Equity and Growth through Economic Research

MEASURING COMPETITIVENESS AND ITS SOURCES: THE CASE OF MALI'S MANUFACTURING SECTOR

African Economic Policy Paper
Discussion Paper Number 16
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ABSTRACT

Competitiveness is a hotly-debated topic among policy-makers and businessmen throughout the world. Yet it has been the subject of surprisingly little rigorous economic analysis. We present a method which draws on economic theory to measure competitiveness and its sources at the firm- and industry-levels. We show that manufacturing firms in Mali are competitive only on their local market where protection offsets a fundamental lack of comparative advantage. Regional integration and trade liberalization thus constitute major challenges with only the textiles sector in a position to potentially exploit the resulting export opportunities. The situation is not entirely hopeless for the other industries and areas for improvements in firm performance and policy reform are pointed out. In general, given its low wages, Mali's manufacturing potential lies in labor-intensive industries rather than the capital- and material input-intensive activities which have predominated in the past.

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INTRODUCTION

As new regional and international trade agreements spring up, nations are torn between the allure of better access to foreign markets and the fear of new competition in existing markets. Competitiveness is the new buzzword. Will we be able to compete? What are our competitive strengths and weaknesses? How must our performance improve? By how much? What is the impact of current government policies? What will be the result of policy reforms? What constructive role remains for government? It is therefore surprising that the numerous lessons economic theory contains in these regards have not been harnessed to respond to these controversial questions.

This paper is based on a detailed quantitative study of the competitiveness of the manufacturing sector in Mali. Data from a sample of competing firms in Côte d'Ivoire is used for comparison. The method of analysis focuses on the sources of competitiveness and the distinction between comparative advantage and competitiveness, as proposed first in Cockburn and Siggel (1995) and Siggel and Cockburn (1995). The underlying detailed study (Cockburn et al., 1997) is available on request. After a survey of the relevant literature (section 1), we present the method of analysis in section 2, a short description of Mali's manufacturing sector and policy environment in section 3, and the major findings in section 4. The policy conclusions concern not only the present situation of Malian firms relative to international and Ivorian competitors, but also their prospects under ongoing trade liberalization and Mali's adhesion to the recently-created West-African Economic and Monetary Union (UEMOA).

1. CONCEPTS OF COMPETITIVENESS IN ECONOMIC LITERATURE

Before pursuing, we should be clear about what exactly we mean by the term "competitiveness" as there is much debate on this subject. Most authors use the term to refer to an advantage of firms or industries vis-à-vis their competitors in domestic or international markets. Some authors have extended the meaning to entire economies[1]. In this context, competitiveness is equivalent to strong performance of economies relative to other countries, where strong performance can mean economic growth, success in exports and improved welfare. We prefer the more commonly understood firm or industry-level (microeconomic) use of the term. This said, it is clear that economy-wide conditions such as generally high levels of education, productivity, natural resource endowment and business-friendly economic policies can have significant impacts on the competitiveness of specific firms and industries.

In the context of our analysis, we adopt the definition which best corresponds to the concept as used by policy-makers, businessmen and the general public: competitiveness is the capacity to sell one's products profitably. To be competitive, a firm must undercut the prices or offer products of better quality (or with better service) than its **competitors**. Defined as such, what can we learn about competitiveness from economic theory? The answer is very much indeed. Understanding the capacity

[1] See World Economic Forum (1995), Markusen (1992) and Porter (1990). Some authors such as Lipschitz and McDonald measure economy-wide competitiveness by the real exchange rate. Helleiner (1989) and Krugman (1994) criticize this concept of economy-wide competitivenss (Krugman calls it a “dangerous obsession”) noting that in the aggregate a country cannot be competitive in all activities as this would lead to currency appreciation until some activities become internationally non-competitive. Lafay (1987) provides a particularly interesting presentation of the role of the exchange rate in drawing the line between competitive and non-competitive activities.

to sell is a primary goal of two of the pillars of economic theory: producer theory and trade theory. In addition, various strands of economic literature are devoted to related issues.

By definition, for a producer to be competitive ("sell profitably"), his costs per unit of production (also called "physical unit cost" or "average cost") must be inferior to the market price. In producer theory, average costs are typically described by a U-shaped curve.[2] Thus, for a producer to be competitive, part of its average cost curve must be located below the market price line[3]. Profit maximization ensures that production will occur on this portion of the average cost curve if it exists. Thus, a simple manner to determine whether a producer is competitive is to examine its unit costs relative to the market price as we propose to do in the current study.

The relationship between unit cost and market price is also an indicator of the future level of a producer's sales. Producer theory indicates that if an activity is profitable, local production (and sales) will expand. This will result from either firm expansion (if it is not yet at the profit-maximizing point on its long-run average cost curve) and/or firm entry (by firms seeking to reproduce the profits of existing firms). Conversely, loss-making activities will contract through firm contraction and/or firm exit. The actual amount that a firm or local industry produces and sells depends on the form and position of its average cost curve. In this paper, we measure and decompose costs in order to analyze current and future competitiveness and their sources.

Standard trade theory applies these principles to identify the causes of world trade[4]. In the process, it identifies the fundamental determinants of competitiveness: differences in factor productivities or relative factor endowments, returns to scale, price distortions, government policies, etc. However, empirical work using standard trade theory is restricted to broad attempts to evaluate which of these explanations is best for a given nation or for the world taken as a whole. In reality, all of them carry some truth and interact in complex ways that vary from industry to industry and even from firm to firm in the real world. It is this complex interaction which firms and governments need to be able to sort out, and which our approach proposes to analyze, in order to assess their competitive situation and identify areas for improvement.

Another strand of economic literature addresses in great detail one of these sources of competitiveness - productivity differentials - at the industry- and firm-levels in order to analyze technical and allocative inefficiencies[5]. However, this literature limits itself to assessing these inefficiencies without linking them to the more general question of evaluating competitiveness and the role of its other determinants. We integrate aspects of this type of analysis although a full integration remains an area for further research.

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[2] For an introduction to production theory, see Varian (1996).

[3] More generally, to include situations of imperfect competition, the condition is that a portion of the average cost curve be located below the producer demand curve. Whereas the producer's demand curve is horizontal at the market price in the case of perfect competition, it is downward sloping in the case of imperfect competition. Note also that, by increasing market prices for local producer relative to their foreign competitors, protectionism allows high-cost local producers to be competitive (that is sell profitably) on the domestic market. We will consider this possibility in more detail further on.

[4] All standard trade theory textbooks present these causes of trade.

[5] See, for example, Aigner et al (1977), Farrel (1957), Forsund et al. (1980) and Nishimizu and Robinson (1984).

Cost-benefit analysis constitutes a fourth area of economic literature with many lessons for the analysis of competitiveness[6]. Indeed, this analysis constitutes the starting point for our own approach. As its name implies, this predominantly empirical branch is devoted to measuring the costs and benefits, and thus the profitability, of specific activities or investments. An important distinction is made between social and private cost-benefit analysis. The former, generally used in assessing public investments, excludes price distortions by substituting market prices with so-called shadow prices. The principal indicator used in social cost-benefit analysis - the domestic resource cost (DRC) ratio - is associated with the concept of comparative advantage. While the use of shadow prices is appropriate for the assessment of public investments, firms must compete at market prices, including all price distortions. Just as comparative advantage is associated with social (or shadow-priced) cost-benefit analysis in this literature, our definition of competitiveness (ability to sell) associates it with private (or market-priced) cost-benefit analysis. Thus, as we shall see, a firm's competitiveness in a given market depends on the combined effects of comparative advantage and price distortions, both of which must be analyzed. Notably, domestic protection can render a firm competitive on its local market despite a lack of comparative advantage.

Besides measuring comparative advantage and competitiveness, we also quantify their respective determinants through a detailed cost comparison with competing firms. This provides crucial information for firms seeking to improve their performance and governments seeking to assess their policy options. In particular, the parallel analysis of comparative advantage and competitiveness allows us to explicitly integrate and analyze the crucial role of price distortions and associated government policies and market failures. This distortion analysis is inspired by yet another important strand of empirical trade literature: protection and incentives analysis[7]. This vast literature is devoted primarily to calculating price distortions and their impacts on the sales prices and input costs of firms.

