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Abstract

In this paper we explore the dynamics of labor market adjustment in Morocco with a particular emphasis on the role of trade liberalization. We utilize the methodology of Davis and Haltiwanger (1990) which enables us to distinguish between job creation, job destruction, overall levels of turnover, and the extent of movement within and between sectors. The results suggest that while average levels of employment growth are typically extremely low, this masks considerable movement in the labor market. The Moroccan labor market is characterized by high levels of simultaneous job creation and job destruction as well as high levels of turnover. Our decompositions show the importance of both "between" and "within" job movements, suggesting that Morocco is changing its specialization pattern. The regression analysis suggests that increasing trade openness, as well as technological change have significantly impacted on the Moroccan labor market and in particular with regards to job creation as opposed to job destruction. In turn this suggests that rigidities in the Moroccan labor market may be impeding the long-run adjustment process, but which in turn is likely to lessen the short-run adjustment costs for workers.

ملخص

نستكشف في هذه الورقة ديناميكية موائمة سوق العمل في المغرب، مع التركيز، بشكل خاص، على الدور الذي يقوم به التحرر التجاري. استخدمنا منهجية كلا من دافس و هالتيفنجر Davis and Haltiwanger (1990) واللذين مكنانا من التمييز بين خلق الوظائف والقضاء على الوظائف والمستويات الكلية لمعدل هذا التداول ومدى الحركة داخل القطاعات من جهة وفيما بينها من جهة أخري. تقترح النتائج أنه في حين أن المستويات المتوسطة لنمو التوظيف منخفضة جدا على نحو نمطي، فإن ذلك يخفي تحركا ملحوظا في سوق العمل. يوصف سوق العمل المغربي بمستويات عالية من تزامن خلق الوظائف والقضاء على الوظائف هذا بالإضافة إلى مستويات عالية من معدلات التداول. أظهرت تحليلاتنا أهمية تحركات العمل سواء داخل القطاعات أو فيما بينها، مقترحة أن تقوم المغرب بتغيير نموذجها للتخصص. يوحي تحليل التراجع أن الانفتاح التجاري المتزايد والتغيير التكنولوجي لهما بالغ الأثر على سوق العمل المغربي، وعلى وجه التحديد، فيما يخص خلق الوظائف كمقابل للقضاء على الوظائف. ويوحي ذلك بدوره على أن الجمود في سوق العمل المغربي ربما يشكّل عائقا لعملية الموائمة طويلة المدى ولكن من المحتمل أيضا أن يقلل تكاليف الموائمة قصيرة المدى على العمال.

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 labor market. Here it is important to distinguish between the overall or net impact (e.g. on wages and employment levels), and the impact on the labor market dynamics. 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 labor 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 liberalization, input reallocation (in particular the labor 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 liberalization on labor 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 as the USA, other Mediterranean and North African (MENA) countries and Latin America. A second important policy initiative was the privatization 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 analyzing the impact of trade on labor market, it is important to separate import and export flows, as their impacts are likely to differ. For example, increasing import competition, due to a fall in tariffs, worsens market conditions 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 and in international export markets. On the other hand, for example, increasing export orientation is likely to induce the more productive firms to increase their sales and consequently their size, with a positive outcome on the labor market. In this paper, we therefore consider the differential impact on labor market dynamics from both sides (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 labor market change is directly due to trade openness. Skill-biased technological change is the dominant explanation, which could be seen as an endogenous response to trade liberalization (Goldberg and Pavnik, 2004). Acemoglu (2002) suggests that international trade interacts with technical change, amplifying 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 "off shoring") has much the same impact on the labor demand as skill-biased technological change. Thus, distinguishing whether or not the change in wages is due to international trade, or technological change, is a fundamentally empirical rather than theoretical question (Feenstra and Hanson, 2001). Here it is worth noting that while trade based on comparative advantage is likely to induce a labor reallocation between sectors; technological change and off shoring are more likely to impact on within sectors reallocation (Berman et al, 1994). This paper, therefore, addresses the issue of technological change on labor market dynamics, as well as disentangles the within and between sectoral impact.

Finally, more recent theoretical models have shifted the focus to the importance of firm heterogeneity, driven by differences in firm-level productivity, in the explaining transmission mechanisms of trade liberalization. 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 has been 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 labor dynamics, this paper makes several innovative contributions. First of all, we explore the link between trade and job dynamics for a North African developing country 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 al. 2003 and Christev et al., 2005) with comparatively few analysis concerned with developing countries (Levinsohn, 1996 for Chile and Hatiwanger et al., 2004 for Latin America). Importantly, a significant similarity in the existing literature is typically only controlling for trade effects and ignoring technological change. Secondly, we examine the trade impact on the labor market at different levels of disaggregation, from the 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 sales, production, exports, and start-up data. In particular, we have detailed information on labor 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 labor market at different levels of disaggregation — from the 2-digit ISIC all the way to the firm level.

In order to capture the labor 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 from shrinking and dying establishments within a sector) at the 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

[1] We use permanent instead of total employment data because we have a lot of missing data for temporary job and this would lead to a sub-sample analysis. Moreover, we are able to 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 reallocations. As the literature suggests, job reallocation could be seen as a lower bound of total churning.

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 specialization 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 prove 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. that it is biased versus labor 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 the labor market. Indeed, while an increase in import penetration disincentives job creation, the opposite happens if export rises. However, neither impacts on job destruction. This could be explained by the strong firing procedures that characterize the Moroccan labor market, which seem to impede the flexibility of the economy to adjust. Moreover, in line with the Stolper-Samuelson theorem, increasing the export share favors the demand for unskilled workers and leaves unchanged that of skilled labor. Finally, productivity improvements are driven by labor saving techniques. Indeed an increase in productivity decreases job creation raises job destruction and discourages the demand for unskilled workers.

This 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 analyzes labor market 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 the 2-digit level. In Section 6, we move to a more disaggregated level of analysis to better investigate the determinants and directions of job dynamics. In Section 6.1 we regress the import, export shares and labor productivity on labor dynamics at 4-digit ISIC and in Section 6.2 we investigate more thoroughly the heterogeneity feature of job reallocation by analyzing the determinants of employment growth at the firm level using the labor demand framework. In this section, we explore more carefully the different impacts of trade and technological change using TFP as a proxy for the latter. Section 7 concludes.

