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Trade and Job Reallocation: Evidence for Morocco

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1. Introduction

International trade is commonly view as an useful tool to remove market distortions, to promote competition among firms and hence increase welfare. However, trade openness is not costless and unavoidably creates gainers and losers (Wood (1995, 1998)). Hence, a complete evaluation of the gain from trade should consider both efficiency benefits and adjustment costs. Indeed, to enjoy of the gain from trade liberalisation, some adjustment processes are required. Increasing trade will induce reallocation of resources from less efficient firms to more productive one, with a final positive effect on growth and uncertain consequences for the labour market. With increasing competition, the less efficient firms will exit from the market and the others will survive only if they would increase their productivity. The first attempts to analyse the impact of trade on labour market focused on the net change in wage and employment levels (Bottini (2005) and Hoeckman and Winters (2005) for a review of the literature). However, further analysis have highlighted that looking at total levels of employment is likely to conceal important dynamics in the labour market and in the economic analysis (Davis and Haltiwanger, 1996). Indeed net change in total employment is derived by adding up new places available through the entry of new firms and expansion of existing firms and employment losses over shrinking and exiting establishments. Studying the link between trade liberalisation and job dynamics is hence a way to examine how increasing trade impacts on job turnover and input reallocation. Furthermore, it is important to detangle the effect of trade on labour market by dealing separately with import and export flows. The available literature shows that trade liberalisation will lead to labour reallocation, with jobs moving away from import-competing industries toward export industries (Davidson and Matusz (2001)). Intuitively, import and export flows have an opposite impact on labour market. Increasing import competition worsen market condition for domestic firms and causes firms exit and downsizing with a final negative effect on employment. Finally, a crucial point in the debate on trade and employment is the relation between trade and technological change. Several recent theoretical papers have argued that only a small percentage of the labour market change is directly due to trade openness. Skill-biased technological change is the dominant explanation and it could be seen as an endogenous response to trade liberalisation (Goldberg and Pavenik, 2004). Acemoglu (2003) suggests that international trade interacts with technical change, amplifies the direct effect of technical change on inequality, wages and job reallocation. On the other hand, Feenstra and Hanson (2001) argue that international trade, in the form of trade in intermediate inputs, is an important explanation for the increase in the wage gap between skilled and unskilled workers. Using a simple model of heterogeneous activities within an industry, they show that trade in inputs (or “outsourcing”) has much the same impact on the labour demand as skill-biased technological change. Thus, distinguishing whether or not

the change in wages is due to international trade, or technological change, is fundamentally an empirical rather than a theoretical question (Feenstra and Hanson, 2001).

The purpose of this paper is to study how import and export flows impact on job reallocation in the Moroccan economy. This paper makes several innovative contributions. First of all, we explore the link between trade and job dynamics for a developing country, indeed the available evidence refer to Europe (Bentivogli and Pagano, 1999), USA (Davidson and Matusz, 2005) and transition countries (Konings at.all (2003). Secondly, we make an attempt to link the turnover literature to the employment growth one. This exercise is fundamental to better investigate the firm level heterogeneity that characterised job reallocation. The data derives from the Annual Industrial Census. The sample covers 4,762 enterprises and contains data for five macro-sectors for 1990 and 2002 in Morocco. The twenty sectors covered could be classified in five groups: clothing and textiles, food processing, chemicals and plastics, metallurgy, and electrical machines. One of the substantial advantages of this survey is that it contains extremely detailed information at the firm level. For each firm we have information on the sales, production, exports, and start-up data. In particular we have detailed information on labour supply for each firm, with employment divided by gender, skills and employment period. Following the Davis and Haltiwanger (1996)'s methodology, we compute the indexes of job creation and job destruction at sectoral level for temporary and permanent workers. Aggregating firm at sectoral level, we get the main indicators of job dynamics. Gross job creation (POS) is defined as the sum of the new places available through expansion of existing firms and creation of new establishments within the sector. Similarly, gross job destruction (NEG) is computed by adding up employment losses over shrinking and dying establishments within a sector. Adding up POS_{st} and NEG_{st} produces SUM_{st}, a measure of the gross job reallocation rate in sector s between t-1 and t. The statistical analysis put in light the simultaneous high job creation and job destruction at 2-digit level and the main role of "within sectors" job movement in explaining labour market dynamics. In order to investigate the within 2-digit sector dynamics, we analyse the turnover determinant both at the 4-digit and firm level. First of all, using a panel data approach., we regress the export and import shares on these indexes of job reallocation at 4-digit sectoral level, after controlling for other sector specific characteristics. Results show that increasing trade openness has a different impact on Moroccan labour market: while higher export orientation impact positively on job creation, increasing import dependency discourage new hiring. As a results, trade liberalisation impact on labour market stability by increasing the flow of job from importing to exporting sector. This result put in light the structural transformation that is characterising the Moroccan manufacturing sector. This change is in line with the classical theory of comparative advantages. Secondly , we estimate a labour demand function to capture the role of firm heterogeneity in explaining job dynamics. Results show that export orientation and productivity are the main determinant of firm labour decision.

The paper proceeds as follows. Section 2 provides a brief overview of the empirical evidence on trade and employment. Section 3 present the key features of the data, with a particular focus on the Moroccan economy structure and its openness. Section 4 analyses labour markets dynamics in the Moroccan economy. Following the Davis and Haltiwanger's methodology, we compute the indexes of job creation, job destruction, job reallocation and excess job reallocation at sectoral level. After presenting the estimation strategy, in Section 5 we regress the import and export shares on labour dynamics for permanent and temporary workers. In section 6, we investigate in deeper the heterogeneity feature of job reallocation by analysing the determinant of employment growth at firm level. In this section, we explore more carefully the different impact of trade and technological change using TFP as a proxy for the latter. Section 8 concludes.

2. Trade and Labour market: some stylised facts.

The available literature presents evidence for high rates of job turnover and suggests that looking at total levels of employment is likely to conceal important dynamics in the labour market and in the economic analysis (Davis and Haltiwanger, 1996). Indeed, job reallocation (as well as input and output reallocation) contributes significantly to aggregate productivity growth (Haltiwanger, 2000). Thought turnover workers move from high-cost firms to low-cost firms increasing the productive level of the economy. Moreover, trade increases the input reallocation by promoting the competition among firms and removing market distortion. Hence, it's interesting to analyse how trade impacts on labour reallocation and firm performance by changing turnover. Many empirical studies have attempted to explain this pattern. In these analyses, increased openness of economies has been put forward as one explanation for increasing gross job reallocation in the form of new hires, recalls, quits, displacements, temporary layoffs, and retirements. In particular, trade liberalisation will lead to labour reallocation, with jobs moving away from import-competing industries toward export industries.

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

The link between trade liberalisation and labour market dynamics has been exploited following three main methodologies: the input-output approach; the regression-based method that involves estimation of labour demand, turnover or production functions; and CGE-based methods. In particular, within the regression-based method we could identify two different trends which differ for the dependent variable. Indeed, the authors link the trade policy to the change in the general level of employment or the index of labour churning.

With regard to the first approach, the change in the employment level across sectors due to trade liberalisation is studied using *the market-clearing models of labour market*. Following this approach, Grossman (1987) analyse the impact of an increase of import competition on the U.S. labour market. The OLS-estimations show that job (or earning) losses in nine unskilled labour intensive US manufacturing sectors due to import competition were very small. The only exception is for the consumer electronics (radio/ television) sector, where employment was estimated to be some 70% lower than it would have been in the absence of import competition. Conversely, Freeman and Katz (1991) focus exclusively on the within-industries effect. They conclude that trade impacts on labour market outcomes in term of inter-sectoral changes in employment, but that domestic factors (demand for skilled labour, skill-biased technical change) were much more important drivers of job losses in the developed countries studied. Moreover, little impact of change in policy trade on wages was observed. Gaston and Trefler (1997) analyse the impact of the Canada-US Free Trade Agreement on employment and earnings in Canada. They provide evidence for the fact that the 1989-93 Canadian massive job losses were not primarily caused by the FTA. Instead, other factors (including fight against inflation) explain more than 85% of the job losses. The effect of FTA on Canadian labour market was analysed also by Beaulieu (2000), but he investigates whether change in tariffs affects skilled and unskilled workers differently. He finds that Canadian tariff reductions do not affect the earning of either non-production or production workers. However, change in employment level affects more non-production workers. When controlling for the endogeneity of tariffs through instrumental variable approach, estimation indicates that a 1 percent point decline in the Canadian tariffs rate lowers Canadian production employment by 3 per cent. These results are explained by the fact that the most protected industries prior to the FTA tariffs cuts were intensive in the use of less-skilled workers. Revenga (1992) using a panel data for manufacturing industries over the 1977-87 analyses the effect of an increase in import competition on wages and employment in the U.S. manufacturing sector. The wage and employment elasticities estimations suggest that labour is quite mobile across industries. It means that most of the adjustment to adverse trade shocks occurs through employment. Moreover, the 1980-85 exchange rate appreciation of the dollar reduced employment on average by 4.5-7.5 percent and wages by 1-2 percent in the sample of trade-impacted industries. Finally, from the comparison of the OLS and the 2SLS estimates, Revenga show that the OLS estimates of the import price elasticities seem to be significantly downward biased. Following Revenga considerations, this could explain why previous studies of the labour market effects of import competition have usually found weak results (see Mann (1984, quoted in Revenga (1992), and Branson and Love (1986, quoted in Revenga (1992)). Kletzer (2000) examine the relationship between increasing foreign competition and job displacement in the U.S. manufacturing during the period 1975-94. In this paper Kletzer present an empirical framework for examining the relationship between international trade and labour market that is a bit different from