Finally, there have been some attempts in the economics and management literature to directly address the issue of competitiveness. Besides the conceptual literature mentioned at the beginning of this section, there are several studies that attempt to measure microeconomic competitiveness and some that even look at its sources. Microeconomic competitiveness has been measured alternatively by market share[8] or price/cost advantage[9]. Helleiner (1989) points out, and our discussion of the concept of competitiveness makes clear, that market share is the result and cost advantage the cause[10]. Swann and Taghavi (1992) try to take account of the effects of differences in quality when measuring price competitiveness by comparing observed and estimated (based on the product's characteristics) prices. Siggel (1997) provides an overview and classification of a number of related concepts and indicators[11]. Several authors attempt to measure the sources of competitiveness through limited cost

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[6] See Balassa and Associates (1982), Krueger (1990), Siggel et al. (1993) and Siggel and Cockburn (1995).

[7] Feenstra (1995) presents an excellent summary of recent empirical methods for analyzing protection and incentives. Technical aspects are presented in Baldwin (1991), Cockburn and Njinkeu (1993), Cockburn and Siggel (1995), Laird and Yeats (1990), Siggel et al. (1993) and Siggel and Cockburn (1995).

[8] The best-known market share indicator of competitiveness is the "revealed comparative advantage" index proposed by Balassa (1965). For related approaches see Buckley et al (1992), Guinchard (1984), Lafay (1987), Mandeng (1991) and Mathis et el. (1988).

[9] Brewster (1989) and Durand et al. (1992) present, respectively, some cost- and price-based indicators of competitiveness.

[10] Golub (1994) studies the extent to which variations in relative unit labor cost affect sectoral trade balances.

[11] Buckley et al. (1992), Markusen (1992) and McFetridge (1995) also provide excellent surveys of the concepts involved.

decompositions along similar lines but in less detail than us[12]. The approach used in this study is the only one, to our knowledge, which actually measures firm-level competitiveness and its sources.

We illustrate our approach (presented in the next section) with an application to the analysis of Mali's manufacturing sector. Coulibaly (1994) combines a traditional cost-benefit analysis of Mali's manufacturing sector with an analysis of its trade policy-induced protection and incentives. Coulibaly's study, however, is limited to calculating traditional measures of incentives and comparative advantage for industrial firms. It does not delve into the analysis of competitiveness of the Malian manufacturing sector and its sources as we propose to do.

2. ANALYSIS OF COMPETITIVENESS AND ITS SOURCES[13]

The approach we propose constitutes an extension to traditional analyses of comparative advantage and incentives. It is based upon the principle that competitiveness, like comparative advantage, of local firms is defined by a cost advantage over foreign competitors. Competitiveness is measured in terms of market prices (the prices which producers actually face), while comparative advantage is measured in terms of shadow prices (economic opportunity costs) net of all price distortions. The difference between competitiveness and comparative advantage is due to price distortions, resulting primarily from protection and incentives offered to local producers. Our competitiveness criterion is thus:

$$uc \leq uc^{*} \qquad (1)$$

where uc denotes unit costs and the asterisk denotes the reference competitor.

Unit costs are generally defined in economic literature as total production cost (TC) per **physical** unit of production, what we will call physical unit costs (puc = TC/Q, where Q is the quantity produced). As we are dealing with firms that may produce goods of different quality than their competitors, such a physical unit cost comparison would be inappropriate. To correct for this we divide each firm's physical unit costs by the output price of their products, the consumer's evaluation of the product's quality:

$$uc = puc/p = TC/pQ \qquad (2)$$

We are therefore measuring **monetary** unit costs. In the context of this study, this is just the cost per CFA franc of production and is a direct measure of profitability. To lighten the text, we use the term "unit costs" to refer to monetary unit costs in the rest of this paper, adding the term "monetary" in parentheses where confusion may arise.

Under the long-term perfect competition condition of zero profits, international producers will sell at cost ($TC^{*} = p^{*}Q^{*}$ or, equivalently, $puc^{*} = p^{*}$ and $uc^{*}=1$). In this situation, our competitiveness criterion (equation 1) becomes:

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[12] See Brewster (1989), Cogneau (1992), Helleiner (1989), Mathis et al. (1988) and Oral et al (1989).

[13] See Cockburn et al. (1997) for a detailed presentation of the approach.

$$uc \leq 1 \quad (3)$$

Thus, an initial assessment of the **degree** of competitiveness (although, as will see, not the **sources** of competitiveness) can be made based solely on local firm data.

In most countries, local producers benefit from tariff and non-tariff protection, which helps them compete with imports on the local market[14]. By artificially increasing the price of competing imports, protection allows local producers to charge a higher price on the local market and thus increase their profits. It is therefore important to distinguish between domestic and international competitiveness. We define unit costs on exports (uce) and domestic sales (ucd) as follows:

$$uce = TC/(pw\ Q), \text{ where pw is the international price,} \quad (4)$$
$$ucd = TC/(pd\ Q), \text{ where pd is the domestic (protected) price,} \quad (5)$$

We thereby obtain the following international and domestic competitiveness criteria:

$$uce \leq 1 \quad (6)$$
$$ucd \leq 1. \quad (7)$$

The comparative advantage criterion is analogous to our competitiveness criterion:

$$ucs\ (= TCS/(pws\ Q)) \leq 1 \quad (8)$$

where TCS is total cost at shadow prices and pws Q is the shadow value of production. As production value expressed at shadow prices is not affected by measures of protection, we do not need to distinguish between markets in analyzing comparative advantage.

The difference between competitiveness and comparative advantage can thus be separated into two components: i) The difference between market- and shadow-price production costs (TC vs. TCS), which is due to distortions in factor prices; ii) The difference between market- and shadow-price production values (pQ vs. pwsQ), which results from distortions in output prices. These distinctions lead to the following accounting framework linking domestic competitiveness with international competitiveness and comparative advantage:

$$ucd = uce + dpd = (ucs + dfc) + dpd \quad (9)$$

where dpd represents the distortions in domestic output prices and dfc represents the distortions in factor costs including the exchange rate.

Both on the domestic and export markets, the principal competitors for Malian manufacturers are located in Côte d'Ivoire. Consequently, after an initial analysis of the degree of comparative advantage and competitiveness of Malian firms (criteria (6) to (8)), we adopt our initial competitiveness criterion (1) to measure the competitiveness of Malian firms relative to their Ivorian competitors. We

[14] This is quite distinct, indeed opposed, to the possible negative impacts of protection on firm efficiency as studied in the productivity literature (e.g. Nishimizu and Robinson (1984)).

distinguish between their relative competitiveness on the Malian market and on the Ivorian market, taking into account the protection of local producers on each market. As the Malian market is the domestic market for Malian producers and the export market for Ivorian producers, our relative competitiveness criterion for the Malian market becomes:

$$ucd \leq uce^{*} \tag{10}$$

Symmetrically, for the Ivorian market, the criterion is:

$$uce \leq ucd^{*} \tag{11}$$

The analogous comparative advantage criterion is independent of the destination market:

$$ucs \leq ucs^{*} \tag{12}$$

This bilateral approach, combined with a detailed cost breakdown, allows us to trace a competitive advantage or disadvantage vis-a-vis a specific foreign competitor back to its sources. To begin, we can separate out the effects of comparative advantage and price distortions by substituting equation

(9) into (10) and (11):

$$(ucs+dfc+dpd) \leq (ucs^{*}+dfc^{*}) \tag{10'}$$
$$(ucs+dfc) \leq (ucs^{*}+dfc^{*}+dpd^{*}) \tag{11'}$$

Examination of these relationships shows that competitiveness depends on each firm's comparative advantage (ucs^{*} vs. ucs), factor-cost distortions (dfc^{*} vs. dfc) and, according to the market studied, domestic protection (dpd or dpd^{*}).