2. Trade and Labor Market: Some Stylized 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 labor 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 to light the role of firm heterogeneity in explaining the transmission mechanism of trade liberalization. Melitz (2003) provides a theoretical framework with heterogeneous firms that link trade, job

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

reallocation and aggregate productivity growth. The model shows how exposure to trade induces the more productive firms to enter the export market, forces the less productive ones to exit and induces a reallocation of market share and profit from the less productive to the more productive firms. This reallocation contributes to aggregate productivity growth and welfare gains. Hence, it's interesting to analyze how trade impacts on labor 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 liberalization will lead to labor reallocation, with jobs moving away from import-competing industries toward export industries.

Although much of the available evidence focuses on developed countries, in the last decades some efforts have been made to analyze the pattern in developing countries. This has been possible as new datasets on developing countries became available.

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

Haltiwanger et al. (1996) made the first attempt to identify the impact of trade on job flows. Their analysis was based on simple cross-tabulation where industries were 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 showed "no systematic relationship between the magnitude of gross job flows and exposure to international trade". The only evident impact of trade on labor market was the large rate of gross job destruction among industries with a very high import penetration ratio. A similar "descriptive statistic" approach was adopted by other authors. Levinsohn (1996) investigated 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 adopted both a parametric and a non-parametric approach to analyze the data. Results indicated that job turnover was somewhat higher among exportable than importable, and that both these sectors showed higher turnover than non-tradables. Moreover, as firm size increased, job destruction rates almost monotonically decreased, while job creation rates did not change across size deciles. The real difference between firms of different sizes, then, was due to a difference in job destruction rates. The same data was used by Roberts (1995), but he adopted a different methodology based on Dunne et al. (1989)[5]. Roberts found that in Chile, Colombia, and Morocco gross job flows greatly exceeded net job flows. As a result there was a lot of churning; jobs were being reallocated even when net job changes at the sectoral level were modest. In particular Roberts (1995) pointed out that in all years except one; simultaneous job creation and job destruction within industries accounted for the vast majority of total turnover and this pattern did not vary much over the Chilean business cycle.

The bulk of empirical analysis investigated the determinants of job flows using econometric tools more precisely, i.e. they regressed trade variables on the indexes of job reallocation. However, their estimation models were not based on a theoretical framework. Following this approach, Dewatripont, Sapir and Sekkat (1999) linked import and export directly with job creation, job destruction and turnover using European labor market data. They mainly showed 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 Industrialized Asian Economies (Nies) on the labor markets of Germany, France, Italy and the United Kingdom, applied the methodology

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

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

proposed by Dewatripont et al. (1999). They showed that while job destruction was absolutely independent from trade flows with the emerging Asian economies, the evidence on job creation was less clear. In two cases imports appeared to have depressed employment dynamics, but in another cases exports turned out beneficial. The most striking evidence was that sector-specific features and individual characteristics, such as sector of (last) employment, sex and education were much more important than trade in explaining individuals' positions in the labor market. For the USA, Davis, Haltiwanger and Schuh (1994) found that there were no distinct patterns in job creation and destruction when industries were grouped according to import penetration and export share, except in industries with high import penetration ratios where job loss was elevated. Using different datasets on turnover in USA, Davidson and Masutz (2001) found strong evidence that exports decreased job destruction and workers separation rates. Weaker evidence suggested a positive correlation between exports and job creation.

More recent evidence focused on job reallocation patterns in transition countries. Konings, Kupets and Lehmann (2003) investigated how the relative openness of a sector impacted on the creation and destruction of jobs at firm and sectoral level in Ukraine. In particular, they analyzed the different impacts of trade flows to the world, to the EU and to the Commonwealth of Independent States (CIS). With regards to the manufacturing sector, they showed that more import competition had a negative effect on employment growth without regards to the origin of trade flows. Contrarily, only firms that exported to the world at large and the EU and were located in more export intensive sectors had a higher employment growth rate. Also at the sectoral level, trade flow origins mattered. In particular, sectors that exported to the EU market and to the world at large presented higher job creation and lower job destruction. Conversely, imports competition from the CIS destroyed fewer jobs at sectoral lever but did not increase job creation. Moreover, while export links to the EU had a positive effect on the job reallocation rate, EU import exerted a negative one. Christev, Kupets and Lehmann (2005) specified job flows as a function of trade flows and real exchange rate that varied systematically by industry and controlled for other industry specific effects, such as privatization and ownership structure. The dynamic estimations suggested that sectoral job flows were mainly driven by the lagged value of job creation and destruction, indicating that idiosyncratic factors within industries explained most of the variation of employment adjustment in Ukraine. On the other side, trade played a minor role in the determination of gross job flows. However, the direction of trade mattered. Indeed, while trade with CIS (Commonwealth of Independent States) decreased job destruction, trade with the EU increased excess job reallocation mainly through job creation.

The approach of Wacziarg and Wallack (2004) was quite different from the previous ones, since they analyzed the impact of trade liberalization on job reallocation using a cross-country dataset instead of focusing on a single country. They showed that in a bunch of developing and transition countries liberalization was followed by an unexpected reduction of intersectoral labor shifts at the economy-wide 1-digit level of disaggregation. Liberalization had a weak positive effect in the 3-digit level, and this effect was small in magnitude and sensitive to minor changes in the definition of liberalization or in the measures of sectoral shifts. Moreover, Wacziag and Wallack's (2004) analysis suggested that the policy environment affected the amount of labor reallocation. In particular, broad-based reforms that included domestic deregulation and privatization had greater effects on intersectoral labor movements than trade reform in isolation. Other comparative analysis were conducted by Baldwin, Dunne and Haltiwanger (1993) for Canada and United States and Haltiwanger et al. (2004) for Latin America. Baldwin et al. (1993) analyzed the effect of trade on job creation and job loss for the manufacturing sector in Canada and the United States. In particular, exports were positively associated with job creation in Canada and the United States though

this result primarily reflected variation across industries rather than changes over time. Indeed, when they analyzed the dynamics across time, they found that in both countries increases in exports over time led to lower job creation, though the effect was only significant in the United States. In the United States, but not in Canada, exports were also associated with increased job losses. With regards to imports, Baldwin et al. (1993) show that, from a dynamic point of view, increasing imports over time was associated with increased job losses in Canada but not in the United States. Haltiwanger et al. (2004) found that trade reforms had significant effects on the pace of job reallocation within sector among Latin American countries. Lowering tariffs increased the pace of job reallocation, as well as real exchange rate appreciation. This result was consistent with the hypothesis that reforms improved allocative efficiency. However, such improvement was small and not without costs. Indeed, they found that a reduction in tariffs was also associated with a decline in net employment growth.

