# TRADE AND JOB REALLOCATION: EVIDENCE FOR MOROCCO

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## 1. Introduction

International trade is commonly viewed as a useful tool to remove market distortions, to promote competition among firms, boost input reallocation and hence increase welfare. However, trade openness is not costless and unavoidably creates gainers and losers (Wood, 1995; 1997). This is because the reductions in distortions and changes in the competitive environment induce structural changes in the

economy, with certain sectors, industries, and firms expanding and others contracting and exiting. In particular, increasing exposure to trade is likely to induce less productive firms to exit or shrink their workforce and more productive firms to expand, as well as offering opportunities for the entry of new firms. These firm-level dynamics induce a reallocation of resources, typically from less efficient firms to more productive ones, with a net positive effect on productivity and hence growth (Melitz, 2003). The reallocation of resources, in turn, is likely to impact on the labour market. Here it is important to distinguish between the overall or net impact (eg. on wages and employment levels), and the impact on the dynamics of the labour market. While the net impact on employment may be small (Currie and Hanson, 1997; Harrison, 1994; Rama, 2003), this is likely to conceal important dynamics within the labour market as the process of reallocation impacts on firm or sectoral level job losses, the creation of new jobs, and the movement of workers within and between sectors. Understanding these dynamics is important in order to understand the nature of the transmission mechanisms between trade liberalisation, input reallocation (in particular the labour market) and economic growth (Davis and Haltiwanger, 1996); and hence also important from the point of view of informing policy.

The aim of this paper is then precisely to focus on the impact of trade liberalisation on labour market dynamics in Morocco over the period 1994-2002. During and before this period, Morocco undertook important policy reforms aimed at modernizing the Moroccan economy. Of particular importance was the role of trade policy reform, with average tariffs decreasing from 99% to 50%, and which resulted in increased trade with both existing major trading partners in the EU, and new emerging ones, such at the USA, other Mediterranean and North African (MENA) countries and Latin America. A second important policy initiative was the privatisation process. However, while the first set of reforms directly involve the main Moroccan manufacturing sectors; the latter is restricted to the energy and telecommunication industry and hence indirectly impacts on manufacturing.

In analysing the impact of trade on labour market, it is important to separate out import and export flows, as their impacts are likely to differ. For example, increasing import competition, due to a fall in tariffs, worsens market condition for some domestic firms and is likely to cause firm exit and downsizing with a negative effect on employment. For other firms it may offer the opportunity to purchase cheaper imported intermediates which may increase their competitiveness both domestically but also in export markets. On the other hand, for example, increasing export orientation is likely inducing more productive firms to increase their sales and consequently their size, with a positive outcome on the labour market. In this paper, we therefore consider the differential impact on labour market dynamics on both the import and export side (Jenkins, 2004; Houas, 2003; Milner and Wright, 1998).

A second key issue in the debate on trade and employment is the relation between trade and technological change. Several recent theoretical papers have argued that only a small percentage of the labour market change is directly due to trade openness. Skill-biased technological change is the dominant explanation and which could be seen as an endogenous response to trade liberalisation (Goldberg and Pavnik, 2004). Acemoglu (2002) suggests that international trade interacts with technical change, amplifies the direct effect of technical change on inequality, wages and job reallocation. On the other hand, Feenstra and Hanson (2001) argue that international trade, in the form of trade in intermediate

inputs, is an important explanation for the increase in the wage gap between skilled and unskilled workers. Using a simple model of heterogeneous activities within an industry, they show that trade in inputs (or "offshoring") has much the same impact on the labour demand as skill-biased technological change. Thus, distinguishing whether or not the change in wages is due to international trade, or technological change, is fundamentally an empirical rather than a theoretical question (Feenstra and Hanson, 2001). Here it is worth noting while trade based on comparative advantage is likely to induce a labour reallocation between sectors; technological change and offshoring are more likely to impact on within sectors reallocation (Berman et al, 1994). This paper, therefore, addresses the issue of technological change on labour market dynamics, as well as disentangles the within and between sectoral impact.

Finally, more recent theoretical models have put in light the importance of firm heterogeneity, driven by differences in firm-level productivity in the explaining transmission mechanisms of trade liberalisation. This literature is growing fast (Baldwin and Forslid, 2006; Bernard, Redding and Schott, 2005; Melitz and Ottaviano, 2005; Broda and Weinstein, 2006; Ghironi and Melitz, 2005) and it's largely inspired by the work of Melitz (2003), though also Bernard, Eaton, Jenson and Kortum (2000). The final section of this paper captures the role of such heterogeneity by considering employment changes at the firm level.

In the analysis on the impact of trade on Moroccan labour dynamics, this paper makes several innovative contributions. First of all, we explore the link between trade and job dynamics for a North African developing countries where we shed light on the different role of imports, exports and technological change. Existing empirical evidence refers mainly to Europe (Bentivoglio and Pagano, 1999), USA (Davidson and Matusz, 2005) and transition countries (Konings et all, 2003 and Christev et al, 2005) and with comparatively few analyses concerned with developing countries (Levinsohn, 1996 for Chile and Hatiwanger et al, 2004 for Latin America). Importantly, a significant lacuna in the existing literature is that it typically only controls for trade effects and ignores technological change. Secondly, we examine the trade impact on labour market at different level of disaggregation, from 2-digit down to the firm level. This exercise is fundamental to better investigate the dynamics and direction of job dynamics as well as the role of firm level heterogeneity in the process of job reallocation.

Our empirical analysis is based on a firm level data set that covers 4,762 Moroccan enterprises over the period 1994 and 2002. One of the substantial advantages of this survey is that it contains extremely detailed information at the firm level. For each firm we have information on the sales, production, exports, and start-up data. In particular we have detailed information on labour supply for each firm, with employment divided by gender, skills and employment period. The sample structure allows for an analysis of the impact of trade on the labour market at different levels of disaggregation- from the 2-digit ISIC through to the firm level.

In order to capture the labour market dynamics, we follow the Davis and Haltiwanger (1992) methodology. This involves computing the indices of job creation (defined as the sum of the new places available through expansion of existing firms and creation of new establishments within the sector) and job destruction (defined as the sum of employment losses over shrinking and dying establishments within

a sector) at sectoral level (both 2 and 4 digit) for permanent jobs[1]. Adding up job creation and job destruction produces a measure of the gross job reallocation[2] rate by sector and over time. A further decomposition then allows us to capture the within-sector and between-sector job movements and through this to better understand the direction and determinants of job reallocation.

Our results show the simultaneous presence of high levels of both job creation and job destruction, at both the 2-digit and 4-digit level of aggregation. However, whereas at the 2-digit level this is primarily captured by the "within-sector" movement of jobs, at the 4-digit level the role of "between-sector" allocations sharply increases. This suggests considerable change in Morocco's pattern of specialisation which is taking place within 2-digit ISIC sectors as opposed to between them. This result suggests the need for further investigations on the determinants of job flows. Both the 4-digit and firm level regressions evidence that both trade and technological change are important in explaining job dynamics. First of all, we show that trade explains mainly "between" sectors reallocation and the undergoing transformation is in line with the classical trade theories, i.e. it's biased versus labour intensive activities. On the other side, technological change is more linked to "within" sector movements. Secondly, export, import and technological change exert a different impact on labour market. Indeed, while an increase in import penetration disincentives job creation, the opposite happens if export rises. However, no one impacts on job destruction. This could be explained by the strong firing procedure that characterised Moroccan labour market and it seem impeding the flexibility of the economy to adjust. Moreover, in line with the Stolper-Samuelson theorem, increasing export share favours the demand for unskilled workers and leaves unchanged that of skilled one. Finally, productivity improvements are driven by labour saving techniques. Indeed an increase in productivity decreases job creation raises job destruction and discourages the demand for unskilled workers.

The paper proceeds as follows. Section 2 provides a brief overview of the empirical evidence on trade and employment. Section 3 describes the Moroccan policy environment. Section 4 present the key features of the data, with a particular focus on the Moroccan economy structure and its openness. Section 5 analyses labour markets dynamics in the Moroccan economy. Following the Davis and Haltiwanger's methodology, we compute the indexes of job creation, job destruction, job reallocation and excess job reallocation at 2-digit level. In section 6, we move to a more disaggregating level of analysis to better investigate the determinants and directions of job dynamics: in Section 6.1 we regress the import, export shares and labour productivity on labour dynamics at 4-digit ISIC and in section 6.2, we investigate in deeper the heterogeneity feature of job reallocation by analysing the determinant of employment growth at firm level using the labour demand framework. In this section, we explore more carefully the different impact of trade and technological change using TFP as a proxy for the latter. Section 7 concludes.

## 2. Trade and Labour market: some stylised facts

The available literature presents evidence for high rates of job turnover and suggests that looking at total levels of employment is likely to conceal important dynamics in the labour market and in the

economic analysis (Davis and Haltiwanger, 1992). Indeed, job reallocation (as well as input and output reallocation) contributes significantly to aggregate productivity growth (Haltiwanger, 2000). Thanks to turnover, workers move from high-cost firms to low-cost firms increasing the productive level of the economy. Among the factors that boost reallocation, trade plays an important role. Indeed, trade increases the input reallocation by promoting the competition among firms and by removing market distortions. This induces an increase in the aggregate productivity[3]. New theoretical models have put in light the role of firm heterogeneity in explaining the transmission mechanism of trade liberalisation. Melitz (2003) provides a theoretical framework with heterogeneous firms that link trade, job reallocation and aggregate productivity growth. The model shows how the exposure to trade induces the more productive firms to enter the export market, forces the less productive one to exit and induces a reallocation of market share and profit from less productive firms to more productive one. This reallocation contributes to aggregate productivity growth and welfare gains. Hence, it's interesting to analyse how trade impacts on labour reallocation and firm performance by changing job and worker turnover. Increased openness of economies has been put forward as one explanation for increasing gross job reallocation in the form of new hires, recalls, quits, displacements, temporary layoffs, and retirements. In particular, trade liberalisation will lead to labour reallocation, with jobs moving away from import-competing industries toward export industries.

Although much of the available evidence focus on developed countries, in the last decades some efforts have been done to analyse the pattern in developing countries. This has been possible because new data set on developing countries have been published.

Davis and Haltiwanger (1990)[4] and Dunne, Roberts and Samuelson (1989) suggested different indexes to capture the creation, destruction and reallocation of job at sectoral level, which are widely applied in the empirical works.

Haltiwanger et al (1996) have done the first attempt to identify the impact of trade on job flows. Their analysis is based on simple cross-tabulation where industries are divided into quintiles based on import penetration ratios and export exposure. The comparison of the weighted average of job creation and job destruction rates within each quintile show that there is "no systematic relationship between the magnitude of gross job flows and exposure to international trade". The only evident impact of trade on labour market is the large rate of gross job destruction among industries with a very high import penetration ratio. A similar "descriptive statistic" approach has been adopted by other authors. Levinsohn (1996) investigates the pattern of job creation and job destruction in the years following Chile's trade liberalization using the indexes of churning proposed by Davis and Haltiwanger (1990). He adopts both a parametric and a non-parametric approach to analyse the data. Results indicate that job turnover is somewhat higher among exportable than importable, and that both these sectors show higher turnover than non-tradable. Moreover, as firm size increased, job destruction rates almost monotonically decreased, while job creation rates don't change across size deciles. The real difference between firms of different sizes, then, is due to a difference in job destruction rates. The same data have been used by Roberts (1995), but he adopts a different methodology based on Dunne et al (1989)[5]. Roberts finds that in

Chile, Colombia, and Morocco gross job flows greatly exceed net job flows. As a result there is a lot of churning: jobs are being reallocated even when net job changes at the sectoral level are modest. In particular for Chile, Roberts (1995) points out that in all years except one, simultaneous job creation and job destruction within industries accounts for the vast majority of total turnover and this pattern does not vary much over the Chilean business cycle.

The bulk of empirical analysis investigate in a more precise way the determinants of job flows using econometric tools, i.e. they regress trade variables on the indexes of job reallocation. However, their estimation models are not based on a theoretical framework. Following this approach, Dewatripont, Sapir and Sekkat (1999) link import and export directly with job creation, job destruction and turnover using the European labour market data. They mainly show no effect of trade with developing countries on job creation, job destruction and job reallocation in Europe. Bentivoglio and Pagano (1999), in their analysis on the effect of international trade with the Newly Industrialised Asian Economies (Nies) on the labour markets of Germany, France, Italy and the United Kingdom, apply the methodology proposed by Dewatripont et al (1999). They show that while job destruction is absolutely independent from trade flows with the emerging Asian economies, the evidence on job creation is less clear. In two cases imports appear to have depressed employment dynamics, but in another case exports turn out to have been beneficial. The most striking evidence is that sector-specific features and individual characteristics, such as sector of (last) employment, sex and education are much more important than trade in explaining individuals' positions in the labour market. Davis, Haltiwanger and Schuh (1994) find that in USA there are not distinct patterns in job creation and destruction when industries were grouped according to import penetration and export share, except that in industries with high import penetration ratios where job loss was elevated. Using different data sets on turnover in USA, Davidson and Masutz (2001) find strong evidence that exports decreases job destruction and workers separation rates. Weaker evidence suggests a positive correlation between exports and job creation.

More recent evidence focuses on the job reallocation pattern in transition countries. Konings, Kupets and Lehmann (2003) investigate how the relative openness of a sector impacts on the creation and destruction of jobs at firm and sectoral level in Ukraine. In particular, they analyse the different impact of trade flows to the world, to the EU and to the Commonwealth of Independent States (CIS). With regard to the manufacturing sector, they show that more import competition has a negative effect on employment growth without regards to the origin of trade flows. Contrary, only firms that export to the world at a large and the EU and are located in more export intensive sectors have higher employment growth rate. Also at sectoral level the trade flow origins matter. In particular, sectors that export to the EU market and to the world at a large present higher job creation and lower job destruction. Conversely, imports competition from the CIS destroys fewer jobs at sectoral lever but do not increase job creation. Moreover, while export links to the EU has a positive effect on excess job reallocation rate, EU import exerts a negative one. Christev, Kupets and Lehmann (2005) specify job flows as a function of trade flows and real exchange rate that vary systematically by industry and control for other industry specific effects, such as privatisation and ownership structure. The dynamic estimations suggest that sectoral job flows are mainly driven by the lagged value of job creation and destruction, indicating that idiosyncratic factors within

industries explain most of the variation of employment adjustment in Ukraine. On the other side, trade plays a minor role in the determination of gross job flows. However, the direction of trade matters. Indeed, while trade with CIS (Commonwealth of Independent States) decreases job destruction, trade with the EU increases excess job reallocation mainly through job creation.

The approach of Wacziarg and Wallack (2004) is quite different from the previous ones, since they analyse the impact of trade liberalisation on job reallocation using a cross-country data set instead of focusing on a single country. They show that in a bunch of developing and transition countries liberalisation is followed by an unexpected reduction of intersectoral labour shifts at the economy-wide 1-digit level of disaggregation. Liberalisation has a weak positive effect in the 3-digit level, and this effect is small in magnitude and sensitive to minor changes in the definition of liberalisation or of the measures of sectoral shifts. Moreover, the Wacziag and Wallack's analysis (2004) suggests that the policy environment affects the amount of labour reallocation. In particular, broad-based reforms that include domestic deregulation and privatisation have greater effects on intersectoral labour movements than trade reform in isolation. Other comparative analyses have been done by Baldwin, Dunne and Haltiwanger (1993) for Canada and United States and Haltiwanger et al (2004) for Latin America. Baldwin et al (1993) analyse the effect of trade on job creation and job loss for the manufacturing sector in Canada and the United States. In particular, exports are positively associated with job creation in Canada and the United States though this result primarily reflectes variation across industries rather than changes over time. Indeed, when they analyse the dynamic across time, they found that in both countries increases in exports over time lead to lower job creation, though the effect is only significant in the United States. In the United States, but not in Canada, exports are also associated with increased job losses. With regard to imports, Baldwin et al (1993) show that, from a dynamic point of view, increasing imports over time are associated with increased job losses in Canada but not in the United States. Haltiwanger et al (2004) find that trade reforms have significant effects on the pace of job reallocation within sector among Latin American countries. Lowering tariff increases the pace of job reallocation, as well as real exchange rate appreciation. This result is consistent with the hypothesis that reforms improve allocative efficiency. However, such improvement is small and not without costs. Indeed, they find that a reduction in tariff is also associated with a decline in net employment growth.

Recent evidence using industry-level data shows that not only trade policy changes but also dollar movements have had implication for labour-market outcomes in industries (Gourinchas, 1999b and Klein et al, 2003) and on the transition probability of employment into other sectors and unemployment (Goldberg and Aaronson, 1999)

The idea of investigating the impact of trade on job reallocation is quite a recent one, indeed the majority of analysis that put in light the impact of trade on labour market are based on the labour demand framework[6]. Using a panel of manufacturing sectors (at different level of aggregation), Grossman (1987), Freeman and Katz (1991), Revenga (1992), Gaston and Trefler (1997), Kletzer (1998) for US and Greenaway et al (1999) for UK estimate how trade (both in terms of import and export) influences the labour demand. The results generally show a negative impact of imports on domestic labour force, mainly on unskilled workers. Although limited, some analyses focus on developing countries. Contrarily to

industrialised economies results, the evidence for these countries is mixed. Indeed while some authors find a negative impact of trade liberalisation on sectoral employment (Rama, 1994 for Uruguay; Edwards, 2004 for South Africa; and Manda and Sen, 2004 for Kenya), other authors show that employment and wages increase both in importable and exportable sectors in the aftermath of trade liberalisation (Milner and Wright, 1998 for Mauritius; and Haouas et al, 2004 for Tunisia); further evidence shows a different impact of import and export (Jenkins, 2004 for Vietnam).

