Motivations and effects of the Private Contributions on Public Schools

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Doctoral Thesis

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"Although nineteenth century law prohibited corporate philanthropy and offered no tax incentives, business leaders gave because they thought that they were stewards of wealth, they saw a need for practical education, they wished to create memorials for loved ones, and they desired to meet the needs of special groups of individuals."

(Wren, 1983, p. 321)

Abstract and Research Roadmap

This Thesis focuses on the analysis of contributions to education, by private companies. Specifically, it centers on the motivations that originate them, and their effects on the educational performance of students who attend public schools in Colombia.

This case study is of special interest, since it represents emerging economy contexts where households make great private-spending efforts on education to compensate low-level public expenditure per student, and yet, despite this, fail to break the persistent gaps in educational access and quality, and great income inequality. Supplementary and consistently with other high social-inequality contexts, private companies have a greater propensity to contribute to the provision of this public good. Indeed, the optimal allocation of both public and private resources is important, in order to raise their impacts and their social returns.

The Thesis is structured in six chapters (Table 0.1. Methodological Synthesis and Roadmap of the Research). The first chapter, *Introduction*, presents the motivation, guide and justification of the Thesis and the methodological option followed, based on the literature gap.

The second chapter, *Private Contributions, Motivations and Effects. Systematic Literature Review*, presents a rigorous and systematic review of the theoretical and empirical literature addressing private company contributions to education, with special reference to the literature of Public Goods, Giving Economics and CSR. The main contributions of the Chapter are a theoretical construct proposal for the concept of 'private contribution' and a taxonomy of motivations and effects. This Chapter summarizes types of private contributions, their decision levels, probusiness and prosocial motivations, private and public effects, types of educational institutions and interventions used in the literature.

The third chapter, *Private Contributions in Education in Practice. Reviewing the Concept with Private Sector Leaders from Colombia*, conducting interviews with leaders of companies and organizations of the private sector–the companies of which make contributions to educational institutions–, inquires about the motivation behind their companies making this type of contributions and the effects they expect for the company and for society. Specifically, the categories of Thematic Analysis are validated with those in the literature review in Chapter 2. Among the findings, the following stand out: the shift from altruistic to strategic motivations, the relationship between companies' targeting criteria and their type of economic activity, and

the presumption of positive effects by business leaders, even when they have not estimated the impact of their interventions. Based on the above, a methodologically useful scheme is proposed, which validates and enriches the concept of private contribution and its effects.

The fourth chapter, *Private Contribution Effect on Public Schools and Academic Performance of Students. Order-m Estimation*, contains an empirical exercise to estimate the effect of such contributions under an efficiency approach. Specifically, a Private Contribution Effect (PCE) is calculated on the academic performance of public-school students in the departments of Cundinamarca (including Bogotá DC), Antioquia, Valle and Atlántico, which concentrate 59% of the economic activity of the country, 45% of the enrollment and 56% of the schools that have received help from private companies. Estimation is attained integrating non-parametric frontier techniques in efficiency analysis (order-m) with a meta-frontier framework and using a database of 269,117 records of students in 1,224 public schools, 725 of which received some type of private contributions in 2015 or 2016. The main result is a positive effect in 7 of the 16 study subsamples, which does not consistently support the presumption of positive effects declared by business leaders in the previous chapter. Also, this techniques integration is a contribution of this Chapter to the empirical literature on efficiency in education and its empirical estimation through an aggregate measure of differentiated contributions.

The fifth chapter, *Which Private Contribution has a greater PCE? Typology of Contributions and Their Effects*, broadens the analysis of the effects of contributions by asking what type of contribution has the greatest effect. Specifically, the intent is to validate the robustness of the PCEs vis-à-vis the different types of private contributions that have previously been classified in accordance with the literature reviewed. Their PCEs are estimated and compared by applying a non-parametric Wilcoxon-Mann-Whitney Rank Sum test for independent samples. The main contribution of this Chapter is a methodology for the comparison of contribution types, which involves a better understanding of contribution effects and it represents a guide for the allocation of resources to achieve a greater effect. The following results are highlighted: the greatest PCEs are associated with Access initiatives in the subregions (without capital cities), and Academic type in the capital cities with weak evidence. Contrary to expectations, the types of initiatives with the greatest PCEs are those with the lowest beneficiary coverage. The allocative efficiency and the effects of private contributions–that business leaders presume as positive–have a potential for improvement.

Finally, the sixth Chapter presents the conclusions and summarizes the main contributions of the Thesis, as well as the limitations and recommendations for future research.

Keywords: private contribution; private provision of public goods; corporate philanthropy; shared value; firm behavior; education and development; public schools

JEL Codes: D22, D64, H44, I25, L21, M14.

Table 0.1. Methodological Synthesis and Roadmap of the Research

	Chapter 2 **Private Contributions and its motivations and effects. Systematic Literature Review**	**Chapter 3** **Private Contributions in Education in practice. Reviewing the concept with Private Sector Leaders from Colombia.**	**Chapter 4** **Private contribution Effect on public schools and academic performance of students.** ***Order-m*** **estimation.**	**Chapter 5** **Which Private Contribution has a greater PCE? Typology of contributions and its effects.**
Research question	- How to define private contributions based on the literature? - Why do private companies make contributions in social goods as education? - What are the effects of those contributions?	- What motivates business leaders to make contributions in public schools? - What effects do they perceive as attributable to these contributions? - Is what the literature reports consistent with what was raised by them?	- What is the effect of private contributions on the academic performance of public schools in Colombia?	- What type of contribution has the greatest effect?
Research Objective	To review the theoretical and empirical literature focusing on private company contributions in education in public schools, identifying the motivations and the effects that are reported.	To validate the consistency of the results presented in the literature *versus* the motivations and effects reported by business leaders in the Colombian case.	To estimate the Private Contribution Effect (PCE) on academic performance of students in public schools in Colombia.	To validate the robustness of the PCE against different types of contributions and its allocative efficiency.
Methodology	- A selective and rigorous review of the literature of (i) public goods, (ii) giving economics and (iii) CSR - An exhaustive Literature Systematic Review on private contributions in public education	A Thematic Analysis of Semi-structured interviews with purposive sampling (qualitative approach)	Efficiency analysis: Integrating non-parametric frontier techniques (order-m) with a meta-frontier framework	Wilcoxon Mann–Whitney rank sum (independent sample, non-parametric edition)
Hypothesis			- Public school students that draw private contributions have a greater academic performance than those that do not.	- Academic initiatives have a greater PCE in capital cities - Access Initiatives have a greater PCE in the subregions (not including Capital cities)
Main Contributions and Results	- A definition of private contribution (as a theoretical construct). - A taxonomy for the structured analysis of this type of contributions. - A state of the art of the motivations and effects of private contributions applied to education.	A concept of 'private contribution' to the theoretical literature validated and enriched with the motivations and the presumption about the effects on the part of the leaders.	- An estimation methodology that aggregates the effect of differentiated contributions, - The estimation of a positive effect (PCE> 1) in 7 of the 16 sub-samples differentiated by subregion and year	- A methodology to make comparable estimations of the effects by type. - On average, with weak evidence, Access initiatives in the subregions and Academic-type initiatives in the capital cities report greater PCE. - The types of initiatives with greater PCE are not those that have greater coverage of beneficiaries.

Source: Research Plan followed by the author

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Acronyms

ANDI	National Business Association of Colombia
CSR	Corporate Social Responsibility
DANE	National Administrative Department of Statistics of Colombia
DEA	Data Envelopment Analysis
DMU	Decision Making Units
ERIC	Education Resources Information Center
EXE	Business for Education Foundation, Colombia
FDH	Free Disposal Hull
ICFES	Colombian Institute for the Evaluation of Education
ISCE	Synthetic Educational Quality Index
MCA	Multiple Correspondence Analysis
MEN	Ministry of National Education of Colombia
MPCR	Marginal Percapita Return
OECD	Organisation for Economic Co-operation and Development
PC	Private Contribution
PCE	Private Contribution Effect
PPM	Provision Point Mechanisms
PPP	Public Private Partnership
SIIPE	Information System of Private Intervention in Education
UNESCO	United Nations Educational, Scientific and Cultural Organization
VCM	Voluntary Contribution Mechanisms
WOS	Web of Science

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Chapter 1

Introduction

1. Introduction

This Thesis addresses the study of private sector contributions to education, specifically emphasizing the contribution of private companies to public schools. The complete document includes: (i) a systematic review of the literature that is validated to the Colombian case, using (ii) a qualitative exercise of consultation with private sector leaders that make contributions to educational institutions, and (iii) an empirical exercise to estimate the effect of such contributions under an efficiency approach. This Chapter motivates, guides and justifies the research and the methodological option to address it.

1.1. General Context and Motivation. Private Contributions in Education

Expenditure on education, due to its positive externalities and social benefits (Hanushek & Wößmann, 2010; McMahon, 2004) remains a priority on the global agenda. *2030 Agenda for Sustainable Development* identifies the education as an objective that contributes to the fight against poverty and the construction of more peaceful societies (Goal number 4: Ensure inclusive and quality education for all and promote lifelong learning).

Although prevailing consensus places the primary responsibility of educational spending on governments (Rahman & Uddin, 2009), private spending is growing, as is the interest in understanding it (Gibson & Davies, 2008). This evidence is much more recurrent in developing countries (Aksoy, 2015; Kondakci, Gokmenoglu, Orhan, & Aschenberger, 2014; Morgan, 2017).

In 2014, governments spend an average 5.5% of GDP on education, while private entities (mainly household spending) devote an additional 2.5% on average (OECD, 2017). When comparing countries, expenditure per student has significant gaps: while Colombia, the country with the lowest expenditure in this 44-country sample, spends US$2,141 per student in primary and US$3,887 in Tertiary, Luxembourg, the country with the largest expenditure, spends US$21,153 and US$46,526 respectively.

Within the countries, differences are also marked. In Colombia, *"from 2005-2011, private spending increased by 31%, equivalent to 35% of total education spending, more than double the OECD average (16%)"*, imposing a special pressure on available income on pre-primary

households (56%) and higher education (46%) compared to 31% and 19%, respectively, of the OECD average (OECD, 2016).

In addition to household spending, the role of the private sector increasingly refers to companies (Kumari, 2016; Valente & Crane, 2010). Several global initiatives are engaging the private sector in a more active role, discovering this as an opportunity for a new education financing source in emerging economies and developing countries (Davies & Hentschke, 2006). *Partnerships for Education Development* of the World Economic Forum (WEF) Global Education Initiative (GEI) in Jordan, Rajasthan (India) and Egypt, starting in 2003, is an example of them.

Diverse sources report on the statistics of the different types of private contributions to social causes, but these mainly present philanthropic motivations. According to Giving USA 2017: The Annual Report on Philanthropy for the Year 2016, donations in the USA originate largely from families (72%) and foundations (15%), while companies contribute 5%. Their behavior is pro-cyclical (Beck, 2012) and they respond less sensibly to tax incentives (Duquette, 2016). Donations for education total US$59.8 billion and represent 16% of total donations in the USA, exceeded only by contributions to religious organizations (32%).

When referring specifically to corporate contributions, Fortune Magazine, with data from The Chronicle of Philanthropy Magazine, estimates the contribution of 'the 20 most generous companies in 2015' in US$3.5 billion, expressed in a variety of initiatives: financial education (Wells Fargo), science education (Exxon Mobil and Chevron), workforce education (Bank of America), online education (AT & T), among others (Preston, 2016).

In addition to spending, the requirement of outcome-oriented performance and impact assessment to public spending on education (Hanushek, 2002) is also being mandated to private contributions (Gibson & Davies, 2008; Morgan, 2017), even when they are volunteer.

Certainly education fulfills, to a large extent, the promises of a positive private return: individuals who reach higher levels of education with higher academic quality have greater opportunities in the labor market (Frankowska, Głowacka-Toba, Rasińska, & Prussak, 2015), are afforded better earnings (Psacharopoulos & Patrinos, 2004) and therefore reach higher living standards and other non-market benefits. For the group of OECD countries, the private returns for a man who attains higher education is equivalent to US$258,176 on average, with values ranging from US$89,300 for Estonia to US$492,700 for Chile (OECD, 2017)

The promise of social return, however, is full of disparities that are expressed in gaps in access and quality. While in Colombia 6.8% of children 5-10 years old are out-of-primary education, that rate is 2.8% for high income countries (UNESCO, 2016). Based on the PISA Math test results, Colombia obtained the lowest score of the sample, 390 points against 490 of the OECD average, where 35.4% of the population is Below Level 1 (below 357.77 score points) against 8.5% of the sample average (OECD, 2015). In relation to the private returns of the previous paragraph, women reach, on average, 66% of the returns of men. That some individuals do well does not mean that society as a whole is doing well (McMahon, 2004).

Private education markets partially solve this problem, but they do so by increasing the quality gaps between public and private education in favor of higher-income people who, in turn, are more willing to pay; have lower opportunity costs of attending school; and reside in family environments susceptible to invest more in education (Durlauf, 1996; Glomm & Ravikumar, 1992). Contrary to what is desired, with unequal access opportunities and quality levels, private investment in education deepens, rather than corrects, inequality gaps.

A better understanding of the motivations and effects of private contributions to public education helps to stimulate greater financing from private companies with better allocation criteria (Kondakci et al., 2014). More and better educational spending is necessary for the social benefits of education to reach more people and to effectively reduce the gaps of social inequality.

1.2. Literature Gap: Integrating the Different Theoretical Approaches

The study of private contributions to education, in terms of definition, motivations and effects, is addressed in the academic literature from different approaches. This section anticipates how these different approaches are integrated and reinforced around a theoretical construct proposal that this study calls *'Private Contribution'* (Chapter 2).

Regarding this research problem, this Thesis has consulted the fields of knowledge in economics, business, management and education around the following concepts: Corporate Social Responsibility (CSR), Private Provision of Public Goods, and Prosocial Behavior. Although not part of the consultation criteria, the nature of the concepts contains elements of other fields of study such as Psychology, Political Sciences, Applied Ethics and Public Management, among others.

In the latter, private contributions take multiple implementation forms: Corporate Social Responsibility (Carroll & Shabana, 2010; Garriga & Mele, 2004; Matten & Moon, 2008), Corporate Philanthropy (Gao, Hafsi, & He, 2017; Ricks & Williams, 2005; Valente & Crane, 2010), Voluntary Contribution (Dodgson & Staggs, 2012; Nelson & Gazley, 2014; Reckhow & Snyder, 2014), Private-Public Partnerships or PPPs (Carpintero & Siemiatycki, 2015; Crawfurd, 2017; Davies & Hentschke, 2006; A Verger, Bonal, & Zancajo, 2016; Zakharova, Mokrushin, Pshizova, Khatukay, & Chinazirova, 2015) or Charitable Giving (Bettigole, 1989; Ricks & Williams, 2005), among others.

In turn, these contributions are made by firms or by individuals (Ardichvili, 2013; Chakraborty et al., 2004; Kondakci et al., 2014; Manner, 2010), that place a high value on gender (Williams, 2003), age (Tilson & Vance, 1985) and the levels of institutional framework and involvement in boards of directors (Gao et al., 2017).

Likewise, private contributions are motivated, on the one hand, by deliberate reasons such as corporate strategy (Chakraborty et al., 2004; Porter & Kramer, 2006) or the personal will of their business leaders (K. S. Groves & LaRocca, 2011; Jia, Song, Li, Cui, & Chen, 2007) or, on the other, fortuitously or conditioned, as is the case of humanitarian motivations such as catastrophes (Dunfee, 2006) or due to regulations (Gao et al., 2017) or pressure from interest groups (Mahenthiran, Terpstra-Tong, Terpstra, & Rachagan, 2015; Ramachandra & Mansor, 2014).

Although there are types of interventions associated with strategic or probusiness criteria, in most cases they involve prosocial and unselfish behavior that engages others and that contributes directly and indirectly to social welfare (Olson, 1965). In a few cases, in practice, the ideal notion of *'shared value'* is attained, where value is created both for society and for the company (Porter & Kramer, 2006, 2011).

Beyond corporate decisions, the literature recognizes the altruistic motivations of people who make the contribution decisions (Andreoni, 2006; Hossain & Lamb, 2015) with their own resources or of third parties (Friedman, 1970). It acknowledges, in them, the limitations of the rational choice theory to model these behaviors. According to Olson (1965, p. 60), *"Economic incentives are not, to be sure, the only incentives; people are sometimes also motivated by a desire to win prestige, respect, friendship, and other social and psychological objectives."*

Altruism can be pure–guided by intrinsic motivations–, or impure–stimulated by extrinsic motivations–(Andreoni, 1990; Ryan & Deci, 2000). Experiments are able to show the

asymmetry between the positive feeling of giving (warm-glow), and the negative feeling of not giving (cold-prickle) (Andreoni, 1995).

Because they take the form of a private provision of the public good, short-term stability solutions do not necessarily remain constant in the long term (Bergstrom, Blume, & Varian, 1986; Besley & Ghatak, 2007b; Slavov, 2014). Evidence suggests that voluntary contributions fall over time (Fischbacher, Gächter, & Fehr, 2001).

The motivation-effect relation is obvious. Literature on public goods recognizes Marginal Per Capita Return (MPCR) as a determinant of voluntary contributions (Fischbacher, Schudy, & Teyssier, 2014; Fisher, Isaac, Schatzberg, & Walker, 1995). Also expected is a direct relation between the type of motivations and the type of effects. That is, if the motivations are strategic or probusiness, private contributions in education are expected to have direct private effects that are mainly associated with labor productivity (Kondakci et al., 2014), reputation (Mahenthiran et al., 2015; Mersham & Skinner, 2016) and corporate sustainability (Diaz, Ospina, & Montoya, 2015). If the motivations are prosocial, public effects are expected on social welfare (Aguirre, 2002) and on the competitiveness of the territory (Valente & Crane, 2010). In both cases, directly or indirectly, there is also a cross-cutting relationship that succeeds in privately-motivated contributions having external effects on society (Ricks & Williams, 2005) and prosocial-motivated contributions having indirect effects on the company (Kondakci et al., 2014; Lipman, 2014).

For the most part, the literature reports on the positive effects of private contributions. However, it is possible that this type of contributions also has undesired effects: the most reported is the *crowding-out* effect of public spending on education, when the purpose of private contributions in education consists in complementing–not substituting–public spending (Besley & Ghatak, 2001; S Bowles & Polanía-Reyes, 2012).

Although sharing many common traits with other types of merit goods that also have positive external effects (e.g., healthcare) and, as such, it is possible that many lessons from the literature apply to them, this Thesis does not account for that and it will only refer to education.

The main contribution of this Thesis is a theoretical construct proposal that includes a wealth of conceptual approaches from different fields of study and a diversity of definitions, motivations and effects reported in the literature. This theoretical construct facilitates a better understanding of the private contributions and the taxonomy of motivations and effects

simplifies the systematization of their learnings. Later, the practical application of the concept will be placed before some business leaders who make contributions in education (Chapter 3) to estimate the magnitude of its effect (Chapter 4) and its robustness (Chapter 5) contributing to that conceptual proposal being relevant, measurable and verifiable, in an applied way.

1.3. Problem Statement: Private Contributions and Education in Colombia

Education in Colombia is a national priority. It has been declared a universal right and is mandatory for anyone 5-15 years old, from primary education to lower secondary education, which is equivalent to the OECD average. Because it is a public service with a social function, the National State is compelled to regulate it and ensure quality and compliance. The priorities of the educational policy are based on the closing of gaps in access and quality (among individuals, population groups and regions) raising the country to high international standards (Ministerio de Educación Nacional, 2015a).

Some differences between Colombia and international benchmarks have been illustrated in section 1.1. When comparing Colombia–which has been in OECD Accession discussions since 2013–with the selected group of countries, the country falls significantly behind. This section presents the state of education within the country, emphasizing the gaps among regions and public and private offerings, as well as a first appraisal of company contributions to education, justifying the selection of the case study and defining the problem.

In Colombia, the educational system is structured as follows: Early Childhood education, from 0 to 5 years, including three preschool years; Basic education, divided into 5 years of primary education for children 6-10 years old, and 4 years of Lower Secondary education for children 11-14 years old; and Upper Secondary education (or High School) consisting of 2 years for youth 15-16 years old, which could optionally emphasize academic or technical knowledge. Higher education can be technical (2 years), technological (3 years) or professional (4-6 years depending on the profession) and the graduate level has specializations, masters and doctorates.

In 2016, the total number of students enrolled in preschool, primary, lower secondary and upper secondary was 8,614,984 students. 79% of them attended 46,614 schools in 9,917 public schools, representing 80% of the total. The highest private offer was for the early childhood education level (Table 1.1). In rural areas, representing 24% of all children and youth that

attend school, 96% did so in a public school (Ministerio de Educación Nacional, 2015b). This number signifies a gross-enrollment ratio of 84.5% in a country where 269,465 children and youth aged 5-15 years were out-of-school (UNESCO, 2016).

Table 1.1. Enrolment by Level of Education. Colombia, 2016

	Official		Private		Total
	Enrolled	%	Enrolled	%	Enrolled
Early Childhood education *(0-5 years old: pre-school, kinder garden, transition)*	602,879	61%	385,390	39%	988,269
Primary education *(6-10 years: first to fifth grade)*	2,936,237	80%	745,125	20%	3,681,362
Lower secondary education *(11-14 years old: sixth to ninth grade)*	2,442,101	85%	460,214	15%	2,902,315
Upper secondary education *(15-16 years old: tenth and eleventh grade)*	850,932	82%	192,106	18%	1,043,038
Other	1,254,838	87%	177,796	13%	1,432,634
Total Enrolled	8,086,987	80%	1,960,631	20%	10,047,618

Note; Other includes: Acceleration of learning; Special Integrated Academic Year (CLEI); Other educational models.
Source: DANE (2016b).

An assessment of the 32 states and the Capital District in which Colombia is divided, politically and administratively, shows gaps within the country. Table 1.2 presents some significant differences in coverage and quality, including variances in the population served (Guainía serves 11,913 students compared to Bogotá that serves 1,455,309), repetition (0.3% in Chocó compared to 9.9% in Bogotá), access to Internet (14.8% in Caquetá *versus* 98.9% in Bogotá) or the percentage of public schools in advanced level according to the Synthetic Quality of Education Index (ISCE) of the Ministry of Education, referring to the ninth grade (ICFES, 2016b). Locations further away from the greater urban economic activity centers present larger lags.

Table 1.2. Coverage and Educational Quality by States. Colombia, 2015

Indicator	Min	Mean	Max	Standard Deviation
Population 5-16 Years Old (Students)	11,913	311,360	1,455,309	332,280
Net Enrolment Ratio	54.90%	82.70%	102.40%	10.00%
Gross Enrolment Ratio	65.90%	95.10%	115.10%	11.00%
Schools with Internet Access	14.80%	38.10%	98.90%	20.70%
Dropout Average	0.60%	3.90%	9.20%	1.90%
Approval Average	75.40%	90.30%	96.40%	5.20%
Fail Average	0.10%	5.80%	17.00%	3.70%
Percentage of Repeaters	0.30%	1.80%	9.90%	1.60%
Advanced Schools According ISCE 3-5	0.00%	6.30%	31.90%	5.70%
Advanced Schools According ISCE 9	1.40%	14.30%	49.30%	11.10%
Advanced Schools According ISCE 11	2.00%	22.80%	53.80%	15.50%

Source: Ministerio de Educación Nacional (2015b).

Table 1.3 presents the main descriptions by state, highlighting Cundinamarca (including Bogotá, the Capital District), Antioquia, Valle and Atlántico where this Thesis implements its empirical applications (Chapters 3 to 5). These states represent 59.1% of GDP (current prices) with 4,116,879 students, which are 47% of the early childhood, primary, lower secondary and upper secondary enrollment (DANE, 2016a; Ministerio de Educación Nacional, 2015b). Of these, 82% reside in urban centers and 75% attend public schools. Likewise, these 4 states concentrate 31% of the schools and, out of the table, 11,637 of the 46,614 public schools, 44% of the professors and academic directors of the public sector. The private offer is greater in the larger population centers.

Table 1.3. Students, Schools and Academic Staff by State. Colombia, 2016

	Enrollment Students			
	Population		Urban Percentage	Public Percentage
State	Students	% of Total	% of State	% of State
Cundinamarca	1,957,264	19.5%	90.6%	63.3%
Antioquia	1,280,454	12.7%	76.0%	86.2%
Valle del Cauca	849,363	8.5%	85.5%	72.9%
Atlántico	521,723	5.2%	94.8%	76.6%
Resto de Colombia	5,438,814	54.1%	68.0%	86.2%
Total	10,047,618		76.3%	80.4%

	Schools			
	Schools		Urban Percentage	Public Percentage
State	Number	% of Total	% of State	% of State
Cundinamarca	6,651	11.3%	60.4%	55.5%
Antioquia	6,172	10.5%	30.3%	82.7%
Valle del Cauca	4,332	7.4%	63.3%	84.0%
Atlántico	1,404	2.4%	93.0%	36.0%
Resto de Colombia	40,124	68.4%	25.4%	87.1%
Total	58,683		34.3%	79.4%

	Academic Schools Personal			
State	Teachers	% of Total	Administrators	% of Total
Cundinamarca	92,731	20.9%	2,884	14.8%
Antioquia	48,541	10.9%	2,251	11.5%
Valle del Cauca	36,319	8.2%	1,473	7.5%
Atlántico	21,824	4.9%	825	4.2%
Resto de Colombia	244,670	55.1%	12,116	62.0%
Total	444,085		19,549	

Source: DANE (2016b).

Academic quality, like coverage, presents gaps favoring urban centers and with greater economic activity. Table 1.4 presents the classification of schools prepared by the public institution in charge of educational assessment in Colombia, based on the results of the standardized tests for the eleventh grade (Saber 11). It shows that the reference states have a

higher percentage of schools in the highest performing categories. It also shows that Bogotá and Cundinamarca have an even greater concentration than Antioquia, Valle and Atlántico.

Table 1.4. Standardized Test School Classification by States. Colombia, 2016

	School Classification				
State	A+	A	B	C	D
Cundinamarca	23%	26%	34%	14%	2%
Antioquia	9%	13%	29%	29%	19%
Valle	10%	14%	30%	31%	15%
Atlántico	10%	11%	22%	29%	27%
Rest of Colombia	8%	10%	26%	30%	26%

Source*: ICFES* (2016a).

Using the Synthetic Index of Educational Quality (ISCE), a tool for school progress used by the Ministry of Education (Table 1.5), interregional disparities are also shown when differentiating the capitals from the rest of the municipalities for each of the 4 reference states. In all cases, for all levels, the average performance of schools is higher in capital cities.

Table 1.5. ISCE Average Performance by States and Capitals. Colombia, 2016-2017

State		ISCE 2016			ISCE 2017		
		Primary	Lower Secondary	Upper Secondary	Primary	Lower secondary	Upper Secondary
Bogotá y Cundinamarca	Capital	6.32	6.04	6.89	6.22	6.46	7.04
	Rest	5.71	5.65	6.31	5.95	6.06	6.45
Antioquia	Capital	5.29	5.43	6.03	5.45	5.60	6.20
	Rest	4.96	4.83	5.33	5.14	5.14	5.48
Valle del Cauca	Capital	5.67	5.46	5.95	6.05	5.89	5.97
	Rest	4.99	4.62	5.28	5.43	5.04	5.13
Atlántico	Capital	5.72	5.58	6.00	6.20	6.23	6.14
	Rest	4.62	4.46	4.70	4.99	4.55	5.01

Source: Ministerio de Educación Nacional (2017).

Based on PISA data in 2012 and an efficiency approach, these are the differences reported in Colombia between public and private schools (de Jorge-Moreno, Díaz, Rodríguez, & Segura, 2018): inefficiency coefficients of 17.36% in public schools and 12.50% in private schools. This model uses performance in Mathematics, Reading and Science as outputs; and as inputs,

the student's PISA index of economic and social status*, peer effect* and school infrastructure and educational resources.

Although public spending on education as a percentage of GDP has been growing (from 4.06% in 2007 to 4.49% in 2015) and spending per student has varied from US$1,210 in 2007 to US$2,456 in 2015 in primary, and US$969 to US$2,212 in lower secondary education, that spending is still very low compared to international standards of high educational performance (UNESCO, 2016).

This does not include the additional budgetary effort to meet the commitments of the peace agreements with the population victim of forced displacement, of which 15.8% is for education (Presidencia República de Colombia, 2017).

The above is heightened in local resource allocation: "*Stronger local leadership in education financing is essential if Colombia is to improve education access, equity and quality. The current financing system remains heavily centralized, with many local governments lacking the commitment, capacity and incentives to fund education improvements. […] There is a clear need, and also an opportunity, to mobilize greater local resources for education in Colombia"* (OECD, 2016, p. 50) and with the empirical evidence that, in Colombia, decentralization improved enrollment rates in public schools (Faguet & Sánchez, 2014) and public spending per student is positively related to better learning outcomes (Heras & Olaberría, 2018).

For developing countries there is evidence of improvement margins of 22% in enrollment rates and 21% in PISA scores, comparing teacher-student relations and levels of public and private spending in lower secondary education for 37 OECD countries (Arias & Torres, 2018).

Colombia has experimented with different strategies to involve private resources and agents such as PPPs or vouchers (Harry Anhtony Patrinos, Barrera-Osorio, & Guaqueta, 2009), while private companies voluntarily make contributions to education. Data from the Second Strategic Social Architecture Survey conducted by the National Business Association of Colombia (ANDI) applied to a sample of 500 large and medium-sized companies during 2017 illustrates that 10% of companies that report expenses in social projects spend at least US$1 million and 46% of them do so in education (only exceeded by the 64% that declares environmental investments) (ANDI, 2017).

A group of Colombian businessman founded *Empresarios por la Educación* (Business for Education, EXE) in 2001, a business alliance that brings together 96 members and contributors

with the purpose of coordinating public and private efforts aimed at improving educational quality. Since 2014, this organization systematically has been collecting information on private company contributions in education in a platform called SIIPE, a robust, unique database which was made fully available for this Thesis, in exchange for sharing the results of this study (Fundación Empresarios por la Educación EXE, 2016). A first version of the results of Chapter 4 was presented in the Workshop *"Convergencias educativas-Aprendizajes sobre la inversión social en educación"* (Educational Convergence-Learning about social investment in education) in Bogotá.[1]

This database, with records up to 2015, identifies 472 initiatives of 164 registered private organizations, located in 48% of the municipalities of 29 of the 32 Colombian states, with emphasis on the municipalities with the highest population density (Fundación Empresarios por la Educación EXE, 2016, p. 7). During the 2010-2015 period, these initiatives impacted 3,825 schools.

1.4. Objectives and Research Approach

Based on the above, together with the theoretical and empirical relevance of the subject and the availability of the database, this Thesis focuses on understanding the motivations and effects of the contributions of private companies to public schools using the Colombian case as comparison mechanism of the literature and as a scenario to estimate its effects on academic performance. A better performance of public schools, in this perspective, will contribute to reducing the gaps between public and private education.

The lessons of the Colombian case are replicable to other emerging economies with educational coverage and quality deficits, and high social inequality contexts where greater and better allocation of the resources of companies–that contribute private resources to education– can raise educational return and relieve the pressure on private household spending.

The main purpose of this Thesis is twofold. On the one hand, the aim is to understand the motivations of private companies to make voluntary contributions to education and, on the other, estimating the effects of such contributions on public schools performance.

[1] Event held on June 7, 2017 in Bogotá. Online access to proceedings in http://www.siipe.co/convergencias-educativas/#1497451994407-bd7d584f-04ef

Given the double nature of this purpose, using a logical-deductive approach, this research integrates a set of different techniques (qualitative and quantitative) that recognize the complementarity of the scope of each of the chapters. Below are each of the four specific objectives and how to approach them.

First specific objective: To review the theoretical and empirical literature focusing on private company contributions in education in public schools, identifying the motivations and the effects that are reported (Chapter 2).

This objective responds to the set of research questions: How to define private contributions based on the literature? Why do private companies make contributions in social goods, with characteristics of a public and merit good, as education? What are the effects of those contributions? A selective and rigorous review of the literature of (i) public goods, (ii) giving economics and (iii) CSR; and an exhaustive Literature Systematic Review on private contributions in public education is the basis for this Chapter to provide: (i) a definition of private contribution (as a theoretical construct), (ii) a taxonomy for the structured analysis of this type of contributions, (iii) a state of the art of the motivations and effects of private contributions applied to education and (iv) a set of derived propositions for research and practice.

Second specific objective: To validate the consistency of the results presented in the literature versus the motivations and effects reported by business leaders in the Colombian case (Chapter 3).

This objective responds to the set of research questions: What motivates business leaders to make contributions in public schools? What effects do they perceive as attributable to these contributions? Is what the literature reports consistent with what was raised by them? A Thematic Analysis of Semi-structured interviews with purposive sampling (qualitative approach) will contribute a concept of 'private contribution' to the theoretical literature, validated and enriched with the motivations and the presumption about the effects on the part of the leaders.

