Economic liberalisation and the environment

- a case study of the leather industry in Brazil

By Jan Thomas H. Odegard
Department of Human Geography
University of Oslo, Norway.

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Economic liberalisation and the environment - a case study of the tanning industry in Brazil[1]

Introduction

In the 1990s two major political global processes have had their «take-off»: Efforts to liberalise the world economy, and efforts to protect the local and global environment. An interesting point is that the two processes represent forces that tend to pull in different directions. While the aim of the Uruguay rounds of the GATT negotiations and establishment of the World Trade Organisation (WTO) in 1994 was national deregulation and to free the market forces, the aim of Agenda 21 following the Earth Summit in Rio de Janeiro in 1992 was to introduce regulatory measures to prevent further pollution and exploitation of natural resources by human activity. Generally stated one could say that many of the activities WTO is aiming at liberalising are the same ones the environmental regulations are trying to get under control.

To be able to better understand the interaction between the two phenomena, it is fruitful to study cases of industries and economic activities that have been subject to both processes. The purpose of this paper[2] is to illustrate this interaction by looking at the changes that have taken place in the Brazilian tanning industry in the 1990s. Until the mid 1980s, Brazil was one of the most protectionist countries in the world, often referred to as having an inward oriented development model. Self reliance and independence were important strategic goals. The start of the democratisation process in 1985 also triggered efforts to liberalise the economy and trade. These efforts did not have a significant impact until the neo-liberal president Fernando Collor de Mello took office in 1990. Mello was also the host to the Earth Summit in Rio in 1992. He made efforts to improve the poor environmental image of Brazil and the country's environmental performance. The result has been two parallel processes, one of increased economic liberalisation and another of more strict environmental regulation.[3]

The tanning industry has three distinct features that makes it a good case for analysing the two processes. First, tanning is an industry with a high pollution load. Second, leather is a world market commodity. The demand for hides is high due to low supply globally. Finally, leather can be divided into three products, each the result of a different and successive process stage. The production stages of «wet-blue», «crust», and «finished leather»[4] each involves a distinct level of

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[1] The empirical basis of this paper is nearly two years of study of the leather industry through the project «Environmental Regulation, Globalisation of Production and Technological Change» where the Department of Human Geography at the University of Oslo is one partner), and specifically one month of fieldwork carried out in Brazil in April/ May 1998. Directors in twelve companies in the leather industry and fifteen highly qualified tanning experts were interviewed on the Brazilian tanning industry. Due to an agreement with the informants of sending them direct quotes for approval before using them in presentations, the individual sources will not be mentioned by name in this paper.

[2] I am grateful for comments to this article by Hege Knutsen, Anne Gjerdåker and Jan Tore Odegard.

[3] In this paper the term environmental regulation means both the law and the enforcement of it.

[4] «Wet-blue» is a term referring to the hide after is has been through the initial tanning process. The use of chromium as a tanning agent gives the hides a blue-grey colour. Chromium makes the hides resistant to biological degradation, and the hides are usually left wet after soaking, hence the term «wet-blue». «Crust» is wet-blue that has gone through the stages of splitting, re-tanning, dying, drying and stretching. «Finished leather» is crust which has been subject to surface treatment such as buffering (sanding of the uneven surface grain), stamping of patterns

value added, capital intensity and pollution. These distinct characteristics results in different influence on each product stage by national and local incentives and regulation, resulting in different patterns of location and interaction with other industries.

This paper consists of four parts. The first is a presentation of the dramatic structural changes that the Brazilian tanning industry passed through during the last decade. Then follows possible explanations to the changes related to economic liberalisation and environmental regulation. The third part is an attempt to answer the specific question as to what extent liberalisation has influenced the environmental performance of the tanning industry. In the fourth, part some final considerations are made of the apparent trend that Brazilian tanners seem to be falling into a trap of specialising in export of a low value added and pollution intensive product.

The restructuring of the tanning industry in the 1990s

At the end of the 1980s Brazil had become virtually self reliant in leather and leather shoes, and was one of the main exporters of leather and leather shoes in the world. During the last two decades Brazil produced and exported about five percent of all world leather. From the late 1960s until 1986 the output of light bovine leather[5] almost doubled, and from 1986 to 1994 output grew by another 40 percent (FAO 1997). By the early 1990s, Brazil was the largest producer of light bovine leather in Latin-America, and the fifth largest producer in the world after South Korea, Italy, China and India. Production was carried out exclusively by domestic tanneries. The number of tanneries reached a peak in the mid 1980s of more than 700 companies employing more than 70.000 people. Together with about 4000 shoe manufacturers, the leather industry employed directly and indirectly about one million people. More than 95 percent of the bovine raw hides used were Brazilian, due to the fact that Brazil has the largest cattle stock in the world.

During the 1990s there have been six main structural changes in the tanning industry. First the industry has passed through a process that might be called *regressive restructuring*[6]. The number of companies has declined sharply since the late 1980s. Between 55 and 65 percent of the companies have gone out of business, and many of the surviving companies are heavily indebted (Gazeta Mercantil 1998). There were about 250 functioning tanneries in early 1998, of which only 20 did well. The general impression is that the crisis has not yet passed. The industry today has a surplus production capacity of approximately 30 percent, and there are frequent bankruptcies. Brazilian tanning experts are serious underemployed, and more than 200 have emigrated to China alone.

The second change is an increased concentration of the production capacity into large groups. The stronger tanneries buy the bankrupt or weak companies, and create scale advantages through accumulated production capacity. Already in 1993, 11 percent of the tanneries had 70 percent of the turnover, while 65 percent of the tanneries were of the artisan type with less than 10 percent of the production. Among the big groups are also foreign investors that go in as owners or rent surplus production capacity from domestic tanneries. Especially Italian tanners are

on the surface, dying by spray or roller-coating, and mechanical treatment to adjust the hide texture.

[5] Light leather has been primarily tanned with chromium, while heavy leather is primarily tanned with vegetable agents.

[6] *Regressive restructuring* is a term for the restructuring of an industrial sector leading to clear negative development for the companies in the industry, both in regard to production volume, number of companies and skill level.

on the offensive to gain production capacity, and guesstimates among the tanners in Brazil are that the Italians own companies with 10 percent of the total production capacity for wet-blue in the industry and have an owner interest or rent production capacity in companies that do another 30-40 percent of the total production in the national industry.