More recently, some authors have estimate the labour demand function using firm level data. Biscourp and Kramarz (2007) use a firm level panel data over the period 1986-1992 to investigate the impact of trade on employment in France. A peculiar feature of their analysis is the distinction between imports of finished goods and intermediate inputs. In so doing, they are able to capture the different impact of pure-trade and offshoring. The results suggest that increasing exports increase employment but more import penetration destroys job. The negative impact is more accentuate in firms that import finished goods than in firms importing intermediate inputs. These results put in light the positive effect of production relocation on firm performance with positive outcome on the labour market. However, imports from low-wage countries have a slightly more negative association than average imports, probably owing to the different production stages that are relocated in these countries. In low-income countries firms usually relocate labour-intensive activities that impact more negatively on domestic labour force. Contrarily, offshoring to advanced countries regards mainly services. Mouelhi (2007) uses a firm level data set to estimate the impact of trade on labour demand in Tunisia. Starting from a firm-specific Cobb-Douglas production function, the author associates change in employment directly with a measure of change in trade protection, rather than using import and export shares, and takes into account also the adjustment process, by adding the lagged dependent variable among the regressors. The firm level regressions suggest that trade liberalisation has beneficial effects on employment in exporting firms. Conversely, trade liberalisation has negative effects on employment for domestically oriented firms. Moreover, exporting firms raise the demand for skilled workers in reaction to trade liberalisation. The author imputes this behaviour to the skill-bias technological change induced by trade liberalisation.

The available literature suggest that international factors (whether defined: tariff reduction, export and import competition, exchange rate fluctuation, outsourcing, change in terms of trades) are important for labour market dynamic both in terms of labour turnover or changes in labour demand. However, the effect is different for developing and developed countries. Indeed, while greater trade exposure increases job turnover in developing and transition countries, the effect is almost null in the former group. However the majority of studies for developing countries estimate trade liberalisation in terms of trade openness or tariff cut and don't differentiate between import and export flows and no one introduces in the estimations any proxy for technological change, missing in this way an important part of the story. Indeed, the trade off between trade and technological change is a crucial point in the debates on trade and employment (Feenstra and Hanson, 2001; Acemoglu, 2002 and Goldberg and Pavenik, 2004).

Finally, with regard to the labour demand estimation, the majority of analysis rely on sectoral level data and put in light a clear pattern for industrialised countries (import hurt domestic markets and mainly

unskilled workers) and a less clear one for developing countries. Furthermore few attempts have been done to investigate the role of firms' heterogeneity in this framework.

Hence, the available evidence is not able to provide a clear picture on the trade impact on labour dynamics with regard to developing countries. The aim of our work is to partly fill in this gap, by analysing the impact of import, export flows and technological change on job turnover and labour demand in Morocco.

# 3. The Moroccan Policy Environment

Following independence in 1956, Morocco's development strategy was primarily based on import-substitution industrialisation and agricultural self-sufficiency in a highly protected domestic market. The trade reforms started in Morocco during the 1980s. As a result of pressure due to a payment crisis in 1983, Morocco virtually eliminated quantitative restrictions on imports and reduced maximum tariffs from 165% to 45% over a 6-year period. The major accomplishment of the tariff reform was to reduce the dispersion in tariff protection within the manufacturing sector. Average import penetration increased only slightly, in part due to domestic contraction combined with the devaluation (Currie and Hanson, 1997). Nevertheless, in the 1990s Morocco was still far from an open economy. An important contribution to the Moroccan liberalisation process has come from the multilateral and regional trade agreements, signed with different partners since the middle of 1990s.

In 1995 Morocco joined the WTO, and also signed a quadrilateral FTA with Tunisia, Egypt and Jordan, which was expanded in following years to include other Arab states, and a bilateral FTA with Turkey. The Barcelona Agreement that puts the base for the economic integration between Morocco and EU was signed in February 1996. The agreement envisaged a freeing up of trade in industrial goods over 12 years from the date of implementation. Given that Morocco already had tariff free access for most goods to the EU market the Association Agreement largely involves the asymmetric reduction of tariffs by Morocco on EU exports. Tariffs on capital goods imported from the EU have been eliminated from 2000, and tariffs on raw materials, spare parts and products without a local equivalent have been removed in four stages up to 2003. From 2003 tariffs on imported manufactured goods that have a local equivalent began to be removed at a rate of 10 percentage points a year.

Another wave of agreements started in the new millennium. The FTA with the US was signed in June 2004 and was expected to come into effect in March 2005. This agreement covers industrial and agricultural goods, services, telecommunications, customs, intellectual property, employment and the environment. In 2004-05 Morocco signed further trade and investment agreements with a range of countries in Eastern Europe, Asia, Latin America and Africa. These treaties will lead to a wider dismantling of tariffs over the longer term, a diversification of trade partners and a lower dependence from the EU economy. Morocco has also recently signed agreements with Turkey, as well as the Agadir Agreement with Egypt, Jordan and Tunisia. These processes of liberalisation have, not surprisingly, been accompanied by a reduction in tariffs and this can be seen in Table 1 below.

Table 1 gives the change in tariffs over 1993-2000 in question. While yearly tariff data were impossible to obtain, there is enough information in the table to show a number of key features. First, tariffs in Morocco are typically extremely high ranging from an average of 47%-99% in 1993 to 17%-52% in the year 2000. Secondly, the period has experienced a substantial decline in tariffs and this is true in all sectors. The biggest declines are in Textiles and Electrical where the reductions were 74% and 58% respectively, and the smallest declines were in Food products (28%) and in Leather goods (29%). It is worth noting however, that despite the reduction in tariffs there are other effective taxes in place on imports into Morocco. Hence the level of tariffs tends to understate the true extent of protection in the economy.

Table 1: Moroccan Tariffs

| | **1993** | **1997** | **2000** |
|---|---|---|---|
| Food | 72 | 61 | 52 |
| Textiles | 92 | 61 | 38 |
| Clothing | 99 | 71 | 50 |
| Leather | 60 | 50 | 43 |
| Chemical | 47 | 35 | 26 |
| R&P | 61 | 48 | 38 |
| Electrical | 65 | 37 | 17 |

Source: Trains database

It is also worth highlighting that Moroccan trade is heavily dominated by Europe, which is the destination and origin of more than three-quarters of exports and imports. France is the main trading partner, taking over one-third of exports and providing over one-fifth of imports. Spain is the second trading partner, typically taking 16-18% of exports and providing 10-12% of imports. The UK, Italy and Germany are other important trading partners.

In addition to the above there have been a range of other reform initiatives. These include a privatisation process launched in the late 1980s and which largely focussed on hotels, road transport, petroleum distribution, petrochemicals, housing, textiles, cement and subsequently power generation, oil refining and telecommunications; a reform of the business environment and the judiciary, as well as a modification of the labour code and the labour legislation in 2003. The Moroccan dirham is set with respect to an (undisclosed) basket of currencies and policy has typically favoured a strong exchange rate, which has caused some difficulties for exporters. Despite the policy initiatives, during the 1990's and early 2000's the Moroccan economic growth has been low and the rising unemployment has been exacerbated by the underlying demographic conditions.

## 4. Data overview

The data for this paper are derived from the Moroccan Annual Industrial Census, which is based on the Moroccan industrial classification. Given its compatibility with the ISIC classification, firms could be grouped at 2 and 4 digit. After the cleaning process due to a number of data irregularities, we get a non-

balanced panel data set with 4,762 enterprises over the period 1994-2002. An important feature of the data is that it contains extremely detailed information at the firm level. For example, for each firm we have information on sales, production, exports, and start-up data, as well as information on the labour supply for each firm, with employment divided by employment status, gender, and skills[7].

**Table 2:** Summary Industry Data

| | | Sector Share in Total Employment | | | Sector Share in Total Sales | | |
|---|---|---|---|---|---|---|---|
| **Sector Code** | **Sector** | **1995** | **2002** | **% Change** | **1995** | **2002** | **% Change** |
| 15 | Food and beverages | 22.41 | 29.58 | 31.99 | 32.1 | 33.5 | 4.32 |
| 17 | Textiles | 16.21 | 7.05 | -56.51 | 9.6 | 5.9 | -38.49 |
| 18 | Clothing | 21.34 | 24.18 | 13.31 | 5.5 | 9.2 | 65.70 |
| 19 | Leather and footwear | 3.4 | 3.09 | -9.12 | 1.5 | 1.5 | 1.23 |
| 20 | Wood and wood product | 2.47 | 2.09 | -15.38 | 1.6 | 1.9 | 13.99 |
| 21 | Paper and paper products | 2.46 | 1.54 | -37.40 | 3.5 | 2.3 | -34.84 |
| 22 | Printing and publishing | 1.65 | 1.08 | -34.55 | 1.2 | 1.3 | 13.75 |
| 24 | Chemicals | 7.61 | 8.31 | 9.20 | 17.7 | 15.1 | -14.81 |
| 25 | Rubber and plastic | 2.87 | 2.99 | 4.18 | 2.6 | 3.2 | 21.18 |
| 26 | Non-metallic mineral products | 6.53 | 4.39 | -32.77 | 7.1 | 7.9 | 12.23 |
| 27 | Metallurgy | 0.55 | 1.02 | 85.45 | 2.1 | 2.6 | 21.78 |
| 28 | Metal products | 5.43 | 3.91 | -27.99 | 6.8 | 3.7 | -45.58 |
| 29 | Machines and equipment | 1.81 | 0.88 | -51.38 | 1.7 | 1.5 | -12.96 |
| 30 | Office machinery | 0.13 | N.A. | | 0.1 | 0.0 | -99.55 |
| 31 | Electrical machinery | 1.47 | 2.37 | 61.22 | 2.0 | 3.5 | 79.09 |
| 32 | Radio, TV & telecom equipment | 0.15 | 3.55 | 2266.67 | 0.4 | 0.7 | 68.92 |
| 33 | Precision instruments | 0.11 | 0.13 | 18.18 | 0.1 | 0.1 | 139.91 |
| 34 | Vehicles | 2.38 | 1.8 | -24.37 | 3.4 | 4.5 | 32.58 |
| 35 | Other transport | 0.34 | 0.56 | 64.71 | 0.4 | 0.3 | -27.25 |
| 36 | Furniture, manuf. n.e.s. | 0.69 | 1.48 | 114.49 | 0.5 | 1.2 | 159.08 |

Table 2 provides some summary information on the basis of the cleaned data set on the share of each industry in employment and sales. From the table, it can be seen that there are a few industries, which dominate the Moroccan economy. In terms of employment the key industries in both 1996 and 2002 were Food and Beverages, textiles, and clothing, with shares in total employment of 22.4%, 16.2% and 21.3% respectively. Over the 8 years period of our sample the share of Food and Beverages increased to 29.58, and that of clothing to 24.18%. In contrast the share of textiles declined to 7.05%. In the majority of cases, the variation in the level of employment matches the variation in the number of firms. This suggests that increasing importance of some sectors in the Moroccan economy is driven both by the expansion of existing firms and the entrance of new one. The employment shares are large reflected in the sales and export shares (Table 3).

**Table 3**: Sector Share in terms of Export and Import

| | | Export $_{it}$/ Total Export$_t$ | | Import $_{it}$/ Total Import$_t$ | |
|---|---|---|---|---|---|
| **Sector Code** | **Sector Description** | **1995** | **2002** | **1996** | **2002** |
| 15 | Food and beverages | 17.2 | 19.3 | 10.98 | 6.94 |
| 17 | Textiles | 18.3 | 6.6 | 6.57 | 17.79 |
| 18 | Clothing | 20.7 | 30.9 | 0.13 | 1.94 |
| 19 | Leather and footwear | 3.5 | 3.0 | 0.58 | 1.32 |
| 20 | Wood and wood product | 1.7 | 1.6 | 2.82 | 2.07 |
| 21 | Paper and paper products | 3.0 | 1.6 | 3.03 | 2.27 |
| 22 | Printing and publishing | 0.0 | 0.0 | 1.14 | 1.02 |
| 24 | Chemicals | 25.9 | 21.0 | 20.23 | 14.07 |
| 25 | Rubber and plastic | 1.2 | 0.8 | 3.50 | 3.51 |
| 26 | Non-metallic mineral products | 0.7 | 1.0 | 1.65 | 1.34 |
| 27 | Metallurgy | 1.1 | 2.0 | 8.39 | 6.75 |
| 28 | Metal products | 1.2 | 1.5 | 3.43 | 2.73 |
| 29 | Machines and equipment | 0.3 | 0.3 | 16.79 | 11.43 |
| 30 | Office machinery | 0.0 | 0.0 | 2.10 | 2.37 |
| 31 | Electrical machinery | 0.7 | 6.6 | 3.78 | 4.85 |
| 32 | Radio, TV & telecom equipment | 1.5 | 2.4 | 2.99 | 6.25 |
| 33 | Precision instruments | 0.1 | 0.0 | 1.91 | 1.85 |
| 34 | Vehicles | 2.7 | 1.0 | 7.46 | 7.01 |
| 35 | Other Transport | 0.2 | 0.1 | 1.16 | 2.70 |
| 36 | Furniture, manuf. n.e.s. | 17.2 | 19.3 | 1.38 | 1.80 |

*** Data for Total Import are from the WITZ data set.

One notable difference is with regard the Chemical sector, which had employment shares of only 7.61% and 8.31% in 1995 and 2002 respectively, but accounts for a considerably higher sales share (17.7% in 1995, and 15.1% in 2002), export share (25.9%, 21%) and import share (20.23%, 14.07% respectively). However, it reports a sharp decrease in its openness degree over the period (Table 3). The clothing sector plays an important role in the Moroccan export and registered a large increase in its export shares over the period, moving from 21.94% in 1996 to 30.92% in 2002. Moreover, the import shares in this sector are the lowest of the Moroccan economy. Worth noting is the sharp increase in the export share reported by the Machinery and Electronic Apparels sectors (sector 31) which saw its share rising from 0.78% to 6.63%, while several other industries experienced only modest increases in their shares. On the other side, the biggest declines in the export shares were reported by Textiles sector, which was counterbalanced by a small increase in the import share. This could be explained by the higher competition from China. Finally, the incidence of foreign goods in the Machine and Equipment, Automobile and Metallurgic sectors is considerable. We can conclude that while the Moroccan exports are dominated by few important sectors, the imports are much more diversified. Since we have data on sales, we could compute a more accurate openness index:

$Export\_share_{jt} = Export_{jt}/Sales_{jt}$

$Import\_share_{jt} = Import_{jt}/Sales_{jt}$

Particularly, the openness ranking that we get using this methodology doesn't depend on the sector size.

**Table 4:** Export and Import share on total sales by sector

| | | $Export_{it}/ Sales_{jt}$ | | $Import_{it}/ Sales_{jt}$ | |
|---|---|---|---|---|---|
| **Sector Code** | **Sector Description** | **1995** | **2002** | **1995** | **2002** |
| 15 | Food and beverages | 14 | 16 | 10 | 9 |
| 17 | Textiles | 44 | 30 | 23 | 34 |
| 18 | Clothing | 90 | 90 | 3 | 2 |
| 19 | Leather and footwear | 59 | 54 | 14 | 18 |
| 20 | Wood and wood product | 35 | 23 | 11 | 13 |
| 21 | Paper and paper products | 15 | 19 | 13 | 25 |
| 22 | Printing and publishing | 0 | 0 | 2 | 5 |
| 24 | Chemicals | 43 | 44 | 36 | 33 |
| 25 | Rubber and plastic | 10 | 7 | 35 | 34 |
| 26 | Non-metallic mineral products | 3 | 4 | 15 | 17 |
| 27 | Metallurgy | 16 | 25 | 71 | 58 |
| 28 | Metal products | 6 | 12 | 24 | 40 |
| 29 | Machines and equipment | 2 | 5 | 44 | 67 |
| 30 | Office machinery | 37 | N.A. | 88 | N.A. |
| 31 | Electrical machinery | 12 | 52 | 54 | 42 |
| 32 | Radio, TV & telecom equipment | 80 | 95 | 53 | 70 |
| 33 | Precision instruments | 56 | 8 | 78 | 96 |
| 34 | Vehicles | 21 | 11 | 34 | 57 |
| 35 | Other Transports | 22 | 16 | 34 | 65 |
| 37 | Furniture, manuf. n.e.s. | 14 | 16 | 10 | 9 |

As Table 4 suggests, the majority of sectors that weight more on the trade balance, export a large share of their output. Indeed, Textile, Clothing and Chemicals in 1995 account for 18,3%, 20,7 and 25,9% of total Moroccan export, respectively (Table 3), and sell on the foreign market the 44%, 90% and 43% of their output (Table 4). "Food and Beverage" is an exception since it accounts for a large share of total export (17.2% in 1995, Table 3), but exports only a small share of its total output (14%). This reflects the importance of this sector in terms of total employment and its double role both in the domestic and foreign markets. Moreover, the Leather, the Watches and Telecommunication sectors account for a small share of total export but sell abroad more than half of their output[8]. With regard to import, the picture that we get using this openness index is quite different. Not surprising, the main sectors of the Moroccan economy import only a small share of their output. Contrarily, the minor sectors, like Metallurgy, Equipment, Bureau Machines, Telecommunication and Watches, are heavily dependent on imports. These results are coherent with the Moroccan specialisation patter. Although the fall in tariff and the strength of exchange rate, this period was not characterised by a general increase in the import penetration. This

could be explained by the contraction of the economy after the drought in 1995, the slow recovery and downturn in economic activity across the Moroccan borders.