the general model described above. Indeed, he links international trade directly to job displacement[1]. The results confirm the widespread idea that imports displace some domestic jobs. Across industries, there is some evidence that the risk of job loss increases as imports rise and\ or import prices falls. This relationship is strong and positive for sectors identified as import sensitive, such as footwear, leather products, radio and television, watches and clocks, and toys. Anyway, the overall relationship between increasing competition and permanent job loss is not strongly systematic. At the same time, in the cross-country specification, increasing foreign competition accounts for a small share of job displacement. Results do not change by correcting for industry fixed effects, in the within-industry estimates. Lang (1998) analyses the effects of trade liberalisation on wages and employment in New Zealand, with particular attention on labour market imperfections. The negative relationship between wage and protection is interpreted by Lang as a tendency for government to protect low-wage industries. Results show that trade liberalisation decreases employment in protected sectors, but the reallocation of workers among sector in the aftermath of tariffs reduction is in part offset by the increase in wages in protected industries. Lang concludes that protection has been an extremely expensive method for shifting employment across industries. Milner and Wright (1998) analyse labour market adjustment to trade liberalisation in Mauritius. They use a panel data for 25 manufacturing industries from 1968 to 1991. Results indicate that in the exportable sector, employment and wages increase in the long-run in response to trade liberalisation, but there is some evidence of wages decrease in the short run. In contrast with the theoretical predictions, employment and wages expand also in the importable sector in the aftermath of trade liberalisation, both in the short- and long-run. Milner and Wright attribute this phenomenon to Mauritius' overall strong economic performance. Indeed, it has been accompanied by general expansion of the economy and labour supply. As emphasised by Hoeckman and Winters (1995), Mauritius opened up via export promotion rather than import liberalisation and, according to Rodrik (1997) and Subramanian (2001), its success is mainly due to its institutions rather than its trade policy.

A second approach analyse the impact of trade on the labour market dynamic using the indexes of job reallocation as dependent variable in the estimation. Davis and Haltiwanger (1996)[2] and Dunne, Roberts and Samuelson (1989) suggested different indexes to capture the creation, destruction and reallocation of job at sectoral level, which are widely applied in the empirical work. Following this approach, Dewatripont, Sapir and Sekkat (1999) link import and export directly with job creation, job destruction and turnover using European labour market data. They mainly show no effect of trade with developing countries on job creation, job destruction and job reallocation in Europe. Bentivoglio and

[1] This work suffers of an important limitation. Displacement is just one of the flows that contribute to net changes in employment. As the literature suggests, it is likely that firms use all the components of turnover (quits and replacements hiring) in response to change in trade policy.

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

Pagano (1999), in their analysis on the effect of international trade with the newly industrialised Asian economies (Nies) on the labour markets of Germany, France, Italy and the United Kingdom, apply the methodology proposed by Dewatripont et.al (1999). They show that while job destruction is absolutely independent from trade flows with the emerging Asian economies, the evidence on job creation is less clear. In two cases imports appear to have depressed employment dynamics, but in another case exports turn out to have been beneficial. The most striking evidence is that on sector-specific features and individual characteristics, such as sector of (last) employment, sex and education: these variables appear to be much more important than trade in explaining individuals' positions in the labour market.

Levinsohn (1996) investigates the pattern of job creation and job destruction in the years following Chile's trade liberalization using the indexes of churning proposed by Davis and Haltiwanger (1996). He adopts both a parametric and a non-parametric approach to analyse the data. Results indicate that job turnover is somewhat higher among exportable than importable, and that both these sectors show higher turnover than non-tradable. Moreover, as firm size increased, job destruction rates almost monotonically decreased, while job creation rates don't change across size deciles. The real difference between firms of different sizes, then, is due to a difference in job destruction rates. Wacziarg and Wallack (2004) provide another example of the attempt to bring together the literature to job reallocation and the literature on the effects of trade liberalisation. Moreover, their paper is one of the few available works that analyses these patterns using a cross-country data set. Results show that liberalisation is followed by an unexpected reduction of intersectoral labour shifts at the economy-wide 1-digit level of disaggregation. Liberalisation has a weak positive effect in the 3-digit level, and this effect is small in magnitude and sensitive to minor changes in the definition of liberalisation or of the measures of sectoral shifts. Moreover, the Wacziag and Wallack analysis (2004) suggest that the policy environment affects the amount of labour reallocation. In particular, broad-based reforms that include domestic deregulation and privatisation have greater effects on intersectoral labour movements than trade reform in isolation. Baldwin, Dunne and Haltiwanger (1993) analyse the effect of trade on job creation and job loss for the manufacturing sector in Canada and the United States. In particular, exports are positively associated with job creation in Canada and the United States though this result primarily reflected variation across industries rather than changes over time. Indeed, when they analysis the dynamic across time, they found that in both countries increases in exports over time lead to lower job creation though the effect is only significant in the United States. In the United States, but not in Canada, exports are also associated with increased job losses. With regard to imports, Baldwin et al (1993) show that they are correlated with higher job creation and higher job losses in both countries. This is true in both the short and the long-run. From a dynamic point of view, increasing imports over time are associated with increased job losses in Canada but not in the United States. Davis, Haltiwanger and Schuh (1994) find that, in general, there are not distinct patterns in job creation and destruction

when industries were grouped according to import penetration and export share, except that in industries with high import penetration ratios, job loss was elevated. More recent evidence is provided by Konings, Kupets and Lehmann (2003) who investigate how relative openness of a sector impact on the creation and destruction of jobs at firm and sectoral level in Ukraine. In particular, they analyse the different impact of trade flows to the world at a large, to the EU and to the Commonwealth of Independent States (CIS). With regard to the manufacturing sector, they show that more import competition has a positive effect on employment growth without regards to the origin of trade flows. Contrary, only firms that export to the world at a large and the EU and are located in more export intensive sectors have higher employment growth rate. Also at sectoral level the trade flow origins matter. In particular, sectors that exports to the EU market and to the world at a large present higher job creation and lower job destruction. Conversely, imports competition from the CIS destroys fewer jobs at sectoral lever but do not increased job creation. Moreover, while export links to the EU have a positive effect on excess job reallocation rate, EU import exerts a negative one. Bruelhart, Murphy and Strolb (2004) analyse the link between intra-industry trade (IIT) and job turnover using a panel for Ireland. They find no relationship between the static IIT index (in the sense of the Grubel-Lloyd Index) and their intra-industry measure of excess job reallocation, computed following the Davis and Haltiwanger (1996) methodology. However, marginal IIT has a small positive effect on the reallocation of labour within an industry. These results are consistent with the theoretical framework and the empirical evidence in the labour literature which suggests that job moves within industries are less costly than flows between industries. Moreover they show that job turnover in the Ireland sector is positively related to the industry's openness to trade and negatively to the plant concentration ratio. Using different data sets on turnover in USA, Davidson and Masutz (2001) find strong evidence that exports decreases job destruction and workers separation rates. Weaker evidence suggests a positive correlation between exports and job acquisition. Conversely, the estimated coefficient of the deviation between period t and average turnover rates are small in magnitude, change signs under alternative specifications, and are statistically different than zero. This suggests that turnover is relatively insensitive to changes in exports and imports. Haltiwanger, Kugler A., Kugler M., Micco and Pages (2004) find that trade reforms have significant effects on the pace of job reallocation within sector among Latin American countries. Lowering tariff increases the pace of job reallocation, as well as real exchange rate appreciation. This result is consistent with the hypothesis that reforms improve allocative efficiency. However, such improvement is small and not without costs. Indeed, they find that a reduction in tariff is also associated with a decline in net employment growth.