The third change has been the growth of the so-called «Briefcase tanners» (called «Curtumes de Pasta» in Brazil). These are usually individuals that use their tanning experience, network and favourable access to capital to usilize the excess production capacity of the de capitalised and indebted tanners. The purpose is to organise a production chain and maximise profits. The briefcase tanners is a phenomenon that can be observed in other countries with similar conditions as well, such as the Czech Republic. They are said to emerge in periods of restructuring and de-capitalisation to make quick profits, and take on other roles (such as running tanneries or dealing in hides) in periods of stability in the industry.

The fourth structural change is that the tanning industry has become increasingly export oriented. While 27 percent of the produced leather was exported directly and 26 percent was exported indirectly, mainly as shoes, in 1990, the numbers in 1997 were 50 and 22 percent respectively.

This growth in export is closely connected to the fifth change, a 32 percent growth in the availability of domestic hides over the period 1990-1997. This is a result of a doubling of the slaughtering of cattle from 16 in 1984 to 29 million heads annually in 1997.

Table 1. Availability of hides in Brazil

Year	1986	1990	1991	1992	1993	1994	1995	1996	1997
Domestic hides	16	24	23	23	24	26	27	29	29
Imported hides	1	2	2	2	3	3	3	3	2
Total hides available	17	26	25	25	27	29	30	31	31

Source: Abicouro 1997

This is due to increased national and international demand for meat and an explicit policy to move away from the traditional extensive cattle raising which deemed to be uneconomic. It is important to note that cattle is never slaughtered for the sake of the hide, as that only makes up 10-15 percent of the slaughter value. Systematic slaughtering the animals at an earlier age (at 18 months compared to the earlier average of four years) improves the quality of the meat, and includes the positive (although unintentional) side effect of improving the quality and availability of hides. While Brazil has 160 million cattle and produces 30 million hides annually, USA produces 40 million hides with only 100 million heads of cattle. This shows that there is still a substantial potential for increasing the rate of slaughtering, and the trend of growth in the annual volumes of hides will most likely continue.

While the export rate of other leather products has remained stable or declined since 1993, all the growth of available hides have gone into the production of wet-blue for direct export, and wet-blue accounts for 90 percent of the total growth in leather exports. In 1997, 72 percent by weight and more than half the earnings from leather exports were due to wet-blue. This development is shown in Table 2.

Table 2. Leather export from Brazil by stage of production (in millions of hides)

Year	1990	1991	1992	1993	1994	1995	1996	1997
Wet-blue	4	4	5	4	4	8	10	11
% share of export	*59*	*61*	*62*	*51*	*57*	*69*	*66*	*72*
Salted hides	0	0	0	0	0	1	1	1
% share of export	*0*	*0*	*0*	*1*	*1*	*6*	*6*	*4*
Crust	2	1	1	2	2	1	2	2
% share of export	*23*	*21*	*17*	*25*	*21*	*12*	*11*	*12*
Finished	1	1	2	2	2	2	2	2
% share of export	*18*	*18*	*21*	*23*	*21*	*13*	*13*	*13*
Total export of leather	7	6	8	8	8	12	15	16

Source: Abicouro 1997; Abiqic various years

Fundamental characteristics of the wet-blue production is that 15 percent of the value added in the leather production chain is generated during the wet-blue process[7], whereas more than 80 percent of the pollution occurs in this stage of production (Miljøministeriet 1992). Moreover the wet-blue process is financially less risky, because the wet-blue is more easily traded to downstream customers. It allows for economies of scale and is neither particularly knowledge nor labour intensive. It also has a shorter production cycle, so that less capital is bound up in raw material in this part of the production process.[8]

A sixth structural change is the relocation of tanneries to the interior and Northern regions of Brazil, a process called «interiorisation», in two waves. The first relocation of tanners started due to northward movement of cattle and slaughterhouses approximately 20 years ago. This upstream restructuring was a consequence of the price increase on pasture land in the industrialising South, combined with significant incentives for cattle farmers to relocate to the less developed West-Central and Northern parts of the country. The consequence has been that while more than half of the cattle was located in the three Southern states in the 1970s, only 17 percent remain today. In 1994 the highest concentration of cattle is located the West-Central states (34 percent). The relocation of tanners was further motivated by increasing incentives directly to the industry to move to the new cattle states. These incentives continue to exist, and include heavy tax reductions, cheap credit,land and equipment. The wages are lower, and environmental costs are lower due to cheaper land for treatment facilities and more lenient regulations compared to the South. The last point is no less important as the majority of the new tanneries in the West-Central areas produce wet-blue (so-called «bluseiros»).

A second and more recent wave of relocation occurred in connection with the interiorisation of the shoe industry. In the mid 1980s Brazil was the fourth largest producer of shoes in the world, following China, Italy and India. More than 500 million pairs were produced annually, of which 25-30 percent were exported. 85 percent of all shoe production was located in the traditional shoe producing districts of Novo Hamburgo in Rio Grande do Sul and Franca in the state of São Paulo. The restructuring of the industry that is the main customer of the tanneries has mainly taken place over the last five years. It is a result of the need of the shoe industry[9] to

[7] The value per kilo increases from USD 0.8 for salted hides to USD 2.3 for unsplit wet-blue.
[8] Raw hides makes up between 50 and 60 percent of the production costs of finished leather.
[9] The Brazilian shoe industry is made out of 2000-4000 companies with 300.000 employees.

reduce costs to meet increasing competition from Asia. An example is shoes from China offered on the market at average prices 35 percent below the Brazilian ones. By relocating to the Northern regions the companies can take advantage of significant incentives and substantially lower salaries than in the traditional shoe producing districts in the South. In the Northern areas people are poorer and not unionised. They often have access to land to supplement their income with food. A majority of the shoe companies are small, labour intensive and artisan, and doing subcontracting work for a handful of dominating conglomerates. Hence, they are footloose, and the relocation is taking place at a high rate. Although there is no detailed documentation of *tanners* relocating their production facilities Northward in great numbers to be closer to the shoe companies, there has been a tendency of already established tanners in the northern and West-Central states expanding their production.

Explaining the changes in the tanning industry

The dramatic restructuring of the Brazilian tanning industry during the 1990s is due to a number of forces at play, some pulling in the same direction, some not. The main focus of this paper is on the forces of economic liberalisation. «Economic liberalisation» is defined as the removal of restrictions created by the national authorities to maintain a certain level of national control of the economy, markets, industries, and the human and natural resources. Liberalisation involves the reduction and/or elimination of trade tariffs controlling the type and amount of goods, products and currencies entering and leaving the country. It also includes the reduction of state and national ownership through privatisation and admitting foreign ownership. Measures to improve the integration of a country into a liberalised world, such as strict budget discipline, stabilise the currency through market mechanisms and other measures to build confidence and attract foreign investment , are also considered part of the liberalisation process.

