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# ***Transnational Corporations***

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# TNCs' global characteristics and subsidiaries' performance across European regions\*

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Carlo Altomonte, Lorenzo Saggiorato and  
Alessandro Sforza\*\*

There is significant regional variation in the performance of foreign affiliates in Europe. The aim of this paper is to examine whether differences in their performance can be explained by the characteristics of the corporate group to which they belong. To this end, we develop a novel procedure that allows us to control for the characteristics of the groups to which each subsidiary belongs. These characteristics include the geographical spread of the group, the total number of subsidiaries and complexity of internal hierarchies, and the degree of industry diversification within the group. We also control for the different institutional characteristics at the regional level. We find that subsidiaries belonging to geographically more widely spread but relatively less diversified TNC groups have superior performance. The results also suggest that regions with quality institutions attract affiliates of such high-performance groups.

## 1. Introduction

A growing strand of research examines the relationship between regional economic performance and foreign direct investment (FDI), focusing on the determinants of FDI and locational choices. This focus on FDI reflects the growing importance of transnational corporations (TNCs) in generating economic spillovers (positive or negative) in the host countries/regions,

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which, due to their large average size, might significantly affect the growth path of the host economies.<sup>1</sup>

Indeed, a number of TNC characteristics might affect the extent to which FDI can influence the performance of host economies, with the most important determinants being the technology gap between domestic and foreign firms, the ownership structure of investment projects (Havranek and Irsova, 2011a, 2011b) and the degree of development of financial markets (Alfaro et al., 2010). Evidence suggests that the magnitude of TNCs' impact on regional disparities can be considerable because TNCs' investment projects result in varied speeds of industrial restructuring across regions (Altomonte and Colantone, 2008).

In this study, we follow up on this approach and assess whether and to what extent the performance of TNCs' affiliates varies across regions.<sup>2</sup> In order to explain these differences, we develop a novel procedure that allows us to control for the global characteristics of the corporate group to which each subsidiary belongs, such as the total number of subsidiaries, their geographical spread, and the degree of industry diversification within the group.<sup>3</sup>

We find that subsidiaries belonging to a TNC group that is geographically more widely spread but less diversified in terms of business activities have superior performance on average, although most of the regional variation in the results are linked to different local institutional settings and the specific industrial structure of each region. The results are robust to the introduction of a series of firm and regional characteristics.

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<sup>1</sup> OECD (2007) provides a detailed study on the effects that globalization and TNCs are having on regional development.

<sup>2</sup> This paper is part of a wider research project conducted for the "Invest in Milan" service of the Milan Chamber of Commerce – Promos, responsible for attracting foreign direct investments to Milan and Lombardy. In the research project, we analysed some 69,000 TNCs affiliates that invested in the 12 European regions that attracted most FDI from 2002 to 2007 and explored the extent to which different regional and industry characteristics contribute to differing impacts of foreign investment.

<sup>3</sup> Khanna and Palepu (2000) were the first to analyse the extent to which firms benefit from affiliation to business groups, with respect to the degree of diversification of the group and to the market institutional framework. Colpan and Hikino (2010) provided a recent summary of the literature on business groups and their effects on a country's performance.



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The rest of the paper is organized as follows. Section 2 describes the dataset and presents some preliminary findings with respect to the main variables of interest. Section 3 introduces the strategy used to obtain information on the TNCs. In Section 4, we present the empirical strategy and the results obtained. Section 5 assesses the role of institutional quality. Section 6 concludes.

## **2. Description of the dataset**

The data used in the paper come from two firm-level databases, Amadeus and Orbis, provided by Bureau van Dijk.<sup>4</sup> Amadeus contains financial information on almost 20 million firms all over Europe, observed over a period of around 10 years, while Orbis contains information on the firms' ownership structure and control chains worldwide. A key feature of these datasets is the richness of information provided for each firm. Moreover, most of the indicators are reported over time, enabling the construction of a panel dataset.

In order to retrieve information on the Nuts2 region<sup>5</sup> in which each firm is located, we have used information provided by the variable, "region", available in the Amadeus database. Since this variable does not always match the regional classification as specified by the Nuts2 classification of Eurostat, we have assigned manually the Nuts2 code to each region using information gathered from the address of the firm.

The focus of this research was on the 12 regions across Europe that are most competitive in attracting FDI. These regions are the Capital Region of Brussels in Belgium, Île-de-France and Rhône-Alpes in France, Baden-Württemberg, Bayern and Brandenburg in Germany, Leinster in Ireland, Lombardy in Italy, Cataluña and Madrid in Spain, and Inner-London and Outer-London in the United Kingdom. The standard OECD definition of FDI (OECD, 2008) has then been applied to identify foreign affiliates in the selected regions, i.e. firms with a foreign shareholder owning at least 10 per cent of the voting stock. A threshold on the size

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<sup>4</sup> Bureau van Dijk is a company that collects and provides firm-level balance sheet data. They also collect data on macroeconomic indicators as well as information on M&A deals. For details, refer to the web page: [www.bvdinfo.com](http://www.bvdinfo.com).

<sup>5</sup> Nuts2 is an EC geocode standard classification to identify regional entities.

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of the firm has also been added, in order to exclude very small firms which are not of primary interest for the present analysis.<sup>6</sup>

Table 1 provides an overview of the distribution of foreign affiliates in different regions. Unlike other regions identified within Nuts2, Lombardy in Italy has been split into Milan's province and its remaining provinces. The reason for this choice is that Lombardy as a whole is much larger in terms of geographical area, population and GDP than the other regions under analysis.

**Table 1. Distribution of foreign affiliates in the selected regions**

Region	No. of foreign affiliates
Brussels Capital Region	780
Baden-Württemberg	1,155
Bayern	1,623
Brandenburg	115
Madrid	3,475
Cataluña	3,626
Île-de-France	12,565
Rhône-Alpes	6,817
Leinster	1,507
Lombardy (Milan)	12,982
Lombardy (No Milan)	15,012
Inner London	6,902
Outer London	2,429
Whole sample	68,988

In order to identify the relevant corporate groups, we started from the OECD definition of foreign affiliates, i.e. at least 10 per cent of the voting stock is held by a foreign group. According to this criterion, the database identifies 68,988 foreign affiliates located in the 12 regions. Out of the 68,988 foreign affiliates, we took the decision to select only those firms that are majority-owned by a corporation, i.e. subsidiaries

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<sup>6</sup> Given the different accounting rules of the countries in the sample and incomplete data, the threshold was set as either sales, operating revenues or value added being greater than one million euro, for the last year for which data were available.

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owned by a corporation. We will refer to the corporate entity at the top of the control chain that has directly or indirectly more than 50.01 per cent of the voting power of the subsidiaries as the ultimate owner (UO).<sup>7</sup>

One may argue that considering only the relationships above the threshold of 50.01 per cent omits a large number of important minority participations and those foreign affiliates owned by individuals, especially at lower levels of control. It also overlooks the issue of cross-participations and strategic alliances. On the other hand, the 50 per cent criterion is appealing precisely because it enables a perfect partition of the affiliates in the sample into mutually exclusive corporate groups, thus avoiding the potential problem of affiliates which could be equally linked to two or more headquarters.

We have also excluded foreign affiliates controlled by individuals, since we are interested only in those affiliates for which we have information on the ultimate owner, so as to have a complete picture of the group's structure.

All the firms in the sample are foreign affiliates, but some of them have a domestic firm as the ultimate owner (i.e. a firm headquartered in the same country as the location of the foreign affiliate). Thus, of the 20,815 subsidiaries in the sample, only 15,699 are actually majority-owned by a foreign corporation (table 2).

For the analysis of the subsidiaries, we focused on some key variables covering different dimensions of performance. These were total assets<sup>8</sup>, total number of employees, operating revenues (turnover) and value added. In addition, two standard summary measures of profitability were considered, namely return on equity (ROE) and earnings before interest and tax (EBIT), both available from Amadeus. Another important dimension of the dataset is the industry in which a firm operates: this is, in principle, classified according to the NACE Revision 2 code of the European Commission. In order to be able to handle the information on the industry of activity, thus avoiding an

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<sup>7</sup> The identities of the ultimate owner are provided by Orbis.

<sup>8</sup> Note that total assets have been chosen as a proxy of capital, instead of fixed assets, because the sample includes firms operating in all sectors of activity, including services, where intangibles are highly relevant.

excessive disaggregation of the sectors, we made use of a slightly modified version of the Pavitt taxonomy (Pavitt, 1984), aggregating the sectors into six broad categories, namely, economies of scale industries, traditional industries, specialized industries, high-tech industries, services, and wholesale & retail.

**Table 2. Definition of FDI in our sample**

Classification	Definition	No. of firms
Foreign affiliates	≥10% participation by foreign firm	68,988
Corporate-owned foreign affiliates	≥10% participation by foreign firm + UO (50%, corporate)	20,815
Foreign subsidiaries	Majority owned by foreign corporate UO	15,699

In order to complete the framework of information available at the firm level, we added three measures of firm-level productivity, which are widely used in economic literature: unit labour cost (ULC), labour productivity (LP) and total factor productivity (TFP). Unit labour cost is measured as the ratio between the cost of employees and value added. Labour productivity is obtained by dividing value added by the number of employees. Total factor productivity is derived as the residual term of the estimate of the production function. In order to obtain consistent estimates, we adopted the semi-parametric methodology suggested by Levinsohn and Petrin (Levinsohn and Petrin, 2003) applied by industry.

Before we proceed to the analysis based on the sample of 20,815 subsidiaries, it is worth considering the possibility of the selection bias in the sample. Table 3 shows the average of the key indicators used in the analysis.

It is clear that the affiliates of TNC groups owned by individuals or minority-owned by corporations, which together make up the majority of the firms in the sample, are much smaller than those that are majority corporate-owned, with respect to almost all the measures considered. An exception is ROE, but this is not surprising because larger firms have much higher paid-in equity reserves, thus driving the ratio downwards. Controlling for country and industry fixed-effects in our estimates enables us to address the concern of a compositional effect possibly driven by an uneven selection bias across countries or industries.

**Table 3. Foreign affiliates' characteristics<sup>1</sup>**

Ownership	No. of firms	No. of Employees	Total Assets <sup>2)</sup>	Revenues <sup>2)</sup>	ROE (%)	EBIT <sup>2)</sup>	K/L	LP	ULC	TFP
Majority corporate-owned	20,815	129.32	217	41	15.79	1.8	706.98	124.2	0.7	3.78
Minority corporate owned or individual-owned	48,173	28.09	7	7	19.05	0.3	375.7	81.91	0.67	2.34
Total	68,988	57.99	70	16	18.11	0.7	473.42	93.35	0.68	2.73

Source: authors' calculations

Note: 1) All the indicators of the firm performance are averages

2) In millions of euros.

In terms of distribution across regions, we also find that affiliates located in different regions are heterogeneous in terms of firm characteristics and performance.

**Table 4. Foreign affiliates' characteristics by regions<sup>1</sup>**

Region	No. of firms	No. of Employees	Total Assets <sup>2)</sup>	Revenues <sup>2)</sup>	ROE (%)	EBIT <sup>2)</sup>	K/L	LP
Brussels Capital Region	780	113.79	48.02	48.02	15.81	2.23	1106.17	182.93
Baden-Württemberg	1155	240.43	51.01	51.01	15.42	3.55	350.90	98.90
Bayern	1623	210.51	43.41	43.41	12.33	3.16	526.05	116.77
Brandenburg	115	187.44	38.04	38.04	14.41	3.27	346.19	80.15
Madrid	3475	97.34	30.64	30.64	19.39	1.41	545.16	99.12
Cataluña	3626	64.41	17.44	17.44	16.10	0.72	330.97	75.85
Île-de-France	12565	45.72	15.12	15.12	23.20	0.62	383.27	107.07
Rhône-Alpes	6817	29.20	7.42	7.42	23.78	0.31	223.44	79.14
Leinster	1507	105.32	38.17	38.17	25.82	2.42	983.12	73.56
Lombardy (Milan)	12982	42.83	12.81	12.81	12.49	0.55	550.36	92.87
Lombardy (No Milan)	15012	27.01	6.45	6.45	11.81	0.31	412.95	72.29
Inner London	6902	107.35	27.63	27.63	25.73	1.30	885.30	146.34
Outer London	2429	154.08	31.75	31.75	28.72	1.18	518.20	92.42
Whole sample	68988	57.99	16.73	16.73	18.11	0.75	473.42	93.35

Source: authors' calculations

Note: 1) All the indicators of the firm performance are averages

2) In millions of euros.

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We notice, for instance, that associates located in Germany are typically much larger than the average with respect to the number of employees, total assets and revenues, although this may well be due to the selection bias in retrieving data for affiliates in Germany<sup>9</sup>. Conversely, it emerges that affiliates located in Lombardy are much smaller in terms of size and profitability measures, which is consistent with the well-known characteristics of the Italian industrial structure.

We now turn to the determinants of this heterogeneity in performance, linking them to the global characteristics of the parent groups to which the subsidiaries belong.

### **3. The characteristics of the parent groups**

In this section, we assess the extent to which the characteristics of the parent groups might explain the variations in the performances of the subsidiaries across the regions. When analysing subsidiaries, it is reasonable to consider them as part of the complex framework of the broader corporate group rather than as a stand-alone entity. However, from an empirical point of view, switching from a strictly firm-level approach to the parent group level is not straightforward. It becomes necessary to define the group's boundaries. Following the approach suggested by Altomonte and others (Altomonte et al., 2012), a group is defined through the criterion of "full control", thus implying an equity participation of more than 50.01 per cent at every stage of the control chain. This procedure, despite being demanding and possibly excluding some relevant group affiliation existing with lower levels of participation, guarantees the uniqueness of the ultimate owner of each FDI.

We implemented a three-step procedure to merge information on TNC groups with the baseline database already described, i.e. to link each foreign subsidiary in the database with the TNC group it belongs to. First, the variables "UO identifier"<sup>10</sup> and "UO type" were

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<sup>9</sup> The relatively small number of firms found in the richest German Länder, together with their average firm-level characteristics, in terms of all the indicators considered, far above those of all the other regions in the sample suggests that we might be getting information mainly on the biggest players in the regions.

<sup>10</sup> To identify a single firm the BvD Identifier is used. It is a code provided by

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downloaded from the Amadeus database for all the subsidiaries in the sample. Then, these codes were inserted in Orbis in order to obtain the following data: the name, the headquarters' location, the list of the codes of all subsidiaries of the TNCs with the level of control of each subsidiary, and the sector of activity according to the NACE Revision 2 code. These data were combined in order to obtain group-specific information, as discussed below. The data obtained were then merged with the baseline dataset.

From the list of worldwide subsidiaries downloaded for each TNC group, we were able to ascertain a number of firm characteristics relevant for our analysis. First, the location of the ultimate owner and all the subsidiaries were identified. Relying on the OECD 2009 "List of Unco-operative Tax Havens", those TNC groups that have subsidiaries in a tax haven and those TNCs groups whose headquarters itself is located in a tax haven were identified.<sup>11</sup> Furthermore, we were able to establish the total number of subsidiaries, as well as the number of countries where the group has subsidiaries. We also created a dummy variable (*Global*) indicating whether the group's subsidiaries are spread over more than one continent or all its subsidiaries are located in the same continent as the headquarters. In terms of industry diversification, we created a variable indicating the share of subsidiaries active in sectors (2-digit NACE Revision 2 aggregation) outside the core business of the group. A variable marking those groups that own subsidiaries involved in financial activities was also added.<sup>12</sup> Furthermore, to consider some proxy of the complexity of the group, we retrieved information on the hierarchical level of control of each subsidiary, i.e. the number of control participations that divide one subsidiary from its ultimate owner, and introduce a variable indicating the maximum level of control existing within the structure of each group.

