# RECOVERY OF A MEXICAN CLUSTER: DEVALUATION BONANZA OR COLLECTIVE EFFICIENCY?

## WORKING PAPER 71

**Roberta Rabellotti**[*]

**SUMMARY**

Mexico, as many other developing countries in Latin America and elsewhere, has been moving in the 1980s towards a liberalised trade regime after a long period of import-substitution. This paper analyses the impact of trade liberalisation on the cooperative behaviour of firms located in the footwear cluster of Guadalajara. The empirical evidence shows that cooperation has increased. It also suggests that cooperation positively influences firms' performance and together with a favourable market environment contributes to the cluster's recovery. The study is based on the findings of field work carried out in Guadalajara in 1996. Qualitative information was collected through in-depth interviews and quantified responses came from a questionnaire survey covering a sample of 63 shoe manufacturing enterprises.

[*] Department of Economics, University of Padua, Italy. Email: rabellotti@decon.unipd.it

## 1 INTRODUCTION[1]

The literature on industrial districts in advanced and less developed countries has shown with a good deal of case material that clustering helps local enterprises to overcome growth constraints and compete in distant markets[2]. In this paper we analyse if firms derive some advantages from clustering to face turning points[3]. More precisely, we investigate the ability of clustered firms to shift gear in the face of the challenges posed by trade liberalisation. Our research proposition is that (raising) cooperation among firms belonging to a cluster is essential to compete in the new market environment. This hypothesis is investigated in the Mexican footwear cluster of Guadalajara.

Mexico as many other developing countries in Latin America and elsewhere, has been moving in the 1980s towards a liberalised trade regime after a long period of import-substituting industrialisation. The first stage in import liberalisation came in July 1985 when licenses were eliminated for almost 3,600 items. In December 1987 the Economic Solidarity Pact was launched bringing government, entrepreneurial organisations and labour unions onto an agreed position to accelerate trade reforms. The result was a tariff structure with five levels of 0-20 per cent *ad valorem* taxes. With these tariff reductions, the Mexican trade reform was completed (Ten Kate, 1992).

This reform had a significant impact on Mexico's footwear sector. From June 1985 to December 1988 the value of domestic production covered by import licensing fell from 99.1 to 0 per cent and the average tariff decreased from 46.8 to 18.1 per cent. In response, imports grew from 0.2 million pairs in 1987 to 107 million pairs in 1991. This dramatic increase in imports was accompanied by a contraction in domestic production from 245.2 to 199.6 million pairs. In this new competition, Mexican shoe manufacturers were initially ill-equipped to compete with imports on price, quality and fashion content.

A recovery from the crisis in the shoe sector came in 1993 when tariffs on imports from China were increased. The footwear industry also took advantage of the 1994 Peso devaluation, boosting exports and increasing import prices. Finally, in 1995 the government increased tariffs on imported shoes from the rest of the world.

The return of (at least partial) import protection, together with the Peso devaluation, are commonly seen as the basis of recovery for the Mexican shoe industry. Can this recovery be entirely explained as a windfall gain from changes in the trade regime? Or are there structural changes occurred in the footwear industry which have enhanced the ability of domestic producers to compete? Is the industry's recovery the outcome of a process of restructuring or the result of devaluation and return to protection?

This paper addresses these questions focusing on structural changes in vertical and horizontal relationships between Mexican shoe firms and their suppliers, subcontractors, buyers, competitors and supporting institutions. These relationships are investigated in the footwear cluster of Guadalajara. Our objective is to assess if trade liberalisation induces greater cooperation in vertical and horizontal linkages. Our empirical evidence shows that cooperation has indeed increased. We also suggest that cooperation positively influences firms' performance and together with a favourable market environment contributes to the

cluster's recovery. Furthermore, within the cluster heterogeneity is also increasing because only some of the firms enter into cooperative actions.

The study is based on the findings of field work carried out in Guadalajara, one of the two main Mexican shoe clusters, in August and September 1996. Qualitative information was collected through in-depth interviews with shoe entrepreneurs, suppliers, buyers, trade organisations and other key informants, and a quantitative survey was conducted with a questionnaire (Appendix 2) covering a sample of 63 shoe manufacturing enterprises. Furthermore, the study also draws on primary field data from 30 firms collected in 1991, prior to the results of the liberalisation programme materialising[4] (Rabellotti, 1997).

The following section discusses the impact of trade policy reform in clusters. Then, a brief historical overview of the Guadalajara cluster, its main turning points and its recent growth record is presented. The changes occurred in backward, forward and horizontal linkages are discussed in Section 3. Section 4 uses regression analysis to test the relationships between firms' performance and cooperation and Section 5 investigates if size plays a role in the cooperation behaviour of the sample firms. The final section summarises the main findings.

## 2 TRADE LIBERALIZATION AND CLUSTERS

Trade policy has long been acknowledged as having a major influence on the process of industrialisation in developing countries. The case for trade policy reform is extensively discussed in the economic literature[5]. Here we need only to recall that according to orthodox neoclassical theory trade liberalisation is expected to produce both static and dynamic benefits. The static argument refers to the reduction of inefficiencies arising from resource misallocation. The dynamic efficiency gains are expected to come from greater capacity utilisation, greater specialisation, enhanced technological capabilities, greater learning by doing, higher process and product innovation. A representative statement can be taken from Balassa (1998, 45):

> The carrot and stick of competition gives inducement for technological change. For one thing, in creating competition for domestic products in home markets, imports provide incentives for firms to improve their operations. For another thing, in response to competition in foreign markets, exporting firms try to keep up with modern technology in order to maintain or improve their market position.

Although this view became conventional wisdom, the empirical foundations of such arguments regarding the dynamic benefits of liberalization are not very clear. Rodrick (1995) presents a survey of empirical studies at firm, industry and country level, emphasizing that there are problems of measurement and direction of causality[6].

On the contrary, a case in which trade liberalization generates unambiguous positive dynamic benefits is in presence of excess demand, when firms have no need to increase demand for their product by improving it. This is what happened in the Mexican shoe industry. Before trade policy reform, for many decades the footwear manufacturers took advantage of a captive market where there was excess demand; making money

in the sector was easy because every kind of product was sold, no matter what its quality, design and cost. Trade liberalization increased the incentive for introducing product and process innovation, improving quality, increasing productivity and lowering costs (Rabellotti, 1997; Woodruff, 1997).

In this paper, we test the hypothesis that in the Guadalajara cluster trade policy reform has also had the effect of increasing cooperation among shoe manufacturers, with their suppliers, subcontractors and buyers. How is this increase in cooperation related with the dynamic effects of liberalization, predicted by orthodox economic theory?

In the small but growing literature on industrial clusters in developing countries, cooperation, together with external economies[7], represent those collective effects whose interplay is supposed to bring about efficiency gains for firms in the cluster and to increase their capability to innovate and grow (Rabellotti, 1997).

As regards trade liberalization and its dynamic benefits, we saw that, in presence of excess demand, the opening up of the market increases the incentive for innovating, improving quality, reducing costs. Furthermore, we know that in a cluster cooperation among firms can induce innovation and growth. Therefore, this paper provides an empirical test, for the case of a Mexican cluster of the hypothesis that trade policy reform brings about more cooperation among firms and that this produces dynamic efficiency gains.

## 3 THE SHOE CLUSTER OF GUADALAJARA

### 3.1 A Brief Historical Overview

Guadalajara, capital of the state of Jalisco, located north-west of Mexico City, is the second largest city in the country[8] and the third most important industrial centre after Mexico City and Monterrey. The economy of Guadalajara is traditionally characterised by a high presence of small firms in sectors like food, textiles and shoes (Arias, 1985). Since the last century, there has been a local tradition of shoe production in small workshops to satisfy local demand. In the second decade of this century, thanks to the continuous growth of the local market and the improvement in communications with the rest of the country, the sector expanded and the first industrial plants were established. In this period of growth a significant role was played by a group of traders, who organised the production of small artisanal firms, providing them with leather and machines and selling their products all over Mexico.

According to Arias (1992), in the 1920s the footwear industry was the most important industrial sector in Guadalajara: there were 34 plants producing shoes, one making lasts, one tannery and about 100 small shoe workshops. From the 1930s, the footwear industry began to develop rapidly helped by the presence of a US enterprise, United Shoe Machinery, which lent machinery to local firms and contributed in spreading technical know-how within the cluster. During the 1940s the shoe sector continued to expand, generating also a considerable increase in the number of local suppliers. At that time, Guadalajara was already well known in the rest of the country for being one of the main centres for shoe production.

In that period there were two important events: in 1940 Calzado Canadà, a firm which strongly

contributed to the development of the cluster, was established and in 1942 the Chamber of the Footwear Industry (*Camara de la Industria del Calzado*) was instituted with branches in Guadalajara, Leon and Mexico City.

The innovativeness of the founder of Calzado Canadà contributed to the diffusion of technological innovations and of a new way to sell products directly to retailers, without intermediaries. Calzado Canadà went through a period of growth becoming a giant firm, reaching its apex in 1982 with 13,000 employees and an annual production of more than 18 millions pairs of shoes[9]. Thanks to its founder, who was always ready to share his knowledge with other local entrepreneurs, Calzado Canadà became a successful example to imitate in the cluster.

