# Dealing with Construction Permits: Implications for the Colombian Case

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## Abstract

Construction industry plays a leading role in the economies worldwide, and its performance is significantly related to the welfare of society. This relationship is direct in the developing countries. Thus, obtaining a construction permit is a critical process in Colombian building projects. This empirical study found that in 21 Colombian capital cities the number of phases, time and cost required to complete building permits have negative effects over the construction industry performance; whereas, per capita GDP and municipal transparency index have a positive influence. As a result, there is a need to reduce unnecessary phases and costs in Colombian building permits. Additionally, this study contributes to the understanding of building construction performance predictors and to address the design of more appropriate public policies.

**Keywords: Building construction industry performance, construction permits, per capita GDP, Municipal transparency index, public policies**.

## 1. Introduction

Construction industry is a business of large proportions (Currie, 1982; Powell, 1980) that produced $1.7 trillion worldwide. In most countries, this industry contributes at least with 7% of gross domestic product (Kenny, 2007), and it ranks third in gross capital formation (United-Nations, 2007). In this regard, Colombia is not an exception due its construction industry contributed 6.5% to GDP in 2011 first quarter (DANE, 2011).

Despite the economic importance of the construction sector, industry regulations are intricate in most countries, being even more complex in developing countries ; as a result, some builders choose to infringe established law, and frequently consider the possibility to pay bribes for obtain building permits. This situation leads to severe problems related to public control and quality of the projects. Notwithstanding, obtaining the approvals to build is, on average, faster and cheaper in Colombia than elsewhere in Latin America (DB, 2011), though variations exist across Colombia cities. Colombia has been pioneer in Latin America on construction regulations; for instance, it became from two decades ago the first

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country in the region to privatize its building permits. Before that reform, construction companies dealing with Public Planning Offices, and interacted informally with the authorities reviewing their cases (DB, 2010).

Internationally, building construction business is dominated by a diverse set of companies. The large construction projects often attract international contractors; nevertheless, most construction activities are contracted with local companies (Kenny, 2007). Colombia has had an institutional context and industry behavior that has prevented access of international competitors (with variations in its long history), specially within the housing sector. However, since two decades ago international companies are more often involved in infrastructure development projects, and local market is increasingly competitive.

Since there is a considerable amount of activities and actors related with the construction industry performance, it is valuable to study the factors that determine its performance. In reviewed literature on construction project management, there is a group of internal and external factors affecting project performance, and therefore, the industrial performance (Campero & Alarcón, 2003). Conventionally, those factors represent the processes within the project development. Empirical evidence shows that these processes that take place in the early project stages (i.e. conception and feasibility) playing a key role in the project value creation (Echeverry, 2007; Páez, Vargas, Prieto, & Mesa, 2010). According to a bunch of empirical evidence, a central process in this matter is to obtain the building permits (DB, 2011). Hence, without a proper management of licenses, projects cannot be legally performed (Kenny, 2007; Moullier, 2009).

Supported on the evidence above, this study proposes to address the analysis of the relationship between the variables that characterize the process of obtaining building permits and the overall formal construction industry performance. To meet this purpose, a regional analysis within Colombia was performed for the period 2010-2011.

This article is organized in four sections as follow: 1) theoretical background and hypotheses; 2) data sources and operationalization of variables; 3) statistical models results; and 4) discussion and conclusions.

## 2. Theoretical background and hypothesized model

Previous section shows how processes to obtain a building permit affect significantly project performance. Those processes are carried out by performing a series of steps which are regulated by the institutional regulations provided in each region (Moullier, 2009). The steps are procedures that all professionals involved (i.e. builders, contractors, engineers, architects, and design consultants) must follow to develop a new project, or to modify an existing one. Therefore, the essential legal document of these procedures is the building permit.