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Bureau van Dijk, which is unique for each firm and constant over time.

<sup>11</sup> The OECD classified the following countries as tax havens: Andorra, Anguilla, Antigua and Barbuda, Aruba, Bahamas, Bahrain, Belize, British Virgin Islands, Cayman Islands, Dominica, Gibraltar, Grenada, Liberia, Liechtenstein, Marshall Islands, Monaco, Montserrat, Nauru, Netherlands Antilles, Niue, Panama, St Kittis and Nevis, St Lucia, St Vincent and Grenadines, Samoa, San Marino, Turks and Caicos Islands, Vanuatu. The following countries are classified as other financial centres: Austria, Belgium, Brunei, Chile, Guatemala, Luxembourg, Singapore, Switzerland. The following countries have not committed to the internationally agreed tax standard: Costa Rica, Malaysia (Labuan), the Philippines, Uruguay.

<sup>12</sup> They are identified as those engaged in financial and insurance activities as well as real estate.

Table 5 describes the dataset with respect to the group-specific variables introduced above, tabulated by region.

**Table 5. Descriptive statistics of TNC groups characteristics**

Region	N. of firms	of which UO	N. of info groups	Avg. N. of subsidiaries	Avg. N. of countries	Subs. Tax Haven	Global	Financial branch	Diversification
Brussels Capital Region	745	668	420	226.7	33.3	1	0.92	0.91	0.72
Baden-Württemberg	768	678	520	136.3	23.3	0.8	0.88	0.72	0.69
Bayern	1,041	926	706	131.1	21.9	0.8	0.83	0.71	0.68
Brandenburg	77	67	56	233.6	24.1	0.73	0.82	0.71	0.68
Madrid	1,926	1,777	1,186	148.1	24.3	0.86	0.87	0.79	0.69
Cataluña	1,316	1,239	942	129.3	21.8	0.8	0.87	0.72	0.67
Île-de-France	3,636	2,838	1,749	119.2	21.3	0.82	0.89	0.75	0.68
Rhône-Alpes	894	576	433	144	21	0.75	0.81	0.73	0.65
Leinster	1,300	1,034	733	174.7	24.5	0.74	0.88	0.85	0.65
Lombardy (Milan)	2,521	1,955	1,285	127.4	22.3	0.76	0.82	0.73	0.65
Lombardy (No Milan)	1,149	660	507	97.4	15.9	0.53	0.61	0.61	0.56
Inner London	4,431	3,690	2,448	71.1	10.5	0.5	0.86	0.58	0.51
Outer London	1,011	890	635	114.1	18.5	0.65	0.88	0.64	0.63
Whole sample	20,815	16,998	6,653 <sup>1)</sup>	57.8	10.9	0.55	0.77	0.58	0.55

Source: Authors' calculations.

Note: The numbers in the column do not add up to the total because many groups have a subsidiary in more than one region.

The third column of Table 5 represents the shift from the firm-level to the group-level; it is the number of TNC groups owning the subsidiaries listed in the second column (e.g. there are 420 groups that control at least one subsidiary in the Brussels Capital Region). The remaining columns present the variables discussed above, which are the average number of the subsidiaries of the same group worldwide, the average number of countries in which the groups have subsidiaries, the share of groups having at least one subsidiary located in a tax haven<sup>13</sup>, the share of groups having at least one subsidiary in a continent different from the headquarters' location, the share of groups having at

<sup>13</sup> Notice that the figure for Belgium takes value one because it appears itself in the OECD list on unco-operative countries.



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least one subsidiary active in a finance-related sector, and the degree of diversification, proxied by the share of subsidiaries within each group active in a sector different from the core business.

The table provides information in terms of similarities and heterogeneity of the parent groups active in the selected regions. If we consider, for instance, the size of the groups, measured both in terms of total number of subsidiaries worldwide and geographical spread, the table provides an extremely heterogeneous picture. The number of subsidiaries ranges from Inner London, with a value of 71.1 subsidiaries (that is, a group that has a subsidiary in Inner London has, on average, 71.1 subsidiaries in the group), to the higher values reached in Brandenburg and Brussels, respectively of 233.6 and 226.7 subsidiaries per group. Not surprisingly, this variable is by and large proportional to the geographical spread of the group. The latter shows again a differentiated picture, with TNCs that have a subsidiary in some regions being almost three times as widely spread as those that have a subsidiary in other regions.

More than half of the groups have at least one subsidiary located in a tax haven, in all the regions in the sample, but again there is wide variation across the regions. With respect to the presence of finance-related firms within the TNC, the percentage of groups that own at least one finance-related subsidiary ranges from 60 to 90 per cent across the regions. This feature is relevant given the important role played by internal capital markets in the performance of TNC groups.<sup>14</sup>

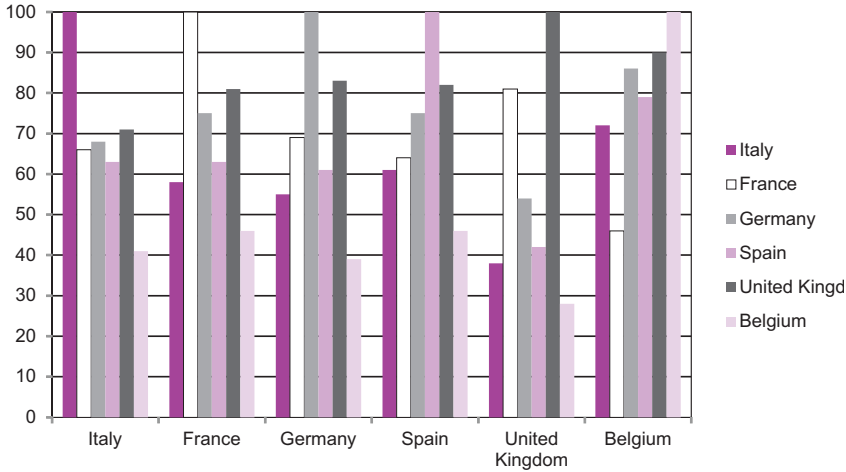
The extent to which TNCs groups have established subsidiaries in more than one European country under analysis can be seen from figure 1. The chart shows the percentages of groups that invest in the different countries conditional on the fact that they have already invested in another country. For example, observing the first group of bars in figure 1, one can deduce that around 70 per cent of the foreign TNCs investing in Italy have also invested in the United Kingdom and around 40 per cent also in Belgium. Hence, the message provided by figure 1 is that the vast majority of the groups observed are active in at least two countries of the sample; all the countries appear very similar

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<sup>14</sup> See Stein (1997) and Rajan et al. (2000) for two relevant different perspectives on the topic.

to each others, with only the United Kingdom recording a slightly more “isolated” pattern of investment.

**Figure 1. Patterns of TNCs establishing subsidiaries across sample regions**



Source: authors' calculations.

#### 4. Estimation methodology and results

All the analysis presented so far on TNCs has to be checked against the question of whether group-related features can influence the performances of subsidiaries in different regions.

The framework of analysis is a linear model, as in equation (1):

$$\Pi_{igt} = \alpha + \bar{\beta}X_{igt} + \bar{\gamma}Z_g + \bar{\delta}E + \varepsilon_{igt}, \quad (1)$$

where the dependent variable is alternatively the natural logarithm of TFP, of ROE, or of EBIT.  $X_{igt}$  is a set of firm-specific variables controlling for the number of employees and the capital-labour ratio,  $E$  is a set of industry and regional fixed-effects, and  $Z_g$  is a matrix of the time-invariant set of group-specific variables presented above. The

model is estimated by ordinary least squares and the error terms are clustered by group identifier. Table 6 provides the results of the estimates respectively on TFP, ROE and EBIT.

**Table 6. Estimation results**

VARIABLES	(1) ln TFP	(2) ln ROE	(3) ln EBIT
N. subsidiaries	-0.0392*** (0.0133)	0.0126 (0.0390)	0.00450 (0.0254)
N. countries	0.114*** (0.0156)	0.115*** (0.0389)	0.112*** (0.0310)
Global	0.0516 (0.0355)	-0.0289 (0.0714)	0.0390 (0.0684)
Financial branch	0.364*** (0.0824)	0.446*** (0.140)	0.481*** (0.133)
Diversification	-0.0805* (0.0446)	-0.372*** (0.121)	-0.255*** (0.0857)
Subsidiaries in Tax Haven	-0.0183 (0.0604)	0.0172 (0.126)	-0.0386 (0.124)
Headquarter in Tax Haven	-0.0247 (0.0183)	-0.0730* (0.0401)	-0.0855** (0.0386)
Max number of hierarchical levels	-0.00221 (0.00463)	0.00487 (0.0124)	-0.00572 (0.00829)
Constant	-1.311*** (0.168)	3.268*** (0.380)	-1.134*** (0.273)
Observations	45,299	29,429	30,138
R-squared	0.422	0.068	0.658
Region FE	YES	YES	YES
Sector FE	YES	YES	YES
Year FE	YES	YES	YES

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Observing table 6, we notice that there are some group-specific characteristics that significantly impact on the performance of subsidiaries, with respect to all the three indicators considered. In particular, it emerges that the geographical spread has a positive and

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significant impact on the performance, i.e. subsidiaries belonging to geographically more widespread TNC groups show, on average, a higher level of profitability and productivity. Another variable which seems important in shaping firm-level performance is the presence of finance-related subsidiaries within the group.<sup>15</sup>

These findings are consistent with a model of international production in which global value chains play a prominent role, as geographical diversification of a TNC group allows subsidiaries to better capture localization advantages across markets. Within these organizational setups, it is also known that a crucial role is played by internal capital markets, with a vast theoretical and empirical literature emphasizing how the availability of internally generated liquidity enhances firms' investment capacity in environments where access to external funds is limited (Stein, 1997).

With respect to the profitability measures, we find a negative and significant impact of the degree of industry diversification within the group (less significant when it comes to productivity), suggesting that a high dispersion of the activities of the group is negatively related with the performance of the subsidiaries.

Finally, subsidiaries of TNCs with the headquarters located in tax havens tend to report, *ceteris paribus*, some 8 per cent lower profits. However, a possible effect of tax distortion, proxied by the presence of subsidiaries in tax havens, does not seem to be significant neither in terms of productivity nor of profitability.

Table 6 thus provides evidence that TNC groups' characteristics matter for the subsidiary-level performance, in line with the general trend in the organization of international production aimed at the creation of global value chains.

The question remains as to whether these diverse characteristics of TNCs can account for the differences in the average performance of foreign subsidiaries across the regions. One difficulty in the analysis

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<sup>15</sup> Since the model includes sector fixed-effects, the share of subsidiaries with financial specialization does not impact firm performance via an industry-driven compositional effect (groups operating in the financial sector might have a larger share of finance-involved subsidiaries and higher profits), as this effect would be absorbed by the sector-specific intercepts.

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is that, as figure 1 shows, the vast majority of TNCs identified in our sample invests in more than one region. This location pattern lowers the explanatory power of TNCs' characteristics in explaining regional heterogeneity.

To explore this issue further, we have compared the regional fixed-effects obtained from the estimate of equation (1) with those obtained from the regression of the same equation without the matrix containing the TNCs' characteristics. The intuition is that, if the regional fixed-effects estimated in the equation with groups' characteristics are lower than the ones estimated only with firm-level variables, it implies that the group characteristics of subsidiaries differ across the region, and thus are able to explain the regional variation in the performance of foreign subsidiaries.

Next section actually shows that the group characteristics do not explain regional fixed-effects on the performance of the subsidiaries. Instead, it is the institutional quality that has significant impact on the performance of the foreign subsidiaries in the region. Furthermore, the regression results suggest that TNCs' group characteristics that are associated with better performance of the subsidiaries are correlated with the regional institutional quality. Clearly this issue requires further research, but the results obtained are consistent with the thesis that a region with quality institutions attracts investment from TNC groups that exhibit the characteristics of high performance, and hence foreign subsidiaries in such a region are seen to be performing well.

## **5. TNC characteristics and Institutions**

Group characteristics matter for the subsidiary-level performance, but their role in explaining differences in regional economic performance is controversial given the large number of TNCs have subsidiaries in more than one region.

In order to examine this issue, in the first two columns of table 7, we compare the regional fixed effects obtained from the estimate of equation (1) with and without the matrix  $Z_g$ , which contains the group characteristics. If the regional fixed effects estimated in the equation with the group characteristics are lower than the ones estimated only with firm-level variables, it implies that group

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characteristics differ on average from one region to the other in the sample and are actually effective in explaining part of the regional heterogeneity. However, it emerges from the comparison of the first two columns that the introduction of TNCs' characteristics does not absorb the regional fixed effects, suggesting that groups' characteristics, although having a significant impact on the subsidiary performance, are not effective in explaining regional performances.

The fact that the group characteristics do not explain regional fixed effects can be due to an autocorrelation across regional fixed effects, with the former arising because TNC groups invest, to a large extent, in more than one region in the sample, as shown in figure 1. In order to deal with the issue, we investigate the relationship between the density of TNC groups and institutional quality. To measure the latter, we constructed a standard indicator of institutional quality (*INST*) as weighted average of World Bank variables such as rule of law, government effectiveness, corruption and regulatory quality.<sup>16</sup>

If we now compare the first and the third columns of table 7, we notice that institutional characteristics do often lower the regional coefficients. However, the institutional variable (*INST*) in column (3) is not significant; this is consistent with the possibility that the institutional indicator is correlated with the TNCs' characteristics also included in the estimate, essentially mapping the same heterogeneity across regions.

In column (4), we estimate the same regression as in column (3) but on the whole sample (i.e. including all affiliates). We notice that the regional fixed effects remain almost the same as the previous specification while the institutional variable acquires significance and it shows the correct sign, thus adding support to the previous explanation.

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<sup>16</sup> Weights are assigned proportionally to the variance of each indicator in the sample, in order to highlight differences among the different institutional settings.