Third specific objective: To estimate the Private Contribution Effect (PCE) on academic performance of students in public schools in Colombia (Chapter 4).

This objective responds to the research question: What is the effect of private contributions on the academic performance of public schools in Colombia? Using an Efficiency analysis that integrates non-parametric frontier techniques (order-m) with a meta-frontier framework and a

robust database, it contributes, for the first time, an estimate of this type of effect to empirical literature. This estimation serves as the basis to test the hypotheses that assume that: Public schools students that draw private contributions have a greater academic performance than those that do not.

Fourth specific objective: To validate the robustness of the PCE against different types of contributions and its allocative efficiency (Chapter 5).

This objective responds to the research question: What type of contribution has the greatest effect? Through nonparametric comparisons of independent samples (Wilcoxon Mann-Whitney ranksum), it contributes a common methodology to make the estimates of effects by type comparable at the empirical literature. This Chapter tests the following hypotheses: (i) Academic initiatives have a greater PCE in capital cities and (ii) Access Initiatives have a greater PCE in the subregions (not including Capital cities). The following results are highlighted: the greatest PCE are associated with Access initiatives in the subregions (without capital cities), and Academic type in the capital cities with weak evidence. Contrary to expectations, the types of initiatives with the greatest PCE are those with the lowest beneficiary coverage. The allocative efficiency and the effects of private contributions-that business leaders presume positive- have a potential for improvement.

Chapter 2

Private Contributions and Motivations and Effects. Systematic Literature Review

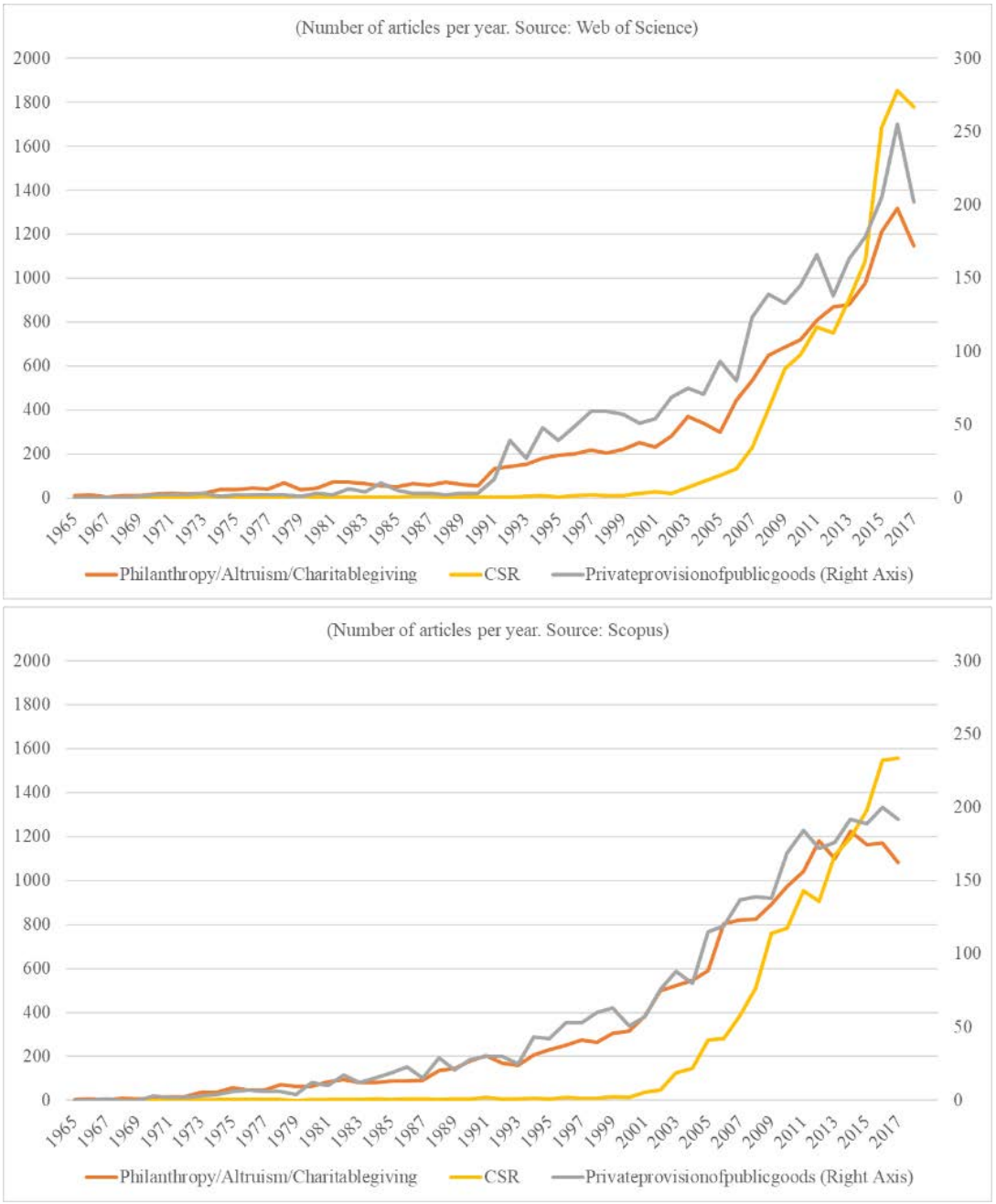
2. Private Contributions and Motivations and Effects. Systematic Literature Review

The specific objective of this chapter, as mentioned in Section 1.4., is to review the theoretical and empirical literature focusing on private company contributions in education in public schools, identifying the motivations and the effects that are reported. A better understanding of this issue provides the literature with a frame of reference to understand (i) How to define private contributions based on the literature? (ii) Why do private companies make contributions in social goods as education? And (iii) What are the effects of those contributions? This better understanding provides elements to improve the allocating criteria for these contributions and, therefore, raise the positive impacts of private companies on society.

This Chapter presents a definition of *'private contribution'* as a theoretical construct and a taxonomy for the structured analysis of this type of contributions (Section 2.1.); a state of the art of the motivations and the effects of private contributions applied to education (Section 2.2.); and implications for research and practice (Section 2.3.).

The relevance of this subject in the literature is remarkable. Figure 2.1 presents the number of publications in each of the fields of knowledge since 1965, taking the article by Olson (1965) as reference, which is cited by publications of the three search sets made: CSR and Philanthropy, Altruism and Charitable Giving, with comparable scales, are plotted on the left axis and Private Provision of Public Goods on the right axis. All three sets present the same growing trend, with a similar behavior for Philanthropy and Private Provision, which has accelerated since the mid-1980s. CSR is a newer, more dynamic category that has had a higher growth rate since the beginning of this century.

Figure 2.1. References on the Object of Study by Approach of Literature



Note: Access made through Servei de Virtual Private Xarxa of the UAB available at https://xpv.uab.cat/dana-na/auth/url_default/welcome.cgi Search updated to January 21, 2018.

The characteristics of each of these literature sets (hereinafter, approaches) are identified using a selective and rigorous review of the literature on (i) Public Goods, (ii) Giving Economics (from the perspective of the individual) and (iii) CSR (from the perspective of the firm). All of these cases draw relationships with other fields of knowledge such as Psychology or Political Science, but this review targets Economic and Management Literature, emphasizing applications in Education. . Subsections 2.1.1 and 2.1.2 recognize the principle of

collective action and the private provision of public goods. Subsections 2.1.3 to 2.1.5 describe the economic and non-economic incentives and the rational and prosocial behaviors of individuals. Finally, subsection 2.1.6 shows the firm's strategic perspective.

These subsections are brought together in a theoretical construct and a taxonomy (subsection 2.1.7), to serve as an analysis and interpretation route for the Systematic Literature Review. Reporting of the review discussion and analysis is organized detailing: forms of private contributions, level and influence on the decision to privately contribute, Probusiness and Prosocial Motivations, and Private and Public Effects.

The results of this Chapter are used, in the first place, to weigh the concept in practice and– through interviews with leaders of private sector organizations contributing to public schools– discover whether their motivations and their perceived or estimated effects are consistent with those in the literature (Chapter 3); and, secondly, to justify empirical implementation in order to estimate, for the first time, a *Private Contribution Effect, PCE* (Chapter 4), testing its robustness by contribution type (Chapter 5).

2.1. Private Contribution as a Theoretical Construct

2.1.1. Starting Point: Collective Action

Private contributions in the literature have been referenced diversely, in the way private companies relate to social causes, whether individually or collectively. The first reference to the rational choice approach in this review is Olson (1965). Although hardly alluding to the 'corporation', this study provides the first formal framework for collective action, revealing the inconsistencies between individual and collective behavior, even when the individuals in a group have a common interest. This research is relevant both in the public goods literature (when referring to private provision), and in the behavioral literature (formalizing notions of cooperation and coordination *versus* other motivations).

2.1.2. Private Provision of Public Goods

The literature on the private provision of public goods identifies, as a starting point, the controversy between Demsetz (1970, 1973) and Thompson (1973) about the optimality conditions of a competitive provision of public goods. Going beyond the idea that any private provision undersupplies pure public goods, and accepting that under certain circumstances a short-term balance of this private provision–vis-à-vis Pareto–may be feasible (Besley & Ghatak, 2007a; T. Groves & Ledyard, 1977; Slavov, 2014), Bergstrom, Blume, & Varian (1986) made the relationship between private provisions and public provisions explicit. As an example, private contributions tend to be greater in contexts with a greater income concentration (Bergstrom et al., 1986) or when facing under-provision in a public good (Benabou & Tirole, 2010). The notion of crowding-out is observed between both types of provision (Besley & Ghatak, 2001; S Bowles & Polanía-Reyes, 2012), identifying the implications of tax measures on the private donors's incentives to contribute, controlling free-rider behaviors (Warr, 1982).

Another mechanism that also responds to market incentives is the Private Public Partnership (PPP). Regarded in the Public Management literature (Flinders, 2005; Klijn & Koppenjan, 2000) and defined as a 'cooperative institutional arrangement that requires the participation of both the public and private sectors' (Greve & Hodge, 2007), it is loaded with multiple meanings that associate it, among others, with public sector restructuring made to deliver public services that reform public management and separate it from the ideological discussion of privatization (Linder, 1999). Supported by formal contracts, private companies are able to use these institutional arrangements for sharing and, to a certain extent, transferring the associated risks of participation in relation to minimum expected return conditions, as in any private activity (Van Ham & Koppenjan, 2001). This has been shown by its main application in infrastructure (Carpintero & Siemiatycki, 2015; Crump & Slee, 2005).

2.1.3. Beyond the Homus Economicus: Behavior and Rewards

The different mechanisms of private provision of public goods do not respond exclusively to market incentives such as taxes or contracts. Many also respond to motivations where the common good prevails but, because individual preferences are not observable, the returns of this type of investment are difficult to estimate. These returns, called Marginal Percapita Return

(MPCR), are the main determinants of the probability of the occurrence of free-rider behaviors (Isaac, Thomas, & Walker, 1984).

In addition to the MPCR, using not only experimental methods, but also a strategic approach, as well as different mechanisms for the private provision of public goods, behavioral economics recognizes other determinants of private decision-making to contribute. Cooperation among private companies is also evaluated against: (i) the size of the groups: while the majority admits greater coordination efforts that affect the provision (Isaac & Walker, 1998; Isaac, Walker, & Williams, 1994), others consider it invariant (Diederich, Goeschl, & Waichman, 2016); (ii) the symmetry and quality of information available (Shang & Croson, 2009), especially when referring to returns (Jackson, 2016; Vollan, Henning, & Staewa, 2017); (iii) the levels of uncertainty (Gangadharan & Nemes, 2009; Levati, Morone, & Fiore, 2009); (iv) the influence on the behavior of others (Bracha & Vesterlund, 2017; Shang & Croson, 2009); (v) the sense of identity (Akerlof & Kranton, 2000); or (vi) anonymity (Soetevent, 2005), among other determinants. Specifically in education, there is also evidence of lower contributions per-pupil with higher student enrollment (Nelson & Gazley, 2014).

2.1.4. Mechanisms and Evidences of Individuals

When comparing mechanisms, the Voluntary Contribution Mechanisms (VCM) possess a single Nash equilibrium (Isaac et al., 1984; Messer, Zarghamee, Kaiser, & Schulze, 2007), while Provision Point Mechanisms (PPM) offer multiple equilibrium solutions (Rondeau, Schulze, & Poe, 1999; Rose, Clark, Poe, Rondeau, & Schulze, 2002). The latter is more familiar in the commons or communal goods literature (Kubo, Kuriyama, & Mitani, 2015). Although the MPCR in both cases, for each individual, is conditional on the decisions of the others, in the PPMs the contribution becomes effective only if a minimum point of total contributions is reached. Therefore, in PPMs the effect of uncertainty or the risk of free-rider behaviors is minimized but in the VCMs the coordination efforts are lower, reporting evidence of greater private contributions using PPM (Rondeau, Schulze, & Poe, 2005).

Two confirmations of the experiments stand out for their relevance to the general objective of this Thesis. In the first place, the one reporting decreases in time of private contributions due, among other factors, to repetition and experience (Palfrey & Rosenthal, 1988), and to conditional cooperation, the peer effect or the decrease in the contributions of others

(Fischbacher et al., 2001; Gächter, 2007). Secondly, the behavior of the conditional cooperators or conditional contributors does not represent the totality of private contributors (Fehr & Gächter, 2000; Fischbacher et al., 2014). Gächter (2007) proposes three types of reasons why people contribute: *"People certainly also contribute for signaling reasons (Glazer & Konrad, 1996), social approval (e.g., Andreoni & Petrie, 2004; Soetevent, 2005), or because observing others has informational value about the charity (Romano & Yildirim, 2001; Vesterlund, 2003)"*(p. 38). This conditional cooperation and its spreads through the network (decay) and the time can be affected by the network architecture and how connected the individuals are (Fatas, Meléndez-Jiménez, Morales, & Solaz, 2015; Fatas, Meléndez-Jiménez, & Solaz, 2010).

2.1.5. Giving Economics: Charity and Altruism

Charitable donations also constitute a mechanism for the provision and financing of public goods (Andreoni, 1988; Hochman & Rodgers, 1969). References of Philanthropy and Charitable Giving in this field of study help to have an in-depth understanding of altruistic motivations and make relevant the feelings of the people making the decisions. The distinction suggested in the previous paragraph on the conditionality of contributors is reflected under the notion of pure or impure altruism (Andreoni, 2006), associated with the intrinsic or extrinsic condition of their motivations (Andreoni, 1990). A taxonomy of human motivation and a deepening of this notion from the field of psychology is presented by Ryan and Deci (2000, p. 61).

These classifications of altruism leave less space–both in the theoretical literature and in the empirical literature–for pure altruism, which, via preferences (Kolm, 2006), implies a willingness to sacrifice one's own resources that one may improve the welfare of others (Fehr & Schmidt, 2006). An assumption of rational behavior by individuals, mostly conditional (50% in a one-shot public goods game by using a variant of the strategy-method) and to a lesser extent free-rider or completely selfish (30%), is supported by evidence (Fischbacher et al., 2001).

The feeling of giving affords a personal satisfaction in the donor, known as warm-glow, which in turn conditions the decision to donate or contribute (Andreoni, 1990). In opposition to the above, but asymmetrically, the negative feeling of not giving, known as cold-prickle, is also reported (Andreoni, 1995). In both cases, the economy adopts that feeling as a private

good that surrounds the provision of the public good, and which affects the pay-off matrix of individuals. . Social preferences also show *competitive preference* features (Charness & Rabin, 2002), where *"people like their payoffs to be high relative to others' payoffs"* (2002, p. 823). This relative perspective, vis-á-vis other individuals, also recognizes that, in addition to social purposes, some individuals display *status-seeking behaviors* (Bolton & Axel, 2000).

Additionally, in the corporate world, very early on, Friedman (1970) had recognized the agency dilemma that this implies for a company executive who allocates shareholders' resources, triggered by his own emotions. Friedman criticized these 'social responsibilities'.

2.1.6. Firm Perspective: From Corporate Philanthropy to CSR and Sustainability

From a purely firm perspective, and consistent with the giving economy concept, the CSR approach has had a similar dynamic, migrating from a Corporate Philanthropy notion (Daly, 2011; Gao et al., 2017) to a more strategic one. Lee (2008), a relevant Review on the subject, refers to this as a progressive rationalization of the concept where, given the level of analysis and the theoretical orientation, there is a move from ethics-oriented arguments to performance-oriented managerial that monitors firm performance. Garriga & Mele (2004), another important Review, suggests the need to develop a new theory on the business-society relationship, which incorporates four dimensions (profits, political performance, social demands and ethical values).

In addition to the rationalization of the concept and its multidimensional nature, the third trend in this literature set is the aspiration of shared value in the spirit of Porter and Kramer (2011) where, in a complementary and non-substitutive manner, value is created both for society and for the company.

In all these cases, the originating premise is that it is the company that promotes the CSR on its own initiative, under the assumption that it is good for business (Carroll & Shabana, 2010). However, factors related to the environment where the company operates (social, ecological, economic or regulatory environment) are also triggers of CSR initiatives, which in this case may be different in each environment (Matten & Moon, 2008).

In addition to the difference between implicit and explicit CSR, instrumentally, the CSR assumes a broad set of implementation forms. In most cases, these actions are aligned with the company's general strategy and its strategy of relationship with stakeholders (Laplume,

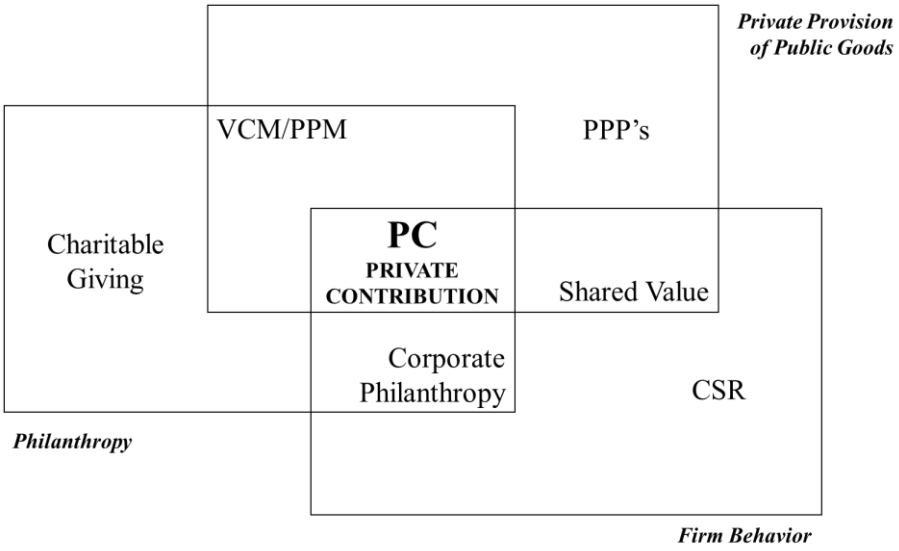
Sonpar, & Litz, 2008; Peloza & Shang, 2011). Consequently, corporate reputation is one of the main effects of a strategic CSR. In addition, by virtue of the indirect effects, engaging with interest groups that are not necessarily related to the core business is justified, given the ability to influence the environment where the company operates (Scherer & Palazzo, 2011; Scherer, Palazzo, & Matten, 2014), and pursuing its own sustainability strategy (Montiel, 2008) and the planet's (Ans Kolk & van Tulder, 2010).

2.1.7. Private Contributions: Developing a Concept and an Analysis Route

Figure 2.2 incorporates the diversity of approaches and mechanisms under which the private sector contributes to public interest social objectives. It reflects the overlaps between the three conceptual approaches of the review, while illustrating the different private contribution mechanisms in each of the approaches. As can be observed, mechanisms such as PPPs, Chartible Giving or CSR have a direct relationship with their respective approaches to Public Goods, Philanthropy and Firm Theory, respectively. In others, common characteristics are shared among approaches. An example is that Corporate Philanthropy shares altruistic and strategic features. To blend this complexity and diversity of features into a common concept is one of the contributions of this study.

Henceforth, this Thesis will define private contribution (PC) as a *contribution (financial or non-financial), that companies or individuals from the private sector voluntarily make, acting individually or collectively, seeking, mainly but not exclusively, a social purpose of public interest.* This definition excludes private spending by households that consume public goods in private or mixed markets, and which is therefore more subject to market incentives and restricted by the willingness to pay.

Figure 2.2. Private Contribution as an Integrative Approach of the Literature



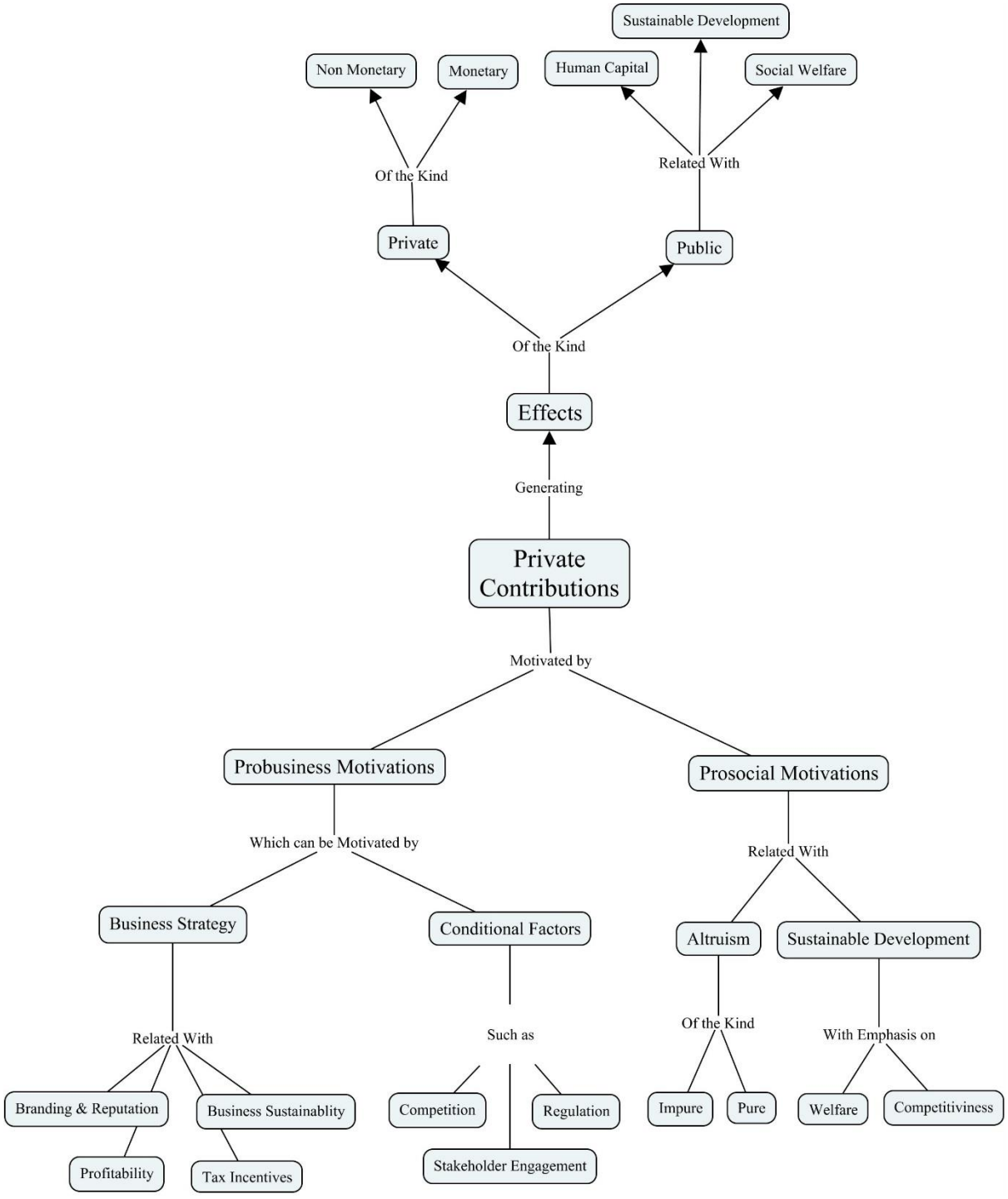
Source: Proposed by the author

PCs involve (i) the genuine interest for the welfare of society that is expected from the provision of public goods, (ii) with altruistic motivations where individuals or firms are willing to yield part of their short-term profits or profitability, (iii) without having to lose sight of the strategic and long-term perspective on their own returns. Additionally, the integration of these three features underscores the implications for cooperation, and the coordination of their efforts with other agents of society that share the same interest for the welfare of society.

Assimilating this diversity of ways to contribute privately also implies combining the way the different motivations and their effects are analyzed. Figure 2.3 provides a taxonomy of motivations and effects to contribute privately.

The PC types are grouped under these categories: CSR, Corporate Philanthropy, PPPs, VCM and Charitable Giving. Likewise, the taxonomy recognizes that decisions are made by individuals who can represent their own interests (shareholders) or of third parties (executives). There is a distinction between probusiness and prosocial motivations, distinguishing at an additional level if the probusinesses are motivated by their strategy (intrinsic) or by conditional factor (extrinsic). The prosocials are related to altruistic motivations or ones that stimulate a sustainable development to favor the environment where the company operates. The effects, analogously, are classified as private or public, distinguishing between market and non-market effects.

Figure 2.3. Taxonomy for the Review of the Motivations and Effects of PCs



Source: Proposed by the author.

This classification suggests a direct relationship between types of motivations and types of effects. It is expected that a PC with pro-business motivations will pursue private effects and that one with social motivations will pursue public effects. It does not exclude, however, cross-cutting or indirect effects since there are external effects, in either case, that affect the other

type of effects. That is, a PC with probusiness motivation that pursues private effects, in accordance with the definition of this study, will also achieve public effects. Likewise, a prosocial motivation that pursues public effects will create impacts in the environment where the company operates, with implications on the private effects of it.

Both the elements of the PC concept, and the taxonomy of types of contribution, motivations and effects constitute the route that leads to the next systematic literature review.

2.2. Private Contributions in Education: a Systematic Review of the Literature

After conducting a rigorous, exhaustive review of literature to single out the main features of the concepts associated with the PCs, this section will now delve into the works referring to PC that specifically target education. The aim is to establish the state of the discussion about their motivations and effects, when private companies contribute to institutions or educational projects. The results will be reported organized in the same route that the taxonomy of the narrative review suggests.

2.2.1. Scope of Review

This review was conducted using two of the main bibliographic databases of peer-reviewed academic literature: Web of Science (WOS), provided by Thomson Reuters, and SCOPUS, provided by ELSEVIER.

The search, restricted to articles in indexed journals published in English in the knowledge areas of Business, Management, Economics and Education with no search limit for publication years, used the following descriptors as field search criteria in the title of article, summary and author keywords: “education”, “public goods”, “corporate social responsibility”, “CSR”, “charitable giving”, “corporate philanthropy”, “reciprocity”, “altruism”, “philanthropy”, “organization”, “corporation”, “private public partnership”, “PPP”, “voluntary contribution mechanism”, “VCM”, “provision point mechanism”, “PPM”, “private provision of public good”. To narrow the search to the characteristic of merit good in education and to minimize articles referring to communal goods, the descriptors “environment”, “natural resources” and

"ecology" were excluded. Table 2.1 and Table 2.2 present the queries and results for each of the databases.

Table 2.1. Query Syntax in Advanced Search. Web of Science.

WEB OF SCIENCE		
Query	**Results**	**Query Syntax**
# 1	6.448	(TS = ("corporate social responsibility" OR CSR) and wc = (business or management or economics or "Education & Educational Research")) AND Idioma: (English) AND Tipos de documento: (Article)
# 2	1.562	(TS = ("charitable giving" or "corporate philanthropy" or "reciprocity" OR "altruism" OR "philanthrop*") and TS=(organiza* or corporat*) and wc = (business or management or economics or "Education & Educational Research")) AND Idioma: (English) AND Tipos de documento: (Article)
# 3	1.219	(TS = ("private public partnershi*" OR ppp) and wc = (business or management or economics or "Education & Educational Research")) AND Idioma: (English) AND Tipos de documento: (Article)
# 4	106	(TS = ("voluntary contribution mechanism" OR vcm OR "point provision mechanism" OR ppm) and wc = (business or management or economics or "Education & Educational Research")) AND Idioma: (English) AND Tipos de documento: (Article)
# 5	107	(TS = ("private provision of public goo*") and wc = (business or management or economics or "Education & Educational Research")) AND Idioma: (English) AND Tipos de documento: (Article)
# 6	9.024	((#1 OR #2 OR #3 OR #4 or #5) and wc = (business or management or economics or "Education & Educational Research")) AND Idioma: (English) AND Tipos de documento: (Article)
# 7	20.755	TS = ((educat* and public*) not "natural resour*" not "environment*" not "ecolog*") and wc = (business or management or economics or "Education & Educational Research")
# 8	95	(#7 AND #6 AND wc = (business or management or economics or "Education & Educational Research")) AND Idioma: (English) AND Tipos de documento: (Article)

Note: Access made through Servei de Virtual Private Xarxa of the UAB available at https://xpv.uab.cat/dana-na/auth/url_default/welcome.cgi Search updated to January 21, 2018.

Table 2.2. Query Syntax in Advanced Search. Scopus.

SCOPUS		
Query	**Results**	**Query Syntax**
#16 Final (#15 and #11)	87	((TITLE-ABS-KEY ("education" AND public*) AND NOT TITLE-ABS-KEY ("environmen*") AND NOT TITLE-ABS-KEY ("natural resou*") AND NOT TITLE-ABS-KEY ("ecolog*")) AND DOCTYPE (ar) AND SUBJAREA (busi OR econ)) AND ((TITLE-ABS-KEY ("corporate social responsibility " OR "CSR") AND DOCTYPE (ar)) OR ((TITLE-ABS-KEY ("charitable giving" OR "corporate philanthropy" OR "reciprocity" OR "altruism" OR "philanthrop*") AND TITLE-ABS-KEY (organiza* OR corporat*)) AND DOCTYPE (ar)) OR (TITLE-ABS-KEY ("private public partnershi*" OR ppp) AND DOCTYPE (ar)) OR (TITLE-ABS-KEY ("voluntary contribution mechanism" OR vcm OR "point provision mechanism" OR ppm) AND DOCTYPE (ar)) OR (TITLE-ABS-KEY ("private provision of public goo*") AND DOCTYPE (ar))) AND (LIMIT-TO (SUBJAREA , "ECON ") OR LIMIT-TO (SUBJAREA , "BUSI ")) AND (LIMIT-TO (LANGUAGE , "English "))

Note: Access made through Servei de Virtual Private Xarxa of the UAB available at https://xpv.uab.cat/dana-na/auth/url_default/welcome.cgi Search updated to January 21, 2018.

The search yielded 95 articles in WOS and 87 in SCOPUS, which, by removing the duplicates in both bases revealed 166 unique references published from 1981 to 2018. After that, 127 full-text articles mentioning some type of private contributions related to education were selected during the review of the abstracts. This time window is contained in the range of the previous narrative review that used Olson's initial reference (1965). Of those references concerning case studies, only one presents a case outside the window of time: donations from Carnegie Corporation to Canadian College Libraries in 1930-35 (Bruce, 2016). The remaining references are contemporary.

2.2.2. Forms of Private Contribution

The PCs use different forms and mechanisms to intervene in education: 74 articles identify at least one specific form of contribution where the following predominate: Corporate Philanthropy (21 articles), Charitable Giving (18 articles) and Private Public Partnerships (16 articles). As Table 2.3 shows, contributions via CSR are the least reported (12 articles). Mechanisms very associated with the nature of the good (public good and with merit characteristics) are predominant.

It is striking that the Provision Point Mechanism (PPM) is not referenced in any of the articles; and all the articles that refer to the private provision of public goods are made using Voluntary Contribution Mechanisms (VCM).