In Colombia building permits authorize the execution of construction projects. This license allows authorities to enforce compliance of adopted building codes as part of the legal body that regulates the construction industry, and ensures the public right over the private right

(Ceballos, 2008). This relationship between public and private actors works in a complex interdependence framework (Vargas, 2009). Hence, this complexity stimulates, in some situations, informality in obtaining a building permit. In most developing countries, the estimated proportion of informal housing construction is among 60% and 80% (Moullier, 2009). Further, in developing countries prevail an amount of non-standard processes that promote asymmetric information between public and private actors, thus having a negative effect over the licensing service quality. This situation arises, in part, due to the corruption high levels that are often found in the licensing process (Kenny, 2007).

After this developing countries context, it can be inferred that a significant portion of licensing process has a significant effect over the construction project performance. This means that building projects licensing could have a significant relationship with construction industry performance. Additionally, as institutional contexts within countries vary (Scott, 2011), the relation between licensing and performance must be different across regions. On the other hand, industry performance is not only determined by variables that characterize the process of obtaining a building permit. There are also demographic and economic variables (i.e. population, GDP per capita, poverty, international commerce) at the regional level related with the performance of the sector which were included in this study (Currie, 1983).

According to Doing Business 2011 (DB), a project developed by the World Bank and the International Finance Corporation, obtaining the approvals to build is, on average, faster and cheaper in Colombia than elsewhere in Latin America (DB, 2011), but variations exist across Colombia cities (see table 1); nevertheless, Colombia has been pioneer in Latin America on construction regulations. The ease of obtaining construction permits in Popayán is noticeable enough to rank it higher than 94% of the 183 economies ranked by DB. Regional differences are essentially due to special inspections, land-use certificates and local stamp duties that are required in particular cities. On average, Colombian builders spend 109 days (46 SD), 170% as a proportion of GPD per capital (79 SD), and 14 phases (2 SD) to obtain all the approvals for a construction project.

***Table 1: City ranking of easier to deal with construction permits, population (65% of the Colombian capital cities), the number of phases, time and cost required to complete building permits (DB, 2010).***

| City | Easier to deal with construction permits ranking | Population | Number of procedures | Time to obtain a building permit (days) | Cost to obtain a building permit (%GDP per capita) |
|---|---|---|---|---|---|
| Popayán | 1 | 265.702 | 11 | 38 | 85,5 |
| Valledupar | 2 | 403.414 | 13 | 89 | 79,7 |
| Santa Marta | 3 | 447.857 | 13 | 43 | 125,5 |
| Tunja | 3 | 171.082 | 13 | 86 | 104,9 |
| Montería | 5 | 409.476 | 13 | 75 | 116,2 |
| Riohacha | 6 | 213.046 | 14 | 48 | 106,1 |
| Bogotá | 7 | 7.363.782 | 11 | 74 | 402,8 |
| Barranquilla | 8 | 1.186.140 | 13 | 91 | 186,9 |
| Sincelejo | 8 | 256.241 | 14 | 85 | 141,5 |
| Manizales | 10 | 388.525 | 13 | 98 | 209,6 |
| Neiva | 10 | 330.487 | 14 | 127 | 112,8 |
| Pasto | 10 | 411.706 | 13 | 140 | 147,2 |
| Armenia | 13 | 288.908 | 14 | 123 | 122,0 |
| Pereira | 14 | 457.103 | 14 | 121 | 171,6 |
| Medellín | 15 | 2.343.049 | 13 | 181 | 231,3 |
| Cartagena | 16 | 944.250 | 14 | 107 | 293,7 |
| Ibagué | 16 | 526.547 | 14 | 217 | 144,8 |
| Cúcuta | 18 | 618.310 | 16 | 96 | 208,1 |
| Bucaramanga | 19 | 524.112 | 18 | 160 | 126,8 |
| Cali | 20 | 2.244.639 | 19 | 146 | 175,1 |
| Villavicencio | 21 | 431.476 | 16 | 151 | 269,0 |
| **Mean** | | **963.136** | **14** | **109** | **170** |
| **Standard deviation (SD)** | | **1.583.608** | **2** | **46** | **79** |

Based on DB (2010 and 2011) indexes, we propose that the ease of obtaining a building permit is related to the construction industry performance in a positive way at the regional level. Being the ease of the process inversely proportional to the number of procedures, time and cost of the building permit, the relationships of these variables and the industry performance are proposed as negative in next hypothesis.