To get a clearer idea of export orientation of Moroccan firms, we report some firm level statistics to study whether exporter and non exporter firms differ in their underlying characteristics. In our sample, a fairly small proportion of firms (20%) are classified as exporter, which we define as having a ratio of total export / total sales, always greater than zero for every year in the sample. Moreover, the vast majority of exporting establishments export a large fraction of total sales. On average, 73% of exporters report an export ratio greater than 60% of total sales. 63% of firms sell only to the domestic market and are defined as non-exporters. The remaining 17% competes on the international market irregularly. The lower importance of exporting firms in the Moroccan economy is echoed in Figure 1[9] that gives the total number of exporting and non-exporting plants. From this graph we see an increase in the number of exporting firms after 1999, while non-exporter one is fairly constant over the sample period. The graph suggests an increase in participation of Moroccan firms to international trade; this could be seen as a positive effect of the policy reforms that increase the entrepreneurs' confidence in the future.

Concomitant with this, in Figure 2 we see that the mean employment size of exporters was slightly increasing since 1996[10]. In contrast the mean size of non-exporting firms has seen a steady decrease over most of the period. It can also be seen that the exporting firms typically employ significantly more workers than do non-exporters. The larger size of exporting firms is not surprising. But, as suggested by Bernard and Jensen (1999) the question is whether good firms become exporters or whether exporting improves firm performance. Hence, the larger size of exporting firms could be explained in two ways. First, selling in international markets is a special and difficult status for a plant to achieve. To compete in the international market, firms need to be reliable, competitive, to have easy access to credit, and an efficient organisation. This is particularly true of large firms especially in developing countries. Second, it has been argued that trade liberalization, by increasing competition, forces firms to lower price-marginal cost mark-ups and hence move down their average cost curves, thereby raising firm size and scale efficiency. If these two theories are correct, the larger firm size of exporters could be the result of the trade reforms of 1980s and 1990s or be an individual intrinsic characteristic. It is also worth noting that for each of the categories the standard deviations (not reported here) are usually about three times the size of the means. This in turn suggests that plant-level heterogeneity is quite large and that simply looking at means and aggregates may be misleading.

**Figure 1:** Number of firms by Export Status

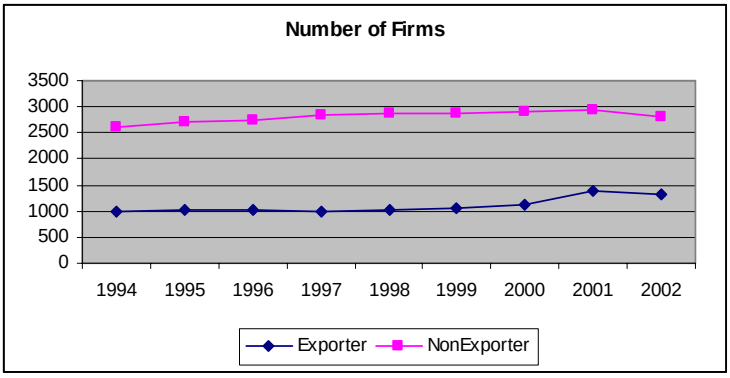
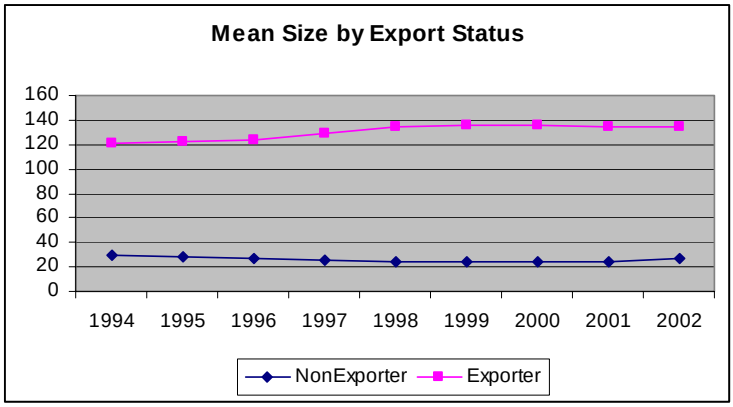



**Figure 2:** Mean firm size by Export status




Finally, we examine whether exporter and non exporter differ in terms of labour productivity. In line with the previous comments, Figure 3 and 4 show that exporter firms present higher productivity, both in form of labour productivity and total factor productivity (TFP), than non exporter firms. Moreover, while exporter firms steadily increase their productivity across the time and the pattern is quite similar for both the variable; non exporter firms decline almost monotonically their labour productivity but the TFP path is much more instable, although always decreasing[11].

Figure 3: Labour Productivity by Export status

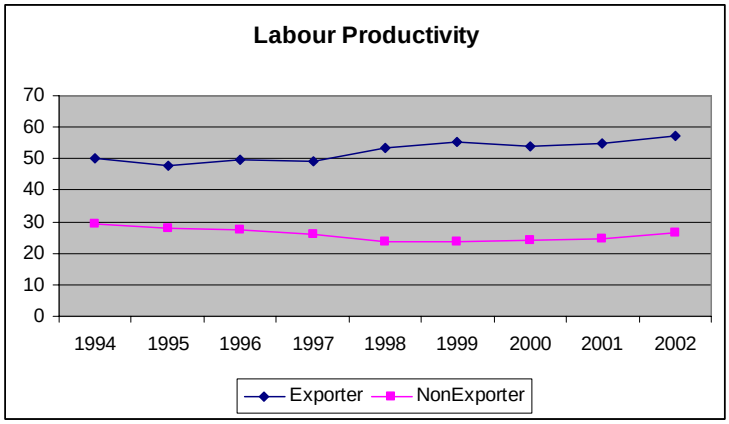
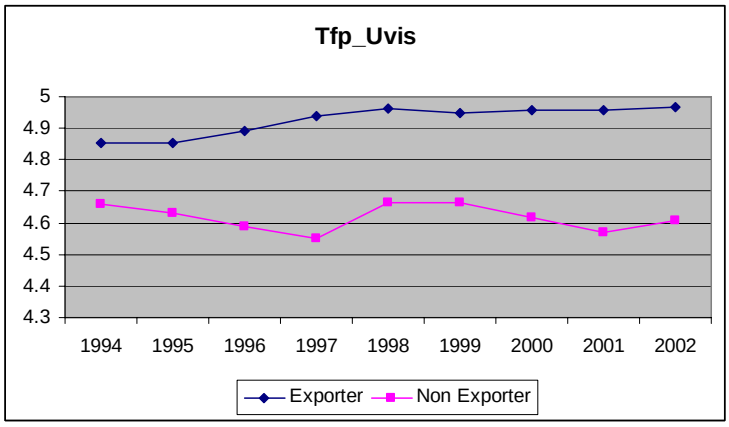


Figure 4: Total Factor Productivity by Export status




# 5. Employment growth and turnover in the Moroccan labour market

In order to shed light on the process of labour market restructuring in Morocco, we rely on a number of key indices following the Davis and Haltiwanger's methodology (1992) , hereafter referred to as DH, that has also been used by Levinsohn (1996), Konings et al (2003), Krugler et al (2004) in the context of Chile, Ukraine and Latin America, respectively. The advantage of the DH approach is that it provides a number of normalised measures, which facilitate comparison, both across time, and across industries. We first consider the evidence on employment growth, and then turn to a more detailed analysis which, for example, considers the extent of job creation, job destruction as well as job reallocation.

## 5.1. Employment Growth

The growth rate of employment at a plant, $g_{et}$ , can be defined as:

$$g_{et} = \frac{x_{i,t} - x_{i,t-1}}{x_{et}} \qquad (5.1)$$

where employment at plant *i* in year *t* is given by $x_{i,t}$ and average employment at plant level is given by:

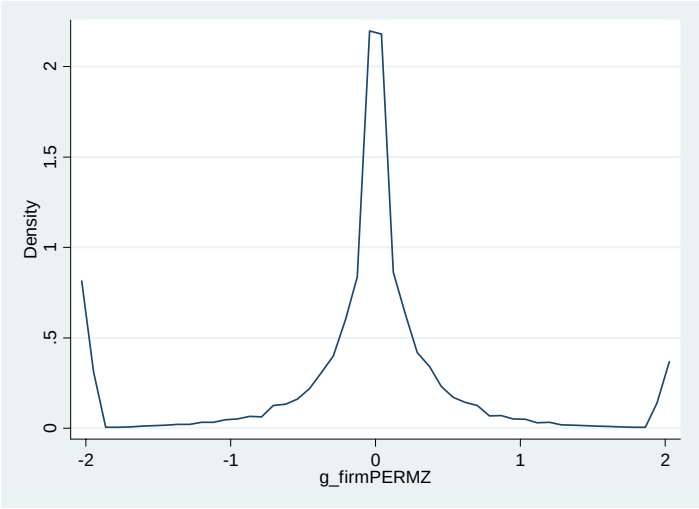
$$x_{e,t} = \frac{x_{i,t} + x_{i,t-1}}{2} \qquad (5.2)$$

This formulation has the nice property that it ranges from 2 to -2, where g=2 captures the entry of a plant and g=-2 the exit of a plant.

Figure 5 gives a summary overview by depicting the empirical density of growth rates for all firms. What emerges from the figures is that the majority of firms have null or negligible growth rates during the sample period[12]. Moreover, overall in the sample the levels of exit are higher than the entry. This feature is due by the data set feature that underestimates entry. Indeed, while we can capture correctly the

entrance of new firms (for each firms is reported the start-up year), the presence of a lot of missing value in the first year of a firm life, makes it impossible to compute the index for that year. Hence, job creation index is underestimated and should be considered as a minimum value. With regard to exit, we don't' have specific information on firm exit, hence assume that a firm exit from the sample at time $t$ if we don't have any information from $t$ onward. Looking at the distribution of entry on the basis of the start up data (without regards to data on employment), we can see that entry and exit account for the same share (~7%).

**Figure 5:** The empirical distribution of employment growth rates




Given the high concentration around zero, in the next section we analyse what's hidden behind this negligible growth rate. Indeed, the theoretical framework and the available evidence suggest that job turnover is important in explaining labour dynamics also in presence of small change in employment level.

## 5.2. Job Reallocation and its determinants: a sectoral level analysis

The preceding discussion indicated that the majority of firms have zero or low growth rates. The aim of this section is to analyse in more depth what may be hidden behind these negligible growth rates. We do this by considering job creation and job destruction, as well as looking at the extent of turnover, and the decomposition of that turnover between the intra- and inter-sectoral movements of jobs.

Job creation is defined as the sum of the new places available through the expansion of existing firms and the creation of new establishments within the sector; and job destruction is derived by adding up employment losses over shrinking and dying establishments within a sector. These are then expressed as rates by dividing by the average size of the sector between $t$ and $t-1$, $X_{st}$:

$$POS_{st} = \sum_{\substack{e \in E_{st} \\ g_{et} > 0}} \left( \frac{x_{et}}{X_{st}} \right) \left| g_{et} \right| \qquad (5.3)$$

$$NEG_{st} = \sum_{\substack{e \in E_{st} \\ g_{et} < 0}} \left( \frac{x_{et}}{X_{st}} \right) \left| g_{et} \right| \qquad (5.4)$$

Where $E_{st}$ is the set of establishments in sector *s* at time *t* . POS and NEG are each bounded between 0 and 2. Hence if there were no firms in period *t-1*, and all firms entered in period *t*, POS would be equal to 2. Similarly if all firms exited in period *t*, then NEG would be equal to -2. An advantage of this index is that it is both bounded and symmetrical, hence if the number of jobs lost in a given year is equal to the number created than this would be captured with POS=NEG. This difference between $POS_{st}$ and $NEG_{st}$ thus gives the net employment change, NET. Finally by adding up $POS_{st}$ and $NEG_{st}$ we get $SUM_{st}$, which can be seen as a measure of the gross job reallocation rate (or turnover) in sector *s* between *t-1* and *t*.

**Table 5:** Job Creation, Job Destruction and Job Reallocation by Sector (weighted average)

| | NET | | SUM | | POS | | NEG | |
|---|---|---|---|---|---|---|---|---|
| | Cont | All | Cont | All | Cont | Entry | Cont | Exit |
| **1994** | | 0.029 | | 0.029 | | 0.029 | | |
| **1995** | 0.016 | 0.010 | 0.183 | 0.236 | 0.100 | 0.023 | 0.083 | 0.030 |
| **1996** | 0.020 | 0.006 | 0.186 | 0.254 | 0.103 | 0.027 | 0.083 | 0.041 |
| **1997** | 0.032 | 0.002 | 0.197 | 0.274 | 0.115 | 0.023 | 0.083 | 0.054 |
| **1998** | 0.018 | -0.008 | 0.166 | 0.224 | 0.092 | 0.016 | 0.074 | 0.042 |
| **1999** | 0.011 | -0.023 | 0.185 | 0.256 | 0.098 | 0.019 | 0.087 | 0.052 |
| **2000** | 0.015 | -0.016 | 0.192 | 0.264 | 0.104 | 0.020 | 0.089 | 0.052 |
| **2001** | 0.028 | 0.015 | 0.161 | 0.246 | 0.095 | 0.036 | 0.067 | 0.048 |
| **2002** | 0.005 | -0.112 | 0.166 | 0.283 | 0.086 | 0.000 | 0.080 | 0.117 |

Table 5 reports on the weighted average measures of job creation (POS), job destruction (NEG), job reallocation (SUM), as well as the net change (NET) by year. In particular, we make a distinction between "continuing" and "all" firms. For "continuing firms" we mean all the firms that expand and contract their workforce across their life. In doing so, we exclude the contribution of entry and exit to job creation and destruction. On the other side, the groups called "all firms" include new entry, exit, contracting and expanding firms. There are several messages, which emerge from Table 5. First if we look at the reallocation effect across years for continuing firms (first column of each section), one immediately notices that the net rate hides much of the dynamics. In 1999, for example, the net rate was close to zero (0.01) but job creation and job destruction were equal to 9.8% and 8.7%, respectively[13]. In 1998 the net rate fell to -0.023, while there was job creation of about 9% and 25% of jobs were reallocated. Hence while on average and in aggregate it might appear that there is little change in the Moroccan labour market (a conclusion which could also be drawn by looking at the growth rate calculations in the preceding section), in reality there is considerable movement and change, although slightly biased versus job creation as suggest the positive value for net employment growth.

Secondly if we include entry and exit firms we see that job reallocation (as well as job creation and job destruction, though we do not report the levels in the table) is typically higher which not surprisingly suggests greater instability than in continuing firms. However, entry and exit account for a small share of

total job creation and job destruction, respectively. Hence job reallocation, or turnover, is better explained looking at the expansion and contraction dynamics of continuing firms more than to entry and exit flows. This implies that considering only the contribution of entry and exit to job reallocation conceal a lot of dynamics.

Thirdly, there is little evidence of any pattern of changes in the indices over time[14]. Hence, although this was a period of some trade policy change (in particular tariff has been reduced), as well as other changes in the policy environment, there is little direct evidence of the impact of these reforms on labour market dynamics. This was also confirmed by a set of regressions which failed to capture a significant structural break with regard to these indices. These results suggest that the higher standard deviation in job flows that characterised the Moroccan labour market, respect to USA and Austria, are mainly due to variation across sectors. The simultaneous high level of job creation and job destruction are reported also in Figure 6, which shows the average annual job creation and job destruction for 20 sectors. Food and Beverage, Clothing, Leather and Footwear, Wood and non-metallic mineral product present the higher level of turnover. The lowest one is in the Chemical, Metallurgy sectors. The major role of job creation in explaining job reallocation is evident also in this graph: the majority of sectors lie below the diagonal line, i.e. they present more job creation than job destruction.

Finally, looking at Table 6, we can compare the magnitude of turnover across different countries. Davis and Haltiwanger (1996) and Stiglabauer et al (2002) show that job reallocation in USA and Austria, respectively, is around 19% and slightly lower than the value for developing countries. Indeed, job reallocation is equal to 25.2% in Chile (Levinsohn, 1999) and 21.5% in Latin America (Haltiwanger et al, 2004). This difference is not surprising since we would expect more reallocation in those countries that are growing faster and are changing their specialisation pattern. Turning to our results we can see that job reallocation in Morocco (19.5%) is more similar to that in developed than developing countries. In particular, the lower level of Moroccan job reallocation than other developing countries, could suggest that the strong Moroccan labour market legislation restricts the flexibility of Moroccan labour markets and hence the underlying ability to adjust to trade reform, as it happens in other developing countries. However, since developing countries' analyses don't separate entry and exit from expansion and contraction, the cross-country comparison is not much informative on difference in the hiring and firing flexibility between Morocco and other developing countries.