Economic liberalisation in Brazil

To a great extent Brazilian industry was protected from foreign competition until the military dictatorship ended in 1985. The shift also marked the demise of the prevailing inward looking development model promoted by the military (for reasons of national security) and the nationalistic entrepreneurs striving to make Brazil independent of foreign consumer and capital goods, as well as technology. During the debt crisis of the 1980s, much political power was transferred to foreign financial institutions who prescribed neo-liberal structural adjustment programs to solve the crisis. These demands were not immediately embraced by the new and weak democratic government which was trying to consolidate power and build legitimacy in the middle of the most serious economic crisis in 50 years. The protectionist and inflationary politics had created a sedate industry dominated by speculative rather than innovative companies, and thi was gradually recognised. Throughout the last part of the 1980s there was an understanding that the industry n general needed time to adapt to international competition.

Since none of the plans to reduce the inflation had the desired effect, and the industry continued to profit from financial speculation and protected markets, it was not until the first directly elected president Fernando Collor de Mello took office in 1990 that trade liberalisation started. There were some minor reductions in the tariffs from the mid 1980s, but the drastic change occurred with Collor. In accordance with neo-liberal ideas of letting the market solve the

problems, Collor opened up for imports by reducing tariffs in accordance with the rates recommended by GATT. Subsidies and other privileges to the national industry were drastically reduced and a massive privatisation program of the state owned companies was announced. Much due to the rash liberalisation in combination with the negative consequences of the international recession in 1991 and 1992, Collo's stabilisation plan did not work and inflation soared again. Poor economy both on the federal and the state level prevented the execution of the program to strengthen the national industry in the face of international competition, and multinational companies easily captured substantial market shares.

The two governments following Collor's impeachment in 1992 saw thousands of national companies go bankrupt and millions of workers loose their jobs. Selective and temporary measures to protect the most strategic and vulnerable industries have been introduced. These measures were loudly criticised by foreign authorities and international financial institution as being in conflict with the liberalisation process within WTO and the initiation of the regional free-trade zone Mercosul in 1995.

For the tanning industry the liberalisation has had both direct and indirect consequences in the market for leather and shoes. Brazil has been one of the few countries in the world with enough hides to export and seems to have taken advantage of this in two ways. Until 1990 the government limited export through regulatory measures and reduced the cost of raw material for the domestic manufacturers of leather goods, thus creating a cost advantage close to 20 percent compared to hide prices in Europe (Ballance et al. 1992). Since 1990 the advantages has been reaped by exporting low quality semi processed hides at high profits. As mentioned above the growth in production and export of wet-blue has been one of the most significant structural changes in the industry.

One of the two Brazilian tanning federations, ABICOURO[10], commissioned a study in 1998 to identify the crucial factors underlying the development of wet-blue export, which has mainly gone to supply Italy (25 percent) and the rest of Europe. The study concluded that the European Union's tariffs of the on Brazilian crust and finished leather (7 percent) was the decisive factor. Since the Brazilian tariffs on export of wet-blue were removed in 1994, the European import tax made the crucial difference in costs as to what type of leather to import from Brazil. At the same time the Brazilian export tax on salted hides (9 percent), made wet-blue the only Brazilian leather European customers could buy from Brazil without paying either export or import duty.

Table 3. The cost of leather produced in Italy with Brazilian raw material

(US Cents for each square foot)

Exported from Brazil	***Salted hides***	***Wet-blue***	***Crust***	***Finished***
Cost of procesing in Brazil	0,0	18,0	48,7	81,6
Internal transport in Brazil	2,7	1,2	0,3	0,3
Export tax from Brazil	9,2	**0,0**	0,0	0,0
External transport from Brazil	6,0	2,6	0,9	0,9
Import tax to Italy	0,0	**0,0**	9,8	11,9

[10] Abicouro is an new industry federation formed in 1996 by 70 tanners mainly in Rio Grande do Sul and São Paulo. It is dominated by higher-value-added companies that see the growth of the wet-blue exports as detrimental to the industry.

Exported from Brazil	***Salted hides***	***Wet-blue***	***Crust***	***Finished***
Cost of processing in Italy	90,6	65,6	32,3	0,0
TOTAL	**108,5**	**87,3**	**92,1**	**94,8**

(Source: Abicouro 1998)

In addition to this forceful promotion of increased production of wet-blue there were also other factors that strengthened this development. To specialise in wet-blue has been the easiest way for the national companies to survive the new and harsher economic climate for Brazilian companies. First of all, producing wet-blue relieves the problem of lack of capital. Wet-blue has a short production cycle (four days as compared to 20 to complete the whole process), and the companies are able to produce high volumes to satisfy the increasing international demand. The process is highly automated as well and it opens up for economies of scale. Wet-blue also leaves the tanneries more flexible in relation to the end markets because wet-blue can be used for a wide range of different end products than leather from the later stages.

Another reason for the growth of wet-blue is it can be a way to reduce two of the main competitive problems of the Brazilian leather industry. One is the extremely low quality of raw materials[11]. 90 percent of the Brazilian hides are classified in the two lowest quality categories of five. The other is the lack of skills among Brazilian tanners and shoe makers to make internationally competitive products out of them[12]. The low Brazilian hide quality has several consequences. Firstly it reduces the value of the hides and end products as it restricts the use of the hides to cheap products or products. Secondly, for the low quality hides to become internationally competitive they require processing with knowledge intensive finishing

[11] The low quality of the Brazilian hides is due to a number of factors. First of all the Brazilian cattle is dominated by the zebu race, which adapts to the hot, wet-and-dry climate of West-Central Brazil, but its hide is thin and porous due to stretching of the hide fibers by the seasonal changes. In this climate there are many insects, parasites and thorns that damage the hides. The cattle-raising in Brazil has traditionally been extensive, subjecting the hides to more damage. As the cattle is raised for meat and the hide only accounts for 10-15 percent of the slaughter-value, the farmers pay little attention to the quality of the hide in the process of branding, herding (barbed wire) and medical treatment. Also the limited care the slaughter houses take of the hides, result in extensive damage and unpredictable hide qualities.