**Table 7. Regional fixed-effects comparison**

VARIABLES	(1) ln TFP	(2) ln TFP	(3) ln TFP	(4) ln TFP
Baden-Württemberg	-0.186*** (0.0319)	-0.180*** (0.0318)	-0.559*** (0.106)	-0.503*** (0.0571)
Bayern	-0.153*** (0.0314)	-0.172*** (0.0307)	-0.587*** (0.121)	-0.529*** (0.0644)
Brandenburg	0.388*** (0.0757)	0.413*** (0.0802)	0.340*** (0.0764)	0.270*** (0.0648)
Madrid	0.621*** (0.0277)	0.607*** (0.0267)	0.382*** (0.0658)	0.347*** (0.0386)
Cataluña	0.639*** (0.0277)	0.644*** (0.0268)	0.436*** (0.0567)	0.388*** (0.0349)
Île-de-France	0.455*** (0.0270)	0.442*** (0.0262)	-0.0556 (0.136)	0.0281 (0.0687)
Rhône-Alpes	0.320*** (0.0311)	0.326*** (0.0300)	0.156*** (0.0525)	0.211*** (0.0330)
Leinster	-1.231*** (0.422)	-1.094** (0.431)	-1.275*** (0.422)	-1.120*** (0.333)
Lombardy (Milan)	0.778*** (0.0275)	0.775*** (0.0261)	0.512*** (0.0685)	0.494*** (0.0369)
Lombardy (No Milan)	0.475*** (0.0305)	0.542*** (0.0300)	0.209*** (0.0697)	0.229*** (0.0370)
Inner London	-0.309*** (0.0304)	-0.294*** (0.0299)	-0.414*** (0.0437)	-0.437*** (0.0326)
Outer London	-0.288*** (0.0339)	-0.290*** (0.0355)	-0.420*** (0.0504)	-0.495*** (0.0352)
INST			-0.0452 (0.0320)	0.0476*** (0.0146)
Constant	-1.053*** (0.0488)	-1.365*** (0.167)	-0.989*** (0.0704)	-1.175*** (0.0396)
TNC Characteristics	YES	NO	YES	NO
Observations	45,299	45,299	45,299	185,408
R-squared	0.384	0.422	0.385	0.367

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

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## 6. Conclusions

The aim of the research was to study the performance of foreign affiliates located in twelve 'top' European regions, chosen among those that attract the highest number of FDI projects, including London, Rhône-Alpes, Île-de-France, Brussels, Madrid, Cataluña and Bayern. The resulting sample is composed of 20,815 foreign affiliates, observed over a time span of eight years from 2002 to 2009. In order to investigate the origin of the performance's differences among foreign affiliates, we developed a novel technique that enables us to retrieve information on the TNC group controlling the subsidiary and to create a set of TNC group-specific variables, such as the total number of group's subsidiaries, the number of countries where the group is active and the extent to which the group is diversified. The estimate of an ordinary least squared model suggests that there are, indeed, some TNC-level characteristics that matter in explaining firm-level performance (both profitability, measured by ROE and EBIT, and productivity, measured as TFP). Furthermore, we found that TNCs that control subsidiaries in the sample are likely to invest in more than one single region (as shown in figure 1), thus reducing the ability of the group-level variables to explain the regional heterogeneity. Finally, the results suggest that the quality of institutions impact on the type of TNC subsidiaries a region can attract, as we found a sound correlation between the proxy of institutional quality and TNC group-level characteristics.

The analysis allows us to draw some relevant policy implications. It emerges, indeed, that corporate-owned subsidiaries, which tend to be large, outperform those affiliates owned by individuals or by corporations with less than 50 per cent equity holding. The subsidiaries of a group that has a subsidiary in the financial industry are also shown to perform better. The latter result is consistent with the growing literature on the internal capital markets, which suggests that subsidiaries can benefit from the presence of a financing arm within the group as those allow easier access to the capital markets. The better performance of subsidiaries belonging to larger TNCs might be related to the geographical spread of the group that gives easier direct access to a large number of markets without incurring the costs related to marketing across borders. Finally, what we find in our analysis is that industry diversification within the TNC is, *ceteris paribus*, negatively



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and significantly related to firm-level performance. Another relevant finding obtained is that the presence of TNCs is closely linked to the institutional quality. This correlation could be interpreted in two ways: the presence of TNCs could somehow influence and shape institutions or, more likely, TNC groups are more inclined to locate subsidiaries in regions with higher quality institutions. Pursuing this issue goes beyond the scope of this research. However these findings suggest that it would be worth trying to find a way to deal with the endogeneity problem highlighted, as this would enable a proper assessment of the causal relationship and to address more specifically the relationship between institutional quality and the characteristics of the TNCs that work in the country.

From a regional economic policy perspective, it may be worth attracting investments from relatively more geographically spread groups, benefitting from their own financial resources, as this may increase regional aggregate performance, together with the possibility of inducing a virtuous circle mechanism on the quality of local institutions. With this respect, working primarily on institutional quality, thus committing to promoting contract enforcement and to fighting corruption could be an important trigger for the attraction of TNCs.

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# **Internationalization and its possible impact on subjective and objective performance: Evidence from Brazilian TNCs**

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Brazilian transnational corporations (TNCs) have increased foreign direct investment nearly every year since 2001. This paper assesses Brazilian TNCs' transnationality index and the relationship with both objective and subjective foreign performance. An empirical study was conducted of 41 Brazilian TNCs' international activities in 2008 and 2009. The results demonstrate that an increase in the degree of internationalization is associated with better foreign performance. This relationship is stronger for the objective performance dimension than the subjective dimension. Furthermore, UNCTAD's transnationality index is more reliable in this context than an alternative construct that includes other internationalization measures.

## **1. Introduction**

Internationalization has long been discussed in the strategic management literature as a way of diversifying the business and creating value (Dunning, 2000; Johanson and Vahlne, 1977). Transnational corporations (TNCs) engage in foreign direct investment (FDI) in pursuit of superior performance (Sharma, 1998). But TNC strategies differ in terms of entry mode (Kogut and Singh, 1988), location (Goerzen and Beamish, 2003), centralization (Davidson, 1984) and ownership (Hennart and Reddy, 1997). The array of international strategy choices available to the firm results in differing levels of internationalization. In order to better understand what these levels mean to the organization, scholars have attempted to establish a reliable measure of the degree of internationalization.

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Many different ways of measuring internationalization exist. Some measures rely on a single-variable based on foreign sales (Geringer, Beamish and daCosta, 1989). Others propose a multidimensional measure including *inter alia* FDI, employment and geographic dispersion (Ietto-Gillies, 1998, 2009; Sullivan, 1994; UNCTAD, 1995). Although the choice of an “ideal” measure seems to depend upon context (Ietto-Gillies, 1998), it is nevertheless important to assess the internationalization level of firms in order to understand the patterns and effects of global strategies on firm performance. For example Brazilian TNCs have been increasing their investment abroad since 2001, with consequent performance improvements (Loncan and Nique, 2010). But since the recession of 2008, many Brazilian firms have begun to question whether further internationalization is the most prudent use of their capital (Ramsey et al., 2010).

The purpose of this paper is to contribute to our knowledge in three areas. First, whether firm performance is related to the degree of internationalization of a firm. Second, whether some measures of internationalization are better suited to assessment of the relationship between performance and internationalization. Third, whether the relationship between internationalization and performance is better explained by subjective or objective measures of performance.

We first discuss alternative ways of measuring the degree of internationalization. We then address how the degree of internationalization is related to firm performance. Finally, we discuss whether the degree of internationalization is more closely related to subjective or objective measures of performance. In doing so, we propose and test two models in which internationalization has a positive relationship with both foreign objective and subjective performance.

## **2. Internationalization**

### **2.1 Degree of internationalization**

An important element in the study of the degree of internationalization is the level of measurement (Ietto-Gillies, 2009). In principle, internationalization can be measured at national, industry or firm level. We chose the firm level because the objective of this paper

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understanding how the degree of internationalization affects a firm's foreign performance.

Internationalization refers to a firm's engagement in FDI and development of foreign business units. The classical determinants of FDI are: (1) ownership advantages that may be explored overseas; (2) location advantages offered by other countries; and (3) internalization advantages by integrating intermediate product markets (Dunning, 2000). Therefore, internationalization via FDI is an alternative to international outsourcing and a means to create value for the firm. Levels of international commitment vary widely across industries and organisational cultures. The process of internationalization typically involves multinational enterprises gradually increasing involvement in foreign markets, often starting with a basic sales office and ending up producing abroad in more advanced stages (Johanson and Vahlne, 1977). As such, firms are committed to foreign markets to varying degrees, depending on their particular stage of internationalisation and according to individual strategic plans.

In spite of this complexity, researchers need a credible means to quantify the degree of internationalization. The first attempts to quantify internationalization used a single-variable approach, based on foreign sales (Collins, 1990; Geringer, et al., 1989; Grant, 1987) or the ratio of foreign assets to total assets (Ramaswamy, 1993). Despite ease of calculation, single-item usually underperform multi-item scales in terms of predictive ability. Multi-item scales reduce measurement errors, resulting in increased reliability and construct validity. Moreover, single-item scales can be ignore the multi-dimension nature of a firm's international presence, which extends beyond a mere financial perspective (Churchill Jr, 1979). Psychic dispersion, a manager's international experience, the intensity level of internationalization and the geographical extensiveness of the international activities may also be important (Ietto-Gillies, 1998).

Therefore, the measurement of internationalization has expanded beyond single measures and financial criteria. Multi-variable measures have emerged as a means to control for measurement error and to address the different aspects of the internationalization process (Dorrenbacher, 2000). Lu and Beamish (2004) for instance,

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assess internationalization using two variables: the number of overseas subsidiaries and the number of countries these subsidiaries inhabit.

One such multi-variable measure was developed by UNCTAD for its *World Investment Report* (UNCTAD, 1995). It combines three ratios: foreign sales to total sales, foreign assets to total assets, and foreign employment to total employment. The “transnationality index” averages the three dimensions in order to balance different types of internationalization across various industries. Tuselmann et al. (2008) used it to assess the importance of industry internationalization in shaping the strength and nature of the country-of-origin influence in employee relations of United States subsidiaries. While relatively few studies have used the transnationality index, some scholars have used its elements to develop alternative indices (Outreville, 2008; Ruzzier, Antoncic and Hisrich, 2007). Furthermore, UNCTAD’s transnationality index has been adopted by several business schools around the world in order to compare companies across countries (see UNCTAD’s annual *World Investment Report* for the largest TNCs worldwide).

Due to the multi-variable nature of the transnationality index as well as its approach of using other than purely financial measures, we have selected it as the primary measure for the degree of internationalization. Furthermore, we have selected Brazil as the country to sample for this study because it is the largest economy in Latin America as well as the greatest source of FDI from the region.

One prior study showed that the more internationalized the Brazilian company (in terms of foreign sales over total sales), the better its performance (returns on assets) (Loncan and Nique, 2010). But the study only sampled five companies and used a single indicator for each concept. The contribution of our study is to extend this research by exploring the relationship by surveying a larger sample, testing multi-dimensional constructs and adding subjective measures of performance.

## **2.2 Internationalization and firm performance**

A number of prior studies have discussed the effects of internationalization on firm performance. The general argument is that TNCs increase their return on foreign investment by focusing on global strategic planning, risk management and their unique advantages

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(Dymsza, 1984). The underlying assumption is that international firms develop firm-specific advantages that lead to superior returns (Bouquet, Morrison and Birkinshaw, 2009). Firms establish these advantages by altering their strategy. For example, management centralization (Davidson, 1984), entry mode (Sharma, 1998), portfolio size (Goerzen and Beamish, 2003) and cultural distance (Park and Ungson, 1997) are all strategic decisions involved in international operations that have been shown to affect foreign performance.

Relatively little research has sought to understanding the effect of the degree of internationalization on performance.<sup>1</sup> It is commonly assumed that as firms increase their degree of internationalization, they will increase their knowledge of doing business abroad, resulting in superior performance. A mechanism for increased knowledge is an increase in employees abroad. Furthermore, the more resources that the firm allocates abroad, the more it will be committed to improving foreign performance. If a firm has a large percentage of its assets abroad, then it will be more inclined to focus on foreign performance. Finally, companies that invest a large amount of time and capital abroad are likely to increase foreign sales and consequently firm performance.

### **3. Performance measurement**

In a review of export studies, Sousa (2004) found that there are approximately 50 different measures of foreign performance, but only a few are frequently utilized. How a firm measures overall foreign performance may affect how satisfied it is with its foreign subsidiaries. For example, executives may be more or less satisfied with performance depending on how it compares to expectations (Oliver, 1997) or competitors (Shoham, 1998).

A distinction can be drawn between objective and subjective measures of performance. Objective measures are indicators mainly based on values ascertained from profit and loss statements (e.g. earnings before interest and taxes (EBIT)) or ratios calculated with absolute values (e.g. return on sales (ROS)). On the other hand, subjective measures are indicators based on attitudes towards performance such as perceived success and satisfaction with foreign performance.

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<sup>1</sup> See Lu and Beamish (2004) as a notable exception.

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### 3.1 Objective measures of performance

Objective indicators are represented as numbers or percentages directly found in financial statements, balance sheets or market/sales reports. Recent studies have used a combination of these variables (e.g. Andersson, Forsgren and Pedersen, 2001). Lel and Miller (2008), for instance, employ measures such as stock price, stock returns and EBIT to assess performance of international cross-listed companies. Taggart and Taggart (1999) also use sales based measures such as market share and growth of exports to show the link between exchange-rate stability and performance. Other authors measure performance by return on assets (Miller and Eden, 2006), return on sales (Makino and Isoe, 2003) and return on equity (Bouquet, Morrison and Birkinshaw, 2009). Bouquet, et al. (2009) found that the amount of time and effort in activities, communications and discussions concerning the global marketplace was correlated with firm performance.

Therefore, we hypothesize that:

*H1: The TNC's degree of internationalization is positively correlated to its objective foreign performance.*

### 3.2 Subjective measures of performance

Despite numerous ways to objectively measure foreign performance, difficulties in obtaining and dealing with company accounts remain a point of contention within the literature for three main reasons.

First, financial statements are usually confidential and restricted to internal control (Woodcock, Beamish and Makino, 1994). Even publicly traded companies are not obliged in most countries (including Brazil) to publish results of foreign operations separately from consolidated statements. Lack of objective information is thus responsible for greatly reducing response rates in empirical work on international business performance (Wall et al., 2004).

Second, objective measures are not easily comparable because companies from different industries and sizes may have different results (e.g. foreign profit), but not necessarily outperform each other.



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For instance, a foreign firm operating in a very large foreign market (e.g. China) might appear to outperform a firm operating in a relatively small foreign market (e.g. Uruguay). Is firm A which sells \$9,000,000 of socks in China outperforming firm B selling \$8,000,000 of socks in Uruguay? One could argue that firm B is dominating the market in Uruguay and firm A is barely getting into the market in China. One way researchers have avoided this issue is by using ratios such as return on assets or by assessing performance subjectively.

A third reason why objective measures may be problematic is due to timing. For instance, many emerging markets companies are more focused on long-term objectives such as learning and obtaining market share than on short term sales and profits (Pangarkar and Klein, 2004). In such cases even though profits may seem marginal, the firm can be satisfied because it did not expect a quick return.

According to Wall et al. (2004), using subjective measures is a cost-efficient choice because evaluations may be collected in simple questionnaires. Additionally, executives are more amenable to evaluating performance on a Likert scale than reporting confidential information (Sousa, 2004). Moreover, subjective measures provide a broader assessment of the results of internationalisation as well as a useful comparison between expectations and perceived success. Furthermore, a study of international joint ventures in the United States provided empirical evidence that subjective measures are adequate for assessing firms' performance (Geringer and Herbert, 1991). Thus, scholars have been increasingly applying subjective measures as a complement to objective measures and also a solution to recurrent issues with objective indicators (Al-Khalifa and Peterson, 2004; Brouthers, Brouthers and Werner, 2008; Nielsen, 2007).

In general, we expect that subjective measures of performance would also reflect the degree of internationalization. One might even argue that subjective measures would be more closely correlated with the transnationality index because it can overcome the aforementioned problems with objective measures. Specifically, managers are more willing to give subjective results than hard numbers and both the size of the operation and how long it has been operating can both be taken into account when the manager responds to subjective measures.

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Therefore, we hypothesize that:

H2: The TNC's degree of internationalization is positively correlated to its subjective foreign performance.

## **4. Data and Methodology**

In this section we present the methods and procedures used to formulate our questionnaire, to collect the data and to validate the scales constructed.