H1a: The cost to obtain a building permit is negatively related to the construction industry performance.

H1b: The amount of phases to obtain a building permit is negatively related to the construction industry performance.

H1c: The time to obtain a building permit is negatively related to the construction industry performance.

Private professionals known as "*urban curators*" became responsible delegates for the complete and timely review of building permit applications in Colombia. By 1996, the system of private urban curators was up and running and today, with the exception of Riohacha, in

all analyzed cities by DB (2010 and 2011). Due this important change in Colombia regulations, it is interesting to study whether higher number of curators in a city is related to better construction industry performance.

H2: The greater the amount of curators in a city, the greater the construction industry performance.

An efficient regulatory framework is the result of a positive both social and economic history of the region (DB, 2010). As it was explained in the first section, construction industry performance is directly related to the economic welfare of a society. Therefore, it is likely that GDP per capita and the proportion of population with unsatisfied basic needs (NUB) are related, positive and negative respectively, with the construction industry performance (United-Nations, 2007). Thus the following hypotheses are proposed.

H3a: Per capita GDP is positively related to the construction industry performance.

H3b: The proportion of population with NUB is negatively related to the construction industry performance.

One of the economic dynamic indicators of a region are the export and import activities (DB, 2010). These exert a significant influence on the construction industry performance, and stimulate the development of commercial, infrastructure and industrial projects. Therefore, these indicators are positively related to the performance of the industry and could be part of the variables that have a significant effect on building performance.

H4a: The city export level is positively related to the construction industry performance.

H4b: The city import level is positively related to the construction industry performance.

High levels of corruption (Tookey & Chalmers, 2009) and poor transparency processes in obtaining a building permit affect significantly the construction industry performance (Kenny, 2007). In view of this background, it is interesting to study the relationship between perceived transparency of public affairs and construction performance as follow.

H5: The transparency city index is positively related to the construction industry performance.

Statistical methods presented in next section were used to support the hypothesis listed above.

# 3. Methodology

## 3.1 Data

This study analyzes the regional level variables of 21 Colombian cities - departmental capitals – representing 65% of the capital cities in the country. Information about these cities

was obtained from four sources: 1) results of the DB 2010 report (number of phases, time and cost to obtain a building permit); 2) demographic and economic information (city population, GPD per capita, construction industry performance, international commerce) published on the official website of the *Departamento Administrativo Nacional de Estadística* (DANE); 3) available information of the official website of the *Colegio de Curadores* (Chamber of Curadurías in a city); and 4) Transparency International data base indexes. In summary, we developed a database that contains information about 11 variables extended between the years 2010 and 2011, and at the regional level.

## 3.2 Measures

**Dependent variable**: Construction industry performance is the depend variable of this study, and has a normal distribution. Performance index was considered as the total built area in 2011 first quarter. In order to have an unbiased measure due the population size, constructed area was weighted based on the city population. Due the lack of data to measure the informal construction building sector performance, only the formal sector was included in the statistical analysis.

**Independent variables:** Hypotheses proposed in this study required the operationalization of nine variables, as follow:

- **Number of procedures:** A procedure is any interaction between an construction company employee with an external entity, including government agencies, notaries, property records, land registry, public service entities, public or private inspectors and technical experts (DB, 2010).

- **Time to obtain a building permit:** Time was measure in calendar days. This captures the necessary average time to complete a procedure. This variable was obtained through interviews with local experts. It is assumed that the minimum time required for each procedure is one day. Also, it is assumed that the construction company does not waste time and performed the procedures without delay.