Table 2.3. Forms of Private Contribution

Conceptual Categories	Examples of Literature References
CSR/Corporate Social Responsibility	(Aksoy, 2015; Ardichvili, 2013; Chakraborty et al., 2004; David, Abreu, Carreira, & Gonçalves, 2010; Lauesen, 2016; Mahenthiran et al., 2015; Manheim & Pratt, 1986; Mersham & Skinner, 2016; Morgan, 2017; Ramachandra & Mansor, 2014; Valente & Crane, 2010; Vázquez, Lanero, & Licandro, 2013)
Corporate Philanthropy	(Ball & Junemann, 2011; Boyce, 2013; Brigham & Klein-Collins, 2011; Bruce, 2016; Crumpton, 2016; Ferrare & Reynolds, 2016; Ferris, Hentschke, & Harmssen, 2008; Flórez, 1997; Gao et al., 2017; Hursh, 2017; Kondakci et al., 2014; S. Lewis, Sellar, & Lingard, 2016; Lipman, 2014; Moeller, 2013; Pauzé & Choate, 1989; Ricks & Williams, 2005; Tilson & Vance, 1985; Valente & Crane, 2010; van Fleet, 2012; Williams, 2003; Wren, 1983)
PPP/Private Public Partnership	(Amjad & MacLeod, 2014; Carpintero & Siemiatycki, 2015; Crawfurd, 2017; Crump & Slee, 2005; Davies & Hentschke, 2006; Gibson & Davies, 2008; Hua, 2017; Ismail Kassim, Nawawi, Hanipah, Hwa, & Azmi, 2015; Kumari, 2016; Morgan, 2017; Poole, Sen, & Fallon, 2016; Scharle, 2002; Tooley, 2005; A Verger et al., 2016; Wokadala & Barungi, 2015; Zakharova et al., 2015)
VCM/Voluntary Contribution /Philanthropic Foundations	(Alston & Nowell, 1996; Cardenas & Sethi, 2010; Dodgson & Staggs, 2012; Ferrare & Setari, 2018; Gavurova, Kocisova, Belas, & Krajcik, 2017; S. X. Li, Eckel, Grossman, & Brown, 2011; List & Metcalfe, 2014; Lubienski, 2016; Lubienski, Brewer, & La Londe, 2016; Markussen, 2011; Miller & Morphew, 2017; Nelson & Gazley, 2014; Reckhow & Snyder, 2014; Showers, Showers, Beggs, Cox, & Cox Jr, 2011)
Charitable Giving	(Bettigole, 1989; Daly, 2011; Dellavigna, List, & Malmendier, 2012; Duquette, 2016; Hossain & Lamb, 2015; James & Jones, 2011; List & Metcalfe, 2014; Mastromatteo & Russo, 2017; Meer, 2011; Meer & Rosen, 2013; Mohd-Arshad, 2016; Mohd-Hasan, 2017; Ricks & Williams, 2005; Showers et al., 2011; Tilson & Vance, 1985; Wilhelm, Brown, Rooney, & Steinberg, 2008; Williams, 2003; Yen, 2002)

Since PCs can be realized by individuals or by companies (Ardichvili, 2013; Chakraborty et al., 2004; Kondakci et al., 2014; Manner, 2010)) and within them the identification of who is the decision maker is relevant (Friedman, 1970), the review focused on the works referring to companies where the decision falls on the owners, shareholders or members of Shareholders' Assemblies (Principal) and where it falls on the CEO, Board of Directors or Managers (Agent). According to Table 2.4, more works report a decision process led by agents (15 articles *versus*

9 for the principal). In both cases, leadership, charisma and personal influence predominate over corporate institutional framework (Gao et al., 2017; Jia et al., 2007).

Although most of the literature does not make the characteristics of decision makers explicit, personal traits such as gender (Williams, 2003), age (Tilson & Vance, 1985), educational level or religion (Mastromatteo & Russo, 2017) are important when deciding whether to contribute privately to education. Women and people of both genders, older, with higher educational levels and a religious confession are more inclined to do so. Although there is confirmation of studies regarding the behavior of public servants and the connection between their individual characteristics and that of the beneficiaries of the support they assign (Cardenas & Sethi, 2010), no evidence is found of studies that contrasted whether the behavior of those who assign those benefits in the private sector is similar.

Table 2.4. Level and Influence on the Decision to Contribute Privately

Who is the Main Decision Maker?	Examples of Literature References
Owners, Shareholders, Members of Shareholders' Assemblies (Principal)	(Chokkalingam & Ramachandran, 2015; Gao et al., 2017; Lipman, 2014; Mersham & Skinner, 2016; Ricks & Williams, 2005; Tilson & Vance, 1985; Valente & Crane, 2010; Williams, 2003; Wren, 1983)
CEO, Board of Directors, Managers (Agent)	(Ardichvili, 2013; Chakraborty et al., 2004; K. S. Groves & LaRocca, 2011; Hursh, 2017; Jia et al., 2007; Keikha, Hoveida, & Yaghoubi, 2017; Kondakci et al., 2014; Mahenthiran et al., 2015; Manner, 2010; Meer, 2011; Mersham & Skinner, 2016; Moeller, 2013; Pauzé & Choate, 1989; Pearce & Manz, 2014; Strand & Freeman, 2015)

2.2.3. Motivations to Contribute Privately

The reasons why a private company contributes to the provision of education are diverse and 64 of the articles reviewed make at least one type of motivation explicit (in several cases more than one reason is reported). Adopting the taxonomy proposed by this Thesis in the previous section, they are classified in probusiness (55 articles) and prosocial (39 articles). Whether they refer to provisions of a public good such as education, companies do not lose

sight of the interests of the business in a complementary relationship between both types of motivations.

Probusiness motivations (Table 2.5), in turn, can deliberately respond to the business strategy or intrinsic factors (45 articles) or be the response to external or extrinsic conditioning (39 articles). Among the factors associated with the strategy, the ones predominating are motivations related to corporate reputation and branding (26 articles): *"The success and standards achieved at Victoria Dock are very important to us ... we need it to do well so it gives us a good accolade on our brand"* is the testimony of a participant of Sewell Group Plc in an interview cited by Gibson & Davies (2008, p. 81) in the case study referencing the first privately-financed school in the United Kingdom using the PPP mechanism. Profitability (19 articles) and Business Sustainability (14) are the other types of motives, while tax incentives are the least reported (11 articles). According to Duquette (2016), the response rate to fiscal stimuli is unequal among different sectors, in addition to the fact that education is less tax-sensitive than other sectors.

Among the conditional motivations (39 articles), those associated with stakeholder engagement are the most frequent (31 articles). Motivations associated with regulation (9 articles) or competition (9 articles) are much less common in this review. Valente and Crane (2010) also recognize that the countries' level of development is a conditioning factor of this relationship: *"This strategic orientation may be based on developing an appropriate context with basic services that allow for or support core operations for competitive maximization; or it may be part of a public relations strategy that is conveyed to the general public to soften pressures, particularly from developed country stakeholders"*(p. 60).

Table 2.5. Probusiness Motivation of Private Contributions

Probusiness Motivations	Main Motivation	Examples of Literature References
Business Strategy (Intrinsic)	Profitability	(Boyce, 2013; Cardenas & Sethi, 2010; Carpintero & Siemiatycki, 2015; Chakraborty et al., 2004; Crump & Slee, 2005; Davies & Hentschke, 2006; K. S. Groves & LaRocca, 2011; Ismail Kassim et al., 2015; Kolk & Lenfant, 2012; Kondakci et al., 2014; Lipman, 2015; Manheim & Pratt, 1986; Manner, 2010; Mersham & Skinner, 2016; Ricks & Williams, 2005; Scharle, 2002; Strand & Freeman, 2015; Verger et al., 2016; Zakharova et al., 2015)

Probusiness Motivations	Main Motivation	Examples of Literature References
	Business Sustainability	(Aksoy, 2015; Ardichvili, 2013; Ball & Junemann, 2011; Chakraborty et al., 2004; Crumpton, 2016; K. S. Groves & LaRocca, 2011; Kondakci et al., 2014; Mahenthiran et al., 2015; Manheim & Pratt, 1986; Mersham & Skinner, 2016; Strand & Freeman, 2015; Valente & Crane, 2010; Vázquez et al., 2013; Yilmaz, 2013)
	Tax Incentives	(Aksoy, 2015; Bettigole, 1989; Duquette, 2016; Flórez, 1997; Hossain & Lamb, 2015; Kondakci et al., 2014; S. X. Li et al., 2011; Mahenthiran et al., 2015; Poole et al., 2016; Wilhelm et al., 2008; Zakharova et al., 2015)
	Branding	(Anderson & Donchik, 2016; Ardichvili, 2013; Arshad & Mohd Arshad, 2016; Ball & Junemann, 2011; Bettigole, 1989; Carpintero & Siemiatycki, 2015; Chakraborty et al., 2004; Dellavigna et al., 2012; Duquette, 2016; Ferris et al., 2008; Gao et al., 2017; Gibson & Davies, 2008; Hossain & Lamb, 2015; Kolk & Lenfant, 2012; Kondakci et al., 2014; Lauesen, 2016; List & Metcalfe, 2014; Mahenthiran et al., 2015; Mastromatteo & Russo, 2017; Mersham & Skinner, 2016; Ricks & Williams, 2005; Tilson & Vance, 1985; Valente & Crane, 2010; Vázquez et al., 2013; Verger et al., 2016; Williams, 2003)
Conditional (Extrinsic)	Regulation	(Aksoy, 2015; Ardichvili, 2013; Gao et al., 2017; A Kolk & Lenfant, 2012; Lauesen, 2016; S. X. Li et al., 2011; Manner, 2010; Mersham & Skinner, 2016; Strand & Freeman, 2015)
	Competition	(Bettinger & Slonim, 2006; Carpintero & Siemiatycki, 2015; Daly, 2011; Dellavigna et al., 2012; Hursh, 2017; Kondakci et al., 2014; Mahenthiran et al., 2015; Meer, 2011; Ramachandra & Mansor, 2014)
	Stakeholder Engagement	(Ardichvili, 2013; Ball & Junemann, 2011; Carpintero & Siemiatycki, 2015; Chakraborty et al., 2004; Crump & Slee, 2005; Daly, 2011; Davies & Hentschke, 2006; Ferrare & Reynolds, 2016; Gao et al., 2017; K. S. Groves & LaRocca, 2011; Hossain & Lamb, 2015; Hua, 2017; Keikha et al., 2017; Kolk & Lenfant, 2012; Kondakci et al., 2014; Kumari, 2016; Lipman, 2015; Mahenthiran et al., 2015; Mastromatteo & Russo, 2017; Mersham & Skinner, 2016; Ramachandra & Mansor, 2014; Ricks & Williams, 2005; Scharle, 2002; Strand & Freeman, 2015; Tilson & Vance, 1985; Valente & Crane, 2010; Vázquez

Probusiness Motivations	Main Motivation	Examples of Literature References
		et al., 2013; Williams, 2003; Wren, 1983; Yilmaz, 2013; Zakharova et al., 2015)

Prosocial motivations in the private contributions in education (39 articles; Table 2.6.) are classified into those where the interest of the beneficiary prevails (and that this Thesis denominates 'Altruism', 28 articles) and those where there is a greater awareness of improvements in the environment that represent a mutual benefit for the taxpayer and for the beneficiary, in a Sustainable Development perspective (25 articles).

Altruistic motivations, in turn, are divided, following Andreoni (2006), in pure (25 articles) and impure (16 articles). Although a greater presence of conditional altruism was expected (Fischbacher et al., 2001), the well-being of the beneficiary of a PC prevails genuinely once an altruistic motivation is declared in it. This is reinforced if the idea that these contributions substitute the government is shared in many cases (Mastromatteo & Russo, 2017).

Within the motivations associated with Sustainable Development, there is a difference between those that prioritize their orientation toward social well-being (20 articles) and those where considerations of the competitiveness of the environment where the company operates (12 articles) prevail. Flórez (1997), in the case of Colombia, also reports the use of corporate resources through non-profit organizations (NGOs), establishing a new agency situation.

Table 2.6. Prosocial Motivations of Private Contributions

Prosocial Motivations	Main Motivation	Examples of Literature References
Altruism	Pure	(Ardichvili, 2013; Ball & Junemann, 2011; Bettinger & Slonim, 2006; Dellavigna et al., 2012; Duquette, 2016; Flórez, 1997; K. S. Groves & LaRocca, 2011; Hossain & Lamb, 2015; A Kolk & Lenfant, 2012; Kondakci et al., 2014; Lipman, 2014; List & Metcalfe, 2014; Lubienski, 2016; Manner, 2010; Mastromatteo & Russo, 2017; Meer, 2011; Mohd-Arshad, 2016; Nelson & Gazley, 2014; Pearce & Manz, 2014; Ricks & Williams, 2005; Scharle, 2002; Showers et al., 2011; Wilhelm et al., 2008; Williams, 2003; Wren, 1983)

Prosocial Motivations	Main Motivation	Examples of Literature References
	Impure	(Bettinger & Slonim, 2006; Cardenas & Sethi, 2010; Dellavigna et al., 2012; K. S. Groves & LaRocca, 2011; Henisz, 2011; Hossain & Lamb, 2015; James & Jones, 2011; Kondakci et al., 2014; List & Metcalfe, 2014; Mastromatteo & Russo, 2017; Mohd-Arshad, 2016; Nelson & Gazley, 2014; Ricks & Williams, 2005; Scharle, 2002; Wilhelm et al., 2008; Williams, 2003)
Sustainable Development	Competitiveness	(Ball & Junemann, 2011; Cardenas & Sethi, 2010; Crumpton, 2016; David et al., 2010; Flórez, 1997; Gavurova et al., 2017; Hossain & Lamb, 2015; Lipman, 2014; Mersham & Skinner, 2016; Ricks & Williams, 2005; Williams, 2003; Zakharova et al., 2015)
	Social Welfare	(Alston & Nowell, 1996; Cardenas & Sethi, 2010; Chakraborty et al., 2004; Daly, 2011; David et al., 2010; Flórez, 1997; Gavurova et al., 2017; K. S. Groves & LaRocca, 2011; A Kolk & Lenfant, 2012; Kondakci et al., 2014; Manner, 2010; Mastromatteo & Russo, 2017; Mohd-Arshad, 2016; Ramachandra & Mansor, 2014; Ricks & Williams, 2005; Strand & Freeman, 2015; Valente & Crane, 2010; Wilhelm et al., 2008; Williams, 2003; Zakharova et al., 2015)

2.2.4. Private Contribution Effects

The typology of effects proposed and revised in this Chapter is analogous to the types of motivations. Private effects (27 articles) and Public effects (29 articles) are identified which, as well as the motivations, are not mutually exclusive (Table 2.7). On the contrary, according to Porter and Kramer (2011), effects of both types capable of creating shared value are reported (Strand & Freeman, 2015).

This review distinguishes private monetary effects (17 articles) and non-monetary effects (20 articles), the latter expected by the nature of the good. Among the monetary effects, 6 out of 17 items correspond to studies using the provision mechanism of a Private-Public Partnership, which is the only one that makes explicit contribution and return conditions through a formal contract: *"As of 2014, in most cases, the PPP schools were performing well financially. It was not possible to have access to the consortia's financial information. However*

according to the information provided in the interviews by representatives of the institutions in charge of the projects and representatives of the banks, financial profitability was around 10%-12% in most cases" (Carpintero & Siemiatycki, 2015, p. 444).

The public effects were reviewed, with the intent to identify effects associated with social welfare (23 articles), human capital (12 articles) and sustainable development (12 articles). In addition to the specific education objectives (e.g., tuition fees, academic performance) and its effects on society, Lubienski (2016) shows the influence of privates on educational policy, through the Think Tank that receives the contributions.

Although most of the effects found and presumed are positive, there is ample evidence of a substitution effect among types of contribution (public or private) or sector to which the contribution is directed, in this case education (e.g., Eckel, Grossman, & Johnston, 2005 cited in Bettinger & Slonim, 2006).

Table 2.7. Private Contribution Effects

Effects	Main Type of Effects	Examples of Literature References
Private	Monetary	(Aksoy, 2015; Boyce, 2013; Carpintero & Siemiatycki, 2015; Chakraborty et al., 2004; Crump & Slee, 2005; Davies & Hentschke, 2006; K. S. Groves & LaRocca, 2011; Ismail Kassim et al., 2015; Kondakci et al., 2014; Lipman, 2014; Manheim & Pratt, 1986; Mersham & Skinner, 2016; Ricks & Williams, 2005; Vázquez et al., 2013; A Verger et al., 2016; Williams, 2003; Zakharova et al., 2015)
	Non-Monetary	(Aksoy, 2015; Boyce, 2013; Davies & Hentschke, 2006; Ismail Kassim et al., 2015; A Kolk & Lenfant, 2012; Kondakci et al., 2014; Kumari, 2016; Lauesen, 2016; Lipman, 2014; Mahenthiran et al., 2015; Meer, 2011; Mersham & Skinner, 2016; Moeller, 2013; Reckhow & Snyder, 2014; Ricks & Williams, 2005; Rydzak & Trębecki, 2009; Strand & Freeman, 2015; Valente & Crane, 2010; Williams, 2003)
Public	Human Capital	(Ardichvili, 2013; Bettinger & Slonim, 2006; Chakraborty et al., 2004; Gavurova et al., 2017; Kondakci et al., 2014; Lipman, 2015; List & Metcalfe, 2014; Mastromatteo & Russo, 2017; Moeller, 2013; Ramachandra & Mansor, 2014; Scharle, 2002; Williams, 2003)
	Social welfare	(Au & Ferrare, 2014; Bettinger & Slonim, 2006; Cardenas & Sethi, 2010; Chakraborty et al., 2004; Crump & Slee, 2005;

Effects	Main Type of Effects	Examples of Literature References
		Crumpton, 2016; David et al., 2010; Dellavigna et al., 2012; Gavurova et al., 2017; Kondakci et al., 2014; Lipman, 2015; Lubienski et al., 2016; Manheim & Pratt, 1986; Markussen, 2011; Mersham & Skinner, 2016; Moeller, 2013; Ramachandra & Mansor, 2014; Scharle, 2002; Valente & Crane, 2010; Vázquez et al., 2013; Williams, 2003; Wokadala & Barungi, 2015; Wren, 1983)
	Sustainable Development	(Aksoy, 2015; Bettinger & Slonim, 2006; Gavurova et al., 2017; Kondakci et al., 2014; List & Metcalfe, 2014; Manheim & Pratt, 1986; Mersham & Skinner, 2016; Moeller, 2013; Nelson & Gazley, 2014; Ramachandra & Mansor, 2014; van Fleet, 2012; Vázquez et al., 2013)

2.2.5. Practical Considerations of the Literature for Applied Research

Considering that this review has been limited to the PCs that are related to the education sector, this section integrates the results by Educational Level (Table 2.8) and Sector (Table 2.9), Target of the Intervention (Table 2.10), which is necessary because of the breadth and complexity of the education sector.

More articles refer to PCs aimed at Primary, Secondary and High School educational levels (38 articles) than to Higher Education (31 articles). Nelson (2014) confirms the determinants of a school to receive help (larger districts and higher endowments have a positive effect, while student enrollment a negative one).

Table 2.8. Practical Considerations for Applied Research: Educational Levels

Classification	Education Level	Examples of Literature References
Level	School	(Alston & Nowell, 1996; Amjad & MacLeod, 2014; Anderson & Donchik, 2016; Arshad & Mohd Arshad, 2016; Au & Ferrare, 2014; Ball & Junemann, 2011; Bettinger & Slonim, 2006; Bruce, 2016; Carpintero & Siemiatycki, 2015; Crawfurd, 2017; Crump & Slee, 2005; Davies & Hentschke, 2006; Ferrare & Reynolds, 2016; Ferrare & Setari, 2018; Ferris et al., 2008; Gavurova et al., 2017; Gibson & Davies, 2008; Giles & Yates, 2014; Hua, 2017; Hursh, 2017; Kolk & Lenfant, 2012; Kondakci et al., 2014; Kumari, 2016; Lewis et al., 2016; Li et al., 2011; Lipman, 2015; Lubienski, 2016; Lubienski et al., 2016; Moeller, 2013; Nelson & Gazley, 2014; Pauzé & Choate, 1989; Poole et al., 2016; Reckhow & Snyder, 2014; Valente & Crane, 2010; Verger et al., 2016; Wetherill & Applefield, 2005; Wilhelm et al., 2008; Wokadala & Barungi, 2015)
	Higher Education	(Alston & Nowell, 1996; Arshad & Mohd Arshad, 2016; Boyce, 2013; Brigham & Klein-Collins, 2011; Bruce, 2016; Crumpton, 2016; Daly, 2011; David et al., 2010; Dodgson & Staggs, 2012; Duquette, 2016; Ferrare & Reynolds, 2016; Flórez, 1997; Henisz, 2011; Ismail Kassim et al., 2015; Keikha et al., 2017; Manner, 2010; Markussen, 2011; McDearmon, 2013; Meer, 2011; Meer & Rosen, 2013; Miller & Morphew, 2017; Pauzé & Choate, 1989; Portugal, 2006; Ramachandra & Mansor, 2014; Ricks & Williams, 2005; Showers et al., 2011; Tooley, 2005; Vázquez et al., 2013; Wren, 1983; Yilmaz, 2013; Zakharova et al., 2015)

Most studies refer to PCs in public (43 articles) *versus* private schools (5 articles) at all educational levels. Those that refer to private institutions, in all cases, do so in contexts where the provision of the educational service is mixed. Frequently, within the whole sample reviewed, normative references are found in relation to a privatization trend in educational policy (Anderson & Donchik, 2016; Lubienski, 2016; Poole et al., 2016).

Table 2.9. Practical Considerations for Applied Research: Educational Sector

Classification	Type of provider	Examples of Literature References
Sector	Public	(Aksoy, 2015; Alston & Nowell, 1996; Amjad & MacLeod, 2014; Anderson & Donchik, 2016; Au & Ferrare, 2014; Ball & Junemann, 2011; Boyce, 2013; Carpintero & Siemiatycki, 2015; Crump & Slee, 2005; David et al., 2010; Davies & Hentschke, 2006; Dodgson & Staggs, 2012; Ferrare & Reynolds, 2016; Ferrare & Setari, 2018; Ferris et al., 2008; Flórez, 1997; Gavurova et al., 2017; Gibson & Davies, 2008; Henisz, 2011; Hua, 2017; Hursh, 2017; Ismail Kassim et al., 2015; Keikha et al., 2017; Kondakci et al., 2014; Kumari, 2016; S. Lewis et al., 2016; S. X. Li et al., 2011; Lipman, 2014; Lubienski, 2016; Lubienski et al., 2016; Mahenthiran et al., 2015; Markussen, 2011; McDearmon, 2013; Miller & Morphew, 2017; Nelson & Gazley, 2014; Poole et al., 2016; Reckhow & Snyder, 2014; Valente & Crane, 2010; A Verger et al., 2016; Wetherill & Applefield, 2005; Wokadala & Barungi, 2015; Wren, 1983; Yilmaz, 2013)
	Private	(Amjad & MacLeod, 2014; Bettinger & Slonim, 2006; Crawfurd, 2017; A Verger et al., 2016; Wokadala & Barungi, 2015)

The wide diversity of PC types aimed at education are summarized in this review, in three categories according to the target intervention entity: (i) demand side (12 articles), supply side (40 articles) and the educational environment (12 articles). This classification is analogous to the one proposed by Masino and Niño-Zarazúa (2016, p. 55, Fig.1) in a systematic review applied to policy interventions for improving education in developing countries, where they propose: (i) Supply-side capability interventions, (ii) incentives for changing preferences and behaviors and (iii) participatory and community management interventions, more effective if applied in combination.

Table 2.10. Literature Referred to the School Level: Target of Intervention

Target of the intervention	Examples of Literature References
Demand Side	(Aksoy, 2015; Bettinger & Slonim, 2006; Flórez, 1997; Henisz, 2011; Kondakci et al., 2014; Manner, 2010; McDearmon, 2013; Meer, 2011; Miller & Morphew, 2017; Moeller, 2013; Nelson & Gazley, 2014; Yilmaz, 2013)
Supply Side	(Verger et al. 2016; Gavurova et al. 2017; Kumari 2016; Amjad & MacLeod 2014; Crump & Slee 2005; Ricks & Williams 2005; Kondakci et al. 2014; Crumpton 2016; Brigham & Klein-Collins 2011; David et al. 2010; Tooley 2005; Pauzé & Choate 1989; Bruce 2016; Markussen 2011; Wetherill & Applefield 2005; Wren 1983; Reckhow & Snyder 2014; Dodgson & Staggs 2012; Gibson & Davies 2008; Miller & Morphew 2017; Poole et al. 2016; Lewis et al. 2016; Hua 2017; Giles & Yates 2014; Valente & Crane 2010; Arshad & Mohd Arshad 2016; Yilmaz 2013; Vázquez et al. 2013; Ramachandra & Mansor 2014; Li et al. 2011; Wokadala & Barungi 2015; Ismail Kassim et al. 2015; Alston & Nowell 1996; Carpintero & Siemiatycki 2015; Wilhelm et al. 2008; Crawfurd 2017; Zakharova et al. 2015; Mastromatteo & Russo 2017; Portugal 2006)
Socioeconomical and Political Environment	(Au & Ferrare, 2014; Boyce, 2013; Daly, 2011; Davies & Hentschke, 2006; Dodgson & Staggs, 2012; Ferrare & Reynolds, 2016; Ferrare & Setari, 2018; Ferris et al., 2008; Hursh, 2017; Lipman, 2014; Lubienski, 2016; Lubienski et al., 2016)

Some examples of this variety of interventions are: on the demand side, scholarships (Kondakci et al., 2014; Yilmaz, 2013) the performance of which is more reported in higher education (Miller & Morphew, 2017); on the supply side, infrastructure contributions (Carpintero & Siemiatycki, 2015; Crump & Slee, 2005), teacher training (Amjad & MacLeod, 2014; Crawfurd, 2017); or, on the environmental side, the advocacy on educational policy that was previously mentioned, among others.

2.3. Implications for Research and Practice

This Chapter provides, in the first section, a concept of Private Contribution that brings together elements of a thorough and rigorous review of narrative literature and a taxonomy to classify their motivations and effects. It also contributes a state of the art of literature that references various types of PCs aimed at education, this time supported in a systematic review.

This two-fold review (narrative and systematic) delivers the following conclusions. First, the study of the contributions of private sector to public schools requires a view that integrates, at least, the nature of the public good contributed to and the altruistic considerations of their ultimate purpose, with the strategic considerations of the person who makes the contribution. In practice, these features overlap in a differentiated way and are specified in different mechanisms of provision and intervention. Second, the transition from the altruistic to the strategic is a constant in the three literature approaches reviewed and it is vital to find complementarities between private and public interests both to better allocate society's resources (public and private) and to achieve greater impacts with them. Third, the types of motivations and the types of effects are directly related, without them excluding the cross-cutting effects to which the second conclusion refers. As mentioned above, private effects are mainly expected of probusiness motivations, and public effects are expected of prosocial motivations, but both public and private effects are expected from both motivations. Even so, in most cases neither the motivations nor the effects are explicit. Fourth, the PCs aimed at education reported in the literature are mainly oriented to: (i) schools, (ii) primary, secondary and high school levels, (iii) public sector in a variety of types of intervention and are most likely carried out by individuals (by women, more educated people, older and with a confession of faith) that in many cases are an 'agent' of the company that contributes.

This two-fold review also extends some research suggestions, some of which are addressed in this Thesis and others represent future lines of work. First, the search for alternatives to add such diversity of PCs. Diversity regarding (i) the provision mechanisms employed, (ii) the objectives of intervention, (iii) the selection or not of partners and their nature, (iv) the types of intervention among others, (v) the objectives that are pursued and the indicators with which they are measured, among others. This will also provide aggregate alternatives for measuring the impacts currently reported separately in the literature. Initially, the aim is to identify common patterns in both the decisions to contribute privately, and its main effects. Second, the premise of economies of scale and scope that the PCs assume, when several contributors do so in the same territory or to the same beneficiary who can, in turn, receive more than one type of contribution. Account for the conditions for greater cooperation and better coordination could also improve the allocation criteria and raise the aggregate impacts. It is also important to anticipate and prevent crowding-out effects not only in public-private contributions but also in private-private contributions. Third, in this review, the absence of evidence of the use of Provision Point Mechanism (PPM) in education was unexpected. Exploring the relevance of

such mechanisms in education could represent opportunities for more efficient private allocations despite the coordination costs mentioned above. Fourth, the measurement of indirect effects of contributions. An example of this is the contributions that are directed to a Think Tank with the aim of formulating educational policy recommendations that have a very different intervention route to those contributions directly received by a student (e.g., a scholarship) or a school (e.g., infrastructure or teacher training).

Both the contributions of this chapter and the lines of research suggested are included in the following chapters for which this state-of-the-art is the starting point.

Chapter 3 validates the Private Contribution concept through a Thematic Analysis of Semi-structured interviews to business leaders who contribute to education, asking them what motivates them to do it and what effects they expect, and which do they perceive to be attributable to their contributions. According to the PC definition, companies and leaders that perform structured interventions (Crumpton, 2016) will be included in the sample with the expectation to identify a diversity of motivations and effects, explicit or not, that are related to each other in different ways (Aksoy, 2015; Kondakci et al., 2014). The feasibility of deducting empirical implications (Mastromatteo & Russo, 2017) guides the dialogue with business leaders.

Chapter 4 estimates the aggregate effect (Private Contribution Effect, PCE) on the academic performance of students in public schools in Colombia responding to insufficient evidence of measurements of this type on education (Kumari, 2016). Crawfurd (2017), Ilon and Normore (2006) and Gavurova et al. (2017), that measure academic quality outputs with standardized tests, are the introduction to link the school-based literature (as concept) with efficiency techniques (as method).

Chapter 5, following the same school-based approach, validates the robustness of the PCE considering different types of contributions from a typical function of educational production in the school. A classification of types of CPs is established after reviewing 145 Journal Articles associated with the descriptor 'Program Effectiveness' cited in ERIC (Education Resources Information Center).

Chapter 3

Private Contributions in Education in Practice. Reviewing the Concept with Private Sector Leaders from Colombia.

3. Private Contributions in Education in Practice. Reviewing the Concept with Private Sector Leaders from Colombia.

The specific objective of this Chapter is to validate the consistency of the results presented in the literature *versus* the motivations and effects reported by business leaders in the Colombian case. The concept of "private contribution" is a notion with deep empirical implications that requires examining from the perspective of those responsible for implementation to understand (i) What motivates business leaders to make contributions in public schools? (ii) What effects do they perceive as attributable to these contributions? (iii) Is what the literature reports consistent with what was raised by them? This Chapter contributes to the theoretical literature by providing empirical elements comparable to the theoretical proposals on the subject, enriching the concept with the motivations and the presumption about the effects on the part of the leaders.

This chapter, following a qualitative approach, describes the methodology, the sample and the analysis process (Section 3.1.) before presenting, in a well-structured report, the findings of the categories associated with motivations and effects (Section 3.2.). It ends with the summary of the conclusions and applications for future research (Section 3.3.). To do this, the Chapter starts with the definition of private contribution as shown in Subsection 2.1.7, based on the taxonomy under which the systematic review of the literature was structured in Section 2.2. of the previous chapter.

3.1. Research Approach

Qualitative research enables the exploratory study of phenomena based on people's experiences. It is a process that can be inductive or hybrid (inductive-deductive) (Fereday & Muir-Cochrane, 2006) where the researcher interacts significantly with the participants, and the interaction is essentially interpretive (Attride-Stirling, 2001; Marshall & Rossman, 2006). In this case, the experience of private sector leaders–the organizations of which make private contributions to education–is consulted to identify and organize analysis patterns.

3.1.1. Data Collection: Semi-Structured Interviews

Among the information-gathering techniques in qualitative research, the interview stands out because it is the vehicle for a direct conversation between researcher and interviewee (Strauss, A., & Corbin, 1990). In order to be operational, the interview instruments toggle between a structured questionnaire and a completely open dialogue, also varying the depth of the topics to be researched and the related topics that the researcher considers of interest regarding the research question.

In this Chapter, semi-structured in-depth interviews were conducted assessing their flexibility so that, based on a script of guiding themes and questions, it would be possible to deepen into those novel or particular issues that broaden the previous knowledge that is intended to be validated. The interview guide contains topics and questions for three theme blocks with their respective estimated duration times for a face-to-face interview, scheduled by appointment, and to last from 60 to 90 minutes (Appendix 3.1.).

First, the interview collects information about the interviewee's profile: the position held in the organization, training and professional experience and in the position, while validating the basic information of organization characterization: mainly the economic activity and organizational structure. From there, the first block inquires about the company's tradition in making social contributions, its strategy or intervention model (it is presumed existing), and partners. And it deepens and describes the contributions in education with questions about the main beneficiaries, the type of educational institution, the educational level and the contribution mechanisms and typologies. The conditions of cooperation, coordination and articulation with other actors are part of the issues also included in this block.

The second block is more oriented toward knowing the explicit and implicit motivations that give rise to the contributions. To accomplish this, the organizational structure and the characteristics of the people who participate in the decision process are analyzed in depth, trying to recognize whether defined influencers or protocols are in place. Likewise, the governance, participation and stability of the decision criteria are studied (e.g., the strategy of targeting and selection of beneficiaries, if any, or sensitivity to fiscal incentives, among others).

The third block corresponds to the effects, seeking to know the benefits that are expected from the contributions, how explicit this expectation is and how formal the metrics are, to give a sense of magnitude to such effect. Expressions such as return, or impact are suggested and

the consistency of the motivations with the effects is tested. Finally, this block validates if there is evidence that greater or lesser effects (observed or perceived) condition or alter the continuity of the contributions made, or stimulate new contributions. In other words, the aim is to examine the circularity of the motivations-effects-motivations relationship.

The interviewees were given a sheet explaining the purpose of the interview and clarifying the meaning of private contribution, and each participant filled out an informed consent form.