In the 1950s the industry experienced a boom with continuous expansion in the domestic market and some occasional export initiatives, mainly to the US. In 1959, the local *Camara del Calzado* created a National Footwear Trade Fair in Guadalajara, contributing to the sector's growth. Growth accelerated during the 1960s and the 1970s thanks to rising domestic purchasing power, fast population increase and protection of the domestic market.

During the 1980s, the industry began to suffer from the decline of domestic purchasing power, but the main negative shock came from the opening up of the market in 1988 when tariffs on imports were cut and all import licenses eliminated (Dominguez-Villalobos and Grossman, 1992). Imports, which accounted for less than 0.1 per cent of the domestic market in 1987, increased substantially and by 1991 accounted for nearly a third of domestic sales. The flood of imports caused a profound crisis in the cluster: many firms went bankrupt, others drastically reduced production.

Following a series of events there have recently been some signs of recovery from import liberalisation. In 1993 the Mexican government placed anti-dumping tariffs (varying from 160 to 1000 per cent, according to the type of shoes) on imports from China. In 1994 the Peso was devalued. Finally in 1995 the tariff on shoes imported from the rest of the world was put back at 35 per cent for a period of 5 years. This combination of events seems to have provided the breathing space and time for Mexican shoe firms to restructure.

### 3.2 Performance and Economic Structure of the Cluster

This section analyses the most recent years, with a particular emphasis on changes since the turning point, that is the 1988 liberalisation of the domestic market. Because some of the changes are not unique to Guadalajara, we present some empirical evidence on the Mexican shoe industry in general as well as some specific data on the cluster under analysis.

In Table 1 we find confirmation of the major turning point that occurred in 1988, indicated by a huge increase in imports from 1988 to 1992 and by a decrease in the total number of pairs produced. This table also shows a substantial increase in exports in the 1990s, with the exception of 1993 and 1994 which were the most severe years of crisis for the industry and for the Mexican economic system as a whole. Exports

again accelerated after the devaluation in 1994. On the import side, there was a continuous decline since 1993 when tariffs on Chinese shoes went up.

While the impact of the 1988 turning point is very evident from the data presented, the more recent recovery, facilitated by the increase in tariffs and the Peso devaluation, is less clearly detectable from aggregated data. There is an increase in exports, but the decrease in output seems to continue, although at a decreasing rate. This may be due to time lags between the change in external circumstances and the reaction of local producers. Furthermore, the decreasing number of pairs could be compensated by an increase in value added.

**Table 1: The Mexican footwear industry, 1970–1996**

| Years | Total n° of pairs produced (millions) | Exports (US$ml.) | Export year growth rate 90-96 (%) | Imports (US$ml.) | Import year growth rate 90-96 (%) |
|---|---|---|---|---|---|
| 1970 | n.a. | 3.4 | | 15.5 | |
| 1975 | n.a. | 1.1 | | 20.8 | |
| 1980 | n.a. | 31.0 | | 62.0 | |
| 1985 | 232.6 | 27.3 | | 15.7 | |
| 1988 | 245.2 | 68.2 | | 54.3 | |
| 1990 | 208.5 | 77.4 | | 127.8 | |
| 1991 | 199.6 | 126.5 | 63.4 | 189.9 | 48.6 |
| 1992 | 193.3 | 160.6 | 26.9 | 213.5 | 12.4 |
| 1993 | 173.3 | 150.3 | -6.4 | 172.7 | -19.1 |
| 1994 | 172.4 | 156.4 | 4.0 | 145.2 | -15.9 |
| 1995 | 167.0 | 201.9 | 34.8 | 87.4 | -39.8 |
| 1996 | n.a. | 355.3[a] | 68.5 | 74.0[b] | -15.3 |

[a] January-May
[b] Estimates

Source: CANAICAL, 1996

As regards the structure of the Mexican footwear industry, according to the 1994 Industrial Census the sector is composed of 4981 enterprises with a total employment of 80971 people. The size distribution is biased towards the small size: 82 per cent of the firms employ fewer than 15 people, 15 per cent between 16 and 100 people, 2 per cent between 101 and 250 people and only 1 per cent more than 251. In Guadalajara the size breakdown, less biased towards the small size than the national breakdown, is the following: 62 per cent are micro enterprises with less than 15 employees, 34 per cent have between 16 and 100 employees, 3 per cent between 101 and 250 and only 1 per cent more than 251 employees.

From the geographical point of view, the shoe industry is concentrated in three areas: 56 per cent of the employees are in Leon, 19 per cent in Guadalajara, 10 per cent in Mexico State and the capital (INEGI, 1994). Guadalajara is therefore the second most important area of shoe production after Leon, with a leadership in women's shoes (41 per cent of the Mexican firms specialised in this segment are located there).

In Guadalajara, according to estimates by the local trade association, the number of footwear firms in

1993 was about 1,100 with 25,000-odd employees, producing 27 per cent of all footwear made in Mexico (ITESM, 1995). Unfortunately more recent data is not available, but according to the director of the local Camara del Calzado there has been a substantial decrease in the number of firms from 1993 to 1995 (interview with Lic. Ricardo Orta, September 1996). Other informants confirmed the declining number of firms, stressing that small and micro firms as a size group were most severely hit by the crisis. Considering only the members of the Camara, in Guadalajara the member firms went down from more than 500 to 315.

The rest of the paper concentrates on Guadalajara and analyses changes in backward, forward and horizontal linkages as a consequence of the turning point.

## 4 LIBERALIZATION AND COLLECTIVE EFFICIENCY

This and the next two sections are based on the field work carried out in Guadalajara. Information was collected through in-depth network case studies, interviews with key informants and a questionnaire survey covering a sample of 63 shoe firms.

For the network case studies, six enterprises of different size were selected (two with less than 20 employees, two with more than 20 and less than 70 and two with more than 70). For each size class, with the assistance of the local trade association[10], one enterprise known for being dynamic and innovative and the other more conservative were picked. Each of the enterprises selected were also asked for the names of their main suppliers and buyers, who were consequently interviewed to get their perspective on the vertical relationship.

As regards the sample survey, 63 enterprises were randomly taken from the registry of members of the local entrepreneurial association[11]. The sample is stratified by size: 20 enterprises employ 70 or more employees, 21 between 21 and 69 employees and the remaining 22 employ 20 or fewer employees.

The final version of the questionnaire[12] presented in Appendix 2 reflects difficulties encountered in the pre-test amongst a small group of shoe entrepreneurs and comments from local sector experts. Our initial objective was to look at changes in cooperation over time. However some questions proved impossible in the field and we, therefore, collected information about firms' cooperative behaviour after trade liberalisation. In the rest of the paper a comparison is presented of cooperation today with cooperation before the turning point using qualitative data from the 1996 survey and findings from a previous survey carried out in 1991 (Rabellotti, 1997).

Finally, a few additional interviews were made in the cluster of Leon, where some new policy initiatives underway are providing an interesting contrast to Guadalajara.

### 4.1 Backward Linkages with Suppliers

In Guadalajara, clustering induced the concentration of a critical mass of suppliers. Shoe producers can therefore buy most of their inputs locally, saving on transportation costs. However, the long closure of the domestic market has not encouraged the growth of a competitive industry of suppliers, hampering price,

quality and service. From the previous empirical investigation it appeared that before liberalisation most of the relationships between shoe manufacturers and suppliers were market links, based purely on price with very little cooperation (Rabellotti, 1997).

Since the opening of the domestic market and the increase in imports of shoes and components, the relationships between footwear producers and suppliers have been improving and becoming more collaborative. As can be seen from Table 2, the share of the sample firms which after liberalisation cooperates intensively with their leather and sole or heel suppliers is high for each of the different specified forms of collaboration.

The information collected during the network case studies confirmed that the manufacturer-supplier relationship is undergoing a profound process of change. Suppliers, who were also hit by liberalisation[13], reacted to the crisis increasing their attention to quality, variety of products and fashion content. For the first time, after many years of copying from European and North-American journals, suppliers have regularly begun to visit international trade fairs. In some cases, suppliers and shoe manufacturers went together to visit the main international trade fairs. According to most of the suppliers and manufacturers interviewed, there is now much more information locally available, which circulates within the cluster more intensively than before liberalisation. An example of recent promotional initiatives are the exhibitions organised by suppliers to present in advance their new sample set to local shoe manufacturers, which is becoming a common practice among the main suppliers in Guadalajara.

**Table 2: Post liberalisation cooperation with suppliers** [a]

| | **Leather suppliers (%)** | **Sole or heel suppliers (%)** |
|---|---|---|
| Information exchange | 54.0 | 54.0 |
| Negotiation of payment and delivery conditions | 55.6 | 41.9 |
| Joint product development | 44.4 | 50.0 |
| Quality improvement | 46.0 | 52.4 |
| Respect of delivering time | 58.7 | 66.7 |

[a] Percentage of firms which cooperate a lot with their suppliers (see questions 4.1 and 4.3 in Appendix 2).
The total number of firms is 63.

Source: author's survey

Notwithstanding these positive changes, the empirical investigation suggests that the local supply of competitive raw materials and components is still inadequate to satisfy the needs of the footwear industry, because only some of the existing firms have adapted their supply to the requirements of the open market.

Many suppliers, especially the very small ones, have as yet introduced few improvements to their products.

According to our survey, 68 per cent and 76 per cent of the sample firms maintained the same leather and sole suppliers respectively since the liberalisation. The large majority of the firms interviewed declared that in case of problems with their suppliers they always try to solve them. This high stability could have two explanations: lack of choice or strong cooperation and commitment. It is hard to say which of the two explanations prevails.