### **4.1 Data collection**

A set of 71 Brazilian groups that entered foreign markets via FDI were contacted to participate in the survey. The potential response pool included publicly traded companies listed on the Bovespa (São Paulo Stock Exchange) and private limited companies (Ltda.). While 71 groups may be considered relatively small for an empirical study, this number is very close to the entire population of large Brazilian multinational groups.<sup>2</sup>

International managers were asked to fill out a three page questionnaire regarding their international activities in 2008 and 2009. Forty four companies replied, of which 41 were valid (57.7 per cent response rate). The three response that were not valid were from firms that only exported or could not provide the required financial data. All variables in this study were obtained from the questionnaire. Companies' financial department provided information on objective performance as well as total and foreign revenues and assets to compose the internationalization measure; human resource departments provided the number of total and foreign employees; and international managers answered the questions regarding subjective performance, number of countries and year when the first international subsidiary was established. An effort was made to verify the data from secondary sources to improve validity. Note that we considered groups instead of individual businesses since decision making is often centralized in the holding company. Therefore, the data are based on the groups' consolidated numbers and locations.

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<sup>2</sup> The questionnaire (in Portuguese) is available from the authors on request.

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## 4.2 Sample profile

From the 41 groups that participated in the study, 90 per cent are privately owned as opposed to state-owned. Respondent firms belong to various industries: manufacturing (51 per cent), services (44 per cent) and natural resources (5 per cent) (see the Appendix for a complete listing of companies and industries). Additionally, companies entered foreign markets relatively recently: 20 per cent opened the first international subsidiary before 1980; 10 per cent between 1981 and 1990; 29 per cent started between 1991 and 2000; and 32 per cent after 2001 (9 per cent did not provide this information).

## 4.3 Measurement

The proposed model has three variable constructs: *degree of internationalization* as the predictor of both foreign *objective performance* and *subjective performance*.

Data from 2008 and 2009 was averaged since firms may have different performances depending on the year. Therefore, using the average avoids spikes in the results due to year effects (e.g. 2008 and the financial crisis), providing a more accurate and stable assessment of performance (Maijor and Vanstraelen, 2006; Slaper and Krause, 2010).

To measure the *degree of internationalization*, we applied the UNCTAD methodology, which considers three indices: foreign sales over total sales, foreign assets over total assets and foreign employees over total employees. The indices achieved good reliability (Cronbach's alpha = .87). As discussed above, using a multidimensional index balances the different ways of internationalizing since we have groups from different industries. In general, companies from the services sector have a large number of employees abroad but a relatively low amount of assets. On the other hand, companies from the manufacturing sector can accumulate high revenues abroad without necessarily having a large workforce. Because aggregating various items into a construct may limit the interpretation of results (Bergkvist and Rossiter, 2007), we also present an analysis of the effects of each index on performance measures separately.

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Furthermore, we added two additional variables that have been used to measure the degree of internationalization (Ietto-Gillies, 1998; Sullivan, 1994). The number of countries and international experience were added to the construct in order to compare two competing rubrics. The first variable was measured by the number of countries that firms had FDI in 2009 (Sundaram and Black, 1992). The second variable, international experience, is based on the organizational learning perspective (e.g., Hennart and Reddy, 1997) and measured by the number of years since the first international subsidiary was established.

Foreign *objective performance* was measured with three indicators. The first was the EBITDA index, which is the proportion of foreign EBITDA to total EBITDA. The second measure was foreign return on sales (ROS), which is calculated by the ratio of foreign profit (EBITDA) to foreign sales. ROS is commonly employed to assess firm's operational efficiency and has been applied in the literature (Daniels and Bracker, 1989; Geringer, et al., 1989). The third measure was foreign return on assets (ROA), which is calculated by the ratio of foreign profit (EBITDA) to foreign assets. This indicator has also been used in the literature as a measure of investment efficiency (Loncan and Nique, 2010; Rugman and Oh, 2010). Using indices instead of the absolute numbers allows us to assess relative foreign performance and compare companies from different industries and sizes. The construct, however, showed low reliability, with Cronbach's Alpha of 0.41. Nevertheless, we decided to proceed with the tests in order to keep a minimum of three indicators per construct.

Four indicators were used to measure *subjective performance* (Al-Khalifa and Peterson, 2004). According to this approach, firms assess performance based on four elements: sales, sales growth, profit and market share. Thus, firms were asked to rate its satisfaction with each of these measures of performance on a five-point Likert scale. The dimensions proved to be unidimensional by factorial analysis and reliable (Cronbach's Alpha = 0.82). See table 1 for a summary of the variables and their components.

#### **4.4 Methodology**

Before testing the models, several analyses were employed in order to assure data consistency. First, missing data were replaced by

**Table 1. Variables, components, year and source of data**

Variables	Components	Year of data	Source of data
Revenues index	Foreign sales/Total sales	Avg of 2008 and 2009	Financial department
Assets index	Foreign sales/Total sales	Avg of 2008 and 2009	Financial department
Employees index	Foreign employees/Total employees	Avg of 2008 and 2009	HR department
UNCTAD index*	Avg of revenues, assets and employees index	Avg of 2008 and 2009	Financial department
EBITDA index	Foreign EBITDA/Total EBITDA	Avg of 2008 and 2009	Financial department
Foreign return on sales (ROS)	Foreign EBITDA/Foreign sales	Avg of 2008 and 2009	Financial department
Foreign return on assets (ROA)	Foreign EBITDA/Foreign assets	Avg of 2008 and 2009	Financial department
Satisfaction with sales	5-point Likert scale ratings on sales	Avg of 2008 and 2009	International department
Satisfaction with sales growth	5-point Likert scale ratings on sales growth	Avg of 2008 and 2009	International department
Satisfaction with profit	5-point Likert scale ratings on profit	Avg of 2008 and 2009	International department
Satisfaction with market share	5-point Likert scale ratings on market share	Avg of 2008 and 2009	International department
Foreign countries	The number of countries the firm had FDI in 2009		International department
International experience	Number of years since the first intl. subsidiary was established		International department

Note: The source for all data is a respondent from each company. Where ever possible, secondary sources were used to verify responses (ie., total revenues).

\* Index Proposed in the *World Investment Report, 1995*.

regression estimates since excluding cases would reduce the sample and statistical power. The method considers the relationship among variables and avoids losing variance, which is common when replacing variables by means (Hairet al., 2005). Furthermore, we employed the Mahalanobis distance  $D^2$  to identify multivariate outliers (Tabachnick and Fidell, 2001). Three firms may be considered outliers in this study, but since large differences in terms of the degree of internationalization and performance are expected in a sample of TNCs from different sizes and industries, discrepancies in this case are not seen as harmful. Additionally, we conducted an exploratory factor analysis (Kline, 2005) with all variables in the models and found that factor loadings are

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concentrated in the expected dimensions. The solution showed three factors (transnationality index, subjective and objective performance) that accounted for 69.4 per cent of the total variance explained. Each construct proved to be unidimensional in a separate exploratory factor analysis. Finally, we assessed constructs' reliability using the Cronbach's Alpha, as shown above.

In order to test the proposed model, we used Structural Equation Modelling and AMOS software. The procedure involves simultaneously testing relationships between one or more independent variables and one or more dependent variables. Thus, the method combines exploratory factor analysis with multiple regression analysis (Tabachnick and Fidell, 2001). The moderating variables were mean centred to avoid multicollinearity issues (Cohen et al., 2003).

The first step was to verify convergent validity. This procedure consisted of testing the significance of the variables' factor loadings (confirmatory factorial analysis) in a model that assumes constructs covary and not causally affect each other (Kline, 2005)8}dc

. Subsequently, discriminant validity was achieved once correlations among pairs of constructs were less than unity, and correlations among variables were larger than correlations among traits (Bagozzi, Youjae and Phillips, 1991). Finally, nomological validity was verified by testing the predicting power of exogenous constructs on endogenous constructs. This procedure involves fixing variances at unity in order to assess the path coefficients (Anderson and Gerbing, 1982). Furthermore, we discuss models' fit and compare the two different models (Marsh, Balla and McDonald, 1988).

## **5. Results**

### **5.1 Descriptive analysis**

This section presents descriptive statistics and a correlation analysis of the variables in this study. The following table shows means, standard deviations and bivariate correlations between the variables.

An examination of the correlation matrix reveals a number of findings regarding the degree of internationalization and performance variables. For instance, the assets index seems to correlate with the greatest number of potential performance variables (e.g. four out

**Table 2. Correlation matrix**

	Mean	s.d.	1	2	3	4	5	6	7	8	9	10	11
1. Revenues index	0.19	0.20											
2. Assets index	0.16	0.16	0.67**										
3. Employees index	0.16	0.18	0.67**	0.74**									
4. EBITDA index	0.14	0.13	0.71**	0.46**	0.60**								
5. Foreign return on sales (ROS)	0.06	0.16	0.16	0.26	0.25	0.19							
6. Foreign return on assets (ROA)	0.05	0.22	0.09	-0.02	-0.07	0.17	0.24						
7. Satisfaction with sales	3.21	0.71	0.13	0.43**	0.41**	0.15	0.12	-0.02					
8. Satisfaction with sales growth	3.18	0.83	-0.06	0.03	-0.10	-0.06	-0.15	-0.02	0.62**				
9. Satisfaction with profits	2.92	0.58	0.15	0.31*	0.31	0.20	0.02	0.07	0.65**	0.49**			
10. Satisfaction with market share	3.16	0.72	0.35*	0.43**	0.45**	0.42**	0.18	0.08	0.56**	0.41**	0.54**		
11. International experience	18.27	10.42	0.07	0.00	-0.14	-0.12	0.08	-0.01	-0.07	0.34**	-0.03	0.15	
12. Number of countries	9.21	5.15	0.26	0.42**	0.21	0.03	0.48**	-0.19	-0.02	-0.03	-0.10	0.06	0.32*

OBS: \*\*\*Beta is significant at 0.1% level; \*\*Beta is significant at 1% level; \*Beta is significant at 5% level; †Beta is significant at 10% level.

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of seven or 57 per cent) This suggests that companies possessing a high percentage of its assets abroad may perform better in various dimensions (profit, sales, market share, etc). The revenues index is positively correlated only with satisfaction with market share. The employee index is positively correlated the EBITDA index, satisfaction with sales and market share. In summary, at least one of the three components of the UNCTAD index was correlated with a performance measure with the exception of ROS, ROA and satisfaction with sales growth.

The number of countries variable is only correlated to ROS, and the amount of international experience is only correlated with satisfaction with sales growth. These results seem to suggest that the components of the UNCTAD index correlate more positively with the performance measures than the two alternative options.

The correlation matrix also shows that all subjective performance measures positively correlate with each other. The highest correlation is between satisfaction with profits and satisfaction with sales. However, only one item of subjective performance (satisfaction with market share) is positively correlated with an item of objective performance (EBITDA index). This is possibly explained by the fact that the subjective construct is measuring the satisfaction with different aspects of performance as compared with the ones in the objective performance construct.

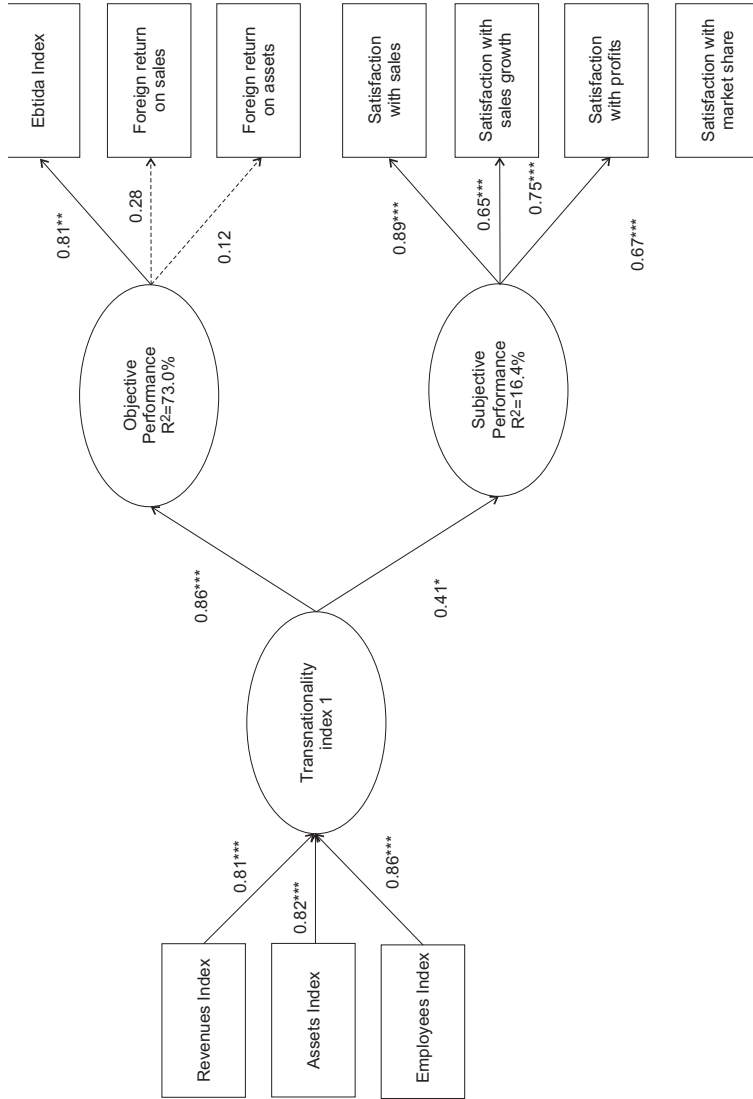
It is interesting to note that international experience is positively associated with satisfaction with sales growth, suggesting that firms operating longer in international markets are better able to obtain incremental sales. Finally, companies operating in many countries seem to have a better ROS.

## **5.2 Structural Equation Modeling**

Two models were tested in order to compare scales and to find the better fitting structure. The first model used the three indices from UNCTAD (ratios of revenues, assets and employees) as the degree of internationalization measure. The second model added the number of countries and international experience to the transnationality index.



**Figure 1. Model 1 – UNCTAD’s transnationality index and objective and subjective performance**



OBS: \*\*\*Beta is significant at 0.1% level; \*\*Beta is significant at 1% level; \*Beta is significant at 5% level; †Beta is significant at 10% level.