Recent evidence using industry-level data showed that not only trade policy changes but also dollar movements had implication for labor-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 analyses that put to light the impact of trade on labor market were based on the labor 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 the US, and Greenaway et al. (1999) for the UK estimated how trade (both in terms of import and export) influenced the labor demand. The results generally showed a negative impact of imports on domestic labor force, mainly on unskilled workers. Although limited, some analysis focused on developing countries. Contrarily to industrialized economies results, the evidence for these countries was mixed. Indeed while some authors found a negative impact for trade liberalization on sectoral employment (Rama, 1994 for Uruguay; Edwards, 2004 for South Africa; and Manda and Sen, 2004 for Kenya), other authors showed that employment and wages increased both in importable and exportable sectors in the aftermath of trade liberalization (Milner and Wright, 1998 for Mauritius; and Haouas et al., 2004 for Tunisia); further evidence showed a different impact of import and export (Jenkins, 2004 for Vietnam).

More recently, some authors estimated the labor demand function using firm level data. Biscourp and Kramarz (2007) used 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 was the distinction between imports of finished goods and intermediate inputs. In so doing, they were able to capture the different impact of pure-trade and off shoring. The results suggested that increasing exports increased employment but more import penetration destroyed job. The negative impact was more accentuated in firms that imported finished goods than in firms importing intermediate inputs. These results put to light the positive effect of production relocation on firm performance with positive outcome on the labor market. However, imports from low-wage countries had a slightly more negative association than average imports, probably owing to the different production stages that were relocated in these countries. In low-income countries firms usually relocated labor-intensive activities that impact more negatively on the domestic labor force. Contrarily, off shoring to advanced countries focused mainly on services. Mouelhi (2007) used a firm level dataset to estimate the impact of trade on labor demand in Tunisia. Starting from a firm-specific Cobb-Douglas

[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).

production function, the author associated change in employment directly with a measure of change in trade protection, rather than using import and export shares, and took into account also the adjustment process, by adding the lagged dependent variable among the regressors. The firm level regressions suggested that trade liberalization had beneficial effects on employment in exporting firms. Conversely, trade liberalization had negative effects on employment for domestically oriented firms. Moreover, exporting firms raised the demand for skilled workers in reaction to trade liberalization. The author imputed this behavior to the skill-bias technological change induced by trade liberalization.

The available literature suggested that international factors (tariff reduction, export and import competition, exchange rate fluctuation, outsourcing, change in terms of trades) were important for labor market dynamics both in terms of labor turnover and changes in labor demand. However, the effect was different for developing and developed countries. Indeed, while greater trade exposure increased job turnover in developing and transition countries, the effect was almost null in the former group. However the majority of studies for developing countries estimated trade liberalization in terms of trade openness or tariff cuts and did not differentiate between import and export flows and failed to introduce any proxy for technological change in the estimations, missing in this way an important part of the story. Indeed, the tradeoff between trade and technological change remains a crucial point in the debates on trade and employment (Feenstra and Hanson, 2001; Acemoglu, 2002; and Goldberg and Pavenik, 2004).

Finally, with regards to the labor demand estimation, the majority of analysis relies on sectoral level data and put to light a clear pattern for industrialized countries (imports 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 unable to provide a clear picture for trade impact on labor dynamics in developing countries. The aim of our work is to partly fill in this gap, by analyzing the impact of import and export flows, and technological change on job turnover and labor demand in Morocco.

3. The Moroccan Policy Environment

Following independence in 1956, Morocco's development strategy was primarily based on import substitution, industrialization 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 six-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 liberalization 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 put 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 involved the asymmetric reduction of tariffs by Morocco on EU exports.

Tariffs on capital goods imported from the EU have been eliminated since 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 were reduced 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 came into effect in March 2005. The 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 like 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 on 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 liberalization 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. While yearly tariff data was impossible to obtain, there is enough information in the table to show a number of key features. First, tariffs in Morocco are extremely high ranging from an average of 47% to 99% in 1993 and 17% to 52% in 2000. Secondly, the period shows a substantial decline in tariffs across all sectors. The biggest declines are in Textiles and Electrical equipment where the reductions were 74% and 58% respectively, and the smallest declines are in Food products (28%) and 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.

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, receiving over one third of exports and providing over one fifth of imports. Spain is the second trading partner, typically receiving 16 to 18% of exports and providing 10 to12% 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 privatization process launched in the late 1980s, which largely focused on hotels, road transport, petroleum distribution, petrochemicals, housing, textiles, cement and subsequently power generation, oil refining and telecommunications. A reform of the business and judiciary environment, as well as a modification of the labor code and the labor legislation was initiated in 2003. The Moroccan dirham is set with respect to an (undisclosed) basket of currencies and policy typically favored a strong exchange rate, which caused some difficulties for exporters. Despite the policy initiatives, during the 1990s and early 2000s the Moroccan economic growth has been low and the rising unemployment has been exacerbated by the underlying demographic conditions.

4. Data Overview

Data for this paper is collected 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 the 2 and 4 digit. After the cleaning process due to a number of data irregularities, we get a non-balanced panel dataset 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 labor supply for each firm, with employment divided by employment status, gender, and skills[7].