Quality components and raw materials are scarce and often not delivered on time. On this particular point according to the survey results, many firms cooperate with their suppliers over delivery schedules. Nevertheless, many firms interviewed for the network case studies complain about late deliveries. In other words, there is more cooperation on this aspect but this has not solved all delivering problems. The suppliers themselves agree that this is a crucial issue, because they often receive orders at the very last moment, and thus are unable to satisfy demand on time. Furthermore, delivery time becomes a really serious problem when suppliers are required to develop *ad hoc* inputs.

From what has been said so far, it appears that there has been an improvement in supplier-manufacturer relations but also that such improvement has not been universal. Some categories of shoe firms obtain better services from suppliers than others. The most privileged are export-oriented enterprises. Suppliers prefer to work with them because they pay without delay, sometimes in advance. Table 3 shows that exporting firms cooperate more with their suppliers than the rest of the sample firms in information exchange, product development, quality improvement and respect of delivering time (only with leather suppliers).

Although export-oriented firms have more privileged relationships with their suppliers and generally do not complain about service and quality, many of them stress that to meet the delivery and quality conditions fixed by buyers they have to supervise their suppliers very closely. In other words, firms are still learning how to work in an integrated system based on a common language, which facilitates understanding and reduces costs of transactions.

A major problem is lack of standardisation or, in other words, lack of a common system of measurement adopted by the majority of the Mexican manufacturers and suppliers. In this respect, there were in the past several initiatives, sponsored by the footwear entrepreneurial associations, which never found the consensus of the main suppliers, already linked by an informal agreement of harmonisation. More recently, these large suppliers were directly involved in a new common initiative promoted by the different business associations in Leon, with the intention to create a wider consensus (see 3.5).

Waiting for the results of this recent institutional initiative, some solutions to the lack of standardisation arise spontaneously from the market. An interesting example is a firm in Guadalajara with a long tradition in the production of lasts, which about five years ago began to produce heels and insoles and more recently soles. In a few years, this firm has captured a large share of the local market, producing standardised bottoms and lasts of good quality[14].

**Table 3 : Cooperation with suppliers and exports** [a]

| | Leather suppliers | | Sole or heel suppliers | |
|---|---|---|---|---|
| | **Exporting firms (%) N=27** | **Non-exporting firms (%) N=36** | **Exporting firms (%) N=27** | **Non-exporting firms (%) N=36** |
| Information exchange | 67.0 | 45.0 | 67.0 | 44.0 |
| Negotiation of payment and delivery conditions | 52.0 | 58.0 | 41.0 | 43.0 |
| Joint product development | 48.0 | 42.0 | 52.0 | 49.0 |
| Quality improvement | 48.0 | 44.0 | 59.0 | 47.0 |
| Respect of delivering time | 63.0 | 56.0 | 59.0 | 72.0 |

[a] Percentage of exporting and non-exporting firms which cooperate a lot with their suppliers.

Source: author's survey

Going back to the relationships between shoe firms and their suppliers, a further differentiation derives from size. According to our survey, large and medium firms tend to cooperate more than small enterprises with suppliers (Table 4). From the empirical investigation it appears that small firms usually have pure market relationships with dynamic, good-quality suppliers. To bargain on delivery and payment conditions, some small firms prefer to buy components and raw materials from traditional, low-quality suppliers.

In our interviews, only one large firm prefers to deal with small traditional suppliers rather than with larger, more dynamic ones. This firm works with a network of very small suppliers, providing them assistance and inputs to produce *ad hoc* components. According to this firm, this strategy involves a large investment in the suppliers' activity but reduces dependence on large, highly demanded suppliers.

To conclude, in Guadalajara two main effects of liberalisation on the supplier-manufacturer system can be stressed:

- first of all, there is an increase in cooperation: suppliers and shoe manufacturers have begun to think and act as an integrated system for being able to compete in the open, highly competitive market;
- secondly, this evolution concerns only some of the enterprises, generating an increasing heterogeneity by size and market within the cluster.

**Table 4: Cooperation with suppliers and size** [a]

| | Leather | | | Soles or heels | | |
|---|---|---|---|---|---|---|
| | **Large firms (%) N=20** | **Medium firms (%) N=21** | **Small firms (%) N=22** | **Large firms (%) N=20** | **Medium firms (%) N=21** | **Small firms (%) N=22** |
| Information exchange | 70.0 | 47.6 | 45.5 | 65.0 | 57.1 | 40.9 |
| Negotiation of payment and delivery conditions | 65.0 | 57.1 | 45.5 | 47.4 | 38.1 | 40.9 |
| Joint product development | 55.0 | 52.4 | 27.3 | 55.0 | 57.1 | 38.1 |
| Quality improvement | 50.0 | 42.9 | 45.5 | 60.0 | 61.9 | 36.4 |
| Respect of delivering time | 60.0 | 61.9 | 54.5 | 60.0 | 76.2 | 63.6 |

[a] Percentage of large (≥ 70 employees), medium (21-69 employees) and small (≤ 20 employees) firms which cooperate a lot with their suppliers.

Source: author's survey

### 4.2 Backward Linkages with Subcontractors

In Mexican footwear clusters division of labour is generally low, certainly much lower than in some Italian or Brazilian clusters investigated in recent studies (Schmitz, 1995; Rabellotti, 1997, Rabellotti and Schmitz, 1997). According to our sample survey, 60 per cent of the firms do not externalise any stage of the production process, 19 per cent externalise upper stitching, 18 per cent sole cutting, 14 per cent hand stitching and 12 per cent heel covering. The majority of firms which do externalise some of their production have more than 70 employees.

A comparison with the results obtained in our previous investigation (Rabellotti, 1997) suggests that division of labour has not increased considerably after liberalisation. However, cooperation with subcontractors has increased in several areas. While, previously we did not find any sign of cooperation with subcontractors, according to the recent survey after trade liberalisation 80 per cent of subcontracting firms in the sample cooperate in quality control, 60 per cent in information exchange and 52 per cent in negotiation of payment and delivery conditions.

Moreover, the qualitative interviews show some signs of a slow evolution towards a greater division of labour in the cluster. For example, some firms have begun to specialise only in upper stitching, working for large enterprises, which have recently increased their export production and decentralised part of their orders for the domestic market to local subcontractors.

Several shoe manufacturers expressed that more division of labour is necessary to expand their presence in the international market and to satisfy large orders. In conclusion, specialisation and subcontracting remain

limited because of the high costs of transactions and quality control. The conditions for a substantial increase in the division of labour are the introduction of measurement standardisation and the diffusion of a collective understanding of international quality standards at cluster level.

### 4.3 Forward Linkages in the Domestic Market

Before liberalisation Mexican shoe producers mainly sold their products directly to retailers. Because of their geographical concentration they acted as a coalition, imposing their quality conditions onto a very fragmented market[15] (Woodruff,1996). In the protected domestic market, the local trade associations played a crucial role in gathering and diffusing information about retailers' behaviour[16], reinforcing the dominant position of the Mexican manufacturers towards retailers. In his study on the structure of contracts in the Mexican footwear industry, Woodruff (1996) concludes that the institutional structure of the market in the closed economy gave the manufacturers the ability both to set the low quality standards for the industry and to judge whether those standards were met, reducing their incentives to make innovation in product quality and to develop a more sophisticated commercial strategy. Moreover, the existence of weak relationships between shoe manufacturers and retailers, characterised by very little cooperation, is also a clear result of our previous empirical investigation (Rabellotti, 1997).

In the post liberalisation environment, the power of the manufacturers' coalition was weakened by providing retailers with the option of procuring product from foreign producers. This had an initial negative impact on the industry, with large increase in imports and the loss of 'morality' of retailers, who began to pay late and return unsatisfactory products with more frequency. Woodruff writes that "Trade liberalisation also had the effect of replacing the quality standard set by the manufacturers' coalition with one determined by world markets" (1996: 19).

The findings of our survey show that after trade liberalisation there is some cooperation between shoe firms and domestic buyers in information exchange, quality control, negotiation of payment and delivery conditions and setting of product specifications (Table 5). Furthermore, relationships are rather stable, given that 67 per cent of the sample firms trade with the same buyers.

Trade liberalisation stimulates also an increasing concentration in the domestic market: wholesalers, large retail chains and department stores are increasing their weight at the expense of small individual retailers. Unfortunately, there are no official data confirming this structural change in the distribution system; nevertheless we found a confirmation of this trend in our empirical investigation. The large majority of firms interviewed for the network case studies said that after liberalisation they increased their share of sales to wholesalers, large retail chains and department stores. The main reasons cited for their preference for large customers over small individual retailers were prompter and more reliable payments and larger size of orders. In particular with larger size of orders they may improve production planning and exploit economies of scale. Furthermore, some of the firms interviewed stressed the benefits of increasing product specialisation, made possible by the efforts of wholesalers and retail chains to choose their suppliers according to their specific capabilities.

**Table 5: Post liberalisation cooperation with buyers** [a]

| | **Domestic market (%)** | **International market (%)** |
|---|---|---|
| Information exchange | 67.2 (N=61) | 80.0 (N=25) |
| Negotiation of payment and delivery conditions | 60.7 (N=61) | 60.0 (N=25) |
| Technological assistance | 18.0 (N=61) | 28.0 (N=25) |
| Quality control | 63.9 (N=61) | 80.0 (N=25) |
| Setting of product specifications | 42.6 (N=61) | 60.0 (N=25) |
| Production organisation | 13.6 (N=59) | 20.0 (N=25) |

[a] % of firms which cooperate a lot with their suppliers (see questions 6.1 and 6.3 in Appendix 2).
In parenthesis, the total number of respondents for each question.