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Performance measures remained equal in both models. Results of model 1 are shown in the next figure:

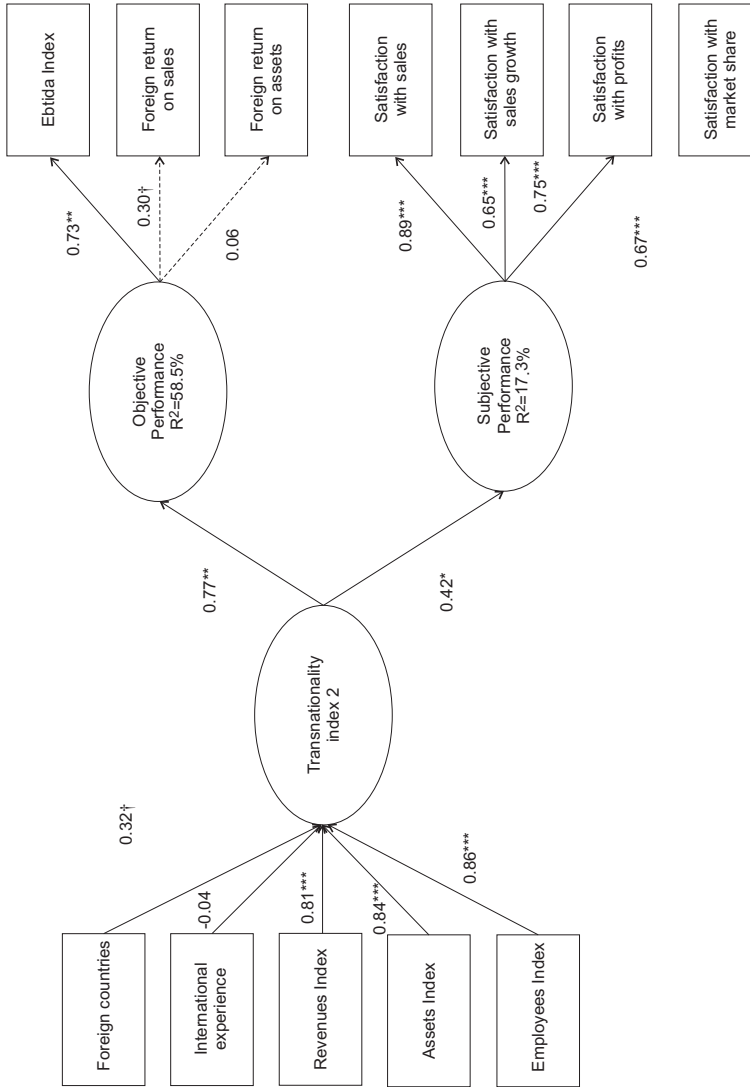
Convergent validity was achieved for most of the variables in model 1. The three UNCTAD indices are significant ( $p < 0.001$ ) and have high factor loadings ( $> 0.80$ ). Additionally, all variables of subjective performance measure are significant ( $p < 0.001$ ). Yet, satisfaction with sales and satisfaction with profits reflect subjective performance more than sales growth and market share. While the positive signs for ROS and ROA indicate that the transnationality index has a positive effect, only the EBITDA index is significant ( $p < .01$ ). This suggests that the transnationality index is closely tied to the relative amount of foreign profits.

While both paths from the transnationality index to objective ( $p < 0.001$ ) and subjective ( $p < 0.05$ ) performance were significant (confirming H1 and H2), the impact was greater on objective performance than subjective performance. This finding points to the importance of internationalization on firm's results and at the same time challenges our initial notion that subjective measures would be more correlated with the transnationality index because they can overcome the problems of objective measures. The transnationality index explains 73.0 per cent of the variance for objective performance ( $R^2$ ) and 16.4 per cent for subjective performance.

Model 1 achieved good measures of fit according to the standards recommended in the SEM literature (Tabachnick and Fidell, 2001). The goodness of fit (GFI) was 0.81 and the adjusted goodness of fit (AGFI) was 0.68. Both these measures indicate that the data fits the model well. Taking into account the degree of parsimony, the PGFI index was 0.49. This shows that there might be too many parameters to be estimated, especially considering a small sample such as this. Furthermore, residual based fit indices such as RMR and RMSEA were 0.11 and 0.13 respectively. It is important to note that the RMSEA is not completely adequate for small samples and thus should be interpreted with caution (Hu and Bentler, 1999).

Two variables were added to the transnationality index in order to test an alternative measure of internationalization: number

**Figure 2. Model 2 – Alternative transnationality index and objective and subjective performance**



OBS: \*\*\*Beta is significant at 0.1% level; \*\*Beta is significant at 1% level; \*Beta is significant at 5% level; †Beta is significant at 10% level.

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of countries and international experience. The results of model 2 are shown in the next figure.

Figure 2 illustrates that the number of countries is significant ( $p = .05$ ), though it has a much lower loading than the UNCTAD variables. On the other hand, international experience does not appear ( $p > .10$ ) to be an indicator of transnationality when controlling for the number of countries and the revenue, asset and employee indices. Low loadings on the two additional measures have reduced the reliability of the five-variable construct to an alpha level of 0.26, effectively invalidating this scale. This result provides evidence that, in this context, UNCTAD's transnationality index is a better measure for the degree of internationalization than the five-variable construct tested. Thus, adding other indicators such as number of countries and international experience does not add internal consistency or explanatory power to the transnationality index.

Furthermore, when the two other internationalization variables were added in model 2, the five-variable transnationality index showed a lower impact on both performance constructs compared to model 1. It may be inferred that companies in international markets for long periods and in many countries do not necessarily perform better than those with less experience or fewer countries, whereas companies that have a more intense presence in terms of revenues, assets and employees abroad tend to be more satisfied and to have a greater ratio for profits abroad.

Regarding the model fit, model 2 is inferior to model 1 in all measures. The goodness of fit (GFI) was 0.66, the adjusted goodness of fit (AGFI) was 0.52 and the PGFI was 0.46. Model 2 also showed poor fitting measures on residual based indices such as RMR (0.20) and RMSEA (0.18).

In order to assess the reliability of the constructs, defined as the proportion of true variance relative to total variance (Tabachnick and Fidell, 2001), we calculated the composite reliability (CR) and the average variance extracted (AVE). The following table compares the quality of the scales used in each model:

All of the constructs show higher values of CR and AVE in model 1 than model 2, indicating that the combined scales are more reliable in the first model. Except for objective performance, all constructs in both models show composite reliability superior to 0.70 (Hair, et al., 2005). The average extracted variance for the transnationality index in model 1 and subjective performance in both models show values above the limit of 0.50.

**Table 3. Composite reliability and average extracted variance of model 1 and model 2**

	CC	AVE
<b>Model 1 (UNCTAD index)</b>		
Transnationality index	0.87	0.69
Objective performance	0.40	0.25
Subjective performance	0.83	0.56
<b>Model 2</b>		
<b>(UNCTAD index + number of countries + international experience)</b>		
Transnationality index	0.73	0.44
Objective performance	0.33	0.21
Subjective performance	0.83	0.56

## 6. Discussion

The purpose of this study was to test two different measures of internationalization and to determine whether the degree of internationalization is related to both objective and subjective performance. The first task was accomplished with a test of whether adding additional measures of internationalization to the three-variable UNCTAD transnationality index improved reliability of the measure and its association with performance measures. The second task was operationalized by contrasting both types of performance measures in order to assess if they were related in the same degree to the transnationality index.

From a survey with 41 Brazilian multinational groups and information over two years of international activities, we were able to propose and test a model using Structural Equation Modelling. The three indicators of UNCTAD (foreign revenues/total revenues, foreign assets/total assets and foreign employees/total employees) are more

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effective in predicting the degree of internationalization in this context than adding other measures such as the number of countries and international experience. International experience was not found to be a significant indicator of the degree of internationalization. This finding is consistent with the sample profile, in which the most internationalized company, JBS-Friboi (food industry), established the first international subsidiary only five years ago. Thus, a lack of international experience is not necessarily detrimental to the firm's degree of internationalization.

Our results show that more internationalized firms perform better overseas. Firms with a higher degree of internationalization were found to be more satisfied with foreign sales, sales growth, profits and market share (the subjective measures). Additionally, internationalization leads to a higher proportion of foreign to total profits. On the other hand, foreign return on assets and foreign return on sales are not significantly impacted by the transnationality index.

Furthermore, the proportion of foreign employees to total employees was found to have a slightly stronger impact on the transnationality index than the other two measures (ratios of sales and assets). Additionally, although the degree of internationalization has a greater impact on objective performance compared to subjective performance, we can still infer that firms will be more satisfied with foreign performance as they increase foreign assets, revenues and employees. Thus, firms in initial stages of internationalization might have little of their performance accounted for by foreign activities and might have low satisfaction rates. As commitment to foreign markets increases, especially in terms of assets, revenues and employees, the percentage of foreign profits tends to increase.

Although we found an impact of the degree of internationalization as a whole on both objective and subjective performance, when analyzing the items separately we found that the assets index correlates with more performance variables than the employee index and the revenue index. Also, the number of countries is only correlated to ROS, and the amount of international experience is only correlated with satisfaction with sales growth. Therefore, companies with a high percentage of assets abroad may perform better on various dimensions (profit, sales, market share). These separate analyses also reinforce

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that the components of the UNCTAD index correlate more positively with the performance measures than the two alternative options.

This study has important implications to both theory and practice. First, it shows that the UNCTAD transnationality index is more reliable in the context of Brazilian firms than some previously investigated measures of internationalization. Second, it provides empirical evidence that the greater the ratio of foreign to total revenues, assets and employees a TNC has across borders, the better its foreign performance. This partially answers the question of “Does more internationalization improve foreign performance?” Thus, firms may consider an internationalization strategy that aims to increase its degree of internationalization as a way to enhance foreign performance. More specifically, internationalization increases the EBITDA measure of objective performance and also all four of the executives’ subjective measures of performance satisfaction.

Nevertheless, it is important to note several limitations of this study. The primary concern is the small sample size. Although 41 firms can be considered quite representative of Brazilian TNCs, the sample is still small for achieving good fit indices and explanatory power in Structural Equation Modelling. Additional studies that can obtain more companies would help verify the findings. Furthermore, we were only able to collect information over two years of international activities. Future studies with three or more years of data could test the model longitudinally, further improving the causality inherent in the proposed models. Also, since the study was built based on a survey with Brazilian TNCs, researchers should be cautious when generalizing to other countries. We thus suggest that this study be expanded to other countries as a way to attest the representativeness of the results. Finally, we did not control for the size and industry of the company. With a large and diverse sample, researchers could include these controls in the regressions.

Another consideration is the problem of endogeneity, in that we cannot assume that a higher degree of internationalization *causes* performance abroad. It is possible that in the long-term superior performance may affect the firms’ ability to expand abroad. Measuring the variables at different time periods could help mitigate

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this problem. While we attempted to justify our selection of variables and methodology, there are many other options for measuring the degree of internationalization to be explored (Ietto-Gillies, 2009). A final consideration is whether the three components of the UNCTAD index should have equal weights. Altering the weights and testing the model for fit may enhance the predictability of the model.

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## Appendix. Companies and industries of sample

Company	Industry
JBS-Friboi	Food
Gerdau	Steel and metal
Ibope	Market Research
Metalfrio	Refrigerators
Odebrecht	Construction
Marfrig	Food
Vale	Mining
Sabó	Autoparts
Tigre	Building materials
Suzano Papel e Celulose	Pulp and paper
Artecola	Chemistry
Lupatech	Parts and equipment
Camargo Corrêa	Construction, cement, textiles and shoes
Ci&T Software	Software and IT services
Marcopolo	Vehicles and parts
Weg	Electrical machines and equipment
Stefanini IT Solutions	Software and IT services
Votorantim	Cement, metal, pulp and paper
América Latina Logística	Logistics
Tam	Airline
Embraer	Aeronotics
Natura	Hygiene and cosmetics
Petrobras	Oil and gas
Bematech	Retail equipment and technology
Alusa	Energy
Spoletto	Food
Andrade Gutierrez	Construction
Banco do Brasil	Financial Institution
Itaúsa	Software and IT services
Totvs	Software and IT services
DHB	Autoparts
Escolas Fisk	Language school
Ultrapar	Chemical products and fuel distribution
Politec	Software and IT services
Localiza	Rental car
Randon	Vehicles and parts
Cia Providência	Rubber and plastics
Brasil Foods	Food
Marisol	Clothing
Cemig	Energy
Eletróbrás	Energy

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# The anatomy of a failed industrial policy: developing an aluminium industry in Trinidad and Tobago

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Lou Anne Barclay\*

The literature argues that the industrial policy is most effective in an institutional environment characterized by embedded autonomy, which describes an independent yet collaborative relationship between government bureaucracy and the private sector. However, such embedded autonomy of government bureaucracy in high-growth Asian countries was created under socio-economic and political circumstances that are no longer prevalent today. Analysis of the industrial policy concerning foreign investment projects in the aluminium industry in Trinidad and Tobago in the 2000s shows that embedded autonomy is necessary, but not sufficient, for successful FDI-facilitated development. This paper posits that the institutional framework for implementing industrial policy in today's economic and political context needs to have the characteristics of embedded autonomy, but at the same time it needs to address the issues of accountability and transparency.

Key words: Embedded autonomy, accountability, transparency, FDI-facilitated development, aluminium industry

## 1. Introduction

Successful industrialization in the latter half of the twentieth century has often been attributed to the implementation of clearly articulated and coherent industrial policy. The extant literature argues that industrial policy formulation and implementation are best undertaken in an institutional environment characterized by embedded autonomy (e.g. Rodrik, 2004a, 2008). The term embedded autonomy, initially coined by Evans (1995),

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refers to a strategic collaborative relationship between government bureaucracy and the entrepreneurial private sector. According to this thesis, government bureaucracy needs to be autonomous of society in the sense of being capable of formulating policies independently of short-term interests of specific groups. At the same time, government bureaucracy needs to be “embedded” in the sense of possessing dense ties with the entrepreneurial elites in strategic industries.

In order to ensure the effectiveness of government agencies, Barclay (2010) further argues that bureaucracy may be bifurcated. It is extremely challenging for resource-indigent, developing countries to establish a highly efficient bureaucracy throughout the government. Hence, the allocation of government resources may be prioritized for those agencies that are critical to the country’s economic development and thus need to be autonomous and competent.

Academic studies in support of the thesis of embedded autonomy have generally drawn on the experience of Japan and the Newly Industrialized Economies in South-East Asia during the period when they were successfully transforming their economies under the guidance of a strong, authoritarian government (Johnson, 1982; Amsden, 1989). But it must be noted that the institutional framework for industrial policy formulation and implementation in those economies was created under specific socio-economic and political circumstances. During the late 1950s to 1960s, some of these economies, notably the Republic of Korea, were economically impoverished, lacked dynamic civil society organizations and were governed by authoritarian leaders.<sup>1</sup> Under these conditions, policymakers, using the institutional framework of embedded autonomy, were able to successfully move their economies away from specializing in traditional commodities

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<sup>1</sup> Luiz (2000) describes the Republic of Korea in 1961 as possessing the characteristics of a hard state with a weak society. He argues that the Park Government, which came into office in 1961, was able to effectively consolidate socio-economic power. The constant military threat from the Democratic People’s Republic of Korea, the country’s poor resource endowment and the memory of extreme poverty all contributed to the society’s tolerant attitudes towards sacrificing freedoms and civil liberties for the promise of future economic prosperity. Further, the land reform programmes implemented in the late 1940s and 1950s resulted in a relatively equal distribution of income. This led to the absence of any opposing social and economic forces, for example a land elite in the country. The lack of power among social groups in the country enabled the Government of the Republic of Korea in 1961 to consolidate its power and successfully pursue a state-led, export-oriented growth model.

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into non-traditional, higher-productivity activities.<sup>2</sup> However, the environment for industrial policymaking and implementation has changed dramatically since then. Today, governments, institutions and firms are increasingly held accountable to their stakeholders in every sphere of their activities (Fowler and Kuyama, 2007; Servos and Marcuello, 2007; Weber, 2008). This development thus begs the question: how applicable is the thesis of embedded autonomy to those developing countries, which currently enjoy relative economic stability, uninterrupted democratic rule, have vibrant civil society organizations and do not possess a strong, authoritarian government?

This paper argues that today, embedded autonomy is not sufficient for efficient industrial policymaking and implementation. Policymakers in developing countries also need to address the issues of accountability and transparency. This paper postulates that the industrial policy apparatus needs to be responsive to the general public. The general public needs to be aware of how industrial policy decisions are made and the reasons why specific firms and activities are being favoured. Further, there is need for transparency in the industrial policy process. The decisions taken by the industry policy apparatus should be made freely available to the general public.

