-0.49	
Research and development	-4.21	-1.90	-6.63	-0.68	-6.63	-5.51	-791	-11.72	
Advertising, market research, and other technical activities	-2.25	0.14	-5.15	-13.95	-5.15	-20.55	-1152	-47.33	
Other business services n.e.c.	-3.12	-4.17	8.44	0.79	8.44	-11.09	317	1.67	

(Continued)

**Table 6.5 (Continued)**

2009

	Offshoring index 1 Annual % change	Offshoring index 2 Annual % change	Import share % of VA; CAGR	Imports Annual % change	Exports Annual % change	Total trade balance Current euros	Relative total trade balance %; calculated with current euros
Other service activities	-7.33	n.a.	-1.45	1.10	-11.28	-459	-26.39
Average/total	-5.83	9.00	-2.92	-7.11	-13.69	-20,487	-4.86
	Acceleration: growth2009>CAGR 2000-08>0			CAGR imports > exports			Degradation: relative balance 2009<2000-08

Note: Figures highlighted in gray are the ones illustrating the trend described in boxes at the bottom of the table. Relative total trade balance is calculated as (exports - imports) / (exports + imports).

“publishing, audiovisual and broadcasting” (for which data are not available in the previous period), suggests that imports from developing economies have been more resilient than overall trade.

To put it in a nutshell, between the nineties and the first decade of the century, there has been overall an acceleration of globalization. This evolution is very clear for all manufacturing activities but more nuanced in the case of services. The second important trend is the shift of employment from manufacturing activities towards services. Moreover, for most industries, but also at the aggregate level, exports have not increased in line with imports, resulting in a deterioration of the trade balance which even worsens with the crisis. In the context of the collapse of global trade during the 2008–2009 crisis, there has been a better resilience of imports from low- and middle-income economies which highlights the depth trade and industrial relationships established during the past decade with developing and emerging economies.

## 5 ECONOMETRIC ANALYSIS: DOES OFFSHORING IN FRANCE LEAD TO LOWER EMPLOYMENT AND MORE PROFITS?

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Before analyzing the variety of sectoral regimes and identifying differences among industries, we propose in this section an econometric analysis of the data (with all sectors pooled together) in order to test some of the relationships previously discussed between offshoring, employment, and labor compensation.

The first variable that we test is the level of employment in French industries. Following Hijzen and Swaim (2007, 2010) and in line with the analysis of Milberg and Winkler (2010a) previously mentioned, we assume that the impact of offshoring on employment is twofold. First, there is a substitution effect: for a given level of output, firms faced with an increase in labor price turn to outsourcing and demand less domestic labor. This substitution effect can also be interpreted as a technology or productivity effect; a more efficient production process requires less labor. What is important is that for a given output, labor demand falls. Then there is a scale effect: having decreased their costs through offshoring, firms are expected to sell at a lower price and to expand their output, thus increasing employment (keeping constant this time the labor intensity). The scale effect can become a mark-up effect if, in the absence of a competitive market, the reduction in costs is not translated into a reduction of prices and the extra profit is used to invest and increase output with again a positive impact on employment for a given labor intensity. Of course, firms can also use the reduction in costs to increase their profits with no impact on employment (this is why we are also interested in the evolution of the labor compensation and investment). The impact of the scale/mark-up effect and the total impact of offshoring on employment are empirical questions.

As proposed by Hijzen and Swaim (2007), the following labor demand functions can be tested. The first one is the “conditional” labor demand testing the impact of offshoring for a given output, i.e. the substitution/productivity effect:

$$\ln L_{it} = \alpha_0 + \beta_1 \ln Y_{it} + \beta_2 \ln W_{it} + \beta_3 \ln K_{it} + \sum_{i=1}^L Y_i Z_{it} \quad (1)$$

where  $L$  is the level of employment (in industry  $i$  for year  $t$ ),  $Y$  is gross output,  $W$  is the nominal price of variable factors (wage and the price of materials),  $K$  the capital stock. The model is augmented with demand shifters,  $z$ , that include the offshoring measures we have calculated and the share of imports in gross output. An assumption in this model is that capital is quasi-fixed to focus on the shift in labor demand. The capital stock rather than the cost of capital is thus the control variable. Firms determine the profit-maximizing level of labor demand by minimizing the costs of production conditional on output (and the capital constraint).

The second model is the “unconditional” labor demand, testing this time the total impact of offshoring. The assumption is that firms maximize profits for given input and output prices. They choose their optimal mix of inputs and the level of output. The model becomes:

$$\ln L_{it} = \alpha_0 + \beta_1 \ln p_{it} + \beta_2 \ln w_{it} + \beta_3 \ln K_{it} + \sum_{i=1}^L Y_i Z_{it} \quad (2)$$

where instead of gross output,  $p$  is the price of output.