Source: author's survey

In the Mexican domestic market, retail chains are probably the most innovative buyers. From our empirical investigation it appears that retail chains have recently improved their relationships with shoe manufacturers, increasing information exchange and frequently providing suggestions on components and raw materials and where to buy them. In a few cases, retail chains have also established an internal department for product development where they develop their sample sets, then put out production to a network of manufacturers. Some retail chains even provide them with components and raw materials. Furthermore, most of the retail chains interviewed have improved their quality control systems: usually control is on finished products, but there are also a few chains controlling quality during the production process.

A new way of shoe distribution, increasingly popular in the Mexican market, is catalogue sale. The first catalogue distributor was established successfully a few years ago in Mexico City. The success of this first initiative soon became an example for others, adopting the same selling system: the distributors create a catalogue and then sell shoes to non-professional door-to-door sellers, mainly women. Interviews with sector experts suggest that the recent economic crisis in the country has facilitated the boom of catalogue sales: women need new ways to contribute to the family budget.

Catalogue sale requires a strong capability to plan production and stocks. Distributors create catalogues including a large number of different patterns, styles and colours and receive very fragmented orders, often consisting of a few pairs. In order to reduce the fragmentation of orders, some catalogue distributors have recently begun to offer training courses to some of their sales vendors. For instance, one catalogue distributor interviewed organises very basic courses in marketing, sales strategy and motivation for a selected group of its sales agents.

From what has been said so far, it appears that the distribution system prompted by liberalisation is increasingly characterised by a clear division between production and commercialisation. Shoe producers are aware that selling to wholesalers or large retail chains may create a dependency on them, but at the same time they know that in the new, highly competitive market it is difficult to sustain an independent sale strategy. According to many enterprises interviewed, the establishment of stable and collaborative relationships with buyers is the most effective way to limit their dependence on the distribution system. At the same time, most wholesalers and retailers interviewed know that to sustain competition with adequate quality standards and fast and reliable delivering times they need to establish stable and collaborative relationships with their suppliers.

To conclude the analysis of the changes occurring in the domestic market it is interesting to report the cases of the only two enterprises, among those interviewed, which sell mainly to individual retailers. In both cases the entrepreneurs worked for long time as salesperson in other companies and only recently established their own footwear firms. In order to exploit their sales experience, they both organised their firms in an unusual way for the Mexican system, focusing their efforts on two stages: developing sample sets and selling the final products. The supervision of production is delegated to a production manager and part of the production is externalised to a network of small suppliers. As regards their sale strategy, they have stable and continuous relationships with most of their customers who are small individual retailers, mainly located in small towns. Both entrepreneurs believe that competition from large retail chains or department stores is not so strong in small towns. This accounts for the success of their sales strategy: they visit most of their customers at least twice a year, providing updated fashion information and developing a trust relationship with them. These experiences represent an alternative to the most recent trend of shoe manufacturers to delegate sales to specialised buyers. It should be remembered that the owners of both case study firms have a background in distribution, while most shoe entrepreneurs in Mexico, as well as in most other countries, are good manufacturers but not expert salesmen.

### 4.4 Forward Linkages in the Export Market

Before devaluation, the manufacturers of Jalisco state (of which Guadalajara is the capital) exported an average of 5 million pairs of shoes per year; in 1995 exports doubled to 10 million pairs. Approximately 40 of Jalisco's 315 shoe factories, which are members of the Camara, now export with some regularity, as compared to only five in 1990[17].

The export market is dominated by US brokers, who after the devaluation discovered in Mexico some enterprises able to produce good quality shoes at competitive price. Exporting firms are generally of large size: in our sample 59 per cent of total exporting enterprises have more than 70 employees, 30 per cent have between 21 and 69 employees and only 11 per cent have less than 20 employees.

The exporting firms interviewed in Guadalajara are generally happy with their experience with brokers. Usually US buyers decide product specifications and then help the Mexicans to produce them. Manufacturers

and brokers often collaborate in identifying, and sometimes directly purchasing, components and raw materials. In order to build collaborative relationships with their suppliers, some brokers have opened branch offices in Mexico, mainly in Leon, although a few are also located in Guadalajara.

The exporters interviewed in Guadalajara all agree that they are learning a lot from their relationship with brokers, particularly regarding organisation of production, quality control and technology. Table 5 shows that exporting firms cooperate intensively with international buyers in information exchange, quality control, negotiation of delivery and payment conditions and setting of product specifications. Other advantages of the export market mentioned by the enterprises interviewed are the large size of orders and the relative standardisation of products, allowing economies of scale.

Apart from exports to the US market, there are a few isolated experiences of exporting to Latin American countries, often thanks to direct contacts established during the trade fair in Guadalajara. According to the Director of the Camara del Calzado, Latin America is a promising market, particularly for small and medium firms in Guadalajara, since quality and speed matter less.

To conclude we can say that regular exports are only experienced by a restricted number of enterprises in Guadalajara, with the capacity to supply large orders. Export manufacturers have to meet demanding price, quality and delivery standards. This requires rapid access to suitable inputs, quick response capabilities on the part of suppliers and therefore a well functioning and highly integrated local footwear system. Exports thus generate positive externalities to other firms located in the cluster.

### 4.5 Horizontal Linkages with Other Shoe Enterprises

Our interviews suggest that during the years of most intense crisis horizontal cooperation was particularly low: firms were too involved in their day to day survival, and were not able to establish cooperative links and invest in joint projects. In those years groups of firms, which had previously regularly exchanged information, machines or sometimes orders, ceased do so. Besides, the crisis changed profoundly relationships at cluster level, as many firms went bankrupt and others reduced or transformed their activities. Since the recovery, however footwear enterprises have begun to build new networks. As can be seen in Table 6, this process is still at an early stage and only horizontal cooperation aimed at information exchange takes place among a significant number of firms. Other forms of horizontal cooperation within the cluster are quite low.

While horizontal cooperation did not emerge as a significant phenomenon in quantitative terms, our empirical investigation provided interesting information about recent as well as earlier initiatives which were not affected by the crisis.

Among the latter are the *agrupamientos industriales*, which began in 1983 and formally ended in 1987[18]. The *agrupamientos* were promoted by National Financiera (Nafin), the main Mexican development bank, using a methodology originally developed by UNIDO[19]. The groups of firms, after a period of training, set up joint projects such as exchanges of machines, workers, orders, information or common purchasing of inputs. From 1983 to 1987 Nafin promoted the creation of 7 groups of footwear producers, the majority of

which went on to meet regularly after the end of the project. Furthermore, some other collective initiatives were stimulated as side effects of the program, namely the creation of a credit union and of a technological institute for the footwear sector.

**Table 6: Post liberalisation cooperation with other local shoe enterprises (% of firms)**

| | **A lot (%)** | **A little (%)** | **Never (%)** | **Total n° of firms** |
|---|---|---|---|---|
| Information exchange | 22.2 | 44.4 | 33.3 | 63 |
| Joint orders | 9.5 | 12.7 | 76.2 | 63 |
| Joint product development | 7.9 | 11.1 | 81.0 | 63 |
| Machinery lending | 6.3 | 17.5 | 76.2 | 63 |
| Joint sale | 7.9 | 12.7 | 79.4 | 63 |
| Joint training | 3.2 | 6.5 | 88.9 | 62 |
| Joint purchase | 7.9 | 12.7 | 79.4 | 63 |

Source: author's survey

Some of the groups survived the crisis and are still functioning. Take for example a group composed of five enterprises, owned by one old entrepreneur and four of his sons. Before taking part in one of the Nafin *agrupamientos*, they used to manage their firms independently but afterwards they realised enormous potential for cooperation. The first step was the establishment of a new firm, managed by another son, to jointly market the products of the five shoe firms and provide fashion information. Furthermore, cooperation also extended to the creation of a small artisanal enterprise specialised in sole cutting, to the joint purchase of most of their components and raw materials and to the sharing of large orders. Their assessment of the results of cooperation is generally positive: costs have been reduced, payment conditions with suppliers and customers improved and their market information and sales strategy enhanced.

Moving on to more recent experiences of cooperation, we observed several group initiatives. An interesting example is a group that brings together 80 suppliers of the largest Mexican catalogue distributor and aims to encourage cooperation in product development and joint purchase of components and raw materials. A planned project is between the distributor and Nafin seeks to facilitate access to credit for firms belonging to the group.

Another group is composed of the main exporting firms located in Guadalajara. This group comes together for informal exchanges of information on technological aspects, to discuss availability and quality of components and raw materials and to exchange machinery and technicians. Similarly, in Leon, there is a

group composed of the main Mexican enterprises specialised in children's shoes which began with the creation of a trading company to export to Latin America. The group has also a common brand name. Following the success of this first common initiative, it has experimented with other forms of cooperation, such as joint purchase of components, adoption of common systems to standardise quality and joint participation to international trade fairs. They have also begun to share some orders for the US market.

The joint participation in the Leon trade fair was the initial stimulus to cooperate for a group of 8 micro enterprises. After the success of this first experience the group started to experiment with other forms of cooperation such as joint training for the workforce and benchmarking in quality.