**Figure 6**: Annual Average Rate of Job Creation and Job Destruction for 20 sectors.

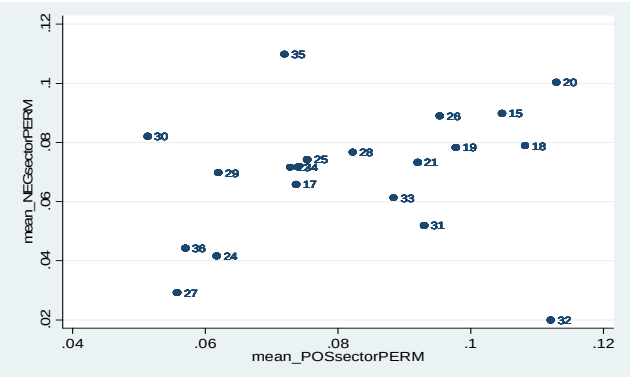


**Table 6:** Job Reallocation Comparison

| | **Job Creation %** | | | **Job Destruction %** | | | **Job Reallocation %** | **Net Employment Growth %** |
|---|---|---|---|---|---|---|---|---|
| | *All* | *Expansion* | *Entry* | *All* | *Contraction* | *Exit* | | |
| **Morocco** | 8.94 | 7.3 | 1.64 | 10.54 | 6.29 | 4.25 | 19.47 | -1.6 |
| **1995-2002** | *5.16* | *4.45* | *0.71* | *6.63* | *3.8* | *2.83* | *10.39* | *5.77* |
| **Austria*** | 9.6 | 5.8 | 3.9 | 9.6 | 5.9 | 3.7 | 19.2 | 0 |
| **1978-1998** | *1* | *0.5* | *0.6* | *0* | *0.5* | *0.5* | *1* | *1.2* |
| **USA**** | 9 | 7 | 1 | 10 | 7.9 | 2.4 | 19.4 | -1 |
| **1973-1988** | *2.1* | *n.a.* | *n.a.* | *3.1* | *n.a.* | *n.a.* | *2* | *4.8* |
| **Ukraine***** | 3.4 | | | 9.8 | | | 12.1 | -7.6 |
| **1993-2000** | *n.a.* | | | *n.a.* | | | *n.a.* | *n.a.* |
| **Chile°** | 11.9 | | | 13.38 | | | 25.28 | -1.5 |
| **1980-1986** | *n.a.* | | | *n.a.* | | | *n.a.* | *n.a.* |
| **Latin America^** | 16.2 | | | 10.5 | | | 21.5 | -0.5 |
| **1991-2001** | *7.9* | | | *7.1* | | | *8.3* | *7.1* |

Stiglbauer et al (2003); ** Davis and Haltiwanger (1992); *** Christev et al (2005); ° Levinsohn (1999); ^ Haltiwanger et al (2004); standard deviations in *italic*.

## 5.3. Job reallocation

The results in the previous section show a significant amount of simultaneous job creation and destruction that induce considerable job reallocation, as well as a lot of variation across sectors. Of interest and importance here is then how much of this reallocation is due to *within* sector employment shifts and what fraction is due to *between* sector shifts. Shedding light on these dynamics allow us to understand the transformation process of the Moroccan economy.

Davis and Haltiwanger's methodology helps us in this decomposition exercise. First of all we "quantify" the ability of each sector and the whole economy to replace the destroyed jobs. This is captured using the rate of *excess* job reallocation, i.e. the difference between total job reallocation (SUM) and the absolute value of the net job reallocation (NET) for the whole economy:

$$EXCESS = \sum_s sum_s - \left| \sum_s net_s \right| \qquad (5.5)$$

where *s* represent the sector. EXCESS is in the range [0; 2n], where *n* is the number of sectors in the economy. The higher is the value of EXCESS the higher is the level of destroyed jobs that have been replaced. Then we decompose excess job reallocation into two components. One component represents the extent of employment movement *between* sectors, and the other component represents movement *within* sectors. These are given by:

$$BETWEEN = \sum_s |net_s| - \left| \sum_s net_s \right| \quad (5.6)$$

$$WITHIN = \sum_s sum_s - \sum_s |net_s| \quad (5.7)$$

Where SUM is a measure of the gross job reallocation rate in sector s between t-1 and t and NET is a measure of net employment change in sector s at time t, as defined in the previous section.

On the basis of these indexes, Table 7 and 8 give us the fraction of excess job reallocation due to employment shifts between and within sectors over the 1995-2002 periods at 2 and 4-digit sector[15]. Starting from the 2 digit classification (Table 7 ) we can see that in all years simultaneous job creation and job destruction *within* industries accounts for the vast majority of total turnover (80% on average). However these results are strictly dependent on the criteria for sector classification. Moving from the 2-digit classification to a more disaggregate classification level (the 4-digit one in Table 8), we immediately see a sharp increase in the between contribution that is around 50% of total job reallocation.

**Table 7:** Employment shift between and within sectors (2-digit Sector)

| ***Continuing Firms:*** | **1995** | **1996** | **1997** | **1998** | **1999** | **2000** | **2001** | **2002** |
|---|---|---|---|---|---|---|---|---|
| **Excess** | 3.59 | 3.05 | 2.71 | 2.19 | 2.90 | 2.12 | 2.74 | 2.30 |
| **Between** | 1.06 | 0.57 | 0.38 | 0.51 | 0.79 | 0.12 | 0.72 | 0.27 |
| **Within** | 2.53 | 2.47 | 2.33 | 1.67 | 2.11 | 2.00 | 2.02 | 2.03 |
| | | | | | | | | |
| **Between/Excess** | 29.47 | 18.82 | 13.97 | 23.52 | 27.19 | 5.64 | 26.32 | 11.86 |

**Table 8:** Employment shift between and within sectors (4-digit Sector)

| ***Continuing Firms:*** | **1995** | **1996** | **1997** | **1998** | **1999** | **2000** | **2001** | **2002** |
|---|---|---|---|---|---|---|---|---|
| **Excess** | 16.51 | 16.42 | 16.01 | 13.15 | 16.32 | 16.53 | 17.06 | 12.92 |
| **Between** | 7.51 | 7.74 | 7.58 | 6.00 | 7.51 | 9.78 | 8.24 | 5.13 |
| **Within** | 9.00 | 8.68 | 8.43 | 7.15 | 8.81 | 6.75 | 8.82 | 7.80 |
| | | | | | | | | |
| **Between/Excess** | 45.49 | 47.13 | 47.36 | 45.63 | 45.99 | 59.17 | 48.29 | 39.67 |

The striking message of these tables is that both between and within job movements are important in explaining the direction of job reallocation. This sheds light on the transformation process of the Moroccan economy, where we see both jobs moving from one sector to the other, but also important within sector movement. Clearly each of these is likely to be impacted upon by the process of trade liberalisation. The between sector shifts are likely to arise from differences in comparative advantage across sectors; and the within sector shifts being driven in part by comparative advantage considerations but at a finer level of specialisation, but also by the differential impact of trade policy (as well as eg. privatisation and financial reforms) on heterogeneous firms. That differential impact could arise directly because of differences in productivity between firms (as in the work of Melitz 2003) and others or because of a differential impact on productivity levels themselves. Moreover, within sector movements

could be explained by "pure" productivity effects, disregard to trade impact, with job moving from across firms with different productivity levels (Berman et al, 1994).

Comparing our results with the available evidence, we notice that the contribution of "between" movement is definitely higher than the results found by Davis and Haltiwanger (1992) for US. Indeed they found that between job reallocation accounts for no more than 1.5 percent of excess job reallocation at 2 digit sector and no more than 12 percent when sectors where classified in 450 groups. The overwhelming importance of between job reallocation has been shown also for other industrialised countries. For example, Boeri and Cramer (1992) find that variance across industry sectors (81 groups) accounted less than 0.5% in Germany. The low between sector reallocation suggests that these countries have already defined their specialisation pattern. Results for other developing countries show that the "between" contribution to excess job reallocation is generally higher than in industrialised countries, however not as high as the results we find for Morocco. Levinsohn (1996) reports that in Chile the between sector reallocation (3-digit) was on average 7.14%, with a pick of 25.3% in 1982-83.

## 6. Job Turnover and Heterogeneity: a within sector analysis

In the previous section we emphasize the simultaneous importance of high job creation and job destruction at sectoral level and relative significance of "between" and "within" job movements at the 4-digit sector. The literature usually links the former movements to trade reform. Indeed, following the classical trade theory, country should specialise in comparative advantages sectors and this induce a worker flows from the less competitive sectors to the main one. On the other side, "within" job movements are usually explained by difference in productivity, induced also by trade reform (Bernard et al, 1995), though as noted earlier comparative advantage can also play a role here.

Following this literature, we disentangle the role of trade and technological change in explaining job dynamics both at 4-digit and at firm level. The 4-digit analysis allows us to investigate the determinants of job turnover within sectors linking directly job flow indices, sectoral level variables and macro shocks. Usually, excess job reallocation at sectoral level is used as the main dependent variable in this analysis. However, this index computed at sectoral level coincide with the "within" component and hence capture only the within sector reallocation[16]. Since our decomposition put in light the importance of both directions, we use a more general index, job reallocation. Moreover, we would decompose it into its two components: job creation and job destruction. Excess job reallocation at sectoral level is then subsequently used in order to investigate the inter- and intra sectors effect of trade and technological change.

We use separate regressions for job creation and job destruction for two main reasons. First of all, being able to disentangle the impact of trade and technological change on job creation and destruction flows is extremely important for calculating the welfare costs of labour adjustment (Klein et al, 2003). Indeed, the welfare implications of a decrease in job creation or an increase in job destruction could be very different even if the net impact is the same. Davis et al (1996) show that job destruction is likely to involve a permanent dislocation of high-wage and/or older workers, human capital destruction, and

permanent income loss. This would lead to higher structural unemployment. In contrast, lower job creation will raise the unemployment rate, mainly among young workers, increase its duration and slow down the human capital's accumulation. These adjustments are likely to have lesser impacts on workers and welfare (Klein et. al, 2003), at least in the short run. Secondly, once we have proved the role of trade in explaining inter-sectors movements, distinguish between job creation and job destruction is useful to disentangle the direction of the "between" trade movements. Indeed, if greater export orientation increases job creation and decreases job destruction (and vice versa import penetration), this suggests that Morocco is changing its production pattern. Since more trade oriented sectors are the more labour intensive one, the transformation is in line with classical trade theory.

In the final part of the analysis we focus directly on understanding the impact of trade policy reform on the labour market at the firm (as opposed to sectoral) level. Since job turnover indexes could be computed only at the aggregate level (a single firm or create or destroy jobs in one year), to examine more in deep the heterogeneity feature of job turnover we should follow a slightly different approach and move from the job turnover literature to the labour demand one. The link between the two frameworks is straightforward since firm-level employment decisions (in the form of employment growth rate) are the base-unit for the job flow indexes computation. Using data at firm level over the period 1994-2002 we can examine how firm and sectoral level characteristics, as well as macro shocks, impact on employment dynamics. This analysis allows us to better investigate the nature of the Moroccan economy transformation and the role of heterogeneity in labour dynamics.

## 6.1. The 4-digit analysis

### *6.1.1. The Theoretical Framework*

The empirical analysis in this section follows the general approach taken by different authors (see for example Beaulieu, 2000; Gaston and Trefler, 1997) to measure the impact of trade liberalisation on employment: we estimate the reduced-form equation derived from the general model of labour market equilibrium. This has become a standard approach for investigating the effect of international trade on labour markets. This approach is based on the Revenga's (1992) simple structural model of the labour market. Labour demand in industry *i* for year t ($L_{it}$), specified in first-difference form, is given by the following equation:

$$\Delta \ln L_{jt} = \beta_1 \Delta D_{jt} + \beta_2 T_{jt} + \beta_3 \Delta \ln W_{jt} + \varepsilon_{jt} \qquad (6.1)$$

where $\Delta$ is the first differences operator (e.g. $\Delta Y_{jt} = Y_{jt} - Y_{jt-1}$); $D_{it}$ is a vector of demand determinant for sector j in year t; $T_{jt}$ is a vector of time-and industry-varying international trade variables (trade flows, price of imports, tariffs); $W_{jt}$ is the average annual wage in sector j and year t and $\varepsilon_{jt}$ is an error term reflecting unobserved labour demand shocks.

The first-difference form of the labour supply function for industry i and year t can be written as:

$$\Delta \ln L_{jt} = \alpha_1 \Delta \ln W_{jt} + \alpha_2 \Delta H_{jt} + \mu_{jt} \qquad (6.2)$$

where $H_{jt}$ is a vector of labour supply determinants and $\mu_{jt}$ is an error term reflecting unobserved labour supply shocks.

The system of equations given by labour demand and labour supply cannot be estimated by OLS because of the simultaneity of supply and demand, which ensures that the wages and employment are correlated with the error terms. To solve this problem, the reduced-form for employment and earnings equations is derived as follow:

$$\Delta \ln L_{jt} = \beta_i + \beta_1 \Delta D_{jt} + \beta_2 \Delta T_{jt} + \beta_3 \Delta H_{jt} + \upsilon_{jt} \quad (6.3)$$

$$\Delta \ln W_{jt} = \alpha_j + \alpha_1 \Delta D_{jt} + \alpha_2 \Delta T_{jt} + \alpha_3 \Delta H_{jt} + \nu_{jt} \quad (6.4)$$

the error terms in equation (6.3) and (6.4), $\upsilon_{jt}$ and $\nu_{jt}$, respectively, are combinations of the labour demand and supply shocks from equations (6.1) and (6.2). Gaston and Trefler (1997) apply a more general version of the same model:

$$\Delta \ln L_{jt} = \beta_1 \Delta X_t + \beta_2 \Delta Z_{jt} + \beta_3 \Delta T_{jt} + \varepsilon_{jt} \quad (6.5)$$

$$\Delta \ln W_{jt} = \alpha_1 \Delta X_t + \alpha_2 \Delta Z_{jt} + \alpha_3 \Delta T_{jt} + u_{jt} \quad (6.6)$$

Where $L_{jt}$ is the employment for sector *j* at time *t*; $W_{jt}$ is the earnings (or wages) for sector *j* at time *t*; $X_t$ is a vector of time-varying regressors common to all sectors; $Z_{jt}$ is a vector of time-varying sector regressors. $T_{jt}$ is the vector containing variables of interest for the analysis, such ad trade flows. $u_{jt}$ and $\varepsilon_{jt}$ are assumed i.i.d. normal. Some of the variable in $X_t$ , $Z_{jt}$ and $T_{jt}$ are intended to capture the determinants of the supply and demand for labour.

This approach has been widely used in the literature but, owing to the methodology implemented, these analyses put in light changes in the level of employment across sector and do not consider job reallocation. However, since the variation in employment ($\Delta L_{jt}$) is form by the variations in job creation and job, we use as dependent variable the job flow indexes. Moreover, we will estimate equation (6.6) using variables in level and adopting a fixed effect estimator, instead of a first difference estimator. The estimation function becomes:

$$L_{jt} = \beta_j + \beta_1 X_t + \beta_2 Z_{jt} + \beta_3 T_{jt} + \varepsilon_{jt} \quad (6.7)$$

Drawing on the theoretical model, we estimate the following regressions:

$$JobFlow_{jt} = \alpha_j + \beta Exp\_share_{jt} + \gamma imp\_share_{jt} + \mu Labour\_prodLAG_{jt} + \varphi Herf\_index_{jt} + \gamma inv\_ca_{jt} + \eta skill\_share_{jt} + \zeta Femm\_share_{jt} + \phi Dt + \varepsilon_{jt} \quad (6.8)$$

Where *j* refers to the 4-digit sector and *t* to year [1995-2002]. $JobFlows_{jt}$ = {Job Reallocation ($SUM_{jt}$); Job Creation ($POS_{jt}$), Job Destruction ($NEG_{jt}$); Excess Job Reallocation ($EXCESS_{jt}$)}.

In this specification, the vector $T_{jt}$ contains the sectoral trade orientation variables and the proxy for technological change. Trade openness is computed as the ratio of total export ($exp\_share_j$) and total import ($imp\_share_j$) on sales for each sector. Following the literature, we expect that more involvement in international trade would create more instability in the labour market, i.e increase turnover (Davis and Haltiwanger (1990), Gourinchas (1999a), Klein et all (2003). In particular, we would expect a negative

effect of final-good import on net employment since higher competition on domestic market could hurt national firms, which react by cutting costs and shirking their labour force (reduce job creation and increase job destruction). However, if increased import penetration is in intermediate goods, this can make firms more competitive and thus increase job creation. The net effect on employment could be ambiguous. On the other side, greater export orientation should boost job creation and decrease (or keep constant) job destruction. From a dynamic point of view[17], if a firm increases its share on the foreign market, it means that it's performing very well. Hence it's reasonable an increase in its size, particularly if it deals in labour intensive goods (like the clothing, and food and beverage sectors)[18]. Moreover, the positive effect of export on labour market could also be driven by the "inshoring effect". European firms relocate different stages of their production process in Morocco, mainly in the textile sector, to take advantage of the lower factor prices. Hence, exports from Morocco to the EU include not only final goods but also intermediate goods, in this way trade openness with Europe has a double positive effect on exports. However, since the Moroccan labour market regulation is particularly comprehensive and rather restrictive about the firing procedures for the private sector workforce, it's possible that this feature could impact on the significance of regressors.

Investment share[19] ($inv\_ca_j$) and labour productivity[20] ($labour\_prod_j$) are introduced as "crude" indicators of technological change. Investment share is computed as the share of total investment on sales; labour productivity is the share of added value per worker and skill share is the share of total skilled workers in total employment. We would expect a negative coefficient for these variables whether firms invest in labour-saving technology. In this case higher investment share as well as higher productivity level should decrease job creation and increase job destruction, at least in the short run. Vice versa in the case of labour-using innovation. In both case, it's important to discern between the short- and the long-run effect. In the short run, without regards to the direction of technological bias, as a firm become more productive, it doesn't need to hire more workers to increase production. Higher productivity implies some adjustment costs, mainly in terms of labour. However, in the long run, this increase in productivity makes firms more competitive. As a result, they will expand output and employment more than it otherwise would. If the technology is labour-intensive it implies a general increase in labour demand, if it's capital driven, the labour demand would be biased in favour of more skilled workers. Hence there are potentially two effects here impacting on the labour market: the adjustment cost –increase in productivity reduces labour demand in the short run- and a long-run benefit –increase in efficiency raises output and creates new jobs.