The results of the estimation of the conditional and unconditional models over the period 1990–2009 can be found in Table 6.6. All the regressions are OLS estimations with year fixed effects and robust standard errors; the variables are in logs. In columns (1) and (5), the Feenstra–Jensen index and the share of imports in gross output are tested as labor demand shifters. We then have two other columns (2 and 6) where the second measure of offshoring (the share of imports from developing countries in total trade) is used. As this measure is collinear with the import share, we run separate regressions.<sup>7</sup> Both the conditional and unconditional models work very well for France. We have a very high R-squared (almost 90 percent). All the variables are significant at the 1 percent level. Controlling for output, nominal prices of factors, and capital stocks, we find a significant and negative relationship between employment and offshoring in the conditional model. As this specification should capture the substitution/productivity effect, this is the expected result. However, there is still a negative (and significant) relationship in the unconditional model capturing the total impact of offshoring on employment. Comparing the two coefficients for the offshoring index 1, one can see that the scale effect is small for French industries and that the substitution effect (loss of jobs) dominates. This result is not surprising as offshoring is particularly strong in manufacturing industries where France has lost a lot of jobs. All job creation, as seen in Table 6.2, is in services industries that have less offshoring.

To confirm this result, we also run the regressions in five-year differences (columns 3, 4, 7, and 8). First, the estimation in differences captures a dynamic view, the impact

**Table 6.6 Regression results: Labor demand functions (1990–2009).**

Dependent variable: employment	Conditional				Unconditional			
	Level of employment		Five year difference		Level of employment		Five year difference	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Output	0.676*** (0.065)	0.461*** (0.071)	0.147*** (0.052)	-0.023 (0.042)	0.656*** (0.064)	0.454*** (0.070)	0.077* (0.044)	-0.023 (0.039)
Price of output/price of materials								
Wage/Price of materials	0.526*** (0.052)	0.634*** (0.067)	0.500*** (0.080)	0.886*** (0.058)	0.534*** (0.051)	0.636*** (0.066)	0.555*** (0.079)	0.889*** (0.060)
Capital stock	-0.265*** (0.023)	-0.152*** (0.028)	0.317*** (0.034)	0.129*** (0.041)	-0.256*** (0.023)	-0.145*** (0.028)	0.319*** (0.036)	0.127*** (0.042)
Offshoring index	-0.230*** (0.026)	-0.211*** (0.031)	-0.028** (0.011)	-0.027*** (0.008)	-0.228*** (0.025)	-0.212*** (0.031)	-0.023*** (0.011)	-0.027*** (0.008)
Import share	0.046*** (0.014)		-0.053*** (0.012)		0.048*** (0.014)		-0.050*** (0.012)	
2nd offshoring measure (imports from developing countries)		0.509*** (0.095)		0.03 (0.100)		0.532*** (0.096)		0.03 (0.100)
Number of obs.	640	412	475	273	640	412	475	273
R-squared	0.898	0.933	0.702	0.779	0.896	0.933	0.697	0.779

Note: All variables are in logs. OLS regressions with year fixed-effects and robust standard errors. \* significant at 10% \*\* at 5% \*\*\* at 1%.

of the change in offshoring on the change in employment. Long-difference estimations are recommended when working with labor data because of the time it takes for labor markets to adjust (see Hijzen and Swaim 2007). In addition, the advantage of the specification is that any time-invariant unobserved variable does not affect the results. We thus test the robustness of the previous relationship. The R-squared is slightly lower, with the estimation in difference and the offshoring index slightly less significant (at the 5 percent level in the unconditional estimation), but still we confirm the negative relationship between offshoring and employment (this time between the change in offshoring and the change in employment).

Another robust result from the two sets of estimations is that the share of imports in output is positively associated with the level of employment but negatively with the change in employment. The higher the competition in final products (or the offshoring of final assembly), the higher is employment in France in the same sector. But over the period of interest (1990–2009), an increase in the import share is associated with a decrease in employment, suggesting that an intensification of competition in a given sector leads to job destruction. A complementary result is that the share of imports from developing countries (our second offshoring measure) is positively associated with employment in the estimation in levels. It suggests that offshoring to other developed economies is what explains lower employment. The second offshoring measure is however not significant in the estimation in difference (columns 4 and 8), indicating that the positive relationship found between employment and trade with developing economies is static and does not last.

Changing slightly the model, we can also run regressions on the share of labor compensation in value-added, controlling for output, capital stock, and the nominal price of factors. Table 6.7 summarizes the results.