3.1.2. Purposive Sampling: Private Sector Leaders Contributing to Public Education in Colombia

For the identification and selection of the interviewees, an intentional open sampling was carried out (Sandelowski, 1995; Strauss, A., & Corbin, 1990). During this phase, November and December 2017, 9 semi-structured interviews were conducted with people with an important level of leadership, knowledge and influence in the decision to make contributions to educational institutions of the public sector in Colombia, by the organizations they represent.

Both the sampling method and the number of participants is consistent with other similar work, in all cases subject to the saturation condition mentioned in the following section: workplace ill-treatment in the higher education sector (Hodgins & Mannix-McNamara, 2017; 9 staff interviews) and preparation of school principals in Malaysia (Ng, Gossett, Chinyoka, & Obasi, 2016; 8 schools) or (Kashif, ur Rehman, Mustafa, & Basharat, 2014; 18 higher degree students), are some relevant examples.

Organizations, like the people that are part of this study sample, meet the condition of being identified for effective commitment to educational quality in Colombia. The participants were chosen for their leadership in the companies they represent in terms of contributions to the country's education, for their willingness to participate in the research and their interest and recognition.

These 9 interviews, as detailed in Table 3.1correspond to 3 Companies, 1 Business Group, 3 Corporate Foundations and 2 Non-profit Business Associations. The aspiration is to reflect a reality of this type of private contributions that can be executed either directly by the companies or, indirectly, by their Corporate Foundations or Business Associations. Among the companies interviewed directly or through their Corporate Foundations is one of the main business groups in the country, 2 top five Colombian companies (according to their Total Operating Revenue,

Fiscal Year 2016) and the remaining 4 are in the top 20 in their respective regions. The interviews were conducted in 3 of Colombia's main cities (Bogotáthesis, Cali and Medellín), of leaders of organizations from different sectors of economic activity (Securities and Financial, Construction Materials, Chemical, Soft Drink, Sugar and Confectionery, Social Media, Paper Manufacturing). Four of these companies are listed in the capital market and three of them have family asset structures. The agenda of the two Non-profit Business Associations have educational quality as a core area, one of them as an exclusive target of operation. Although it was desirable, it was not possible to conduct at least one interview with a leader of this profile in the Caribbean region (Barranquilla City)-the fourth region that is treated in the empirical section of this Thesis (Chapter 4 and 5).

About the characteristics of the people interviewed, only one is male; and the interviewees' positions also reflect a diversity of organizational structures responsible for these decisions. This is consistent with the 'ANDI (National Business Association of Colombia) Survey of Strategic Social Architecture 2017. Panorama of the Social Management of 500 Companies in Colombia': *"The majority of people in charge of social issues in companies are 26 to 45-year-old women with a high educational level [...] The majority of companies (52%) do not have an area that manages the social strategy. Those companies that do have it, call it human management, social responsibility or sustainability..."* (ANDI, 2017).

Table 3.1.Brief description of the Leaders and Companies Interviewees

ID	Type of Organization	Industry	Organization Location	Respondent's Position	Interview Duration
A	Company	Securities and Financial	Antioquia	Direction of Social Development	01:27:12
B	Company	Construction Materials	Antioquia	Head of Educational Infrastructure	01:12:01
C	Company	Chemical Manufacturing	Valle del Cauca	Vice Presidency Corporate Affairs	01:13:29
D	Business Group	Soft Drink, Sugar, Social Media	Bogotá	Social Responsibility Management	01:14:32
E	Corporate Foundation	Paper Manufacturing	Valle del Cauca	Executive Management	01:06:53

ID	Type of Organization	Industry	Organization Location	Respondent's Position	Interview Duration
F	Corporate Foundation	Sugar and Confectionery Manufacturing	Valle del Cauca	Executive Management	01:22:53
G	Corporate Foundation	Sugar and Confectionery Manufacturing	Valle del Cauca	Management	01:18:57
H	Business Association	Non-Profit	Antioquia	Executive Management	00:55:28
I	Business Association	Non-Profit	Bogotá	Executive Management	01:20:14

Considering that the literature reveals dilemmas in the agency relationship among companies' stockholders or owners, a limitation in this qualitative analysis is the failure to include large shareholders or owners of the companies in order to contrast the uniformity of valuations between agents and principals.

3.1.3. Analysis Process: Thematic Analysis

The 9 interviews were recorded and transcribed, using the Thematic Analysis method (Alhojailan, 2012; Fereday & Muir-Cochrane, 2006) with the AtlasTi software as support. The Thematic Analysis makes it possible to identify and organize patterns in a theme based on a detailed reading of the information collected. Results can therefore be inferred to help in the interpretation and, with this, to the understanding of the phenomenon under study (Braun & Clarke, 2006). This method relates the text content (participants' opinions and perceptions) to concepts facilitating the comparison with other research elements (Alhojailan, 2012).

Each interview revealed the parts of the text related to the central ideas of the theoretical concepts from the literature review. The coding strategy was open, axial and selective (Strauss, A., & Corbin, 1990). The information was codified and categorized identifying parts of the text with the topics, and relating them with a code representing each category of analysis (Gibbs, 2007). The main purpose of this method was to make connections between the information in the interview text and the central ideas that construct a concept. In our case, '*private contribution*' constitutes a category of analysis.

It was also verified in this process that the 9 interviews reached data saturation, where the information is redundant when relating the contents with the identified categories (Glaser & Strauss, 1967; Saunders et al., 2017). The categories are understood as themes and concepts that are interrelated with the theoretical framework defined in this Thesis, as explanatory of the study topic.

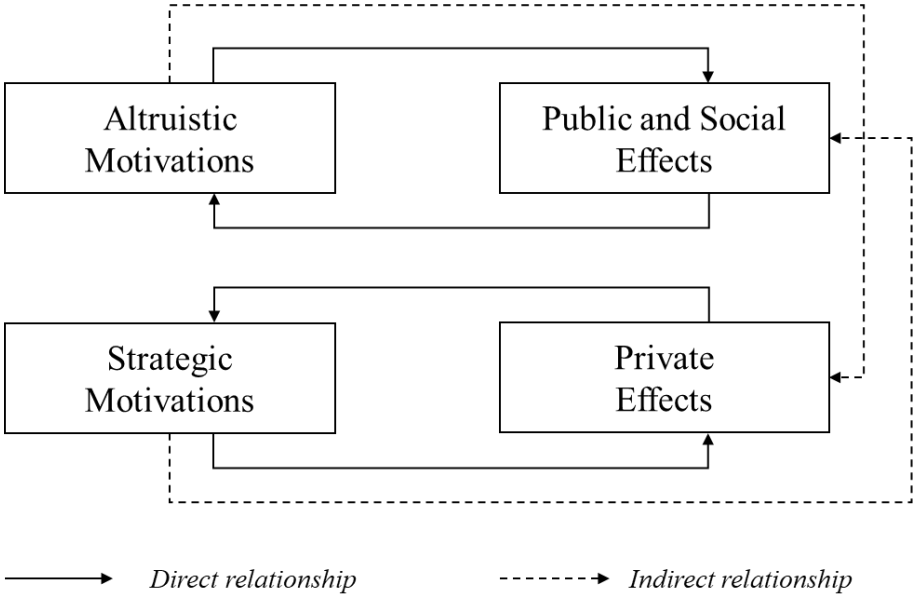
As an applied research, the analysis process begins with the deliberation of a priori categories, considered research topics, and reflected in the structure of the interview guide instrument (Moreira & Costa, 2016) as described in the Subsection 3.1.1. This is based on the taxonomy of the systematic review of the literature of the previous chapter. It is possible that, under this consideration, emerging categories can be identified during the process, in such a way that some categories will emerge from the data (Spencer & Ritchie, 2002). Based on the above, the aim is to give meaning, recognizing patterns that make up significant interpretation categories (Patton, 2002).

3.1.4. Analysis Categories

The analysis process originates around two themes: motivation and effects of private companies when contributing to public education in Colombia. These themes guide the development of the interviews conducted. Each topic is considered a category, and the breakdown becomes analysis subcategories. In principle, the basis consists of altruistic and strategic motivations and of public/social and private effects that are complementary (Figure 3.1.)

In accordance with the literature, a direct and reciprocal relationship is expected among the types of motivations and effects represented by the solid lines in the figure. Strategic motivations stimulate and expect private effects which, in turn, reinforce such motivations. The same is true for altruistic motivations and public effects. However, the spillover effects of a good such as education also generate indirect effects (dotted line in the figure): altruistic motivations generate private effects and strategic motivations generate public effects. The circularity of these indirect effects is also implicit in direct relationships. It is a process that is fed back and reinforced.

Figure 3.1. Categories of Analysis and Relationships



Source: Proposed by the author

Private contributions to education, in general, positively impact both the direct beneficiary (the school, the student and the student's family) and the environment (the district, the sector, the territory). However, there are also undesired effects, positive or negative, that are not necessarily anticipated by the contributor. Also appearing are some observable and unobservable factors that are not under the control of the private company making the contribution and that positively or negatively affect the impact of the contribution: student skill levels (Hanushek & Woessmann, 2008), levels of quality and commitment of teachers (Hanushek & Rivkin, 2006; Rivkin, Hanushek, & Kain, 2005), educational level of parents (Muhammad, Iqbal, & Tasneem, 2015), teaching styles (Comi, Argentin, Gui, Origo, & Pagani, 2017), pedagogical innovations (Kremer & Holla, 2009), physical resources (P. Glewwe & Muralidharan, 2016; Hanushek, 2006) or technological resources (Comi et al., 2017) of the school, management skills of the rectors (Bloom, Lemos, Sadun, & Van Reenen, 2015), regulations and priorities of the local or national educational policy (Lubienski et al., 2016), the motivations or incentives of other agents to cooperate (Zakharova et al., 2015), the conditions of the environment such as security (Burdick-Will, 2013), migrations (Ganimian & Murnane, 2016), among many others that involve the appearance of emerging categories in the analysis. Section 2.2.5., in the previous chapter, summarizes some practical considerations of the literature for applied research.

3.2. Findings and Evidences

In the search for elements empirically verifiable with the definition of the previous chapter, the participants described the main characteristics of their private contributions (Table 3.2).As in the literature review, the diversity of forms and intervention strategies of private contributions is evident, as well as the objectives they pursue, their targeting criteria for beneficiaries and territories, among other characteristics.

Although the study refers to public schools, interviewers asked about the main strategies of each organization at all educational levels and sectors and it was evident that most companies combine strategies that, on the one hand–and with a demand orientation–, provide scholarships directed to the higher education level. On the other hand, when the orientation is towards supply, contributions to the primary, secondary and high school level predominate throughout public schools. In most cases, program designs are the responsibility of the companies' own teams, but implementation is subcontracted to NGOs or community organizations. Business Associations, for their part, have the role of influencing the design and monitoring of public education policy.

Table 3.2. Main Characteristics of the Contributions by Companies Interviewees

ID	Form of Private Contribution	Geographical targeting	Main Beneficiaries	Main objectives	Leading Program
A	Own program implemented by third parties	All the country	Public Schools educational community	Education Quality & Cultural promotion	School environment
B	PPP's	Area of influence of the operation	Public Schools	Sustainable infrastructure	Educational infrastructure
C	Own program implemented by third parties	Area of influence of the operation	Employees and their families, and Neighbor Community	Education Quality & Access to Higher Education	Scholarships (demand) & Academic Quality improvement (supply)
D	Various own programs implemented by third parties	Area of influence of the operation	Various (by company)	Various (by company)	Resources for students and schools and Readability

ID	Form of Private Contribution	Geographical targeting	Main Beneficiaries	Main objectives	Leading Program
E	Direct operation	Area of influence of the operation	Own schools (private)	Educational quality	Rural Education
F	Direct operation	Area of influence of the operation	Three municipalities	Reduce of Urban-Rural gaps	Sustainable communities
G	Direct operation	Area of influence of the operation	One Public School	Education Quality	ICT learning strategies
H	Public Policy & Advocacy	Area of influence of the operation	Community	Education Quality	Advocacy in Education Policy
I	Education Policy & Advocacy	All the country	Public Schools and Public Offices	Articulate public and private efforts	Leadership in School Management

3.2.1. Motivations

There is a consensus in the notion that private contributions in companies arise as welfare or charitable-type contributions and donations, developing voluntarily. Consequently, their emergence has not corresponded to company policies, to the development of strategies or to regulatory elements. The general perception is that these types of contributions are genuinely altruistic and are identified as generous acts of companies with no compensation in mind (Mastromatteo & Russo, 2017). However, the majority of interviewees agree that in recent years the conception of contributions has changed, highlighting in them explicit features of relationship with the communities involved and a more formal management through programs and projects (Crumpton, 2016). This transition is perceived and judged in organizations as maturity: *"but this organization has been maturing a lot and my goal, for which I work hard, is that we move from philanthropy to a more strategic and sustainable social investment, where the social issue adds [value] to the business and does not punish the P&L".* (D; 0:50:02) This transition of motivations is widely reported in the literature (Lee, 2008).[2]

[2] Authors' notes in brackets.

A strategic nature is considered, two-fold: (i) The impacts of the contribution on the social problem that motivates it (Valente & Crane, 2010) and (ii) the benefits for the contributing company (Lipman, 2014; Ricks & Williams, 2005). Thus, two types of motivations guide the contributions: altruistic (prosocial) and strategic (probusiness) that are understood in most cases complementarily (Aksoy, 2015; Kondakci et al., 2014): *"So it is not merely a reputational issue, but there is also a motivation for regional development, for an area that gives us a lot"* (B: 0:28:52).

Altruistic Motivations

Within the category of altruistic motivations, three subcategories are established: (i) one related to the conviction of the company leader, (ii) another with aspects related to regional development and (iii) another in relation to the incentive by the cooperation of other actors. While strategic factors are observed in favor of the company, the main motivation revolves around the general welfare.

The personal conviction of the company leader, the first subcategory, is a common feature in the narrations, recognized as a main motivator when making private contributions to any public interest good and specifically to education (K. S. Groves & LaRocca, 2011; Pearce & Manz, 2014). The interviewees, beyond the personal characteristics, refer to their ability to inspire and convince around an issue that summons collective and common interests based on international referents: *"Don Manuel Carvajal-Sinisterra brings a program to Colombia, to Universidad del Valle, [...] which was a kind of MBA, where eventually they invited Peter Drucker, and a mobilization is created here in administration topics, including philanthropy"*. (E; 0:16:45).

The names of Manuel Carvajal-Sinisterra (1916-1971) and Nicanor Restrepo (1941-2015), for example, and their legacy of an 'entrepreneurial class' are mentioned in several interviews: *"the Brazilian private sector significantly promoted a Latin American agreement for education and that was of great influence in consensus of social responsibility in Latin America; and there education was valued very much because of a very important leadership by Nicanor Restrepo, a leadership that meant, in the Antioquia business world, a more modern, more managerial business and where obviously the issue of education was highly valued"*. (H;

0:10:28). *"Nicanor Restrepo outlined a way of understanding social contributions, which can almost be considered immersed in the organizational culture"* (I; 0:38:15).

Also highlighted in this personal influence is that privileging the social does not exclude the strategic. From the social point of view, that leadership can be referred to as: *"a personal conviction of education being an engine of social transformation, necessary for this country"* (A; 0:12:04); and from the strategic point of view: *"this is a strategic preparation that was decided by the business sector; but there was one very important thing that was part of the [Colombian] business sector's openness to the world, and that was that there was a consensus, where the Colombian business community participated very actively in, and there, the issue of education was highly valued"* (H; 0:09:58)

The second subcategory, *regional development*, is based on the idea that contributions to education are perceived as generating opportunities and social equity, which is especially true when mention is made of the regional context (Tvaronavičienė, Shishkin, Lukáč, Illiashenko, & Zapototskyi, 2017): *"our greatest motivation is to be able to bring development to these regions where we do the intervention: we not only take education, but also other projects or the same operation hired here, because we have local labor and we try for everything to be from the same area*" (B; 0:28:35). Education, as opposed to other possible intervention areas, is largely justified by the notion of its recognized development of capacities: *"the great umbrella of this foundation is to develop capacities in all individuals. And one of the transformation engines or axes to develop capacities in individuals and networks, definitely, is education"* (A; 0:11:51).

Additionally, this subcategory is associated with the idea of *'giving back to society'* (Lubienski, 2016) that the interviewees mention and is generally manifested in the territories and towards the communities where the companies have operations and influence. This awareness of reciprocity (Sugden, 1984 cited in Shang & Croson, 2009) is greater in the areas of business influence for various reasons: (i) as a voluntary compensation for negative external effects (e.g., environmental impacts): *"another project [...] focused on education and also with good neighbor criteria, are the desks made with recycled Tetra Pack®. It is part of our responsibility with the environment, with the millions of packages that we produce to the planet every year, the idea is for us to recover that intelligently, and that it also targets an issue that is school endowment deficit"* (D; 0:38:06); (ii) a company's regionalist feelings and identification with the region where it operates; or (iii) the sense of permanence of the companies' owners or leaders with the land where they were born: *"there are others who are*

much more regionalist, who care about their contribution reaching their region, because it is the region where they live, where they were born, where their company is, where their family is, where their family has land, where their investments are, and there are variations: there are some who feel that it is like a debt they have with that region or a commitment to that region" (I; 0:39:08).

This perception of 'social debt' is also part of the communities' expectations. About the closing of one of its schools, company G declared: *"...well then, let's close it, because if people aren't going, it's because there is a supply of other schools and that's that [...]a week later we had a 'chiva' [a rural transport bus] at that door with thirty people who came to protest, well, to talk to us because they were going to close the school. So even if they were few, the school was considered, within the community, as a contribution a company was making to pay a social debt [...] especially a multinational in rural areas, they have debts with society and have to respond to them with this type of programs"* (E; 0:24:45).

The targeting of the territory where contribution is made does not always correspond to the business's area of influence. It can be recognized that there is some relationship between the type of economic activity of the company and said geographical focus. Companies that have intensive industrial and manufacturing activity in the use of human and natural resources were found to make their contributions to impact the region where they operate; and companies with a commercial activity and services, with more dispersed impacts, make contributions with a universal targeting criteria: *"we do not have a territory: our affiliates, clients, insured, pensioners are all over the national territory and [...] because you fall into the logic that I, as a company, only sponsor the investment of the territories where I am: that would mean that there are territories with no sponsors. Then there are territories where the state does not reach, but neither does private enterprise because it is not its area of influence; so, we're not going to hold on to those ideas either."* (A; 0:11:10).

The third subcategory refers to *cooperation with other public and private actors* (Fehr & Gächter, 2002, p. 19). This cooperation is established as another motivator to make contributions. On the one hand, cooperative work is valued among interviewees as a determinant of better results of the contribution, it ensures greater relevance to social problems and provides greater opportunities for learning and legitimacy vis-à-vis communities for the contributor: *"never work alone; all projects are in partnership with either the government or other foundations, or with other private companies"* (D; 0:28:49)

On the other hand, the purpose is to assure the will of the other actors in society and minimize the risks of what the literature calls crowding-out effects (Besley & Ghatak, 2001; S Bowles & Polanía-Reyes, 2012): *"If the government, not only of this municipality, but of another municipality says: 'I want to do what [you] are doing, it is replicable'. And it contributes, for example, the tutors of "Todos a Aprender" of the Ministry [...], well, no problem. [but]... if we do it only for all [the municipality of] Palmira, then no, that's not acceptable"* (G; 0:42:17). This, with monetary and non-monetary contributions: *"we do not necessarily have an agreement that involves monetary resources, but in general we try to make formal partnership processes, where we make clear what it is that each one contributes to that partnership and we kind of try to develop concrete joint work processes"* (I; 0:22:17).

In the motivations classified as altruistic, it can be observed that the major contribution intention is the common good. Words such as 'genuine' and 'generous' are found to describe contributions that come from intrinsic motivations (Ryan & Deci, 2000).

In general, interviewees associate strictly altruistic motivations with donations, which are more within the discretional scope of the owners of the companies and of which a return is not expected to be measured (Kolm, 2006; Rose-Ackerman, 1996). It is a category that in the corporate world is less prestigious and tends to disappear: *"Today, the percentage of donations that do not target education, culture and democracy are not more than 2%; [...] yes, we continue to donate because of our history, because the owners are friends of the foundations, but they're minimal."* (D; 0:22:47)

Strategic Motivations

Strategic motivations explicitly recognize a private company's profit motives when contributing to educational interventions. These motivations are grouped into four subcategories: (i) those associated with corporate reputation; (ii) those that respond to social or institutional influence; (iii) those that manifestly seek to add value to both the company and society and that this Thesis calls 'shared value;' and (iv) those that recognize a company's long-term sustainability logic. These categories are related to each other and have different degrees of voluntariness (proactivity) or conditioning (reactivity). The second subcategory exemplifies the case of greater external conditioning.

The *business reputation*, the first subcategory, is directly related to the company's ability to recognize its brand's good name as an asset associated with the management of the relationship with its stakeholders and, therefore, its perspective is of risk management (Godfrey, 2005; Laplume et al., 2008): *"others that move more to the spectrum of pure competitiveness or better performance, well, they feel that contributing to that region or to the benefit of it will help their public image, their image as an institution; it will help them with the relationship with the people of that place"* (I; 0:39:37); where reputation is a declared motivation: *"well, to answer your first question, we have to be honest, we are the business foundation, we are a reputational vehicle for the organization"* (B; 0:28:25).

When talking about business reputation, participants also mention related concepts such as 'good neighbor' and 'corporate citizen' as attributes with which they wish to be recognized in their community, as already mentioned in the altruistic motivations section.

The second subcategory, *social or institutional influence* (Andreoni & Petrie, 2004; Soetevent, 2005), also corresponds to the field of relationship with the company's stakeholders, but this time the motivation to contribute privately is a response to an exogenous demand on the organization, and even as an opportunity that arises in the context of some labor problem or with the community: *"So, since the relationship was broken, they told us to please take charge of reconfiguring that. So, in the agreement, we included a large suite of social management. In that suite–which was the one we were developing–we supported them in the process, we organized them, but there we realized a critical education issue when we appraised the situation, and they told us, 'I don't want education for myself, I want education for my children, I'm already involved here."* (F; 0:15:50)

The motivations that correspond to this subcategory are identified with community requirements by community leaders or social organizations and are differentiated according to the nature of the companies' operation, with industrial companies facing greater pressures due also to their greater social and environmental impacts: *"well, because we are an extraction company, we have some legal conditions that bind us, socially. And then there was the voluntary and the mandatory, these leaders prioritized social investment projects in the communities where we were operating."* (B: 0:02:17). This situation conditions the targeting of the private contributions of these companies in the area of influence of their operation.

Therefore, there is a difference between the latter and service companies, which have less social and environmental impacts, the contributions of which are less prone to external

influences and have more autonomous motivations and with much wider areas of coverage than their area of direct operation and which they define as universal: *"Two years ago, we started the methodological transfer of the program to the Dominican Republic and El Salvador because this Foundation has the mandate of private social investment in Latin America, not only in Colombia and not only in Antioquia. In fact, they have told us no more Antioquia, even, no more Colombia."* (A; 0:24:21). This proposition has no precedents in the literature reviewed in the previous chapter.

Another motivation identified in this subcategory is regulatory (Lauesen, 2016). It involves the contributions that companies make with the main objective of obtaining international certifications of their processes that become, in turn, their license to operate and to access more demanding markets: *"in 2004 or 2005 the company began the forest certification process with a very demanding international entity [...]; 'The second thing you must do,' the certifier told us, 'is that we want to see the level of education of your forestry workers,' and there, it was also evident that the forestry worker had very low levels of education [...] and the Foundation began, at that moment, a Primary and Secondary Validation Program for all forest workers who needed it"* (E; 0:36:10).

In this category it can be seen that, just as private leadership undergoes a transformation from altruistic motivations to strategic ones, there are also collective leaderships in society that are increasingly strategic in their demands on companies regarding their interests and which are institutionalized with regulatory instruments and control and certification mechanisms.

The third subcategory, *generation of shared value*, explicitly recognizes the will to pursue benefits for society and for the company simultaneously (Crumpton, 2016; Porter & Kramer, 2011). This is something that in the language of the interviewees is mentioned as win-win behaviors. This idea manifests itself in two senses: first, as the condition for contribution authorization: *"because, if I ask the [President of the Company:] 'Can I have a million dollars for some farmers in Cauca?' He'd tell me to buzz off! But if I tell him that they, themselves, are going to solve the problem of insufficient fruit we have today due to the growth of our juice market, he's say 'where do I sign'? Awesome! Because my business is growing and, in the process, we are generating opportunities for the farmers. So, it's a matter of creativity, devise things that hit both worlds and to show more a shared value perspective"* (D; 0:51: 05). Secondly, as a condition for the continuity of the contributions that are already being made: *"the only one that could be in question is [the municipality] due to lack of results, but that has nothing to do with employee programs, because they have all demonstrated effectiveness and*

results" (C; 0:44:43). The results of the contributions (or the perception of them) in terms of their impact and their effectiveness, and their relation to the motivations, is taken up in the next section.

Motivations of this nature affect the type, form, educational level and even the type of educational institution of the private contribution that the company chooses to make: *"There are companies that are interested in issues associated with their business properly; [...] so they have a much more direct relationship between the product they produce in their company and the social project in which they invest. For example, [...] I work in metallurgy, so I give scholarships for people to get trained in metallurgy and then to be able to work in my production chain"* (I; 0:40:11)

This subcategory reflects the shift towards strategy more clearly and there is a more evident relationship with the effects, finding consensus in the interest to know the effects of contributions (social and corporate, even if the latter are indirect). It is also related to the transparency of the actions and the accountability to position the win-win valuation in the communities.

The fourth subcategory, *sustainability of the company*, recognizes the conviction that a company contributes privately to social causes, such as education, motivated by its expectation of positively affecting, in the long term, the conditions to continue operating satisfactorily (Chakraborty et al., 2004; Kitzmueller & Shimshack, 2012). And although most of the mentions of sustainability in the interviewees refer to environmental issues, there is a shift to a perspective with motivations giving more value to structural and long-term factors: *"For example, the school we are going to finish in Yumbo is the first public LEED-certified*[3] *school [...] apart from that, we have a sustainability policy [in the Company] which is very strong. In construction we are very rigorous with the issue, with all environmental, sustainable issues."* (B: 1:07:42). Sustainability refers to both of the company and of the territory where it operates: on the formation of the Administrative Council of the Foundation of this family company, *"the first transformation that occurred in this exercise was the answer to the question, 'In what capacity are we sitting here?' [...] They make the decision that they have a seat at the foundation as shareholders, because as shareholders they acquire a responsibility for the sustainability of the communities and the territories in the face of the sustainability of their*

[3] Leadership in Energy & Environmental Design, LEED, is a green building rating system of the U.S. Green Building Council (USGBC). More information available in https://new.usgbc.org/leed

assets" (F; 0:24:35). However, the financial performance of the business conditions its contributions to education: *"What motivates you today to invest less? The economic results of the business!"* (F; 1:20:00)

This long-term consideration activates the two-way relationship between private contribution motivations and effects, and a clear management awareness that involves an institutional commitment that interviewees reflect in the organizational structure through their own sustainability offices: *"Other initiatives such as "My Bike" or "My Desk" have [emerged] in the direction of sustainability of the companies; literally, a creative exercise: What do we do in education? What can we do in education? and well, researching and seeing what other companies do, what they are doing in the world"* (D; 1:14:32). They are able even to account for the measurement of the effects of their contributions: *"The President says that we must create a Vice Presidency of Sustainability because we must not only take care of the social, but also of the three components: [...] a development direction with communities that has the direction of sustainability metrics and the direction of SISO*[4]*, an environmental management and we as a foundation"* (B; 0:04:50).

In summary, many and varied are the motivations that companies recognize to contribute privately to education. This subsection groups them into altruistic and strategic, highlighting a growing strategic awareness and a growing association between motivations and effects.

3.2.2. Effects

This section reports the propositions that are derived from the analysis of the interviews when inquiring among the participants about the expected effects, trying to classify them into private (for the company) and public or social effects; asking about the associated metrics and the applications of these measures (if any) or the perceptions about the effects that are formed in the company in the absence of objective metrics. Because these are private companies, it is assumed that there is an explicit awareness of the return of the use of resources allocated to education, even though this awareness is a recent issue as shown in the previous section.

In fact, and although only one organization has a full-time team responsible for measuring the impacts of their contributions, there is total consensus on the idea of having more precise estimates of the effects but, generally, it is also widely accepted that the available information

[4] Unified Management System for Industrial Safety and Occupational Health

about the projects talks more about the management than of the impacts: *"the big task I tell you, we still have very basic metrics–not even metrics–, some very basic management and results indicators: well, how much did I invest, where did I invest, with what coverage, in how many departments, how many people did I benefit directly and how many indirectly, and no more [...] but hey, what happened? what's going on? then we started an impact assessment process of the program [...] and we are in that process and it is very important to do it"* (A; 1:14:45).

Likewise, the language of quantitative metrics is spreading in the corporate world and it corresponds to the profile of the leaders who evaluate the processes, even if they admit being unprepared to be able to account for the objectives pursued: *"...because if you talk to them of attitudinal changes [to the Board], well, are they happy about that? No! It's more like: 'tell me, how many entered? And, of those who entered, who started with the program, how many have gone to college? or how many are doing something for their lives, something productive? So, there are some indicators [...] validated by the Board and by him, especially by him. He is a man of results [...] Metrics such as tuition rates are always there, but the thing is, some things are very difficult to establish..."* (G; 0:47:52)

The relationship between the motivations and the effects is direct, as already mentioned, but it does not exclude indirect effects. That is, altruistic motivations expect, at least, positive public and social effects, and strategic motivations expect, at least, positive effects for the company. Accordingly, the route of this section bears great similarity with the previous section. A proposition that is quickly derived in the analysis of the information is that, in the long term, the additional private contributions will be conditional to the positive effects of the preceding contributions.

Private Effects

The category of private effects reported by participants is broken down into three subcategories: (i) those related to legitimacy or social license to operate, (ii) fiscal and tax incentives and (iii) competitiveness.

The first subcategory, legitimacy or social license to operate, is directly related to reputational motivations or public relations issues (Mersham & Skinner, 2016). The solution of some conflict with the community of influence becomes the main return, even if this is due

to a direct effect (e.g., the termination of the cane cutters' strike in the sugar industry after 52 days) or indirectly: *"We have always done very well in certifications because auditors come and consult with the community and [...] we have been very well rated in the three axes of the certifications. However, we are faced with the fact that we have to conduct a quick impact evaluation of the Foundation's social programs; that, we have not done"* (E; 0:58:23). The maturation process of the communities along with the corporations will make this subcategory increasingly relevant.

Concerning *fiscal and tax benefits*, the second subcategory, it is certainly true that the fact that companies, which have made private contributions to educational institutions, have been able to reduce their tax base. However, for the interviewees and consistently with the literature (Duquette, 2016; Hossain & Lamb, 2015), this benefit is not decisive when defining whether or not to contribute: *"...with the tax reform, I believe that isn't so significant [...] we have an administrative and financial agent who handles these issues, but I really do not think that's the motivation"* (B; 0:31:01). Private contributions in education, in the Colombian case, as in the empirical evidence identified, is not very sensitive to tax incentives: *"How much does the tax benefit weigh? For us, not so much anymore. When the great goal already becomes part of the company's strategy and everybody realizes that the sustainability of the territory is part of the sustainability of the company, the tax factor stops weighing"* (F; 1:03:40). Four of the nine interviewees were directly asked about the tax benefits and all agreed in considering the magnitude of the effect low, and their sensitivity to the decision to contribute to the level of the schools, null. Only one of them recognized that it is sensitive, at the level of higher education in the private sector.

That is, even if financially there are tax incentives, the perception is that such benefits are unimportant either in the decision or in the management of contributing privately.

The third subcategory, *competitiveness*, is mentioned recurrently even when no reference is made to supporting evidence. In the cases where there is more relation, direct effects are noted on the labor productivity of employees with lower levels of training, which is why practically all the organizations interviewed make investments in the education of this group of employees: *"the people [in the municipality] are very basic people who do not even have good reading comprehension; so we need to raise the skills of the population to ease the adaptation into our productive processes"* (C; 0:24:20).

In this last subcategory, unlike the first two, it is more difficult for the company to internalize all the positive external effects of investments in education and they succeed, even without intending to, in generating positive external benefits on the industry and on the territory.

Public and Social Effects

This group of effects, where the company–originally and authentically–pursues social objectives, is broken down into: (i) those directly associated with social progress and (ii) those related to the conditions that ensure the stability of the results.

The subcategory of *social progress* represents the diversity of social objectives sought, which is consistent with the diversity of private contributions: educational infrastructure (participant B), advocacy in public policy (H) and education (I), sex education (A), ICT-based learning (G), and bicycles in rural schools (D) are some examples of the contributions of participating companies. While company C targets population to access the university: *"for employees' children to study in high quality schools, for them to have greater opportunities to enter a high quality university and be beneficiaries of our scholarships"* (C; 0:16:33); for organization G, the emphasis is on closing gaps between sectors over a territory: *"the target of action in education is public education, because it is what allows the creation of balanced opportunities and equitable for the entire population"* (F; 0:28:48).