The introduction of these variables allows us to investigate the different impact of trade and technological change on labour market dynamics (Acemoglu, 2002). Moreover, they give us some indication on the direction of job flows: trade should mainly explain "between" sector movements and technological change the "within" dynamics.

The introduction of skill share ($skill\ share_{jt}$) captures two different effects. Form one side it could be used as an alternative proxy for technological change. Indeed, if technological change is capital intensive, it requires more skilled workers. Consequently, sectors with higher productivity –and more technology-

would hire more skilled workers. Hence a negative impact of this variable on job creation (and vice versa on job destruction) could be compared to a labour-saving technological change effect. On the other side, skill share could shed light on the direction of Moroccan economy transformation. Following the classical trade theory, we would expect that following trade liberalisation, Morocco would specialize in unskilled intensive sectors. Hence, sector with higher skill share would resize their workforce, with negative consequences on job creation and job destruction. Consequently, in both direction –technological change or trade effect- we would expect a negative sign if this variable.

The choice of the time-varying sector regressors included in $Z_{jt}$ is based on the literature. We add among the regressors the Herfindal index ($Herf\_Index_j$), which capture the market structure of each sector[21]. Nickell (1999) provides a theoretical intuition of the positive effect that an increase in labour market competition would have on the labour demand. Indeed, in his model, the external shifts of the labour demand curve derives from the modification of firms pricing behaviour when competition become stronger. In addition to this direct effect, Boeri et al (2000) and Nicoretti et al (2000) evidence an indirect effect on labour market operation: increased competition on the product market may be associated with stronger turnover. Hence, we expect a negative sign for the Herfindal index. Moreover, as the theoretical framework (Evans, 1987) and the available evidence (Koning et al, 2003; Stiglbauer et al, 2003) show, firm size matters in the analysis of job reallocation. In particular, size is inversely related to instability: small firms present lower turnover than the large one. Hence, we control also for the average size of firm ($lag\_AV\_size_j$) in each sector, computed on the basis of total employment, and we expect a negative sign of its coefficient. We introduce the lagged value to avoid endogeneity problems. Indeed change in job creation and job destruction could induce change in the average size. Following the Jovanovic's (1982) life-style model, we also examine how age influences job reallocation. Jovanovic shows that young firms grow faster than older ones and this could be reflected in higher job turnover among this group. Hence we would expect a negative sign of the firm age variable ($AV\_age_j$). Finally, we examine whether difference in turnover could be explained by difference in workers composition. The labour market literature (Eherenberg and Smith, 2003) and the scarce evidence (Levinsohn, 1996) suggest that job reallocation is higher for female ($Female\_Share_j$) workers. As a result, we would expect a positive sign of their coefficient.

The vector of time-varying regressors common to all sectors ($X_t$) is substituted with the year dummies vectors that control for macro shocks.

Finally, lagged value of $JC_{jt}$ and $JD_{jt}$ are added to the regressors to account for possible dynamic adjustments. These exercises allow us to investigate the labour market flexibility and its adjustment speed. Given the strict firing procedure, this analysis could shed light on the effects of labour market institutions on the adjustment process.

**Table 9**: Descriptive Statistics of relevant variables (4-digit sector, 1995-2002)

| Variable | Obs | Mean | Std.Dev. | Min | Max |
|---|---|---|---|---|---|
| SUM | 812 | 0.16 | 0.13 | 0 | 1.16 |
| POS | 812 | 0.09 | 0.10 | 0 | 0.91 |
| NEG | 812 | 0.08 | 0.10 | 0 | 1.13 |
| Export Share | 812 | 0.19 | 0.27 | 0 | 1 |
| Import Share | 624 | 0.37 | 0.30 | 0 | 1 |
| Female Share | 723 | 0.75 | 4.31 | 0 | 100.25 |
| Skill_Share | 653 | 0.31 | 0.20 | 0 | 1.46 |
| Average Firm Size (RS^) | 812 | 0.90 | 1.34 | 0.02 | 10.15 |
| Average Share | 812 | 18.36 | 9.78 | 0 | 62 |
| Labour Productivity (RS^) | 747 | 3.27 | 7.46 | -0.36 | 106.27 |
| Investment Share | 812 | 0.09 | 0.18 | 0 | 3.72 |
| Herf_index | 812 | 0.33 | 0.30 | 0.00 | 1 |

^ To get the real value of Average Size and Labour productivity, multiplied by 100.

### *6.1.2. Estimation Methodology*

Since the data set pools time series data with cross-sectional data, the best tool of analysis is a panel data approach. This method allows us to capture both the temporal dimension (within variation) as well as the space dimension (between variations). On the other hand, a simple OLS model, which stacks the observations of each firm over time on top of one other, discards the temporal and space dimension and thus throws away useful information. Indeed, in the standard pooled model intercepts and slope coefficients are homogeneous across all N cross-sections and through all T time periods.

First of all we should test for the poolability of the data using a Chow test. If the null hypothesis is rejected, it means that sectoral dummies are jointly significant and different from zero. In this case, the pooled OLS model yields biased and inconsistent estimates of the regression parameters. This is due to the omission of important variables: OLS deletes the time and individual dummies when in fact they are relevant. Once we reject the pooled estimator, we use a two-way fixed effect model (LSDV) where sectoral and time dummies are assumed to be fixed parameters to be estimated. Finally, in the latter specifications, we control also for possible dynamic adjustment. We proceed in two ways. First of all we verify if job creation is influenced by the lagged value of job destruction; vice versa for job destruction. In this way we avoid the estimation problems of a dynamic panel - that are particular evident in our estimation owing to the short time span in our data set-, the autocorrelation problems and the high number of instruments that weak the Sargan/Hansen test. However, as a robust check on the dynamics significance, we introduce among the regressors the lagged dependent variable and we follow the System Generalized Method of Moments (GMM-SYS) estimator approach suggested by Blundell and Bond (1998) that combines equation in first-differences with equation in levels to exploit a larger set of moment conditions. In each specification, the variance-covariance matrix is corrected for heteroschedasticity using the White-Huber sandwich estimators.

Different authors estimate the labour market function using the first-difference estimator. We prefer the fixed-effect approach for two main reasons. Application of OLS to the first differences model

produces unbiased and consistent coefficients but the error process is now a moving-average and this may present problem in estimation. Moreover, given the assumption of i.i.d. errors, the first-difference estimator is less efficient than the within estimator for T>2 (Cameron and Trivedi, 2005).

Finally, we estimate different specifications of equation (6.8). In particular we start from an equation with only import and export share as dependent variables and we progressively add more variables. In this way we test for the robustness of our key variables (export share, import share and technological change) to the inclusion of different controls. However, the comment to the results is based on the last column of each table that includes all the variables of interest.

### *6.1.3. Results*

Tables 10, 11 and 12 summarize the results of the model estimation on job turnover, job creation and job destruction. Focusing on the impact of international trade on turnover, Table 10 suggests that increasing trade, both in terms of higher import penetration and export orientation, greatly impacts on the Moroccan labour market. As expected, import and export flows exert an opposite effect on labour market. Indeed, while an increase in export orientation increases turnover by rising job creation (Table 11), an increase in import decreases turnover by having a negative impact on job creation. Looking at column 4 of Table 11 we can quantify these effects: a 10 percentage point increase in export share rises job creation by 3.5 percent, on average and ceteris paribus[22]. On the other side, a 10 percentage point increase in import decreases turnover by 1.2 percent, on average and ceteris paribus. The lower impact of import penetration on job creation could be explained by the nature of the imported goods. Indeed, while import of final goods replaces domestic goods and hence negatively impacts on labour market, import of intermediate goods[23] may increase the creation of new jobs by boosting the manufacturing production. However, the data does not enable us to identify the nature and destination of imported and exported good.

Conversely, it is very interesting that the trade variables are never significant for job destruction. Here it is worth noting that the process of trade liberalisation for Morocco in this period is largely asymmetric whereby Morocco is reducing its tariff barriers much more significantly than its principal trading partners. Hence, Morocco is becoming much more open to world trade principally on the import side. One would normally therefore expect an impact on job destruction as that process of opening up the economy leads to an increase in competition on the domestic market. Our results suggest that to the extent that this is happening it is on the side of job creation rather than job destruction. One plausible explanation for this is that this could be a result of the strict labour market regulation of Morocco that is particularly rigid on firing procedures. On the one hand this suggest that impact of the increased openness may result in less of a direct impact on unemployment with its attendant social implications, on the other hand it points to a lack of flexibility in the Moroccan economy which is likely to impact on long term growth prospects. It is also worth pointing out that since the destroyed jobs are more than compensated by new jobs in the exporting sectors, the costs, in terms of lower human capital accumulation and longer unemployment duration, may be lower.

When we control for labour productivity, we can see that technological change damage the Moroccan labour market. Indeed, also if it doesn't change job stability, it decreases the net employment level by worsening the hiring and firing opportunities. In particular, a 10 percentage point increase in labour productivity implies a 0.36 percent decline in hiring, on average and ceteris paribus (Column 4 Table 11). The negative impact of technological change on labour market is confirmed in Table 12: a 10 percentage point increase in labour productivity raises job destruction by 0.41 percent. These results suggest that technological change is based on the adoption of labour-saving technology. Indeed, during the 1990s Moroccan government strongly supports the adoption of capital intensive technology. This result is echoed by the positive coefficient of skill share[24]. Indeed, capital intensive technology usually requires more skilled workers. Hence if an increase in the skill share induces an increase in job destruction, the effect could be equalised to that of technological change. However, the other proxy for technological change (investment share) is never significant. To evaluate the impact of technological change, we should differentiate between the short run and the long run effects. Indeed, in the short run, given the already precarious unemployment and poverty situation in Morocco, it risks to worsen the social tension. On the other hand, technological change, by improving firm performance and competitivity, will boost future growth with positive outcomes on labour market and incomes.

From this analysis we conclude that both trade and technological change are important in explaining job dynamics. Furthermore, by comparing the estimation of job reallocation (Table 10) with the excess job reallocation one (Table 13), we discover that they are also complementary. The non-significance of trade variables in the excess job reallocation regression, which as already pointed out capture within sector movements, support the idea that trade flows mainly explains "between" sector movements. The job creation estimations advocate that this shift is from importing, that created fewer jobs, to exporting firms, that create new jobs. Hence Morocco is changing its specialisation pattern. Since exporting sectors are also the more labour intensive one (clothing and food and beverage, in particular), we could infer that this transformation is in line with the classical trade theories, that suggest that a country specializes in the sectors intensive in the relative abundant factor. The negative sign of the skilled share supports this position. We examine this further in the next section where the analysis is undertaken at the firm level and where we investigate whether a rise in export induces a "pure" increase in labour demand and whether it's biased versus unskilled workers. On the other side, the significance of labour productivity in excess job reallocation regression implies that technological change is important in explaining "within" sector movements. In particular, sectors with higher productivity level present lower within reallocation. However, the low size of its coefficients, the insignificance of other sectoral variables and the low R-squared, suggest that other elements, such as firm heterogeneity (Melitz, 2003), are key variables in explaining job dynamics. Hence, differences in labour productivity across sectors are useful to explain different levels of "within" sector reallocation, but differences in trade exposure explain only "between" sectors movements.

Finally, it's worth noting that in this specification, skill share is not significant, suggesting that this variable capture more the direction of the Moroccan economy transformation than technological change.

However this dichotomy would better investigate at firm level, where we focus on the different impact of trade and technological change on skilled and unskilled workers.

Another important determinant of Moroccan job turnover is the average firm size. In line with the theoretical framework, the negative sign of these coefficients confirm that large firms are more stable. However, larger firms exert a negative impact on net employment by creating fewer jobs and destroying more, although the latter effect is less significant and robust. Comparing the average size coefficient with the export share one, we can see that these two dimensions have an opposite effect on turnover and in particular on job creation. It's commonly accepted in the literature (Bernard and Jensen, 1999) and is confirmed in our data (see Section 4) that exporter firms are usually larger than non exporter. Hence the opposite effect that size and export orientation have on turnover deserves particular attention to better understand the impact of trade liberalisation on labour market (see Bottini and Gasiorek, 2007). On the other side, market structure and average firm age are not relevant in explain differences in turnover.

Finally, we control for possible dynamic adjustments. The last columns of Table 11 and 12 shows a strong influence of past job flows on hiring and firing that doesn't change the significance of the other variables. As we can see comparing the elasticities, job creation is more reactive to change in job destruction than the opposite way. Indeed the elasticities are 0.036 and 0.014, respectively[25]. This result could be interpreted as a positive signal for the Moroccan labour market, since some of the destroyed jobs are replaced by new jobs within one year. On the other side, it supports the idea that the strict Moroccan firing procedure impedes a quick adjustment and could bring to an inefficient job allocation. The higher labour market responsiveness to job destruction is confirmed by the positive and significant coefficient of lagged job destruction in the turnover regression (Table 10). The strong significance of lagged values of job creation and job destruction indicates also that idiosyncratic factors within industries explain most of the variation of costly employment adjustment. The evidence is in line with the analysis of real business cycle of Davis et al (1996).

The results suggest that higher Moroccan participation in international trade, promoted by the Barcelona agreement and other FTA, will have seriously consequences for the Moroccan labour market. Indeed, these agreements would boost both exports, by favouring the trade relationships, and import penetration, by decreasing tariffs. Consequently it induces job reallocation from import to export sectors and hence a change in the Moroccan specialisation pattern. However, the adjustment process is slow down by the strict firing procedure. This constraint would safeguard employed workers but at the same time it impedes to Moroccan economy to fully take advantages from the trade liberalisation gains in terms of higher aggregate productivity and welfare (Melitz, 2003). Hence, although labour market institutions limit the short run losses in terms of higher unemployment, it could undermine future growth. On the other side, the adoption of capital-intensive production technique, which was supported by the Moroccan government during the 1990s, hurts the labour market. Contrarily to trade flows, change in productivity mainly explains reallocation within sectors and do not impact on the manufacture's structure. However, contrarily to trade factors, it negatively influences both job creation and job destruction. From these results it is evident the complementary role of trade and technological change in explaining job dynamics.

Moreover the sectoral level analysis puts in light the importance of a deeper analysis to investigate the change in specialisation pattern and the role of firm heterogeneity in job dynamics.

**Table 10**: 4-digit Regression: Job Turnover, period 1994-2002

| **Job Turnover (SUM)** | | | | | |
|---|---|---|---|---|---|
| | LSDV_1 | LSDV_2 | LSDV_3 | LSDV_4 | LSDV_5 |
| Export Share | 0.135 | 0.157 | 0.181 | 0.181 | 0.219 |
| | (2.21)** | (2.50)** | (2.37)** | (2.38)** | (2.82)*** |
| Import share | -0.051 | -0.071 | -0.097 | -0.098 | -0.057 |
| | (1.53) | (2.10)** | (2.06)** | (2.08)** | (1.24) |
| Labour Productivity | | 0.001 | 0.001 | 0.001 | 0.001 |
| | | (0.05) | (0.1) | (0.11) | (0.29) |
| Average Firm Size | | | -0.034 | -0.034 | -0.034 |
| | | | (1.71)* | (1.70)* | (1.55) |
| Average Age | | | 0.001 | 0.001 | 0.001 |
| | | | (0.58) | (0.6) | (0.45) |
| Investment share | | | 0.067 | 0.068 | 0.041 |
| | | | (0.83) | (0.82) | (0.54) |
| Herf_index | | | 0.002 | 0.001 | 0.004 |
| | | | (0.02) | (0.02) | (0.05) |
| Skill Share | | | | 0.012 | -0.032 |
| | | | | (0.14) | (0.33) |
| Female Share | | | | 0.013 | 0.003 |
| | | | | (0.33) | (0.07) |
| Lag_Job Creation | | | | | 0.014 |
| | | | | | (0.18) |
| Lag Job Destruction | | | | | 0.278 |
| | | | | | (1.94)* |
| Year | Yes | Yes | Yes | Yes | Yes |
| Constant | 0.174 | 0.178 | 0.135 | 0.134 | 0.112 |
| | (9.44)*** | (9.38)*** | (3.52)*** | (3.41)*** | (2.90)*** |
| Observations | 624 | 601 | 601 | 601 | 523 |
| Number of isic4d | 89 | 88 | 88 | 88 | 86 |
| R-squared | 0.03 | 0.04 | 0.07 | 0.07 | 0.12 |
| Chow_Test | 3.56 | 3.75 | 3.39 | 3.34 | 1.59 |
| Heterosched: Prob>chi2 | 0 | 0 | 0 | 0 | 0 |

Absolute value of t statistics in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