The specification is less robust than the labor demand functions, with a lower R-squared. But the control variables are very significant and the model explains a fair amount of inter-industry variations. The offshoring index is significant and positively correlated with the share of value-added going to labor in the estimation in levels. But the variable loses its significance when estimating the model in difference. While offshoring seems to decrease employment in the labor demand functions, the increase in the share of value-added to labor appears as a paradox. It could be explained, however, by a shift in skills (and thus higher wages paid). But again we cannot overinterpret this result as the coefficient is not robust in the estimation in difference. We have an indication that the import share might be negatively correlated with the share of labor and there the significance in the estimation in difference would appear as the sign of a more robust relationship than for the offshoring index. Regarding the second offshoring measure, the results suggest that the higher the imports from developing economies the lower the share of labor in value-added. But this relationship is not confirmed in the estimation in difference.

Overall, what the econometric analysis suggests can be summarized in three points:

- Because employment increases in services sectors in France where less offshoring occurs, we find a robust negative relationship between offshoring and the level of

**Table 6.7 Regression results: Impact of offshoring on labor compensation (1990–2009)**

	Dependent variable: share of labor compensation in VA			
	Level		Five year difference	
	(1)	(2)	(3)	(4)
Output	-0.409*** (0.047)	-0.165*** (0.053)	-0.633*** (0.063)	-0.586*** (0.080)
Wage/price of materials	0.561*** (0.033)	0.362*** (0.036)	0.526*** (0.069)	0.563*** (0.107)
Capital stock	-0.234*** (0.028)	-0.232*** (0.029)	-0.121** (0.052)	-0.250** (0.097)
Offshoring index	0.150*** (0.026)	0.067*** (0.020)	0.024 (0.043)	0.009 (0.042)
Import share	0.002 (0.017)		-0.027*** (0.009)	
2nd offshoring measure (imports from developing countries)		-0.333*** (0.113)		0.204 (0.254)
Number of obs	680	432	510	288
R-squared	0.671	0.511	0.258	0.223

Note: All variables are in logs. OLS regressions with year fixed-effects and robust standard errors. \* significant at 10% \*\* at 5% \*\*\* at 1%.

employment (both in a static and dynamic way; that is, more offshoring leads also to lower employment). The substitution effect (use of foreign rather than domestic labor) is stronger than the scale effect (higher market shares because production is more efficient with offshoring). In a panel of OECD countries Hijzen and Swaim (2007) find that on average the scale effect is stronger. France appears to be in the same situation as Japan, the United States, and a few other large economies where offshoring does not translate into more productivity.

- Overall, the negative relationship between offshoring and employment does not seem to result from higher competition from developing economies. If more competition in final products sourced from developing countries has an impact on labor, it is through a lower share of value-added going to wages in globalized industries (maybe because of a skill bias).
- Last, the extent to which industries face foreign competition in final goods has a complex relationship with employment. On the one hand, industries in which the import share is higher have a slightly higher level of employment, but an increase in the import share during the 1990–2009 period was associated with a relative decrease in employment. This suggests that French industries have specific difficulties in their integration in the world economy. Together with the lack of scale effect for offshoring, the productivity gains from trade seem elusive in the French context.

In the econometric analysis, we have pooled together all industries. It is time now to look more into the detail of sectoral dynamics. What is found on average to be correlated in the econometric analysis hides contrasted evolutions among industries.

## 6 VARIETY OF SECTORAL REGIMES OF OFFSHORING

In order to better understand the variety of dynamics associated with offshoring, we have built an analytical table using the various combinations of results we have for the offshoring measures, import share, labor share, level of employment, and investment rate (see Table 6.8).

On the basis of Table 6.8, we can distinguish three important driving forces related to offshoring. First, in some industries we observe at the same time an increase in the share of imports in output and a strong intensification of offshoring, which suggests that the main phenomenon is the fragmentation of production processes. In some other industries, we also observe an increase in the import share but no strong increase in offshoring; we regard this case as the intensification of competition on final products. The third case is the lack of globalization (at least on the import side), when both offshoring and the import share are decreasing (or growing very slowly). We have used different criteria to characterize the intensity of offshoring in manufacturing and services industries as by definition there are fewer material inputs in services industries and services are less tradable than goods. The contrast is really striking between, on the one hand, manufacturing industries where import shares are above 18 percent in all cases (18.6 percent is the minimum level of imports share for “food products, beverages, and tobacco,” and the maximum one—151.5 percent—refers to “computing products and electrical and optical equipment”) and, on the other hand, services activities where the highest share is 14.4 percent (“transport and storage”) and others are generally below 10 percent. The same difference is observed with the offshoring indexes. It is worth noting that for all manufacturing industries considered in our study, none fits with the no-globalization scenario. This is consistent with our first stylized fact which is that during the period considered there has been a considerable deepening of globalization, although some services appear to have stay apart from such dynamic.