Thus, beyond coverage or enrollment rates, there is a diverse group of educational objectives that are pursued such as gender equity, smaller rural-urban gaps, lower dropout, higher academic performance, greater access to higher education, among others, which have higher objectives associated with social mobility (poverty, equity, quality of life, among others): *"there is total conviction that [education] is the right path to generate well-being for more people, because not only the person being educated is impacted, but the family is also impacted and, so, it is the way to create development, progress and well-being"* (C; 0:15:30).

This diversity of objectives poses the challenge of identifying variables that add social effects. In addition, the participants focus on the positive results and notice the difficulty of anticipating unexpected negative effects: *"There is only one case, that is the Camilo Mora, where we could conclude that having made the infrastructure was something bad or negative. [...] That school was tiny, with about 100 students. So, we started to expand the school and it was for about 500 students. But what this meant was that they started to come from all the*

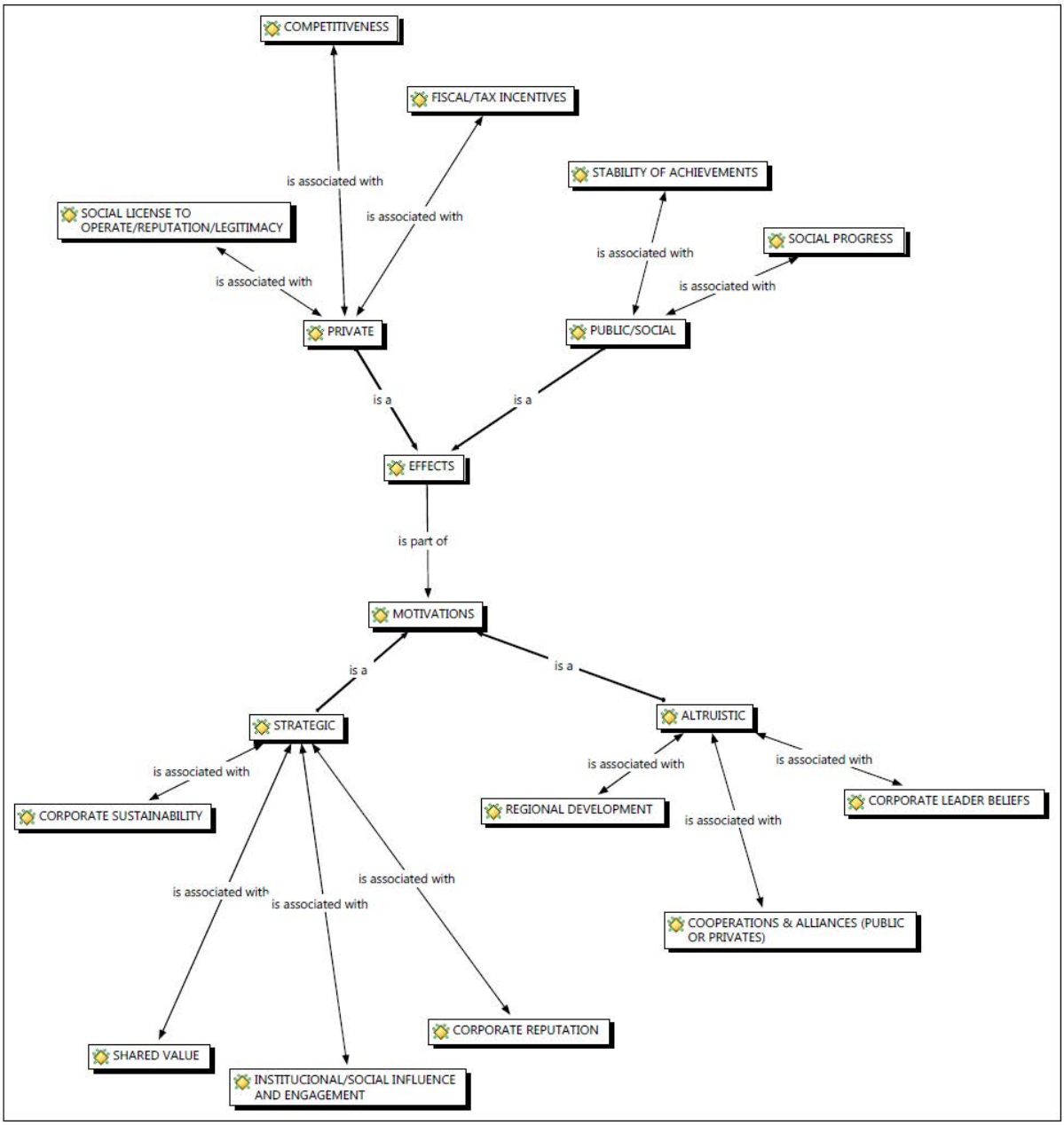
neighborhoods and this is a complicated sector, a lot of squatters and lots of invisible borders, and around here, there is a neighborhood that is of African descent and then all this moved to the school. So, the school started with issues of racism, of invisible borders; even the rector resigned: he couldn't take it anymore" (B; 0:49:58).

The *stability of the results* subcategory recognizes the importance given by participants to the fact of contributing positive impacts, and of ensuring that such impacts remain even after the private contribution no longer continues. In other words, keeping the sustainability of the impacts over time. On the one hand, this recognizes that the company assumes its contributions to a school as temporary, even if the project is very long term and that, therefore, it must conclude co-responsibility agreements and processes of transfer of knowledge and empowerment with different actors of the educational process (parents, teachers, among others): *"Another issue is relationship, and that is critical because, in the end, that is one of the great aspects that make processes sustainable; because in the end, in an educational institution, teachers or managers who know how to relate, who know what actors there are in the territory, who know how to connect those actors based on what their institution and their territory needs, and that in terms of that pillar and that capacity of knowing how to relate, is what can generate sustainable processes"* (A; 0:43:57).

By comparing these categories with the systematic review of the literature, these objectives are mentioned exclusively in private contributions that take the form of Private Public Partnerships (PPPs) (A Verger et al., 2016; Zakharova et al., 2015).

Indeed, the effects in most cases are intentional and predictable, seeking effects both for society (direct and in the short term) and for the company (indirect and in the long term). Having objective and quantitative metrics is an expectation by everyone, but few really manage to do. Even so, with or without objective measurements, private companies form opinions about the effect of their contributions and, based on them, redefine their actions in subsequent periods. Figure 3.2 represents the thematic network of the categories and subcategories described in this section, highly validating the taxonomy suggested by the literature review of the previous Chapter (Figure 2.3).

Figure 3.2. Thematic Network Private Contribution on Education in Colombia



Source: Proposed by the author (Thematic Analysis using Atlas.ti)

3.3. Discussion and Implications

Considering the objective of comparing the main empirical elements presented in the review of the literature on private contributions, which is reflected both in the definition and in the taxonomy of motivations and effects, this Chapter finds a significant consistency in the individual features of the contributions of his/her organization described by each interviewee.

Private contributions take the form of direct and indirect contributions (financial and non-financial) that organizations make voluntarily. In most cases, they arise from personal and altruistic initiatives that, over time, are articulated to the corporate strategy and institutionalized in it and in the communities. The objectives pursued are, predominantly, of a social and public interest nature, so that the cooperation and coordination conditions with other social actors are privileged.

Consistent with the objective and the results of the literature review, the interviews and their resulting 'themes' have been guided by corporate behaviors that take the form of projects and programs (Crumpton, 2016) and that respond to an altruistic motivation (Mastromatteo & Russo, 2017) but that, over time, move to a strategic approach (Lee, 2008). Some other features that are present in the literature were validated in semi-structured conversations with business leaders: (i) the idea of giving back to society (Lubienski, 2016), (ii) the feeling of reciprocity (Sugden, 1984 cited in Shang & Croson, 2009), (iii) low sensitivity to fiscal incentives (Duquette, 2016; Hossain & Lamb, 2015) and (iv) interest in the sustainability of investments and the complementarity of the effects (Aksoy, 2015; Kondakci et al., 2014).

The coincidence of the categories in the thematic analysis and those of the literature review justify the direct and indirect relationships among the types of motivations and effects. It is observed that strategic motivations mainly–but not exclusively–stimulate private effects; the same is true for altruistic motivations and public effects. Indirect relationships and the circular relationship between motivations and effects provide evidence that the effects become, repeatedly, determinants of new private contributions.

The notion of shared value, theoretically and empirically, recognizes the complementarities between public and private benefits, while integrating the categories that taxonomy isolates to facilitate analysis. Business leaders' decisions reveal that companies do not choose corner solutions (private contributions with pure motivations, whether altruistic or strategic). What is not so evident is that to achieve these complementarities, the company faces a trade-off between its private effects and effects on society.

Although the effect of contributing privately is assumed to be observable and known, and the interviews confirm that this effect is taken into account by those who make the decisions to contribute or not, it is also evident that the processes for measuring impacts are only incipient. Consequently, only some decision makers have a measurement available of the effect, while the rest of the decision makers have a conjecture or presumption about it.

However, the effect (in one case) and its perception (in the other) are treated similarly. In addition to objectively estimating the effects, assessing whether the effects correspond to perceptions represents an interesting future line of research.

One of the issues reported in the literature which was not discriminated in this analysis refers to social preferences that are affected by other contributors' behavior (competitive and status-seeking preferences, subsection 2.1.5). Given the qualitative nature of the analysis, only interviewee information is available, but not information of other companies that may affect their decisions. This is another work opportunity in this research agenda.

Likewise, the challenge of adding such a diversity of features to public schools private contributions also represents a research opportunity. For this, in the empirical implementation, it is necessary to review the categories and classification codes of the information systems (in the cases where they exist) where the companies report both their management and their goals and impacts. This taxonomy, which starts in the literature and is contrasted with this qualitative exercise, is the main contribution of this chapter.

Although those initiatives in charge of the executives or managers of the companies (agents) are more documented in the literature, the most marked limitation, after the analysis process, refers to the impossibility of contrasting the implications of the agency literature since none of the participants in the sample has the role of owner (principal). In the future, contrasting a group of investors and owners of the companies will allow discovering the similarity between the decisions made by the agents on their behalf, as opposed to what they themselves would make. With this second reference group, it would also be possible to deepen the magnitude of the expenditure, especially in those contributions (and then in the returns) that are not monetary.

With the approach used (exploratory qualitative type) and in line with other works reported in the literature, the number of interviews satisfied the required saturation criterion. However, the line of work proposed in the previous paragraph is an opportunity to increase the number of interviews and collect information related to competitive and status-seeking preferences that this chapter has not included. The foregoing would be especially useful for the following chapters where, given the quantitative approach, the external validity criteria focused on the research results–and not on the process–would be favored (Cho & Trent, 2006).

Based on the above, the following Chapter assumes the task of defining a methodological proposal to estimate the effect of contributing privately to public schools. The hypotheses that

this previous work suggests to test relate to the existence of an effect attributable to the private contribution. In other words: a student who attends a school that receives contributions from private companies will perform better than one who attends a school that does not. This methodological route in Chapter 4 is done from an aggregate perspective and in Chapter 5 validating the robustness of the results according to the different types of contributions.

Chapter 4

Private contribution Effect on public schools and academic performance of students. Order-m estimation.

4. Private contribution Effect on public schools and academic performance of students. Order-m estimation.

4.1. Introduction

The specific objective of this Chapter is to estimate the effect of voluntary contributions by private companies to public schools on the educational performance of their students. Henceforth, we will refer to this result as the Private Contribution Effect (PCE). This objective responds what is the effect of private contributions on the academic performance of public schools in Colombia and validates the hypothesis that Public schools students that draw private contributions have a greater academic performance than those that do not, once both their socio-economic condition and the educational quality of their schools are controlled. Also, contributes an estimate of this type of effect to empirical literature using an efficiency approach.

After proposing a concept of private contribution and a classification of its motivations and effects based on the review of the literature (Chapter 2), as well as validating its empirical implications in the interviews with the leaders making these contributions (Chapter 3), the absence of aggregate measures capable of integrating the diversity of private contributions is notorious. This, even though the effects (which are assumed to be positive) are highly valued by the decision makers.

PCE is measured by integrating nonparametric estimators of the efficient frontier analysis (order-m), oriented toward output, with a meta-frontier framework, using a robust data base. This estimate backs both the evidence-based literature, by providing a reference of an aggregate measure in relation to independent and differentiated contributions, and the empirical literature, on efficiency in education. This methodology decomposes the students' total inefficiency by comparing types of students (who attend schools that receive CPs versus those who attend schools that do not) to estimate the direction and magnitude of PCE. A sample of 269,117 students from four Colombian regions in 2015 - 2016, demonstrated that a PCE is not always positive (coefficients with values greater than 1).

The Colombian case represents an emerging economy, with high inequality, where the quality gaps between public and private education are significant and private household spending is high, resulting in excessive pressure on household welfare (OECD, 2016). Within similar contexts, this country case is of special interest because of the philanthropic tradition of its business class, something that is consistent with the aversion to inequality in prosocial behaviors (Bergh, 2008; Fehr & Schmidt, 1999). Although the systematic review of the literature refers to cases in developed countries, these largely refer to higher education (Barnhardt, 2017; Weerts, Cabrera, & Sanford, 2010; Wren, 1983) or infrastructure endowment (Carpintero & Siemiatycki, 2015; Crump & Slee, 2005; Torres, Pina, & Acerete, 2003). In emerging or developing countries, the reference to elementary and basic education, and to school-based interventions are more frequent. Some examples of this are: Aksoy (2015) who makes a critical judgment about CSR in Public Elementary Schools and Kondakci et al. (2014) who identifies drivers behind business contributions, both in Turkey; Amjad and MacLeod (2014) in Pakistan or Kumari (2016) in India, both assessing the educational performance of students in schools operated by Private-Public Partnerships.

For empirical implementation, Colombia has an unpublished database called SIIPE (Information System of Private Intervention in Education) that is developed in section 4.4. and which registers the contributions by private companies to education: 472 have been registered by 164 private organizations, which in the 2010-2015 period have impacted 3,825 schools (6.1% of all public schools) in 48% of the municipalities with the highest population density (Fundación Empresarios por la Educación EXE, 2016).

Our database compares the SIIPE records with the results in the standardized tests for seniors enrolled in public schools of the municipal heads (urban areas) of all the municipalities of 4 Colombian departments for 2015 and 2016. This sample involves 269,117 students, where 134,114 presented the exam in 2015 and 135,003 in 2016, representing 16.9% and 17.3% of students in public schools respectively. Of these, 130,798 students (48.60%) were enrolled in schools that received some type of private contribution. There is no history of studies in the reviewed literature that use databases with a comparable structure.

The four selected departments (Cundinamarca–including Bogotá, Capital District–, Antioquia, Valle del Cauca and Atlántico), from a total of 32 departments in Colombia, account for: 59% of the country's economic activity; 45% of the enrollment in primary, secondary and high school; and 56% of the schools that have received help from private companies.

The rest of the document includes the literature review (Chapter 2), a description of the method and defines the concept of PCE (section 4.3); it describes the database and sources (section 4.4); and it summarizes the results with which it presents the elements of discussion (section 4.5) and conclusions on the efficiency of the private contributions on educational performance (section 4.6).

4.2. Literature Review

There is an significant and growing interest among academics (Anand, Mizala, & Repetto, 2009; Angrist, Bettinger, Bloom, King, & Kremer, 2002; Hanushek, 2002; Mizala & Urquiola, 2013; Sreekanth, 2011) and public policy makers (LaRocque, 2008; L. Lewis & Patrinos, 2012; Harry Anhtony Patrinos et al., 2009; Harry Anhtony Patrinos & Sosale, 2007; Antoni Verger & Moschetti, 2017) for assessing and generating evidence of the impact of private sector participation in education. In most cases, this conceptual approach refers to whether the provision of the educational service is conducted by the public or private sector.

Beyond assessing which sector performs the best provision, this Chapter starts by reviewing the effects of the systematic review of the literature (Table 2.6, section 2.2 hereof), to identify the evidence that helps to better understand the effects of the contributions by private companies to public schools.

The diversity of forms of private contribution can be identified in this review. The effects, clearly related to the motivations, are more likely to be measured when particular interests are explicit, as is the case with PPPs, which, in turn, refer almost exclusively to educational infrastructure (Carpintero & Siemiatycki, 2015; Crump & Slee, 2005; Kumari, 2016). In contrast, the idea persists that altruistic motivations are less exacting with measuring the effects of their contributions, while undeniably pursuing positive social impacts. Kumari's claim about the measurement of the effects of PPPs extends to all kinds of private contributions: *"While private participation in school education has increased significantly over the past two decades, there is not enough rigorous research on the effects of PPPs in education to be able to draw many definite conclusions at this time"* (Kumari, 2016, p. 52)

This literature highlights the culture of accountability being imposed thanks to these private participation mechanisms but, all the while, there is a potential risk of higher educational costs because of the profit expectation of private investors (Kumari, 2016), as well as a critical stance

towards the weight of the public sector debt with the private (Crump & Slee, 2005). Likewise, there is a risk of focusing on financial performance and enrollment rate as the main criteria, postponing educational quality assessment, for example, due to the recent building of schools: *"As of 2014, in most cases, the PPP schools were performing well financially. [...] However, according to the information provided in the interviews by representatives of the institutions in charge of the projects and representatives of the banks, financial profitability was around 10%-12% in most cases. [...] Although most of the schools had just started to operate and therefore it could be argued that we are too early to pronounce the programme successful, previous experience with social infrastructure initiatives suggests that the initial phase is the most difficult"* (Carpintero & Siemiatycki, 2015).

Although the three articles mentioned in the previous paragraph share the same mechanism (PPPs), both the objectives they pursue and the nature of the effects and the way where they are measured are different. This diversity of metrics is a constant that is also observed in other types of private contributions. Two additional examples to illustrate this idea are: the work of Bettinger and Slonim (2006) where, using experimental economic methods, the research variable is students' altruism affected by a voucher program; and the work of Markussen (2011) evaluating how the institutions of democracy and taxation affect the private provision of public goods, the latter referring to higher education.

While greater efforts are recognized in the measurements of the effects of contributions with private motivations, it is also true that the effects reported are diverse and, therefore, technically difficult to aggregate. In contrast, private contributions with social motivations have the potential to be aggregated through outputs and outcomes indicators, which are universal, and typical of educational management. In other words, while private effects are the source of diversity, public effects are the source of commonality.

In line with these major global agreements on education, educational quality is much more than the educational performance of students and schools. However, measurements associated with standardized tests (e.g., OECD's PISA) are widely reported in the literature and, although not exempt from criticism (Feniger & Lefstein, 2014; Grek, 2009), they provide a more objective, comparable and additive framework (Hopfenbeck et al., 2018), which allows assessing good practices in teaching systems (S. Lewis, 2017) and testing different determinants individually: cultural capital (Tramonte & Willms, 2010), parent education (Martins & Veiga, 2010), immigration (Meunier, 2011), peer effect (Micklewright, Schnepf, & Silva, 2012), among others. In turn, better educational performances measured with

standardized tests are associated with higher GDP growth rates at country level (Hanushek & Woessmann, 2008).

When the measurement of these effects is associated with private contributions (systematic review of the literature, section 2.2 of this Thesis), only two studies measure academic quality with standardized tests. Crawfurd (2017), using a dynamic OLS 'value-added' specification, evaluates the role of school management on the educational performance in Africa. Ilon and Normore (2006), with a three-stage process (multiple regression, cost analysis and a simulation), compares relative costs of size class in Florida. A third article, using Data Envelopment Analysis (DEA) evaluates the efficiency of public spending in Europe (Gavurova et al., 2017).

Considering other types of valuations, sources and techniques to measure the effects of private contributions that do not use standardized tests, this Thesis differentiates the studies that address the effects from the perspective of student performance (Anderson & Donchik, 2016; Crawfurd, 2017; Ferris et al., 2008; Ilon & Normore, 2006; S. Lewis et al., 2016; Lipman, 2014; Tooley, 2005; Wetherill & Applefield, 2005; Yilmaz, 2013), from those analyzing the effects from the perspective of the school (Amini, Ghodsi, & Rafiee, 2016; Amjad & MacLeod, 2014; Au & Ferrare, 2014; Crawfurd, 2017; Davies & Hentschke, 2006; Ferrare & Setari, 2018; Henisz, 2011; S. Lewis et al., 2016). This Thesis integrates both perspectives using a multilevel approach (De Leeuw & Meijer, 2008; Dedrick et al., 2009; Rasbash & Browne, 2008) with a nested hierarchical structure (Dedrick et al., 2009; Thanassoulis et al., 2016) where the effects are measured at the student level, considering determinants at the student and school level because private contributions are mostly school-based. Territory level and environment factors are treated through comparison groups.

Additionally, not all the effects of private contributions are positive and foreseeable. The most sensitive case reported in the literature is the crowding-out of private or public provision (Besley & Ghatak, 2001; S Bowles & Polanía-Reyes, 2012; Newland, 1994) and which, for this study, means that there is a potential risk that the public agents in a territory will reduce their commitment and contributions when encountering private contributions in their public schools. This, according to the accounts by the business leaders in the qualitative exercise (Chapter 3). The empirical implication for the PCE estimation is that it should assess the net effect of private contributions, considering the potential effects–positive or negative–of a greater or lesser commitment of other institutional actors in the environment of the reference schools.

Methodologically, among the different ways of approaching the issue in the empirical literature, two stand out: (i) outcomes assessment using quasi-experimental methods and randomized experiments and (ii) nonparametric frontier estimators using an efficiency approach.

Of the first group, McEwan's Meta-Analysis of 77 Randomized Experiments of school-based interventions in developing-country primary schools is noted. This analysis evaluates the effects on learning by intervention types, finding: *"On average, monetary grants and deworming treatments had mean effect sizes that were close to zero and not statistically significant. Nutritional treatments, treatments that disseminated information, and treatments that improved school management or supervision, had small mean effect sizes (0.04-0.06) that were not always robust to controls for study moderators. The largest mean effect sizes included treatments with computers or instructional technology (0.15); teacher training (0.12); smaller classes, smaller learning groups within classes, or ability grouping (0.12); contract or volunteer teachers (0.10); student and teacher performance incentives (0.09); and instructional materials (0.08)."* (McEwan, 2015, p. 353).

Referring to the second methodological approach, which employs efficiency techniques with nonparametric methods, there are at least two recent exhaustive literature reviews. The first, specifically referred to Applications of Data Envelopment Analysis (DEA) in Education (Thanassoulis et al., 2016), which makes precise reference to the multilevel perspective and its nested relationships mentioned before (school and pupil level). De Witte and López-Torres (2015) also provide an extensive overview of the literature on efficiency in education proposing, even, a link between this approach and the economics of education.

The first methodological approach, based on a counterfactual approach, emphasizes that it represents causal effects of a treatment through efficient and unbiased estimators (Angrist, 2010; Angrist, Imbens, & Rubin, 1996; Rubin D. B, 1974). However, this Thesis selected an efficiency approach for several reasons. Conceptually, one of the main advantages of this approach is that it allows measuring the overall Pareto efficiency of a set of Decision Making Units (DMUs), students in this case, that use multiple inputs to produce multiple outputs: *"The presence of multiple inputs, multiple outputs, and prices that are unlikely to serve a useful purpose as weights, are features that combine to make DEA an instructive tool in this context"* (Thanassoulis et al., 2016, p. 368). To be able to relax the assumption about prices, brings to mind the original idea of the seminal work of Charnes, Cooper and Rhodes (1978) of evaluating the efficiency of public programs offered by non-profit institutions that resemble

our analysis case. Empirically, without being the only alternative, the initial reason that justifies the use of this approach is the impossibility of controlling the conditions of treatment implementation (in this case, for a school to receive a private contribution). This approach, moreover, does not impose a functional form for technology and does not have to make assumptions about the distribution of errors. The construction of an empirical frontier based on the observed data facilitates the identification of peers, relatively, as opposed to estimates based on measures of central tendency.

Although the term 'effect' is more closely connected to literature on the economics of education, the use of the term in this chapter (which follows an efficiency approach) is not intended to suggest a causal inference approach. The use of the term 'effect' parallels previous works in the literature on educational efficiency that share the methodological route of this chapter: pupil and school effects in Thanassoulis and Silva (2002) and de Jorge-Moreno, Díaz, Rodríguez, and Segura (2018); overall, student, school, peer and resource endowments' effects in Thieme, Prior, and Tortosa-Ausina (2013); overall, student, school and contextual effects in Thieme et al. (2016)

This Thesis, which employs an order-m estimator that is a refinement of the Free Disposal Hull (FDH) technique (Deprins, Simar, & Tulkens, 1984), solves the traditional criticism of outliers (Cazals, Florens, & Simar, 2002; Simar, 2003) adding a random component (bootstrapping).

Since the first application of order-m in education to incorporate a multilevel concept (De Witte, Thanassoulis, Simpson, Battisti, & Charlesworth-May, 2010), other works have incorporated it for other purposes: (i) To decompose the total inefficiency in different effects (Thieme et al., 2013), (ii) To estimate a measure of added value (Thieme et al., 2016), (iii) To allocate human resources in public schools (López-Torres & Prior, 2016), iv. To identify competitive pressures among public schools (López-Torres, Nicolini, & Prior, 2017), among others. A reference for the Colombian case, using PISA 2012, tests differences between public and private schools and decomposes student and school effects (de Jorge-Moreno et al., 2018).

In summary, this Thesis conducts an order-m estimate under a non-parametric approach of efficiency with orientation to output to estimate a PCE that represents the effect on the educational performance of students that is attributable to private company contributions to public schools, recognizing the diversity of contributions and, even, the confluence of more than one company or more than one contribution to the same school. This measurement

represents a net and aggregate effect considering: conditions of the student, the school and the geographical area where the school is located. After the literature review, as hypothesis, is expected that public schools students that draw private contributions will have a greater academic performance than those that do not.

4.3. Methodology

This section presents the methodology for developing the PCE, adapting a meta-frontier approach, as well as the estimate technique (order-m) and the model used.

In line with the idea developed by Thanassoulis and Silva Portela (2002) and Thieme et al. (2013) for the decomposition of effects of global efficiency from local frontiers, this Chapter estimates the PCE as the distance between two frontiers that result from comparing each student (DMU) with two groups of students: those who attend schools that received private contributions and those who attend schools that did not. Intuitively, if the distance of an individual in relation to the frontier of each group represents a measure of partial efficiency (hereinafter, inefficiency or potential improvement because it is output-oriented), the difference between the two distances for each student corresponds to the effect that is attributable to the private contribution.

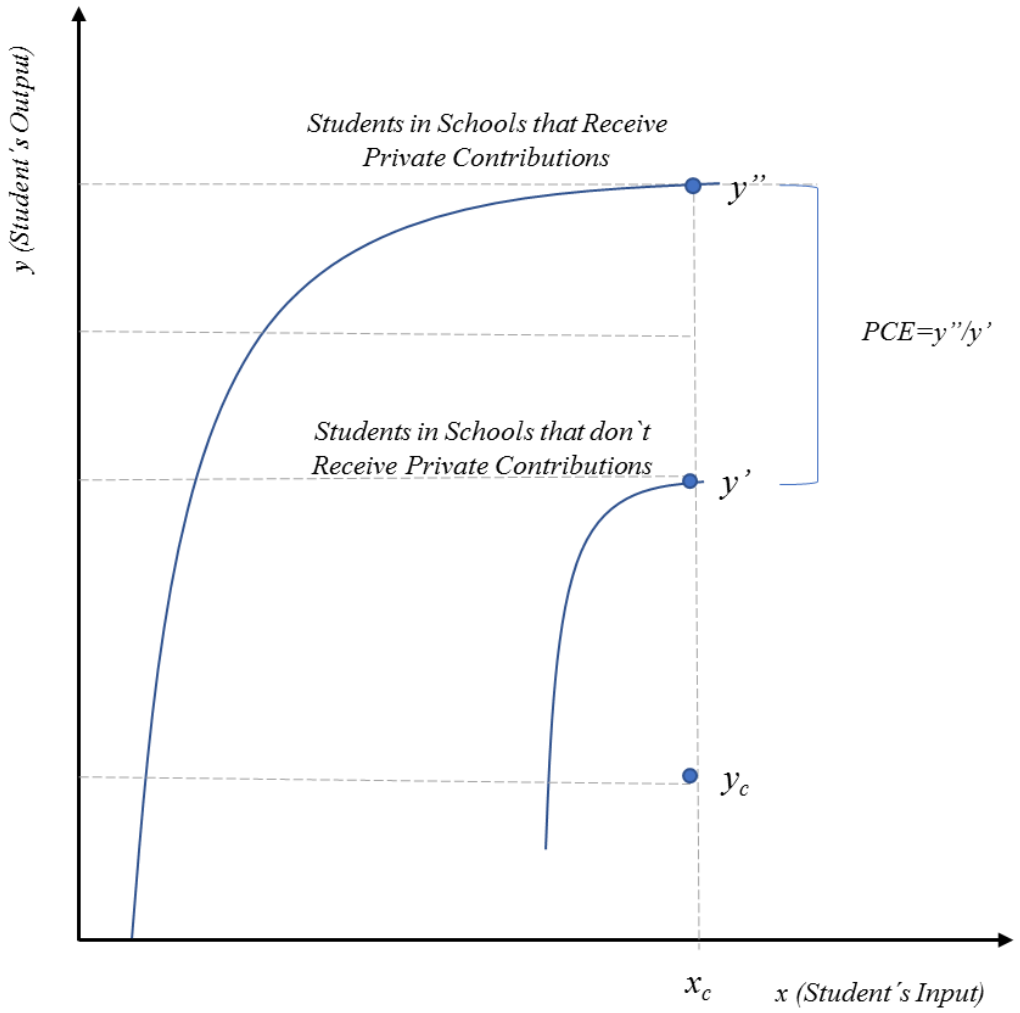
Figure 4.1 with one that seeks to maximize the level of outputs given the level of inputs (Bessent & Bessent, 1979), represents the situation of student *C* who can attend both a school that receives contributions from private companies and one who does not. Educational performance (y_c) is compared with those students who, having similar levels of inputs (x_c), obtain the highest educational performance. The two frontiers represent each of the groups of students against which student *C* is compared: those who attend schools that receive private contributions and those that attend schools that do not. By construction and consistent with the research hypothesis, this work assumes that, on average, the educational performance of students who attend schools that receive private contributions is higher than that of students who attend schools that do not receive them.

The distance between the performance of student *C* and the frontier of students who attend schools that receive private contributions (y''/y_c) corresponds to student *C*'s margin of potential

improvement in relation to this first group given the levels of his inputs. The values of this distance would equal 1 when the student evaluated has the highest educational performance given the level of inputs and, therefore, is the most efficient possible. In any other case, that is, students with educational performance below the frontier, that distance has values greater than 1, which is the measure of inefficiency. Due to the random component of the estimation method explained below, it is possible to have super-efficient cases with efficiency coefficients less than 1. The same is true with the distance (y'/y_c) when compared to the group that does not receive contributions.

Finally, the difference between both distances $\frac{y''/y_c}{y'/y_c}$, which is equivalent to the distance between both frontiers *(y''/y')*, corresponds to the PCE and it will have values greater than 1 when $y''>y'$ that is, when the research hypothesis is confirmed The interpretation of the PCE, when it has values greater than 1, corresponds to the potential improvement that is attributable to the contributions of private companies.

Figure 4.1. Construction of the PCE: A Metafrontier Approach



Source: (Thanassoulis & Silva, 2002; Thieme et al., 2013)

As an example, a coefficient equal to 1.0564 is interpreted as a margin of potential improvement equal to 5.64% attributable to the difference of being in a school that receives contributions versus one that does not. A coefficient equal to 1 corresponds to the case where it is irrelevant to attend a school that receives or not private contributions. A coefficient lower than 1, on the other hand, represents a situation where the contributions of private companies do not represent an opportunity for improvement.

This latter case, less intuitive, can be explained by several reasons that are also consistent with literature. A first reason is that, just as positive external effects are recognized, it is also possible that negative externalities exist. The most reported is the crowding-out effect (S Bowles & Polanía-Reyes, 2012; Newland, 1994) which, in practice and due to institutional

rigidities, more than the transposition of public spending, it can take the form of weaker efforts on the part of the local educational authorities or initial resistances of educational administrators and teachers who fear privatization. A second reason is associated with the coordination costs of a private contribution, which involves additional work for school staff, additional pressure on the students and that could be aggravated. Evidence of this type of costs is reported in health care provision (Cohen et al., 2012; Smith, Brick, O'Hara, & Normand, 2014; Suijker et al., 2012).