In order to better understand the sources of comparative advantage, total shadow unit costs (ucs and ucs^{*}) are further broken down into their component parts: tradable inputs, non-tradable inputs, labor and capital costs. We compare the shadow prices and productivity of each of these inputs with those of the corresponding Ivorian competitor. This points out areas for improvement in the performance of local firms and the types of activities in which each country has natural advantages. Considering Mali's landlocked situation, we also attempt to evaluate the impact of transport costs on input prices and the cost of exporting. In parallel, the total impact of factor-cost distortions (dfc) on market unit costs is broken down into the impact of distortions in each specific cost element: wage rates, interest rates, exchange rates, asset prices, intermediate input prices and output prices.

Detailed cost analysis is crucial in obtaining a clear vision of the long-term feasibility of firms and activities and in orienting public and corporate policies toward areas in which the most substantial improvements can be made. For example, if a labor cost disadvantage can be traced primarily to wage distortions, the policy implications are much different than if labor productivity emerges as the culprit. Price distortion analysis also provides valuable information for policy reform, particularly in assessing the likely impacts of trade reform on existing firms.

This approach has two basic limitations that should be made explicit. First, it is limited to the analysis of cost competitiveness. A firm may be cost competitive but lack the know-how required to successfully market and deliver its product. Quality differences are also often identified as a non-cost determinant of competitiveness, however our approach takes them into account by comparing monetary unit costs where we divide total costs by the **value** of production. We assume that any quality differences will show up in the sale price thus reducing production value and increasing (monetary) unit cost.

Second, it is an accounting rather than a modeling approach. This creates difficulties when we attempt to analyze differences in the productivity of specific factors of production. Labor productivity, for example, is strictly comparable between a local firm and a foreign competitor only if the production function is of the Leontief or fixed-coefficients type - that is, if no inter-factor substitution is possible - or if the two producers use exactly the same method of production. In reality, this is rarely the case. Indeed, we would expect that producers in a country with relatively low wages, such as Mali, adopt more labor-intensive production methods. This will reduce labor productivity (production per worker) and increase the productivity of all other factors of production.

In general, we would expect that, in the absence of technical inefficiencies, any labor productivity disadvantage resulting from the use of a labor-intensive method of production should be **roughly** offset by a corresponding capital productivity advantage and vice versa. If this is not the case, we take it as an indication that there **may** be some technical inefficiency. Obviously this is not a replacement for rigorous modeling of the cost and production functions. We hope to integrate such modeling into a future extension of the method. This would also allow us to better simulate the impacts of changes in factor prices, capacity utilization rates and the scale of production while at the same time measuring the competitive effects of technical and allocative inefficiencies.

3. MALI'S MANUFACTURING SECTOR AND POLICY ENVIRONMENT

Despite several decades of intensive government intervention, manufacturing activity in Mali remains underdeveloped, representing only 7.7% of GDP in 1995. However, between 1992 and 1995 it has grown at an annual rate of 4.5% while the rest of the Malian economy (except construction) stagnated. This expansion was far from uniform within the sector. The largest sub-sector, food industries, did not grow at all while the textile industry expanded at an annual rate of 16.3% and all other industries at 5.9%. The manufacturing sector produces a very limited range of unsophisticated products: principally vegetable oil, batteries, cigarettes, printed fabric and flour. Industrial policy has been inward oriented resulting in limited import competition (representing less than 5% of domestic consumption of goods produced in Mali) and poor export performance (2.5% of local production).

Mali has a relatively large (2.8 million workers) and unskilled labor force, 80% of which is concentrated in rural areas. Wage rates are very low, roughly one quarter those observed in the Ivorian firms we sampled. Mali has a minimum industrial wage that is binding for temporary workers, who represent almost half of the industrial work force, but not for permanent workers. It proved difficult to measure the resulting wage distortion. However, as we will see, wages typically represent less than 10% of production costs and their distortions are therefore of limited importance.

Malian firms have three main sources of credit: own funds, supplier credit and loans from commercial banks. In the year analyzed, 1995, interest-rate ceilings on commercial bank loans were set by the West-African States Central Bank (BCEAO) at 17.5% in both Mali and Côte d'Ivoire. Given the extent of bad loans and the lack of competition in the financial sector, manufacturing firms generally pay the maximum rate. Taking into account various factors (LIBOR rates, inflation rates, risk premiums and the money market rate), we estimate the interest rate distortion at roughly 50%. Even at this high interest rate, access to bank credit is difficult and mainly short-term, resulting in low debt-equity ratios (reported to be about 1:1) and enormous use of supplier credit. As supplier credit is generally interest-free, it constitutes an implicit credit subsidy to Malian manufacturers from their suppliers. We separate these effects in our analysis.

With regards to the foreign exchange market, both Mali and Ivory Coast are members of the CFA Franc Zone. The 1994 devaluation of the CFA franc has helped the member countries to strengthen their competitiveness. However, Devarajan (1997) estimates that the exchange rate was still overvalued by 9% in both countries in 1995.

Malian infrastructure is expensive and poor in quality. Given Mali's landlocked nature, transport costs play a particularly important role in determining Mali's domestic and export competitiveness. In an attempt to better understand the impact of transport costs, a special transport cost analysis was carried out.

The structure of taxation is heavy on trade taxes (36% in 1995) but, as a result of increased use of domestic excise taxes and trade liberalization, they have diminished in importance since 1992 (52%). Direct taxes play a relatively minor role (17%). Tax rates are similar to those in Côte d'Ivoire.

Trade policy plays a central role in determining Mali's domestic and international competitiveness. Trade liberalization has led to the quasi-elimination of quantitative restrictions and the use of reference prices and a reduction in tariff exemptions, except for inputs to export activities. The Ivorian import regime is similar to that of Mali. The average tariff rate is 10.4% in Mali as compared to 8.2% in Côte d'Ivoire. In both countries, tariffs are higher for consumption goods and for imports that compete with local production. For example, in Mali the maximum 36% tariff rate applies to imports of soap, confectionery and plastic shoes. High rates also apply to paint (30%), plastic bags (27%), printed fabric (21%) and wheat flour (20%). However, widespread smuggling may substantially undermine this protection. In the case of printed fabric, a comparison of local and international prices suggests that the real nominal rate of protection (NRP) is only 8%. Also, some tariffs are prohibitive (eliminating all imports) further suggesting that real NRPs are lower than suggested by the tariff rates. This said, in the only other case where prices were successfully compared - plastic shoes - the resulting real NRP was equal to the applied tariff rate. In the absence of export taxes and subsidies, there are no distortions in Malian export prices. Note finally that import tariffs constitute an implicit consumption tax of 16.8%. This tax rate is even higher on essential consumption goods such as food (17.5%) and clothing (22.4%). Rates this high undoubtedly have significant negative welfare consequences in a country as poor and with as widespread malnutrition, particularly among children, as Mali.

4. THE FINDINGS ON COMPARATIVE ADVANTAGE, COMPETITIVENESS AND ITS SOURCES

We begin with an overview of comparative advantage and competitiveness within Mali's manufacturing sector (section 4.1). To better understand these results, we then analyze the sources of comparative advantage (section 4.2) and, taking into account price-distortions, competitiveness (section 4.3). Given the central role of trade policy in determining competitiveness and the extent of trade policy reform currently under consideration in Mali (WTO, UEMOA, etc.), we also analyze the likely impacts of trade liberalization and regional integration (section 4.4). Our analysis is based on a sample of 12 Malian firms producing ten distinct products representing more than half of the sector's total production. Data from 17 Ivorian firms producing similar products are used in the comparative analysis. The firm sample is briefly presented in Table A1 (appendix).