Recent evidence using industry-level data show that not only trade policy changes but also dollar movements have had implication for labour-market outcomes in the U.S. industries. Moreover they match the market cleaning approach with the job turnover analysis. Indeed, the theoretical framework

is the same but these authors use the job reallocation indexes as dependent variable. Klein et.al (2003) analyse the impact of real exchange rate movements on gross job flows. From the estimation results, Klein et.all (2003) find strong evidence that movements in real exchange rates have statistically and economically important effects on both net and gross job flows, with the largest changes coming in the most open industries. Whether real exchange rate fluctuations primarily affect net or gross flows seems to depend on whether the fluctuation occurs in the trend or cyclical part of the real exchange rate. Movements in trend real exchange rates significantly affect both job creation and destruction in the same direction by similar magnitudes, thus they have large allocative effects but no effect on net employment growth. In contrast, an appreciation of the cyclical component of real exchange rates increases job destruction but has little effect on job creation, thus it reduces net employment growth but has no other allocative effects. Gourinchas (1999) evaluates the impact of exchange rate fluctuations on inter- and intrasectoral job reallocation among French industries. Estimations show that traded-sector industries are very responsive to real exchange rate movements. In the benchmark estimation, a 1% appreciation of the real exchange rate destroys 0.95% of tradable jobs over the next two years. This variation in net employment is brought about through a simultaneous increase in job destruction and decrease in job creation of 0.24% and 0.71%, respectively. Unlike the US data, French job destruction does not appear systematically more volatile than job creation, except possibly for non-traded sectors. Moreover, import-competing industries appear more responsive, both in magnitude and timing, than exporters. Using a similar approach, Gourinchas (1998) investigate the effect of real exchange rate movements on net and gross job reallocation in the U.S. manufacturing sector. They use four-digit level data for the period 1972-1988. Using a 2SLS estimation, with growth rate of military expenditure used as instrumental variable, they find that a 10% appreciation of the real exchange rate causes a 0.27% contraction in tradable employment. This contraction is due to a simultaneous destruction of 0.44% and creation of 0.17% of tradable jobs. Conversely, currency depreciation does not display much job churning.

Finally some authors study the effect of trade reform on the transition probability of employment into other sectors and unemployment. Goldberg, Tracy and Aaronson (1999) explore the link between movements in exchange rates and employment adjustment using a probit-model.: The results suggest that switches in exchange rate, and mostly dollar appreciations, increase job reallocation. However, these results are not systematic for all industries and over time. Rather, they document that dollar impacts are concentrated in specific sectors and the effect depends on whether dollar movement arise through the export or import channel. Moreover, results indicate that exchange-rate movements have larger relative effects on the probability that a worker switches industries than on the probability that a worker change jobs. (OR results indicate that exchange-rate movements have larger relative effects on across-industry than between-industry job reallocation). Finally, Goldberg et.al. show that in many

sectors the job reallocation across industry (industry attachment) is more affected by dollar appreciations than by dollar depreciations. Using a survey on Austrian male workers, Egger, Pfaffermayr and Weber (2003) show that an increase in imports, terms of trade and in the share of outsourcing negatively affect the probability of staying in (or changing into) the manufacturing sector. These effects are more accentuate for industries with a comparative disadvantages (net importing industries).

The available literature suggest that international factors (whether defined: tariff reduction, export and import competition, exchange rate fluctuation, outsourcing, change in term of trades) are important for labour market dynamic both in term of labour turnover or changes in employment level. In particular, while import competition seems decreasing job reallocation, export has a positive effect. Moreover, these patterns are not uniform in a given country but depend on the geographical origin and destination of the trade flows.

3. The Moroccan policy environment

Following independence in 1956, Morocco's development strategy was primarily based on import-substituting industrialisation and agricultural self-sufficiency in a highly protected domestic market. The trade reforms started in Morocco during the 1980s. As a result of pressure due to a payment crisis in 1983, Morocco virtually eliminated quantitative restrictions on imports and reduced maximum tariffs from 165% to 45% over a 6-year period. The major accomplishment of the tariff reform was to reduce the dispersion in tariff protection within the manufacturing sector. Average import penetration increased only slightly, in part due to domestic contraction combined with the devaluation (Currie and Hanson, 1999). Nevertheless, in the 1990s Morocco was still far from an open economy. An important contribution to the Moroccan liberalisation process has come from the multilateral and regional trade agreements, signed with different partners since the middle of 1990s.

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

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

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

Table 1: Moroccan Tariffs

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

Source: Trains database

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

In addition to the above there have been a range of other reform initiatives. These include a privatisation process launched in the late 1980s and which largely focussed on hotels, road transport, petroleum distribution, petrochemicals, housing, textiles, cement and subsequently power generation,

oil refining and telecommunications; a reform of the business environment and the judiciary, as well as a revamped labour code and labour legislation in 2003. The Moroccan dirham is set with respect to an (undisclosed) basket of currencies and policy has typically favoured a strong exchange rate, which has caused some difficulties for exporters. Despite the policy initiatives the period of the 1990's and early 2000's has witnessed low growth in the Moroccan economy, and rising unemployment exacerbated by the underlying demographic conditions.

4. Data overview

The data for this paper are derived from the Moroccan Annual Industrial Census, which is based on the Moroccan industrial classification and divides manufacturing into 20 sectors (as listed in Table 2). After the cleaning process due to a number of data irregularities, we get a non-balanced panel data set with 10,058 enterprises and a total of 90,522 observations over the period 1994-2002. An important feature of the data is that it contains extremely detailed information at the firm level. For example, for each firm we have information on sales, production, exports, and start-up data, as well as information on the labour supply for each firm, with employment divided by employment status, gender, and skills[3].

Table 2: Summary Industry Data

		Sector Share in Total			Sector Share in Total Sales		
Sector Code	**Sector**	**1995**	**2002**	**% Change**	**1995**	**2002**	**% Change**
15	Food and beverages	22.83	29.58	0.23	32.1	33.5	4.3
17	Textiles	15.77	7.05	-1.24	9.6	5.9	-38.5
18	Clothing	21.07	24.18	0.13	5.5	9.2	65.7
19	Leather and footwear	2.64	3.09	0.14	1.5	1.5	1.2
20	Wood and wood productc	2.15	2.09	-0.03	1.6	1.9	14.0
21	Paper and paper products	2.09	1.54	-0.36	3.5	2.3	-34.8
22	Printing and publishing	1.63	1.08	-0.5	1.2	1.3	13.8
24	Chemicals	8.91	8.31	-0.07	17.7	15.1	-14.8
25	Rubber and plastic	2.68	2.99	0.1	2.6	3.2	21.2
26	Non-metallic mineral products	7.72	4.39	-0.76	7.1	7.9	12.2
27	Metallurgy	0.61	1.02	0.4	2.1	2.6	21.8
28	Metal products	4.9	3.91	-0.25	6.8	3.7	-45.6
29	Machines and equipment	1.66	0.88	-0.88	1.7	1.5	-13.0
30	Office machinery	0.33	0		0.1	0.0	-99.5
31	Electrical machinery	1.48	2.37	0.38	2.0	3.5	79.1
32	Radio, TV & telecom equipment	0.15	3.55	0.96	0.4	0.7	68.9
33	Precision instruments	0.11	0.13	0.13	0.1	0.1	139.9
34	Vehicles	2.35	1.8	-0.31	3.4	4.5	32.6
35	Other transport	0.31	0.56	0.45	0.4	0.3	-27.2
36	Furniture, manuf. n.e.s.	0.61	1.48	0.59	0.5	1.2	159.1

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

Table 2 provides some summary information on the basis of the cleaned data set on the share of each industry in employment and sales. From the table, it can be seen that there are a few industries, which dominate the Moroccan economy. In terms of employment the key industries in both 1996 and 2002 were Food and Beverages, textiles, and clothing, with shares in total employment of 22.8%, 15.7% and 21.07% respectively. Over the 8 years period of our sample the share of Food and Beverages increased to 29.58, and that of clothing to 24.18%. In contrast the share of textiles declined to 7.05%. In the majority of cases, the variation in the level of employment matches the variation in the number of firms. This suggests that increasing importance of some sectors in the Moroccan economy is driven both by the expansion of existing firms and the entrance of new one. The employment shares are large reflected in the sales and export shares (Table 3).