Empirically, order-m, a nonparametric estimator of the efficient frontier (Cazals et al., 2002; Daraio & Simar, 2005) is used to estimate the coefficients of the effects. Order-m estimation shares, with its predecessor the Data Envelopment Analysis (DEA), the ability to evaluate the relative efficiency of homogeneous Decision Making Units (DMUs) against efficient frontiers using more than one output without having to assume a functional form or establishing assumptions about the distribution of errors (Charnes et al., 1978), which are features that make it attractive face to a regression analysis (Silva & Thanassoulis, 2001). Unlike DEA models, but coinciding with the Free Disposal Hull (FDH) (Deprins et al., 1984), order-m does not assume convexity; these comparisons are only possible with observable DMUs and not with linear combinations thereof. Order-m is also less sensitive to extreme values or outliers, and does not suffer from the curse of dimensionality.

In addition to other efficient frontier estimators, in the optimization process of such an order-m efficiency measure, a random sample with m-size replacement is defined comparing the output level observed in each *DMU* ($y_{c,j}$) with random *m DMU* that complies with the condition of having an output level greater than the observed [$y_{m,j} > y_{c,j}$ of *m* random variables ($y_{m,j}$,..., $y_{m,j}$)]. This efficiency measure of such artificial reference sample is known as pseudo *FDH efficiency* $\widehat{\theta_{mi}^{FDH_b}}$. The technique then introduces a bootstrapping component by performing this procedure *B* times, in such a way that the efficiency measure results from the average of the *B* subsamples (Daraio & Simar, 2007).

$$\widehat{\theta_{mi}^{OM}} = \frac{1}{B}\sum_{b=1}^{B} \widehat{\theta_{mi}^{FDH_b}}$$

Because *FDH* is sensitive to atypical values, the larger the *m*, these observations are more likely to be included in the sample, and order-m will be closer to the *FDH* estimation. Due to large samples and the differences of the number of observations among them, *m* was defined as 1% of the sample in the estimation of the frontiers. Parameter *B* is equal to 200 (tests with

higher values did not show significant changes in the magnitude of coefficients, but they did show them in the duration of computational processes). This bootstrapping condition for the estimation of efficiency coefficients and magnitudes of *m* and *B* impose high computational requirements reported in the literature (Tauchmann, 2012), and which this study has solved using part of the code of the "doParallel" routine in the *"nonparaeff" package* for R to optimize the use of resources (processors) in parallel. This is one of the reasons why it is not usual to find estimates of this nature in the literature with equivalent sample sizes: 47,076 observations in Thieme et al. (2016); 22,313 in Cordero, Prior and Simancas (2015); 1,127 in López-Torres, Nicolini and Prior (2017) and 11,319 in Thieme et al. (2013), among others.

The selected production function is conventional in the literature on efficiency in education. A comprehensive review of the most commonly used variables, among others, has been done by De Witte and López-Torres (2015). This study, where students are the *DMUs,* defines their scores in Language (y_1) and Mathematics (y_2) as outputs in a standardized test. The inputs define 3 efficiency sources: the socioeconomic and cultural level of the student (x_1), the quality of the school he or she attends (x_2), and the socioeconomic and cultural level of his or her peers (x_3).

The first variable is at the student level and the other two at the school level. To define x_1, a latent variable is estimated through a Multiple Correspondence Analysis (MCA) (Tenenhaus & Young, 1985), considering the mother's education years, father's education years, and monthly family income. The quality measure of the school x_2 uses the *Índice Sintético de Calidad Educativa, ISCE* (Synthetic Educational Quality Index), corresponding to high school (grades 10 and 11). This index is calculated by ICFES, the National Educational Evaluation Authority, and for the high school level, it weighs 3 components: progress, performance, and efficiency. By construction, x_2 considers the performance of each school in the years prior to the year evaluated, in one of its components, from the performance of other cohorts of students. Finally, x_3 is calculated by averaging x_1 for each school. Unlike previous studies where each input is added progressively to observe its contribution (Thieme et al., 2013), this study maintains the specification of the model y_1, y_2 *(outputs)*, x_1, x_2, x_3 *(inputs)*.

Given that, within the educational process, part of the performance is explained by social, economic and family characteristics within the student's environment (Levin & Kelley, 1994), the literature is increasingly demanding with the influence of environmental variables in student outcomes (De Witte & López-Torres, 2015; Thanassoulis et al., 2016). The literature on educational efficiency suggests at least four different alternatives to be able to incorporate

these variables (Giménez, Prior, & Thieme, 2007) without there being consensus regarding the application conditions among them. In line with the first alternative suggested by Giménez et al. (2007), this Thesis reports the environmental factors grouping DMUs based on school location and the proximity of the company (Henderson, Shalizi, & Venables, 2001; Porter, 1996), and then, estimating different frontiers for each group. As shown below, these groups are the four departments and, within them, their capital cities are independent, to form a total of eight groups. The student's micro-environment and the school are taken into account when employing inputs for the level of the student and the school, and in the latter when considering the socioeconomic and cultural conditions of the school (De Leeuw & Meijer, 2008; Dedrick et al., 2009; J. Johnes, 2006).

4.4. Data and Variables

Four different databases were used for the consolidation of the database that includes 269,117 observations from Cundinamarca y Bogotá, Antioquia, Valle y Atlántico in 2015 and 2016. The first contains information on all the students who performed the Saber 11 standardized tests in 2015 and 2016 (682,194 and 680,109 observations, respectively) applied to seniors, by ICFES. It delivers the individual performance of each student for language and mathematics, as well as family income, and education of both parents to estimate the student's family socio-economic and cultural index. The second database, which contains useful information for the characterization of the school (sector, area, etc.), is the unified catalog of 62,758 schools (educational establishments) at national level, 76% of which are public. This database is prepared by DANE (the Statistical Authority of the National Government) through a census conducted by administrative registry. The third database is the aforementioned Educational Quality Index (ISCE), which only has open access to public schools. ISCE is presented for several levels of education, but this study only considers the high school level (grades 10 and 11). The most important innovation in data construction is, for the first time, the inclusion of a variable that shows the contribution of private companies to educational initiatives. This is achieved in a fourth database of the Information System of Private Intervention in Education (SIIPE) that consolidates the offer of private contributions in education and is led by *Empresarios por la Educación* (EXE), a non-profit business organization. This database identifies 472 initiatives led by 164 private companies that have impacted 3,825 schools in the 2010-2015 period. The database describes the type of

contribution (e.g., school management, ICT, infrastructure, teacher training, among a total of 31 types), academic level of the beneficiaries (elementary, primary, secondary, high school and higher education), and the target population (teachers, students, families, etc.) among other variables, which are discussed in depth in Chapter 5.

In this Chapter, this dataset is compared with the level of educational establishment, selecting those initiatives that, focused on high school, were implemented in 2014 and 2015. In 2014, 37 private organizations are identified implementing 64 initiatives that impacted 501 schools and in 2015, 55 private organizations were identified implementing 109 initiatives that impacted 653 schools (65 organizations and 131 initiatives in both years). As an assumption adopted by this study, one-year private contributions are evaluated from the following year.

In summary, our dataset contains information on the educational performance, and socio-economic and cultural conditions of 269,117 seniors who took the Saber 11 test. These students attend 1,224 public schools in the municipal heads (urban areas) of all municipalities of Cundinamarca (including Bogotá), Antioquia, Valle del Cauca, and Atlántico. Strictly for homogeneity reasons of DMU, two exclusions were applied: (i) Students who declared disabilities, and (ii) schools with fewer than 30 students who took the test in at least one of the two years.

The selection of these four departments is also associated with the relation of private contributions with the proximity of businesses to schools: these four territories concentrate 59.1% (2016) of the country's economic activity, have 46.6% and 49,54% of the students who took the Saber 11 test in 2015 and 2016, respectively, and by far, have the highest proportion of students enrolled in schools that receive private contributions (on average 43% y 54%).

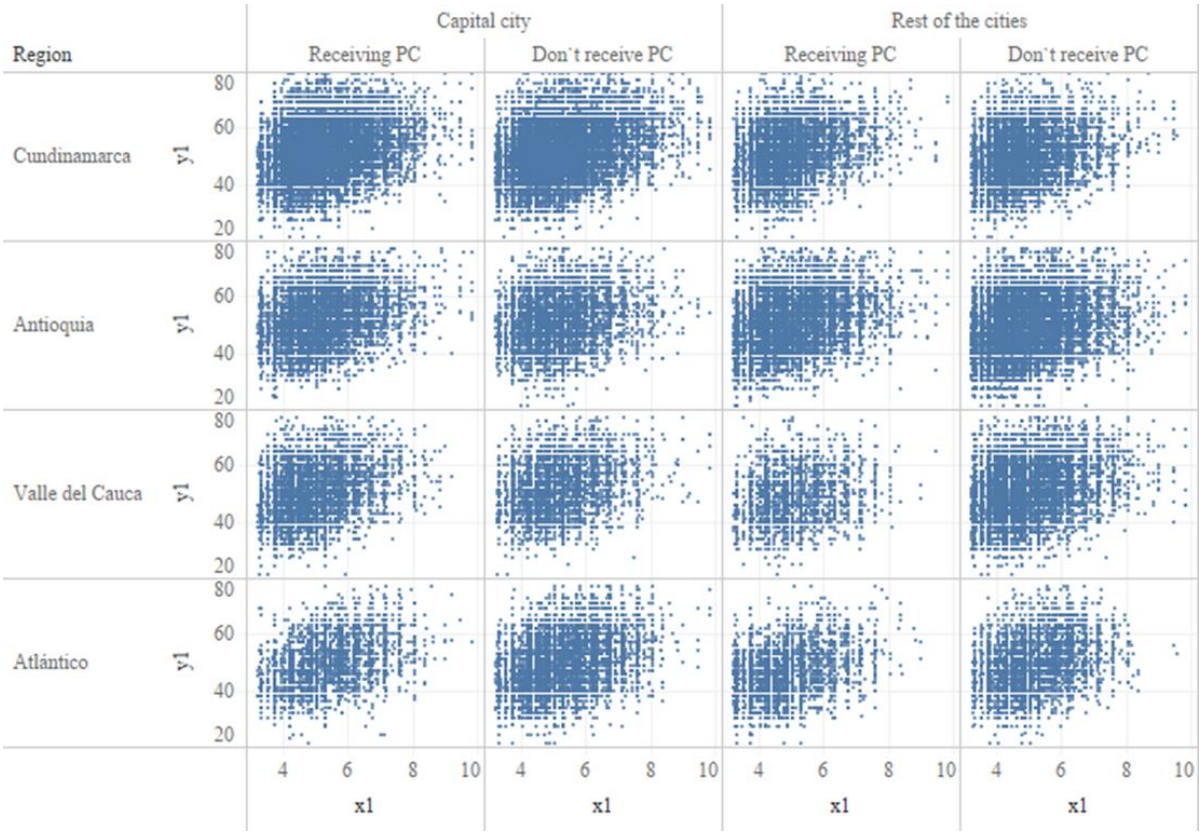
Table 4.1 shows the number of schools and students per department differentiating the type of city and the percentage of coverage of private contributions. The 269,117 students and 1,224 schools per year are broken down for each of the 8 analysis groups in each year (4 departments and the subdivision of capital city and other municipalities). As an example, in Antioquia there are 407 of the 1,224 schools in the sample, 149 in Medellín (its capital) and 258 in the other municipalities of the Department. In the first year, the percentage of schools that received private contributions in Medellín was 53.0% and in 2016, it amounted to 74.5%. For the country as a whole, the growth in private contributions was more accelerated in cities other than capital cities, with Antioquia being the region with the highest percentage of private contributions.

Table 4.1. Students and Schools by Private Contribution Condition

Capital city / State		2015					2016				
		Capital city		Rest of the cities		Total	Capital city		Rest of the cities		Total
		Obs	% receive CP	Obs	% receive CP	Obs	Obs	% receive CP	Total	% receive CP	Obs
Bogotá / Cundinamarca	Schools	301	44.2%	149	45.0%	450	301	43.5%	149	46.3%	450
	Students	41,919	48.0%	16,024	48.2%	57,943	41,667	47.9%	15,828	49.3%	57,495
Medellín / Antioquia	Schools	149	53.0%	258	36.0%	407	149	74.5%	258	67.8%	407
	Students	12,944	58.2%	25,009	36.3%	37,953	12,663	74.9%	25,510	69.1%	38,173
Cali / Valle Del Cauca	Schools	69	63.8%	124	14.5%	193	69	58.0%	124	25.8%	193
	Students	8,757	59.6%	12,786	16.1%	21,543	9,033	55.7%	13,416	26.5%	22,449
Barranquilla / Atlántico	Schools	104	31.7%	70	48.6%	174	104	59.6%	70	47.1%	174
	Students	9,150	27.7%	7,525	44.9%	16,675	8,969	57.7%	7,917	57.2%	16,886
Total general	Schools	623	46.4%	601	35.3%	1,224	623	55.2%	601	51.4%	1,224
	Students	72,770	48.7%	61,344	36.3%	134,114	72,332	54.8%	62,671	53.4%	135,003

Figure 4.2 illustrates some of the criteria described that justify the selection of the technique. The presence of outliers and extreme values, and the differences in output levels for students with the same input level is evident (the figure illustrates this as an example for 2015 with x_1 vs. y_1 although the relation is similar for both outputs and years in relation to each input and between them), differentiating sub-samples for the capital cities and for the rest of the cities for the four departments, and for the condition of receiving or not private contribution.

Figure 4.2. Language versus Socio-Economic and Cultural Level (Colombia, 2015)



This distinction between capital cities and the rest of the cities in each department also aims to make the DMU more homogeneous and comparable. The proximity of companies to large urban centers (in this case capital cities) is one of the main reasons for this decision. The design of the sample also favors this purpose by including only the students of schools located in the municipal head of each municipality and excluding rural schools. In the absence of geo-referenced data that allow to adjust the proximity to location patterns, the criterion for grouping has been the administrative political division with the limitations it represents: on the one hand, the possibility of including municipalities too distant from the capital cities, and on the other hand, forcing the comparison of Bogotá (which is an independent district) with the department that contains most its municipalities of influence.

Figure 4.3 shows the average performances in language and mathematics in the four regions (capital cities versus the rest of the department) depending on whether the schools are receiving help from private companies or not for both years. There are gaps in the average score for language in both years, from 51.7 (2015) and 54.5 (2016) in schools that receive private contributions in the capital city in Antioquia, up to 46.8 (2015) and 51.3 (2016) in the same

type of schools in the other municipalities of Atlántico. Similarly, in mathematics: from 51.9 (2015) in schools that received aid in Bogotá to 46.8 in schools that indeed received these contributions in the rest of cities at Atlántico. Students enrolled in schools located in capital cities received on average better scores than those enrolled in other cities, and students enrolled in schools that received contributions from private companies, also on average scored higher compared to those that did not. Even so, for example, in Cali (the capital city of the department of Valle del Cauca), the average performance (2015) of students in schools that do not receive contributions is higher, or although in most cases mathematics has a higher average performance than language, in the region, and in Barranquilla language is doing better than mathematics. Additionally, it can be seen that the improvement rates are different between regions, for the rest of the cities in Atlántico the rate in mathematics was 2 points and in language, 5, while in the capital of Antioquia it was 0.3 and 3.5 respectively. On the other hand, in regions like the rest of the cities in Atlántico, the schools that did not receive aid had a negative growth rate in mathematics. These discrepancies among groups justify the disaggregation of the analysis into sub-samples.

Figure 4.3. Language (y1) and Math (y2) Performance by Private Contribution

Source: (ICFES, 2016c)

Table 4.2, summarizes descriptive statistics for each sub-sample to which the model is applied. In total, 16 sub-sets of data are evaluated that result from multiplying the four departments by 2 levels of aggregation in each (capital and the rest) and two years. As an example, in Bogotá and Cundinamarca there are 115,438 students, where 57,943 took the exam in 2015 and 41,919 in the Capital, of these 20,115 were in schools (133) that received contributions from private companies.

Table 4.2. Summary Statistics of the Variables Used in the Models

Bogotá / Cundinamarca

Variable	Year	Description	Capital cities				Rest of the cities			
			Min	Max	Media	Std.Dev.	Min	Max	Media	Std.Dev.
y1	2015	Language Score (Critical Reading)	16.00	94.00	51.17	8.27	16.00	100.00	49.92	8.21
y2		Math score	13.00	100.00	51.78	10.30	16.00	100.00	50.64	10.26
x1		Socioeconomic and cultural level of the student's family	3.25	9.81	5.11	0.96	3.25	9.81	4.76	0.93
x2		ISCE Synthetic index of educational quality	2.25	8.31	6.32	1.37	2.23	7.62	5.73	1.49
x3		School's average of Socioeconomic and cultural level of the student's family	4.12	6.85	5.17	0.41	3.95	5.79	4.79	0.37
y1	2016	Language Score (Critical Reading)	26.00	84.00	53.87	8.44	27.00	82.00	52.76	8.57
y2		Math score	9.00	100.00	52.80	9.93	21.00	100.00	51.83	10.31
x1		Socioeconomic and cultural level of the student's family	3.25	9.81	5.10	0.95	3.25	9.81	4.74	0.93
x2		ISCE Synthetic index of educational quality	2.09	9.19	6.53	1.39	3.75	7.72	6.14	1.47
x3		School's average of Socioeconomic and cultural level of the student's family	4.12	6.85	5.17	0.41	3.95	5.79	4.79	0.37

Medellín / Antioquia

Variable	Year	Description	Capital cities				Rest of the cities			
			Min	Max	Media	Std.Dev.	Min	Max	Media	Std.Dev.
y1	2015	Language Score (Critical Reading)	16.00	100.00	51.35	8.69	16.00	94.00	49.42	8.85
y2		Math score	13.00	100.00	50.69	10.53	8.00	100.00	48.98	11.21
x1		Socioeconomic and cultural level of the student's family	3.25	9.81	5.14	1.01	3.25	9.81	4.80	1.04
x2		ISCE Synthetic index of educational quality	2.11	7.87	5.41	1.57	2.27	7.74	5.61	1.53
x3		School's average of Socioeconomic and cultural level of the student's family	3.52	6.68	5.21	0.50	3.77	6.79	4.88	0.55
y1	2016	Language Score (Critical Reading)	28.00	83.00	54.51	8.85	26.00	84.00	52.18	9.39
y2		Math score	20.00	100.00	51.92	10.54	20.00	100.00	49.46	11.38
x1		Socioeconomic and cultural level of the student's family	3.25	9.81	5.18	0.99	3.25	9.81	4.83	1.08
x2		ISCE Synthetic index of educational quality	3.66	7.98	5.85	1.52	3.75	8.12	5.72	1.54
x3		School's average of Socioeconomic and cultural level of the student's family	3.52	6.68	5.22	0.50	3.77	6.79	4.86	0.55

Cali / Valle Del Cauca

Variable	Year	Description	Capital cities				Rest of the cities			
			Min	Max	Media	Std.Dev.	Min	Max	Media	Std.Dev.
y1	2015	Language Score (Critical Reading)	4.00	94.00	50.80	8.88	9.00	100.00	49.90	8.85
y2		Math score	13.00	100.00	49.93	10.64	13.00	100.00	49.14	11.01
x1		Socioeconomic and cultural level of the student's family	3.25	9.81	5.04	0.97	3.25	9.81	4.87	0.99
x2		ISCE Synthetic index of educational quality	2.18	7.61	5.86	1.49	2.19	7.85	5.12	1.55
x3		School's average of Socioeconomic and cultural level of the student's family	4.28	6.15	5.07	0.45	3.79	6.13	4.90	0.48
y1	2016	Language Score (Critical Reading)	27.00	100.00	53.16	9.25	26.00	84.00	52.56	9.41
y2		Math score	22.00	87.00	50.43	10.76	21.00	100.00	50.06	11.12
x1		Socioeconomic and cultural level of the student's family	3.25	9.81	5.09	0.97	3.25	9.81	4.88	0.99
x2		ISCE Synthetic index of educational quality	3.87	7.72	5.92	1.53	3.70	7.84	5.48	1.51
x3		School's average of Socioeconomic and cultural level of the student's family	4.28	6.15	5.07	0.46	3.79	6.13	4.91	0.48

Barranquilla / Atlántico

Variable	Year	Description	Capital cities				Rest of the cities			
			Min	Max	Media	Std.Dev.	Min	Max	Media	Std.Dev.
y1	2015	Language Score (Critical Reading)	8.00	94.00	49.28	8.89	16.00	85.00	47.45	8.63
y2		Math score	7.00	100.00	49.30	11.03	7.00	100.00	47.30	10.58
x1		Socioeconomic and cultural level of the student's family	3.25	9.81	5.30	1.05	3.25	9.55	5.02	0.95
x2		ISCE Synthetic index of educational quality	2.42	8.14	5.43	1.55	2.03	7.83	4.69	1.28
x3		School's average of Socioeconomic and cultural level of the student's family	3.83	6.99	5.36	0.65	4.11	6.17	5.10	0.52
y1	2016	Language Score (Critical Reading)	27.00	83.00	52.60	9.58	27.00	81.00	50.34	9.08
y2		Math score	20.00	100.00	50.44	11.19	21.00	83.00	47.95	10.87
x1		Socioeconomic and cultural level of the student's family	3.25	9.81	5.30	1.01	3.25	9.81	5.10	0.95
x2		ISCE Synthetic index of educational quality	3.83	9.40	5.72	1.54	3.66	7.81	4.85	1.23
x3		School's average of Socioeconomic and cultural level of the student's family	3.83	6.99	5.35	0.65	4.11	6.17	5.09	0.51

4.5. Results and Discussion

Table 4.3 reports the results of the order-m estimates for the models corresponding to the capital cities and Table 4.4 for those corresponding to the rest of the municipalities of the 4 departments for 2015 and 2016 (a total of 16 estimates). For each of them, following the notation of the methodology, three measures are reported: the one corresponding to the frontier of the students that attended schools that received private contributions (*y'')*, the frontier of the students that attended schools that did not (*y')*, and the ratio between both (*y''/y'*) that represents the effect on the educational performance of students that is attributable to the contributions by private companies to public schools and that in this Thesis is called Private Contribution Effect (PCE).

The statistics are presented for each of these measures, describing the location of the distribution. For example, for the first model, corresponding to 41,919 seniors in public schools in Bogotá, where 48% of them attended schools that received private contributions, the inefficiency of an average student compared to the group of students who attended schools that received contributions (*y*") equals 1.3345 (Column 1). This means that, on average, there is an improvement potential of 33.45% of a student given the levels of inputs (the socio-economic and cultural conditions of the family, as well as the academic quality and socio-economic and cultural conditions of the school). Thus, for an average student who obtains a performance in language of 51.17 points and 51.78 in math (values previously reported in Table 4.2), given his/her conditions and the performance of students similar to him/her, it is reasonable to expect scores of 68.28 and 69.10 respectively for him/her. On the other hand, the inefficiency compared to the group of students who attended schools that did not receive contributions (*y'*) is equal to 1.3384. In this case, given that both levels of inefficiency are so similar, the PCE tends toward 1 (PCE=1.3345/1.3384=0.9970). In other words, for these students, the effect of the contributions that companies make to their schools is neutral on their educational performance and the potential improvement margin is attributable to other factors, not to this.

According to the research hypothesis, the expected value is for PCE to be greater than 1. This can be observed for the case of Cali in 2015 where PCE=1.0821 resulting from y''>y'(1.0821=1.2683/1.1720) and therefore 8.21% of the potential improvement of students in that city is attributable to the contributions of private companies. The opposite case is Barranquilla in 2015, where the effect is equal to -8.81%=(1-0.9119), contrary to what was expected.

In addition to the central values, it is observed that the results are not uniform throughout the distribution. For the first case of Bogotá in 2015, for values below the geometric mean y”<y’ while for values above the mean y”>y’. The effect’s predominance is observed in 6 of the 16 analysis cases, where Antioquia (and Medellín) and Atlántico (and Barranquilla) report this evidence.

Table 4.3. PCE and Local Frontiers. (Capitals, 2015-2016)

Region	Year	Inefficiency component	(1) Geometric mean	(2) Minimun	(3) 1st quartile	(4) Median	(5) 3rd quartile	(6) Maximun	(7) Std. Dev.	(8) Mean (inefficient)
Bogotá Obs: 41.919 (48%)	2015	y''	1.334528	0.6865671	1.204404	1.333418	2.644907	4.28875	0.2120317	1.349671
		y'	1.338446	0.7511213	1.208528	1.336525	2.701405	4.232188	0.2120579	1.352095
		PCE	0.9970729	0.6865671	0.9916324	1.003058	1.21038	1.237369	0.0369269	1.016575
Bogotá Obs: 41.667 (48%)	2016	y''	1.276498	0.756839	1.145667	1.258203	2.400000	2.500153	0.205731	1.290686
		y'	1.292290	0.763600	1.160492	1.273970	2.428628	2.474251	0.207784	1.303711
		PCE	0.987779	0.765625	0.976397	0.993054	1.285714	1.368421	0.030161	1.013659
Medellín Obs: 12.944 (58%)	2015	y''	1.2688670	0.7090618	1.1406940	1.2641450	2.6104670	2.8142500	0.2111939	1.2965200
		y'	1.2339300	0.5952381	1.1060290	1.2349600	2.5783810	2.7745420	0.2135688	1.2762040
		PCE	1.0283130	0.7985491	0.9971953	1.0129810	1.5986710	1.6328440	0.0765176	1.0502400
Medellín Obs: 12.663 (75%)	2016	y''	1.2446590	0.7498324	1.1112330	1.2244580	2.2240560	2.4478210	0.2075049	1.2675300
		y'	1.2014070	0.6250000	1.0701640	1.1825810	2.1756810	2.4109360	0.2041488	1.1930730
		PCE	1.0360010	0.8000000	1.0206320	1.0380570	1.6426150	1.6786890	0.0408377	1.0443530
Cali Obs: 8.757 (60%)	2015	y''	1.2682740	0.7058500	1.1350450	1.2678560	2.5916000	2.9147920	0.2173948	1.3015950
		y'	1.1720180	0.6411783	1.0491560	1.1708780	2.2974000	3.7195240	0.2011153	1.2319710
		PCE	1.0821290	0.6515700	1.0317270	1.0764300	1.4406800	1.4761900	0.0695622	1.0916820
Cali Obs: 9.033 (56%)	2016	y''	1.2325350	0.7140081	1.0922120	1.2118750	2.2923210	2.4179360	0.2187253	1.2659100
		y'	1.2015510	0.6961335	1.0685300	1.1809630	2.1448460	2.2974170	0.2086213	1.2426460
		PCE	1.0257870	0.7116949	1.0024300	1.0223400	1.3939490	1.5957410	0.0520979	1.0412590
Barranquilla Obs: 9.150 (28%)	2015	y''	1.1630010	0.4858308	1.0360320	1.1582890	2.1722660	2.3746670	0.2032057	1.2259500
		y'	1.2753190	0.7031022	1.1373370	1.2751390	2.3772410	2.5085710	0.2227321	1.3086640
		PCE	0.9119291	0.4191592	0.8893782	0.9155792	1.0481180	1.2188870	0.0523644	1.0042000
Barranquilla Obs: 8.969 (58%)	2016	y''	1.2202140	0.7033500	1.0743950	1.1989640	2.1780880	2.2430900	0.2202875	1.2629160
		y'	1.1903080	0.4893617	1.0505830	1.1699690	2.1430120	2.2296810	0.2140856	1.2430470
		PCE	1.0251240	0.7436442	1.0025340	1.0236450	1.3579060	2.0434780	0.0468807	1.0391100

Table 4.4. PCE and Local Frontiers. (Rest of Municipalities, 2015-2016)

Region	Year	Inefficiency component	(1) Geometric mean	(2) Minimun	(3) 1st quartile	(4) Median	(5) 3rd quartile	(6) Maximun	(7) Std. Dev.	(8) Mean (inefficient)
Cundinamarca Obs: 16.024 (48%)	2015	y''	1.244814	0.5873016	1.118269	1.243514	2.464074	3.091381	0.2078631	1.279715
		y'	1.301695	0.677	1.172852	1.298948	2.522452	3.055714	0.2108014	1.321168
		PCE	0.9563023	0.5873016	0.9452366	0.9772905	1.152886	1.333333	0.0604973	1.015169
Cundinamarca Obs: 15.828 (49%%)	2016	y''	1.250210	0.431035	1.117250	1.231249	2.283581	2.516852	0.208980	1.273897
		y'	1.253417	0.639344	1.120590	1.233795	2.283051	2.407445	0.210051	1.276525
		PCE	0.997442	0.431035	0.986091	1.000000	1.454545	1.564103	0.041754	1.022075
Resto antíoquia Obs: 25.009 (36%)	2015	y''	1.2408130	0.6152703	1.1074690	1.2396880	2.6576810	3.1617110	0.2172272	1.2821560
		y'	1.3193230	0.6400000	1.1760470	1.3172710	2.7544230	4.0122040	0.2294405	1.3415880
		PCE	0.9404922	0.5371469	0.9107367	0.9560929	1.3311390	1.5625000	0.0601779	1.0287100
Resto antíoquia Obs: 25.510 (70%)	2016	y''	1.3139130	0.7031250	1.1556010	1.2904580	2.5178650	2.6450000	0.2414984	1.3312550
		y'	1.2475640	0.5107242	1.0981030	1.2275110	2.4139170	2.5076950	0.2303735	1.2831240
		PCE	1.0531840	0.7031250	1.0222690	1.0386590	1.8068250	1.9563490	0.0562466	1.0585920
Resto Valle del Cauca Obs: 12.786 (16%)	2015	y''	1.1204910	0.5920417	0.9988060	1.1170150	2.2333330	2.9664770	0.2050641	1.2077790
		y'	1.3136200	0.7308417	1.1767660	1.3092310	2.6911420	3.0345740	0.2275278	1.2914070
		PCE	0.8529794	0.6098737	0.8073172	0.8482836	1.0986140	1.1366700	0.0696829	1.0064560
Resto Valle del Cauca Obs: 13.416 (26%)	2016	y''	1.1682160	0.6653000	1.0293500	1.1506720	2.1904690	2.4541210	0.2132012	1.2348970
		y'	1.2622250	0.7421341	1.1156240	1.2440370	2.3088340	2.6104720	0.2233597	1.2897840
		PCE	0.9255211	0.6614465	0.9016622	0.9260901	1.1367160	1.2307690	0.0433434	1.0080710
Resto Atlántico Obs: 7.525 (45%)	2015	y''	1.2013270	0.5406079	1.0718480	1.1995940	2.3507410	2.9356250	0.2123651	1.2536640
		y'	1.2033190	0.3651631	1.0794350	1.2023500	2.3800000	2.9365630	0.2078351	1.2519820
		PCE	0.9983444	0.4091655	0.9674538	0.9931483	2.3283100	2.6299400	0.0973998	1.0531130
Resto Atlántico Obs: 7.917 (57%)	2016	y''	1.2278460	0.7495946	1.0876020	1.2127210	2.0931510	2.1950900	0.2135941	1.2681460
		y'	1.1998470	0.7044107	1.0604670	1.1872290	2.0551520	2.1855890	0.2098894	1.2503550
		PCE	1.0233360	0.8016772	1.0030150	1.0256050	1.3177770	1.3652280	0.0423075	1.0370210

Table 4.5, which summarizes the PCE for the 16 models and presents two statistics for the subset of inefficient students (that is, those for which the effect of contributions from private companies represents a potential for improvement in their educational performance), shows that the hypothesis is confirmed in 7 of the 16 models. These cases correspond to 2 capital cities in 2015 (Cali and Medellín) and 3 in 2016 (the former plus Barranquilla) and 2 remaining 2016 subregions (Antioquia and Atlántico).

Among the remaining cases, in 4 of them private contributions have an effect that is contrary to that expected: a capital city (Barranquilla in 2015) and two subregions (the rest of Antioquia in 2015 and the rest of Valle in 2015 and 2016). In the remaining cases, the PCE is neutral. Contrary to what was expected, these effects, which are mainly concentrated in the subregions, suggest, on the one hand, lower efficiency of the schools that received aid and, on the other hand, a potential correlation with the low coverage levels of private contributions during the first year of analysis in this group of municipalities.

This contextual condition may not be sufficiently controlled with the formation of subsamples and may even suggest some level of endogeneity. In interviews, business leaders admit that for them, the institutional capacity of a public school to take advantage of the resources received is almost a condition to contribute to it and, after the criterion of geographical proximity, they have a preference for schools with lower academic performance. This potential selection bias is not relevant in groups with large coverage but it could be sensitive in groups with reduced coverage.