In recent years several attempts have been made to improve the quality of the raw hides. As mentioned above Brazilian cattle today graze for a shorter period before being slaughtered, which reduce the amount of damage climate and nature cause to the hide. There has been a campaign to educate farmers about how and where to brand the animals, what measures can reduce natural harm to the hides, and the general advantages of more intensive production and better animal care.

Despite these efforts, the general opinion in the leather industry is that there has been a marked reduction in the quality of Brazilian wet-blue. This deterioration is related to the high demand, which allows the producers to process even the lowest quality hides, and to use less chemicals, and both increase profits.

[12] The reason the tanning know-how in Brazil is not advanced enough to provide internationally competitive leather from domestic hides is the above mentioned situation of Brazil being virtually closed to outside competition for many years. The domestic industries enjoyed a monopoly situation in their big home market. The structure of the industry was not conductive to learning through user-producer relations either between the companies, or with the users (shoe-producers), due to the comfortable situation of the all-absorbing domestic market of the 1980s. Brazilian products were (and still is) copies of last year's fashion in Europe, and no internal dynamic was created. Many of the shoe-producers were frustrated by the established tanners and helped start up new tanners that would cater to their special needs. This forced the traditional tanners to improve their co-operation with shoe-producers to meet international quality requirements

technologies to cover up the scared surface and to strengthen the weak texture; the lower the quality of the raw hides the more skill and efforts are required. High international demand for leather the global market accepts low quality Brazilian made wet-blue, but not Brazilian products on the more knowledge intensive levels. This indicates that Brazilian tanners find themselves in a *low quality trap*. The Italian and tanners from a few other European countries, however, are able to utilise the Brazilian hides for international competitive products with knowledge and skills the Brazilian tanners do not have. This explains why especially Italy, the world leader in tanning, is one of the main clients and the main investors recently in the Brazilian tanning industry. Italy buys almost one quarter by value of all leather exports from Brazil. However, this makes up only one third by weight of, which indicates that they buy mostly wet-blue. Of the total wet-blue export growth from Brazil since 1993, the Italians represent almost half of it in value. This means Italy is an important engine of the wet-blue production growth in Brazil.

The table below shows that hides and leather imported to Brazil have a much higher unit value than the Brazilian exports. This is a clear indication of the low appreciation of Brazilian leather in the international market.

Table 4. Unit cost of leather imported to and exported from Brazil in 1997

(taxes and transport costs not included).

PRODUCT	Import value in USD per Kg	Export value in USD per Kg	Export value vs. import cost
Crust	20.5	12.2	68%
Wet-blue	3.3	2.3	43%
Wet-blue (small)	6.4	1.7	276%
Finished	13.2	14.9	-11%
Salted hides	1.0	0.8	25%
Average (weighed)	10.5	3.5	

Source: Abicouro 1997

A second and indirect consequence of the liberalisation on the tanning industry relates to the situation for the main client of the industry, the domestic shoe industry.[13] Increased imports of cheaper Asian shoes to Brazil, USA and Europe have been important to the downturn and restructuring of the Brazilian shoe industry. Until 1990 there were virtually no imports of leather shoes to Brazil, but with the liberalisation, imports of shoes to Brazil rose by high rates, especially in the years of 1993 and 1994. Millions of pairs were imported, and even non-leather shoes were replacing national leather shoes. The Brazilian shoe production was almost halved from the top year of 1986 to 1994, when the level again was that of 20 years earlier (FAO 1996). In 1989 Brazilian exports of leather shoes amounted to 155 million pairs, but dropped below the 1984 level in 1992 to 120 million pairs. Much of this was due to the reduced sales in the 1990s to the

[13] The growth in the Brazil's shoe industry in the 1950s was the prime engine of the development of the tanning industry. Within the middle 1980s, 80 percent of total production was shoes for the domestic market and 70 percent of export was to USA. Cheap labour, abundance of raw materials, active state intervention and a reasonable level of industrialisation were crucial factors for creating a shoe industry that in the 1990s produced more than 500 million pairs.

main export market in USA, where Brazilian leather shoes[14] earlier had a substantial market share[15] (? Com.chain 1992).

The situation became so threatening that the Brazilian government deemed it necessary to raise the import tax on the most threatening shoe imports from 20 percent to 63 percent in May 1995. A year later the tax was reduced to 40 percent, in 1997 it was further adjusted to 36 percent, and by 2001 it will return to 20 percent (Gorini & de Siqueira 1997). Although the shoe industry has recovered somewhat in recent years, the turnover has stagnated (at USD 1.300.000.000) (World Leather 1997/1998). In 1996 580 million pairs where produced, which was 20 percent below the production capacity of the industry.

Stabilising the currency

To understand the present macro-conditions for the Brazilian tanners, the successful effort since 1994 to stabilise the earlier hyper inflation is an important factor. An aspect of the liberalisation of the Brazilian economy, it is also a measure to let market forces better integrate and adapt the Brazilian economy into the liberalised world economy. The economy has been stabilised under the currency regulatory measures called "Plano Real" (The Real plan, referring to the new Brazilian currency called Real). The plan is to peg the national currency to the US dollar by attracting foreign investment to federal bonds with high interest rates, and establish strict budget discipline. The plan has basically been successful in reducing and keeping inflation down, hence stabilising the economy and attracting foreign investment. Very recent developments (Aug-Sept 1998) cast grave doubts on the whole scheme.

The immediate negative effects for the tanners of reducing inflation are several. First of all the Real plan has eliminated much of the profit the tanners generated through the «currency game» by earning dollars on exports and paying for raw materials in weak national currency. Significant profits were also made through high return on speculative activities in the national financial markets where the interest rates rose with inflation.

Another negative effect of the stabilisation plan for the tanneries and other domestic industries, is that the high interest rate on federal bonds is compensated by a correspondingly high interest rate for domestic loans. The high interest rate is also part of a general policy to dampen consumption and thus keep inflation down. These rates does not only limit access to capital for the tanners to invest in new technology and raw material, but it also reduces the competitiveness of the shoe producers that are suffering the same conditions. The domestic market is faltering as the Real plan has resulted in increased living expenses, especially for the middle class, and decreased consumption. The high priced Brazilian currency makes exports more difficult. Companies cut back on labour and wages to meet foreign competition. Others go bankrupt in competition with foreign companies that have access to much cheaper credit in their home

[14] Leather shoes does not including athletic shoes. If athletic shoes were included, the share was 15 percent in 1985 and 11 percent in 1990.