Table 3: Sector Share in term of Export and Import

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

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

One notable difference is with regard to Chemicals, which had employment shares of only 8.91% and 8.31% in 1995 and 2002 respectively, but with considerably higher sales shares (17.7% in 1995, and 15.1% in 2002), export shares (25.9%, 21%) and import share (20.23%, 14.07% respectively). However, it reports a sharp decrease in its openness degree over the period. The clothing sector plays an important role in the Moroccan export and registered a large increase in its export shares over the

period, moving from 21.94% in 1996 to 30.92% in 2002. Moreover, the import shares in this sector are the lower of the Moroccan economy. Worth noting is the sharp increase in the export share reported by the Machinery and Electronic Apparels sectors (industry 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 the export shares were experienced by Textiles sector, which was counterbalanced by a small increase in the import share. Finally, the incidence of foreign goods in the Machine and Equipment, Automobile and Metallurgic sectors is considerable. We can conclude that while the Moroccan exports are dominated by few important sectors, the imports are much more diversified. Since we have data on sales, we could compute a more accurate openness index, $Export\_share_{jt} = Export_{jt}/Sales_{jt}$

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

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

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

		$Export_{it}$/ $Sales_{jt}$		**$Import_{it}$/ $Sales_{jt}$**	
Sector Code	**Sector Description**	**1995**	**2002**	**1995**	**2002**
15	Food and beverages	0.14	0.16	0.1	0.09
17	Textiles	0.44	0.30	0.23	0.34
18	Clothing	0.90	0.90	0.03	0.02
19	Leather and footwear	0.59	0.54	0.14	0.18
20	Wood and wood productc	0.35	0.23	0.11	0.13
21	Paper and paper products	0.15	0.19	0.13	0.25
22	Printing and publishing	0.00	0.00	0.02	0.05
24	Chemicals	0.43	0.44	0.36	0.33
25	Rubber and plastic	0.10	0.07	0.35	0.34
26	Non-metallic mineral products	0.03	0.04	0.15	0.17
27	Metallurgy	0.16	0.25	0.71	0.58
28	Metal products	0.06	0.12	0.24	0.4
29	Machines and equipment	0.02	0.05	0.44	0.67
30	Office machinery	0.37	N.A.	0.88	
31	Electrical machinery	0.12	0.52	0.54	0.42
32	Radio, TV & telecom equipment	0.80	0.95	0.53	0.7
33	Precision instruments	0.56	0.08	0.78	0.96
34	Vehicles	0.21	0.11	0.34	0.57
35	Other Transports	0.22	0.16	0.34	0.65
37	Furniture, manuf. n.e.s.	0.14	0.16	0.1	0.09

As Table 4 suggest, sectors that weight more on the trade balance, export a large share of their output, except for "Food and Beverage". Moreover, the Leather, the Watches and Telecommunication sectors

account for a small share of total export but sell abroad more than half of their output[4]. With regard to import, the picture that we get using this openness index is quite different. Not surprising, the main sector 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. This results are coherent with the Moroccan specialisation patter.

5. Employment growth and turnover in the Moroccan labour market

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

5.1 Employment Growth

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

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

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

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

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

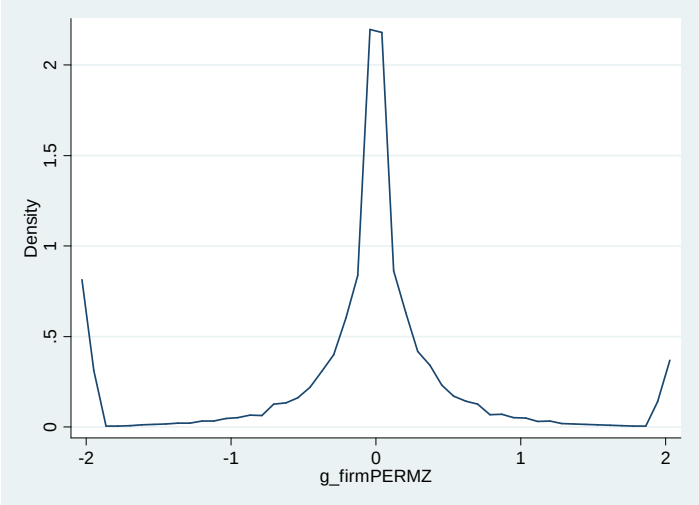
Figure 1 gives a summary overview by depicting the empirical density of growth rates for all firms. What emerges from the figures is that the majority of firms have null or negligible growth rates during the sample period[5]. Moreover, overall in the sample the levels of exit are higher than the entry. This feature is due by the data set feature that underestimates entry. Indeed, while we can capture correctly

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

[5] 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 base of start-up and exit.

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

Figure 1: The empirical distribution of employment growth rates



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

5.2 Job Reallocation and its determinants: a sectoral level analysis

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

Job creation is defined as the sum of the new places available through the expansion of existing firms and the creation of new establishments within the sector; and job destruction is derived by adding up

employment losses over shrinking and dying establishments within a sector. These are then expressed as rates by dividing by the average size of the sector between *t* and *t-1*, X_{st}:

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

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

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 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. There are several messages, which emerge from the table. 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[6]. In 1998 the net rate fell to -0.023, while there was job creation of about 9% and 25% of jobs were reallocated. Hence while on average and in aggregate it might appear that there is little change in the Moroccan labour market (a conclusion which perhaps could also be drawn by looking at the growth rate calculations in the preceding section), in reality there is considerable movement and change. Here, it is also worth noting that the magnitude of turnover in Morocco is similar to that found by Levinsohn (1999) for Chile, Davis and Haltiwanger (1996) for USA, Konings et.al (2003) for Ukraine, Stiglbauer et.all (2002) for Austria and slightly lower than the value for Latin American countries (Kugler et.al, 2004).

[6] 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.

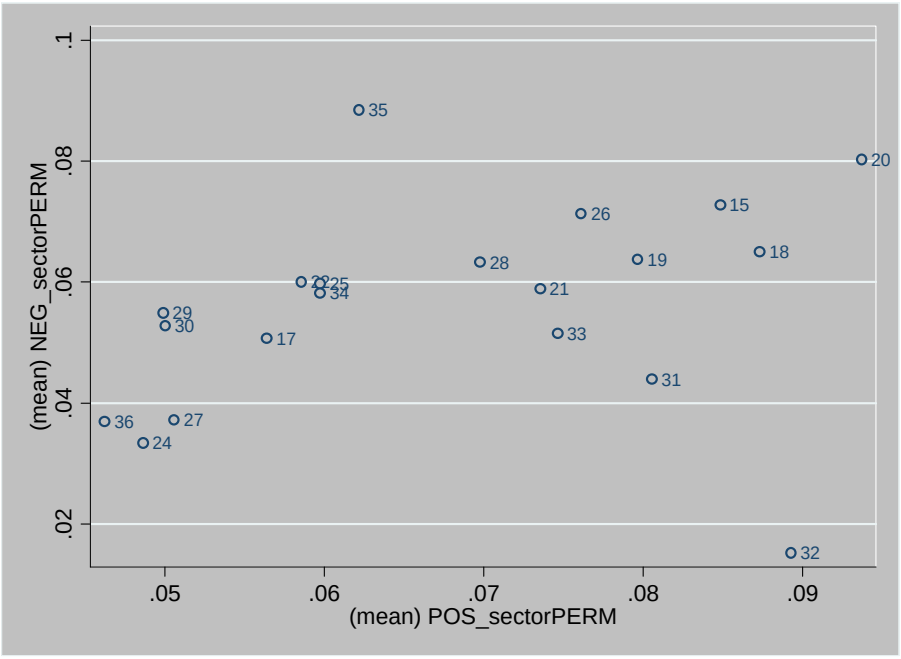
Table 5: Job Creation, Job Destruction and Job Reallocation by Sector (weighted average)

	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

Secondly if we include entry and exit firms we see that turnover (as well as job creation and job destruction, but the value are not reported in Table 5) are typically higher which not surprisingly suggests greater stability than in continuing firms. However, entry and exit account for a small share of total job creation and job destruction, respectively. This suggests that turnover is better explained looking at the expansion and contraction dynamics of continuing firms. Thirdly, there is little evidence of any change in the indices over time[7]. Hence, although this was a period of some trade policy change, as well as other changes in the policy environment with regard to the aggregate data there is little evidence of direct impact on the labour market as a result of these changes in policy. This was also confirmed by a set of regressions which failed to capture a significant structural break with regard to these indices. These results suggest that the higher standard deviation in job flows that characterised the Moroccan labour market, respect to USA, Austria and Ukraine, are mainly due to variation across sectors. The simultaneous high level of job creation and job destruction are reported also in Figure 2, which shows the average annual job creation and job destruction for 20 sectors. Food and Beverage, Clothing, Leather and Footwear, Wood and non-metallic mineral product present the higher level of turnover. The lowest one is in the Chemical, Metallurgy sectors.

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

Figure 2: Annual Average Rate of Job Creation and Job Destruction for 20 sectors.



5.3 Job reallocation

The results in the previous section show a significant amount of simultaneous job creation and destruction, considerable job-reallocation and a lot of variation across sectors. In this section we focus on the ability of each sector and of the whole economy to replace and destroyed jobs. In the literature this phenomenon is known as "churning". This is captured using the rate of *excess* job reallocation, i.e. the difference between total job reallocation (SUM) and the absolute value of the net job reallocation (NET) for each sector. Adapting the DH index at sectoral level, we get:

$$EXCESS_s = \sum_i sum_i - \left| \sum_i net_i \right|$$

where *s* represent the sector and *i* the single firm. In its form proposed by DH the bounds of EXCESS = 2*n*, where *n* is the number of sectors in the economy. For this table we have weighted sum and net by the share of each sector in production, such that the index is here bounded between 0 and 2. The higher is the value of EXCESS the higher is the level of *simultaneous* job creation and job destruction. This is not captured by NET, for this will be zero when POS and NEG are equal and both high, or when they are both low.