Table 2 provides some summary information — on the basis of the cleaned dataset — on the share of each industry in employment and sales. The table shows that a few industries 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-year 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 the increasing importance of some sectors in the Moroccan economy is driven both by the expansion of existing firms and the entrance of new ones. The employment shares are largely reflected in the sales and export shares (Table 3).

There is one notable in the chemical sector, which had an employment share 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% and 21%) and import share (20.23% and 14.07%). However, it reports a sharp decrease in its openness degree over the period (Table 3). The clothing sector plays an important role in Moroccan exports 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 in 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 rise 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 export shares were reported by the textile 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 machines 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.

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 exports, respectively (Table 3), and sell on the foreign market 44%, 90% and 43% of their output (Table 4). Food and beverage is an exception since it accounts for a large share of total exports (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

[7] Skilled and unskilled workers belong to the permanent workers group. We don't have information about the skill 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.

but sell abroad more than half of their output[8]. With regards to imports, the picture that we get using this openness index is quite different. Not surprisingly, 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 in line with the Moroccan specialization pattern. Despite the fall in tariffs and the strength of the exchange rate, this period was not characterized by a general increase in import penetration. This could be explained by the contraction of the economy after the drought in 1995 and 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 exporters, which we define as having a ratio of total export / total sales, of 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. Some 63% of firms sell only to the domestic market and are defined as non-exporters. The remaining 17% compete 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 that of non-exporter firms is fairly constant over the sample period. The graph suggests an increased participation of Moroccan firms in international trade. This could be seen as a positive effect of the policy reforms that could increase entrepreneurs' confidence in the future.

Concomitant with this, in Figure 2 we see that the mean employment size of exporters has slightly increased 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 non-exporters. The large 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 on 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, have easy access to credit, and an efficient organizational structure. 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 either 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.

Finally, we examine whether exporter and non-exporter differ in terms of labor productivity. In line with the previous comments, Figure 3 and 4 show that exporter firms present higher productivity, both

[8] The sector ranking on the basis of this index is confirmed by the Klein, Schuh and Triest (2002) index, which computes openness as follow: $open(flow)_{j,t}=(Flow_{jt}/Flow_{tot,t})/(employment_{jt}/employment_{tot,t})$, where flow = import and export.

[9] In this table we report only firms that export all through their life or firms that 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 and average size. Their average employment lies between exporter and non-exporter size.

in form of labor productivity and total factor productivity (TFP), than non-exporter firms. Moreover, while exporter firms steadily increase their productivity across time and the pattern is quite similar for both variables, the labor productivity of non- exporter firms declines almost monotonically but the TFP path is much more unstable, albeit decreasing[11].

5. Employment Growth and Turnover in the Moroccan Labor Market

In order to shed light on the process of labor 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. This methodology 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 normalized 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.

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 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 entry. This feature is due by the dataset feature that underestimates entry. Indeed, while we can capture correctly the entrance of new firms (for each firms is reported the start-up year), missing values in the first year of a firm life, makes it impossible to compute the index for that year. Hence, the job creation index is underestimated and should be considered as a minimum value. With regards to firm exit, we do not have specific information, hence we assume that a firm exits 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%).

Given the high concentration around zero, we analyze, in the next section, what's hidden behind this negligible growth rate. Indeed, the theoretical framework and the available evidence suggest that job

[10] Since temporary workers represent only a small share of total employment and we have a lot of missing values 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.

turnover is important in explaining labor dynamics also in the presence of small change in employment level.

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 analyze, in 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

$$POS_{st} = \sum_{e \in E_{st}} \left(\frac{X_{et}}{X_{st}} \right) |g_{et}| \tag{5.3}$$

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

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 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 labor 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 towards job creation as suggest by the positive value for net employment growth.

[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.

Second, 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 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 by looking at the expansion and contraction dynamics of continuing firms more than at entry and exit flows. This implies that considering only the contribution of entry and exit to job reallocation may conceal a lot of dynamics.

Third, there is little evidence of any change of pattern in the indices over time[14]. Hence, although this was a period of some trade policy change (particularly reduced tariffs), as well as other changes in the environment, there is little direct evidence of the impact of these reforms on labor market dynamics. This was also confirmed by a set of regressions which failed to capture a significant structural break with regards to these indices. These results suggest that the higher standard deviation in job flows that characterized the Moroccan labor market, with 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 highest level of turnover. The lowest turnover is in the chemical and metallurgy sectors. The major role of job creation in explaining job reallocation is also evident 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% which 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 specialization pattern. Turning to our results we can see that job reallocation in Morocco (19.5%) is more similar to developed than developing countries. In particular, the lower level of Moroccan job reallocation than other developing countries could suggest that the strong Moroccan labor market legislation restricts the flexibility of Moroccan labor 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 informative on the difference in the hiring and firing flexibility between Morocco and other developing countries.

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 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

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

reallocation (SUM) and the absolute value of the net job reallocation (NET) for the whole economy:

$$EXCESS = \sum_s sum_s - \left| \sum_s net_s \right| \tag{5.5}$$

where *s* represents the sector. EXCESS is in the range [0; 2n], where *n* is the number of sectors in the economy. The higher 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:

$$BETWEEN = \sum_s |net_s| - \left| \sum_s net_s \right| \tag{5.6}$$

$$WITHIN = \sum_s sum_s - \sum_s |net_s| \tag{5.7}$$

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 in Table 8), we immediately see a sharp increase in the between contribution that is around 50% of total job reallocation.

The striking message rendered by 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 jobs both moving from one sector to the other, and also within the same sector. Clearly the process of trade liberalization is likely to impact both movements. The between sector shifts are likely to arise from differences in comparative advantage across sectors, meanwhile the within sector shifts are driven in part by comparative advantage considerations but at a finer level of specialization, and also by the differential impact of trade policy (e.g. privatization 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 — disregarding the trade impact — with jobs moving 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 the US. Indeed they found that between job reallocation accounts for no more than 1.5% of excess job reallocation at the 2-digit sector and no more than 12% when sectors where classified in 450 groups. The overwhelming importance of between job reallocation has also been shown for other industrialized countries. For example, Boeri and Cramer (1992) find that variance across industry sectors (81 groups) accounted for less than 0.5% in

[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.