[15] Brazilian shoe producers had 34 percent of the US leather shoe market in 1985, and 30 percent in 1990. In 1993 Brazil exported more than 130 million pairs of leather shoes to USA, but this declined to 96 million pairs by 1995. At the same time China increased its export of leather shoes to USA from 1 percent of the market in 1985, to 15 percent in 1991 (425 million pairs), and further increased the sales to 716 million pairs in 1995 (U.S. Leather Industries Statistics, 1997).

countries (such as Italy), because they cannot handle the combination of expensive capital and low profit margins.

There is a clear tendency that many tanneries have not had the strength to handle the new economic climate of the 1990s. Even so, it is relevant to ask why the tanneries suffer capital shortage considering their huge profits and the low investment rates of the 1980s. The general explanation is that companies have been mismanaged. The profits of the 1980s were in many cases taken out of the companies and spent on consumption by the owners or invested in other business. Little reinvestment was made in tanning technology and skills, and financial reserves were not accumulated. The general view is that those few companies that did reinvest their profits in the 1980s are the ones doing well today.

Another explanation why tanneries are going bankrupt, is simply that the companies are coming of age. It is a known phenomenon that family companies (there are many in the tanning industry) tend to get into financial trouble in the second or third generation, either because those generations are not sufficiently competent or dedicated, or the heirs have problems co-operating, which often results in the company being split up or drained of values.

Increased environmental regulation

Deregulation of trade and the stabilisation of the currency are important causes for the changes in the tanning industry. But there is reason to believe that also the new environmental regulations of the 1990s have had a significant impact. One reason is that tanners are one of the most polluting industries[16] if left unchecked, and is therefore often one of the first industries to be targeted for regulation.

There is consensus among my sources that until 1985 there was nearly a total political lack of awareness of environmental matters in general in Brazil. Environmental regulation and enforcement were close to non-existent, and did not influence the tanning industry as a whole. The new constitution of 1988 introduced important elements to improve the protection of the environment, but most of these proposals remained good intentions. No specific laws and financing was passed. The unstable political and economic situation of the 1980s pushed long term environmental issues aside. This had serious consequences for the environment. Highly contaminated water was released directly into waterways and onto the topsoil, and organic and toxic solids were being dumped as regular waste. Only in the most extreme cases of contamination, such as in areas with a high concentration of tanneries, efforts were made to clean up. Estancia Velha (in the Southernmost State of Rio Grande do Sul), a small village near the shoe district Novo Hamburgo, is an example. With close to 20 medium and large tanneries, pollution reached unbearable levels already in the 1970s, and area was one of the most polluted of the entire country. Pressure from the local population and more stringent environmental regulations by the southernmost state from the early 1980s, the companies were forced to start to clean up.

It was not until the early 1990s that increased national and international environmental

[16] The pollution load of tanneries doing the whole production process is as follows: For every ton of raw material (raw-hide) that goes into the process, 500 kg comes out as finished leather and the other half is organic waste. Some 200 different chemicals are used in tanning and dissolved together with the organic waste into the large amounts of water used in the process. Tanning is also infamous for its unpleasant smell, and solvents are released into the air during the finishing parts of the process.

awareness resulted in stricter environmental regulations that also influenced the tanneries outside the tanning districts in the South. With the 1992 Earth Summit in Brazil (Rio de Janeiro) there was a increasing domestic debate on environmental issues, and environmental legislation was updated and political practice improved. Since that time environmental law at the federal level has become much more strict. Federal law requires regulations at state level to be strict as or more strict than the federal laws. In 1994 a new comprehensive environmental law was presented to the Congress, but many parts of it took years to get through the political bureaucracy of the country. Only in April 1998 was the law of environmental crime finally passed.

Even so there were improvements in environmental regulations that applied to the tanneries. At the firm level there was reasonably high level of consciousness on the matter among company directors, and smaller or bigger efforts in all companies to improve the environmental performance. Both national and foreign chemical companies claimed that solutions to pollution problems was the main field of innovation of the tanning industry. An environmental expert said that "the industry and government have the [all the] knowledge [necessary to eliminate the environmental problems of the tanneries] - the rest is affordability". It is believed that the stringency of the environmental law is the same as in The European Union (EU), and on some points the Brazilian law is said to be even stricter.

The law is one thing, but enforcement another. Many sources claimed that only the southernmost state of Rio Grande do Sul was at the EU level when it came to environmental regulation. It is important to note that many of the environmental problems in the South have been solved not by introducing cleaner production technology, but by outsourcing of the pollution intensive wet-blue production to the «bluseiros» in the West-Central and Northern regions. An environmental expert said without hesitation that "many [tanners in the South] do finishing only just to avoid environmental problems". In other words, the most polluting part of the process have been shifted internally in Brazil and to a region where state government puts much more emphasis on attracting industry than enforcing environmental regulation. Several informants that had knowledge of the area could confirm that environmental pressure from the authorities and the NGO in the interior is much lower and there is almost no enforcement. Even though there are some significant environmental advantages to the relocation of wet-blue production closer to the raw material sources[17], these are offset by lower standards in the enforcement of the regulations of the pollution intensive wet-blue process.

There are several indicators that the level of stringency in enforcement of environmental regulations in Brazil are substantially lower than in Europe. Tanners in the South claimed that their environmental expenses were 0,5-2 percent of the production costs, a environmental cost level that was confirmed by ABICOURO in their general investigation in 1998. This is significantly lower than in Europe, where the level is 3-6 percent. The environmental cost in Brazil was found to be one third of that in Italy in absolute terms. The following tables (Table 4 and Table 5) provides details on the differences between Italy and Brazil in effluent treatment costs[18] in by stages of production and as part of total processing costs.

[17] The advantages are that the use of salts and chemical preservatives for the preservation of hides for transport is almost eliminated, and less energy is used for transport since wet-blue weighs half as much as raw-hides.
[18] Effluent treatment costs represent the main bulk of environmental costs for the tanneries.