The final example of horizontal cooperation worthy of attention is the creation in Guadalajara of a plant for sole cutting by a group of 7 enterprises. Within the group there is also an intense exchange of information and regular informal meetings are organised to discuss future plans for cooperation.

To conclude, although the experience of cooperation described above can not be generalised, there are an increasing number of cases of inter-firm collaboration in the Guadalajara cluster. It is, however, too early to tell whether this represents a shift towards a more cooperative culture.

### 4.6 Institutional Linkages

During the crisis of 1992-94 the three local branches of the trade association concentrated most of their efforts on lobbying the Federal Government to support the footwear industry. Finally, in May 1995 a document for the development of the sector was approved, including as its main measure the increase in tariffs to 35 per cent for a period of 5 years. This act is generally considered as the beginning of the recovery for the industry.

In Guadalajara, the crisis hit several institutions aimed at supporting footwear enterprises: first of all, the Instituto Tecnologico del Calzado, an institution set up with the collaboration of the Camara and specialised in training and technological assistance, was closed due to lack of demand of its services; secondly, the credit union suffered from a very high rate of insolvency, caused by a huge increase in interest rates after the devaluation.

As regards the Camara del Calzado, during the crisis it engaged only in defensive activities. With the beginning of the recovery it has started again to organise and promote the local trade fair. With an intense promotional activity in the domestic and international markets, the number of exhibiting firms increased from 70 in 1995 to more than 250 in 1996. There was also a significant increase in the number of foreign buyers who visited the fair. Particularly large was the participation of buyers from Latin America. For promoting the trade fair abroad the Camara obtained some support from Bancomext, the Mexican bank for export promotion, to invite groups of foreign buyers. Furthermore, the Camara holds training courses to prepare small firms which seek to participate for the first time in the trade fair. For promotion abroad, the Camara also organises joint participation of groups of local firms to the main international exhibitions, promotes new market studies and provides an information service on foreign buyers.

In the field of training and technological assistance, the Camara is involved in the establishment of a local branch of Ciatec in Guadalajara. Ciatec was created in Leon by Conacyt, the Mexican national science and technological council, and is an institution with a long tradition in supporting the footwear sector. In Guadalajara, it will supply services, previously offered by the Istituto Tecnologico, making available to local enterprises its highly specialised know how, accumulated in many years of activities in Leon.

Given these new institutional activities, the response of local footwear enterprises appears to be quite good according to the results of our survey: 45 per cent of the sample firms said that they use the services supplied by the Camara more frequently than before liberalisation.

From what we have said so far, it emerges that in Guadalajara institutional support has begun to flourish again, particularly with a focus towards the promotion of the cluster in the international market. Local enterprises appreciate these efforts and seem to be willing to strengthen horizontal cooperation through institutions.

Institutionalised cooperation has recently increased even more strongly in Leon, the largest footwear cluster in Mexico. Although this paper concentrates on Guadalajara and the research in Leon was not comprehensive, it can be useful to present some empirical evidence about institutional support there, because of its dynamism and also of its effects on Guadalajara.

Among the most innovative initiatives for supporting the footwear industry in Leon, there is the establishment of Cosec (*Coordinadora Sectorial Cuero, Calzado y Proveduria*), an institution co-founded by the local Camara del Calzado, the state government, the municipality, Cofoce (the local export promotion institute), Secofi (Secretary for Trade and Industrial Development) and Nafin (the Mexican development bank). Cosec promotes initiatives aimed at increasing the systemic integration within the production chain and therefore at intensifying the collaboration among leather and component suppliers and shoe manufacturers. The first important action of Cosec, in collaboration with the main trade associations and the most important enterprises (both in Leon and in Guadalajara), is to develop a standardisation program for leather and components. This is a crucial problem in the Mexican footwear system, which, as seen in Section 3.1, generates high transaction costs, making it very difficult to increase the division of Labour in the industry and obstructing the sharing of large orders.

Another organisation recently created with the participation of all the main local institutions is Cofoce, aimed at promoting regional exports[20]. Amongst other activities, Cofoce brings foreign buyers to Leon and organises tours of local entrepreneurs abroad. Moreover, Cofoce has several branches in the United States for promoting products made locally.

A final example of institutional activism in Leon is the total quality program, GTO 2000, promoted by the state government together with the Camara del Calzado and other local institutions. Its objective is to promote the adoption of a quality certification system among local enterprises as well as diffuse information about quality control systems, their importance and their impact on firms' productivity. The program began with work shoes and will be extended to other type of shoes in the future. The Camara hopes that certification

will contribute to export in the US market, attracting larger orders from brokers.

To explain the recent institutional dynamism of Leon, we can refer to the local political situation and to the very strong specialisation of the local economic system. Both at the state and the municipal level there are respectively a governor and a mayor who began their professional life in the footwear industry and who are therefore very receptive to the industry's problems. Secondly, given that in 1992 the footwear *filière* accounted for 15.5 per cent of the GDP of Guanajuato (the state of Leon) and for 68 per cent of the GDP of the city of Leon (CEESP, 1993), the crisis of the sector hit the local economy strongly. This called for urgent policy interventions.

To conclude we would like to draw attention to the two most interesting characteristics of the Leon experience of institutional development. First, the most recent initiatives were promoted jointly by private self-help organisations in collaboration with public bodies. The effectiveness of the joint public/private sector initiatives is one of the main lessons of the European experience of industrial districts (Schmitz and Musyck, 1994). Second, most of the initiatives are oriented towards the whole footwear system. This systemic and cooperative approach is new in the Mexican footwear industry and represents an important step towards the creation of an integrated system. Besides, through the standardisation program promoted by Cosec, the systemic approach is likely to diffuse to Guadalajara.

## 5 IS FIRMS' PERFOMANCE INFLUENCED BY COOPERATION?

In the previous section we presented a descriptive analysis of the changes occurred in vertical and horizontal linkages within the footwear cluster of Guadalajara after trade liberalisation. Our focus was on cooperative behaviour, both vertically and horizontally. In what follows we assess if cooperation is related with performance using the results obtained from a questionnaire survey covering a sample of 63 enterprises[21].

Ordinary least squares (OLS) regression analysis is used to study the relationship between performance and cooperative behaviour. Appendix 1 describes how data on performance and cooperative behaviours, estimated by using multiple scales in the questionnaire, are aggregated into indicators of vertical and horizontal cooperation and performance.

The independent variables included in the regression model are: horizontal cooperation with other local shoe firms (C32) and through the entrepreneurial association[22] (C31), backward cooperation with leather and sole suppliers (D4143) and forward cooperation with buyers in the domestic market (F61)[23]. The response variable (FAC1) is a performance indicator obtained with principal component analysis. With the stepwise selection method we obtain the model presented in Table 7, which does not change if backward or forward selection methods are adopted.

The main conclusions of the regression analysis are as follows: horizontal cooperation through the entrepreneurial association (C31) and with other local shoe firms (C32) and backward cooperation with leather and sole suppliers (D4143) are positively and significantly related with performance. Furthermore, though not reported here, the computed values of the standardised *beta* coefficients[24] suggest that backward

cooperation with leather and sole suppliers is the largest of any regressors, followed by horizontal cooperation with other local shoe firms and by cooperation through the entrepreneurial association.

**Table 7: OLS estimation of performance equation**

| Variable | *Beta* Coefficient | Std.Error | T-Statistic | Prob. |
|---|---|---|---|---|
| Constant | -0,055352 | 0,228305 | -0,242 | 0,8096 |
| C31 | 0,322891** | 0,123193 | 2,621 | 0,0122 |
| LOGC32 | 0,629435** | 0,309575 | 2,033 | 0,0485 |
| LOGD4143 | 2,158912*** | 0,795077 | 2,715 | 0,0096 |
| R-squared | 0,35016 | F-statistic | 7,36405 | |
| Adjusted R-squared | 0,30261 | P-value (F-statistic) | 0,005 | |
| S.E. of regression | 0,83510 | | | |

Notes:
a. dependent variable is FAC1 obtained from principal component analysis on performance indicators;
b. number of observations: 63;
c. missing values are deleted pairwise;
d. ** = 5% level of significance, *** =1% level of significance

Source: author's survey

The only variable removed from the model by stepwise selection is F61, representing cooperation with buyers in the domestic market. Nonetheless as can be seen from Table 8, F61 is positively and significantly correlated with D4143 and therefore its contribution to firms' performance in the regression model is indirectly represented by this last variable.

**Table 8: Partial correlation coefficients controlling for FAC1**

| | C31 | C32 | D4143 | F61 |
|---|---|---|---|---|
| C31 | 1,0000 | | | |
| C32 | -0,0255 (P=0,847) | 1,0000 | | |
| D4143 | 0,0406 (P=0,758) | 0,0830 (P=0,529) | 1,0000 | |
| F61 | 0,0295 (P=0,823) | 0,0364 (P=0,782) | 0,2664 (P=0,040) | 1,0000 |

Source: author's survey

Finally, given that in the questionnaire performance was originally measured by several indicators, the robustness of the regression model is also tested substituting the dependent variable FAC1 with the 7 original variables[25]. This is done with two different methodologies explained in Appendix 1. The results[26] confirm the robustness of the original model for at least 4 of the performance variables: sign and level of significance of the *beta* coefficients are confirmed with both methods for B21, B23, B24 and B28 as dependent variables. In other words, production, sales, profits and employees trends are positively and significantly associated with horizontal cooperation with other shoe firms (C32) and through the entrepreneurial association (C31) and with backward cooperation with leather and sole or heel suppliers (D4143).