**Table 11**: 4-digit Regression: Job Creation, period 1994-2002

| **Job Creation (POS)** | | | | | |
|---|---|---|---|---|---|
| | LSDV_1 | LSDV_2 | LSDV_3 | LSDV_4 | LSDV_5 |
| Export Share | 0.136<br>(2.09)** | 0.146<br>(2.10)** | 0.158<br>(1.93)* | 0.166<br>(1.91)* | 0.193<br>(2.09)** |
| Import share | -0.058<br>(2.08)** | -0.045<br>(1.38) | -0.078<br>(1.98)** | -0.087<br>(2.18)** | -0.061<br>(1.39) |
| Labour Productivity | | -0.001<br>(2.27)** | -0.001<br>(1.98)** | -0.001<br>(1.81)** | -0.001<br>(1.84)* |
| Average Firm Size | | | -0.039<br>(2.30)** | -0.037<br>(2.24)** | -0.04<br>(1.76)* |
| Average Age | | | -0.002<br>(1.56) | -0.002<br>(1.29) | -0.003<br>(0.24) |
| Investment share | | | 0.056<br>(0.71) | 0.067<br>(0.82) | 0.039<br>(0.56) |
| Herf_index | | | 0.054<br>(0.77) | 0.055<br>(0.79) | 0.062<br>(0.85) |
| Skill Share | | | | -0.126<br>(1.4) | -0.19<br>(1.77)* |
| Female Share | | | | 0.025<br>(0.69) | 0.025<br>(0.65) |
| Lag_Job Destruction | | | | | 0.444<br>(3.64)*** |
| Year | Yes | Yes | Yes | Yes | Yes |
| Constant | 0.077<br>(4.37)*** | 0.072<br>(3.84)*** | 0.065<br>(1.87)* | 0.069<br>(1.97)** | 0.043<br>(2.99)*** |
| Observations | 624 | 601 | 601 | 601 | 542 |
| Number of isic4d | 89 | 88 | 88 | 88 | 87 |
| R-squared | 0.03 | 0.03 | 0.07 | 0.08 | 0.22 |
| Chow_Test | 2.43 | 2.53 | 2.54 | 2.53 | 2.79 |
| Heterosched: Prob>chi2 | 0 | 0 | 0 | 0 | 0 |

Absolute value of t statistics in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

**Table 12**: 4-digit Regression: Job Destruction, period 1994-2002

| **Job Destruction (NEG)** | | | | | |
|---|---|---|---|---|---|
| | LSDV_1 | LSDV_2 | LSDV_3 | LSDV_4 | LSDV_5 |
| Export Share | -0.001 | 0.011 | 0.051 | 0.043 | 0.047 |
| | (0.02) | (0.25) | (1.12) | (0.97) | (1.09) |
| Import share | 0.007 | -0.026 | -0.035 | -0.029 | 0.001 |
| | (0.23) | (0.93) | (1.26) | (1.06) | (0.04) |
| Labour Productivity | | 0.001 | 0.001 | 0.001 | 0.001 |
| | | (1.95)* | (1.95)** | (1.84)* | (1.73)* |
| Average Firm Size | | | 0.01 | 0.01 | 0.049 |
| | | | (2.02)** | (1.99)*** | (0.90) |
| Average Age | | | 0.019 | 0.003 | 0.001 |
| | | | (1.54) | (1.35) | (1.17) |
| Investment share | | | 0.011 | 0.001 | 0.001 |
| | | | (0.31) | (0.02) | (0.01) |
| Herf_index | | | -0.052 | -0.054 | -0.115) |
| | | | (1.01) | (1.05) | (2.11)** |
| Skill Share | | | | 0.142 | 0.139 |
| | | | | (1.97)** | (1.79)* |
| Female Share | | | | -0.012 | -0.026 |
| | | | | (0.54) | (1.1) |
| Lag_Job Creation | | | | | 0.164 |
| | | | | | (2.30)*** |
| Year | Yes | Yes | Yes | Yes | Yes |
| Constant | 0.098 | 0.106 | 0.07 | 0.065 | 0.054 |
| | (5.86)*** | (6.64)*** | (2.73)*** | (2.40)** | (2.01)** |
| Observations | 624 | 601 | 601 | 601 | 523 |
| Number of isic4d | 89 | 88 | 88 | 88 | 86 |
| R-squared | 0.04 | 0.05 | 0.08 | 0.09 | 0.15 |
| Chow_Test | 2.24 | 2.66 | 2.45 | 2.71 | 1.91 |
| Heterosched: Prob>chi2 | 0 | 0 | 0 | 0 | 0 |

Absolute value of t statistics in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

**Table 13**: 4-digit Regression: Excess Job Reallocation, period 1994-2002

| | **Excess Job Reallocation (EXCESS)** | | | |
|---|---|---|---|---|
| | LSDV 1 | LSDV 2 | LSDV 3 | LSDV 4 |
| Export Share | 0.05 | 0.047 | 0.046 | 0.055 |
| | (1.35) | (1.27) | (1.25) | (1.42) |
| Import share | -0.021 | -0.016 | -0.017 | 0.013 |
| | (0.98) | (0.67) | (0.68) | (0.41) |
| Labour Productivity | -0.001 | -0.001 | -0.001 | -0.001 |
| | (1.79)* | (2.19)** | (1.91)* | (1.94)* |
| Average Firm Size | | -0.002 | -0.002 | -0.002 |
| | | (0.74) | (0.77) | (0.91) |
| Average Age | | -0.001 | -0.001 | -0.001 |
| | | (0.83) | (0.35) | (0.96) |
| Investment share | | | 0.024 | -0.006 |
| | | | (0.42) | (0.1) |
| Herf_index | | | -0.033 | -0.035 |
| | | | (1.13) | (1.04) |
| Skill Share | | | -0.006 | -0.039 |
| | | | (0.11) | (0.65) |
| Female Share | | | 0.005 | -0.016 |
| | | | (0.23) | (0.65) |
| Lag_Job Creation | | | | 0.015 |
| | | | | (0.38) |
| Lag_Job Destruction | | | | 0.037 |
| | | | | (0.88) |
| Year Dummy | Yes | Yes | Yes | Yes |
| Constant | 0.1 | 0.117 | 0.115 | 0.111 |
| | (8.50)*** | (5.81)*** | (5.31)*** | (4.36)*** |
| Observations | 601 | 591 | 591 | 514 |
| Number of isic4d | 88 | 87 | 87 | 85 |
| R-squared | 0.04 | 0.04 | 0.04 | 0.05 |
| Chow_Test | 6.18 | 4.64 | 3.14 | 2.58 |
| Heterosched: Prob>chi2 | 0 | 0 | 0 | 0 |

Absolute value of t-statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

## 6.2. The firm level analysis

### *6.2.1. The Theoretical framework*

The 4-digit analysis has shed light on important features of labour dynamics and in particular on the complementary role of trade and technological change. While the trade's impact on labour markets is relevant but not too large, give that the negative impact of increasing competition is compensated by the positive one due to increasing export; technological change strongly hurts workers, by decreasing both job creation and job destruction, at least in the short run. In this section we capture the role of firm heterogeneity in terms of job dynamics as suggested by the Melitz (2003)'s model and supported by our

previous analysis. Moreover, by adding export share in the labour demand, we try to disentangle the direction of Moroccan economy transformation. Indeed, since Morocco is relatively abundant of (unskilled) labour respect to its trade partner (mainly Europe) the classical trade theory suggests that an increase in exports would induce a rise in labour demand and in particular of unskilled workers.

The link between the job reallocation literature and the firm level analysis is straightforward since firm-level employment changes are the base-unit for the job flow index computation. In particular, job creation and job destruction are based on firm level employment growth. However, it's a common practice in the labour market literature to analyse firm level employment changes by taking the logarithms of employment, not its growth rates, and applying a first-difference or a fixed effect estimator. Hence, in order to capture the impact of trade and labour productivity on firm level employment, we rely on the standard labour demand approach.

The econometric analysis is conducted within the framework of simple static profit-maximising model of firm behaviour. Following the standard approach (see for example Milner and Wright, 1998), we assume a Cobb-Douglas production function of the form:

$$Q_i = A^{\gamma} K_i^{\alpha} L_i^{\beta} \tag{6.9}$$

Where:

Q = output;

K = capital stock;

L = labour;

A = hicks neutral technological change.

and where α, β represent the factor share coefficients and γ allows for factors changing the efficiency of the production function. Solving the firm cost minimisation problem:

$$\min_{l,k} \left[ wl + rk : Q_i = A^{\gamma} K_i^{\alpha} L_i^{\beta} \right] \tag{6.10}$$

We obtain the following expression:

$$Q_i = A^{\gamma} \left( \frac{\alpha L_i}{\beta} * \frac{w}{r} \right)^{\alpha} L_i^{\beta} \tag{6.11}$$

Taking the logarithms and rearranging equation (6.10) allows us to derive the firm's demand for labour as:

$$\ln L_{it} = \theta_0 + \theta_1 \ln(\frac{w}{r}) + \theta_2 \ln Q_i + \theta_3 \ln A_i \tag{6.12}$$

Where:

$\theta_0 = -(\alpha \ln \alpha - \alpha \ln \beta)/(\alpha + \beta)$

$\theta_1 = -\alpha/(\alpha + \beta)$

$\theta_2 = 1/(\alpha + \beta)$

$\theta_3 = -\gamma/(\alpha + \beta)$

Since the Moroccan labour market is characterised by a large supply of labour, high unemployment and minimum wage, we could make the assumption that change in wages doesn't impact on firm level labour demand, at least in the short run.

### *6.2.2. The Estimation Strategy*

Given this assumption and the data set feature, that has both a cross-sectional and time series element, the estimated equation is in the following form:

$$\ln L_{it} = \lambda_i + \delta_t + \beta_1 \ln Q_{it} + \beta_2 A_{it} + \beta_3 X_{it} + \varepsilon_{it} \qquad (6.13)$$

Where:

$L_{it}$ = permanent employment in firm i in time t;

$Q_{it}$ = production at constant price in firm i in time t;

$A_{it}$ = labour productivity or TFP in firm i in time t;

$X_{it}$ = other variables that influence the efficiency of the production function;

$\lambda_i$ = industry specific effect;

$\delta_t$ = time specific effect.

As proxy for technological change we use different indicators of productivity. First of all we control for labour productivity[26], computed once again as the share of added value on total employment. Secondly, total factor productivity (TFP) is computed using two different approaches: the index number approach (TFP 1) and the production function estimation (TFP 2)[27]. Since data on capital are available only for the main sector of the Moroccan manufacturing sectors[28], TFP is computed only for a sub-sample of firms. Given the purpose of our analysis, X vector includes the share of total export on sales. Since we don't have data at firm level on import, we can control only for this aspect of trade orientation. As in the 4-digit analysis, we investigate also the impact of market concentration and workforce composition on employment decision. Product market structure is computed as the firm sales on total sector sales as well as using the Herfindhal Index; workforce composition is measured as the share of skilled on unskilled job and female on male jobs[29].

Equation (6.13) is estimated using both a static and a dynamic approach. Given the nature of the data, the static approach relies on the fixed effect estimator where we control both for firm and 2-digit sectoral dummies[30]. Moreover, standard errors are corrected for heterogeneity using the White-Huber estimator. Moving to the dynamic panel, that allows us to capture the adjustment path of labour demand, it's known that the coefficient on lagged employment is biased in presence of fixed effect, hence we don't apply the standard static panel estimators but we move to the dynamic estimation methodologies. In particular we estimate the dynamic model by the System Generalised Method of Moment (GMM SYS) suggested by Blundell and Bond (1998). It's an alternative method to the standard first-differenced GMM estimator of Arellano-Bond (1991), deduced from a system of equations in first difference and in levels that permits the identification of time-invariant firm characteristics. In this framework we control also for the possible endogeneity of labour (for the dynamic nature of the estimation), output, export share (Bernard and Jensen, 1999) and productivity (both labour productivity and TFP). Consequently, we use the lagged

levels of labour, output, export share and productivity (dated t-2) and earlier as instruments for equations in first differences; and the correspondingly lagged first differences (dated t-1) and time dummies as instruments for the equation in levels. The validity of instrument set is checked using a Sargan test. It's an over-identification test and is asymptotically distributed as a chi-squared under the null hypothesis. Finally, we test for no second-order serial correlation in the errors.

### *6.2.3. The Estimation Results*

Before moving to the regression results, Table 14 offers a quick look to the firm level characteristics for two firm groups: all sample and 7 main 2-digit sectors (for which we have the TFP computation). The reported shares mirror the picture already defined in the previous data description (Section 4). Firms in the sub-sample, that includes the main Moroccan manufacturing sectors both in terms of employment, sales and export orientation, employ more workers (and in particular female and unskilled workers), produce more output, export an higher share of their sales, present higher labour productivity are slightly more concentrated (Herfindahl index) also if the firms share on total share is quite similar.

**Table 14:** Descriptive statistics of relevant variables for the firm level regressions (1994-2002)

| | **Full Sample** | | | **7 main 2-digit sectors** | | |
|---|---|---|---|---|---|---|
| *Variable* | *Obs* | *Mean* | *Std.Dev.* | *Obs* | *Mean* | *Std.Dev.* |
| ln_PERM | 48,965 | 3.04 | 1.42 | 20,215 | 3.67 | 1.43 |
| exp_share | 28,849 | 0.34 | 0.44 | 15,616 | 0.48 | 0.46 |
| ln_LabourProd | 47,258 | 3.62 | 0.97 | 20,215 | 4.71 | 0.98 |
| ln_product | 48,921 | 7.86 | 1.95 | 20,215 | 8.68 | 1.85 |
| firm_share | 48,920 | 0.004 | 0.02 | 20,214 | 0.003 | 0.01 |
| ln_HerfIndex | 54,224 | -3.65 | 0.92 | 20,215 | -4.04 | 0.87 |
| Invest. Share | 32,680 | 0.44 | 19.73 | 19,995 | 0.24 | 2.00 |
| skill_unskill | 16,185 | 0.39 | 0.83 | 6,933 | 0.33 | 0.80 |
| femm_male | 40,102 | 0.72 | 2.26 | 18,920 | 0.97 | 4.04 |
| Tfp 1 | | | | 20,215 | 4.79 | 1.25 |
| Tfp 2 | | | | 20,215 | 4.96 | 1.41 |

Table 15 reports the labour demand estimation for the whole sample. As column 6 suggests, an increase in export share induces a rise in labour demand also if we control for output and technological change. This result suggests that trade impacts on labour demand both indirectly, by inducing higher productivity and output, and directly, by inducing a specialisation - and export - labour intensive goods. Since Morocco is relatively abundant of workers the production pattern transformation is in line with the classical trade theory. The direct effect is however quite small, indeed a 10 percentage point increase in the export share induces a 0.5 percent increase in labour demand. The elasticity rises to 0.6 percent if we consider the sample with the more export oriented sectors.

The labour saving nature of technological change is confirmed also in the labour demand estimation. A one percentage point increase in labour productivity induces a 0.2 percent decrease in labour demand and the effect is still larger if we consider the main Moroccan sectors and measure technological change using TFP. Indeed, a one percentage point increase in labour productivity in this sample reduces labour

demand by 0.23 percent (Column 7 Table 16) and a one percentage point increase in TFP reduces labour demand by 0.6 percent, on average and ceteris paribus (Column 6, Table 16)[31]. The difference could be explained by the better measurement power of TFP versus labour productivity and the feature of the sub-sample. The negative impact of technological change on labour demand is confirmed also by the negative coefficient of investment share; although its significance is less robust and the elasticity is lower (0.006).

The negative sign of skilled share offers two different interpretations: from one side it supports the idea of capital intensive technological change, indeed these production techniques require more skilled workers; on the other side it sheds more light on the change in the production pattern. Indeed since Morocco is relatively abundant of unskilled workers, we would expect that Morocco would specialise in unskilled labour intensive sector. Consequently sectors that use a higher share of unskilled workers would resize their workforce[32].

Finally, product market structure turns out to be significant in the firm level regressions. An increase in the firm share on total sectoral sales as well as an increase in sectoral concentration will lead to an increase in labour demand. This effect is mirrored by the positive coefficient of output and suggests that Moroccan firms produce labour intensive goods.

Moving to the dynamics estimation (Table 17), we immediately notice that also if we control for a possible endogeneity problem in export share, output and productivity, the significance of coefficients don't change. Moreover, the coefficient on the lagged dependent variable is of 0.3 if we consider the whole manufacturing sector and 0.4 for the reduced sample. The speed of adjustment is hence 0.7 and 0.6, respectively and suggests that Moroccan firms adjust their workforce relatively quickly each year. Hence, the strong firing procedure that characterised Moroccan labour market doesn't seem an impediment to firm adjustment.

Finally, we explore heterogeneity in two ways, by making a distinction between skilled and unskilled jobs, and exporter versus non exporter firms. The first taxonomy is useful to better understand the consequences of trade and technological change on labour market and generally on inequality and future growth. Indeed, if as expected they would impact differently on the two groups, we could refine our previous conclusion on the Moroccan transformation process and on the long-run consequences of technological change. The second classification allows us to better investigate how exporter and non exporter firms react to changes in output and production, and how they adjust their workforce. This information sheds more light on the possible impact of trade reforms on Moroccan labour market.

As Table 20 and 21 suggest, increasing export orientation has an "unskilled-bias" effect on Moroccan labour market. In line with the traditional trade theory, an increase in export share induces an increase in the demand for unskilled workers and leaves unchanged that for non-production workers. Hence, increasing trade favours a change in the Moroccan specialisation pattern and this change is biased versus labour -and particular unskilled- intensive sectors. Contrarily with the empirical evidence for Latin American countries (see for example Harrison and Hanson, 1999 for Mexico; Robbins and Gindling, 1999 for Costa Rica), but in line with the classical trade theory, an increase in trade exposure of a relatively unskilled abundant country, such as Morocco, would increase the demand for this worker

category and hence decrease inequality. However, the positive effect of trade is counterbalanced by the skill-bias effect of technological change. Indeed, an increase in labour productivity mainly impacts on unskilled workers, supporting the idea of a capital intensive technological change that requires less unskilled workers but leaves almost unchanged the skilled share. If from one side technological change increases skill inequality, on the other side, by leaving unchanged the skilled labour demand, it prevents large human-capital destruction and doesn't obstacle human-capital accumulation in the long run. Consequently, it doesn't undermine a sustainable growth in the long run. The higher elasticity of unskilled labour demand to output change supports the idea of unskilled labour intensive production. The female share turns to be significant. As already pointed out in the description of the Moroccan economy, female workers are mainly employed in low-paid and unskilled occupation. This feature is validating by the opposite sign of this variable in the two regression groups: an increase in female share decreases the demand for skilled workers and increases that of unskilled one. Finally, the dynamic estimations show that skilled workers adjust much more quickly than unskilled one. Hence the adjustment process is more expensive for the latter group. Given the high level of inequality and poverty in Morocco and the skilled-bias effect of technological change, the higher costs borne by unskilled workers could worsen the future scenario.