Table 5. Effluent treatment cost[19] in Italy and Brazil in 1997 by stages of production .
(Cost in US Cents per sq.feet)

Main stages of production	Italy		Brazil		Difference I-B	
	Cost	Share	Cost	Share	Cost	% B of I
Salted hides to wet-blue	7.61	89.5	2.86	87.2	4.75	37.6
Wet-blue to crust	0.87	10.3	0.41	12.5	0.46	47.1
Crust to finished	0.02	0.2	0.01	0.3	0.01	50.0
TOTAL	8.50	100.0	3.28	100.0	5.22	38.8

Source: Abicouro 1997

Table 6. Effluent treatment cost[20] of total processing costs in Italy and Brazil in 1997
(Cost in US Cents per sq.feet)

Cost in US Cents per sq.feet	Italy	Brazil	Difference I-B	
Total processing cost[21]	90.59[22]	81.61	8.98	90.1
Total effluent treatment cost	8.50	3.28	5.22	38.8
% share of effluent cost	9.4	4.0	58.1	

Source: Abicouro 1997

Table 5 and Table 6 shows that the effluent treatment cost in Brazil was roughly 40 percent of that in Italy, while the total processing cost itself was about 90 percent. The share of the effluent treatment cost was almost 10 percent of the total processing costs in Italy, while it was only 4 percent in Brazil. The difference in the cost of treating effluents in Italy as compared to Brazil made up almost 60 percent of the difference of the total costs of processing. Observed also that almost all of the effluent treatment cost was in the wet-blue stage in both countries.

The significantly lower environmental costs in Brazil result from a number of factors, such as less expensive energy (76 percent of that in Italy), less expensive labour (61 percent of that in Italy), scale economies in treating the effluents, but not least less: stringent enforcement of environmental laws in Brazil.

Environmental enforcement

The Southern state of Rio Grande do Sul is commonly known to have the most stringent implementation of environmental regulations. However, the cost of storing sludge and other solid waste in this state one tenth of that in Germany and Italy. Even though state regulations have

[19] In effluent treatment costs both energy for running the treatment plants and the cost of sludge disposal is included.
[20] In effluent treatment costs both energy for running the treatment plants and the cost of sludge disposal is included.
[21] Costs of hides, taxes, administration and transport are not included.
[22] The significantly higher costs in Italy were those of labour, energy and effluent treatment costs, while cost of capital and chemicals were higher in Brazil.

resulted in centralised storage of waste, the fundamental technical requirements to fulfil the Brazilian legislation are not complied with at the storage facilities.[23] If this was done it would increase storage costs for the tanners five to ten times, according to a tanning and environmental expert. In another Southern state, Paraná, the environmental authorities responsible for monitoring the tanning industry, did not know where the tanneries disposed of their solid waste. There were no centralised storage facilities for the tanning sludge in the state, and the government representatives assumed that the waste was disposed of in municipal waste facilities or other illegal locations.[24]

Although there has been no general assessment of the environmental performance of all Brazilian tanneries, there have been several in-depth studies at the state levels. These studies have concluded in most states that the Brazilian tanning industry has to undergo a fundamental technological change to meet the new environmental regulations. The investigations show a great variation in the environmental performance of the companies. While some companies have state-of-the-art technology at all levels of production (one tannery even purified the water going into the factory), a number of tanneries do not even have primary treatment. One tannery in the North supposedly let the tidal water take away the daily waste.

According to a number of sources the general view is that the further North in the country, the less strict were the restrictions and the enforcement. Even so, during the field trip in the Southern state of Paraná, observations were made of open pit filtering. This implies that wastewater with sludge is channelled into open air pits where from the water «filters» down into the groundwater. In the tanning district of Franca (in the state of São Paulo) the tanneries have built a centralised effluent treatment facility, but according to tanning experts in the field of environment, the facility has serious problems and works poorly. While the newer wet-blue tanneries in the West-Central region of the country had to build treatment facilities as an integrated part of the factory, informants with experience from the region say that the facilities are either insufficient, not operating or not working well. Often they are only turned on when the company expects foreign visitors or inspections of the factory. In these areas the environmental authorities are usually poorly financed, understaffed and have little power. The administrative capacity of the Brazilian states has been reduced during the last years by cuts in the public budgets, thus limiting the capacity of the government to enforce new laws.

Environmental improvements

Despite the above observations, there are improvements in the environmental performance of the tanning industry in Brazil. The latest law on environmental crime, passed in March 1998, calls for incarceration of those who commit crimes against nature. The logic behind this law is that financial penalties for this sort of crime will not have the desired effect because the polluter will pass the cost on to the customers. A number of tanneries have already been closed down permanently or temporarily by state governments due to their non-compliance with environmental regulations. The state government of Paraná has set 1998 as the final year for the tanneries to comply with the existing regulations, otherwise they will be shut down. Only 12 of the 30

[23] Since most tanneries use chromium in the tanning process, which results in high amounts of this heavy metal in the tanning sludge, the solid residues are classified as special waste and must be disposed of in specialised locations (hence the high cost).

[24] Since sludge with chromium is defined as specialised waste, it can according to the law only be stored is special storage sites.

tanneries that existed in the state in 1990 remain today. According to environmental experts and other tanners several were closed due to problems with financing the construction and operation of treatment facilities. Investment costs for treatment facilities have traditionally been very high in Brazil due to the geographical spread of the companies, the virtually complete absence of municipal waste treatment facilities, and the lack of will among the tanneries to build common treatment facilities where they are located close together. All in all this makes it very difficult to obtain advantages of scale and lowered treatment costs.

An interesting indication of the increasingly stringent environmental regulations for the tanneries in Brazil, is how the companies evaluate the importance of the Brazilian environmental regulations on their competitiveness with foreign tanneries. Many tanners claimed it is a great problem that competitors in Asia (especially China) do not have any environmental regulations or enforcement at all. This in combination with low wages (often referred to as «social dumping») was considered a significant problem for the industry. It is possible for the Asian tanneries to produce at much lower costs than the Brazilian tanners. But none of the tanners mentioned the corresponding difference between Europe and Brazil, where Brazil is the one that has the advantage of more lenient environmental regulations and lower labour costs.

On one hand the Brazilian tanning industry is being pushed to carry out investments in *process* technology to comply with the environmental requirements at European level. On the other hand the Brazilian tanners have higher environmental standards and costs than tanneries from countries whose *products* they compete with, such as China and others in Asia. As the tanneries delay the environmental investments, the local environment continues to suffer from the high pollution load of the tanneries. As a consequence one could say that the tanning industry in Brazil is subject to an «environmental squeeze».

A general complaint among Brazilian tanners, as among tanners in Europe, is that there is no demand for «ecological» leather either in the internal or the global market. Lack of demand of «cleaner products» makes the environmental regulations the only pressure on the tanneries to improve their environmental performance. In Brazil the consequence is that investment in environmental improvements for the already heavily indebted tanneries is a cost without economic return. Similar pressure to improve the environmental standard is exerted by the requirements put forward by governments in Europe, especially Germany, towards imported leather. The ban against the use of PCP, certain biocides and certain azodyes has forced the Brazilian exporters to change their practice.