Germany. The low between sector reallocation suggests that these countries have already defined their specialization pattern. Results for other developing countries show that the "between" contribution to excess job reallocation is generally higher than in industrialized countries. They are, 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 high 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 the 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, any country should specialize in sectors of comparative advantage and that this would induce worker flows from the less competitive sectors to the more competitive ones. 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 directly linking job flow indices, sectoral level variables and macro shocks. Usually, excess job reallocation at the sectoral level is used as the main dependent variable in this analysis. However, this index computed at the sectoral level coincides with the "within" component and hence captures only the within sector reallocation[16]. Since our decomposition put to 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 the 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 labor 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 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

[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 sectors 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

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, distinguishing 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 the more trade oriented sectors are the more labor intensive ones, 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 labor market at the firm (as opposed to the 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), in order to examine in depth the heterogeneity feature of job turnover we should follow a slightly different approach and move from job turnover to labor demand literature. 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 the firm level over the period 1994-2002 we can examine how firm and sectoral level characteristics, as well as macro shocks, impact employment dynamics. This analysis allows us to investigate the nature of the Moroccan economy transformation and the role of heterogeneity in labor 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 liberalization on employment we estimate the reduced-form equation derived from the general model of labor market equilibrium. This has become a standard approach for investigating the effect of international trade on labor markets. This approach is based on the Revenga's (1992) simple structural model of the labor market. Labor 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 Δ 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 ε_{jt} is an error term reflecting unobserved labor demand shocks.

The first-difference form of the labor 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 labor supply determinants and μ_{jt} is an error term reflecting unobserved labor supply shocks.

The system of equations given by labor demand and labor 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:

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

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

the error terms in equation (6.3) and (6.4), υ_{jt} and ν_{jt}, respectively, are combinations of the labor 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; ans T_{jt} is the vector containing variables of interest for the analysis, such as trade flows. u_{jt} and ε_{jt} are assumed i.i.d. normal. Some of the variables in X_t , Z_{jt} and T_{jt} are intended to capture the determinants of the supply and demand for labor.

This approach has been widely used in the literature but, owing to the methodology implemented; these analyses bring to light the changes in the level of employment across sectors and do not consider job reallocation. However, since the variation in employment (ΔL_{jt}) is formed by the variations in job creation and job destruction, we use the job flow indexes as dependent variable. Moreover, we 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 labor market, i.e increase turnover (Davis and Haltiwanger (1990), Gourinchas (1999a), Klein et al. (2003). In particular, we would expect a negative effect of final-good import on net employment since higher competition on the domestic market could hurt national firms, which react by cutting costs and shirking their labor 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 is reasonable to increase its size, particularly if it deals in labor intensive goods (like the clothing, and food and beverage sectors)[18]. Moreover, the positive effect of export on labor market could also be driven by the "in shoring effect". European firms relocate different stages of their production process to Morocco, mainly in the textile sector, to take advantage

[17] The dynamic impacts of import and export share on job turnover are analyzed in Section 6, where we exploit the panel dimension of our dataset.

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.

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 labor market regulation is particularly comprehensive and rather restrictive about the firing procedures for the private sector workforce, it is possible that this feature could impact on the significance of regressors.

Investment share[19] (inv_ca_j) and labor productivity[20] ($labor\_prod_j$) are introduced as "crude" indicators of technological change. Investment share is computed as the share of total investment on sales, labor 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 or not firms invest in labor-saving technology. In this case a higher investment share as well as a higher productivity level should decrease job creation and increase job destruction, at least in the short run. Meanwhile, the opposite is true in the case of labor-using innovation. In both cases, it is 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 becomes more productive, it doesn't need to hire more workers to increase production. Higher productivity implies some adjustment costs, mainly in terms of labor. 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 labor-intensive it implies a general increase in labor demand, if it is capital driven, the labor demand would be biased in favor of more skilled workers. Hence there are potentially two effects impacting on the labor market: the adjustment cost — increase in productivity reduces labor demand in the short-run, but in the long-run increases in efficiency raises output and creates new jobs.

The introduction of these variables allows us to investigate the different impacts of trade and technological change on labor 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 should explain 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 labor-saving technological change effect. On the other side, skill share could shed light on the direction of the Moroccan economy's transformation. Following the classical trade theory, we would expect that following trade liberalization, Morocco would specialize in unskilled intensive sectors. Hence, sectors with a higher skill share would resize their workforce, with negative consequences on job creation and job destruction. Consequently, in both directions — technological change or trade effect — we would expect a negative sign for 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 captures the market structure of each sector[21]. Nickell (1999) provides a theoretical intuition of the positive effect that an increase in labor market competition would have on the labor demand. Indeed, in his model, the external shifts of the labor demand curve derives from the modification of firms' pricing behavior when competition becomes stronger. In addition to this direct effect, Boeri

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

[20] It captures the per-worker added value. This result is robust to other specifications, 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.

et al. (2000) and Nicoretti et al. (2000) witness an indirect effect on labor 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 larger ones. Hence, we control also for the average size of the 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 a 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 labor 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 dummy 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 labor market flexibility and its adjustment speed. Given the strict firing procedure, this analysis could shed light on the effects of labor market institutions on the adjustment process.

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 adjustments. We proceed in two ways. First of all we verify if job creation is influenced by the lagged value of job destruction; and vice versa for job destruction. In this way we avoid the estimation problems of a dynamic panel — that are particularly evident in our estimation owing to the short time span in our data set — such as the autocorrelation problems and the high number of instruments that weaken 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 heteroskedasticity using the White-Huber sandwich estimators.

Different authors estimate the labor 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 a 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 labor market. As expected, import and export flows exert an opposite effect on the labor market. Indeed, while an increase in export orientation increases turnover by raising 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 raises job creation by 3.5 % on average and ceteris paribus[22]. On the other side, a 10 percentage point increase in import decreases turnover by 1.2% on average and ceteris paribus. The lower impact of import penetration on job creation could be explained by the nature of imported goods. Indeed, while import of final goods replaces domestic goods and hence negatively impacts the labor 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 goods.