Table 6 calculates excess by sector over the years of the sample. From this we see that simultaneous job creation and job destruction is an important phenomenon in all sectors. While the average value of excess job reallocation is 10%, it varies from 24% to 4% across sector. In particular, the TV and radio equipment industry is characterised by the lowest level of churning (4%) while Food and Beverages is

characterised by the highest level of churning. Interestingly Chemicals has a low level of churning. This could be explained by the sector's maturity and possibly lack of flexibility.

Table 6: Excess Job Reallocation by Sectors.

	Excess = SUM -|NET|		
Sector	**Code**	**Mean**	**St.Dev**
Food and beverages	15	0.243	0.038
Textiles	17	0.126	0.059
Clothing	18	0.149	0.05
Leather and footwear	19	0.118	0.041
Wood and wood productc	20	0.129	0.053
Paper and paper products	21	0.124	0.072
Printing and publishing	22	0.106	0.056
Chemicals	24	0.079	0.084
Rubber and plastic	25	0.089	0.053
Non-metallic mineral products	26	0.126	0.07
Metallurgy	27	0.042	0.073
Metal products	28	0.148	0.059
Machines and equipment	29	0.077	0.06
Office machinery	30	0.022	0.031
Electrical machinery	31	0.138	0.126
Radio, TV & telecom equipment	32	0.028	0.046
Precision instruments	33	0.046	0.048
Vehicles	34	0.079	0.058
Other transporet	35	0.074	0.05
Furniture, manuf. n.e.s.	36	0.067	0.067

The DH methodology also allows us to 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:

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

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

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 gives the fraction of excess job reallocation due to employment shifts between and within sectors over the 1995-2002 period[8]. EXCESS is in range [0; 2*N°sectors]. First of all, the magnitude of excess, between and within job reallocation indexes is frequently lower for continuing firms than for the entire sample. Secondly, in all years simultaneous job creation and job destruction *within* industries accounts for the vast majority of total turnover (80% on average). However

[8] 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.

these results are strictly dependent on the criteria for sector classification. Moving from the 2-digit classification to the 4-digit one (Table 8), we immediately see an increase in the between contribution but it never exceeds the 50%.

**********ADD comparison with D&H!!!!!!!

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

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

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

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

The striking message of these tables is that excess job reallocation plays a small role in explaining between-sector employment shifts across all years. As a result, the vast majority of excess job reallocation is within sectors and is linked to firm level heterogeneity. This result results could indicate that there are simultaneous economy-wide macro shocks that dominate and offset the impact of trade liberalisation (Levinsohn, 1999). Indeed, between 1990 and 2002, Moroccan economy is shocked not only from the trade liberalisation process, but from a set of policy aimed at increase the country's competitiveness, such as privatisation and financial reforms. Finally, the small contribution of between reallocation to churning confirms the analysis of Roberts (1995) for Morocco. A similar phenomenon has been observed also in the U.S plant-level data (Davis and Haltiwanger, 1992) and in the Chilean manufacturing sector (Levinsohn, 1999 and Roberts, 19995).

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

In the previous section we emphasize the simultaneous importance of high job creation and job destruction at sectoral level and the overwhelming importance of within-sector determinants of job reallocation. In this section, we analyse the "within-2 digit-sector" heterogeneity at two stages: the 4-digit sectoral and the firm level. The aim is to understand how trade openness and technological change impact on the Moroccan labour market dynamics. The 4-digit analysis allows us to investigate the

determinants of job turnover within sector linking directly job flow indexes, sectoral level variables and macro shocks. Particular attention is reserved to the different impact of trade and technological change on the two components of turnover: job creation and job destruction. Being able to disentangle the impact of these key variables on job creation and destruction flows is extremely important for calculating the welfare costs of labour adjustment (Klein et.al, 2003). Indeed, the welfare implication of a decrease in job creation or an increase in job destruction could be very different also if the net impact is the same. Davis et.al (1996) shows 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 the accumulation of human capital. These adjustments are likely to have lesser impacts on workers and welfare (Klein et. al, 2003), al least in the short run. Since job turnover indexes could be computed only at the aggregate level (a single firm or create or destroy jobs in one year), to examine more in deep the heterogeneity feature of job turnover we should follow a slightly different approach and move from the job turnover literature to the labour demand one. The link between the two frameworks is straightforward since firm-level employment decisions (in the form of employment growth rate) are the base-unit for the job flow indexes computation. Using data at firm level over the period 1994-2002 we can examine how firm and sectoral level characteristics, as well as macro shocks, impact on employment dynamics. At this stage, we explore more carefully the different impact of trade and technological change on employment growth and, consequently, on turnover.

6.1 The 4-digit analysis

6.1.1. the Theoretical Framework

The empirical analysis in this section follows the general approach taken by different authors (see for example Beaulieu (2000), Gaston and Trefler (1997) to measure the impact of trade liberalisation on employment by estimating the reduced-form equation derived from the general model of labour market equilibrium. This has become a standard approach for investigating the effect of international trade on labour markets. This approach is based on the Revenga's (1992) simple structural model of the labour market. Labour demand in industry i for year t (L_{it}), specified in first-difference form, is given by the equation (6.1):

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

where Δ is the first differences operator (e.g. $\Delta Y_{jt} = Y_{jt} - Y_{jt-1}$);Dit 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 labour demand shocks.

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

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

where H_{jt} is a vector of labour supply determinant and μ_{jt} is an error term reflecting unobserved labour supply shocks.

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

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

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

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

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

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

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

This approach has been widely used in the literature but, owing to the methodology implemented, these analysis put in light change in the level of employment across sector and do not consider job reallocation. However, since variation in employment (ΔL_{jt}) could be decomposed in variation in job creation and destruction of jobs, we use as dependent variable the job flow indexes. A similar approach is followed by Klein et.al. (2003). Moreover, we will estimate equation (6.6) using variables in level and adopting a fixed effect estimator. The estimation function becomes:

$$\ln L_{jt} = \beta_j + \beta_1 X_t + \beta_2 Z_{jt} + \beta_3 T_{jt} + \varepsilon_{jt} \tag{6.7}$$

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

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

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})}.

In this specification, the vector T_{jt} contains the sectoral trade orientation variables that are computed as the ratio of total export (exp_share_j) and total import (imp_share_j) on sales for each sector. Following the literature, we expect that more involvement in international trade would create more instability in the labour market, i.e increase turnover (Davis and Haltiwanger (1996), Gourinchas (1998), Klein et all (2003). In particular, we would expect a negative effect of final-good import on net employment since higher competition on domestic market could hurt national firms, which reacts by cutting costs and shirking their labour force (reduce job creation and increase job destruction). However, if increased import penetration is in intermediate goods, this can make firms more competitive and thus increase job creation. The net effect on employment could be ambiguous. On the other side, greater export orientation should boost job creation and decrease (or keep constant) job destruction. From a dynamic point of view[9], if a firm its share on the foreign market, it means that it's performing very well. Hence it's reasonable an increase in its size, particularly if it deals in labour intensive goods (like the clothing and textile sectors)[10]. Moreover, the positive effect of export on labour market could also be driven by the "inshoring effect". European firms relocate different stages of their production process in Morocco, mainly in the textile sector, to take advantage of the lower factor prices. Hence, exports from Morocco to the EU include not only final goods but also intermediate goods, in this way trade openness with Europe have a double positive effect on exports. However, since the Moroccan labour market regulation is particularly comprehensive and rather restrictive about the firing procedures for the private sector workforce, it's possible that this feature could impact on the significance of regressors. The choice of the time-vaying sector regressors included in Z_{jt} is base on the literature. We add among the regressor the Herfindal index ($Herf\_Index_j$), which capture the market structure of each sector[11]. Nickell (1999) provides a theoretical intuition of the positive effect that an increase in labour market competition would have on labour demand. Indeed, in his model, the external shifts of the labour demand curve, derives from the modification of firms pricing behaviour when competition become stronger. In addition to this direct effect, Boeri et.al. (2000) and Nicoretti et.al (2000) evidence an indirect effect on labour market operation: increased competition on the product market may be associated with stronger turnover. Hence, we expect a negative sign for the Herfindal index. Moreover, as the theoretical framework (Evans, 1987) and the available evidence (Koning et. al. (2003), Stilgbauer et.al (2002)) show, firm size matters in the analysis of job reallocation. In particular, size is inversely related to instability: small firms present lower turnover than the large one. Hence, we control also for

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

[10] 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.