To conclude, the hypothesis that since trade liberalisation shoe firms' performance has been positively influenced by cooperation with other firms is confirmed by regression analysis on a random sample stratified by size, covering 63 enterprises located in Guadalajara. Horizontal cooperation with other local shoe firms and through the entrepreneurial association as well as vertical cooperation with input suppliers contributes significantly to sample firms' good performance. The estimated coefficients are in fact positive and statistically significant. Furthermore, cooperation with buyers also plays a role in performance, as indicated by its correlation with cooperation with suppliers.

## 6 A TEST OF SIZE HETEROGENEITY WITHIN THE CLUSTER

The industrial district literature has given little attention to internal differentiation by size or by performance within clusters, but it has instead favoured the diffusion of an idea of homogeneity and unity which rarely exists. In our previous work on two Mexican footwear clusters and two Italian districts the enormous internal heterogeneity came out clearly as a by-product of research (Rabellotti, 1997). Furthermore, internal heterogeneity is the focus of a recent comparative paper on footwear clusters in Brazil, Italy and Mexico (Rabellotti and Schmitz, 1997).

The present analysis of the structural changes originated by liberalisation in the Guadalajara shoe cluster confirms the existence of a considerable internal heterogeneity. From the qualitative empirical evidence presented in Section 4 the following forms of internal heterogeneity within the cluster can be emphasised:

- first, heterogeneity is generated by the suppliers' practices: some shoe manufacturers cooperate with them to develop *ad hoc* inputs tailored to their requirements, others have to buy what is available in the market;
- second, heterogeneity is generated by the use of different marketing channels: exports vs. domestic sales and within the domestic market department stores, large retail chains, catalogue sellers or small individual retailers;
- finally, there is also heterogeneity by size, confirmed by Table 9, showing that after trade liberalisation large and medium firms have performed better than small ones.

The relationship between internal heterogeneity by size and firms' performance is also tested with OLS regression analysis. This is done adding dummy variables for large (70 or more employees) and small (20 or less employees) size to the equation linking firms' performance with their cooperative behaviours, summarised above in Table 7.

As shown in Table 10, Dl (dummy for large size) and Ds (dummy for small size) are both statistically significant but their coefficients have different signs: this means that performance depends on size and the relationship is positive for large firms and negative for small ones.

**Table 9: Performance indicators by size** [a]

| | >= 70 employees % | 21-69 employees % | <= 20 employees % | Chi-squares [b] |
|---|---|---|---|---|
| Production | 70.0 (N=20) | 61.9 (N=21) | 22.7 (N=22) | 11.105 (0.025) |
| Export | 50.0 (N=16) | 23.8 (N=8) | 4.5 (N=3) | 20.185 (0.003) |
| Sales | 75.0 (N=20) | 52.4 (N=21) | 22.7 (N=22) | 11.698 (0.020) |
| Profits | 25.0 (N=20) | 14.3 (N=21) | - | 12.422 (0.053) |
| Average price | 65.0 (N=20) | 42.9 (N=21) | 68.2 (N=22) | |
| Average delivery time | 35.0 (N=20) | 33.3 (N=21) | 36.4 (N=22) | |
| Product quality | 80.0 (N=20) | 76.2 (N=20) | 73.0 (N=21) | |
| Employees | 35.0 (N=20) | 23.8 (N=21) | 9.1 (N=22) | |

Notes:
[a] % of firms which after liberalisation have registered an increase in the listed performance indicators (for average delivery time it is indicated a decrease).
[b] The significance level is in parenthesis. If the chi-squares are not reported the size distribution is not statistically significant.

Source: author's survey

In the two models in Table 10 the effect of the dummy variables on performance is additive; in other words, it increases or decreases performance by a fixed amount, regardless of the other predictors. An alternative model allows the effect of size to be different for different combinations of the other predictors. The new equation to be tested is obtained by defining a new set of independent variables that are the product of the dummy variables and the original predictors. The regression model including the dummy for large size presents some interesting results. The full equation estimated with OLS is:

$$FAC1 = \beta_0 + \beta_1 Dl + \beta_2 LOGC32*Dl + \beta_3 LOGD4143*Dl + \beta_4 C31*Dl + \beta_5 LOGC32 + \beta_6 LOGD4143 + \beta_7 C31.$$

Given this initial equation, with the stepwise selection method we obtain the model presented in Table 11. The most interesting result is the variable LOGD4143*Dl, which is statistically significant and positively related with performance. This suggests that large firms' cooperation with suppliers positively and significantly influences performance.

**Table 10: OLS estimation of performance equation with additive dummy variables for large and small size**

| | | |
|---|---|---|
| C31 | 0,316**<br>(0,121) | 0,313**<br>(0,118) |
| LOGC32 | 0,682**<br>(0,306) | 0,539*<br>(0,299) |
| LOGD4143 | 1,872**<br>(0,802) | 1,756**<br>(0,783) |
| Dl | 0,427*<br>(0,272) | |
| Ds | | -0,571**<br>(0,262) |
| Adjusted R-squared | 0,327 | 0,361 |
| S.E. of regression | 0,820 | 0,799 |
| P-value (F-statistic) | 0,001 | 0,001 |

Notes:
a) dependent variable is FAC1 obtained from principal component analysis on performance indicators;
b) number of observations: 63;
c) missing values are deleted pairwise;
d) * = 10% level of significance, ** = 5% level of significance;
e) Dl = dummy large size (≥ 70 employees); Ds = dummy small size (≤ 20 employees);
f) Constants are not reported. Standard errors in parentheses.

Source: author's survey

**Table 11: OLS estimation of performance equation with non-additive dummy variable for large size**

| | |
|---|---|
| C31 | 0,320** (0,124) |
| LOGC32 | 0,673** (0,316) |
| LOGD4143*Dl | 2,796* (1,535) |
| Dl | 0,128 (0,365) |
| Adjusted R-squared | 0,294 |
| S.E. of regression | 0,840 |
| P-value (F-statistic) | 0,001 |

Notes:
a) dependent variable is FAC1 obtained from principal component analysis on performance indicators;
b) number of observations: 63;
c) missing values are deleted pairwise;
d) * = 10% level of significance, ** = 5% level of significance;
e) Constants are not reported. Standard errors in parentheses.

Source: author's survey

From the statistical results presented in this section we can conclude that performance and some forms of cooperative behaviour, namely cooperation with suppliers, varies with size. These results also confirm the existence of internal heterogeneity within the cluster investigated.

## 7 CONCLUSIONS

The main question addressed in this paper concerns the impact of market liberalisation on the footwear industry in a Mexican cluster: Guadalajara. The impact was quite strong as seen in the huge reduction in the number of firms and domestic production and in the large increase in shoe imports. However, trade reform made firms aware of global competitive pressures. Furthermore, the later return to partial protection and the Peso devaluation gave some firms the time to respond with greater cooperation with suppliers, buyers and through the entrepreneurial association.

Cooperation within the cluster contributes to collective efficiency, defined as the comparative advantage derived from local external economies and cooperation. With regression analysis on data from a sample of 63 enterprises, we tested the hypothesis of a positive association between firms' performance and their cooperative behaviours. The model shows clearly that performance is positively related with vertical and horizontal cooperation. For all the independent variables included in the regression model, which are aggregated indicators of the different types of cooperation, we found positive and statistically significant coefficients. Therefore, one can conclude that cooperation, which is one of the main components of collective efficiency, contributes to firms' performance.

External economies are another source of collective efficiency. This effect has not been measured in our investigation, but it is a clear finding of the qualitative research. For instance, there are positive externalities generated by cooperation – called by Nadvi (1997) "external economies of joint action" – between some shoe manufacturers and suppliers: improvements in quality, fashion content, speed in delivery which percolate through the cluster. Important externalities also emerge from cooperation between the few exporting enterprises and their foreign buyers: learning from exports takes place at individual level among exporters but also spills over to the rest of the cluster.

A further effect of the structural changes caused by liberalisation is the increasing heterogeneity within the cluster. Internal heterogeneity by size influences firms' performance, as confirmed by regression analysis. Nonetheless, the more successful firms generate externality gains to others in the cluster.

From what has been said so far it appears that although some external events like the Peso devaluation and the return to higher market protection helped the footwear industry of Guadalajara, the increase in collective efficiency also played an important role in the recent recovery of the cluster. Nevertheless, the positive impact of collective efficiency affects only part of the cluster: those firms which enter into cooperative actions and those which are able to benefit from some externalities generated by cooperation. The main challenge for the future will be to transform the static part of the cluster. Is it possible to assist the less dynamic manufacturers to 'switch gear' in order to meet the challenges of the increasingly competitive and rapidly evolving international market? How can they be helped to cooperate and upgrade? These are crucial questions for policy makers and donors.

**NOTES**

1. This paper is part of an IDS research project directed by Dr. Hubert Schmitz and financed by the Department for International Development, London. I am grateful to participants in seminars held at the Institute of Development Studies (Sussex) in April 1997 and at Bocconi University (Milan) in September 1997 for their helpful comments. Paolo Giudici helped me with statistical analysis and Khalid Nadvi and Hubert Schmitz made valuable comments on a previous draft. Finally, I have a debt of gratitude to the Camara de la Industria del Calzado and many entrepreneurs in Guadalajara. The usual disclaimer applies.