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 liberalization for Morocco in this period is largely asymmetric; 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 Morocco's strict labor market regulation that is particularly rigid in firing procedures. On the one hand this suggests that the impact of increased openness may have a less direct effect on unemployment and hence social stability. 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.

[22] To interpret our coefficients in terms of elasticity we need some additional computations, since we specify our variables in levels. For example, to get the elasticity of job creation to a 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.

When we control for labor productivity, we can see that technological change damages the Moroccan labor market. Even 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 labor 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 labor market is confirmed in Table 12: a 10 percentage point increase in labor productivity raises job destruction by 0.41 percent. These results suggest that technological change is based on the adoption of labor-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 equalized 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. 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 competitiveness, will boost future growth with positive outcomes on labor 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 we already pointed out capture within sector movements, support the idea that trade flows mainly explain "between" sector movements. The job creation estimations advocate that this shift is from importing firms (that create fewer jobs), to exporting firms (that create new jobs). Hence Morocco is changing its specialization pattern. Since exporting sectors are also the more labor intensive ones (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 which are intensive in the relatively 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 labor demand and whether it is biased versus unskilled workers. On the other side, the significance of labor productivity in the excess job reallocation regression implies that technological change is important in explaining "within" sector movements. In particular, sectors with higher productivity levels 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 labor 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 captures the direction of the Moroccan economy transformation more than technological change. However, this dichotomy could be investigated better at the firm level where we focus on the different impacts of trade and technological change on skilled and unskilled workers.

[24] The coefficient is significant to another specification; if we exclude labor productivity and investment shares, it does not change its sign or its significance.

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 is commonly accepted in the literature (Bernard and Jensen, 1999) and is confirmed by our data (see Section 4) that exporter firms are usually larger than non-exporters. Hence the opposite effect that size and export orientation have on turnover deserves particular attention to better understand the impact of trade liberalization on the labor market (see Bottini and Gasiorek, 2007). On the other hand, market structure and average firm age are not relevant in explaining differences in turnover.

Finally, we control for possible dynamic adjustments. The last columns of Tables 11 and 12 show a strong influence of past job flows on hiring and firing that do not change the significance of the other variables. As we can see by comparing the elasticities, job creation is more reactive to change in job destruction than the other way round. Indeed the elasticities are 0.036 and 0.014, respectively[25]. This result could be interpreted as a positive signal for the Moroccan labor market, since some of the destroyed jobs are replaced by new jobs within one year. On the other hand, it supports the idea that the strict Moroccan firing procedures impede a quick adjustment and could cause inefficient job allocation. The higher labor 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 also indicates that idiosyncratic factors within industries explain most of the variation of costly employment adjustment. The evidence is in line with the analysis of the 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 serious consequences for the Moroccan labor market. Indeed, these agreements would boost both exports, by favoring 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 specialization pattern. However, the adjustment process is slowed down by the strict firing procedures. While this constraint would safeguard employed workers, it would impede the Moroccan economy from fully taking advantage from the trade liberalization gains in terms of higher aggregate productivity and welfare (Melitz, 2003). Hence, although labor market institutions limit the short-run losses in terms of higher unemployment, it could undermine future growth. On the other hand, the adoption of capital-intensive production techniques — which was supported by the Moroccan government during the 1990s — hurt the labor market. Contrarily to trade flows, change in productivity mainly explains reallocation within sectors and does not impact on the manufacture's structure. However, contrary to trade factors, it negatively influences both job creation and job destruction. From these results the complementary role of trade and technological change in explaining job dynamics is obvious. Moreover the sectoral level analysis brings to light the importance of a deeper analysis to investigate the change in the specialization pattern and the role of firm heterogeneity in job dynamics.

[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 of our dataset, the autocorrelation problems and the high number of instruments that weaken the Sargan/Hansen test, we prefer to control for adjustment in this way.

6.2. The Firm Level Analysis

6.2.1. The Theoretical Framework

The 4-digit analysis has shed light on important features of labor dynamics and in particular on the complementary role of trade and technological change. While the trade's impact on labor markets is relevant albeit not too large — given that the negative impact of increasing competition is compensated by the positive impact due to increasing exports — 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's (2003) model and supported by our previous analysis. Moreover, by adding export share in the labor demand, we try to disentangle the direction of Moroccan economy's transformation. Indeed, since Morocco is relatively abundant in (unskilled) labor with respect to its main trade partner (Europe) the classical trade theory suggests that an increase in exports would induce a rise in labor demand of unskilled workers in particular.

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 is common practice in the labor market literature to analyze 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 labor productivity on firm level employment, we rely on the standard labor demand approach.

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

$$Q_i = A^{\gamma} K_i^{\alpha} L_i^{\beta} \qquad (6.9)$$

Where:

Q = output;

K = capital stock;

L = labor;

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 minimization problem:

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

We obtain the following expression:

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

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

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

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 labor market is characterized by a large supply of labor, high unemployment and minimum wage, we could make the assumption that change in wages doesn't impact on firm level labor 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} = labor productivity or TFP in firm i in time t;

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

λ_i = industry specific effect;

δ_t = time specific effect.

As proxy for technological change we use different indicators of productivity. First of all we control for labor productivity[26], computed again as the share of added value on total employment. Second, 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 is 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 the 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 and 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

[26] This variable could suffer of possible endogneity problems. We control for this problem by taking its lagged value as instrument, both at the static (not reported) and dynamic level, and by using another 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 Beverage (sector 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 the 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 equations are not identified.

heterogeneity using the White-Huber estimator. Moving to the dynamic panel, which allows us to capture the adjustment path of labor demand, it is known that the coefficient on lagged employment is biased in the presence of a 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 Generalized 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 permit the identification of time-invariant firm characteristics. In this framework we also control for the possible endogeneity of labor (for the dynamic nature of the estimation), output, export share (Bernard and Jensen, 1999) and productivity (both labor productivity and TFP). Consequently, we use the lagged levels of labor, output, export share and productivity (dated t-2) and earlier as instruments for equations in first differences. In the meantime we use 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 is 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 at 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 a higher share of their sales, present higher labor productivity are slightly more concentrated (Herfindahl index) also if the firms' share on total share is quite similar.