- **Cost to obtain a building permit:** Due the DB (2010) report international comparability mission, cost is measured as a percentage of GDP per capita. Only official costs were measured. All taxes required for legal building were measured.

- **Amount of curators in the city**. It measures the number of curators´ offices available to each city.

- **Municipal transparency index:** This index consists in three measurement factors: visibility, institutional quality, and municipal control and punishment.

- **Per capita GDP:** This index measures the mean income within an economic aggregate, such as a city.

- **NUB population proportion:** This indicator determines whether the basic needs of the population are covered. Groups of people that do not reach the minimum threshold set are classified as poor.

- **Traditional exports and imports by cities:** Traditional exports and imports by cities measured in thousands of dollars FOB.

### 3.3 Statistical model

This empirical study was conducted in six stages: 1) the variables selection that explain the industry behaviour for the period 2010-2011; 2) the data collection of the variables at the regional level; 3) the statistical methods development to support the relationships between the variables; and 4) the results discussion and conclusions analysis. Due the variables features, a set of multivariate linear regression models at the regional level (city) were used as follow. Three regression models were developed to incorporate progressively all the variables by typological groups (Hair, Anderson, Tatham, & Black, 1999) as it shows in table 2. Model 1 included the variables that represent the ease of obtaining a building permit from the variables: numbers of procedures, and time and cost to obtain a building permit. Additionally, due the remarkable relationship of the political transparency and economic prosperity on the ease of obtain a building permit (DB, 2011), but without a significant statistical correlation, model 1 took into account the municipal transparency index and the per capita GDP variables. Model 2 included, in addition to the former variables, the proportion of population with unsatisfied basic needs variable in order to support H3b. Finally, Model 3 discarded NUB variable but incorporated traditional exports and imports by cities indexes. Thereby, this final model contains all variables that could have a combined effect on building performance. The general statistical model is shown as follow.

$$CIP = \beta_0 + \beta_1 NP + \beta_2 TOBP + \beta_3 COBP + \beta_4 ACC + \beta_5 MTI + \beta_6 GDPp + \beta_7 NUBp + \beta_8 TEIC + \varepsilon$$

Where CIP is the construction industry performance; NP is the number of procedures; TOBP is the time to obtain a building permit; COBP is the cost to obtain a building permit; ACC is the amount of curator´s offices in a city; MTI is the municipal index transparency; GDPp is the gross domestic product per capita; NUBp is the NUB per capita; TEC and TIC are the traditional exports and imports in a city, respectively.

## 4. Results

Figure 1 shows the behavior of the key dependent and independent variables of this study. Relevant results from these figures are the following. First, CIP reflects an uneven performance between cities. It is noted that the most populated cities of the country (Bogota, Medellin, and Cali) do not present high levels of construction performance. In contrast, medium cities (i.e. Bucaramanga, Pereira, and Neiva) have the highest levels of this CIP. According to NP variable, cities have a homogeneous behavior. Though, at the national level there is a standard regulatory framework, comparative time and cost invested in these processes show a significantly different situation; so, these variables have considerable

variations between cities. Regarding municipal transparency index, all cities have a homogenous behavior, except for Villavicencio and Riohacha.

Three multivariate linear regression models are presented in table 2. Each one was validated satisfactorily according to the multivariate linear regression assumptions, that is, the weak exogeneity, linearity, constant variance, independence of errors, and lack of multicollinearity in the predictors of the statistical models. First model (R2 was equal to 0.651) includes the variables for ease of obtaining a building permit when testing the relationship between NP, TOBP and COBP with CIP; additionally, takes into account the MTI and GDPp. In addition to the factors included in first model, the second (R2 was equal to 0.624) involved NBUp variable. The latter does not yield a significant relationship with CIP. In the third model (R2 was equal to 0.626), NBUp variable was discarded and TEC and TIC were incorporated.