Our analytical table then allows us to distinguish four socioeconomic dynamics at the sectoral level, which can be linked to the three driving forces of offshoring, competition, and no-globalization.

The first socioeconomic dynamic is regressive. Despite a reduction in employment, the profit share and investment rate decrease (i.e., the labor share increases). This scenario corresponds to the decline of activities progressively eliminated by foreign competition (“transport equipment,” “wood, paper, paper products, and printing”) with net trade worsening.

**Table 6.8 A mapping of French industries according to socioeconomic and offshoring dynamics.**

SOCIO-ECONOMICS DYNAMICS	DECLINE	FINANCIAL PREDATION	TENTATIVE REBOUND	EXPANSION
<b>DRIVING FORCES</b>				
<b>Fragmentation of production process</b>	Reduction in employment, increasing labor share and decline in investment rate	Decline in labor share and decline or weak growth in investment rate	Reduction in employment and rise in investment rate	Increase in employment and in labor share
<b>Manufacturing:</b> Increase in offshoring index 1 > 9 index points and increase in imports share > 5 percentage points		Basic metals and fabricated metal products	Rubber, plastic and other non-metallic mineral products	Food products, beverages and tobacco
<b>Services:</b> Increase in offshoring > 1 index point and > increase in import share		Collection, purification and distribution of water Telecom	Electrical machinery and apparatus	Research and Development
<b>Global competition</b>	<i>Weakening</i>	<i>Financial-driven decline</i>	Chemicals and chemical products <i>Survival limited to some niches</i>	<i>Expansionary insertion in global competition</i>
<b>Manufacturing:</b> Increase in offshoring index 1 < 9 index points and increase in import share > 5 percentage points	Transport equipment	Pharmaceuticals	Machinery and equipment	
	Wood, paper, paper products and printing	Other manufacturing	Textiles, textile products, leather and footwear	

(Continued)

**Table 6.5 (Continued)**

SOCIO-ECONOMICS DYNAMICS	DECLINE	FINANCIAL PREDATION	TENTATIVE REBOUND	EXPANSION
Services:				
Increase in import share > 1 percentage point and > increase in offshoring			Computing products and electrical and optical equipment	Other service activities
<b>No apparent globalization</b>		<b>Domestic predation</b>		Computer and related activities <b>Domestic based expansionary path</b>
Manufacturing:				
Increase in offshoring index 1 < 5 index points and decrease in imports share				
Services:				
Increase in offshoring < 1 index point and increase in imports share < 1 percentage point		Legal, accounting, architectural and engineering activities  Transport and storage		Publishing audiovisual and broadcasting  Other business services Financial intermediation Advertising, market research and other technical activities

The second dynamic is called “financial predation.” In this category, a higher reliance on offshoring has allowed firms to compress the labor share. However, the resulting increase in the profit margin has not been used to reinvest in domestic sectors. On the contrary, investment rates have diminished or do not compensate for the decrease in the labor share. Such a dynamic is consistent with the literature that suggests that globalization and financialization should be analyzed as interrelated phenomena (for example, Milberg 2008). In this context, offshoring allows firms to diminish the cost of their inputs and to shrink the scope of their productive activities, which in turn reduces their productive investment and operating costs. Such a reorganization frees up financial resources to increase share buybacks and dividends as requested by impatient financial markets through the shareholder-value norm. Globalization thus participates in the general transformation of the relationship between financial markets and non-financial corporations, which is called “financialization.” “Basic metals and fabricated metal products” appear to be the sole manufacturing sector of this kind and its trade balance deteriorates. Among services industries, “telecommunications” and “collection, purification and distribution of water” belong to this category. De facto protection from competition together with a recent deregulation may be the leading factors explaining the financial predation in these industries, which are nonetheless able to improve their trade balance. Such a phenomenon is probably also important in the retail sector, where global buyers have fueled their profits by cheaper inputs (Baud and Durand 2012), but this cannot be captured in our data (where only the commercial margin is affected to the distribution sector).

In the case of “pharmaceuticals” and “other manufacturing,” financial predation occurs despite an increase in global competition and a relative deterioration of the trade balance, paving the way to a progressive decline of the sector while firms try to cope with shareholders requirements. Another important feature is the very existence of strong predatory dynamics in sectors that are relatively immune from global competition and that do not rely on the international fragmentation of production, such as “legal, accounting, architectural and engineering activities” and, to a lesser extent, “transport and storage.” In such sectors, the lack of competition (because of trade restrictive measures and heavy regulations) seems to be the source of financial predation.