Table 15 reports the labor demand estimation for the whole sample. As column 6 suggests, an increase in export share induces a rise in labor demand also if we control for output and technological change. This result suggests that trade impacts on labor demand both indirectly, by inducing higher productivity and output, and directly, by inducing a specialization. Since Morocco is relatively abundant in 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 % increase in labor demand. The elasticity rises to 0.6 % if we consider the sample with the more export oriented sectors.

The labor saving nature of technological change is confirmed also in the labor demand estimation. A one percentage point increase in labor productivity induces a 0.2 % decrease in labor 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 labor productivity in this sample reduces labor demand by 0.23%(Column 7 Table 16) and a one percentage point increase in TFP reduces labor 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 labor productivity and the feature of the sub-sample. The negative impact of technological change on labor demand is also confirmed 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, as these production techniques

[31] Estimations based on the two different TFP measurements are really close.

require more skilled workers; on the other side it sheds more light on the change in the production pattern. Since Morocco is relatively abundant in unskilled workers, we would expect that Morocco would specialize in the unskilled labor 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 labor demand. This effect is mirrored by the positive coefficient of output and suggests that Moroccan firms produce labor intensive goods.

Moving to the dynamics estimation (Table 17), we immediately notice that even 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 characterizes Moroccan labor market doesn't seem to be 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 labor market and generally on inequality and future growth. If, as expected, they would impact the two groups differently, 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 the Moroccan labor market.

As Table 20 and 21 suggest, increasing export orientation has an "unskilled-bias" effect on Moroccan labor 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 the demand for non-production workers. Hence, increasing trade favors a change in the Moroccan specialization pattern and this change is biased versus labor intensive sectors— particularly the unskilled. Contrary to 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 labor 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 labor 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 labor demand, it prevents large human-capital destruction and doesn't hinder human-capital accumulation in the long run. Consequently, it doesn't undermine a sustainable growth in the long- run. The higher elasticity of unskilled labor demand to output change supports the idea of unskilled labor 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 occupations. This feature is validated 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 the demand for unskilled ones. Finally, the dynamic estimations show that skilled workers adjust much more quickly than the unskilled. Hence the adjustment process is more

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

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 regards to the small sample (Column 3 and 6 in Table 20), the elasticities for TFP are 0.9 and 0.2, and the elasticities for output are 0.2 and 0.1, respectively. This suggests that exporter firms are more flexible than non-exporter firms and adjust their workforce quicker to technological change. The higher sign for output could indicate the labor intensive nature of exporting firms' production. Indeed, to increase output of the same proportion, exporting firms require much more workers. The same conclusion is derived from the firm share coefficient. Finally, an increase in the skill composition induces a much higher decrease in labor 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 the Moroccan specialization 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 proxies and specifications. Hence, if trade reforms would increase the exporter firms' number, we would expect a much quicker adjustment of the workforce with regards to both changes 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 labor 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 the 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 levels 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 specialization which takes 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 labor market depending on whether it is on the export or import side. Not surprisingly, increased exposure to external markets has a 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 labor

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 liberalization, in terms of higher aggregate productivity as advocated by Melitz (2003) are not automatic in Morocco; to get the benefits a reform of the labor 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 labor productivity raises job destruction and reduces job creation suggesting the presence of labor-saving technological change. This is consistent with the 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 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, technological change risks to elevate the social tension. On the other hand, technological change, by improving firm performance and competitiveness, will boost future growth with positive outcomes on labor 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 labor 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 specializing in labor intensive sectors —particularly the unskilled. Also the labor-saving nature of technological change is confirmed by the firm level regressions. Indeed, an increase in productivity, both in terms of labor productivity and total factor productivity reduces the demand for labor 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 fast adjustment process at the firm level and, in particular, skilled workers adjust much more quickly than unskilled ones, 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 does not seem to hinder the adjustment process at the firm level but it mainly influences aggregate job destruction.

The paper brings to light the complementary nature of trade and technological change. Indeed, both are important in explaining job dynamics while having opposite effects on the Moroccan labor market. However, analyzing our results in a wider context, two main concerns emerge. First of all, the Moroccan specialization process, biased versus unskilled intensive sectors, could lead 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 recorded by the textile sector in the last years. Secondly, while an improvement in labor productivity and total factor productivity is essential for a sustainable future growth, it is 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 labor demand doesn't look as the best recipe 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 Morocco the opportunity to invest in product quality and diversify its specialization pattern. In this way Morocco will increase productivity, improve employment conditions and decrease the competitive pressure from emerging countries.

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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

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 3: Sector Share in Terms of Export and Import

Sector Code	Sector Description	Export $_{it}$/ Total Export$_t$ 1995	Export $_{it}$/ Total Export$_t$ 2002	Import $_{it}$/ Total Import$_t$ 1996	Import $_{it}$/ Total Import$_t$ 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.

Table 4: Export and Import Share in Total Sales by Sector

Sector Code	Sector Description	Export$_{it}$/ Sales$_{jt}$ 1995	Export$_{it}$/ Sales$_{jt}$ 2002	Import $_{it}$/ Sales$_{jt}$ 1995	Import $_{it}$/ Sales$_{jt}$ 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

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 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*.

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

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
Labor 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 Labor productivity, multiplied by 100.