4.1 Competitiveness and comparative advantage

In Table 1, we present the market-priced (uc) and shadow-priced (ucs) unit costs of our sample firms taken, respectively, as indicators of their competitiveness and comparative advantage. Eight of the 12 Malian firms are competitive on the Malian market (uc≤1, Table 1), with particularly low unit costs in the cases of sheet metal (0.72) and vegetable oil (0.89). The competitiveness of Malian manufacturers appears even stronger relative to the performance of their Ivorian competitors on the Malian market. Indeed, in all but the carton industry, Malian have lower unit costs than their Ivorian competitors ($uc \leq uc^*$) for sales in Mali.[15]

Table 1: Competitiveness and comparative advantage of Malian and Ivorian manufacturers

Industry		ucs	uc			ucs	uc*	
			Malian market	Ivorian Market			Malian market	Ivorian Market
Vegetable oil & derivatives	**Mali 1**	1.07	0.89	1.17	**Ivory 1**	1.05	1.14	1.00
	Mali 2	1.43	1.23	1.61	**Ivory 2**	1.13	1.09	1.05
					Ivory 3	1.53	1.56	1.42
					Ivory 4	1.04	1.08	0.94
Wheat Flour	**Mali**	1.13	1.05	1.23	**Ivory**	1.14	1.19	0.99
Confectionery	**Mali**	1.17	1.00	1.35	**Ivory**	0.93	1.11	0.75
Plastic Bags	**Mali**	1.45	1.05	1.38	**Ivory**	1.07	1.15	1.03
Plastic Shoes	**Mali**	1.30	0.97	1.33	**Ivory 1**	1.03	1.01	0.78
					Ivory 2	0.90	1.02	0.83
Paint	**Mali**	1.35	0.97	1.31	**Ivory 1**	1.01	1.14	1.01
					Ivory 2	1.05	1.08	0.95

[15] In the vegetable oil and derivatives industry, Mali 1 and Ivory 1, 2 and 4 are predominantly oil-producing (62%, 72.5%, 55% and 58%, respectively, of total production) whereas Mali 2 and Ivory 3 are principally soap-producing (100% and 51%).

Printed Fabric (Textiles)	**Mali 1**	1.00	0.98	1.06	**Ivory 1**	0.97	1.03	0.96
	Mali 2	0.77	0.90	0.98	**Ivory 2**	0.66	0.70	0.65
					Ivory 3	1.05	1.10	1.02
Carton	**Mali**	1.04	1.10	1.17	**Ivory**	1.05	1.05	0.95
Printing	**Mali**	1.06	0.97	1.15	**Ivory**	0.96	1.14	1.02
Sheet metal	**Mali**	0.90	0.72	0.98	**Ivory**	1.04	1.24	1.01

On the Ivorian market, the situation is very different.[16] Only two Malian firms - producing sheet metal and printed fabric (Mali 2) - are competitive ($uc \leq 1$). A further five Malian firms - vegetable oil (Mali 1), wheat, printed fabric (Mali 1), carton and printing - have an estimated rate of losses on exports under 25%. Relative to their Ivorian competitors, the Malian firms appear to be even less competitive. Their unit costs are substantially higher ($uc > uc^*$) for all but the firm producing sheet metal. The divergence in Mali's competitiveness between the two markets suggests that price distortions play a major role. In order to exclude the effects of these distortions, let us now look at the comparative advantage of the Malian and Ivorian manufacturers.

Only three of the 12 Malian firms, producing two of the ten products analyzed (printed fabric and sheet metal), have a comparative advantage ($ucs \leq 1$). However, Mali is close to having a comparative advantage in producing five other products - vegetable oil (Mali 1), wheat flour, confectionery, carton and printing - with shadow unit costs less than 1.2. Under the competitive pressure of trade liberalization and regional integration, these firms may improve their performance sufficiently to develop a comparative advantage. Mali is strongly lacking in comparative advantage in the four remaining industries, all in the chemical sub-sector: plastic shoes, plastic bags, soap (Mali 2 in the vegetable oil and derivatives industry) and paint.

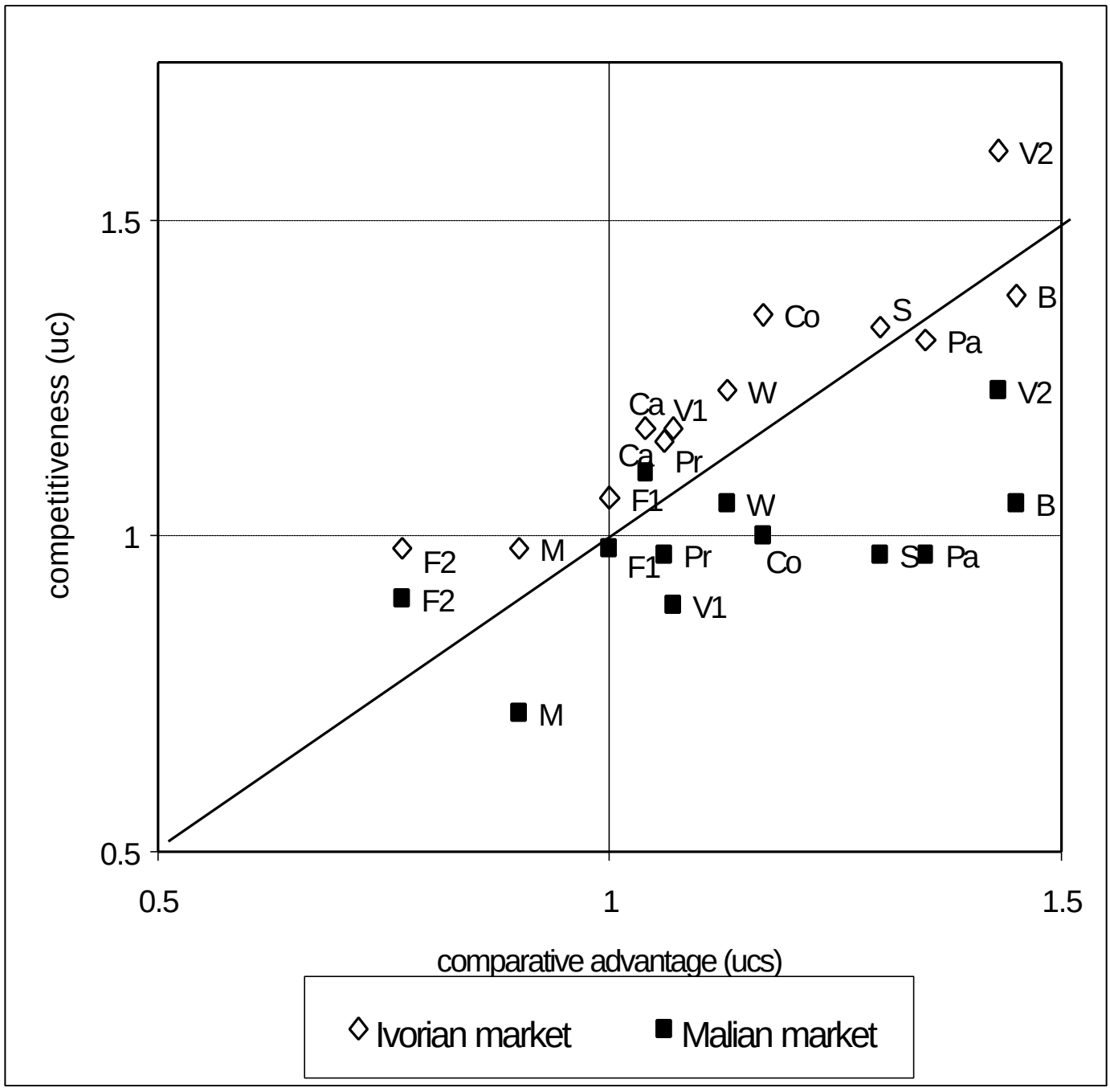
Let us now compare these results with the principal competitors in Côte d'Ivoire. While Mali has a comparative advantage in sheet metal production, Côte d'Ivoire does not, although it is not far. Mali's performance is comparable to that of Côte d'Ivoire in its other industry of comparative advantage, the printed fabric industry. Among the five industries in which Mali is close to having a comparative advantage, Côte d'Ivoire is also close to having a comparative advantage in three cases - vegetable oil, wheat flour and carton - with almost identical shadow unit costs. Côte d'Ivoire has a comparative advantage in the other two cases: confectionery and printing. Finally, Ivorian producers are close to having or already have a comparative advantage in the three industries in which Mali has a strong comparative disadvantage (paint, plastic bags and plastic shoes). In general, Côte d'Ivoire appears to have a greater comparative advantage in manufacturing activities, which suggests that regional integration will lead to strong competition.