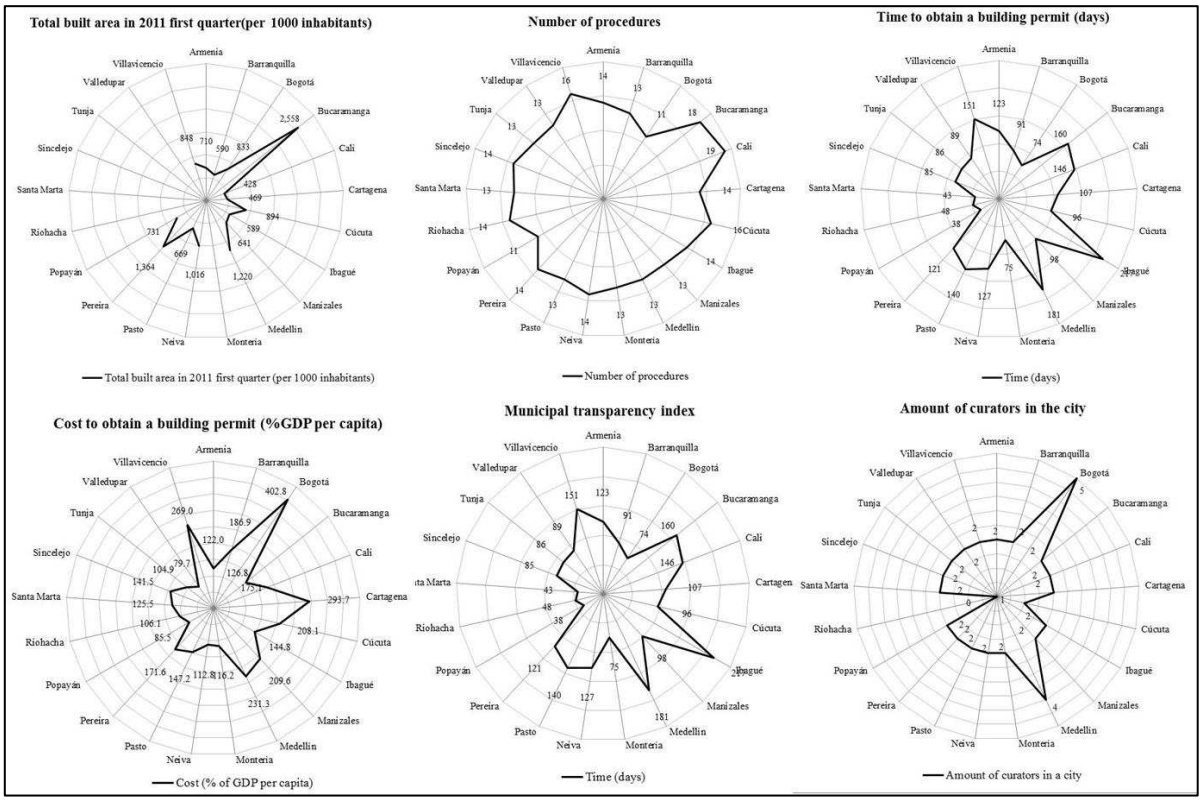


***Figure 1: Variable descriptions***

Concerning to the hypotheses support, the three multivariate linear regression models have the following results (see table 2). H1a, that proposed a negative relationship between COBP and CIP, was supported by models 1 and 2. H1b, that suggested a negative relationship between NP and CIP, was supported by all models. H1c, that proposed a negative relationship between TOBP and CIP, was not supported by any of the models. As expected, these results indicate that the ease of obtaining a building permits have a positive relationship with CIP.

H2, that suggested a positive relationship between ACC and CIP, was not supported by any of the models. Contrarily, it shows a significantly and negative relationship between those variables. Due the possibility that a greater number of curatorial offices affect negatively the CIP, it is interesting to study the results to revise the regulatory system policies.