[11] Herfindahl Index is computed on the base of firm sales.

the average size of firm ($lag\_AV\_size_j$) in each sector, computed on the base of total employment, and we expect a negative sign of its coefficient. We introduce the lagged value to avoid endogeneity problems. Investment share[12] (inv_ca_j), labour productivity[13] ($labour\_prod_j$) and skill share (*skill_share*) are introduced as "crude" indicators of technological change. In particular, higher investment share as well as higher productivity level should decrease job creation and increase job destruction if firms invest in labour-saving technology, vice versa in case of labour-using innovation. In both case, it's important to discern between the short- and the long-run effect. In the short run, without regards to the direction of technological bias, as a firm become more productive, it doesn't need to hire more workers as it expands. Higher productivity implies some adjustment costs. However, in the long run, this increase in productivity makes firms more competitive. As a result, they will expand output and employment more than it otherwise would. If the technology is labour-intensive it implies a general increase in labour demand, if it's capital driven, the labour demand would be biased in favour of more skilled workers. Hence there are potentially two effect here impacting on the labour market: the adjustment cost – increase in productivity reduces labour demand in the short run- and a long-run benefit –increase in efficienty rises output and creates new jobs. These variables allow us to investigate the different impact on employment of trade and technological change on labour market dynamics (Acemoglu, 2003). Following the Jovanovic's (1982) life-style model, we examine how age influence on job reallocation. Jovanovic show 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 average firm age variable (AV_age_j). Finally, we examine whether difference in turnover could be explained by difference in workers composition. The labour market literature (Eherenberg and Smith, 2003). and the scarce evidence (Levinsohn, 1996) suggest that job reallocation is higher for female ($Female\_Share_j$) workers. As a result, we would expect a positive sign of their coefficient.

The vector of time-varying regressors common to all sectors is substitute with the year dummies vectors that control for macro shocks.

Finally, lagged value of JC_{jt} and JD_{jt} are added to the regressors to account for possible dynamics adjustment.

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

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

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
exp_share	812	0.19	0.27	0	1
imp_share	624	0.37	0.30	0	1
female_male	723	0.75	4.31	0	100.25
skill_unskill	653	0.31	0.20	0	1.46
AV_FirmSize_RS	812	0.90	1.34	0.02	10.15
AV_age	812	18.36	9.78	0	62
va_TotEmpl_RS	747	3.27	7.46	-0.36	106.27
inv_ca	812	0.09	0.18	0	3.72
Herf_index	812	0.33	0.30	0.00	1

6.1.2 Estimation Methodology

Since my 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. Hence, 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. Hence the pooled OLS model yields biased and inconsistent estimates of the regression parameters. This is an omission variables bias due to the fact that 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 where sectoral and time dummies are assumed to be fixed parameters to be estimated. Finally, in the latter specifications, where we control also for possible dynamic adjustment. First of all we verify if job creation is influence by the lagged value of job destruction; viceversa for job destruction. In this way we avoid the estimation problems of a dynamic panel. However, as a robust check on the dynamics significance, we introduce among the regressors the lagged dependent variable and we follow the Generalized Method of Moments (GMM) estimator approach suggested by Arellano and Bond (1991). This approach takes the model in first differences and exploits all available linear orthogonality conditions. It is widely used in the dynamics panel data applications. Moreover, as suggest by Blundell and Bond (1998), the presence of near unit root in the series make weak the instruments utilised in the GMM Arellano-Bond estimation and bias its estimator. To correct for this problem, we apply the system GMM estimator that

combines equation in first-differences with equation in levels to exploit a larger set of moment conditions. In each specification, the variance-covariance matrix is corrected for heteroschedasticity using the White-Huber sandwich estimators.

Different authors estimate the labour market function using the first-difference estimator. We prefer the fixed-effect approach for two main reasons. Application of OLS to the first differences model produces unbiased and consistent estimator of coefficients but the error process is now a moving-average and this may present problem in estimation. Moreover, given the assumption of i.i.d. errors, the first-difference estimator is less efficient than the within estimator for $T>2$ (Cameron and Trivedi, 2005).

6.1.3 Results

Table 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 openness greatly impact on the Moroccan labour market. Indeed, while an increase in export orientation increases turnover by rising job creation (Table 8), an increase in import decrease turnover through a negative impact on job creation. However, this last result is not robust to different specification. In particular, a 10 percentage point increase in export share increase job turnover by 0.25 percent, on average and ceteris paribus. On the other side, a 10 percentage point increase in import decrease turnover by 0.22 percent, on average and ceteris paribus. The net effect of trade liberalisation on the Moroccan labour market stability is really small but it varies considerably across sectors. Trade openness variables are never significant for job destruction, this could be explained by the strict labour market regulation of Morocco, that is particularly rigid on firing procedures.

When we control for labour productivity, we can see that technological change damage the Moroccan labour market. Indeed, also of it doesn't change job stability, it decrease the net employment level by worsening the hiring and firing opportunities. In particular, a 10 percentage point increase in labour productivity implies a 0.38 percent decline in hiring, on average and ceteris paribus, i.e. technological change is based on adoption of labour-saving technology. This result shows that technological change and export orientation exert an opposite impact on the labour market, and the latter is greater. Following, the Hecksher-Ohlin theorem, since Morocco is labour-intensive we would expect that sector more involved in international trade are the labour intensive one (Clothing and Textile). As a result, increase in trade openness would favour job creation in these sectors and this positive effect is not cancel out by the technological upgrading that is necessary to survive in the foreign markets. However, we return on this trade-off with a more detailed analysis the next section. The negative impact of technological change on labour market is confirmed in Table 12: a 10 percentage point

increase in labour productivity rises job destruction by 0.41 percent. This is echoed by the positive coefficient of skill share[14]. However, the other proxy of technological change (inv_ca) is never significant.

Another important determinant of job turnover in Morocco is the average firm size. In line with the theoretical framework, the negative sign of this 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. The higher elasticity of hiring to variation in the average size confirms the impact of a strict firing procedure on the job flows dynamics. Comparing the average size coefficient with the export share one, we can see that this two dimension have an opposite effect on turnover. It's commonly accepted in the literature (Bernard and Jensen (1996),) that exporter firm are usually larger than non exporter. Hence the opposite effect that size and export orientation have on turnover diverse particular attention to better understand the impact of trade liberalisation on labour market. From this analysis, we can see that the negative impact on job stability due to an increase in trade orientation is partially cancel out by the positive one due to an increase in size. The elasticity are 0.21 and 0.19 respectively, on average and ceteris paribus. However, the greater stability linked to an increase in the average size is not costless: creation of new job is more sensible to the negative effect of a variation in size than the positive one due to change in export orientation[15].

On the other side, market structure and average firm age are not relevant in explain difference in turnover. The non-significance of female share could be explained by the low share of this workers on total employment[16].

Finally, we control for possible dynamic adjustments. The last column of Table 11 and 12 show a strong influence of past job flows on hiring and firing that doesn't change the significance of the other variables. As we can see comparing the elasticities, job creation is more reactive to change in job destruction than the opposite way. Indeed the elasticity are 0.036 and 0.014, respectively[17]. This result could be interpreted as a positive signal for the Moroccan labour market, since job destroyed are replaced by new jobs. On the other side, it supports the idea that the strict Moroccan firing procedure impede a quick adjustment and could bring to an inefficient job allocation. The higher labour market responsiveness to job destruction is confirmed by the positive and significant coefficient of lagged job destruction in the turnover regression (Table 10). The strong significance of lagged values of job creation and job destruction indicates also that idiosyncratic factors within industries explain most of

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

[15] For a more detailed analysis of the link between turnover and size and the trade off between size and export status, see chapter 3.

[16] However, adding among the regressors the female share to analyse whether turnover differ by gender is a weak procedure. For a better discussion on this topic, see the analysis in chapter 3.

[17] The higher reaction of job creation is confirmed also by the dynamics regression, not reported here.

the variation of costly employment adjustment. The evidence is in line with the analysis of real business cycle of Davis et al (1996).

From this analysis is evident the opposite effect of increasing export and import on labour market and the consequent flow of jobs from importing to exporting sector. This shift is in line with the comparative advantage theory and the consequent impact of trade on the manufacturing structure. As expected, greater export orientation push job creation reflecting both the specialisation patter of the Moroccan economy towards labour intensive sectors and the positive effect of trade on firm performance. On the other side, greater import penetration hurts Moroccan firms that react by lowering the creation of new jobs. Adjustment to trade and idiosyncratic shocks through an increase in job destruction is impede by the strict firing procedure.

Quite surprising is the job flows from more productive to less productive sectors. This trend could suggest an inefficient allocation of workers among sectors and the adoption of labour saving technique to improve firm profitability. This analysis put in evidence the important role of trade and productivity in explaining the movement of jobs between 4-digit sectors (that account for almost 50% of total movement). In order to investigate the determinant of the other part, we move to the firm level analysis.