Given the generally comparable, although slightly inferior, comparative advantage of Malian manufacturers, their strong local competitiveness noted earlier suggests an important role for price distortions. Indeed, we find that nominal protection dominates all other price distortions in each country's domestic market. On their respective export markets, producers receive no protection and thus are affected only by the generally cost-increasing distortions in input costs.

[16] These results do not account for export transport costs, which, as we will see in section 4.2, are often substantial.

Figure 1 illustrates the impact of price distortions on Malian firms. We classify each firm according to its comparative advantage (horizontal axis) and its competitiveness (vertical axis) on the Malian and Ivorian markets using the values presented in Table 1. The diagonal line represents equality between market- and shadow-priced unit costs, which occurs when the net effect of price distortions is nil. Points above (below) the diagonal represent firms for which the net effect of price distortions is to increase (reduce) costs. The vertical distance from the diagonal line indicates the extent of distortions.

Figure 1: The competitiveness and comparative advantage of Malian firms



B - Plastic bags
Ca - Carton
Co - Confectionery
F - Printed Fabric
M - Sheet Metal
Pa - Paint
Pr - Printing
S - Plastic shoes
V - Vegetable oil and derivatives
W - Wheat flour

On the Malian market, the net impact of price distortions is cost-reducing (points below the diagonal line) for ten of the 12 Malian firms, often substantially so (e.g. plastic shoes, paint and plastic bags). For five of these firms - vegetable oil (V1), confectionery, plastic shoes, paint and printing - the effect is strong enough to render them locally competitive (uc≤1) despite a lack of comparative advantage (ucs≥1). These firms rely on domestic protection to compete locally and are consequently vulnerable to the current wave of liberalization. For the others, price distortions either reinforce comparative advantage - sheet metal and printed fabric (F1) - or compensate for comparative disadvantage but not enough to render the firms competitive - plastic bags, soap (V2), wheat flour. Price distortions increase the unit cost for local sales of one of the printed fabric firms (F2) and the carton firm, partially offsetting comparative advantage in the first case and reinforcing comparative disadvantage in the second.

On the Ivorian export market, the impact of price distortions is reversed. In the absence of nominal protection for Malian firms, the net impact of the other price distortions is cost-increasing (points above the diagonal line) for all but the plastic bag and paint firms. While sheet metal exports and the exports of Mali 2 in the printed fabric industry are penalized by price distortions, this effect is not sufficient to offset their comparative advantage. This is not the case for Mali 1 in the printed fabric industry, which had only borderline comparative advantage (ucs=1). In all the other cases, the net impact of price distortions on exports exacerbates the firms' lack of comparative advantage. It is clear that Mali's already slim prospects for exporting manufactured goods disappear when these price distortions and the protection received by Ivorian firms are taken into account.

In conclusion, the Malian firms show a general lack of comparative advantage in manufacturing activities, although this situation could be considerably improved with some moderate efficiency gains. Local competitiveness is based largely on protection and is vulnerable in the current context of liberalization. Finally, Mali's export potential in manufacturing goods appears to be limited to the textiles sector, although regional integration may help by reducing production costs and removing the protection given to Ivorian producers on their local market. To better understand these results, let us now turn to an analysis of the causes of Mali's general lack of comparative advantage in manufacturing.

4.2 The sources of comparative advantage

The fundamental determinants of comparative advantage are the productivity and opportunity costs of factors, which combine to determine the unit costs of intermediate inputs, labor and capital, and sum up to total unit costs. Table 2 shows these unit costs in terms of shadow prices.

Given the relatively low wage rates, the high cost of capital and the high cost of tradable inputs (given the landlocked nature and poor transport infrastructure in Mali) in Mali, we would expect Mali to have a comparative advantage in labor-intensive, rather than capital- and tradable-input intensive, activities. Indeed, in Table 2 the activities with the highest labor intensities - printed fabric, printing and, to a lesser extent, confectionery, vegetable oil (Mali 1) and carton - are also among the activities with the lowest shadow unit costs (greatest comparative advantage). These activities also tend to have lower than average tradable input intensity. The one exception is the sheet metal industry. The evidence for capital intensity is less clear-cut.

Table 2: The sources of comparative advantage

	UNIT COSTS AT SHADOW PRICES				
	Tradable inputs	**Non-tradable inputs**	**Labor**	**Capital**	**Total**
Vegetable oil and derivatives	**0.64**	**0.13**	**0.08**	**0.22**	**1.07**
- Mali 1	**0.97**	**0.37**	**0.05**	**0.04**	**1.43**
- Mali 2	0.57	0.23	0.12	0.13	1.05
- Ivory 1	0.79	0.21	0.01	0.12	1.13
- Ivory 2	0.95	0.23	0.09	0.26	1.53
- Ivory 3	0.79	0.08	0.08	0.08	1.04
- Ivory 4					
Wheat flour					
- Mali	**0.95**	**0.12**	**0.03**	**0.04**	**1.13**
- Ivory	0.93	0.06	0.07	0.08	1.14
Confectionery					
- Mali	**0.40**	**0.55**	**0.10**	**0.12**	**1.17**
- Ivory	0.50	0.19	0.13	0.12	0.93
Plastic bags					
- Mali	**0.84**	**0.11**	**0.05**	**0.45**	**1.45**
- Ivory	0.70	0.13	0.08	0.18	1.07
Plastic shoes					
- Mali	**0.83**	**0.13**	**0.05**	**0.28**	**1.30**
- Ivory 1	0.63	0.16	0.06	0.19	1.03
- Ivory 2	0.57	0.10	0.09	0.15	0.90
Paint					
- Mali	**0.90**	**0.19**	**0.05**	**0.21**	**1.35**
- Ivory 1	0.63	0.15	0.10	0.12	1.01
- Ivory 2	0.79	0.11	0.07	0.09	1.05
Printed Fabric					
- Mali 1	**0.27**	**0.26**	**0.15**	**0.32**	**1.00**
- Mali 2	**0.15**	**0.30**	**0.12**	**0.21**	**0.77**
- Ivory 1	0.53	0.16	0.10	0.19	0.97
- Ivory 2	0.37	0.11	0.08	0.09	0.66
- Ivory 3	0.58	0.17	0.12	0.18	1.05
Carton					
- Mali	**0.59**	**0.34**	**0.06**	**0.06**	**1.04**
- Ivory	0.76	0.11	0.05	0.13	1.05
Printing					
- Mali	**0.67**	**0.16**	**0.11**	**0.12**	**1.06**
- Ivory	0.62	0.10	0.15	0.10	0.96
Sheet Metal					
- Mali	**0.77**	**0.10**	**0.02**	**0.02**	**0.90**
- Ivory	0.83	0.10	0.04	0.08	1.04

Among these industries, it does not appear that the Malian firms have any systematic input cost disadvantage relative to their Ivorian competitors, although in specific industries (particularly, paint, plastic bags and plastic shoes for tradable inputs and wheat flour, confectionery and carton for non-tradable inputs) they do. To go any further in this type of analysis requires recourse to cost function analysis as it impossible to know whether any divergences we may observe are due to factor substitution or technical inefficiencies as we mentioned in section 2.

We examined the possibility that the prices of tradable inputs are higher in Mali due to its landlocked nature[17]. This analysis indicates that transport costs represents close to half the total cost of tradable inputs to the wheat flour and soap industries and five to ten percent of these costs for the oil, confectionery, carton and printing industries. For the other industries, transport costs appear to have little impact on the cost of tradable inputs.