Table 4.5. PCE by Subsample. (Colombia, 2015-2016)

Region	PCE 2015			Region	PCE 2016		
	Coefficient	Mean (inefficient)	Inefficient students (%)		Coefficient	Mean (inefficient)	Inefficient students (%)
Capital cities by state				*Capital cities by state*			
Bogotá D.C.	0.9971	1.0166	58.4%	Bogotá D.C.	0.9878	1.0137	33.9%
Medellín	1.0283	1.0502	69.5%	Medellín	1.0360	1.0444	89.0%
Cali	1.0821	1.0917	92.1%	Cali	1.0258	1.0413	80.0%
Barranquilla	0.9119	1.0042	5.4%	Barranquilla	1.0251	1.0391	89.9%
Rest of the cities by State				*Rest of the cities by State*			
Cundinamarca	0.9563	1.0152	17.4%	Cundinamarca	0.9974	1.0221	48.8%
Antioquia without Medellín	0.9405	1.0287	8.8%	Antioquia without Medellín	1.0532	1.0586	93.6%
Valle del Cauca without Cali	0.8530	1.0065	5.9%	Valle del Cauca without Cali	0.9255	1.0081	5.3%
Atlántico without Barranquilla	0.9983	1.0531	40.0%	Atlántico without Barranquilla	1.0233	1.0370	79.4%

Evaluating the estimates by subregion, it is observed that the capital cities (with the highest business density and, on average, with a higher percentage of students in schools receiving contributions) have a higher PCE compared to the rest of the municipalities in that department. The implications associated with business location and distance from schools to business centers are issues that go beyond the scope of this Chapter but which were also mentioned by business leaders in Chapter 3 and merit further study.

The percentage of inefficient students who benefit from their schools receiving contributions from private companies is significantly higher in the capital cities and in the rest of the Department of Antioquia. Especially low values are observed in the rest of the municipalities of the department of Valle (5.9% in 2015 and 5.3% in 2016) and also question the configuration of the subsamples using the criteria of political and administrative organization of the departments instead of spatial criteria that recognize better the economic and social interactions between companies and territories.

With respect to time, the database has made it possible to evaluate two years (2015 and 2016) noting that in 6 of the 8 subregions evaluated there is positive growth in the PCE. Only Bogotá shifts from 0.9970 to 0.9878 and Cali from 1.0821 to 1.0258. The rest of the subregions, 2 capitals and all departments without their capitals have a growing PCE. In all cases, the standard deviation of PCE distributions is reduced, improving accuracy. Although two years are not conclusive, another hypothesis that could be tested in new studies is in relation to the cumulative effects of the contributions and the duration of such effects over time. That is, whether a school that receives contributions in more than one period has a growing PCE or what is the time it takes for the effect to materialize. In both cases, it would be worth asking when such effects begin to decrease.

Finally, it is striking that the cases with greater PCEs coincide with the subregions with a higher percentage of students attending schools that receive private contributions. Although this result is not conclusive to suggest a causal relationship, it does spark the interest to apply causal effects techniques to control it.

In short, differentiated effects are obtained between subregions that are not uniform within each distribution and that have a tendency to favor 2016 over 2015. The capital cities and the Antioquia region represent a place where students have a higher potential for improvement, attributable to companies.

4.6. Conclusions

This Chapter, based on the conceptual proposal of Chapter 2 and considering the empirical implications of Chapter 3, has aimed to estimate the effect of voluntary contributions by private companies to public schools on the educational performance of their students. The Private Contribution Effect (PCE), constructed with a meta-frontier approach and an order-m estimator, is measured by calculating the distance between the frontiers of two groups: the students who attend schools that received private contributions and those who attend schools that did not (PCE=y''/y') to test the hypothesis that PCE>1 or $y''>y'$ given it is output-oriented. This methodological route and an estimate are the main contributions of this Chapter in order to have available, for the first time, a magnitude of an effect of this type in the empirical school-based literature.

Data from standardized tests and a record of contributions from private companies to educational institutions, which has no comparison in the literature, provide results for 16 datasets: 4 Colombian departments, differentiating their capital cities from the rest of the municipalities, for 2015 and 2016. Faced with the diversity of companies, motivations and types of contribution, the ability to aggregate the results into a single estimator is a benefit of this approach. It delivers a general overview which later, in the next Chapter, will help guide the analysis according to the type of contributions.

The most important conclusion is that in most cases, the educational performance of students is not unresponsive to the contributions by private companies to the public schools they attend. However, the resulting effects are differentiated by subregion and by period (7 of them confirm the hypothesis, 4 deny it and the rest have a neutral effect) and do not always correspond to the assumption of positive effects that business leaders declare in the previous Chapter. This differentiation includes the non-uniform behavior of the frontiers throughout the distribution. The results of this Chapter also show that the effect is greater in the capital cities when compared with the rest of the municipalities of each department and that the effects, in most cases, are increasing from one year to the next, while reducing dispersion. A measure of the potential for student improvement that is attributable to company contribution is a tool that guides the investment decisions of private sector leaders.

As mentioned in the results section, some future research lines are related to this temporal dimension, which are also feasible in relation to a new information system that continues

collecting information on private contributions year after year. Among them, the results have suggested the possibility of cumulative effects over time, of private contributions in the same school, as well as questions about the duration of the impacts over time and the permanence conditions over time and point of decrease. This is especially important since, as mentioned, there is evidence in the literature of a decreasing trend over time in the decision to contribute of those who do it with an altruistic motivation.

A second line of future research refers to the impacts following the PCE and which motivate this Thesis, in general. The aim is to research the effect of a greater PCE (to measure educational performance) in closing quality gaps between public and private schools and, consequently, in the levels of equity of a territory. Already the literature on efficiency in education provides a guideline on the treatment of inequality as a bad-output and applications of it could help answer this research question.

Third, as will be proposed in the next Chapter, a pertinent question in this line of work is related to the robustness of the results of this Chapter when, instead of treating them in an aggregate manner, they are broken down according to typology. It is expected that the effects of different types of contributions will also be different. Because the database recognizes 31 different types of intervention, part of the exercise will consist of reclassifying this typology.

Finally, two limitations are identified in this Chapter, one referring to the level of analysis and the other regarding the methodological approach. The level of analysis refers to the data and it prevents calculating the PCE at the municipal or subregional level in those extreme cases where there is full (100%) or no coverage (0%) of students who attend schools that receive contributions. In either case, by construction, one of the two groups is left without a reference group to estimate the PCE, which, as is known, is the quotient of both frontiers. The methodological approach refers to the difficulty to control a possible selection bias of the companies when choosing the schools benefitting from its contributions. A limitation that, by definition, is controlled in causal approaches and that was accepted in this Chapter as a trade-off against the benefits of adopting a non-parametric efficiency approach.

The next Chapter takes into account the third line of research proposed to validate the robustness of this PCE by type of contribution.

Chapter 5

Which Private Contribution Has a Greater PCE? Typology of Contributions and Their Effects

5. Which Private Contribution Has a Greater PCE? Typology of Contributions and Their Effects

5.1. Introduction

One of the characteristics of private contributions is diversity. In the literature (Chapter 2) and in empirical implementation (Chapter 3), there is sufficient evidence of the diversity of: (i) implementation forms, (ii) motivations, (iii) characteristics, (iv) educational institutions, beneficiary territories or populations and, therefore, (v) effects. Chapter 4, in aggregate form, has estimated a Private Contribution Effect (PCE).

The specific objective of this Chapter is to validate the robustness of the PCE against different types of contributions and its allocative efficiency responding what type of contribution has the greatest effect. Considering the both theoretical and empirical lessons learned in the previous chapters to the case-study, the following hypotheses will be contrasted: (i) Academic initiatives have a greater PCE in capital cities and (ii) Access Initiatives have a greater PCE in the subregions (not including Capital cities). The discussion about the allocative efficiency and the effects of private contributions-that business leaders presume positive-enrichs the analysis and is the last piece that completes the understanding of the problem statement that this Thesis has addressed. The main contribution of this Chapter to the literature refers to the possibility of comparing types of private contributions. Until now, the literature had reported and evaluated the effects of each intervention separately but, with this methodology, the effects of differentiated interventions become comparable.

Based on the estimation of the PCE in the previous Chapter, this Chapter reviews the literature that evaluates the contribution of different school-based interventions on school performance to identify in them a set of categories of determinants under which they can be grouped, and evaluate private contributions. This review anticipates some guidance on type, meaning and magnitude of the effect that can be expected in each of these categories. With this, the PCEs are calculated for each type of intervention and, with non parametric tests for two independent samples (Wilcoxon-Mann-Whitney Rank Sum), they are compared to each other. Therefore, knowing the coefficients and coverages of beneficiary schools and students discussing about the efficient allocation of private contributions. This, for each of the sub-

samples of the previous Chapter, which also allows testing the robustness of the effects by sub-region and by year.

The same dataset of the previous Chapter is used, which matches the contributions of the private companies to each school and, in them, to the results of seniors' standardized tests in 16 subsamples. These sub-samples correspond to 4 regions in Colombia that account for 56% of the schools that receive contributions from private companies. They differentiate capital cities from the rest of the municipalities for 2015 and 2016. In total, there is a sample of 269,117 students, of which 48.6% attend schools that received at least one private contribution in one of the two years of study. The formation of the subgroups and the application of some exclusion criteria (urban zones, schools with at least 30 students taking the test and students with disabilities), allow to control, on the one hand, environmental variables and, on the other, the comparability of the decision units, which continue to be the students.

This Chapter, after this first introductory section, is organized as follows: the review of the literature on school-based interventions and academic performance (section 5.2.), the methodology of construction and comparison of groups by contribution type and the description of the data by type (section 5.3.), the results and their discussion (section 5.4.) and the conclusions, future lines and limitations (section 5.5.).

5.2. Literature Review

The evidence of measurements of the effects of private contributions to education, as reported in the previous Chapter, is insufficient (Kumari, 2016). Most of the measurements of this type of contribution target infrastructure using Private Public Partnership (PPP) mechanisms (Carpintero & Siemiatycki, 2015; Crump & Slee, 2005). Crawfurd (2017) and Ilon and Normore (2006) are the only studies in the systematic review of the literature (section 2.2) that measure the effects with academic performance, using standardized tests. The PCE estimate in the previous Chapter, in that regard, is an unprecedented reference.

In order to identify a set of categories that groups and then evaluates the different types of private contributions (e.g., infrastructure, teacher training, scholarships, among many other types), this section reports the literature review on the effects of the academic performance of different types of interventions. From Bowles (1970) or Hanushek (1979, 1986), the literature

has formalized production functions that emphasize an output orientation as assumed by Coleman (1966), in the "Coleman Report" of the U.S. National Center for Educational Statistics.

The school, in these theoretical production functions and in practice, is the place that centralizes a wide spectrum of interventions targeting them directly or their communities (students, parents, teachers or administrators). The literature reports on this under 'school-based interventions'. In the last 10 years, 470 Journal Articles (peer reviewed) have been cited in ERIC (Education Resources Information Center, the largest database specialized in education, funded by the US Department of Education's Institute of Education Sciences). 145 of them are associated to the descriptor 'Program Effectiveness'.[5] The effects of these interventions are measured with different outcomes and in this Chapter, for consistency with the construction of the PCE, greater attention is given to those that refer to academic performance.

A first large group of interventions are those related to access and permanence. On the supply side, the majority is related to infrastructure for expansion of coverage (Amjad & MacLeod, 2014), and when the provision mechanism is the PPP, the result variable is also the financial performance of the investors (Carpintero & Siemiatycki, 2015). Cuesta, Glewwe and Krause (2016, p. 106), in relation to the review of 39 studies on the impact of school infrastructure on students' academic performance, conclude: *"Overall, the evidence base is not particularly strong. […] there is limited evidence that having roofs, walls, and floors in good condition improves student learning, but no other classroom-level variables have clear effects. […] there is some evidence that school libraries and the creation of new schools (which make schools more accessible) lead to improved learning. […] Finally, with the possible exception of toilets, there is no evidence that utilities affect student learning"*.

Associated with access and retention, the literature reports on another set of school resources that reduce the relative costs of attending and although they may increase attendance and attainment (Pugatch & Wilson, 2018), they do not show consistent results in student achievement (Ganimian & Murnane, 2016). Some of the most relevant are: free lunch with positive effects (Conroy & Arguea, 2008), textbooks in Kenya do not affect average test scores (Paul Glewwe, Kremer, & Moulin, 2009) or deworming (Miguel & Kremer, 2004). More

[5] Access in ERIC website, available at https://eric.ed.gov/?q=%22School-Based+Interventions%22&pr=on&ff1=pubJournal+Articles&ff2=dtySince_2009&ff3=subProgram+Effectiveness Search updated to January 21, 2018

consistent are the positive results, on academic performance, of scholarships (Kondakci et al., 2014; Yilmaz, 2013) and monetary incentives, vouchers and conditional cash transfers (Angrist et al., 2002; Angrist, Bettinger, & Kremer, 2006; Barrera-Osorio, Bertrand, Linden, & Perez-Calle, 2011) and even uniforms (Evans, Kremer, & Ngatia, 2009).

ICT resources, from the point of view of access, report positive effects on academic performance (Cabus, Haelermans, & Franken, 2017; Cuesta et al., 2016; Kim, 2018), especially when they affect teaching methods and, therefore, involve teaching practice (Comi et al., 2017). However, negative effects are reported when referring to the use of computers in the classroom (Patterson & Patterson, 2017), or for schoolwork (Kim, 2018), or in the case where what is being evaluated is practice skills (Falck, Mang, & Woessmann, 2018).

Pedagogical innovations, in general, in addition to contributing to better academic performance, are interventions known for their low cost (P. Glewwe & Muralidharan, 2016; Kremer & Holla, 2009). A positive effect on school performance is also expected when students participate in remedial education programs and tutoring (Banerjee, Cole, Duflo, & Linden, 2007; García-Pérez & Hidalgo-Hidalgo, 2017), which is even greater when there is a larger exposure to the program and when applied to students in rural areas, but bearing in mind its potential capacity to widen the gap between low- and high-performing students (Cole, 2017).

In addition to academic interventions, the literature describes multiple interventions associated with the development of civic and socio-emotional competencies in students. Most of these articles, from a psychological or mental health perspective, assume these competencies as output (Barry, Clarke, & Dowling, 2017; Massetti, DuBois, Ji, Crean, & Johnson, 2009; Mychailyszyn, 2017; Nielsen, Meilstrup, Nelausen, Koushede, & Holstein, 2015) and very few relate it to academic achievement, so they present moderate effects (Gil-Olarte, Palomera, & Brackett, 2006) or assess different social behaviors: *"Results suggest that all teachers viewed cooperation and self-control skills as significantly more important than assertion skills"*. (Lane, Pierson, & Givner, 2003). Even studies, such as Bischoff's (2016), provide two innovations in that literature: a sense of inverse causality, evaluating the effects of schools on civic behaviors, and a consideration of the aggregate effects on society and not only on individuals. The socio-emotional competences of teachers and their ability to provide supportive relationships are also reported as a condition of success of interventions of this type directed at students (Jennings & Greenberg, 2009). Social skills for more specific contexts find

a positive and significant effect of teachers, as occurs with the decrease of post-traumatic symptoms and levels of anxiety derived from the war in Lebanon (Baum et al., 2013).

The quality of the teachers regarding the academic performance of the students and, even, on economic activity is significant (Hanushek, 2011). The training of teachers to achieve higher levels of quality, however, has ambiguous effects on academic performance. Amjad and MacLeod (2014) and Blanco (2009) report positive effects while Angrist et al. (2013) state that there is no correlation with school effectiveness, while for Boyd et al. (2006) and Kane et al. (2008) the results for teacher credentials and teacher training are not consistent with students' academic performance. This category of literature is associated with that which studies incentives and salaries to attract and hire better teachers (de Talancé, 2017) and increase their effort to benefit their students' results (Ganimian & Murnane, 2016; Muralidharan & Sundararaman, 2011).

Another large set of interventions in schools refers to school management. There is sufficient evidence that 'higher management quality is strongly associated with better educational outcomes' (Bloom et al., 2015; Crawfurd, 2017). This effect is significant, in relation to different management styles (Moradi, Beidokhti, & Fathi, 2016) but it is not symmetrical for all areas of knowledge: *"The results show that, especially for reading, the most influential variables relate to the composition of the student body, while the students' performance in mathematics is partly correlated with the management practices adopted by the school principal/head teacher"* (Masci, De Witte, & Agasisti, 2018). These effects are conditional and proportional to the autonomy of rectors and school administrators over budgets, salaries and, in turn, for schools to have accountability mechanisms (Schutz, West, & Wossmann, 2007).

An additional category groups together educational interventions aimed at influencing educational policy, no longer through schools but through think tanks or other types of NGOs (Lubienski, 2016; Lubienski et al., 2016). This, understanding education as an instrument of policy (Hanushek, 1979, 1986) where the inputs that most affect the results of education are controlled outside the school by policy makers (Hanushek, 2008). In this category, interventions that provide information to parents and the rest of society about the quality of schools or returns of education, among others, are frequent (Ganimian & Murnane, 2016). Unlike an intervention directed at a single school, which internalizes practically all the benefits, advocacy in educational policy works more like a pure public good, making it more difficult to estimate effects attributable exclusively to it.

In general, although any intervention at school is expected to have a positive impact on the quality of the school and its students, such effects are not uniform and, on the contrary, are conditional on a wider set of factors in the decision; some of them–even–unobservable (such as the commitment of families or teachers or students' skills). Likewise, the expected effect of each type of private contribution will depend on the conditions of the agents and the environment where it occurs.

Given the wide diversity of effects and interventions, the literature makes various efforts to compare their effectiveness to guide the allocation of resources. These efforts are mainly conducted through meta-analysis (e.g., Hanushek, 2003; McEwan, 2015) that have the benefit of identifying the determinants and comparing the consistency of the results with different models, estimates, methodologies and cases. Comparisons with common methodologies and metrics for such particular treatments have the natural limitation of aggregation.

This review, added to the theoretical and empirical path covered by this Thesis, gathers enough evidence to anticipate that the performance of the PCE between different types of initiatives have effects of different magnitudes. The differences in the effects between the capital cities and the rest of the municipalities suggest that factors such as the proximity of companies, the institutional capacity of the public sector, the dominance of the student effect over the school effect, the larger size of the schools in cities and, therefore, the biggest gaps between and within schools are determinants of students' academic performance. In this way, academic initiatives targeted at students can contribute more to improving academic performance and private companies are expected to contribute more to them. This, even above those related to the school environment or school management are also very sensitive in large cities.

On the side of the subregions that do not include the capital cities, both municipalities and schools are smaller, public institutional capacity is lower and families with young children seek job opportunities in larger cities. Although the departments analyzed did not have the largest incidences of the armed conflict during the study period, that this is a problem that affects the entire national territory and the regions of the sample are also recipients of victims displaced by the conflict. For all the above, It is expected that initiatives associated with Access and School Retention are the ones that contribute the most to academic performance of the students.

In summary, the following two research hypotheses are formulated: (i) Academic initiatives have a greater PCE in capital cities and (ii) Access Initiatives have a greater PCE in the subregions (not including Capital cities).

Methodologically, to establish a comparison of different types of interventions, in different schools and financed by different sponsors, is the main contribution of this Chapter from this literature gap. Decomposition works such as those by Thanassoulis and Silva Portela (2002), to compare the contribution of the school to that of the student in his/her own performance (where the latter predominates), or that of Thieme et al. (2013), to decompose up to 5 levels of inputs in a single production function, suggest the route that begins in Chapter 4 with the PCE estimate. It continues in this Chapter with the comparison of the effects by intervention categories (hereinafter, types of intervention) applying a non parametric Wilcoxon-Mann-Whitney Rank Sum tests for pairs of independent samples.

5.3. Methodology and Data

This section presents the methodology of construction and comparison of groups by type of contribution. The starting point is the Private Contribution Effect (PCE) estimated for 16 sub-samples. The PCE, using an output-oriented efficiency measure, is measured by calculating the distance between the frontiers of two groups: the students who attend schools that received private contributions and the ones who attend schools that did not receive them (PCE=y”/y’) to test the hypothesis that PCE>1 or y”>y’, where PCE is the geometric mean of all students in a subsample. This construction only recognizes the fact that a school has received a private contribution or not. This Chapter now recognizes which type of contribution has a greater PCE.

For each group of students who attend schools that have received a specific type of contribution *i*, a geometric mean PCE_i is calculated, which, compared to the geometric mean of each group of each type of contribution, allows us to know, on average, what kind of contribution has a greater effect. To test if the coefficients are statistically different, the Wilcoxon-Mann-Whitney test (Wilcoxon, 1945) has been applied, which is a non-parametric test for unrelated samples, evaluating the null hypothesis that the distributions of each pair of groups compared are equal (Harris & Hardin, 2013).

The selection of this test, in line with a non-parametric estimate in the previous chapter, is made so as not to assume any kind of statistical distributions underlying the data. Alternatively,

for unknown density functions, other reviewed works employ the Li Test (Q. Li, 1996). Some applications in the literature on educational efficiency are: Thieme et al. (2013); Thieme et al. (2016); and Aparicio, López-Torres, and Santín (2018).

Additionally, since not only the coefficients are different, but the number of students attending schools that receive each type of contribution is also different, it is evaluated whether, at higher levels of the effects coefficient, there is also a larger number of students benefited. This still fails to be a sufficient measure for a cost-benefit analysis because there is no reliable information available regarding the resources invested in each contribution (and, eventually, be able to obtain a cost measure per student). It is, however, a first form to approach and validating entrepreneurs' assumption of allocating their resources in the best way. Higher levels of PCE by type of initiative and more students benefiting from their contributions to schools is a first indicator of efficiency in resource allocation.

Empirically, one of the database sources used in this work (SIIPE, Information System of Private Intervention in Education) recognizes a total of 31 different types of interventions of companies in educational institutions. The SIIPE (Fundación Empresarios por la Educación EXE, 2016) is a voluntary reporting mechanism where the companies declare their initiatives to support schools, through a structured instrument. These initiatives can be projects or programs that one or several companies carry out in a school with the common objective of raising the educational quality of their students.

Due to the nature of the interventions, and the form of registration in the database, the same company can contribute to one or several schools, through one or several interventions, which, in turn, can be of different types. The sample selection (seniors who have taken the Saber 11 test and who attend urban public schools with at least 30 students in both 2015 and 2016), in this educational level, reveals 16 of the 31 intervention types that are classified into 6 categories as proposed based on the review of the literature in the previous section.

These categories are: first, the interventions related to access and permanence of the students in the school system that includes a range from infrastructure and other physical resources, to inputs or incentives that reduce the cost of attending school. Second, the interventions associated with academic instruction that includes disciplinary matters or pedagogical innovations. Third, the interventions that favor the socio-emotional development of students and are oriented toward the development of civic and citizen competences and respect for human rights in a broad sense. Fourth, the interventions related to the education and training

of teachers that affect their preparation and skills to carry out quality support. Fifth, the interventions aimed at improving the quality of school management that results in a better allocation and use of resources, as well as in a better school climate. Sixth, the interventions aimed at advocacy in educational policy to affect the allocation of resources at the aggregate level before reaching the school. Table 5.1 classifies SIIPE interventions following these categories of types of contributions. Because of construction, initiatives of advocacy in educational policy were not included because they do not appear in the database linked to a particular school.

Table 5.1. Classification of SIIPE Interventions by Type of Contributions

Type of Contribution	SIIPE Classfication of interventions
Access and retention	Scholarships, recognitions and incentives, elementary, Strategies for access to education aimed at people with special educational needs, Infrastructure
Academic Competences	Strengthening of basic competences, Appropriation of a Foreign Language, Social Sciences, Environmental Education, Innovation and ICT, Language
Civic and Social Competences	Citizenship, human rights and education for peace
Teacher training	Teacher Training and Teaching Directors in service
School Management	Strengthening school management, Academic Management, Administrative and financial management, Community Management, Management

Table 5.2 presents the number of students attending schools that received different types of contributions. As an example, the first row shows that for the Bogotá subsample in 2015 there were 41,919 students, of which 20,115 attended a school that received some type of private contribution. Of these, 19,651 attend schools with contributions being Civic (Civic and Social Competences), and 5,560 attend schools with contributions being Management (School Management). It is important to note that, given the non-hierarchical or cross-classified structure (Rasbash & Browne, 2008), a school can receive more than one contribution of more than one type.

Table 5.2. Number of Students Attending Schools Receiving Private Contributions, by Type (Colombia, 2015-2016)

		Total of contributions		Type of contribution				
Region	Year	Enrollment	Beneficiaries	Access	Academic	Civic	Teachers	Management
Capital city								
Bogotá D.C.	2015	41,919	20,115	2,973	2,904	19,651	4,954	5,560
	2016	41,667	19,951	1,057	764	19,188	3,097	4,430
Medellín	2015	12,944	7,539	2,847	4,240	7,180	6,927	7,137
	2016	12,663	9,489	1,546	8,794	7,565	9,281	7,532
Cali	2015	8,757	5,221	2,313	2,774	5,221	5,221	5,221
	2016	9,033	5,030	698	1,969	5,030	4,890	4,817
Barranquilla	2015	9,150	2,538	98	2,357	987	188	781
	2016	8,969	5,172	2,918	5,081	1,576	3,500	1,940
Rest of the cities								
Cundinamarca	2015	16,024	7,729	380	57	7,599	2,106	2,913
	2016	15,828	7,801	511	422	7,570	1,506	2,238
Antioquia	2015	25,009	9,081	5,585	3,562	9,081	7,389	8,775
	2016	25,510	17,618	7,662	6,492	16,946	15,310	16,424
Valle del Cauca	2015	12,786	2,057	150	911	1,080	706	1,026
	2016	13,416	3,550	331	1,919	1,875	1,525	1,463
Atlántico	2015	7,525	3,380	654	600	3,326	2,955	2,746
	2016	7,917	4,527	1,803	1,977	4,060	2,752	2,183

Although there is no perfect consistency of the distributions by subsample, it is noted that private contributions to citizen and social competency development programs are those where the most students intervene. The environmental conditions of a country that was preparing for the post-conflict are consistent with companies' preference in practically all the sub-samples. In capital cities, by number of beneficiary students, contributions associated with Teacher Training and School Management continue being preferred, while in the rest of the municipalities that only applies for School Management for Antioquia and Valle (hereinafter, every reference to a department is understood to exclude its capital city).

It is striking that the contributions of Access and Retention, in all cases, have the fewest student beneficiaries, followed by contributions of an academic nature. Barranquilla, on the other hand, is the only city where the greatest number of beneficiaries is associated with this type of academic contributions.

Although the database does not have a robust reference to the resources invested, it is known that Access and Retention interventions are usually those that require the most resources. Likewise, contributions associated with Teacher Training and School Management are justified by the idea of leaving an installed capacity and the potential multiplier effect of a rector or teacher over time.

The change rate in 2015 and 2016 shows Barranquilla and Atlántico growing faster than the rest in Academic and Access contributions, and Bogotá growing at negative rates even with percentages of beneficiary coverage similar to the other subsamples. While Medellín and Barranquilla grow the number of beneficiaries more rapidly in academic contributions, Antioquia and Valle do so with training teachers.

5.4. Results and Discussion

Table 5.3 reports the results of the comparisons by pairs of contribution types in the capital cities and Table 5.4 for those in the rest of the municipalities of the 4 departments. Each box reports the p-value of the Wilcoxon-Mann-Whitney Rank Sum Test. The probability value (p-value) appears shaded on the table when it is less lower than a significance level of 0.05. In that case, the pairs of contribution types compared are different. As an example, the first table refers to the case of Bogotá in 2015, where 48% of the students attended a school that received private contributions with a general PCE of 0.9971. When comparing pairs of types of contributions, Access (PCE=0.9980 and 2,973 beneficiaries) versus Academic (1.0011; 2,904) evidence is insufficient to reject H_0: $PCE_{Access}=PCE_{Academic}$ (p-value=0.3012>α=0.05). In other words, statistically, the effects of these two types of contribution are not different. In total, in half of the comparisons of pairs of variables, the null hypothesis can be rejected (41% in the capital cities and 59% in the rest of the municipalities, with a greater consistency in the second year).

A second example, by way of contrast, is $PCE_{Management}>PCE_{Academic}$ in Cali 2015. That is, that the effect of contributions aimed at improving school management, which represent an opportunity for potential improvement of students' academic performance of 10.11%, is significantly higher than contributions for academic performance, of 8.92%. Consistently, there are more beneficiaries in the typology with higher PCE: 5,221 students attending schools that receive contributions from companies to improve school management compared to 2,774 students who receive contributions for academic performance in their schools.

Table 5.3. PCE by Type of Contributions: Capital Cities

Bogotá DC				
2015				
PCE *0.9971 (48.0%)*	Access *0.9980 (2,973)*	Academic *1.0011 (2,904)*	Civic *1.0007 (19,651)*	Teacher *1.0024 (4,954)*
Academic *1.0011 (2,904)*	0.3012			
Civic *1.0007 (19,651)*	0.3272	0.0295		
Teacher *1.0024 (4,954)*	0.7898	0.1498	0.4888	
Management *0.9984 (5,560)*	0.0516	0.0019	0.0465	0.0297
2016				
PCE *0.9878 (47.9%)*	Access *0.9882 (1,057)*	Academic *0.9851 (764)*	Civic *0.9908 (19,188)*	Teacher *0.9866 (3,097)*
Academic *0.9851 (764)*	1.54E-13			
Civic *0.9908 (19,188)*	1.60E+05	3.20E-33		
Teacher *0.9866 (3,097)*	5.11E+03	4.72E-04	7.51E-08	
Management *0.9860 (4,430)*	3.71E+01	5.60E-01	5.25E-23	1.20E+05

Medellín				
2015				
PCE *1.0283 (58.2%)*	Access *1.0592 (2,847)*	Academic *1.0385 (4,240)*	Civic *1.0413 (7,180)*	Teacher *1.0416 (6,927)*
Academic *1.0385 (4,240)*	2.70E-33			
Civic *1.0413 (7,180)*	3.57E-25	6.70E+01		
Teacher *1.0416 (6,927)*	1.12E-23	9.94E+00	6.10E+05	
Management *1.0416 (7,137)*	4.70E-24	2.08E+01	7.44E+05	8.55E+05
2016				
PCE *1.0360 (74.9%)*	Access *1.0340 (1,546)*	Academic *1.0381 (8,794)*	Civic *1.0387 (7,565)*	Teacher *1.0383 (9,281)*
Academic *1.0381 (8,794)*	0.3001			
Civic *1.0387 (7,565)*	0.1242	0.3383		
Teacher *1.0383 (9,281)*	0.2357	0.7753	0.4859	
Management *1.0387 (7,532)*	0.1150	0.3025	0.9397	0.4400

Cali				
2015				
PCE *1.0821 (59.6%)*	Access *1.0961 (2,313)*	Academic *1.0892 (2,774)*	Civic *1.1011 (5,221)*	Teacher *1.1011 (5,221)*
Academic *1.0892 (2,774)*	2.26E+01			
Civic *1.1011 (5,221)*	4.48E+05	6.82E-04		
Teacher *1.1011 (5,221)*	4.48E+05	6.82E-04	1.00E+06	
Management *1.1011 (5,221)*	4.48E+05	6.82E-04	1.00E+06	1.00E+06
2016				
PCE *1.0258 (55.7%)*	Access *1.0149 (698)*	Academic *1.0295 (1,969)*	Civic *1.0377 (5,030)*	Teacher *1.0386 (4,890)*
Academic *1.0295 (1,969)*	1.15E-03			
Civic *1.0377 (5,030)*	1.61E-25	6.48E-13		
Teacher *1.0386 (4,890)*	3.80E-28	5.18E-17	1.11E+05	
Management *1.0392 (4,817)*	7.20E-30	7.74E-20	9.48E+03	3.17E+05

Barranquilla				
2015				
PCE *0.9119 (27.7%)*	Access *0.8992 (98)*	Academic *0.9060 (2,357)*	Civic *0.9025 (987)*	Teacher *0.8871 (188)*
Academic *0.9060 (2,357)*	6.07E+02			
Civic *0.9025 (987)*	0.0039	2.55E+05		
Teacher *0.8871 (188)*	5.39E+05	4.50E-02	1.84E+00	
Management *0.8982 (781)*	0.0216	0.0016	0.0009	0.0002
2016				
PCE *1.0251 (57.7%)*	Access *1.0350 (2,918)*	Academic *1.0379 (5,081)*	Civic *1.0334 (1,576)*	Teacher *1.0385 (3,500)*
Academic *1.0379 (5,081)*	2.14E+00			
Civic *1.0334 (1,576)*	1.82E+05	4.91E+04		
Teacher *1.0385 (3,500)*	9.78E+02	1.67E+05	2.96E+05	
Management *1.0487 (1,940)*	3.87E-15	2.82E-05	3.08E-06	1.20E-06

Note: Wilcoxon Mann-Whitney Rank Sum Test (p-value)

Table 5.4. PCE by Type of Contributions: Rest of municipalities

Cundinamarca				
2015				
PCE *0.9563 (48.2%)*	Access *0.9845 (380)*	Academic *0.9284 (57)*	Civic *0.9731 (7,599)*	Teacher *0.9673 (2,106)*
Academic *0.9284 (57)*	4.42E-14			
Civic *0.9731 (7,599)*	6.17E-06	1.86E-10		
Teacher *0.9673 (2,106)*	1.00E-06	5.99E-07	3.10E+04	
Management *0.9706 (2,913)*	6.28E-03	1.39E-08	1.15E+05	6.46E+03
2016				
PCE *0.9974 (49.3%)*	Access *0.9939 (511)*	Academic *1.0034 (422)*	Civic *1.0068 (7,570)*	Teacher *1.0024 (1,506)*
Academic *1.0034 (422)*	0.0003			
Civic *1.0068 (7,570)*	0.0011	0.1971		
Teacher *1.0024 (1,506)*	0.0020	0.1893	0.7085	
Management *1.0020 (2,238)*	0.0153	0.0589	0.1217	0.3975