This paper explores these issues by analysing the industrial policy process involved in the development of the aluminium smelter projects proposed by the Government of Trinidad and Tobago in the first decade of the 21st century. In so doing, this paper will also analyse the extent to which these projects would have resulted in foreign direct investment (FDI)-facilitated development in the aluminium industry of Trinidad and Tobago.

The focus on the success of resource-seeking, FDI-facilitated development is motivated by the fact that the proposed aluminium projects are driven by transnational corporations (TNCs). Moreover, the extant literature has focused on the role that embedded autonomy has played in the success of the resource-seeking, FDI-facilitated development in developing countries (Barclay, 2010). This paper

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<sup>2</sup> Hausmann et al. (2005) note that Taiwan Province of China exported very little besides sugar and rice in the 1950s, while the Republic of Korea exported virtually no manufactured goods in the early 1960s. Their subsequent phenomenal growth was based on their economic diversification into various manufactured goods.

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advances the literature by including the issues of accountability and transparency with embedded autonomy by examining the case of FDI-facilitated development in Trinidad and Tobago.

Trinidad and Tobago provides an excellent case study in which to examine these issues. This twin-island state of approximately 1.3 million people enjoys one of the highest per capita incomes (\$16,167 in 2010) in the Latin America and Caribbean region. Its economy is largely based on oil, natural gas and petrochemicals, which currently accounts for 40 per cent of the Gross National Product and 80 per cent of exports. During the period 1994–2008, its economic growth averaged six per cent, one of the highest in the region. This multi-ethnic country, which possesses a strong body of civil society organizations, is a parliamentary democracy and has experienced relatively uninterrupted democratic rule since its independence from the United Kingdom in 1962.

This paper is organized as follows. Section 2 examines the literature on embedded autonomy in the industrial policy process, highlighting the recent concerns with accountability and transparency. Section 3 discusses of the increasing proclivity of natural gas-rich, developing countries to locate aluminium smelters in their countries, emphasizing the experience of Trinidad and Tobago. Section 4 discusses the institutional environment created for industrial policymaking in the natural gas-intensive industries<sup>3</sup> in Trinidad and Tobago, one of which is the aluminium industry. Section 5 examines the possible impact that the proposed aluminium projects would have had on development. The information discussed in these two latter sections was obtained from interviews with key policymakers, industry analysts, and executives of aluminium companies, local supplier and downstream firms, and support institutions as well as from secondary sources. Finally, section 6 presents the conclusion.

## **2. Creating an institutional environment for effective industrial policy: the importance of embedded autonomy, accountability and transparency**

The extant literature argues that industrial policy is most effective when it is formulated and implemented in an environment

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<sup>3</sup> The term natural gas-intensive industry is used here to describe those industries that are intensive in their use of natural gas. In the context of Trinidad and Tobago, they are petrochemicals, iron and steel, liquefied natural gas and aluminium.



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characterized by embedded autonomy (Rodrik, 2004a; 2008). Government bureaucracy should be independent and committed to monitoring firm performance and imposing penalties in the event of non-performance – characteristics described as state autonomy (Chang and Ali, 2002). However, a high degree of state autonomy is not necessarily desirable. Key policymakers need to be “embedded” in a dense policy network with the private sector, which will ensure continuous information flows between the two. In so doing, policymakers would be able to identify where the significant obstacles to business activity lie, and design and implement the type of intervention policies that would most effectively remove them.

Embedded autonomy is not the only variable critical to the effective design and implementation of industrial policy. Government also needs to possess an efficient bureaucracy. Developing countries in Asia that have successfully managed to achieve sustained economic growth possessed a highly efficient bureaucracy. Research conducted on the Newly Industrialized Economies in South-East Asia has identified the “quality” of the bureaucracy as one of the factors contributing to their phenomenal economic success (e.g. World Bank, 1993). A defining feature of the bureaucracy in successful South-East Asian economies was meritocratic recruitment practices, with “the best and the brightest” being selected for employment in key economic agencies (Cheng et al., 1998). In addition, top bureaucrats were promoted from within, thereby encouraging strong loyalty to organizational goals and thus policy continuity. Further, public service careers carried long-term rewards with career structures that produced rewards commensurate with those attainable in the private sector. Moreover, Evans (1998) notes that structures were created to resolve issues of jurisdiction and co-ordination. While there were wide variations among South-East Asian countries, industrial policies were generally built around a pilot agency that shaped development initiatives. It is also significant to note that Cheng et al. (1998) report on the existence of bifurcated bureaucracies in Taiwan Province of China and the Republic of Korea. Not all government agencies could have been described as efficient. Rather, certain government agencies that were critical to the countries’ economic development enjoyed selective recruitment policies and attractive compensation packages. These agencies were also insulated from other branches of government, and from pressures from political and interest groups.

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Recent research argues that possessing an efficient, bifurcated bureaucracy, which enjoys a close collaborative relationship with the private sector, is not the only requirement for effective industrial policymaking and implementation. Indeed, Rodrik (2008) argues that the specifics of industrial policymaking depend heavily on the circumstances and institutional capabilities of a country. Studies on developing countries outside of South-East Asia point to other factors as also contributing to the success of industrial policy.

One such factor is the issue of accountability and transparency. In the past few decades, the number of democratic regimes and the use of constitutional measures designed to make politicians accountable to citizens have expanded substantially (Adserà et al., 2003). Indeed, the concept of political accountability, which is the extent to which societies hold political leaders accountable for their actions while in office, is now being used to evaluate the performance of governments (Weber, 2008).

Hence, the issues of embedded autonomy as well as accountability and transparency are now considered as critical to effective industrial policy formulation and implementation. The industrial policy apparatus now needs to be responsive to the general public. The general public needs to be aware of how industrial policy decisions are made and the reasons why specific firms and activities are being favoured. This paper will examine these issues in the context of the recent aluminium investments proposed by the Government of Trinidad and Tobago. First, the recent trend of the relocation of aluminium production from developed countries to energy-rich, developing countries including Trinidad and Tobago, is discussed.

### **3. The shift of aluminium production to developing countries**

Aluminium production is an energy-intensive process, which was traditionally carried out in developed countries where the cost of electricity was low. However, as table 1 shows, since 1995, a shift in aluminium production has taken place from industrialized countries to developing countries, including Asia, specifically China, and the Middle East. The oil and gas-rich Gulf States are increasingly becoming attractive locations for FDI in the aluminium industry. These countries,

in their attempts to diversify their economies from the dependence on oil, have been investing heavily in aluminium smelters (Morgan, 2010). Trinidad and Tobago, which is rich in oil and gas, is attempting to emulate the examples of the Gulf States.

**Table 1. Global Aluminium Production, 1995 to 2008**  
(Millions of tonnes)

Region	1995	2000	2005	2008
Africa	623	1,169	1,744	1,725
North America	5,547	6,041	5,375	5,778
Latin America & Caribbean	2,014	2,173	2,398	2,669
Asia	2,753	3,637	9,479	15,363
China	1,680	2,550	7,806	13,177
Middle East	817	1,149	1,693	2,079
West Europe	3,167	3,794	4,359	4,641
East/Central Europe	3,160	3,934	4,634	5,130
Oceania	1,570	2,094	2,255	2,290

Source: Brown et al. (2010)

The notion to establish an aluminium industry in Trinidad and Tobago dates back as early as the late 1960s when Brewster and Thomas (1967) argued for the economic integration of the Caribbean region based on the integration of production and trade. In the case of aluminium production, they posited that it was only through combining the bauxite resources of Jamaica and Guyana with the energy resources of Trinidad and Tobago to establish an aluminium smelter that the region would be able to achieve significant economic gains. Partially in response to this proposal, the then Prime Minister of Trinidad and Tobago, Eric Williams, entered into an agreement with Jamaica and Guyana to construct an aluminium smelter in 1973, which would utilize the resources of these three Caribbean countries. The smelter, scheduled to be established by 1977, was to be jointly owned by these three Governments. However, this agreement was short-lived. Inter-governmental conflicts between Trinidad and Tobago and Jamaica over the role to be played within the regional economy by powers outside of the Commonwealth Caribbean resulted in the project being abandoned

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and Trinidad and Tobago's decision to "go it alone" with a national smelter project (Payne, 1980: 185).<sup>4</sup>

However, it was only in the 2000s that concrete steps were taken to establish an aluminium industry in Trinidad. Two new smelter projects were proposed: a project with the United States firm, Alcoa and another with the Venezuelan firm, Sural. In 2006, Alcoa signed an Agreement in Principle with the Government of Trinidad and Tobago to establish a wholly-owned, 341,000 tonnes per year aluminium smelter, which was scheduled to be operational in late 2008. The bauxite to be used in this facility would have been sourced from Alcoa's subsidiaries in Jamaica and Suriname. Alcoa was to achieve the production integration long advocated by Brewster and Thomas (1967).

Nevertheless this investment was vehemently opposed by civil society organizations in the country.<sup>5</sup> The proposed site for the smelter was in the south-west peninsula of the country – an area designated by parliament as agricultural and forest land in 1984. Civil society organizations charged that harmful emissions emanating from the proposed smelter would adversely affected the quality of life and the livelihood of this rural farming community (Fernandes, 2006). Alcoa's attempts to convince the locals of the benefits of the proposed smelter were unsuccessful.<sup>6</sup> In late 2006, the then Prime Minister, conceding to the demands made by local civil society organizations, informed the public that his administration had "decided to immediately discontinue

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<sup>4</sup> The decision of the then Prime Minister of Jamaica, Michael Manley to supply Venezuela with bauxite for the expansion of its aluminium smelter aroused the ire of the then Prime Minister of Trinidad and Tobago, Eric Williams, who perceived that this decision would jeopardise the three countries' plans to establish a regional aluminium industry. He claimed that the Venezuelan policy was a "calculated attack upon the CARICOM scheme" (Trinidad Guardian, 16 June 1975 cited in Payne, 1980, p. 214).

<sup>5</sup> Several civil society organisations were united in opposition to the location of the smelter in the southwest peninsula of the country. One went as far as undertaking an eight-day march from the proposed site of the aluminium smelter to the capital, some 90 km away. Others even pursued legal channels to stop the construction of the smelter. They vowed to appeal to the highest court of appeal, the Privy Council in London, if the local courts agreed with the Government's position (Fernandes, 2006).

<sup>6</sup> Alcoa launched a well-designed public relations campaign to persuade locals. The aluminium TNC *inter alia* held at least 36 meetings with stakeholders (Reynolds, 2006) and purchased full page advertisements in local newspapers. Some of these advertisements read, "Alcoa – Investing in communities. Our social investment policies are followed by social actions" and "Alcoa – Longtime steward of the environment" (Fernandes, 2006). It even organised a trip to a smelter site in Brazil for selected journalists and citizens.

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plans” to establish the aluminium smelter in the designated area (Richards, 2007). The administration’s later attempts to select another site were unsuccessful (Kublalsingh, 2009a).<sup>7</sup> Hence, Alcoa suspended the project in 2007. The company is still awaiting for another suitable site to be identified by the Government.

The other project, the Alutrint project, was to become the country’s first aluminium smelter. This 125,000 metric tonnes per year facility was a joint venture formed in 2005 between the majority shareholder, the Government of Trinidad and Tobago (60%) and initially, the Venezuelan firm, Sural. This facility, through its sister company, Alutech Limited, was to engage in downstream activities as well, producing aluminium rods, wires, and cables. The plan was that Alutech Limited, which was a joint venture between the Government and Sural with latter owning the majority equity (60%), would use metal supplied by Alutrint to produce high value-added, aluminium automotive parts and alloy wheels. However, in early 2009, Sural withdrew from the Alutrint venture because of difficulties in accessing international capital. It was replaced by the Brazilian firm, Votorantim Metais, which was to provide the venture with much needed expertise in the downstream aluminium production and marketing.

Civil society organizations adopted a position to the Alutrint project which was very similar to that of the Alcoa venture. They ran a well-orchestrated campaign to protest against the construction of the Alutrint smelter.<sup>8</sup> Academics, activists and civil society organizations questioned the viability of this project on both economic and environment grounds.

The activities of the civil society organizations were successful. On 16 June 2009, the High Court revoked the Certificate of Environment

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<sup>7</sup> The Government planned to re-locate Alcoa’s operations to an industrial estate, which was to be developed off the Otaheite bank in the southern part of the country. However, to date, the application for a Certificate of Environmental Clearance (CEC) for this proposed industrial estate has not been granted.

<sup>8</sup> The protest actions of the ‘anti-smelter’ campaign, as it was popularly called, included protests outside the site of the Alutrint smelter, sit-ins, a 40-day fast, unscheduled visits to offices of the local organisations responsible for establishing Alutrint, press conferences held in the capital city, letters sent to the acting CEO of Alutrint and government officials, advertisements and letters placed in the local newspapers and other media, and the hosting of a public symposium on the economics of the smelter (see for example, Kublalsingh, 2009b).

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Clearance (CEC) that had been granted to Alutrint by the Environmental Management Authority (EMA) in 2007, ruling that the EMA's decision to grant the Certificate was illegal. The High Court halted construction on the Alutrint site (Richards, 2009). The EMA appealed the High Court's decision to the Court of Appeals in November 2009, but withdrew its petition in July 2011. The Court of Appeal accepted the EMA's request to withdraw its appeal, which negated the need for a ruling. In the meantime, the ruling Government, which strongly supported the development of the aluminium industry in Trinidad and Tobago, lost the general elections in May 2010. The new Government, which aggressively opposed both smelter projects while in opposition, summarily announced that it decided to discontinue the Alutrint project in the first budget speech after coming to power.<sup>9</sup> While this decision was lauded by those who opposed the Alutrint project, it was strongly opposed by the less vocal and less well-organized civil society organization, representing residents of the economically depressed community, where the smelter was to be located (Richards, 2010).

At the time of this decision, the 316.6 hectare industrial estate on which the Alutrint project was to be located had already been developed. The 720 megawatt power plant was near completion. The construction of the port was completed. The foundation for the storage facilities for inputs such as aluminium ingots were mostly in place. The Government and Alutrint had spent \$166.8 million on the infrastructure and project development, specifically for the aluminium smelter (GOTT, 2010b). Moreover, a Cabinet note dated three months before the first budget speech was delivered not only highlighted the economic advantages of the Alutrint project to Trinidad but also dismissed the environment concerns (GOTT, 2010b: 8–11).<sup>10</sup>

It is evident that the policymaking process for the development of the aluminium industry was negatively impacted by the actions of

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<sup>9</sup> The newly appointed Minister of Finance in his first budget speech noted, "...in addition to the health and environment risk, there is also serious concerns as to Alutrint's viability and the optimal use of our gas. This project will cease and an alternative strategy will be put into place for the south-west peninsula." (GOTT 2010a, p. 12).

<sup>10</sup> The report identified several benefits arising from the Alutrint project, the most significant of which was employment creation with gross employment income of US\$ 27 million being generated annually. Additionally, it revealed that Alutrint had reduced and mitigated the potential environment risks.

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civil society organizations. Hence, it will be instructive to examine the institutional framework created for policymaking for the gas-intensive sector, including the aluminium industry.