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

Job Turnover (SUM)					
	LSDV_1	LSDV_2	LSDV_3	LSDV_4	LSDV_5
exp_share	0.135	0.157	0.181	0.181	0.219
	(2.21)**	(2.50)**	(2.37)**	(2.38)**	(2.82)***
imp_share	-0.051	-0.071	-0.097	-0.098	-0.057
	(1.53)	(2.10)**	(2.06)**	(2.08)**	(1.24)
va_TotEmpl_RS		0.001	0.001	0.001	0.001
		(0.05)	(0.1)	(0.11)	(0.29)
L.AV_FirmSize_RS			-0.034	-0.034	-0.034
			(1.71)*	(1.70)*	(1.55)
AV_age			0.001	0.001	0.001
			(0.58)	(0.6)	(0.45)
Herf_index			0.067	0.068	0.041
			(0.83)	(0.82)	(0.54)
inv_ca			0.002	0.001	0.004
			(0.02)	(0.02)	(0.05)
skill_share				0.012	-0.032
				(0.14)	(0.33)
Femm_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
exp_share	0.136	0.146	0.158	0.166	0.193
	(2.09)**	(2.10)**	(1.93)*	(1.91)*	(2.09)**
imp_share	-0.058	-0.045	-0.078	-0.087	-0.061
	(2.08)**	(1.38)	(1.98)**	(2.18)**	(1.39)
va_TotEmpl_RS		-0.001	-0.001	-0.001	-0.001
		(2.27)**	(1.98)**	(1.81)**	(1.84)*
L.AV_FirmSize_RS			-0.039	-0.037	-0.04
			(2.30)**	(2.24)**	(1.76)*
AV_age			-0.002	-0.002	-0.003
			(1.56)	(1.29)	(0.24)
Herf_index			0.056	0.067	0.039
			(0.71)	(0.82)	(0.56)
inv_ca			0.054	0.055	0.062
			(0.77)	(0.79)	(0.85)
skill_share				-0.126	-0.19
				(1.4)	(1.77)*
Femm_share				0.025	0.025
				(0.69)	(0.65)
Lag_JobDestruction					0.444
					(3.64)***
Lag JobCreation					
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	
Sargan_HansenTest					
AR_1					
AR_2					
Wald Test:Prob>chi2					

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
exp_share	-0.001	0.011	0.051	0.043	0.047
	(0.02)	(0.25)	(1.12)	(0.97)	(1.09)
imp_share	0.007	-0.026	-0.035	-0.029	0.001
	(0.23)	(0.93)	(1.26)	(1.06)	(0.04)
va_TotEmpl_RS		0.001	0.001	0.001	0.001
		(1.95)*	(1.95)**	(1.84)*	(1.73)*
AV_FirmSize_RS			0.01	0.01	0.049
			(2.02)**	(1.99)***	(0.90)
AV_age			0.019	0.003	0.001
			(1.54)	(1.35)	(1.17)
Herf_index			0.011	0.001	0.001
			(0.31)	(0.02)	(0.01)
inv_ca			-0.052	-0.054	-0.115)
			(1.01)	(1.05)	(2.11)**
skill_share				0.142	0.139
				(1.97)**	(1.79)*
Femm_share				-0.012	-0.026
				(0.54)	(1.1)
Lag_Job Creation					0.164
					(2.30)***
1Lag Job Destruction					
2Lag Job Destruction					
3Lag Job Destruction					
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	
Sargan_HansenTest					
AR_1					
AR_2					
Wald Test:Prob>chi2					

Absolute value of t statistics in parentheses

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

6.2 The firm level analysis

6.2.1. The Theoretical framework

In order to capture the impact of trade and labour productivity on firm level employment, we rely on the standard labour demand approach. In order to capture the trend in employment, we study how trade and labour productivity influence the demand of labour at firm level.

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

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

Where:

Q = output;

K = capital stock;

L = labour;

A = hicks neutral technological change.

and where a, ß represent the factor share coefficient and γ allows for factors changing the efficiency of the production function. Solving the firm cost minimisation problem:

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

We obtain the following expression:

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

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

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

Where:

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

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

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

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

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

Given this assumption and the data set feature, that has both a cross-sectional and time series element, the estimating equation for the panel of firms is in the form:

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

Where:

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

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

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

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

λ_i = industry specific effect;

d_t = time specific effect.

As proxy for technological change we use different indicator of productivity. First of all we control for labour productivity, computed as in the previous section, as the share of added value on total employment. Secondly, total factor productivity (TFP) is computed using two different approaches: the econometric (TFP_uvis) and the index number approach (TFP_interp). Since we have data on capital only for the main sector of the Moroccan manufacturing sectors, TFP is computed only for a sub-sample of firms. Given the purpose of our analysis, X vector include the share of total export on sales. Since we don't have data at firm level on import, we can control only for this aspect of trade orientation. As in the 4-digit analysis, we investigate also the impact of mark-up (Anderson et al, 2000) and workforce composition on employment decision. Mark-up is computed as the firm sales on total sector sales and workforce composition as the share of skilled on unskilled job and female on male jobs[18].

Table 13 reports the results for the whole sample where technological change is computed as labour productivity. The opposite effect of trade and technological change on labour dynamics is confirmed also in the firm level regression. However, while at sectoral level the negative effect on job creation of increasing productivity is cleaned out by the positive one of increasing export, at the firm level the negative impact of productivity on labour demand predominates. This is particular evident when we control also for the change in output and other firm level characteristics. In particular, a 1% increase in export share induce a 0.05% increase in labour demand and a 1%

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

increase in labour productivity decreases labour demand by 0.2%[19]. The gap is still more evident if we compute technological change as Total Factor Productivity (TFP_uvis and TFP_interp). In these cases a 1% increase in export share rises labour demand by 0.06% and TFP by 0.64% and 0.53% respectively. The negative effect of technological change on labour market is confirmed also by the increase in investment share (but it's significant only for the whole sample) and skill share. However, labour demand is few sensible to changes in these variables. The elasticity are 0.02 and 0.04, respectively. Finally, as suggest by the theoretical framework, an increase in output impact positively on labour demand. In particular, a 1% increase in output, increase labour demand by 0.2%. Given the labour-intensive nature of the main manufacturing sectors in the Morocco, the level of employment could influence the output level as well as labour productivity. Hence, we use instrumental variables to handle endogeneous regressors. We use the lagged variable as an instrument and we estimate equation (6.13) using a panel GMM estimator. Results don't change: labour demand is positively related to increasing export orientation but its effect is lower than the negative one exerted by technological change[20].

Finally, we control for a possible dynamic trend in the labour demand adding the lagged value of the permanent job. The positive and significant coefficient of the lagged dependent variable suggest that employment exhibits persistence as the change of employment depends significantly on its lagged value. Thus, the long-run response will be greater than the short-run responses. It's worth noting that the positive value of the lagged coefficient doesn't conflict with the negative one in the 4-digit analysis. Both suggest a quite stable level of employment in the sample and a quick adjustment process. With regard to the variables of interest, the elasticity is generally higher but the difference is more evident for export share. Variables that capture mark-up and workers composition are still non-significant.

[19] On average and ceteris paribus. This condition holds for all the following elasticity.

[20] This result is robust to different specification. In particular, if we add in the regression the value of export and the value of domestic sales, the elasticity of labour demand to variation in the level of export is 0.05.

Table 13: Labour Demand estimation at firm level
(LSDV estimation; 1994-2002; labour productivity)

	Ln_Permanent Workers					
	LSDV_1	LSDV_2	LSDV_3	LSDV_4	LSDV_5	LSDV_6
exp_share	0.153	0.141	0.094	0.084	0.15	0.154
	(5.93)***	(5.57)***	(2.31)**	(1.91)*	(2.88)***	(3.69)***
ln_vaTotEmpl		-0.145	-0.197		-0.233	-0.204
		(19.63)***	(12.20)***		(11.28)***	(11.17)***
ln_product			0.212	0.164	0.229	0.198
			(11.13)***	(9.50)***	(7.62)***	(11.85)***
firm_CA_share			0.057	0.028	0.042	0.072
			(1.02)	(0.47)	(0.63)	(1.14)
ln_Herf_index				0.001	0.02	0.016
				(0.04)	(0.93)	(0.89)
ln_inv					0.005	
					(1.1)	
inv_ca						-0.022
						(1.72)*
skill_unskill			-0.039	-0.043	-0.046	-0.041
			(3.28)***	(3.26)***	(2.97)***	(3.10)***
femm_male			0	0	0.002	0
			(0.36)	(1.49)	(1.1)	(0.15)
Year Dummy	Yes	Yes	Yes	Yes	Yes	Yes
Firm Dummy	Yes	Yes	Yes	Yes	Yes	Yes
Constant	3.385	3.963	2.385	2.027	2.672	2.646
	(276.42)***	(134.47)***	(15.50)***	(12.71)***	(9.92)***	(16.84)***
Observations	28832	27986	7497	7740	5123	6691
Number of firm	7471	7298	2535	2617	1848	2355
R-squared	0.01	0.06	0.17	0.08	0.21	0.19
Chow_Test	39.9	40.16	16.67	16.67	15.24	15.9
Heterosched: Prob>chi2	0	0	0	0	0	0