We also note the extremely low labor productivity in our sample firms relative to the Ivorian firms (see detailed report). Wage rates are, however, four times lower in Mali. Consequently, Malian firms generally have lower unit labor costs than their Ivorian competitors. However, they tend to have higher capital costs. This is due almost exclusively to lower capital productivity as shadow interest rates are assumed to be the same in the two countries. Once again, without a detailed productivity analysis, we cannot confirm whether lower labor and capital productivity is due to inefficiency or to the use of more labor- and capital-intensive production technology. We note, however, the extremely low rates of capacity utilization in Mali.

To examine these relationships somewhat more rigorously, we run some very simple OLS regressions of shadow unit costs on the shadow cost shares (factor intensities) of each factor taken separately[18]. Our results bear our intuition and initial impressions out (standard errors in parentheses):

$ucs = 0.95 + 0.34*tis;\ R^2 = 0.11$
(0.30)

$ucs = 1.25 - 0.53*nis;\ R^2 = 0.10$
(0.49)

$ucs = 1.32 - 2.59*lcs;\ R^2 = 0.33$
(1.16)

$ucs = 1.14 + 0.01*kcs;\ R^2 = 0.00$
(0.60)

where tis, nis, lcs and kcs represent, respectively, the tradable input, non-tradable input, labor and capital cost shares measured at shadow prices.

[17] We calculated additional input transport costs in Mali as the product of input weight, the cost of road transport in Mali by ton/km and the distance from the port of Abidjan to Bamako.

[18] Since they are cost shares, it would not make sense to do the regressions on al cost shares simultaneously.

As shadow unit costs are positively related to the tradable input cost share (positive slope coefficient), it appears that Mali does not have a comparative advantage in tradable input-intensive activities. However, this result is not statistically significant and tradable input-intensity has limited predictive power as evidenced by the R^2 of the first equation. Shadow unit costs are negatively related to the cost shares of non-tradable inputs and, to a much greater extent, labor. This suggests that labor-intensive and non-tradable input-intensive activities are best suited to Mali's comparative advantage. The labor cost share result is statistically significant and shows fairly good predictive power (R^2=0.33). The evidence for capital-intensive activities is not clear as there is no significant relationship between the capital cost share and shadow unit costs. This may be due to variations in capacity utilization among sample firms.

Transport costs are generally not taken into account in studies of comparative advantage, but they do matter for competitiveness. Given the speculative nature of our transport cost estimates, we have also chosen to exclude these costs from our quantitative analysis[19]. However, it is clear that transport cost is both a source of natural protection, by virtue of its domestic price-increasing effect, and an obstacle to export competitiveness. We present briefly in Table 3 our estimations of the **increase** in our reported unit costs that would result from including transport costs on Malian exports. Estimated unit transport costs are of course extremely high for low-value high-weight exports such as sheet metal and wheat flour. Export transport costs on vegetable oil and derivatives and confectionery products are very high. For the other products, the cost of transport is an important but perhaps not insurmountable barrier to export competitiveness.

Table 3: Unit transport costs on Malian exports to Côte d'Ivoire

Industry	unit cost	Industry	unit cost	Industry	unit cost
Vegetable oil and derivatives		**Confectionery**	0.39	**Printed Fabric**	
		Plastic bags	0.09	**- Mali 1**	0.03
- Mali 1	0.59	**Plastic shoes**	0.10	**- Mali 2**	0.03
- Mali 2	0.24	**Paint**	0.15	**Printing**	0.04
Wheat Flour	1.21	**Carton**	0.12	**Sheet Metal**	2.33

In conclusion, Mali's weak comparative advantage appears to be primarily due to a neglect of labor-intensive industries, which correspond more to its comparative advantage, in favor of capital- and material input-intensive activities. In addition, low capacity utilization and, to a certain extent, input transport costs and wastage may play a role. Within specific activities, attention should be paid to cost elements, particularly tradable and non-tradable input costs, which are often suspiciously higher than those of the corresponding Ivorian competitors. Finally, although unit labor costs are generally lower

[19] We assume that market prices in Mali will be higher by roughly the amount of the cost of transporting the product in question from Abidjan to Bamako. So, in order to export to Côte d'Ivoire, Malian producers must accept a price that is inferior to the Malian market price by the amount of transport costs between the two markets. Furthermore, they must absorb their own export transport costs. In other words, the value of their production is reduced by **twice** the amount of these transport costs. On the other hand, Ivorian producers' export transport costs to Mali are offset by higher market prices such that the price they receive for their product is the same as for sales on their local Ivorian market. We calculate the transport costs between Bamako and Abidjan as the product of output weight (tons), the cost of road transport in Mali by ton/km and the distance in kilometers from Bamako to Abidjan.

in Mali, the labor productivity lag in Mali is nonetheless astounding and merits some deeper production- or cost-function based analysis.

4.3 The competitive impact of price distortions

We have already seen (section 4.1) the important role of price distortions in determining the competitiveness of Mali's manufacturing sector. Let us now look in more detail at the role of specific price distortions that affect output prices (nominal protection), input and asset prices, wage rates, interest rates and exchange rates as well as direct taxes and subsidies.

Averaged over all firms, the net impact of distortions is to reduce Malian unit costs for local sales by 15.3% (Table 4). As shown in Section 4.1, this is sufficient to render locally competitive five of the firms, which are lacking in comparative advantage, while cutting losses or increasing profits for five others. Only two firms suffer from net cost-increasing price distortions for local sales. Furthermore, price distortions **increase** the unit costs of Ivorian producers by 7.2% for sales on the Malian market, which further increases Malian competitiveness. On the Ivorian market, the tables are turned as Ivorian producers see their unit costs fall by 6.9% as a result of price distortions whereas Malian firms' unit cost increase by 7.8%. Table 4 displays the enormous divergences in the impacts on specific firms that lie behind these average results.

As could be expected, **nominal protection** is the main price distortion for local sales. On the Malian market, they inflate the production value and thus reduce the (monetary) unit costs of Malian producers by an average of 23.1%. This has a dramatic effect on their domestic competitiveness relative to their Ivorian counterparts as the latter have no protection on the Malian market. On the Ivorian market, the situation is reversed as Malian producers receive no protection and the Ivorian competitors experience an average 14.1% reduction in unit costs from nominal protection. This reflects the Ivorian government's less protectionist industrial policy. In the absence of reliable price comparisons, we must also consider the possibility that applied tariff rates overstate the extent of nominal protection. If this is the case, our distortions would be overestimated and our shadow-priced unit cost estimates, used in the comparative advantage analysis, would be underestimated.

Exchange rate overvaluation has the effect of lowering the domestic price of output as well as that of tradable inputs, which partially cancel out, so that the net effect raises unit costs by 3.7% on average for Malian firms. This effect, however applies only vis-à-vis products imported from countries outside the franc zone; costs relative to Ivorian competitors are little affected as the latter, facing an equal estimated exchange rate overvaluation, also see their unit costs increase as a result; by 3.1%, on average.

Table 4: The impacts of price distortions on unit costs (in percentage)[20]