Turning to the export orientation dimension, Table 20 suggests that exporter firms react much more than non-exporter firms to change in productivity and output. With regard to the small sample (Column 3 and 6 in Table 20), the elasticities for TFP are 0.9 and 0.2, and for output 0.2 and 0.1, respectively. This suggests that exporter firms are more flexible than non exporter firms and adjust their workforce quirkier to technological change. The higher sign for output could indicate the labour intensive nature of exporting firms' production. Indeed, to increase output of the same proportion, exporting firms require much more workers. The same conclusion derives from the firm share coefficient. Finally, an increase in the skill composition induces a much higher decrease in labour demand among non-exporter firms than exporters. However, among non-exporter firms, the coefficient is significant only in the small sample groups, hence among more export-oriented sectors. This supports the idea of an "unskilled-bias" effect of Moroccan specialisation pattern. The lower reaction of exporter firms could be explained by their higher propensity to adopt capital- and skill-intensive technologies that counterbalance the "unskilled-bias" effect of increasing export. If we introduce the dynamics (Table 21), we can seen that exporter firms adjust their workforce slightly quicker that non exporter firms, however the adjustment gap is not robust to different technology proxy and specifications. Hence, if trade reforms would increase the exporter firms' number, we would expect a much quicker adjustment of the workforce both with regard change in productivity and output.

# 7. Conclusion

Using a firm level data set for the Moroccan manufacturing sector, this paper adds new evidence on the job reallocation process and sheds light on its link with trade and technological change

In order to capture the labour market dynamics, we follow the Davis and Haltiwanger (1992) methodology. This involves computing the indices of job creation (defined as the sum of the new places available through expansion of existing firms and creation of new establishments within the sector) and job destruction (defined as the sum of employment losses over shrinking and dying establishments within a sector) at sectoral level (2 and 4 digit) for permanent jobs. Adding up job creation and job destruction produces a measure of the gross job reallocation rate in sector s between t-1 and t. A further decomposition then allows us to capture the within-sector and between-sector job movements and through this to better understand the direction and determinants of job reallocation.

Our results show the simultaneous presence of high levels of both job creation and job destruction, at both the 2-digit and 4-digit level of aggregation. However, whereas at the 2-digit level this is primarily captured by the "within-sector" movement of jobs, at the 4-digit level the role of "between-sector" allocations sharply increases. This suggests considerable change in Morocco's pattern of specialisation which is taking place within 2-digit ISIC sectors as opposed to between them. This would be consistent with the much documented rise in vertical fragmentation in world trade and production.

Moving to the econometric analysis, the 4-digit regression results clearly indicate that trade openness has quite a different impact on the Moroccan labour market depending on whether it is on the export or import side. Perhaps not surprisingly increased exposure to external markets has substantial positive impact on job creation. Interestingly however, while increased domestic openness impacts negatively on job creation there is little evidence of an increase in job destruction. It is likely that this is being driven by the relative rigidity in Moroccan labour markets and in particular by the strict laws on firing workers, which may impede the flexibility of the economy to adjust. Hence, the benefits from trade liberalisation, in terms of higher aggregate productivity as advocated by Melitz (2003) are not automatic in Morocco: to get it a reform of the labour market is needed. As well as trade, we also show that technological change plays an important role in explaining job dynamics and firm level decisions. In particular, an increase in labour productivity rises job destruction and reduces job creation suggesting the presence of labour-saving technological change. This is consistent with government policy which over the last decade has provided increased incentives for capital intensive investment (Achy, 2002). To evaluate the impact of technological change, we should differentiate between the short run and the long run effects. Indeed, in the short run, given the already precarious unemployment and poverty situation in Morocco, it risks to worsen the social tension. On the other hand, technological change, by improving firm performance and competitivity, will boost future growth with positive outcomes on labour market and incomes. Finally, the different role of trade and technological change in explaining "between" and "within" sector movements, respectively, is advocated by the literature (Berman et al, 1994) and emerges in our analysis.

In order to better understand the dynamics underlying the Moroccan economy transformation, the impact of trade and technological change on labour market and to account for firm heterogeneity, we move to the firm level analysis. The positive sign of export share after controlling for output and technological change, suggests that, in line with the classical trade theory, Morocco is specialising in labour –and particularly unskilled- intensive sectors. Also the labour-saving nature of technological change is confirmed by the firm level regressions. Indeed, an increase in productivity, both in terms of

labour productivity and total factor productivity reduces the demand for labour and in particular the demand for unskilled workers. Hence, the positive effect of trade, in terms of decreasing wage inequality, is partially offset by the skill-bias effect of technological change. Finally, the dynamic estimations show a quite fast adjustment process at firm level and, in particular, skilled workers adjust much more quickly than unskilled one, suggesting that the adjustment process is more expensive for the latter group. Given the high level of inequality and poverty in Morocco and the skilled-bias effect of technological change, the higher costs borne by unskilled workers could worsen the future scenario. The strict firing procedure seems not impeding adjustments process at firm level but it mainly influences aggregate job destruction.

The paper put in light the complementary nature of trade and technological change. Indeed, both are important in explaining job dynamics and have opposite effects on the Moroccan labour market. However, analysing our results in a wider context, two main concerns emerge. First of all, the Moroccan specialisation process, biased versus unskilled intensive sectors, could bring to a precarious economic situation owing to the increasing competition from other emerging countries, mainly China, that would be exacerbated after the expiring of the Multi-Fibre Agreement. Some of these negative effects are already evident in the bad performance that the textile sector recorded in the last years. Secondly, while an improvement in labour productivity and total factor productivity is essential for a sustainable future growth, it's not the most appropriate strategy. Indeed, the World Bank (WIR, 2005) has recently advocated the necessity for Morocco, and other developing countries, to improve both their productivity and their level of employment. Hence a capital intensive technological change that discourages the labour demand doesn't look as the best receipt for the future Moroccan development. Morocco will benefit from this type of technological change only if it invests in education. This strategy will increase the employment of skilled workers and give to Morocco the opportunity to invest in the product quality and diversify its specialisation pattern. In this way Morocco will increase productivity, improve the employment conditions and decrease the competitive pressure from emerging countries.

**Table 15:** Labour demand estimation at firm level
(permanent job; static panel; 1994-2002; labour productivity)

**Ln Permanent Job**

| | LSDV 1 | LSDV 2 | LSDV 3 | LSDV 4 | LSDV 5 | LSDV 6 |
|---|---|---|---|---|---|---|
| exp_share | 0.153 | 0.141 | 0.068 | 0.093 | 0.092 | 0.153 |
| | (5.95)*** | (5.58)*** | (2.98)*** | (2.28)** | (2.27)** | (3.67)*** |
| Ln_Labour Prod | | -0.145 | -0.22 | -0.196 | -0.197 | -0.204 |
| | | (19.60)*** | (28.16)*** | (12.13)*** | (12.14)*** | (11.11)*** |
| ln_product | | | 0.287 | 0.212 | 0.211 | 0.196 |
| | | | (33.58)*** | (11.08)*** | (10.96)*** | (11.68)*** |
| Firm Share | | | | | 1.081 | 1.229 |
| | | | | | (1.78)* | (1.96)** |
| ln_Herf_index | | | | | 0.028 | 0.054 |
| | | | | | (0.94) | (1.82)* |
| Invest share | | | | | | -0.022 |
| | | | | | | (1.72)* |
| skill_unskill | | | | -0.038 | -0.038 | -0.04 |
| | | | | (3.21)*** | (3.20)*** | (2.98)*** |
| femm_male | | | | 0.001 | 0.001 | 0.001 |
| | | | | (0.37) | (0.37) | (0.14) |
| Year | Yes | Yes | Yes | Yes | Yes | Yes |
| Firm Dummy | Yes | Yes | Yes | Yes | Yes | Yes |
| 2Digit ISIC | Yes | Yes | Yes | Yes | Yes | Yes |
| Constant | 3.387 | 4.021 | 1.854 | 2.259 | 1.993 | 2.273 |
| | (33.35)*** | (35.92)*** | (14.87)*** | (8.63)*** | (4.71)*** | (5.43)*** |
| Observations | 28832 | 27986 | 27986 | 7497 | 7497 | 6691 |
| Number of firm | 7471 | 7298 | 7298 | 2535 | 2535 | 2355 |
| R-squared | 0.01 | 0.06 | 0.22 | 0.17 | 0.17 | 0.19 |
| Chow_Test | 36.01 | 35.89 | 12.15 | 11.85 | 11.71 | 24.66 |
| Heterosched: Prob>chi2 | 0 | 0 | 0 | 0 | 0 | 0 |

Robust t-statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

**Table 16:** Labour demand estimation at firm level.
(permanent job; static panel; 1994-2002; TFP)

**Ln_Permanent Job**

| | LSDV 1 | LSDV 2 | LSDV 3 | LSDV 4 | LSDV 5 | LSDV 6 | LSDV 7 |
|---|---|---|---|---|---|---|---|
| exp_share | 0.17<br>(5.40)*** | 0.094<br>(3.35)*** | 0.145<br>(3.06)*** | 0.132<br>(4.69)*** | 0.059<br>(2.26)** | 0.142<br>(3.00)*** | 0.131<br>(2.91)*** |
| ln_labour product | | | | | | | -0.231<br>(10.59)*** |
| ln_tfp1 | -0.198<br>(4.46)*** | -0.623<br>(10.53)*** | -0.646<br>(6.37)*** | | | | |
| ln_tfp2 | | | | -0.138<br>(4.09)*** | -0.503<br>(11.43)*** | -0.646<br>(6.47)*** | |
| ln_product | | 0.311<br>(22.37)*** | 0.193<br>(8.68)*** | | 0.305<br>(26.61)*** | 0.192<br>(8.72)*** | 0.201<br>(9.21)*** |
| firm share | | | 7.448<br>(3.02)*** | | | 7.451<br>(3.03)*** | 8.073<br>(3.32)*** |
| ln_Herf_index | | | 0.101<br>(2.14)** | | | 0.09<br>(1.92)* | 0.095<br>(2.14)** |
| investment share | | | -0.024<br>(1.46) | | | -0.023<br>(1.43) | -0.024<br>(1.83)* |
| skill_unskill | | | -0.052<br>(2.55)** | | | -0.053<br>(2.63)*** | -0.052<br>(2.63)*** |
| femm_male | | | 0.001<br>(0.41) | | | 0.001<br>(0.44) | 0.001<br>(0.37) |
| Year Dummy | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Firm Dummy | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 2 Digit Dummy | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Constant | 4.59<br>(19.35)*** | 2.532<br>(10.59)*** | 3.506<br>(11.56)*** | 4.197<br>(22.87)*** | 2.18<br>(11.72)*** | 3.227<br>(13.98)*** | 3.1<br>(14.12)*** |
| Observations | 15597 | 15597 | 4467 | 18981 | 18981 | 4467 | 4470 |
| Number of firm | 4229 | 4229 | 1535 | 4827 | 4827 | 1535 | 1537 |
| R-squared | 0.04 | 0.19 | 0.14 | 0.02 | 0.17 | 0.14 | 0.21 |
| Chow_Test | 24.66 | 12.49 | 11.94 | 25.63 | 12.71 | 11.92 | 11.68 |
| Heterosched: Prob>chi2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Robust t-statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

**Table 17:** Labour demand estimation at firm level
(permanent job; dynamic panel; 1994-2002)

**Ln Permanent Job**

| | GMM SYS 1 | GMM SYS 2 | GMM SYS 3 |
|---|---|---|---|
| ln_Perm (t-1) | 0.351<br>(5.17)*** | 0.416<br>(6.45)*** | 0.454<br>(6.98)*** |
| exp_share | 0.451<br>(2.08)** | 0.315<br>(1.80)* | 0.357<br>(2.14)** |
| ln_Labour Productivity | -0.267<br>(2.97)*** | | |
| ln_tfp1 | | -0.57<br>(1.81)* | |
| ln_tfp2 | | | -0.581<br>(1.80)* |
| ln_product | 0.238<br>(2.60)*** | 0.209<br>(3.50)*** | 0.238<br>(3.42)*** |
| Firm share | 16.967<br>(1.29) | 23.867<br>(1.12) | 24.195<br>(1.19) |
| ln_Herf_index | -0.012<br>(0.05) | 0.31<br>(1.58) | 0.042<br>(0.22) |
| Investment share | 0.037<br>(0.3) | 0.07<br>(0.68) | 0.007<br>(0.09) |
| skill_unskill | -0.065<br>(1.25) | 0.004<br>(0.11) | 0.006<br>(0.16) |
| femm_male | 0.013<br>(1.08) | 0.01<br>(1.11) | 0.006<br>(0.79) |
| Year Dummy | Yes | Yes | Yes |
| Firm Dummy | Yes | Yes | Yes |
| 2 Digit Dummy | Yes | Yes | Yes |
| Observations | 6359 | 4235 | 4234 |
| Number of firm | 2157 | 1398 | 1397 |
| Sargan_Hansen: Prob>chi2 | 0.94 | 0.28 | 0.4 |
| Number Instruments | 115 | 115 | 115 |
| AR_1 | 0 | 0 | 0 |
| AR_2 | 0.82 | 0.2 | 0.2 |
| Wald Test:Prob>chi2 | 0 | 0 | 0 |

Robust z-statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

**Table 18:** Labour demand estimation at firm level: skilled VS unskilled job.
(permanent job; static panel; 1994-2002)

| | **Ln_Skilled Job** | | | **Ln_Unskilled Job** | | |
|---|---|---|---|---|---|---|
| | LSDV 1 | LSDV 2 | LSDV 3 | LSDV 4 | LSDV 5 | LSDV 6 |
| exp_share | 0.006<br>(0.09) | 0.02<br>(0.29) | 0.021<br>(0.3) | 0.183<br>(3.28)*** | 0.18<br>(3.11)*** | 0.176<br>(3.05)*** |
| ln_vaTotEmpl | -0.064<br>(4.49)*** | | | -0.232<br>(10.51)*** | | |
| ln_tfpinterp | | -0.127<br>(1.67)* | | | -0.741<br>(5.87)*** | |
| ln_tfpuvis | | | -0.11<br>(1.42) | | | -0.744<br>(5.94)*** |
| ln_product | 0.135<br>(7.39)*** | 0.122<br>(4.92)*** | 0,084028<br>(4.85)*** | 0.207<br>(9.58)*** | 0.21<br>(7.15)*** | 0.21<br>(7.17)*** |
| ln_Herf_index | -0.017<br>(0.38) | -0.011<br>(0.16) | -0.009<br>(0.13) | 0.115<br>(2.92)*** | 0.176<br>(2.92)*** | 0.164<br>(2.73)*** |
| firm_CA_share | 0.893<br>(1.24) | 6.287<br>(2.28)** | 6.288<br>(2.31)** | 1.481<br>(1.78)* | 8.348<br>(2.23)** | 8.344<br>(2.23)** |
| inv_ca | -0.006<br>(0.61) | -0.002<br>(0.29) | -0.003<br>(0.3) | -0.016<br>(1.48) | -0.015<br>(1.14) | -0.015<br>(1.1) |
| femm_male | -0.001<br>(3.31)*** | -0.001<br>(2.99)*** | -0.001<br>(2.96)*** | 0.002<br>(8.49)*** | 0.002<br>(7.94)*** | 0.002<br>(8.09)*** |
| Year Dummy | Yes | Yes | Yes | Yes | Yes | Yes |
| Firm Dummy | Yes | Yes | Yes | Yes | Yes | Yes |
| 2 Digit Dummy | Yes | Yes | Yes | Yes | Yes | Yes |
| Constant | 0.765<br>(1.77)* | 1.353<br>(4.66)*** | 1.351<br>(4.63)*** | 2.158<br>(4.22)*** | 3.954<br>(9.88)*** | 2.928<br>(9.65)*** |
| Observations | 6324 | 4191 | 4192 | 6691 | 4467 | 4467 |
| Number of firm | 2205 | 1428 | 1429 | 2355 | 1535 | 1535 |
| R-squared | 0.04 | 0.04 | 0.04 | 0.14 | 0.1 | 0.1 |
| Chow_Test | 5.51 | 5.06 | 5.04 | 8.75 | 8.9 | 8.9 |
| Heterosched: Prob>chi2 | 0 | 0 | 0 | 0 | 0 | 0 |