The third dynamic is that of tentative rebound. In the industries concerned, we observe a decline in employment but at the same time an increase in investment. In the case of “rubber, plastic, and other non-mineral products,” there is a small decline in the labor share, which should be linked to a surge in offshoring, which has allowed efficiency gains and then has paved the way for new investments. In “chemicals and chemical products” and “electrical machinery and apparatus,” the growth of offshoring is concomitant with an increase in the labor share, which may suggest a shift in intraindustry specialization towards high-skill activities. There is no common pattern for these sectors in terms of trade balance evolution.

Distinct from such an offensive restructuring configuration, we have some sectors where there is at the same time a decline in employment, an increase in investment, and an important increase in the share of imports, but no significant increase in offshoring.

In such sectors, we believe there is a general decline but an intraindustry specialization leading to survival in some niches. Such a dynamic fits very well with the case of “textiles, textile products, leather and footwear” and a similar trend is found for “computing products and electrical equipment” and “machinery and equipment.” For all these sectors, the survival scenario is not able to compensate for the pressure of imports and as a consequence there is a decline in net trade.

Finally, we have a set of sectors following an expansionary path along three distinctive ways. First, “food products, beverage and tobacco” and “research and development” are the only sectors that expand both in terms of employment and increasing labor share, while relying more intensively on offshoring. This is the story of a successful globalization, although in the case of the food industry, the positive trade balance is declining.

Interestingly, “other service activities” and “computer and related activities” experience an expansion in the context of increasing competition from imports. Their domestic expansion occurs despite the fact that imports perform relatively better. In the case of “computer and related activities,” the trade balance has even improved as compared to the 1990s.

Finally, other services industries expand strongly in terms of employment and labor share but without any significant increase in offshoring or pressure from imports. Relatively immune to the globalization of production, there is no common pattern in the trade balance for these four industries. The implementation of specific industrial policies in the case of “publishing, audiovisual and broadcasting” may be a factor explaining the significant reduction in the trade deficit. In the case of “financial intermediation,” the improvement of the wage share is probably related to the surge in wages and bonuses for executives and top-ranked employees, which is a specific feature of this industry (Godechot 2008).

## 7 CONCLUSION

To conclude, the evolution of offshoring in France can be summed up in three stylized facts.

The first one is the acceleration of globalization in manufacturing activities. At a higher pace in the 2000s than in the 1990s, the share of imports in output has considerably increased and all manufacturing industries see a significant increase in their offshoring indexes. Beyond this general pattern of strong deindustrialization, we can distinguish three different types of dynamics. On the one hand, there are industries that are truly in decline in the sense that France has no comparative advantage and the open trade regime within the European Union and to some extent beyond it leads to interindustry specialization. Jobs are lost in such industries, as a consequence of interindustry labor reallocations. Then there are industries at the opposite end that are successfully expanding both domestically and internationally and that use offshoring as a source of productivity gains. In such industries, offshoring can be associated with an increase in

employment. Most French industries, however, appear to be in between. In some cases, they fight to survive and use offshoring to improve productivity and find niche markets by differentiating products (intraindustry specialization). In some other cases, there are predatory strategies with no long-term prospects, just the postponement of an inevitable decline.

This diversity in outcomes in the French manufacturing sector has implications regarding industrial policy. To provide the right incentives, such a policy should help industries to move from predatory restructuring to tentative rebound. Industries shielded from foreign competition are often leaning towards the scenario of “financial predation” in our analysis, as exemplified by the fabricated metals (e.g., steel) or pharmaceuticals sectors. One can also see that no manufacturing industry is found in the “no apparent globalization” category. Therefore, the question for these industries is no longer whether offshoring should be encouraged or prevented; it has already happened, and the only successful manufacturing industry (in terms of labor outcomes) that we have identified is one with increasing offshoring intensity. Finally, as industrial policy at the sole national level is likely to be constrained, the issue could be better addressed through transnational industrial policy, for example—but not necessarily only—at the European level.

The second stylized fact is the major structural shift of employment from manufacturing to services. Between 1990 and 2009, 762,000 jobs have disappeared in the manufacturing sector, while 1,752,000 have been created in services industries. As previously mentioned, this is partly the result of outsourcing: the fact that the same job that was previously part of a manufacturing industry is now a service provided by an independent firm. But beyond this organizational restructuring of firms, the shift is also the result of the specialization of the French economy in services industries. A major implication of this shift is that France has now most of its jobs in sectors where offshoring is very marginal. This does not mean that globalization does not matter anymore in these industries, as services are essential inputs for manufacturing firms and our analysis has focused on the import and production sides. It should also be noted that it is generally through investment and foreign affiliates that services are “traded,” something we do not capture in our data. But because offshoring and more generally cross-border imports are lower in services, we find not surprisingly a negative relationship between offshoring and employment in France. As productivity gains are generally lower in the services sector (Baumol et al. 1989), a challenge for the French economy will be how to face the socioeconomic consequences of this major shift towards services. There are in particular implications in terms of skill content and wage inequalities, but these issues were not covered by our analysis.