H3a proposing a positive effect of GDPp over the CIP, was supported by all models; whereas, H3b suggesting a negative relationship among NBUp and CIP was supported by models 1 and 3. This means that social and economic conditions of a city have a considerable effect on its construction activity.

H4a and H4b proposing a positive effect of TEC and TIC on CIP were not supported by model 3; therefore, it is possible that the effects of such international commercial activities on the CIP are perceived only in the long term. Hence, longitudinal studies must be developed to supports these hypothesis.

H5 suggesting a positive relationship between MTI and CIP was supported by all models. This result shows how a fewer perceived corruption affect in a positive way the conditions to develop construction projects in a city.

***Table 2: Multivariate regression models results.***

| Variable | Model 1 | Model 2 | Model 3 |
|---|---|---|---|
| COBP | -3,401E+00 * | -3,395E+00 [a] | -2,757E+00 |
| | (1,581E+00) | (1,650E+00) | (1,909E+00) |
| MTI | 7,287E+01 *** | 7,263E+01 ** | 7,390E+01 *** |
| | (1,587E+01) | (1,805E+01) | (1,645E+01) |
| ACC | -7,126E+02 ** | -7,118E+02 ** | -6,450E+02 * |
| | (2,119E+02) | (2,215E+02) | (2,654E+02) |
| NP | -2,006E+02 * | -2,000E+02 * | -2,035E+02 * |
| | (8,238E+01) | (8,770+E01) | (9,117E+01) |
| GDPp | 2,400E-04 *** | 2,394E-04 ** | 2,508E-04 *** |
| | (5,189E-05) | (5,715E-05) | (5,618E-05) |
| TOBP | 2,208E+00 | 2,181E+00 | 7,177E-01 |
| | (2,162E+00) | (2,391E+00) | (2,694E+00) |
| NUBp | | -3,169E-01 | |
| | | (9,740E+00) | |
| TEC | | | 5,961E-05 |
| | | | (1,342E-04) |
| TIC | | | -6,337E-05 |
| | | | (6,204E-05) |
| $R^2$ *adjusted* | 0,651 | 0,6240 | 0,626 |
| *N* | 21 | 21 | 21 |

[a] p < 0,1; * p < 0,05; ** p < 0,01; *** p < 0,001; standard error in brackets.

## 5. Discussion and conclusions

The empirical evidence provided in this study reinforces partially the conclusions of DB (2010 and 2011). Furthermore, the present article highlights the necessity to review some factors in the processes of construction industry policy design. The conclusions of this cross-sectional study must be confirmed later with longitudinal analysis. Nevertheless, since the variables included reflected the city behavior in the long run, it is not expected to have different results with longitudinal analysis. Thus the principal findings of the study are the following.

First, our results support the background hypothesis that processes located in early project stages have a significantly impact over the project performance. Hence, variables measured by DB (2010) have a significantly relationship with CIP. Nonetheless, to conclude causal relationship among these variables will require a longitudinal analysis. For instances, best positioned cities in the ranking of "ease of obtaining a license", though not in all cases, demonstrate a tendency to show a higher construction activity. Due to variables not included in DB reports, (i.e. Popayán, Valledupar and Santa Martha) a well ranked city did not present high construction levels.

Second, a lower level of perceived institutional corruption contributes significantly to the development a high CIP index. This result corroborates the theoretical framework of Kenny (2007), presented in the first section. Additionally, it highlights the need of a continuous improvement of construction sector regulatory policies.

Third, the welfare of a society plays an essential role in explaining CIP. This result indicates that, beyond good performances of the processes for obtaining building permits, economic welfare of a city generally determines its CIP.

Finally, the exemplary position achieved by Colombia, as a result of efforts to improve the efficiency of the process of obtaining building permits, should be reviewed in the future through a deeper analysis of its institutional context.

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