	Nominal protection (local sales)	Exchange rate	Input tariffs	Wage rates	Market interest rate	Credit subsidies	Net direct taxes	Total for sales in:	
	Malian firms							Mali	Côte d'Ivoire
oil	-26.3	2.5	6.3	1.9	3.9	-8.1	2.3	-17.5	8.8
	-35.3	3.6	8.6	0	0.5	-1.5	4.2	-19.9	15.4
flour	-17.8	1.7	4.3	0.5	1.2	-0.9	2.7	-8.2	9.6
confectionery	-32.7	6.1	5.2	0.8	4.3	-11.7	10.2	-17.8	14.9
plastic bags	-33.9	3.8	7.2	1.0	16.7	-35.7	0.5	-40.4	-6.5
plastic shoes	-34.7	3.5	2.0	0.9	10.8	-16.1	1.6	-32.1	2.6
paint	-33.9	3.1	4.8	0.5	8.9	-26.2	5.1	-37.7	-3.8
fabric	-7.6	5.9	2.3	3.0	13.1	-23.2	3.8	-2.7	4.9
	-6.4	6.0	0.9	2.4	3.3	-3.5	10.7	13.4	19.8
carton	-6.2	3.8	4.0	0.3	1.3	0	2.6	5.8	12.0
printing	-17.3	3.2	3.7	1.6	2.2	-2.2	0	-8.8	8.5
sheet metal	-24.8	1.0	5.0	0.4	0.2	0	0.4	-17.8	7.0
TOTAL	**-23.1**	**3.7**	**4.5**	**1.1**	**5.5**	**-10.7**	**3.7**	**-15.3**	**7.8**
	Ivorian firms							Mali	Côte d'Ivoire
oil	-13.7	4.3	1.9	2.0	4.1	-6.6	3.0	8.7	-5.0
	-3.5	2.5	3.0	0.1	3.1	-6.4	-6.9	-4.6	-8.1
	-14.5	4.8	7.9	0.6	8.6	-19.1	0.3	3.0	-11.5
	-13.9	2.1	3.8	0.7	3.2	-6.1	0.3	3.9	-10.0
flour	-20.2	1.8	4.9	0.7	3.6	-6.5	0.9	5.5	-14.7
confectionery	-33.1	4.3	5.4	1.2	5.3	-8.0	9.6	17.9	-15.2
plastic bags	-11.9	3.4	4.4	1.4	6.7	-10.7	3.6	8.8	-3.1
plastic shoes	-23.7	3.0	6.2	1.6	7.9	-19.8	-0.7	-1.7	-25.4
	-18.1	2.4	9.7	2.6	3.0	-6.9	1.5	12.2	-5.9
paint	-11.6	3.5	6.5	1.8	4.9	-6.8	3.3	13.2	1.6
	-13.0	2.0	6.8	0.7	4.1	-9.5	-1.8	2.3	-10.7
printed fabric	-7.0	3.8	4.8	1.9	8.0	-13.3	0.9	6.1	-0.9
	-5.0	2.4	3.4	1.6	3.9	-7.4	0.9	4.8	-0.2
	-8.0	4.1	3.9	2.6	6.2	-7.7	-3.9	5.2	-2.8
carton	-10.4	2.4	2.8	0.7	5.0	-11.0	0	-0.1	-10.5
printing	-10.9	3.0	16.3	-0.6	4.4	-8.2	2.7	17.7	6.8
sheet metal	-21.0	2.2	9.3	0.2	3.6	-0.6	4.5	19.2	-1.8

[20] We present the percentage increase (or decrease in the case of negative values) in unit costs engendered by the distortions identified in each column. The cumulative effect of all distortions (including nominal protection for sales on the domestic market) appears in the last two columns. Results for Malian firms are in the upper half of the table and for Ivorian firms in the lower half.

TOTAL	**-14.1**	**3.1**	**5.9**	**1.2**	**5.0**	**-9.1**	**1.1**	**7.2**	**-6.9**

Tradable input tariffs (including those on capital assets) increase Malian unit costs by 4.5% on average. Ivorian competitors face an even higher input tariff impact, which increases their costs by 5.9%. Thus, lower input tariff effects appear to work slightly in favor of Mali's manufacturing competitiveness relative to Côte d'Ivoire. **Wage distortions** have a small impact (roughly 1% cost increase) on producers in both countries on account of the small proportion of labor cost.

Interest rates face two, usually opposed, types of distortions. First, the market interest rate of 17.5% exceeds the shadow interest rate of 11.5%, increasing unit costs by roughly 5% in both countries. As the market interest rate is fixed by the UEMOA's Central Bank at the same level for both countries, the slightly different impacts reflect differences in capital intensity. However, through access to interest-free supplier credit and preferential loans, some firms receive a **credit subsidy** that more than compensates for the high market interest rate. Indeed, credit subsidies often bring the average interest rate on firm debt below the shadow interest rate of 11.5%. On average, Malian firms' credit subsidies reduce unit costs 10.7%, while Ivorian firms' costs fall by 9.1%.

Direct taxes are not necessarily distortions. However, to the extent that the direct tax burden differs between firms, they can be distorted and they certainly will affect competitiveness. Direct taxes, net of subsidies where any exist, increase Malian unit costs by 3.7%. This effect reduces the Malian firm's manufacturing competitiveness moderately relative to their Ivorian competitors for whom net direct taxes increase unit costs by only 1.1% on average.

In conclusion, Malian firms are moderately harmed by price distortions other than nominal protection, particularly input tariffs and exchange rate overvaluation. Relative to Ivorian firms, none of these price distortions play a dramatic role except nominal protection. Direct tax policies appear to slightly undermine Malian competitiveness whereas input tariff policy and access to interest-free supplier credit moderately increase Malian relative competitiveness. The net impact of all distortions is to enhance local competitiveness and diminish export competitiveness for firms in both countries.

4.4. Trade liberalization and regional integration

Both Mali and Côte d'Ivoire are currently engaged in two parallel initiatives that are likely to have significant impacts on manufacturing competitiveness. On one hand, they are liberalizing their economies as part of ongoing structural adjustment. On the other hand, they are both members of the recently-created UEMOA regional integration pact. By separating out the role of government policies in determining competitiveness, our approach allows us to predict how Malian industries will be affected by these two initiatives in the short-term. We must caution the reader, however, that we cannot predict the outcome of the longer-run adjustment process in which firms may either exit the industry or, hopefully, increase their efficiency and real competitiveness.

Of course, the impact of the actual liberalization process will depend on its extent and characteristics. As liberalization is an ongoing process, we consider the extreme case, where all price distortions are eliminated, to give us an idea of the types of effects to be expected. In the absence of price distortions, market prices would equal their shadow values, so that competitiveness and comparative advantage would be the same. The distinction between domestic and export markets would also vanish, except for transport costs. In terms of Figure 1, market-priced unit costs would move vertically on to the diagonal line. The impacts can be assessed by simply inversing the signs in Table 4 and examining the shadow unit costs presented in Table 1. Malian firms would be rendered locally non-competitive

in the following industries: vegetable oil (Mali 1: 17.5% increase in unit costs), confectionery (17.8%), plastic shoes (32.1%), paint (37.7%) and printing (8.8%). Two firms would see their competitiveness diminished: sheet metal (17.8%) and printed fabric (Mali 1: 2.7%). However, the other printed fabric firm (Mali 2: 13.4% cost **reduction**) and the carton firm would gain competitiveness (5.8% cost reduction) as they are both presently penalized by the price distortions. Mali's export competitiveness would improve, considerably in several cases, with cost reductions experienced by all but two firms (plastic bags and paint). The printed fabric firms appear especially well positioned to benefit as their estimated export transport costs (Table 3) are very low.

A more complicated scenario is the one of regional integration by means of preferential and, eventually, free trade between the Union members. This would involve trade diversion and a resulting loss of tariff revenue that needs to be balanced against the benefits of trade creation. The first stage of integration according to the UMEOA treaty is a 60% tariff reduction for regional trade, which has been implemented since 1997 for firms satisfying various rules of origin. Simulations we conducted indicate that this will have a modest impact on average tariff rates (5.3% reduction), tariff revenue (4.7% reduction) and import values (1.1% increase) in Mali.

However, these effects will be concentrated disproportionately on manufactured goods produced in Mali as they tend to have higher initial tariff rates and compete more with regional imports. If regional competitors do not pocket the tariff savings but rather pass them on to Malian consumers, domestic prices in Mali will decline proportionately. Our computations indicate that this would increase the (monetary) unit cost of Malian producers by 2% to 14% for local sales. The soap, confectionery and plastic shoe industries would be the hardest hit, but the carton and, possibly, textile industries would also suffer. If, on the other hand, regional competitors do pocket a share of the tariff savings, the impact on Malian prices and, consequently, the unit costs of local sales by Malian producers would be smaller. However, regional exporters would then experience a reduction in the unit costs of their exports to Mali. We conclude that regional free trade is a potential threat to a substantial part of the manufacturing sector.