Lastly, the third stylized fact is that there is no one-way relationship between offshoring and the labor share. Despite interesting links between financialization and globalization, our data show that patterns are different at the industry level. In some sectors, offshoring is associated with a decrease in the labor share, in some others an increase. There are thus sectors where the fulfillment of the requirement of shareholder value norm and globalization are combined in such a way that the gains from offshoring are

not mobilized for investment. But, for some services activities where the level of offshoring intensity is limited, we also observe a decrease in the wage share and a declining investment rate; that is, financialization with a slowdown of accumulation (Stockammer 2004) but without strong globalization dynamics. Such sectors are often characterized by a lack of competition, allowing firms to not invest. Competition policy or adequate industry regulations appear necessary in such cases. However, part of the story about financialization is not well captured by our methodology as gains from global sourcing by retailers do not appear in the data we are using.

## NOTES

1. This threshold is chosen according a statistical criterion: a decrease of employment superior to 25 percent is more than a standard deviation below the average change of employment on the period.
2. Offshoring towards North African countries concerns manufacturing activities such as textile, electrical and electronics equipment but also services: call centers (for internet providers, mobile operators, etc.) for low value added activities, but also for high value added activities as computer maintenance or software development.
3. This study updates Biscourp and Kramarz (2007).
4. There are no data for agriculture which is not covered in our analysis. Data for public administrations are available only from 1999 onwards, but we have also excluded this sector from the scope of our analysis.
5. See Kirkegaard (2007) and Agnese and Ricart (2009) for a discussion of the empirical measurement of offshoring.
6. The advantage of using national accounts data is that services are covered as well as goods. But for services industries, the proportionality assumption has to be maintained due to data limitations.
7. The correlation coefficient between the second offshoring index and the import share is 0.45.

## REFERENCES

- Agnese, P., and J. E. Ricart. 2009. "Offshoring: Facts and Numbers at the Country Level." Working Paper, IESE Business School, Universidad de Navarra.
- Amiti, M., and S.-J. Wei. 2005. "Fear of Service Outsourcing: Is It Justified?" *Economic Policy* 20 (42): 308–347.
- Arthuis, J. 2005. "Les délocalisations de métiers de services." In *La globalisation de l'économie et la délocalisation des activités et des emplois*. Commission des finances, Rapport d'information au Sénat, no. 416, annexe 2, 95–142.
- Aubert, P., and P. Sillard. 2005. "Délocalisations et réductions d'effectifs dans l'industrie française," Document de Travail de l'INSEE, n° 2005/03.
- Bardhan, A. D., and D. M. Jaffee. 2005. "Innovation, R&D and Offshoring." University of California Berkeley: Fisher Center for Real Estate and Urban Economics.
- Bardhan, A. D., and C. Kroll. 2003. "The New Wave of Outsourcing." University of California Berkeley: Fisher Center for Real Estate and Urban Economics.