Since there is no price mechanisms that can compensate for the increased environmental costs of the Brazilian tanners, and since the enforcement is not efficient, the extent to which the tanners comply with the environmental regulations depends heavily on the attitudes of the company directors. As can be expected there are great differences in these attitudes, related to the economic situation of the tanneries, their size, their markets and the general environmental practice in the region where they are located. Larger and visible tanneries with a sound financial situation and a brand name to protect, usually see environmental costs as a natural part of the overall production costs, and have the intention of «returning the water back to the waterways as clean as when it entered the factory». Their exemplary attitude is that the environmental cost should have been included from the start so that the tanners could have operated with real costs all along and avoided the recent investment problems. They also consider the environmental costs a lesser problem as other costs are much more stable volatile, such as the price of hides, and therefor much more of a worry.

On the other hand, there are tanners with economic problems and smaller production volumes directed mainly at the internal market. These tanners are generally not willing to improve their environmental performance until the government threatens to shut the factories down. A number of tanneries in the South have been closed down for a period of time by the authorities, forcing the companies to try to improve their environmental performance. Not all of the tanneries start up again after this kind of ultimatum.

Liberalisation and environmental practice – the link

In the previous sectionsI have shown how the tanning industry in Brazil has restructured and to what extent liberalisation, financial regulation and environmental laws and their enforcement have influenced this. To evaluate the influence of liberalisation on the environmental performance of the tanning industry a critical question remains: How has liberalisation influenced the implementation of the new environmental regulations?

During the 1990s liberalisation and financial stabilisation have created a very difficult situation for many Brazilian tanneries. At the same time the federal government has not seen any reason to take measures to help the industry, since the restructuring of production into bigger groups and companies has resulted in a higher production volume and a significant positive trade balance.[25] This stands in deep contrast to the situation until the 1990s. Not only did Brazilian tanneries thrived with protected home markets, but had also limited environmental regulations while the dominating North-European tanning industry suffered continuously stricter regulations and enforcement.

Before looking at the main negative consequences of liberalisation on the environment, I should mention that liberalisation also has had environmental advantages. The increased export of wet-blue to Europe has resulted in certain environmental improvements in the Brazilian tanneries as they are forced to comply with German requirements on the use of chemicals to preserve the wet-blue for transport and storing. Since the production of wet-blue is generally profitable, there is a possibility that the *bluseiros* will be better fit to make investments to comply with the environmental regulations. Another advantage of the liberalisation is that the tanneries, first of all those who can afford the capital costs have better access to advanced technology both for improving product quality and environmental performance. Through partnerships with foreign companies Brazilian producers can get both access to better technology and capital at lower interest rates.

The trade-off between industry and the environment

There are two main areas where economic liberalisation clearly has affected the environmental situation of Brazil negativly. Both have to do with ways the local authorities and the companies deal with the difficulties arising from the changes in federal economic policy. Even if the production volume has grown, the number of companies and employed in the tanning industry has been more that halved. This has for many states resulted in reduced state level tax-earnings and

[25] In 1997 the trade balance surplus for leather was USD 570 million, and the total leather exports (including shoes and artifacts) accounted for 1,4 percent of all Brazilian exports (Abicouro 1998).

employment, both due to less income tax and no export duty on wet-blue. Although the regressive restructuring not necessarily is caused directly by stricter environmental regulation, it is undoubtedly a situation which surviving companies take advantage of. They ask local authorities for time and support to fulfil the requirements, otherwise they claim they will go bankrupt too. Tanneries who comply with the environmental regulations say these companies use environmental regulations as a scapegoat and excuse for their poor performance.

No doubt this mechanism is part of the reason for the lower cost of treating effluents in Brazil. Although parts of the lower environmental cost can be attributed to scale advantages of treating the effluents, and lower labour and energy costs in Brazil, there are clear indications that it is also due to the lack of enforcement by the responsible governments. A number of informants explained that the tanning industry and individual companies are protected from strict government enforcement by the fact that they are economically fragile. This is well known: The harder the economic times the less governments pressure companies to comply with environmental regulation. Even in Germany, where many of the tanneries did close in great part due to strict enforcement of environmental regulations, the authorities have somewhat reduced the pressure on the remaining tanneries during the last few years of increased unemployment. For Brazil and many other countries, the political choice in hard times between maintaining industry and employment on the one hand and protecting the environment on the other, still is the former. A main reason for that is that the environmental awareness among the voters is virtually non-existent.

Increased pollution through wet-blue

Perhaps the clearest and most serious consequence of liberalisation on the environment is the significant growth in the production of wet-blue, which, as mentioned above, is the cause of nearly all the pollution, but yield little value added. This means that Brazil is specialising in the lowest value added and most pollution intensive stage of tanning.

Table 7. Leather exports from Brazil in 1997 (weight, value and pollution cost).

	WEIGHT		VALUE			Pollution cost
PRODUCT	T-TONS	SHARE	Mill USD	SHARE	Per KG	% SHARE
Salted hides	14,5	6,6	12,0	1,6	0,8	
Wet-blue	168,0	77,5	390,0	53,0	2,3	87.2
Crust	11,0	5,0	133,5	18,0	12,2	12.5
Finished	12,0	5,5	178,0	24,0	14,9	0.3
TOTAL	207,0	95,7	719,3	97	Ave. 3,5	100

Source: Abicouro 1997, 1998

A general assessment by a number of informants is that specialising in wet-blue export is not profitable if you have to treat the pollution according to the regulations. Even if some companies in Brazil produce at a very large scale, a frequent statement by environmental experts is that today's production is only possible due to the weak enforcement of the environmental regulations.

Even so, the tanning federation Abicouro still consider the combination of Brazilian and European tariffs, which makes wet-blue the only type of leather that is not taxed for export to Europe, to be the critical factor behind the increased wet-blue production in Brazil. It is the opinion of Abicouro that the best way to solve this problem is for the Brazilian government to

introduce an export tax on wet-blue that makes it more expensive than Brazilian crust or finished leather. This export tax could even be lower than the European import tax on Brazilian crust and finished leather. Abicouro argues that the European tariffs today work in a protectionist manner. While the pollution burden is pushed onto Brazil, Italy and other European importers of Brazilian wet-blue end up doing the cleaner processes with most value added. Considering the strong dominance and power of the Italian tanners internationally and within the EU, it is not impossible that this is exactly the motivation behind the present tariffs. Italian tanners processed 55 million hides in 1997, and 50 million were imported. Having the wet-blue process done in Brazil greatly reduces the pollution in Italy, where there are already absolute water and space shortages in several of the central tanning districts (Arzignano and Santa Croce). This strategy of the Italian tanners have been observed in other countries in the course of this research project, such as The Czech Republic, Poland and Argentina, but is probably more widespread.