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)
Labor 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	0.146	0.158	0.166	0.193
	(2.09)**	(2.10)**	(1.93)*	(1.91)*	(2.09)**
Import share	-0.058	-0.045	-0.078	-0.087	-0.061
	(2.08)**	(1.38)	(1.98)**	(2.18)**	(1.39)
Labor Productivity		-0.001	-0.001	-0.001	-0.001
		(2.27)**	(1.98)**	(1.81)**	(1.84)*
Average Firm Size			-0.039	-0.037	-0.04
			(2.30)**	(2.24)**	(1.76)*
Average Age			-0.002	-0.002	-0.003
			(1.56)	(1.29)	(0.24)
Investment share			0.056	0.067	0.039
			(0.71)	(0.82)	(0.56)
Herf_index			0.054	0.055	0.062
			(0.77)	(0.79)	(0.85)
Skill Share				-0.126	-0.19
				(1.4)	(1.77)*
Female Share				0.025	0.025
				(0.69)	(0.65)
Lag_Job Destruction					0.444
					(3.64)***
Year	Yes	Yes	Yes	Yes	Yes
Constant	0.077	0.072	0.065	0.069	0.043
	(4.37)***	(3.84)***	(1.87)*	(1.97)**	(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)
Labor 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)
Labor 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%

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_LaborProd	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: Labor Demand Estimation at Firm Level

(Permanent job; static panel; 1994-2002; labor 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_Labor 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: Labor 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	0.094	0.145	0.132	0.059	0.142	0.131
	(5.40)***	(3.35)***	(3.06)***	(4.69)***	(2.26)**	(3.00)***	(2.91)***
ln_labor product							-0.231
							(10.59)***
ln_tfp1	-0.198	-0.623	-0.646				
	(4.46)***	(10.53)***	(6.37)***				
ln_tfp2				-0.138	-0.503	-0.646	
				(4.09)***	(11.43)***	(6.47)***	
ln_product		0.311	0.193		0.305	0.192	0.201
		(22.37)***	(8.68)***		(26.61)***	(8.72)***	(9.21)***
firm share			7.448			7.451	8.073
			(3.02)***			(3.03)***	(3.32)***
ln_Herf_index			0.101			0.09	0.095
			(2.14)**			(1.92)*	(2.14)**
investment share			-0.024			-0.023	-0.024
			(1.46)			(1.43)	(1.83)*
skill_unskill			-0.052			-0.053	-0.052
			(2.55)**			(2.63)***	(2.63)***
femm_male			0.001			0.001	0.001
			(0.41)			(0.44)	(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	2.532	3.506	4.197	2.18	3.227	3.1
	(19.35)***	(10.59)***	(11.56)***	(22.87)***	(11.72)***	(13.98)***	(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: Labor 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	0.416	0.454
	(5.17)***	(6.45)***	(6.98)***
exp_share	0.451	0.315	0.357
	(2.08)**	(1.80)*	(2.14)**
ln_Labor Productivity	-0.267		
	(2.97)***		
ln_tfp1		-0.57	
		(1.81)*	
ln_tfp2			-0.581
			(1.80)*
ln_product	0.238	0.209	0.238
	(2.60)***	(3.50)***	(3.42)***
Firm share	16.967	23.867	24.195
	(1.29)	(1.12)	(1.19)
ln_Herf_index	-0.012	0.31	0.042
	(0.05)	(1.58)	(0.22)
Investment share	0.037	0.07	0.007
	(0.3)	(0.68)	(0.09)
skill_unskill	-0.065	0.004	0.006
	(1.25)	(0.11)	(0.16)
femm_male	0.013	0.01	0.006
	(1.08)	(1.11)	(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: Labor Demand Estimation at Firm Level: Skilled versus 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	0.02	0.021	0.183	0.18	0.176
	(0.09)	(0.29)	(0.3)	(3.28)***	(3.11)***	(3.05)***
ln_vaTotEmpl	-0.064			-0.232		
	(4.49)***			(10.51)***		
ln_tfpinterp		-0.127			-0.741	
		(1.67)*			(5.87)***	
ln_tfpuvis			-0.11			-0.744
			(1.42)			(5.94)***
ln_product	0.135	0.122	0,084028	0.207	0.21	0.21
	(7.39)***	(4.92)***	(4.85)***	(9.58)***	(7.15)***	(7.17)***
ln_Herf_index	-0.017	-0.011	-0.009	0.115	0.176	0.164
	(0.38)	(0.16)	(0.13)	(2.92)***	(2.92)***	(2.73)***
firm_CA_share	0.893	6.287	6.288	1.481	8.348	8.344
	(1.24)	(2.28)**	(2.31)**	(1.78)*	(2.23)**	(2.23)**
inv_ca	-0.006	-0.002	-0.003	-0.016	-0.015	-0.015
	(0.61)	(0.29)	(0.3)	(1.48)	(1.14)	(1.1)
femm_male	-0.001	-0.001	-0.001	0.002	0.002	0.002
	(3.31)***	(2.99)***	(2.96)***	(8.49)***	(7.94)***	(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	1.353	1.351	2.158	3.954	2.928
	(1.77)*	(4.66)***	(4.63)***	(4.22)***	(9.88)***	(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: Labor Demand Estimation at Firm Level: Skilled versus 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_labor 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>chi 2	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: Labor Demand Estimation at Firm Level: Exporter versus 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: Labor Demand Estimation at Firm Level: Exporter versus 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	0.495	0.461	0.303	0.452	0.509
	(4.47)***	(3.77)***	(3.71)***	(2.35)**	(3.36)***	(3.69)***
exp_share	0.349	0.123	0.36			
	(1.77)*	(0.43)	(1.71)*			
ln_Labor Productivity	-0.297			-0.171		
	(3.09)***			(1.99)**		
ln_tfp1		-1.513			-0.18	
		(1.93)*			(0.5)	
ln_tfp2			-1.588			0.097
			(2.51)**			(0.26)
ln_product	0.28	0.329	0.371	0.269	0.295	0.26
	(2.98)***	(2.68)***	(2.68)***	(3.15)***	(2.99)***	(2.64)***
firm_share	8.954	23.91	25.096	-15.315	-42.845	-64.227
	(0.96)	(0.98)	(0.99)	(0.67)	(0.46)	(0.68)
ln_Herf_index	0.06	0.339	0.142	0.001	0.258	0.29
	(0.27)	(1.37)	(0.51)	(0.3)	(0.7)	(0.94)
investment share	0.034	-0.008	0.002	-0.021	-0.058	-0.064
	(0.28)	(0.05)	(0.02)	(0.23)	(0.64)	(0.69)
skill_unskill	-0.088	0.043	0.011	-0.092	-0.171	-0.149
	(1.42)	(0.8)	(0.24)	(1.11)	(1.19)	(0.88)
femm_male	0.013	0.007	0.009	0.12	0.008	0.014
	(1.21)	(0.67)	(0.83)	(1.1)	(0.17)	(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%