2. For a summary of the argument and evidence see Schmitz (1995).

3. A turning point may be defined as a break with the past that opens up new opportunities or poses new threats.

4. It is not realistic to expect trade liberalisation to lead to a substantially greater efficiency and competitiveness of the domestic industry in a short period of time. Following Ten Kate (1192), one should expect a lag of at least 5-10 years before the benefits of trade reform fully materialise.

5. A very good and comprehensive survey of this literature is presented in Rodrick (1995).

6. In a study on trade reform in Africa Lall (1998) adopt an alternative approach to standard neoclassical theory based on *evolutionary*, or 'neo-Schumpeterian', theory to analyse how import liberalisation may be expected to affect technological activity in developing countries.

7. External economies are defined as the by-product of some activities undertaken within the clusters; while cooperation effects are the result of explicit and voluntary cooperative behaviours (Rabellotti, 1997).

8. According to the last available census (1990), the population of the metropolitan area of Guadalajara is 2,9 million.

9. The opening up of the market had a very negative impact on Calzado Canadà leading to a long period of crisis and only more recently to a profound restructuring.

10. Although most of the firms selected were affiliates to the local trade association, a few firms, which did not belong to the Camara, were also interviewed.

11. In the previous survey carried out in Guadalajara and Leon, the sample was also randomly taken from the register of members of the local entrepreneurial associations. According to the associations and to sector experts interviewed, the lists are well representative of the formal enterprises because when firms decide to register officially for paying taxes and social benefits they usually become members of the entrepreneurial association, which helps them in dealing with bureaucratic procedures (Rabellotti, 1997).

12. The questionnaire was elaborated together with Peter Knorringa, Khalid Nadvi and Hubert Schmitz and also adopted for field work carried out in clusters in India, Pakistan and Brazil.

13. Figures about the impact of liberalisation on suppliers were collected only in the tannery sector. According to estimates of the local Chamber of Leather Producers, there was a 40 per cent decrease in leather production (interview with Lic. Rogelio Alferez, September 1996).

14. In our previous survey we found that most of the shoe firms in Guadalajara bought lasts in Leon because

local producers, among which the quoted firm was one of the largest, were all considered low quality.

15. According to the 1989 Mexican Industrial Census there were more than 19,000 footwear retailers, the large majority of them individual retailer stores or small chains.

16. Both the Camara del Calzado in Guadalajara and Leon have a data base which includes information respectively on some 1300 and 4300 retailers about their payment history and their behaviour (e.g. if he/she accepts orders when delivered, how often he/she returns orders for quality problems).

17. These are estimates provided by the local Camara del Calzado.

18. In the 1990s a new initiative for promoting *agrupamientos industriales* was launched by the Camara del Calzado.

19. This methodology was developed to bring about cooperation among small enterprises in rural areas. In Guadalajara at the beginning of the 1980s Nafin experimented the *agrupamientos* in an urban setting, promoting groups in different sectors, such as footwear, clothing, furniture and machinery.

The stages of the process for creating the groups are the following:

- first of all, a selection of enterprises were invited to participate in the group. The selection was based on a study of the structural characteristics and motivations of firms to cooperate;
- secondly, selected entrepreneurs attended a training course on production, human resources, management, accounting and marketing and at the same time an evaluation exercise was undertaken on each firm by university students;
- thirdly, visits to each other's enterprise and diverse social activities were encouraged to promote cohesion within the group;
- finally, at the end of the course each group elaborated plans for future joint projects.

20. Shoes are one of the main exports from the state of Guanajuato, where Leon is located.

21. For more information about the sample see Section 4.

22. This variable has to be considered cautiously, given that the sample is selected from the list of the Camara's members. However among the Camara's members there is a wide variety of opinions concerning the activities of the entrepreneurial association. This result is also confirmed by our previous inquiry (Rabellotti, 1997).

23. Information about cooperation with subcontractors and buyers for the export market was also collected, but due to the high number of missing values it could not be included in the statistical analysis.

24. The standardised *betas* are the estimated coefficients in a regression where the original variables have been divided by their sample standard deviation so as to clean the estimated coefficients of their dependence on measurement units.

25. The share of exports is omitted from the principal component analysis, due to the high number of missing values.

26. Results are not reported in the paper, but on request they are available from the author.

**APPENDIX 1**

This Appendix presents the technical details of the statistical analysis, whose results are discussed in Section 5 and 6. The first step in analysing the data from the sample survey is to build aggregated indicators of vertical and horizontal cooperation and performance.

The indicators of cooperation are obtained adding various forms of cooperative behaviours undertaken by the sample firms. Taking as an example question 3.2 about inter-firm cooperation (see Appendix 2), the resulting aggregate indicator is:

$$\sum_{j=1,..,7} W_j \, I_{ji}$$

$I_{j=(1,..,7),}$ = answers of firm *i* (i=1,...,63) to each item - from a) to g) - included in question 3.2;

$W_j$ = weight attributed to item *j*, $0 \leq W_j \geq 1$, $\sum_{j=1,..,7} W_j = 1$.

For weighting items we use two different methods and then compare the results with regression analysis, obtaining the same model. The two methods are the following:

- every item is weighted equally;
- items are weighted differently, according to the type of cooperation involved. For example, in question 3.2 exchange of information with other local shoe firms is weighted 0.5/7 because it is considered *a priori* the easiest way of cooperation, while joint product development is considered the most difficult cooperative action and weighted 1.5/7; the other remaining 5 items are all weighted 1/7.

With this methodology we build the following independent variables: horizontal cooperation with other local shoe firms (C32), backward cooperation with leather and sole suppliers (D4143) and forward cooperation with buyers in the domestic market (F61). These variables are treated in the regression model as continuous. Furthermore, an ordinal variable indicating the changes in the use of the services supplied by the entrepreneurial association (C31) is also used as a predictor in regression analysis.

The dependent variable is a performance indicator obtained with principal component analysis, estimated as linear combinations of the original variables. Table A-1 presents the rotated factor matrix with three components extracted. The first component explains 47 per cent of the total sample variance and is characterised by the following variables with the highest factor loadings: output trend (B21), annual sales trend (B23), net profit trend (B24) and trend of the number of workers (B28). The other two components together explain only 33 per cent of the total sample variance and are not considered in the rest of the analysis. For the first component, factor score coefficients for each observation are estimated and then used as the dependent variable (FAC1) in regression analysis.

To test the robustness of the results obtained with principal component analysis we have also used canonical correlation analysis. This analysis is similar to principal component analysis with the difference that its focus is on the relationship between two groups of variables and not within a set of variables, as in the case of principal component analysis. In canonical correlation analysis we look for vectors *a* and *b* for

which the correlation between *a'x* and *b'y* is maximised. In our case, canonical correlation analysis confirms the results obtained with principal component analysis: the variables with the highest factor loadings in the first component, adopted as dependent variable in regression analysis, have also the highest coefficients in the first canonical variable.

**Table A-1: Rotated factor matrix of performance indicators**

| | Factor 1 | Factor 2 | Factor 3 |
|---|---|---|---|
| B21 Output (in quantity) | 0.93 | 0.08 | -0.04 |
| B23 Annual sales | 0.95 | 0.04 | -0.08 |
| B24 Net profit | 0.84 | -0.09 | -0.01 |
| B25 Average price of products in US $ | -0.18 | -0.79 | 0.15 |
| B26 Average speed of product delivery | -0.02 | -0.04 | 0.98 |
| B27 Average quality of products | -0.50 | 0.62 | 0.17 |
| B28 Number of workers | 0.68 | 0.50 | 0.17 |
| Explained variability (%) | 47.00 | 18.00 | 15.00 |

Source: author's survey

Given the initial model composed of FAC1 as response variable and C31, C32, D4143 and F61 as regressors, we use the stepwise selection method for identifying the relevant variables to predict sample firms' performance. The stepwise selection of independent variables is a combination of forward and backward procedures. In forward selection, the first variable considered for entry into the equation is the one with the largest positive or negative correlation with the dependent variable. The F test for the hypothesis that the coefficient of the entered variable is 0 is then calculated. To determine whether this variable (and each succeeding variable) is entered, the F value is compared to an established criterion (a variable is included if the p-value associated with the F statistic is less than or equal to 0.05). If the first variable selected for entry meets the criterion for inclusion, forward selection continues. The procedure stops when there are no other variables that meet the entry criterion.

Backward selection starts with all variables in the equation and sequentially removes them. Instead of entry criteria, removal criteria are specified. A variable is removed if the p-value associated with the F statistic is greater than or equal to 0.10.

In stepwise selection, the first variable is selected in the same manner as in forward selection. If it passes the criterion, the second variable is selected based on the highest partial correlation. From this point, stepwise selection differs from forward selection: the first variable is examined to see whether it should be removed as in backward elimination. In the next step, variables not in the equation are examined for entry. After each step, variables already in the equation are examined for removal. Variable selection terminates when no more variables meet entry and removal criteria. The three procedures do not always result in the same equation; when they do, it suggests that the model is robust.

The model obtained with stepwise selection and presented in Table 7 above is tested against a simpler

model without C31, the ordinal variable, as well as against a more extensive model including the interaction variable LOGC32*LOGD4143. For testing the two alternative models, the F-test is used and the original selected model results as the best possible equation.