An additional factor that aggravates the environmental problem in Brazil is the process of interiorisation of the wet-blue production to areas with lower environmental standards. The process of re-localisation from the South to the West-Central and Northern regions started simultaneously with the introduction of the first environmental regulations. At the same time the main motivation for the interiorisation of wet-blue production was the advantage of being located close to the cattle and the slaughterhouses. In recent years as Brazilian industry in general is facing harder international competition, the motivation for interiorisation has been to cut costs. When asking how important the less stringent environmental enforcement in these areas has been for motivating the continued interiorisation of tanners, the answers varies from «crucial» (environmental experts) to «insignificant» (tanners). If not a prime motivating factor, the lower environmental costs in the interior can not be ruled out as one of several economic incentives for the tanneries to move there.

No matter how strong the enforcement of environmental regulations in Brazil, the fact remain that the country gets an increasing part of the pollution burden, and a smaller part of the value added. As wet-blue is exported the polluted water and ground remains in Brazil, without any effects for the consumers. The growth of wet-blue production is and will be generating significant profits for the industry as long as the demand in the market is good. In a long time perspective the consequences of a Brazilian tanning industry dominated by exports of wet-blue is most likely to be detrimental to its competitiveness. First: as quality of wet-blue continues to fall, the bad reputation Brazilian hides have in the European and the US markets will worsen, making it difficult to change the attitudes of the international market at a later point. The growing export from Brazil of semi finished leather to foreign clients with stronger purchasing power than domestic customers, increase the price of leather and force a growing number of Brazilian shoe companies to buy foreign hides. This practice will result in an even weaker network relationship between the domestic tanneries and shoe producers, reducing the chances of creating an internal innovative force in the industry. A third negative factor of the wet-blue production is that there is no need to maintain and improve skills to increase the value added of the product, since wet-blue production is well automated and capital intensive. There is even a danger of lowering the knowledge level and innovative capability (the *innovation roof*) of the Brazilian tanning industry further. Statistics show that a the tanneries in the South, which are traditionally more knowledge intensive and make finished leather, are increasingly turning their production to wet-blue. Another indication is transnational chemical companies serving the tanning industry drastically reducing their activities in Brazil, leaving the market and innovation to domestic firms. Finally, Brazilian

companies producing high quality shoes for export increasingly import higher quality leather (crust) from Argentina, as they consider Brazilian leather unsuitable for the purpose.

Final considerations

This paper has shown that the Brazilian tanning industry has gone through a dramatic restructuring over the last decades. This has coincided with the liberalisation of the Brazilian economy and the introduction of environmental regulation. However, it is not possible to say that the economic liberalisation and the environmental regulation are the reasons for the problems many of the tanneries have today. During the 1980s the Brazilian tanning industry operated within a set of conditions that created latent problems. These problems were exposed by the new economic and regulatory regime of the 1990s. Problems such as the *low quality trap*, the *environmental squeeze* and the *innovation roof* are all an expression of the lack of ability of Brazilian tanners to handle the stiffening international competition. As the protected industry lacked the disciplinary effect of the market until the 1990s allowed for inadequate management, low investment in technology and environment, weak network relations between producers (the tanneries) and users (shoe producers) and short term profit harvesting to dominate the industry.

The tanning industry in Brazil is a good example of what happens to a sector that is not well prepared for increased international competition and environmental regulations. To survive under the new conditions, companies to an increasing degree have turned their activities towards an area where they are competitive, specialising in low quality, low value added and pollution intensive production of wet-blue for export. More specifically, it is a result of a number a factors working together: The combination of tariffs in Brazil and Europe favouring wet-blue export, high capital cost favouring short production cycles, significantly weaker environmental enforcement and therefor lower environmental costs than in Europe, ample access to low quality raw hides, and a lack of will and capacity among the tanners to co-operate internally and improve level of skills and build networks with users.

At first sight this should be something Brazilian authorities should worry about. However, the case of the tanning industry in Brazil is a good demonstration of how different actors have their own agendas on economic liberalisation and environment regulation. The federal government is first of all interested in the macro economic situation, achieve a trade surplus and economic growth, and increasing goodwill in international markets. As the Brazilian tanneries as a whole generate a significant surplus on the trade balance, the federal government sees no reason to change the conditions of the sector. In a short term perspective they are not concerned about *how* this surplus is generated (in low value added, pollution intensive wet-blue), by *whom* (a few big groups and companies) and at the expense of *what* (employment, value added and the environment). Hence they have done little to change the present situation.

It is the state governments that are concerned about the survival of tanneries and attracting new ones to the state. They are responsible for the policies that directs the tanning activities in relation to tax earnings, employment and the environment. A number of factors influence what measures the state authorities take to promote or regulate the industry. In the South the authorities have been concerned about increasing the value added in the production. As the population in the region is dense and people have the strongest environmental awareness of the country, low-value-added pollution intensive activities have been squeezed out. Further North, as in the West-Central region, the industrial structure is much less developed and population scarce.

The state government here gives priority to attracting industry, and do this at the expense of the environment.

The different actors in the leather industry each have different interests. The Brazilian shoe industry and tanneries specialising in finishing would profit from measures to reduce the export of hides from Brazil, as a higher supply to the domestic market would reduce the cost of raw materials. This argument goes that hides leaving the country as wet-blue reduce the possibilities of increasing value added and improving the skills of the tanners. The companies producing wet-blue are of the opinion that Brazilian tanners must adapt to reality and do what they can to make money.

The Brazilian tanning industry is but one example how of the two processes of economic liberalisation and environmental regulation can work and interact. It would be of interest to compare the findings here to other industries to see if there are similar tendencies of increasing low value added and pollution intensive processes in developing countries in the South, but that is beyond the theme of this paper. Some will argue that the changes in the tanning industry in Brazil is a necessary and healthy adaptation to the realities of international economy. On the other hand are the consequences on employment, value added and the environment. While those who push for economic liberalisation do not intend the free market to be a counterforce to environmental improvements, there is a clear negative environmental impact in the case of the tanning industry in Brazil. It would not be a surprise to this author if further investigation revealed similar mechanisms at work in industries in other countries. There is undoubtedly a need to find ways to ensure that economic liberalisation does not further increase the pressure on the environment.

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