In the current context of liberalization and regional integration, the survival of Mali's manufacturing sector depends on the firms' ability to increase productive efficiency. Our results suggest they have some potential to succeed and perhaps even benefit in terms of increased exports. If this is the case, they will be relying on their own competitive strength rather than the artificial support of protection, a much more solid base for growth. This said, government clearly has to play a role in this adjustment process by providing a competitive economic environment with efficient public services and infrastructure and the least possible distortions in input costs. Such an environment would level the playing field for Malian manufacturers and thereby ensure that scarce resource are allocated towards industries with the greatest comparative advantage.

5. CONCLUSION

We have illustrated the use of a new method of analysis that allows us to measure competitiveness and its sources. Our aims were to assess the competitive prospects of Malian manufacturers, identify areas

for improvement, assess the impacts of government policies and formulate corresponding policy recommendations. In the analysis of the sources of competitiveness, a major distinction is made between comparative advantage, reflecting factor productivity and opportunity costs, and the impact of price distortions, particularly those caused by government policy. Let us summarize the results of the analysis before drawing up a final assessment of the methodology.

Our results indicate that Malian manufacturers are generally competitive on the Malian market but not on the Ivorian export market. These results reflect a lack of comparative advantage coupled with protectionist trade policies in both countries. Thus Mali's manufacturers will face a serious challenge on their local market in the current context of trade liberalization and regional integration. This said, the cost reductions required of Malian manufacturers in order to compete locally appear feasible, in the range of 10 to 20% in most cases. Furthermore, the textiles industry, and perhaps even some other industries, show some potential to become competitive exporters.

These overall results disguise quite a lot of variation among industries and firms. The soap and carton industries appear to be very non-competitive, even on the local market. On the other hand, the sheet metal and printed fabric industries have a clear comparative advantage and, in the latter case, even some export potential. Mali's comparative advantage clearly lies in labor-intensive activities which tend to perform better than capital-intensive and, especially, input-intensive activities. This results mainly from the low cost of labor and despite low labor productivity.

Relative to their Ivorian competitors, the Malian firms' material input costs do not appear to be systematically higher, despite higher input transport costs. However, these costs are higher for some specific activities. This warrants further analysis as material input coefficients are generally expected to be fairly rigid, barring wastage due to poor supervision or maintenance, for a given product line. Capital costs, on the other hand, do tend to be higher in Mali, likely due to low capacity utilization rates and, perhaps, the adoption of inappropriately capital-intensive technologies. Finally, labor costs are inferior in Mali, despite much lower labor productivity, given the extremely low wages in Mali. The labor productivity gap between these two countries is remarkable and merits a deeper productivity analysis.

With the exception of nominal protection, government policy appears to have a moderate cost-increasing impact of roughly 8% of production value on Malian manufacturing firms. Given the Malian manufacturers' lack of comparative advantage, this is harmful for Malian exports and, in the context of trade liberalization, also undermines their attempts to compete locally. Attention should be paid to reducing the most important of these distortions, input tariffs, concurrently with the reduction in nominal protection. Exchange-rate policy must carefully avoid overvaluation, the second most important source of cost increases in Mali. Malian firms also are extremely dependent on access to interest-free supplier credit, a situation that requires constant monitoring. Financial liberalization and deepening would contribute to lowering market interest rates and thus allowing Malian firms to turn to more stable and long-term sources of finance.

In terms of improving the underlying performance of Malian firms, it appears that the most fruitful results are to be expected from efforts to encourage the establishment or the expansion of labor-intensive manufacturing activities. It is likely that Malian firms will reduce inefficiencies as they are increasingly exposed to competitive pressure. To the extent that UEMOA will add some regional competition this may help reduce such inefficiencies. Our preliminary analysis of transport costs suggests they play a very important role that merits more analysis. It is possible that national or

regional transport infrastructure investments could prove profitable in counteracting the negative effects of Mali's landlocked status. In conclusion, the situation of Mali's manufacturing sector is worrying but not without hope depending on the capacity of local producers to improve their performance and the government's capacity to create a favorable industrial environment.

As to a final methodological assessment, the method allows us to measure the competitiveness of firms and its sources. The information is detailed enough to be used to identify areas for improvement in firm performance and government policy while at the same time providing insight as to the comparative advantage of the industry as a whole. Its primary weakness concerns the modeling of factor substitution and, consequently, the analysis of productivity differentials. By integrating a cost or production function and explicitly modeling the firm's profit maximization process, we would be better able to distinguish factor substitution, technical inefficiencies and allocative inefficiencies which each lead to additional recommendations concerning policy reform and areas of improvement in firm performance.

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Table A1: Sample description

Product	Country	Date of creation	Private (%)	Foreign (%)	Capacity Utilization Rate	Equity (millions FCFA)	Sales (millions FCFA)	Permanent Employees	Exports (%)	Location (city)	Principal products
1. Vegetable oil and derivatives	Mali 1	1981	60	6	80%	1,500	17,336	877	0	Bamako	oil (62%), soap (26%), animal feed (12%)
	Mali 2	1981	100	0	20%	25	1,050	133	0	Bamako	soap (100%)
	Côte d'Ivoire 1	1973	90	24	100%	1,300	13,035	338	25	Bouake	oil (72.5%), soap (27.5%)
	Côte d'Ivoire 2	1992	100	N/A	N/A	845	67,238	30	41	Abidjan	oil (55%)
	Côte d'Ivoire 3	1977	100	3.34	80%	727	7,968	158	22	Abidjan	soap (51%), oil (22%)
	Côte d'Ivoire 4	1970	100	90	78%	6,040	64,501	889	19	Abidjan	oil (58%), soap (29%)
2. Wheat flour	Mali	1982	100	34	83%	N/A	5,811	100	0	Bamako	flour (95%)
	Côte d'Ivoire	1964	100	100	95%	2,000	33,647	272	1	Abidjan	flour (98%)
3. Confectionery	Mali	1949	100	100	34%	20	1,880	241	2	Bamako	confectionery (100%)
	Côte d'Ivoire	1981	100	100	100%	100	1,305	49	42	Abidjan	confectionery (100%)
4. Plastic bags	Mali	1990	100	N/A	75%	100	570	46	0	Bamako	plastic bags (95%)
	Côte d'Ivoire	1986	100	N/A	100%	208	861	25	19	Abidjan	plastic bags (100%)
5. Plastic shoes	Mali	1985	100	100	60%	100	914	81	0	Bamako	plastic shoes (100%)
	Côte d'Ivoire 1	1984	100	0	100%	800	3,941	N/A	87	Abidjan	plastic shoes (81%) and bags (18%)
	Côte d'Ivoire 2	1986	100	N/A	100%	161	2,794	275	73	Abidjan	plastic shoes (100%)
6. Paint	Mali	1980	100	0	81%	86	542	17	0	Bamako	paint (97%)
	Côte d'Ivoire 1	1962	100	71	40%	1,006	3,624	105	0	Abidjan	paint (98%)
	Côte d'Ivoire 2	1979	100	71.16	N/A	114	3,246	62	0	Abidjan	paint (100%)
7. Printed fabric	Mali 1	1972	80	0	86%	1,500	4,130	796	6	Bamako	printed fabric (100%)
	Mali 2	N/A	80	80	N/A	1,500	4,492	844	0	N/A	printed fabric (98%)
	Côte d'Ivoire 1	1921	52	36	100%	2,999	20,102	996	25	Bouake	printed (60%)/plain (30%) fabric
	Côte d'Ivoire 2	1969	100	17	100%	1,000	19,939	594	15	Abidjan	printed fabric (90%)
8. Carton	Mali	1979	100	0	31%	200	866	115	21	Bamako	carton (100%)
	Côte d'Ivoire	1988	100	87	60%	1,200	21,619	245	4	Abidjan	carton (97%)
9. Printing	Mali	1978	100	0	70%	30	175	26	0	Bamako	printing (100%)
	Côte d'Ivoire	1976	100	0	100%	250	2,853	80	0	Abidjan	printing (100%)
10. Sheet Metal	Mali	1978	N/A	N/A	50%	N/A	3,506	32	0	Bamako	sheet metal (96%)
	Côte d'Ivoire	1982	100	99.9%	N/A	306	9,568	60	15	Abidjan	sheet metal (93%)

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