#### **4. The institutional framework for industrial policymaking for the natural gas-intensive sector**

Given the inefficiency of the public sector in Trinidad and Tobago (Brown, 1999; Bissessar, 2003, 2009), successive Governments have attempted to by-pass government ministries and created a form of bifurcated bureaucracy, endowed with the requisite human and financial resources, to formulate and implement policy for the natural gas-intensive industries. During the height of its first economic boom, which lasted from 1974 to 1982, the Government created a single organization to formulate and implement policy for the development of its state-owned, natural gas-intensive industries. This was the Coordinating Task Force, which was created in 1975 and then transformed into a formal organization, the National Energy Corporation (NEC), in 1979. This organization, which reported directly to the Cabinet, was solely responsible for industrial policy formulation and implementation for the development of the natural gas-intensive industries during this period (see figure 1).

The following decade, 1983 to 1993, was marked by a dramatic economic decline. In 1986, the party that ruled Trinidad and Tobago for almost twenty-five years, the People's National Movement (PNM), lost the elections to the newly created National Alliance for Reconstruction (NAR). During this period, the new Government privatized many of the state-owned firms in the natural-gas intensive industries. Hence, the NEC lost its mandate and its operations faltered.<sup>11</sup> In 1992, it was acquired by the National Gas Corporation (NGC), an entity created in 1975 with the mandate of operating as the sole buyer, seller and distributor of natural gas in the country. With its acquisition of the NEC, the NGC assumed a new role as a "prime mover in gas-based development" (Punnett, 2005). It was now given the responsibility for the development and evaluation of new energy projects as well

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<sup>11</sup> The NAR government severely reduced the operations of the NEC. In fact, by 1991 this organisation was merely managing the marine assets of the Point Lisas Industrial Estate, which housed the gas-intensive industries created during the period of economic boom.

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as investment facilitation and promotion. The merger of these two entities were successful; by 2004, the NEC operating within the NGC group, had attracted private investment in five methanol plants, six ammonia plants and two steel plants (Julien, 2005).

In 2001, the PNM party returned to power. The new Government effected significant changes in the organizational structure of policymaking in the natural gas-intensive industries.<sup>12</sup> First, under a Cabinet mandate, the NGC was forced to rationalize and restructure its operations. As a consequence, the NEC was de-merged from the NGC group and given greater operational autonomy in 2004. It was now responsible for natural gas-based investment promotion and screening, and the provision of industrial sites and the related port and marine infrastructure at the industrial sites earmarked to house new gas-intensive industries (Punnett, 2005). At the same time, a more comprehensive organizational structure to formulate and implement policy for the gas-intensive sector emerged (see figure 1).

New organizations were now given the responsibility for formulating policy for the natural gas-intensive sector. The first was the National Gas Export Task Force (NGETF), which was essentially an ad hoc body staffed by technocrats drawn from various agencies and ministries related to the natural gas-intensive industries. Several members of the NGETF were subsequently employed at the NEC. Hence, while the NGETF still exists, it is the NEC, which currently conducts the major technical work required for policymaking in this sector. The other organizations are the Standing Committee on Energy, chaired by the Prime Minister, and the Inter-Ministerial on Energy, chaired by the Chairman of the ruling party. These two organizations were deliberately created to facilitate the political aspects of industrial policymaking for this sector. Further, the Ministry of Energy and Energy Industries regulates the state agencies involved in this sector. This Ministry, together with the Standing Committee on Energy, reports directly to the Cabinet.

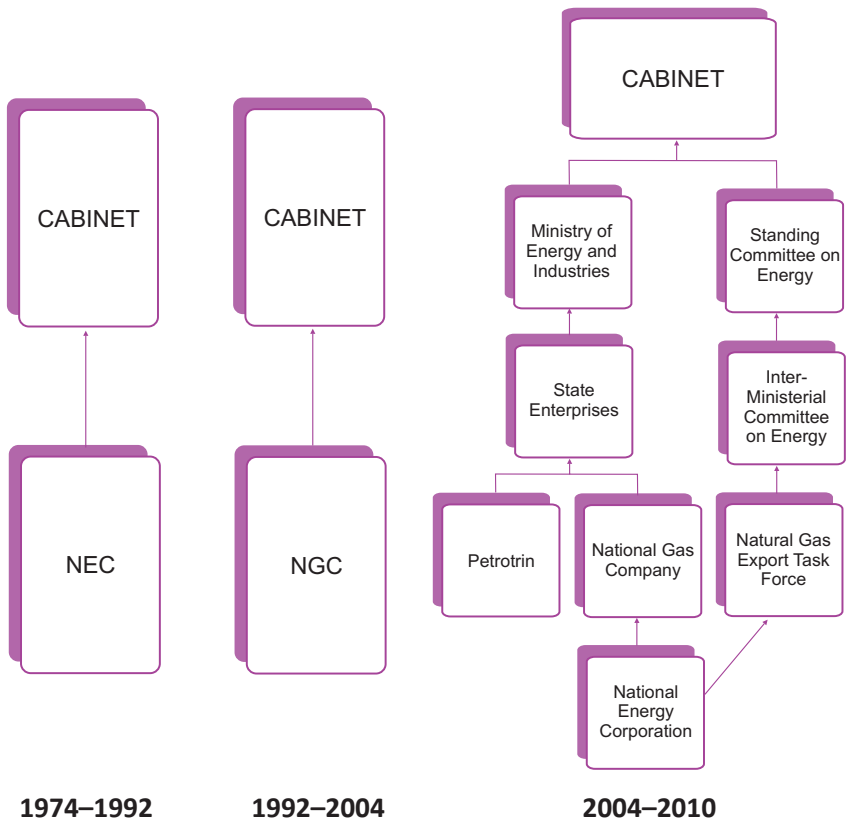
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<sup>12</sup> It is noteworthy that the United National Congress (UNC), which ruled the country from 1995 to 2001, made no changes in the organizational structure created for policymaking in the energy sector.



Thus, an institutional framework was put in place to formulate and implement industrial policy for the natural gas-intensive sector. Despite the existence of such a framework, the two aluminium smelter projects failed to materialize. It is worth noting in this context that no mechanisms were created to facilitate dialogue between the policymakers in these agencies and the domestic private sector and civil society. The following sections explore the reasons for this situation.

**Figure 1. Institutional Framework created for policymaking in the gas intensive sector of Trinidad and Tobago, 1974 to 2010**



Source: Punnett (2005), McGuire et al. (2009) and interviews with industry analysts.

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## 4.1 Embeddedness and the policy process in Trinidad and Tobago

Higman and Monteith (2010) observed that the relationship between the private sector and the Government in the West Indies was always intimate before independence. Although the colonial Government was autonomous, it unofficially included members of the private sector in the policy process.<sup>13</sup> Moreover, Higman and Monteith (2010) noted that the colonial Government made rules that encouraged and controlled local enterprises, offering them both protected markets and security. However, the immediate post-independence period of the early 1960s witnessed the emergence of a new government, which seemingly challenged the hegemony of the “white-dominated” private sector.

At the cusp of the country’s political independence, the then Premier of Trinidad and Tobago, Eric Williams refused to withdraw the statement “massa day done” that he had made in a quarrel with the leading newspaper in the country and the main opposition party (Cudjoe, 1997). Clarifying this statement in the famous speech, “Massa Day Done”, Williams blamed the plantocracy and the colonial Government for the stunted socio-economic development of the country (Williams, 1997). He characterized the European-descended community, including those in the private sector, as inheritors of the guilt of eighteenth-century slave owners, asserting that they were determined to send Trinidad and Tobago back into slavery. Not surprisingly, some elements of the population, especially the white-dominated private sector, reacted strongly to this speech (Besson, 2009).

Nonetheless, there was a vast difference between Williams’ rhetoric and actions.<sup>14</sup> Although Williams did not design formal mechanisms to facilitate dialogue for policymaking with the private sector, he implemented policies that were strongly supportive of its operations. Williams shielded some of the established firms from

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<sup>13</sup> Williams (1969) explained that under the crown colony system, Trinidad’s legislative council consisted of two types of members – official and unofficial. The former were the Governor’s top civil servants and the latter were mainly drawn from the plantocracy.

<sup>14</sup> In fact, Williams subsequently explained that “Massa is not a racist term. Massa is the symbol of a bygone age. Massa Day is a social phenomenon. Massa Day connotes a political awakening and a social revolution” (Cudjoe, 1993, pp. 238-239).

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foreign acquisition by introducing the Alien Landholding Act. He also established the Industrial Court and enacted legislation that were anti-trade union and favourable to the successful operations of the private sector (Besson, 2009). The Government's supportive relationship of the private sector continued despite changes in government, the changing composition of the private sector and its adoption of a state-led, gas-based, industrialization strategy.

By the late 1970s, the old established retail companies divested. While their owners migrated, a new business class emerged. Although some of the new members of the private sector were European descendants, they did not emerge from the traditional plantocracy. In fact, unlike the old business class, these new business owners brought a new managerial perspective to their operations (Besson, 2009). In tandem, other ethnic groups including the Indians, Syrian-Lebanese and Chinese became established members of the private sector business community. Indeed, by the late 1990s, the leading business people in private sector were a multi-ethnic group involved in retail, professional services and light manufacturing. Its members created elaborate mechanisms, including various chapters of the Chamber of Commerce, to facilitate dialogue with the Government.

Nevertheless, the members of the private sector did not enjoy a synergistic relationship with the Government in the policy process. Although mechanisms were created to facilitate dialogues, the private sector was not closely involved in policy formulation. Their involvement was limited to consultations after policies were formulated and implemented.

This situation was even more pronounced for the policymaking process for the development of the state-owned, natural gas-based industries during the 1970s. The Government created an efficient bifurcated bureaucracy to formulate and implement policies for the development of this new economic sector. However, no mechanism was created to facilitate dialogue between the policymakers and the domestic private sector. Indeed, although the domestic private sector was initially involved in the plans to develop an industrial estate to house these industries, they had little say in the formulation and implementation of the requisite industrial policies to develop these new industries. Moreover, it was the Government, not the domestic

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private sector, that invested in the natural gas-intensive industries.<sup>15</sup> Additionally, it was foreign investors, not the domestic private sector, which were joint venture partners to the Government.<sup>16</sup> This relationship persisted through to the 2000s. Not surprisingly, the domestic private sector was excluded from the policymaking process for the development of the aluminium industry.

The domestic private sector was not the only segment of society which was excluded from the policy process for the development of the aluminium industry. As the following section discusses, policymakers also failed to include civil society.

#### **4.2 Accountability and transparency in policymaking for the aluminium industry<sup>17</sup>**

While the country's latest strategic plan, Vision 20-20, highlighted issues of accountability and transparency in policymaking for the natural gas-intensive sector (GOTT, 2004a), no attempts were made to involve civil society in policymaking for the aluminium industry. Civil society organizations have traditionally played a passive role in the policymaking process in Trinidad and Tobago (Bissessar, 2009). However, this was not the case for policymaking for the aluminium industry. As discussed earlier, several civil society organizations vehemently opposed the establishment of the proposed aluminium smelters. In response to their protest, two joint Select Committees of Parliament were convened to consider the economic, social and ecological impacts of the two proposed aluminium smelter projects. However, the major policymakers identified with these projects refused to attend the meetings of these committees. Moreover, they also failed to provide a cost-benefit analysis of the Alutrint project despite repeated requests from civil society organizations and the regulatory requirement, which mandated them to provide this information. Further, questions posed by civil society organizations on the preferential gas pricing and subsidies

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<sup>15</sup> During the period 1975–1985, the Government, in its role as lead investor, spent \$3,300 million on developing gas-based industries at the Point Lisas Industrial Estate (GOTT, 2004a).

<sup>16</sup> It is noteworthy that more than thirty years after the establishment of the gas-intensive industries, there is only one locally owned firm currently involved in this activity.

<sup>17</sup> This section draws heavily on Kublalsingh (2009a).

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to be enjoyed by these projects were left unanswered. Indeed, the then Chairman of the Select Committee of Parliament complained:

“Nothing has come to Parliament and little to the general public which defines and justifies the creation of an aluminium smelter industry with respect to its feasibility and optimum use of our diminishing natural gas reserves, its impact on the environment, the level of earnings from the sale of gas and comparison with the longer use to which this gas can be put in the context of Peak Oil.” (King, 2006: 10)

Notwithstanding such scepticism, policymakers maintained that the investment in the aluminium industry would contribute significantly to the economic development of the country. The following section examines this assertion by analysing the potential of this industry to FDI-facilitated development.

## **5. Embedded autonomy, accountability and transparency, and FDI-facilitated development in the proposed aluminium industry of Trinidad and Tobago**

As the foregoing discussion demonstrates, Trinidad and Tobago does not appear to have achieved the appropriate balance between state autonomy and embeddedness. Moreover, as clearly seen with the state-initiated investments in the aluminium industry, its industry policy apparatus is not equipped to deal effectively with the issues of accountability and transparency.

The extant literature argues that developing countries could derive specific benefits from resource-driven, FDI-facilitated development. These include enhanced technological and managerial competencies, foreign market access, secondary processing activities and the formation of clusters of resource-related activities (Dunning, 1994). Interestingly enough, in its most recent national strategic plan, the Government of Trinidad and Tobago, recognizing that its natural resources – oil and gas – are finite, posited that the country needed to use these resources to “create a sustainable economic life beyond the era of oil and natural gas” (GOTT, 2004a). In so doing, policymakers proposed local involvement in all aspects of the energy value chain. In

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line with the extant literature, policymakers argued that the country needed to develop internationally competitive local firms in the supplier and downstream industries, upgrade its human resources and become more fully involved in research and development.

As stated earlier, one of the objectives of this paper is to examine the extent to which government industrial policies for the aluminium industry promoted FDI-facilitated development. In this regard, the specific policies analysed are those which were outlined in the country's national strategic plan. Hence, the policies examined are those aimed at industrial deepening – stimulating the development of supplier and downstream industries; enhancing institutional capabilities; and developing technical, managerial and industrial research capabilities. These issues were analysed for the Alutrint project, which progressed substantially before it was abandoned.

### **5.1 Developing local supplier firms**

Before 2004, the Government had no formal policies to foster the development of local supplier firms. Rather, organizations such as the NEC, the Ministry of Trade and Industry as well as the Energy Chamber of Commerce used moral suasion to encourage the resident TNCs to employ the services of local supplier firms. However, in 2004, the Government took decisive steps to deepen local content and local participation in the gas-intensive sector. Recognizing that the current levels of local value capture were in the range of a dismal 10 per cent or so, the Government attempted to create a policy framework which would “determine the major mechanisms for local content, participation and capability development; ascertain where, how and by whom these will be delivered; develop performance measurements, assurance and reporting processes; and identify key areas for policy focus” (GOTT, 2004b: 5). In order to achieve these objectives, the Government created the Permanent Local Content Committee (PLCC), which was endowed with the requisite resources to fulfil its mandate. Nonetheless, the local supplier firms were ignored in the policymaking process for the development of the aluminium industry. There were several reasons for this failure.

First, the conditions of the loan financing agreement that the Government secured with the EXIM bank of China for the Alutrint project limited the involvement of local supplier firms. The \$400 million loan

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agreement stipulated that the project engage the Chinese firm, China National Machinery and Equipment Import and Export Corporation (CMEC), which was responsible for the technology design for this plant, as the sole source of labour and technology (Shah, 2009). Hence, the CMEC was the only firm involved in the Engineering, Procurement and Construction (EPC) activities for the plant. While there were attempts to involve local engineering firms during the construction phase, their activities were limited to non-specialized, low-technology functions such as path construction, fencing and drainage (Shah, 2009). Further, the CMEC's position as the sole provider of EPC activities, together with the proprietary nature of the Chinese technology used in the plant, precluded the involvement of local firms in the procurement of equipment. Indeed, all the major equipment for the facility was sourced and manufactured in China and subsequently transported to Trinidad and Tobago for assembly by the CMEC.