- Barlet, C., D. Blanchet, L. Crusson, P. Givord, C. Picart, R. Rathelot, and P. Sillard. 2007. “Les flux de main d’œuvre et les flux d’emplois dans un contexte d’internationalisation.” In *L’économie française, Comptes et Dossiers*, INSEE, Paris.
- Baumol, W. J., B. S. A. Blackman, and E. N. Wolff. 1989. *Productivity and American Leadership*. Cambridge: MIT Press.
- Baud, C., and C. Durand. 2012. “Financialization, Globalization and the Making of Profits by Leading Retailers.” *Socioeconomic Review* 10 (2): 217–240.
- Besson, F., and C. Durand. 2006. “Délocalisations de services: quels enjeux pour les politiques publiques.” Université Paris 1 Panthéon-Sorbonne: Post-Print and Working Papers, halshs-00135920\_v1, HAL.
- Biscourp, P., and F. Kramarz. 2007. “Employment, Skill Structure and International Trade: Firm-Level Evidence for France.” *Journal of International Economics* 72: 22–51.
- Boulhol, H. 2004. “Quel impact du commerce extérieur international sur la désindustrialisation dans les pays de l’OCDE?” *Flash CDC Ixis*, 2004–06, 1 July.
- Brainard, S. L. 1993. “A Simple Theory of Multinational Corporations and Trade with a Trade-Off between Proximity and Concentration,” NBER Working Paper, no. 4269. Cambridge, MA: National Bureau of Economic Research..
- Cattaneo, O., G. Gereffi, and C. Staritz (eds.). 2010. *Global Value Chains in a Postcrisis World: A Development Perspective*, Washington, DC: World Bank.
- Chanteau, J. P. 2008. “Quantifications et analyse stratégique des délocalisations,” *Revue d’Economie Industrielle* 124: 23–50.
- Cogneau, D., J.-C. Dumont, and E. M. Mouhoud. 2000. “Regional Integration, Migration, Growth, and Direct Investment: A Reading of the Economic Literature.” *Globalization, Migration, and Development*. Paris: OECD.
- Cohen, D. 2006. “Les effets du commerce international sur l’emploi dans les pays riches.” In *Délocalisation, normes de travail et politique de l’emploi: vers une mondialisation plus juste*, edited by P. Auer, G. Besse, and D. Meda, 29–53. Paris: La Découverte, coll. “Recherches.”
- Crinò, R. 2010. “Service Offshoring and White-Collar Employment.” *Review of Economic Studies* 77 (2): 595–632.
- Crotty, J. 2005. “The Neoliberal Paradox: The Impact of Destructive Product Market Competition and ‘Modern’ Financial Markets on Nonfinancial Corporation Performance in the Neoliberal Era.” In *Financialization and the World Economy*, edited by G. Epstein, 77–110. Northampton: Edward Elgar.
- Crozet, M., T. Mayer, and J. L. Mucchielli. 2004. “How Do Firms Agglomerate? A Study of FDI in France.” *Regional Science and Urban Economics* 34: 27–54.
- Daudin, G., and S. Lévassieur. 2005. “Délocalisations et concurrence des pays émergents: mesurer l’effet sur l’emploi en France.” *Revue de l’OFCE* 94: 131–160.
- De Gimel, L. 2005. “Repères quantitatifs sur les délocalisations industrielles à partir des relations extérieures avec les pays émergents ou à bas salaires.” In *Désindustrialisation, délocalisations*, Rapport du Conseil d’analyse économique, edited by L. Fontagné and J.-H. Lorenzi, 163–187. Paris: La Documentation française.
- Demmou, L. 2010. “La désindustrialisation en France.” *Document de Travail de la DGTPE*, 1, February.
- EMCC (European Monitoring Centre on Change). 2006. *Restructuring and employment in the EU: Concepts, measurement and evidence*. European Foundation for the Improvement of Living and Working Conditions. Luxembourg: Office for Official Publications of the European Communities.

- Ernst, D. 2006. "Innovation Offshoring: Asia's Emerging Role in Global Innovation Networks." East-West Center Special Report, 10; <http://scholarspace.manoa.hawaii.edu/bitstream/handle/10125/12531/SR010.pdf?sequence=1sic>.
- Feenstra, R. C., and B. Jensen. 2009. "Evaluating estimates of Materials Offshoring from U.S. Manufacturing." In *Measurement Issues Arising from the Growth of Globalization*, edited by S. N. Houseman and K. F. Ryder, 359–378. Washington, DC: W. E. Upjohn Institute for Employment Research and National Academy of Public Administration.
- Feenstra, R. C., and G. H. Hanson. 1999. "The Impact of Outsourcing and High-technology Capital on Wages: Estimates for the United States, 1979–1990." *Quarterly Journal of Economics*, 114 (3): 907–940.
- Fontagné, L., and J.-H. Lorenzi. 2005. "Désindustrialisation, délocalisations." In *Désindustrialisation, délocalisations*, Rapport du Conseil d'analyse économique, edited by L. Fontagné and J.-H. Lorenzi, 9–131. Paris: La Documentation française.
- Freeman, R. 2007. "The Expansion of the Global Labor Supply." In *Global Capitalism Unbound: Winners and Losers from Offshore Outsourcing*, edited by E. Paus. London: Palgrave Macmillan.
- Geishecker, I. 2008. "The Impact of International Outsourcing on Individual Employment Security: A Micro-Level Analysis." *Labour Economics* 15 (3): 291–314.
- Glyn, A. 2007. *Capitalism Unleashed*. Oxford: Oxford University Press.
- Godechot, O. 2008. "'Hold-up' in Finance: The Conditions of Possibility for High Bonuses in the Financial Industry." *Revue Française de Sociologie* 49 (supplement annual English edition): 95–123.
- Goos, M., A. Manning, and A. Salomons. 2009. "Job Polarization in Europe." *American Economic Review* 99 (2): 58–63.
- Guscina, A. 2006. "Effects of Globalization on Labor's Share in National Income." IMF Working Paper, no. 06/294. Washington, DC: IMF.
- Hijzen, A., and P. Swaim. 2007. "Does Offshoring Reduce Industry Employment?" Research Paper, no. 2007/24, Leverhulme Centre for Research on Globalisation and Economic Policy, University of Nottingham.
- . 2010. "Offshoring, Labour Market Institutions and the Elasticity of Labour Demand." *European Economic Review* 54 (8): 1016–1034.
- IMF (International Monetary Fund). 2007. *World Economic Outlook*. Washington DC: IMF.
- Jabbour, L. 2008. "Slicing the Value Chain Internationally: Empirical Evidence on the Offshoring Strategy by French Firms." GEP Working Papers 2, Leverhulme Centre for Research on Globalisation and Economic Policy, University of Nottingham.
- . 2010. "Offshoring and Firm Performance: Evidence from French Manufacturing Industry." *World Economy* 33 (3): 507–524.
- Kirkegaard, J. F. 2007. "Offshoring, Outsourcing, and Production Relocation: Labor Market Effects in the OECD Countries and Developing Asia." Working Paper, no. 07–02. Washington, DC: Peterson Institute for International Economics.
- Kramarz, F. 2008. "Offshoring, Wages, and Employment: Evidence from Data Matching Imports, Firms, and Workers," Paris: Crest Working Paper.
- . 2011. "Employment and Trade in France: A Firm-Level View (1995–2004)." Contribution to the International Collaborative Initiative on Trade and Employment (ICITE), Paris: OECD, TAD/TC/WP(2011)19.
- Krippner, G. 2005. "The Financialization of the American Economy." *Socio-Economic Review* 3 (2): 173–208.