Robust t-statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

**Table 19:** Labour demand estimation at firm level: skilled VS unskilled job.
(permanent job; dynamic panel; 1994-2002)

| | **ln_Skilled Job** | | | **ln_Unskilled Job** | | |
|---|---|---|---|---|---|---|
| | GMM SYS 1 | GMM SYS 2 | GMM SYS 3 | GMM SYS 4 | GMM SYS 5 | GMM SYS 6 |
| ln_perm (t-1) | 0.147 | 0.137 | 0.15 | 0.231 | 0.309 | 0.351 |
| | (2.45)** | (2.59)*** | (2.80)*** | (3.25)*** | (4.13)*** | (5.05)*** |
| exp_share | -0.123 | -0.097 | -0.06 | 0.346 | 0.464 | 0.453 |
| | (0.5) | (0.53) | (0.31) | (1.22) | (2.29)** | (2.16)** |
| ln_labour productivity | -0.122 | | | -0.412 | | |
| | (1.2) | | | (3.80)*** | | |
| ln_tfp1 | | 0.173 | | | -1.224 | |
| | | (0.4) | | | (2.86)*** | |
| ln_tfp2 | | | 0.331 | | | -1.152 |
| | | | (0.65) | | | (2.41)** |
| ln_product | 0.402 | 0.32 | 0.299 | 0.242 | 0.365 | 0.387 |
| | (3.62)*** | (5.20)*** | (3.34)*** | (2.14)** | (4.15)*** | (4.38)*** |
| firm share | -7.925 | 16.589 | 4.823 | 18.607 | 17.865 | 34.856 |
| | (0.67) | (0.82) | (0.26) | (1.2) | (0.71) | (1.23) |
| ln_Herf_index | 0.332 | 0.485 | 0.422 | -0.087 | 0.421 | 0.111 |
| | (0.81) | (1.46) | (1.45) | (0.26) | (1.58) | (0.38) |
| investment share | 0.058 | 0.094 | 0.147 | -0.117 | -0.059 | -0.072 |
| | (0.33) | (1.46) | (1.16) | (0.73) | (1.15) | (0.7) |
| femm_male | 0.014 | 0.003 | 0.002 | 0.012 | 0.012 | 0.009 |
| | (0.82) | (0.39) | (0.28) | (0.88) | (1.13) | (0.86) |
| Year Dummy | Yes | Yes | Yes | Yes | Yes | Yes |
| Firm Dummy | Yes | Yes | Yes | Yes | Yes | Yes |
| 2 Digit Dummy | Yes | Yes | Yes | Yes | Yes | Yes |
| Constant | 0.604 | 0.006 | -0.095 | 0.482 | 1.779 | 1.088 |
| | (0.31) | (0.02) | (0.04) | (0.25) | (0.85) | (0.5) |
| Observations | 4664 | 3125 | 3124 | 4991 | 3380 | 3379 |
| Number of firm | 1731 | 1127 | 1126 | 1900 | 1249 | 1248 |
| Sargan_Hansen:Prob>chi2 | 0.91 | 0.44 | 0.75 | 0.93 | 0.76 | 0.87 |
| Number Instruments | 104 | 130 | 104 | 104 | 130 | 104 |
| AR_1 | 0 | 0 | 0 | 0 | 0 | 0 |
| AR_2 | 0.82 | 0.45 | 0.36 | 0.26 | 0.71 | 0.72 |
| Wald Test:Prob>chi2 | 0 | 0 | 0 | 0 | 0 | 0 |

Robust z-statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

**Table 20:** Labour demand estimation at firm level: exporter VS non exporter firms
(permanent job; static panel; 1994-2002)

**Ln Permanent Job**

| | **Exporter Firms** | | | **Non Exporter Firms** | | |
|---|---|---|---|---|---|---|
| | LSDV 1 | LSDV 2 | LSDV 3 | LSDV 4 | LSDV 5 | LSDV 6 |
| exp_share | 0.148 | 0.144 | 0.138 | | | |
| | (3.71)*** | (3.03)*** | (3.07)*** | | | |
| ln_vaTotEmpl | -0.257 | | | -0.127 | | |
| | (10.60)*** | | | (5.31)*** | | |
| ln_tfpuvis | | -0.647 | | | -0.635 | |
| | | (6.45)*** | | | (6.56)*** | |
| ln_tfpinterp | | | -0.958 | | | -0.236 |
| | | | (5.95)*** | | | (2.51)** |
| ln_product | 0.213 | 0.195 | 0.224 | 0.16 | 0.209 | 0.106 |
| | (8.51)*** | (8.88)*** | (7.31)*** | (8.23)*** | (9.42)*** | (3.83)*** |
| firm_CA_share | 1.186 | 4.702 | 6.401 | -0.001 | 0.057 | -0.037 |
| | (1.94)* | (2.86)*** | (2.68)*** | -0.03 | (1.71)* | -0.5 |
| ln_Herf_index | 0.071 | 0.059 | 0.14 | 1.151 | 4.492 | 32.439 |
| | (2.01)** | (1.74)* | (2.57)** | -0.55 | (2.79)*** | (1.84)* |
| inv_ca | -0.032 | -0.024 | -0.033 | 0.006 | -0.023 | 0.004 |
| | (2.39)** | -1.45 | (1.86)* | -1.03 | -1.46 | -0.58 |
| skill_unskill | -0.054 | -0.053 | -0.052 | -0.011 | -0.062 | -0.07 |
| | (2.70)*** | (2.59)*** | (2.59)*** | -0.94 | (2.82)*** | (2.08)** |
| femm_male | 0.001 | 0.001 | 0.001 | 0.011 | 0.001 | 0.019 |
| | (0.64) | (0.4) | (0.01) | (1.52) | (0.48) | (1.95)* |
| Year Dummy | Yes | Yes | Yes | Yes | Yes | Yes |
| Firm Dummy | Yes | Yes | Yes | Yes | Yes | Yes |
| 2-Digit ISIC Dummy | Yes | Yes | Yes | Yes | Yes | Yes |
| Constant | 3.771 | 3.249 | 3.848 | 2.017 | 3.148 | 2.098 |
| | (11.16)*** | (13.06)*** | (12.45)*** | (6.96)*** | (12.89)*** | (5.24)*** |
| Observations | 3761 | 4467 | 3074 | 3122 | 4665 | 1499 |
| Number of firm | 1126 | 1535 | 930 | 1245 | 1568 | 617 |
| R-squared | 0.24 | 0.14 | 0.18 | 0.13 | 0.15 | 0.1 |
| Chow_Test | 11.74 | 11.52 | 11.53 | 11.41 | 13.62 | 13.53 |
| Heterosched: Prob>chi2 | 0 | 0 | 0 | 0 | 0 | 0 |

Robust t-statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

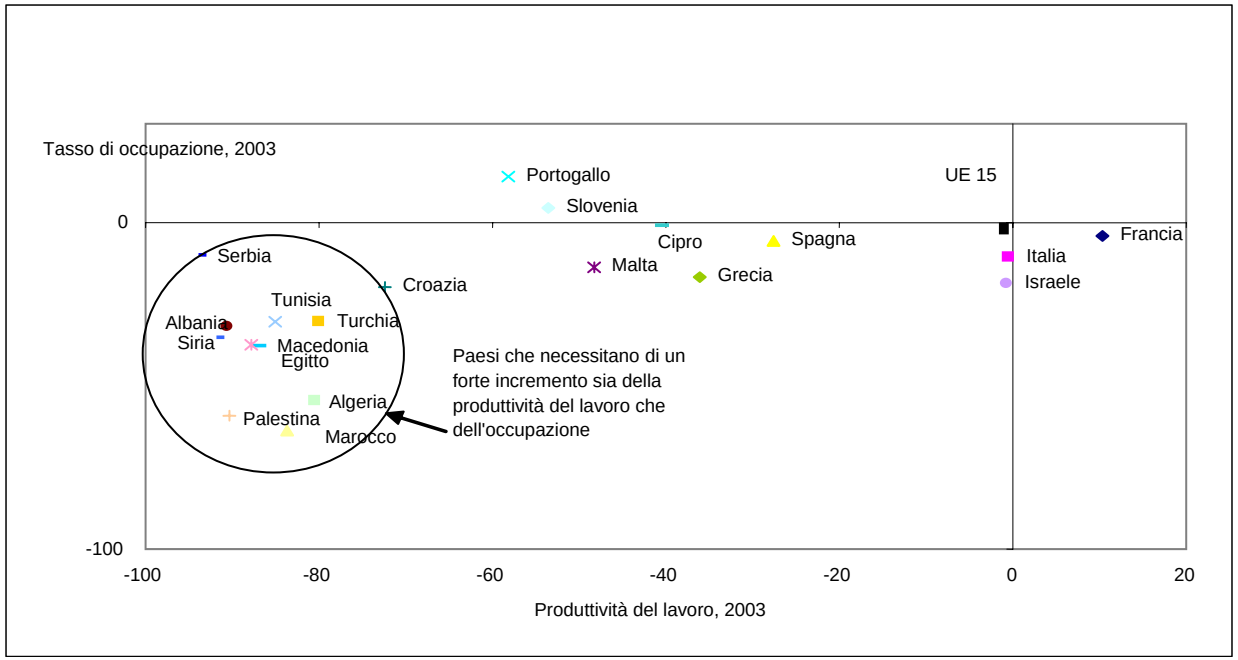
**Table 21:** Labour demand estimation at firm level: exporter VS non exporter firms
(permanent job; dynamic panel; 1994-2002)

**Ln Permanent Job**

| | **Exporter Firms** | | | **Non Exporter Firms** | | |
|---|---|---|---|---|---|---|
| | GMM SYS 1 | GMM SYS 2 | GMM SYS 3 | GMM SYS 4 | GMM SYS 5 | GMM SYS 6 |
| ln_Perm (t-1) | 0.327 (4.47)*** | 0.495 (3.77)*** | 0.461 (3.71)*** | 0.303 (2.35)** | 0.452 (3.36)*** | 0.509 (3.69)*** |
| exp_share | 0.349 (1.77)* | 0.123 (0.43) | 0.36 (1.71)* | | | |
| ln_Labour Productivity | -0.297 (3.09)*** | | | -0.171 (1.99)** | | |
| ln_tfp1 | | -1.513 (1.93)* | | | -0.18 (0.5) | |
| ln_tfp2 | | | -1.588 (2.51)** | | | 0.097 (0.26) |
| ln_product | 0.28 (2.98)*** | 0.329 (2.68)*** | 0.371 (2.68)*** | 0.269 (3.15)*** | 0.295 (2.99)*** | 0.26 (2.64)*** |
| firm_share | 8.954 (0.96) | 23.91 (0.98) | 25.096 (0.99) | -15.315 (0.67) | -42.845 (0.46) | -64.227 (0.68) |
| ln_Herf_index | 0.06 (0.27) | 0.339 (1.37) | 0.142 (0.51) | 0.001 (0.3) | 0.258 (0.7) | 0.29 (0.94) |
| investment share | 0.034 (0.28) | -0.008 (0.05) | 0.002 (0.02) | -0.021 (0.23) | -0.058 (0.64) | -0.064 (0.69) |
| skill_unskill | -0.088 (1.42) | 0.043 (0.8) | 0.011 (0.24) | -0.092 (1.11) | -0.171 (1.19) | -0.149 (0.88) |
| femm_male | 0.013 (1.21) | 0.007 (0.67) | 0.009 (0.83) | 0.12 (1.1) | 0.008 (0.17) | 0.014 (0.31) |
| Year Dummy | Yes | Yes | Yes | Yes | Yes | Yes |
| Firm Dummy | Yes | Yes | Yes | Yes | Yes | Yes |
| 2 Digit Dummy | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 3617 | 2945 | 2944 | 2742 | 1290 | 1290 |
| Number of firm | 1052 | 862 | 861 | 1105 | 536 | 536 |
| Sargan_Hansen: Prob>chi2 | 0.67 | 0.61 | 0.69 | 0.92 | 0.81 | 0.79 |
| Number Instruments | 115 | 87 | 87 | 88 | 67 | 67 |
| AR_1 | 0 | 0 | 0 | 0 | 0 | 0 |
| AR_2 | 0.68 | 0.4 | 0.43 | 0.61 | 0.05 | 0.04 |
| Wald Test:Prob>chi2 | 0 | 0 | 0 | 0 | 0 | 0 |

Robust z-statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

*Labour productivity and employment rate (GDP per empl, PPP,2003): percentage deviation from UE 15 average*
*Source: World Bank, WDI, 2005.*



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# Notes

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[1] We use permanent instead of total employment data because we have a lot of missing for temporary job and this would lead to a sub-sample analysis. Moreover, we could disaggregate permanent job on the basis of skills.

[2] Indeed, since we don't have data on hiring and firing we cannot observe workers reallocation, but only job reallocation. As the literature suggest, job reallocation2 could be seen as a lower bound of total churning.

[3] See Baily, Hulten and Campbell, 1992; Baily, Bartelsman and Halriwanger, 1996; Olley and Pakes, 1996 for the direct impact of labour reallocation on productivity.

[4] See Section 4for a detailed description of the methodology.

[5] See section 5.1.2 for more details about the methodology.

[6] Other methodologies have been applied: the factor content approach (see for example Sakurai, 2003); the growth accounting approach (see for example Jenkins, 2004) and the Computational General Equilibrium (CGE) (see for example Harrigan and Balaban, 1997).

[7] Skill and unskilled workers belong to the permanent workers group. We don't have information about the skill intensity of temporary job. Moreover, owing to missing information, the worker classification by gender and skill is a sub-sample of total employment and permanent workers.

[8] The sector ranking on the basis of this index is confirmed by the Klein, Schuh and Triest (2002) index, which compute openness as follow: open(flow)j,t=(Flowjt/Flowtot,t)/(employmentjt/employmenttot,t), where flow = import and export.

[9] In this table we report only firms that export during all you life or have never exported. Firms that changed their status are kept aside. However, these firms are quite stable across the sample period both in terms of number of firms and average size. Their average employment lies between exporter and non exporter size.

[10] Since temporary workers represent only a small share of total employment and we have a lot of missing value in the Total Employment variable, we compare the different groups on the basis of their permanent workers.

[11] These differences could be explained by the better measurement precision of the latter variable.

[12] The greater density of growth rate around zero is confirmed by the distribution of normal growth rate (y(t)-y(t-1))/y(t-1). This check is important to make more robust our claim that growth rate are close to zero. Indeed, since the DH growth rate is in the range [-2;+2], the growth rates are squeezed around zero and this could be a misleading information about the real growth rate. Moreover, the entry and exit dynamics described in figure 7 (and 8) are confirmed by the firm distribution on the basis of start-up and exit.

[13] As these indices are bounded between -2 and 2, and as they are highly non-linear these figures do not correspond exactly to percentages. However, at lower levels they do approximate percentage changes, and hence are often referred to in the literature as percentage changes. We follow that convention here.

[14] The sharp increase in Job destruction due to exit in 2002 is mainly due to a data set feature than an economic explanation. Indeed, while in 2001 exit accounts for 12% of total sample, the average in the previous year was around 7%.

[15] To compute these indicators, we take the value of SUM and NET for each sector in each year. Then, we aggregate them by sector following the formula above.

[16] In section 5.3 we compute excess job reallocation for the whole economy as follow:

$$EXCESS = \sum_s sum_s - \left| \sum_s net_s \right|$$

and we decompose it into the BETWEEN and WITHIN components:

$$BETWEEN = \sum_s |net_s| - \left|\sum_s net_s\right|$$

$$WITHIN = \sum_s sum_s - \sum_s |net_s|$$

Slightly modifying the EXCESS index and applying it at the sectoral level, we get:

$$EXCESS_{st} = SUM_{st} - |NET_{st}| = \text{WITHIN}_{st}$$

Comparing this expression with the WITHIN one you can see that this index captures the amount of job reallocation within each sector. Summing up the $EXCESS_{st}$ across all sector we get exactly the WITHIN value reported in Table 8. As a double check, you can notice that BETWEEN computed for each sector and each year is equal to zero.

[17] The dynamic impact of import and export share on job turnover are analysed in section 6, where we exploit the panel dimension of our data set.

[18] Moreover, as widely demonstrated in the literature (Bernard and Jensen (1996)), there is a clear connection between firm size and export status: exporter firms are large. However, the direction of the causality linkage is not well defined.

[19] It's computed as the share of investment on total sales, to capture the firm propensity to invest.

[20] It capture the per-worker added value. This result is robust to other specification, as the production per worker.

[21] Herfindahl Index is computed on the basis of firm sales, by computing the share of firms sales on total sectoral share, taking the squared value and summing up for each year and each sector.

[22] To interpret our coefficients in terms of elasticity we need to do some additional computations. since we specify our variables in levels. For example, to get the elasticity of job creation to variation in export share, we multiply the export share coefficient for the average export share value and divide it for the average value of job creation (Table 9).

[23] In this case, imported goods may be transformed and re-exported (i.e. in-shoring) or used in the production of domestic goods.

[24] The coefficient is significant to other specification: In particular, if we exclude labour productivity and investment share, it doesn't change its sign and its significance.

[25] The higher reaction of job creation to lagged job creation and destruction is confirmed also by the dynamics regressions (GMM system estimator). However, given the short time span in our data set, the autocorrelation problems and the too high number of instruments that weak the Sargan/Hansen test, we prefer control for adjustment in this way.

[26] This variable could suffer of possible endogneity problems. We control for this problem by taking its lagged value as instrument, both at static (not reported) and dynamic level; and by using other proxy for technological change (such as TFP). In all cases the variable is negative and significant.

[27] I would like to thank Professor Gasiorek for giving me this variable. The parametric estimation is based on the comparison of different methodologies, included the more recent one of Olley and Pakes (1996) and Levinsohn and Petrin (1999). See Gasiorek, Augier and Varela (2006) for major details.

[28] 2 digit sectors: Food and Beveradge (secotr 15); Textiles (sector 17); Clothing (sector 18); Leather (sector 19); chemicals (sector 24); Rubber and Plastic (sector 25) and Electrical Machinery (sector 31).

[29] We shift to this definition of workforce composition to avoid a problem of endogeneity.

[30] The choice of the 2-digit dummies is due to the need to harmonize the static and the dynamic approach. Indeed, if we use 4-digit dummies in the dynamic framework, it fails to work since regressors outnumber instruments and equation are not identified.

[31] Estimation based on the two different TFP measurement are really close.

[32] This aspect is better pointed out in the skilled-unskilled demand estimations in Table 18-19.