Antioquia				
2015				
PCE *0.9405 (36.3%)*	Access *0.9681 (5,585)*	Academic *0.9717 (3,562)*	Civic *0.9616 (9,081)*	Teacher *0.9552 (7,389)*
Academic *0.9717 (3,562)*	9.61E+03			
Civic *0.9616 (9,081)*	2.92E-14	1.31E-20		
Teacher *0.9552 (7,389)*	3.05E-68	2.41E-70	2.23E-17	
Management *0.9616 (8,775)*	4.87E-16	2.31E-22	6.20E+05	4.61E-15
2016				
PCE *1.0532 (69.1%)*	Access *1.0402 (7,662)*	Academic *1.0457 (6,492)*	Civic *1.0562 (16,946)*	Teacher *1.0593 (15,310)*
Academic *1.0457 (6,492)*	5.50E+04			
Civic *1.0562 (16,946)*	1.08E-44	3.95E-20		
Teacher *1.0593 (15,310)*	3.03E-66	6.65E-34	8.11E+01	
Management *1.0568 (16,424)*	7.85E-47	1.72E-21	5.69E+05	8.47E+02

Valle del Cauca				
2015				
PCE *0.8530 (16.1%)*	Access *0.9646 (150)*	Academic *0.8741 (911)*	Civic *0.8564 (1,080)*	Teacher *0.8715 (706)*
Academic *0.8741 (911)*	5.90E-37			
Civic *0.8564 (1,080)*	2.66E-38	6.45E-20		
Teacher *0.8715 (706)*	6.02E-38	5.57E-02	2.88E-11	
Management *0.8739 (1,026)*	6.84E-38	2.44E+03	3.00E-19	9.61E+02
2016				
PCE 0.9255 (26.5%)	Access *0.9728 (331)*	Academic *0.9352 (1,919)*	Civic *0.9592 (1,875)*	Teacher *0.9350 (1,525)*
Academic *0.9352 (1,919)*	6.28E-68			
Civic *0.9592 (1,875)*	1.55E-06	1.89E-94		
Teacher *0.9350 (1,525)*	7.79E-70	3.27E+05	4.56E-92	
Management *0.9380 (1,463)*	5.63E-58	1.39E+04	5.64E-65	1.50E+03

Atlántico				
2015				
PCE *0.9983 (44.9%)*	Access *1.0699 (654)*	Academic *1.0773 (600)*	Civic *1.0278 (3,326)*	Teacher *1.0291 (2,955)*
Academic *1.0773 (600)*	1.24E+05			
Civic *1.0278 (3,326)*	1.25E-02	5.16E-08		
Teacher *1.0291 (2,955)*	4.15E-04	7.19E-10	2.64E+05	
Management *1.0314 (2,746)*	4.95E-02	3.89E-07	7.96E+05	1.92E+05
2016				
PCE *1.0233 (57.2%)*	Access *1.0351 (1,803)*	Academic *1.0330 (1,977)*	Civic *1.0340 (4,060)*	Teacher 1.0321 (2,752)
Academic *1.0330 (1,977)*	0.0035			
Civic *1.0340 (4,060)*	4.79E+01	0.3627		
Teacher *1.0321 (2,752)*	0.0007	0.7178	0.6118	
Management *1.0311 (2,183)*	8.10E+01	1.86E+05	4.24E+05	3.04E+05

Note: Wilcoxon Mann-Whitney Rank Sum Test (p-value)

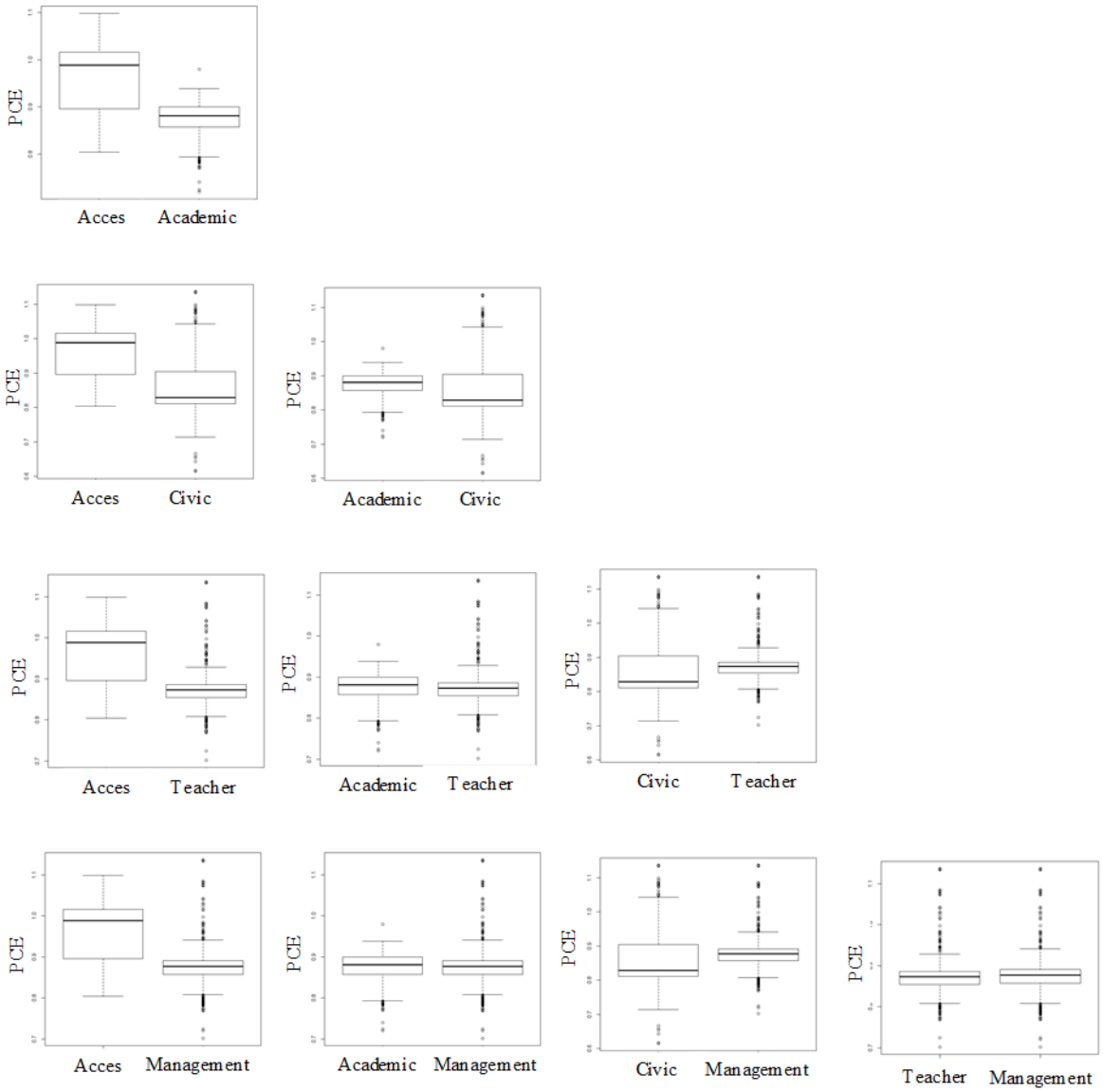
Comparing the effects, the results are not consistent among all types of contributions, nor among subregions or periods. However, greater consistency is noted in the subregions that exclude capital cities and the case of Medellín stands out, which in 2016 does not reflect differences between effects.

Figure 5.1 is an example of the graphical analysis that compares the distributions by pairs of variables to facilitate the understanding of the way the results have been interpreted. It refers to the rest of Valle del Cauca in 2015. The first column, in the same order as the previous matrices of the statistics (Tables 5.3 and 5.4), shows clearly that the distribution of the PCE of the students that attend schools that receive Access-type private contributions is statistically

different from the distribution of the other four types of contributions (the value of the test statistic confirms it). In this case, the PCE is higher. Likewise, the distribution of the effects associated with Civic-type contributions (the two boxes of the second row and the two additional boxes of the third column) are different from any other type of contribution in this region. In this case, the PCE is smaller.

In summary, from the perspective of the company that makes the contribution or of the school that receives it, the best option would have been to carry out Access-type initiatives, and the least would have been Civic-type initiatives. Statistically, the other three types of initiatives are irrelevant. This interpretation can be replicated in each of the sub-samples.

Figure 5.1. PCE distribution by Type of Contributions: Valle del Cauca



In general, the contributions aimed at improving access and retention, compared with the other types, have a greater effect on academic performance, especially in the subregions that exclude capitals (Table 5.4, the first columns of each matrix). This does not necessarily mean values greater than one in the PCE, as indicated in the previous Chapter, but in this case, it does report a growing effect from one year to the next. It is a result that reinforces the intraregional differences and the environmental conditions that are modeled in the formation of groups. Likewise, it is consistent with other factors observed in these regions regarding capital cities such as supply restrictions, greater distances to school or migrations to urban centers of families with school-age children, among others, which are reflected in less coverage and higher levels

of school dropout. Despite being the most effective type of contribution, it is also the type of contribution with fewer beneficiaries. Barriers associated with implementation costs or the more explicit responsibility that educational policy awards the public sector are possible explanations for this occurrence.

Secondly, academic contributions constitute the second group of interventions with the greatest contribution, also with greater consistency in the regions that do not include capital cities. The number of beneficiaries in this type of intervention has been growing more rapidly in most departments. Contrary to the evidence from the rest of the country, Cali presents the highest contribution coefficients of this type of initiatives, but with a negative growth rate from one year to the next, and with a lower value when compared with other types of contributions. in the same city. In this region, several of these initiatives are associated with the use of ICT in the teaching-learning process. Delving into each typology could provide even more information.

With weaker evidence, the contributions associated with school management are the third group of interventions with the greatest effect, especially in Barranquilla and Medellín. This type of contributions, after those associated with civic competencies and together with those in relation to training teachers, are the contributions with the most beneficiaries. Access and teacher training, in spite of being the ones with the most beneficiaries, are the types of contributions with less effects, in some cases, even reducing the potential improvement in the academic performance of the students. It is possible that the initiatives referring to civic and social competences pursue objectives different from academic performance but given that the highest objective–which is assumed to be common–is the closing of quality gaps between public and private schools, for the purposes of this study, the measurements are also related to academic performance using standardized tests as an outcome.

Table 5.5 summarizes the previous results and reports the magnitudes of the effects and the percentage of beneficiaries by type of contribution. As revealed in the Methodology section, this is a first approach to evaluate the efficiency in the allocation of private contributions and test whether the assumptions of business leaders to be achieving positive effects are satisfied.

Table 5.5. PCE and Allocative Efficiency by Type of Contribution

Region	Year	Access		Academic		Civic		Teachers		Management	
		PCEi	CP (%)	PCEi	CP (%)	PCEi	CP (%)	PCEi	CP (%)	PCEi	CP (%)
						Capital Cities					
Bogotá D.C.	2015	0.9980	14.8%	1.0011	14.4%	1.0007	97.7%	1.0024	24.6%	0.9984	27.6%
	2016	0.9882	5.3%	0.9851	3.8%	0.9908	96.2%	0.9866	15.5%	0.9860	22.2%
Medellín	2015	1.0592	37.8%	1.0385	56.2%	1.0413	95.2%	1.0416	91.9%	1.0416	94.7%
	2016	1.0340	16.3%	1.0381	92.7%	1.0387	79.7%	1.0383	97.8%	1.0387	79.4%
Cali	2015	1.0961	44.3%	1.0892	53.1%	1.1011	100.0%	1.1011	100.0%	1.1011	100.0%
	2016	1.0149	13.9%	1.0295	39.1%	1.0377	100.0%	1.0386	97.2%	1.0392	95.8%
Barranquilla	2015	0.8992	3.9%	0.9060	92.9%	0.9025	38.9%	0.8871	7.4%	0.8982	30.8%
	2016	1.0350	56.4%	1.0379	98.2%	1.0334	30.5%	1.0385	67.7%	1.0487	37.5%
						Rest of the cities					
Cundinamarca	2015	0.9845	4.9%	0.9284	0.7%	0.9731	98.3%	0.9673	27.2%	0.9706	37.7%
	2016	0.9939	6.6%	1.0034	5.4%	1.0068	97.0%	1.0024	19.3%	1.0020	28.7%
Antioquia	2015	0.9681	61.5%	0.9717	39.2%	0.9616	100.0%	0.9552	81.4%	0.9616	96.6%
	2016	1.0402	43.5%	1.0457	36.8%	1.0562	96.2%	1.0593	86.9%	1.0568	93.2%
Valle del Cauca	2015	0.9646	7.3%	0.8741	44.3%	0.8564	52.5%	0.8715	34.3%	0.8739	49.9%
	2016	0.9728	9.3%	0.9352	54.1%	0.9592	52.8%	0.9350	43.0%	0.9380	41.2%
Atlántico	2015	1.0699	19.3%	1.0773	17.8%	1.0278	98.4%	1.0291	87.4%	1.0314	81.2%
	2016	1.0351	39.8%	1.0330	43.7%	1.0340	89.7%	1.0321	60.8%	1.0311	48.2%

Consistent with the previous literature, the effects are greater in the types of contributions that impact the student more than the school. As anticipated, no results are available for initiatives related to advocacy in education policy. Beyond the impossibility of estimation, because these initiatives are not associated with a single school, this Thesis does not recognize indirect effects that may originate, for example, from the influence by the business sector in the local educational authorities' decisions. This is a limitation of the Thesis.

In summary, these results show that the diversity of types of contributions is reflected in differentiated effects as both hypothesis suggest. On average, with weak evidence, Access initiatives in the subregions and Academic-type initiatives in the capital cities report greater PCE. Even presenting consistency problems, on average, the contributions that have the most beneficiaries are not those that have the highest effect from private contributions. This, in addition to being contrary to expected, provides sufficient evidence to award an unfavorable opinion on the allocative efficiency of private contributions and it contradicts the assumption of employers about the effects of their interventions.

5.5. Conclusions

This Chapter, starting from the Private Contribution Effect (PCE) estimated in the previous Chapter, aimed to validate the robustness of the PCE and the good allocation of contributions considering their different typology. Six categories of types of private contributions are defined, grounded on school-based literature to reclassify the intervention categories of SIIPE, the source of the information on private contributions. These categories are: 1. Access and retention, 2. Academic Competences, 3. Civic and Social Competences, 4. Teacher Training, 5. School Management, and 6. Advocacy in Educational Policy. Because of construction, the effects are only reported for the first five categories since the impact on educational policy operates more like a pure public good, making it more difficult to estimate effects attributable exclusively to it.

Applying the nonparametric Wilcoxon-Mann-Whitney test for independent samples, the distributions of the effects for each pair of contribution types were compared. This, for each of the 16 subsamples (4 departments, differentiating the capital from the rest of the municipalities, for 2015 and 2016), which enables the validation of the robustness of the effect by subregion and year. Methodologically, the most important contribution of this work is the possibility of comparing effects with different contributions.

In half of the comparisons, there is sufficient statistical evidence to affirm that the distribution of their respective PCE is different. This is more consistent for regions without capital cities (59%). By type of contribution, those related to *Access and Permanence* and with *Academic Competencies* have the greatest effects, followed by *School Management,* with weaker evidence. Contrary to what was expected, the types of initiatives that report the most beneficiaries are those with the lowest PCE. This is a first approximation that provides sufficient evidence to conclude that there is an important margin for improvement in the allocation of private contributions when the objective sought is to improve the academic performance of students and, consequently, to reduce the quality gaps between public and private schools.

A cost-benefit approach is an interesting way to delve into the relationship between the magnitude of the PCE and the number of beneficiaries. It would be desirable for companies to allocate their resources to the types of initiatives where not only the PCE is greater, but the cost per unit of efficiency achieved is lower. Consequently, in addition to improving the criterion of social allocation, the company would contribute a set of good practices to the public provision of education. The availability of information on the companies' investments is

limited and the quality of this information is unequal. Therefore, this thesis does not progress in this direction but recognizes it as a future line.

The nature of the data, due to the registration structure, is a limitation, to the extent that it imposes a non-hierarchical structure at its multiple levels, which makes it impossible to disaggregate information at the school or company level. This is true in the case of schools, because they can receive more than one contribution and these, in turn, can be of more than one type. In the case of companies, because they can provide more than one contribution, of more than one type, to more than one school. Methodologically there are treatment alternatives (Cross-Classified Multilevel Models, for example) which require additional information and processing validation in the database.

Future lines of research include, first, the refinement of private contribution costs to advance to cost/benefit estimates per beneficiary student as just mentioned. Second, one that can provide support methodologies to guide the processes of resource reallocation. In addition to the information available for decision making, it would include the targeting criteria of beneficiary schools (and their communities) that have already been suggested in previous Chapters. This would consider that, because of the motivations declared by the business leaders and their assumption of positive effects, there is a risk of them reducing their contributions instead of reassigning them. Third, it would make sense to study more in-depth the effects of private company contributions to initiatives related to advocacy on educational policy. As anticipated, unlike many of the other contributions, the logic of allocation and evaluation corresponds more to that of a pure public good.

Chapter 6

Conclusions

6. Conclusions

The contribution of private companies to the solution of the social problems of their environment is crucial in contexts where low public social spending, coupled with social and equity gaps, dilute the benefits of growth and, recurrently, deteriorate the competitiveness and the conditions to operate. Of the interventions in education, given their public and merit good characteristics, a positive and greater effect is expected, when compared to other intervention alternatives. However, the quality gaps between public and private education, contrary to what is desired, stimulate negative effects: a greater disparity in academic performance and a greater allocation of private spending by households in private education.

Greater and better private contributions to public schools accelerate the achievement of social benefits at different levels. Through improved academic performance, students improve their likelihood of accessing quality higher education and actively participating in better-paid labor markets. Families, with a better quality in public education, can reduce their spending on private education and expand their well-being through a basket of more diversified goods and services. For the economy as a whole, a reorientation of private spending and greater labor productivity in the lowest-income households stimulates a more equitable development dynamics. In all cases, the company also wins.

The theoretical literature and policy documents report on this issue extensively and increasingly but, in practice, the results do not alter the problem statement significantly. Faced with this complexity, this Thesis seeks a better understanding of private contributions that includes: (i) a better definition of the interventions, (ii) greater clarity of the motivations that originate the contributions and (iii) a better measurement of the effects.

This Chapter reviews the roadmap (section 6.1.), summarizes the main contributions and main findings (section 6.2.), identifies the main limitations (section 6.3.), and suggests possible future lines of research (section 6.4.).

6.1. The Roadmap

Chapter 1, *Introduction*, motivates the set of research questions, recognizing the role of the private sector as an answer to the question of how to improve the quality of the public education system and the performance of its students to take advantage of the benefits already described. It provides a general context, with the opportunities behind the literature gap and sets the scope of the research problem in the power of private contributions to improve the academic performance of public school students. The theoretical relevance and replicability in different contexts and social services is justified.

Chapter 2, *Private Contributions and Their Motivations and Effects. Systematic Literature Review*, actually contains two reviews: a first, narrative, to devise a concept of private contribution that integrates different approaches in the literature. This operational definition comprises: motivations, mechanisms and effects. These components of the definition guided a second systematic review of literature, specifically related to private interventions in education.

Chapter 3, *Private Contributions in Education in Practice. Reviewing the Concept with Private Sector Leaders from Colombia*, empirically validates the concept and taxonomy of analysis of the motivations and effects of private contributions through thematic analysis of semi-structured interviews with Colombian business leaders. Validating the consistency of the findings in the literature and gathering evidence for empirical implementation was the aim of this chapter.

Chapter 4, *Private Contribution Effect on Public Schools and Academic Performance of Students. Order-m Estimation*, from an Efficiency Approach, offers an aggregate and comparable quantitative estimate that measures the effect that is attributable to private contribution. Having a metric fills a gap that exists both in the literature and in practice for these decisions to not be based only on a well-intentioned assumption of effectiveness by the decision-makers.

Chapter 5, *Which Private Contribution has a greater PCE? Typology of contributions and its effects,* breaks down the previous measurement identifying the different types of contributions, which are classified based on categories that arise from the school-based interventions literature review. This Chapter completes the circle that originates in the motivation of this Thesis, continuing with the evaluation of the efficiency of the companies'

allocation criteria, discussing if those types of contributions with greater number of beneficiaries are those with the greatest PCE.

6.2. Contributions and Main Findings

The involvement of the private sector in improving the quality of public education is a reality. Companies' contributions to schools reflect a great diversity of types of initiatives and implementation forms. These, in turn, respond to a diversity of motivations with different levels of formality that are increasingly consistent with the business strategy. Therefore, the effects are worth, even when measurement is incipient. Despite this, business leaders assume a positive effect of their actions. By contrast, empirical evidence has shown that this presumption does not always coincide with reality. The effects in capital cities are greater than in the rest of the municipalities, which makes sense with the proximity of firms and the institutional capacity of the public sector in the big cities, among other factors. By types, as expected, Access initiatives in the rest of the municipalities dominate the other types and, contrary to expectations, Academic initiatives in the capital cities do not have enough robustness to dominate the rest. Even in capital cities, access initiatives have the greatest effects. The contribution of the CPs is evident in relation to the objective of reducing the quality gaps among public schools. However, the opportunities to improve this contribution from a better allocative efficiency of initiatives by type and selection of schools is irrefutable. The following paragraphs break down the lessons learned by Chapter and, when finished, they also add lessons from the practitioners' point of view.

In Chapter 2, private contribution was defined as "*a contribution (financial or non-financial), which companies or individuals of the private sector, acting individually or collectively, voluntarily make, mainly but not exclusively, to a social objective of public interest.*" This definition is derived from the literature review that integrates and synthesizes the main conceptual approaches that analyze private contributions in social matters and their main mechanisms: Private Provision Mechanisms in Public Goods, Charitable Giving and Philanthropy in Giving Economics, and CSR in Firm Theory . The review reflects: (i) the progressive transition from altruistic to strategic approaches, (ii) the direct and indirect relationships between types of motivations and effects, (iii) the diversity of education-oriented contributions, oriented more to public schools at primary, secondary and high school levels,

most likely performed by 'agents' within a company that are more often women, more educated people, older and religious beliefs. The definition, the detail of the categories that make up the taxonomy of the motivations (probusiness or prosocial) and the effects (private or public) and these findings, among others, are the main contribution of this chapter.

Chapter 3 shows the consistency of the results of the interviews with business leaders with the core elements of the operational definition. The empirical implications are the main contribution. Some common features of the results, against each definition component, exhibit: (i) in relation to the motivations: the voluntary nature of the contribution and the public/social interest on the part of the companies, originated in altruistic motivations of the founding leader; (ii) in relation to the mechanisms: their diversity and heterogeneity, defined within companies, implemented externally by third parties; (iii) in relation to the effects: the significant relationship between the types of effects and the types of motivations, the demand for measurement that emerges when making the transition to a more strategic approach in the management of contributions, and the high valuation by incentives associated with legitimacy or social license to operate. Regarding the relationship between the effect and the decision to contribute or not, prominent is a significant valuation by the metrics that is not apparent in previous measurements, but this does not prevent their decisions from being guided by the assumption of effectiveness in what they do.

In Chapter 4, the main result is the aggregate estimate of the impact of private contribution on the academic performance of students who attend the public schools that receive it. Given the unprecedented nature of a database with this type of information such as SIIPE, which was used in this Thesis, this effect, called *Private Contribution Effect* (PCE), delivers two innovative aspects: (i) it is an aggregate and additive measure and, therefore, comparable, of the educational quality (standardized tests for seniors) versus differentiated interventions, (ii) methodologically, it varies from previous studies that integrate a meta-frontier approach with an order m-based technique that overcomes the criticisms of other methodologies and increases estimation precision with robust samples (7,525 - 41,919 DMUs). With a total of 269,117 students from 1,224 public schools in 4 departments of Colombia in 2015 and 2016, the results measuring the effects of 131 initiatives of 65 Colombian companies to improve the educational quality of 725 public schools attended by 130,798 students show that: (i) the PCE is significant and, in 7 of the 16 subregions, positive, (ii) the PCE is higher in the capital cities and it grows from one year to the next.

In Chapter 5, based on this PCE and recognizing the diversity of types of contributions, these are reclassified into six categories grounded on the school-based literature: 1. Access and Retention, 2. Academic Competences, 3. Civic and Social Competences, 4. Teacher Training, 5. School Management and 6. Advocacy in Educational Policy, comparing the distributions of the first 5 through a nonparametric Wilcoxon-Mann-Whitney test for independent samples. The main contribution of this Chapter is the possibility of comparison of effects between different types of contributions, added to a first approximation to evaluate the allocative efficiency of companies. The results, with a higher degree of consistency for the subregions that exclude capital cities, on average, show that: (i) Access initiatives in the subregions and, with less robustness, Academic-type initiatives in the capital cities report greater PCE and (ii) the types of initiatives with greater PCE are not those that have greater coverage of beneficiaries.

From the practitioners' point of view, this work highlights, among other issues, the following recommendations. In the first place, this Thesis provides elements to guide a reflection that typifies private contributions, differentiating motivations and, therefore, their direct effects. Thus, it will be easier to anticipate the objectives that can be expected and the relevant metrics to assess the results. A better design, ex ante, of any treatment also allows a better design of the subsequent evaluation. In relation to the above, in the second place, there are several recommendations for documentation process and systematization of information of these interventions. As mentioned, the classification of the initiatives by type is not uniform enough and, therefore, comparison and aggregation become difficult. A better report of the financial resources and a more thorough identification of beneficiaries will enrich the perspective of efficiency with one that is cost-benefit; in other words, in the direction of a cost-effectiveness balance. From the management's point of view, it would also facilitate better coordination/cooperation among companies and other interest groups. Third, with better outputs/outcomes metrics, results-oriented communication favors the construction of agreements and commitments with stakeholders that can be reflected both in better allocation decisions of each of them and in greater pressure on public managers of educational policy. The above is among a much broader set of possibilities that this work is expected to have submitted.

6.3. Limitations

In Chapter 3, the impossibility of consulting shareholders and owners of companies that make private investments is the main limitation even though the most frequent studies in the literature are those in which the executives have the role of decision. Without this, it was not possible to contrast whether the funders' point of view differs from that of the executives who manage the private contributions. In the event of being different, what implications would such differences have on the direction, magnitude and expected effects of the contributions? In other words, this research has not been able to learn whether there is an agency bias and, if so, in what direction, contrasting the hypothesis of the literature where executives contribute more to education than shareholders.

In Chapter 4, regarding the methodological approach, the main limitation is the difficulty in controlling a possible selection bias of the companies when choosing the schools that benefit from their contributions. On the one hand, this limitation is solved with a future line of research that: (i) deepens the targeting and selection criteria of beneficiaries by companies and (ii) contrasts the results obtained in this Thesis with others that are obtained with microeconometric causal-approach techniques. On the other hand, this limitation is justified by the trade-off versus the benefits of using a non-parametric efficiency approach.

In Chapters 4 and 5, two limitations are identified on the nature of the data: one refers to the geographic analysis unit and the other to the structure of the data. The one that refers to the unit of geographic analysis, as presented in the chapter, excludes corner solutions (full or zero coverage of beneficiaries), a fact that is more frequent at a higher level of disaggregation of the sample (e.g., municipalities, neighborhoods). The one that refers to the structure of the data (Cross-Classified Multilevel), requires an additional processing effort to apply other treatment alternative treatment methodologies.

6.4. Future Lines of Research

Among many future research opportunities, attention is drawn to two large sets of topics that are considered especially important for the development of the agenda suggested by this Thesis. The first future research opportunity refers to a better understanding of the criteria used

by a company to select a beneficiary school. This work already suggests reasons associated with proximity and geographic location, as well as the influence of the type of economic activity that the company developed. However, this is a more complex phenomenon where it is assumed that discretion and influence weigh heavily on the part of company executives and the conditions of the closest environment in the short term. A better understanding of this decision-making process is an opportunity to better design both the interventions and the 'lotteries' of beneficiary selection in order to best design the measurement experiments. This line of research also opens the door to estimations with microeconometric techniques that control the causal effects (sacrificing the aforementioned advantages of efficiency techniques) the results of which can be contrasted with those of this Thesis.

Second, the measurement of the PCE has also left evidence of possible cumulative effects of private contributions. This means that there are reasons to think that the longer the interventions, the greater the effects. This is a feasible exercise given that all the sources that make up the dataset are still collected periodically. This is not the only effect that the results of this Thesis suggest. Economies of scale and scope can also be evaluated to measure the effect of more than one contribution in a school and ponder the saturation point of a school that receives a large number of contributions and faces coordination and cooperation challenges in addition to its own management.

To conclude, this Thesis hopes to contribute significantly to a better understanding of the types, motivations and effects of private contributions to public schools so that when the literature continues to report on the impact of different interventions in schools, the quality gaps between public and private education may have begun to close.

Chapter 7

Appendix

Appendix 3.1. Guide to business leaders interview

Motivations and Effects of Private Contributions in Public Schools

Interview with Private Sector Leaders

[5min] This interview aims to better understand the motivations and effects of private sector contributions in education. This study is developed within the framework of my doctoral research at the UAB.

In this interview, private contribution is understood as a contribution (financial or non-financial), that companies or individuals from the private sector voluntarily make, acting individually or collectively, seeking, mainly but not exclusively, a social purpose of public interest. The interviews are aimed at leaders and decision-makers within private organizations that are recognized for this type of contributions.

To begin, please tell me a little about yourself, your training and experience and your role within the organization, especially in regard to these private contributions.

	Interviewee	Influencer
Name		
Position		
Training		
Seniority		
Experience		

Name of the company	**Type ***	**Assets**	**Operating income**	**Number of employees**	**Industry**
Geographic location			Family		
Sustainability Report			Listed		

Note: Company, Business Group, Corporate Foundation or Business Association

This is a semi-structured interview which is divided into three blocks. The first part will help me learn about the contributions that your company makes. The second part will refer to the motivations and the way these decisions are made in your company. And the third part will delve into the metrics that assess their success. It is designed to be completed in 60 - 90 minutes.

1. The decisions that are made: Nature and description of contributions in education made by the company.

[5'/10'] Could you briefly describe your organization's tradition of making social investments?

[5'/15'] On investment in education, describe the strategy or intervention model that guides your investments?

- The objectives/target
- Values/conceptualization
- The relationship: the partners and the contributions of each (public/private/cooperation/community)
- Invested resources (Own, third-party/leverage)
- Reporting Culture

[10'/25'] Specifically and in more detail, describe the main initiatives: What are they? What kind of initiatives are they? Who do they target? Who are the beneficiaries? Are they aimed at an educational level or a specific type of EI?

- Who? Beneficiaries (Student, Rector, School, Teacher)
- What type of schools? (Sector: Official/Not official, Socioeconomic condition, academic level, location)
- Level: elementary, primary, secondary, high school, higher eduaction
- How? Direct investment/through third parties. Donations, contributions, cooperation, matching, PPP, consulting
- Type: School management (administrative and academic), Pedagogical and disciplinary strategies, Endowment and infrastructure, Access and permanence, Advocacy

2. How the decisions are made: Structure of the organization and motivations of the people who make the decisions. Examine the decision-making process and the motivations of the company making private investments.

Now let's talk about the way the investment decisions are made in your company:

[10'/35'] What is the deepest motivation guiding the decisions in the organization? Here I would like to approach the balance between altruism and strategy more in-depth. How was the decision made for these investments?

- Altruism/strategy balance (business core, tax benefit)
- Where did the investment initiative come from? (influencers)
- Targeting criteria:
  - Why education?
  - Why a specific school/municipality?

- What would drive the company to change the investment decision?
    - Until when? Keep/withdraw the investment
    - Stability over time

[10'/45'] Structure: Who makes these decisions in the organization? What structure and what governance mechanisms do these decisions have? Does the ability of some people to influence these decisions weigh significantly?

- Government structure
- Participation/decision/approval mechanisms
- Consultative/democratic/leadership process
- Timing: frequency, temporality and stability of decisions

3. Performance measures. Know and differentiate the returns of the investment

[10'/55'] Metrics: What is your measure of success in the projects you carry out? What benefits do you expect from the investment?

- Metrics: coverage, quality, access, permanence, outputs, outcomes
- Social return/impact
- Return⇔Impact
    - Do they know/estimate them?
    - Do they value them?
- Consistency of these metrics with the objectives

[5'/60'] Have your investment decisions in education been affected, or could they be affected, by the value of these measurements? Are your investments conditional on any of these metrics?

- Substitutes/opportunity cost

END OF THE INTERVIEW

Chapter 8

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