- Lazonick, W., and M. O'Sullivan. 2000. "Maximizing Shareholder Value: A New Ideology for Corporate Governance." *Economy and Society* 29 (1): 3–35.
- Lipsey, R. E. 2006. "Measuring International Trade in Services." NBER Working Paper, no. 12271. Cambridge, MA: National Bureau of Economic Research.
- Madrick, J., and N. Papanikolaou. 2010. "The Stagnation of Male Wages in the US." *International Review of Applied Economics* 24 (3): 309–318.
- Mankiw, G., and P. Swagel. 2006. "The Politics and Economics of Offshore Outsourcing." *Journal of Monetary Economics* 53 (5): 1027–1056.
- Markusen, J. R. 2002. *Multinational Firms and the Theory of International Trade*. Cambridge, MA: MIT Press.
- Mathieu, E. 1997. "La production industrielle française à l'étranger." *Le 4 pages des statistiques industrielles*, SESSI, 71 (January).
- Milberg, W. 2008. "Shifting Sources and Uses of Profits: Sustaining US Financialization with Global Value Chains." *Economy and Society* 37 (3): 420–451.
- Milberg, W., and D. Winkler. 2010a. "Financialisation and the Dynamics of Offshoring in the USA." *Cambridge Journal of Economics* 34 (2): 275–293.
- . 2010b. "Economic Insecurity in the New Wave of Globalization: Offshoring and the Labor Share under Varieties of Capitalism," *International Review of Applied Economics* 24 (3): 285–308.
- Miroudot, S., R. Lanz and A. Ragoussis. 2009. "Trade in Intermediate Goods and Services." OECD Trade Policy Working Paper, no. 93. Paris: OECD.
- Mouhoud, E. M. 2006. *Mondialisation et délocalisations des entreprises*. Paris: La Découverte, Collection Repères.
- Orhangazi, O. 2008. "Financialization and Capital Accumulation in the Non-Financial Corporate Sector: A Theoretical and Empirical Investigation on the US Economy, 1973–2003." *Cambridge Journal of Economics* 32 (6): 863–886.
- Peoples, J., and R. Sugden. 2000. "Divide and Rule by Transnational Corporations." In *The Nature of the Transnational Firm*, edited by C. Pitelis and R. Sugden, 174–191. London: Routledge.
- Petit, P. 2010. "The Systemic Nature of the Rise of Inequalities in Developed Economies." *International Review of Applied Economics* 24: 251–267.
- Stockhammer, E. 2004. "Financialization and the Slowdown of Accumulation." *Cambridge Journal of Economics* 28 (5): 719–741.
- Winkler, D. 2009. *Services Offshoring and its Impact on the Labor Market—Theoretical Insights, Empirical Evidence, and Economic Policy Recommendations for Germany* Heidelberg: Springer.
- Winkler, D., and W. Milberg. 2009. "Errors from the "Proportionality Assumption" in the Measurement of Offshoring: Application to German Labor Demand." SCEPA Working Paper, no. 2009–12. New York: Schwartz Center for Economic Policy Analysis, New School. <http://econpapers.repec.org/RePEc:epa:cepawp:2009-12>.