The same equation is also estimated with the independent variables aggregated according to the alternative weighting system (equal weight for each item). The predicted dependent variables with the two different weighting systems, adopted to aggregate the regressors, do not differ considerably, further confirming the robustness of the model. Furthermore, the plot of standardised residuals against standardised predicted values does not show any particular systematic pattern.

Finally given that in the questionnaire performance is measured by several indicators, the robustness of the regression model is also tested substituting the dependent variable FAC1, obtained with principal component analysis, with the 7 original variables. This can be done in two different ways: first of all, testing with OLS 7 separate models in which the independent variables are always the same while the dependent variables are the 7 performance indicators and secondly, with multivariate regression analysis, testing the relationship between a set of interrelated dependent variables (the 7 performance variables) and one group of independent variables.

There is a substantial difference in the two methods (Krzanowski, 1988):

- in the first case we test 7 different multiple regression equations in which there is just one dependent variable for each system ($p$=1) and $q$ explanatory variables. They are therefore treated as univariate systems and possible correlation among the different dependent variables is ignored;
- with multivariate regression analysis, a system of $p$ dependent ($y_1$ , ..., $y_p$) and $q$ explanatory ($x_1$ , ..., $x_q$) variables is considered, establishing the relationships between these two sets of variables for an observed data set. Its objective is therefore to derive models that will enable each of the values $y_{i1}$ , ..., $y_{ip}$ for the $i$th individual to be predicted, given the values $x_{i1}$ , ..., $x_{1q}$ .

Both methods confirmed the robustness of the original model for at least 4 of the original performance variables.

**APPENDIX 2**

**Legenda:**

| | | | | |
|---|---|---|---|---|
| + | increase | | | |
| = | neither increase nor decrease | | | |
| - | decrease | | | |
| **IF INCREASE OR DECREASE, PLEASE SPECIFY:** | | | | |
| + | increase | OR | + + | strong increase |
| - | decrease | OR | - - | strong decrease |

## 1 GENERAL INFORMATION

1.1 Name of enterprise: _____

1.2 Main product:

| | | | |
|---|---|---|---|
| -Ladies Shoes | YES | -Leather | YES |
| -Men Shoes | YES | -Synthetic | YES |
| -Children Shoes | YES | -Textile | YES |

1.3 Total number of employees: _____

1.4 Year of establishment: _____

## 2 PERFORMANCE

What has happened to the following as compared before trade liberalisation, at the end of the '80s:

| | + | = | - |
|---|---|---|---|
| 2.1 Output (in quantity) | | | |
| 2.2 % exported | | | |
| 2.3 Annual sales | | | |
| 2.4 Net profit | | | |
| 2.5 Average price of products in US $ | | | |
| 2.6 Average speed of product delivery | | | |
| 2.7 Average quality of products | | | |
| 2.8 Number of workers | | | |

## 3 HORIZONTAL COOPERATION WITH OTHER SHOE FIRMS

3.1 Do you make use of the *Camara del Calzado* more frequently now as compared before trade liberalisation, at the end of the '80s?

| + | = | - |
|---|---|---|
| + + + | | - - - |

3.2 Do you cooperate with other local shoe producers? Specify for the following areas:

| | a lot | a little | never |
|---|---|---|---|
| a) Exchange of information and experiences | | | |
| b) Sharing orders | | | |
| c) Joint product development | | | |
| d) Lending machinery | | | |
| d) Joint marketing of products | | | |
| e) Joint labour training | | | |
| f) Joint purchase of inputs | | | |

## 4 BACKWARD COOPERATION WITH SUPPLIERS OF INPUTS

4.1 Do you cooperate with your main suppliers of finished leather? Specify for the following areas:

| | a lot | a little | never |
|---|---|---|---|
| a) Exchange of information and experiences | | | |
| b) Negotiation of payment and delivery conditions | | | |
| c) Joint product development | | | |
| d) Improving quality | | | |
| e) Respect of delivery timing | | | |

4.2 Do you now change suppliers of finished leather more often as compared before trade liberalisation, at the end of the '80s?

| + | = | - |
|---|---|---|
| + + + | | - - - |

4.3 Do you cooperate with your main <u>suppliers of soles</u>? Specify for the following areas:

| | a lot | a little | never |
|---|---|---|---|
| a) Exchange of information and experiences | | | |
| b) Negotiation of payment and delivery conditions | | | |
| c) Joint product development | | | |
| d) Improving quality | | | |
| e) Respect of delivery timing | | | |

4.2 Do you now change <u>suppliers of soles</u> more often as compared before trade liberalisation, at the end of the '80s?

| + | = | - |
|---|---|---|
| + + + | | - - - |

## 5 BACKWARD COOPERATION WITH SUBCONTRACTORS

5.1 Are you now <u>putting out</u> more or less work as compared before trade liberalisation, at the end of the '80s? Specify for each of the following stages of production:

| | + | = | - |
|---|---|---|---|
| a) Upper cutting | | | |
| b) Upper stitching | | | |
| c) Hand-stitching | | | |
| d) Heel covering | | | |
| e) Sole cutting | | | |
| f) Lasting | | | |
| g) Finishing | | | |

5.2 Do you cooperate with your main sub-contractors? Specify for the following areas:

| | a lot | a little | never |
|---|---|---|---|
| a) Exchange of information and experiences | | | |
| b) Negotiation of payment and delivery conditions | | | |
| c) Technological upgrading | | | |
| d) Quality control | | | |
| e) Labour training | | | |

5.3 Do you now change sub-contractors more often as compared before trade liberalisation, at the end of the '80s?

| + | = | - |
|---|---|---|
| + + + | | - - - |

## 6 FORWARD COOPERATION WITH BUYERS

6.1 Do you cooperate with your main buyer for internal market? Specify for the following areas:

| | a lot | a little | never |
|---|---|---|---|
| a) Exchange of information and experiences | | | |
| b) Negotiation of payment and delivery conditions | | | |
| c) Technological upgrading | | | |
| d) Quality control | | | |
| e) Setting of product specifications | | | |
| f) Organisation of production | | | |

6.2 Do you now change <u>buyers for internal market</u> more often as compared before trade liberalisation, at the end of the '80s?

| + | = | - |
|---|---|---|
| + + + | | - - - |

6.3 Do you cooperate with your main customer for export? Specify for the following areas:

| | a lot | a little | never |
|---|---|---|---|
| a) Exchange of information and experiences | | | |
| b) Negotiation of payment and delivery conditions | | | |
| c) Technological upgrading | | | |
| d) Quality control | | | |
| e) Setting of product specifications | | | |
| f) Organisation of production | | | |

6.4 Do you now change <u>customer for export</u> more often as compared before trade liberalisation, at the end of the '80s?

| + | = | - |
|---|---|---|
| + + + | | - - - |

**REFERENCES**


Arias, P., ed., 1985, *Guadalajara, la gran ciudad de la pequeña industria*, Zamora: El Collegio de Michoacan.

Arias, P., 1992, *El calzado en la region jalisciense: la industria y la camara*, Guadalajara: Camara de la Industria del Calzado de Jalisco.

CANAICAL, 1996, 'Perfil de la Industria del Calzado', mimeo, Mexico City: Camaras de la Industria del Calzado.

CEESP, 1993, 'Boletin Informativo', mimeo, Leon: Centro de Estudios Economicos del Sector Privado.

Dominguez-Villalobos, L., Grossman, F., 1992, 'Employment and Income Effects of Structural and Technological Changes in Footwear Manufacturing in Mexico', Working Paper, World Employment Programme Research, No.224, Geneva: International Labour Office.

INEGI, 1994, *XIII Censo Industrial*, Mexico City: Instituto Nacional de Geografia, Estadistica e Informatica.

ITESM, 1995, 'Jalisco 2000; De frente a las nuevas realidades', mimeo, Guadalajara: ITESM.

Krzanowski, W., 1988, *Principles of Multivariate Analysis. A User's Perspective*, Oxford: Clarendon Press.

Lall, S., ed., 1998, *The Technological Response to Import Liberalisation in Africa*, London: Macmillan (forthcoming).

Nadvi, K., 1997, 'The Cutting Edge: Collective Efficiency and International Competitiveness in Pakistan', *IDS Discussion Paper*, No.360, Brighton: Institute of Development Studies, University of Sussex.

Rabellotti, R., 1997, *External economies and cooperation in industrial districts. A comparison of Italy and Mexico*, London: Macmillan.

Rabellotti, R., Schmitz, H., 1997, 'The internal heterogeneity of industrial districts in Italy, Brazil and Mexico', *IDS Discussion Paper*, No.59, Brighton: Institute of Development Studies, University of Sussex (forthcoming in *Regional Studies*).

Schmitz, H., 1995a, 'Collective efficiency: growth path for small-scale industry', *Journal of Development Studies*, Vol. 31, No. 4: 529-66.

Schmitz, H., 1995b, Small Shoemakers and Fordist Giants: Tale of a Supercluster**,** *World Development*, Vol. 23, No. 1:9-28.

Schmitz H., Musyck B., 1994, 'Industrial Districts in Europe: Policy Lessons for Developing Countries?', *World Development*, Vol. 22, No.6:889-910.

Ten Kate, A., 1992, "Trade Liberalisation and Economic Stabilization in Mexico: Lessons of Experience", *World Development*, Vol. 20, No.5: 659-72.

Woodruff, C., 1997, "Trade Associations and Coalition Bargaining with Incomplete Contracts", mimeo, San Diego: University of California.