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

Table 14: Labour Demand estimation at firm level (LSDV estimation; 1994-2002; TFP)

	Ln_Permanent Workers							
	LSDV_1	LSDV_2	LSDV_3	LSDV_4	LSDV_5	LSDV_6	LSDV_7	LSDV_8
exp_share	0.171	0.135	0.143	0.133	0.132	0.076	0.142	0.129
	(5.40)***	(2.83)***	(3.02)***	(2.21)**	(4.69)***	(1.68)*	(2.99)***	(2.18)**
Ln_tfpuvis	-0.202	-0.632	-0.645	-0.97				
	(4.56)***	(6.36)***	(6.45)***	(5.84)***				
Ln_tfpinterp					-0.145	-0.506	-0.537	-0.827
					(4.72)***	(7.27)***	(7.14)***	(7.83)***
Ln_product		0.219	0.2	0.274		0.215	0.192	0.261
		(7.19)***	(9.15)***	(6.08)***		(8.19)***	(9.10)***	(5.98)***
firm_CA_share		-0.014	-0.01	-0.047		-0.036	-0.011	-0.05
		(0.12)	(0.09)	(0.38)		(0.35)	(0.09)	(0.39)
Ln_Herf_index		0.048	0.05	0.031		0.034	0.064	0.056
		(1.45)	(1.52)	(0.84)		(1.06)	(1.95)*	(1.49)
Ln_inv				0.004				0.005
				(0.64)				(0.85)
inv_ca			-0.023				-0.022	
			(1.42)				(1.36)	
skill_unskill		-0.052	-0.053	-0.051		-0.047	-0.05	-0.048
		(2.58)***	(2.60)***	(2.44)**		(2.67)***	(2.46)**	(2.25)**
femm_male		0	0	0.002		0	0	0.002
		(0.48)	(0.41)	(1.22)		(0.98)	(0.61)	(1.19)
Year Dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	4.169	2.972	3.185	3.105	3.858	2.719	3.146	3.132
	(58.93)***	(9.64)***	(13.06)***	(6.85)***	(76.33)***	(9.98)***	(13.63)***	(7.03)***
Observations	15597	4493	4467	3514	18981	4992	4467	3515
Number of firm	4229	1537	1535	1232	4827	1642	1535	1233
R-squared	0.03	0.13	0.14	0.16	0.02	0.12	0.13	0.16
Chow_Test	30.77	14.96	15.02	13.85	34.49	14.64	15	13.83
Heterosched: Prob>chi2	0	0	0	0	0	0	0	0

Absolute value of z statistics in parentheses

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

Table 15: Labour Demand estimation at firm level (IV estimation; 1994-2002)

	Ln_Permanent Job						
	GMM_1	GMM_2	GMM_3	GMM_4	GMM_5	GMM_6	GMM_7
exp_share	0.123	0.147	0.165	0.132	0.103	0.123	0.104
	(5.82)***	(2.17)**	(2.11)**	(1.98)**	(2.25)**	(1.99)**	(2.26)**
ln_export							
ln_vaTotEmpl^	-0.068	-1.192	-0.686				
	-0.52	(3.12)***	(2.66)***				
ln_tfpuvis				-0.966	-0.874		
				(21.78)***	(11.17)***		
ln_tfpinterp						-0.67	-0.691
						(21.66)***	(10.70)***
ln_product^		0.872	0.504	0.579	0.434	0.537	0.408
		(7.29)***	(5.34)***	(20.51)***	(6.60)***	(22.75)***	(6.40)***
firm_CA_share			0.062		-0.061		-0.061
			(0.85)		-0.69		-0.68
ln_Herf_index			-0.002		0.046		0.066
			(0.06)		-1.29		(1.84)*
ln_inv			-0.007				
			(1.08)				
inv_ca					0.021		0.023
					(1.99)**		(2.19)**
skill_unskill			-0.041		-0.05		-0.047
			(4.99)***		(6.37)***		(6.00)***
femm_male			0.001		0.001		0.001
			(0.78)		(0.33)		(0.54)
Year Dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	3.278	1.703	2.063	1.306	1.451	1.175	1.51
	(6.72)***	(2,21)**	(2.44)**	(2,11)**	(2.82)***	(2,31)**	(2.95)***
Observations	21535	21535	4768	12291	4235	14949	4234
Number of firm	5968	5968	1647	3476	1398	3991	1397
Chow_Test	37.37	13.93	12.91	13.72	13.24	14.48	13.6
Walt Test:p_value	0	0	0	0	0	0	0

Absolute value of z statistics in parentheses

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

^ instrumented variables

Table 16: Labour Demand estimation at firm level
(GMM System estimation; 1994-2002; Labour Productivity)

	Ln Permanent Workers			
	GMM_SYS_1	GMM_SYS_2	GMM_SYS_3	GMM_SYS_4
L.ln_PERM	0.626	0.619	0.589	0.46
	(11.87)***	(11.71)***	(9.81)***	(4.61)***
exp_share	0.369	0.377	0.418	0.239
	(4.05)***	(3.88)***	(3.60)***	-1.35
ln_vaTotEmpl	-0.212	-0.214	-0.255	-0.365
	(3.38)***	(3.44)***	(4.04)***	(4.12)***
ln_product	0.255	0.253	0.277	0.31
	(5.61)***	(5.47)***	(5.15)***	(3.82)***
firm_CA_share		3.882	5.446	7.565
		(0.84)	(1.13)	(1.11)
ln_Herf_index		-0.001	0.044	-0.092
		(0.01)	(0.7)	(0.92)
inv_ca			0.097	0.093
			(1.12)	(0.62)
skill_unskill				-0.025
				(0.58)
femm_male				0.007
				(0.68)
Year Dummies	Yes	Yes	Yes	Yes
Observations	21929	21929	17804	6359
Number of firm	6067	6067	5267	2157
Sargan_Hansen:Prob>chi2	0.09	0.13	0.13	0.29
Number Instruments	116	116	116	87
AR_1	0	0	0	0
AR_2	0.11	0.14	0.11	0.91
Wald Test:Prob>chi2	0	0	0	0

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

Table 17: Labour Demand estimation at firm level
(GMM System estimation; 1994-2002; TFP)

	Ln Permanent Workers							
	GMMSYS 5	GMMSYS 6	GMMSYS 7	GMMSYS 8	GMMSYS 9	GMMSYS 10	GMMSYS 11	GMMSYS 12
L.lnPERM	0.588	0.598	0.601	0.468	0.602	0.602	0.588	0.517
	(8.94)***	(9.14)***	(9.00)***	(4.25)***	(10.78)***	(10.73)***	(8.85)***	(5.24)***
exp_share	0.428	0.448	0.434	0.314	0.35	0.34	0.394	0.482
	(3.21)***	(3.24)***	(3.12)***	-1.43	(3.06)***	(2.99)***	(2.88)***	(2.20)**
Ln_tfpuvis	-0.556	-0.617	-0.761	-1.516				
	(1.76)*	(1.97)**	(2.45)**	(3.58)***				
ln_tfpinter					-0.436	-0.442	-0.326	-0.525
					(1.86)*	(1.79)*	(1.56)	(1.66)*
Ln_prod	0.301	0.276	0.291	0.349	0.291	0.258	0.256	0.238
	(4.70)***	(4.30)***	(4.61)***	(3.69)***	(5.25)***	(4.59)***	(4.06)***	(2.66)***
firm_sales_share		17.021	17.565	20.248		20.278	20.126	19.285
		(1.51)	(1.56)	(1.03)		(1.59)	(1.73)*	(1.02)
ln_HerfIndex		0.012	0.031	-0.161		-0.09	-0.04	-0.203
		(0.14)	(0.36)	(1.39)		(1.2)	(0.51)	(1.73)*
inv_ca			0.046	0.078			0.049	0.093
			(0.52)	(0.67)			(0.67)	(0.82)
SkillUnskill				-0.017				0.002
				(0.47)				(0.04)
FemmMale				0.01				0.011
				(0.96)				(0.97)
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs	12290	12290	12158	4235	14948	14948	12162	4234
Number of firm	3476	3476	3466	1398	3991	3991	3466	1397
Sargan Test: Prob>chi2	0.23	0.31	0.34	0.5	0.18	0.2	0.46	0.51
N. Instrument	116	116	116	107	116	116	116	87
AR_1	0	0	0	0	0	0	0	0
AR_2	0.14	0.14	0.14	0.21	0.15	0.15	0.14	0.22
Wald Test: Prob>chi2	0	0	0	0	0	0	0	0

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

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