Second, the loss of relevance of the Permanent Local Content Committee (PLCC) adversely affected the involvement of the local supplier firms during the construction phase of the Alutrint project. With the departure of its political champion in 2007<sup>18</sup>, the PLCC lost its political legitimacy since its successor was unconcerned with the issues of local content and local participation in the gas-intensive sector. Hence, the highly vaunted objectives of “determining the major mechanisms for local content, participation and capability development; ascertaining where, how and by whom these will be delivered; developing performance measurements, assurance and reporting processes; and identifying key areas for policy focus” were unrealized. In consequence, despite the concerted efforts made by the Energy Chamber of Commerce to highlight the visibility of internationally competitive, local supplier firms,<sup>19</sup> policymakers failed to meaningfully involve these firms during the construction phase of the Alutrint project.

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<sup>18</sup> The political champion was forced to resign from his ministry under allegations of corruption. These allegations were subsequently disproven.

<sup>19</sup> These activities included creating a database of local firms that possess the experience and capabilities to provide support services to the aluminium TNCs; convening meetings with international contracting firms and the local supplier firms to ensure that the former was aware of the latter's capabilities; and engaging in repeated discussions with policymakers to address the involvement of local supplier firms in the proposed aluminium industry.

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## 5.2 Fostering downstream industries

In an effort to develop downstream industries, in 2004, the Government took the strategic decision to no longer approve any stand-alone projects such as ammonia, but only those projects that include significant downstream activity (Coombs, forthcoming). The aluminium investments were supposed to be the country's first venture into downstream activity. The Alutrint plant was to be geared to producing aluminium that would be converted into cables, wire and rods. These products would have been further fabricated into alloy wheels and automotive components by Alutrint's sister company, Alutech Limited, and then all exported.

It is noteworthy that only four per cent of Alutrint's 125,000 annual output would have been made available to local manufacturers. Trinidad and Tobago boasts approximately twenty local firms, which are small and medium-sized manufacturers of aluminium products ranging from doors, windows to roofing sheets. These firms supply the domestic and regional markets with one being the largest exporter of aluminium construction products in the Caribbean region.

The majority of the firms interviewed were enthusiastic about the proposed aluminium investments, stating that they were willing to use the aluminium produced locally since it would allow them to gain a competitive advantage through savings in inventory and logistics costs. Nonetheless, no formal mechanisms were created to facilitate dialogue among the existing local manufacturers of aluminium products, policymakers in the government agencies and the executives of the proposed aluminium smelters. As a result, neither executives of the proposed aluminium projects nor policymakers in the government bureaucracy were aware of the characteristics of the local aluminium product manufacturers. Similarly, the local firms interviewed were unaware of pertinent issues concerning the proposed aluminium projects, including the quality of the aluminium to be produced locally and its compatibility with the imported aluminium, which they used to manufacture their products. Interestingly enough, policymakers suggested that, before the projects were halted, the aluminium TNCs were currently more preoccupied with community relations rather than with the local users of aluminium. Indeed, had the projects been completed, the local aluminium product manufacturers would have



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followed the fate of their counterparts in the local steel industry. Similar promises made to the latter firms in the initial years of the steel industry (1970s and 1980s) are still unrealized (McGuire et al. 2009).

### **5.3 Building technical and managerial capabilities**

The natural gas-intensive sector has always attracted the “best and brightest” of the country’s technical and managerial talent because it offers the highest level of compensation and has been resourceful in attracting this talent (GOTT, 2004a). The country also enjoys a long history of training workers for this sector. TNCs operating in the petroleum industry traditionally offered apprenticeship programmes at the craft and technician levels. These programmes subsequently served as models for other craft and technician-level training implemented by industries and national organizations such as the Trinidad and Tobago Institute of Technology. The training of senior professional and managerial workers was initiated at a much later date. Urged by the proponents of the Black Power revolution,<sup>20</sup> the Government persuaded TNCs operating in the natural gas-intensive sector to hire more nationals at senior professional and managerial levels. As a result, more nationals received training at the Engineering Department of the local university and at foreign tertiary institutions (GOTT, 2004a).

Despite this fairly comprehensive system to develop skilled workers, by the mid-1980s, there was a critical shortage of trained workers, especially at the craft and technical levels, caused by the increasing number of TNCs operating in the natural gas-intensive sector. Moreover, there were increasing demands by the industry to further upgrade the skills of these workers (Coombs, forthcoming). Further, the system was developing what has been described as a “static technological capability” in the gas-based industry. These are the skills required for the maintenance of a given system. The nationals possessed the technologies that permit them to successfully carry out certain routine tasks, in a more or less fixed fashion and with more or less given equipment. They were not developing a “dynamic technological capability”, which consists of the skills needed for the

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<sup>20</sup> The Black Revolution, which occurred in 1970, was the culmination of the growing unrest that erupted among large sections of the urban working class and members of the growing Black middle class. These groups believed that despite the growing presence of Blacks in the corridors of political power, they were still excluded from the control over the social and economic arrangements in the country.

long-term development of the industry. The nationals did not possess the complex set of technological skills that were needed to run the industry successfully over time, innovating when necessary to solve its problems (Barclay, 2004).

In response, in 2004, the Government created the University of Trinidad and Tobago (UTT) with the mandate to satisfy the country's needs for a highly trained and qualified technological manpower. The UTT incorporated the existing state-owned, technical training institutes into its operation, and currently operates from nine campuses. This institute, which has well-established ties with industry, offers a sandwich-type programme that involves students spending part of their courses in an operating facility. Its training programmes currently range from the craft to the graduate level. Hence, the aluminium TNCs had access to a cadre of well-trained nationals who could be drawn from the existing educational institutes. Indeed, as table 2 demonstrates, Alutrint,

**Table 2. Training of Workers for the Alutrint Plant**

Level	Expertise	Numbers to be trained	Strategic Partnerships
1	Semi-skilled	200-300	<p><b>Local institutes offering craft-level training:</b> National Training Agency (NTA), Youth Empowerment Through Quality Training (YTEPP), Service Volunteered for All (SERVOL)</p>
2	Skilled Operator	250	<p><b>Local institutes offering craft and technical-level training:</b> National Energy Skills Centre (NESC), Metal Industries Company Limited (MIC)</p>
3	Technical/ Supervisory	100-120	<p><b>Local Institutions offering craft, technical and supervisory training:</b> The University of Trinidad and Tobago (UTT)</p>
4	Professional	75	<p><b>Local institutions offering graduate/ professional training:</b> UTT and the University of the West Indies (UWI)</p>
5	Managerial/ Sub-Managerial	50	<p><b>Local institutions offering graduate/ professional training:</b> UTT and the UWI including the Arthur Lok Jack Graduate School of Business (ALGSB)</p>

Source: Julien (2010).

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which planned to have its plant totally managed and operated by locals within three years after start-up, intended to use mainly local training institutions to develop the skills of its workers. Nonetheless, the local training institutions did not offer training programmes that specifically catered to the needs of the aluminium industry. Thus, Alutrint planned to send its managerial and professional workers to China (CMEC and North Eastern University), Brazil (Votorantim Development System) and Norway (Norwegian University of Science and Technology) for plant-specific training (Julien, 2010).

#### **5.4 Developing research and development capabilities**

The country's latest strategic plan emphasized the need for "long-term policies to encourage firms in the gas-intensive sector ..... to regard the country as a location for technology, research and development" (GOTT, 2004a, p. 75). However, these long-term policies have not been formulated. Policymakers failed to outline the role that the national system of innovation would play in the proposed aluminium industry. Indeed, the relationship that long-standing R&D institutions such as the Caribbean Industrial Research Institute (CARIRI) would enjoy in this new economic activity was not articulated. Industry analysts warned that the local R&D institutes lacked the capability required to engage in meaningful work with TNCs in the aluminium industry. However, no measures were taken to endow these institutes with the requisite resources for increasing their capabilities. Instead, the Government sought to increase the size and complexity of its national system of innovation with the establishment of the National Gas Institute of the Americas (NGIA).

The NGIA was launched by the UTT in 2006 with the mandate to undertake natural gas-based research, which would impact on the economy. However, its research activities did not focus on the aluminium industry. Rather, this institution was involved in research that examines upstream technologies, midstream and downstream technologies, energy economics and policy, and energy and the environment. It was also involved in collaborative projects with firms in the gas-intensive sector. However, it did not engage in collaborative research with the aluminium companies.

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Before the smelter projects were abandoned, the impetus to engage institutions of the national system of innovation in research on the aluminium industry was driven by the aluminium company, not by the policymakers in the government agencies. Indeed, the executives of Alutrint initiated a research-based relationship with the two local tertiary institutions, the University of the West Indies (UWI) and the UTT. This relationship was modelled on the one that the Norwegian University of Science and Technology enjoys with the aluminium companies such as Norsk Hydro, which operate in Norway.

Norway is one of the world's leading countries for R&D in the aluminium industry. The Norwegian University of Science and Technology is one of the few universities worldwide that offers light metal-specific programmes. This university is supported by the aluminium companies in its R&D initiatives that are also of interest to the companies. In this way, the key stakeholders – the university and the aluminium companies – all benefit from this relationship.

Alutrint was attempting to emulate this synergistic relationship with the Norwegian University of Science and Technology and the two local state-funded, tertiary institutions. To this end, its executives held meetings with academics involved in the light metal programme at the Norwegian University of Science and Technology. This was followed by meetings with the heads of the Engineering departments of the two local tertiary institutions. These heads later attended a three-week training programme at the Norwegian University of Science and Technology. In so doing, Alutrint intended to develop a close relationship with the local tertiary institutions as well as one of the world's premier institutes for research in the aluminium industry.

## **6. Conclusion**

The extant literature has convincingly argued that the industrial policy process is most effective when conducted in an institutional environment with a government bureaucracy characterized by embedded autonomy. Much of the support for this thesis draws on the experience of countries which, at the start of their phenomenal economic transformation, were economically improvised, lacked dynamic civil society organizations and were governed by authoritarian leaders. However, the socio-economic and political climate for

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industrial policymaking and implementation has since changed for governments, institutions and firms. With the gradual increase in democratic governments worldwide and the growing dynamism of civil society organizations, governments, institutions and firms are increasingly being called to be accountable to their stakeholders. Hence, embedded autonomy is no longer sufficient for effective industrial policymaking and implementation. Policymakers need to be cognizant of the issues of accountability and transparency. This is especially pertinent to policymakers in resource-rich, developing countries that are increasingly being affected by the growing wave of democracy and/or the emergence of vibrant civil society organizations.

Trinidad and Tobago presents an excellent case study in which to explore these issues. This country, emulating the example of other oil and gas-rich, developing countries, attempted to establish an aluminium industry in the 2000s. Its policymakers astutely created efficient bifurcated bureaucracies, endowed with requisite human and financial resources, to formulate and implement policies for this new industry. But this bifurcated bureaucracy was not designed to effectively deal with the issues of accountability and transparency. Thus, when the previously passive civil society organizations began to aggressively demand greater accountability and transparency in the industrial policymaking process for the aluminium industry, policymakers in the bifurcated bureaucracies were ill-equipped to deal with their demands. Indeed, policymakers remained publicly silent on crucial issues such as the preferential gas pricing and subsidies to be enjoyed by TNCs operating in this new industry. In consequence, civil society organizations were instrumental in influencing the decision of the Government to discontinue the two aluminium projects.

Notwithstanding this experience in Trinidad and Tobago, the issue of embedded autonomy remains critical to the industrial policy process. Policymakers asserted that the investment in the aluminium industry would contribute significantly to the country's economic development. This paper attempted to examine the validity of this assertion. It specifically sought to ascertain the extent to which embedded autonomy resulted in industrial policies that would promote FDI-facilitated development.

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It appears that the policymakers were not in dialogue with the domestic private sector when formulating and implementing policies for the development of the aluminium industry. As a result, the local firms in the supplier and downstream industries were not consulted in the process of policy formulation. Indeed, despite the Government's stated objective of increasing local involvement in all aspects of the energy value chain (GOTT, 2004a), internationally competitive local supplier firms were not involved in the EPC activities for the construction of the Alutrint project. Moreover, the linkages of the aluminium smelters with the rest of the economy would have been limited since almost all of their output was designated for export. Further, policymakers failed to consider the local firms, which used imported aluminium to manufacture products for the domestic and regional markets, in the policies to develop TNC driven-aluminium production.

Trinidad and Tobago possesses a relatively well developed education system, from which the aluminium companies could have sourced and further trained their workers. However, it seems that this education system is only capable of producing static technological capabilities. It does not appear to be able to develop the dynamic technological capabilities needed for the aluminium industry since Alutrint intended to send its senior professionals and managers to foreign institutes for training.

It is also noteworthy that while policymakers increased the size and complexity of the national system of innovation with the establishment of the NGIA, they failed to improve the capabilities of longstanding R&D institutes such as the resource-starved CARIRI. Moreover, although the NGIA was extensively involved in research activities for the natural gas-intensive sector and was undertaking collaborative research projects with firms in this sector, it did not engage in research on the aluminium industry. More importantly, it was the executives of Alutrint, not the policymakers in the bifurcated bureaucracies, who initiated a research-based relationship with local tertiary institutions. The research undertaken by these institutions in collaboration with the Norwegian University of Science and Technology would undoubtedly have been relevant to the needs of this aluminium company. However, this research was not integrated into an overall strategic plan, developed by policymakers, which would have articulated the role that the national system of innovation played in the

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technological development of the aluminium industry in Trinidad and Tobago.

This paper argues that embedded autonomy is critical to effective industrial policymaking and implementing. Policymakers in bifurcated bureaucracies need to enjoy a collaborative relationship with the private sector in order to achieve resource-seeking, FDI-facilitated development. However, this paper also shows that embedded autonomy is necessary but not sufficient for the success of resource-seeking, FDI-facilitated development. In the present socio-economic and political climate, the industrial policy apparatus also needs to be well equipped to deal effectively with the issues of accountability and transparency. As the case of Trinidad and Tobago aptly illustrates, policymakers' neglect of these issues could adversely influence the future of government-inspired, resource-based projects.

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Please do take the time to complete the questionnaire and return it to the above-mentioned address. Your comments are important to us and will help us to improve the quality of *Transnational Corporations*. We look forward to hearing from you.

Sincerely yours,

James Zhan  
Editor  
*Transnational Corporations*





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# *TRANSNATIONAL CORPORATIONS*

## Questionnaire

1. Name and address of respondent (optional):

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2. In which country are you based?

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3. Which of the following best describes your area of work?

Government

Public enterprise

Private enterprise

Academic or research

Non-profit organization

Library

Media

Other (specify)

4. What is your overall assessment of the contents of *Transnational Corporations*?

Excellent

Adequate

Good

Poor

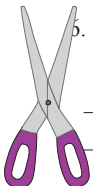
5. How useful is *Transnational Corporations* to your work?

Very useful

Of some use

Irrelevant

5. Please indicate the three things you liked most about *Transnational Corporations*:



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7. Please indicate the three things you liked least about *Transnational Corporations*:

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8. Please suggest areas for improvement:

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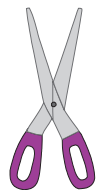
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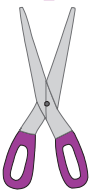
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