

Family Networks, Confidence and the Emergence of Financial Capital in Antioquia in the XIXth Century

(First draft. Do not quote without permission)

Andrés Álvarez¹

César Mantilla²

Javier Mejía-Cubillos³

July, 2014

I- Introduction

Antioquia is considered the cradle of modern financial capitalism and entrepreneurial culture in Colombia. Moreover, this region is still characterized as dominated, politically and economically, by an entrepreneurial elite based on strong and secular family links. Most of these ideas are based on cultural and sociological evidence collected and analyzed independently from economic or entrepreneurial historical evidence. In this paper we try tackling and assessing the well founded and the economical implications of this hypothesis.

We put together two data set we built up from economical, demographical, historical and biographical data. On the one hand, we use data from around 1000 people belonging to the Antioquian 19th century elite allowing to construct a genealogy network based on parental, sibling and marriage links among this population. On the other hand, we compile evidence from stock ownership data from private banks and commercial houses since 1860s - 1880s and match it with the individual information of the Antioquian economic elite.

We employ social network analysis as methodology. Constructing the family and entrepreneurial networks of Antioquian elite, and exploring them on detail, we precise the interactions between non market capital (social capital resulted from marital and genealogical connections) and the emergence of the financial market.

¹ Universidad de los Andes. Email: ca.alvarez967@uniandes.edu.co

² Institute for Advanced Study in Toulouse. Email: cesar.mantilla@iast.fr

³ Universidad de los Andes. Email: j.mejia10@uniandes.edu.co

The paper has being structured in 5 sections. The first one offers the historical context of Antioquia in the last part of the 19th century. The second one presents a basic recount of the use of social network analysis in economic history. The third section details our database. The fourth section presents the results of the. Finally, the last section

II- Historical context

a. Entrepreneurial tradition in Antioquia

Antioquian enterprises led the process of industrialization and the consolidation of modern capitalism in Colombia during the first part of the 20th century. The raisons behind the emergence of large economic actors in a region that was part of the periphery until the last decades of the 18th century have being one of the classic subjects of study in Colombian economic history. The hypotheses in this research agenda can be grouped in three big branches.

The first and most popular tradition is one that emphasizes the existence of some sort of cultural virtues, available in Antioquian society during the 19th century, which encouraged the involvement of people in market activities. This literature can be traced to the work of Hagen (1962) and Fajardo (1969), and more recently authors like Mayor (1984) and Sanclemente (2010) represent this tradition. The origin itself of those alleged productive virtues of Antioquian culture is also a subject of major discussion, the hypotheses go from the influence of Protestantism and Judaism in the region to a natural reaction resulted from the isolation and geographical conditions of the territory.

In a similar line, the second tradition explores a more complex idea of social productive virtues, based not on the culture but on the disposal of the “appropriate” institutions. Authors like Uribe & Álvarez (1985, 1987, 1997) and Robinson & García-Jimeno (2010) argue in favor of this idea. Despite the heterogeneity among these studies, all of them seem to suggest the same argument, a process in which emerged an elite related with international trade, rather than landholding (as in the rest of Latin America), an elite that captured political positions and favored the establishment of “non-extractive” institutions, thus, businesses and economic growth were encouraged.

The last group of hypotheses explore more regular economic arguments, suggesting that Antioquia’s productive structure profited from the access to international trade thanks to its singular natural endowments (in particular the availability of gold mines) and the advantages of economies of scale, associated with a significant demographic expansion. In other words, beyond the particular institutional framework and the cultural characteristics of people, the disposal of exceptional productive factors and the conditions

of markets were the key elements for explaining the appearance of successful entrepreneurships. Authors like Safford (1967) and Brew (1977) represent this tradition.

Our analysis focuses in some sort of in-between mechanism behind these three explanations. We consider the role of social capital in the development of a particular important sector in the economic development of Antioquia, banking. Therefore, we analyze the relevance of non-market interaction, motivated by cultural and institutional factors, in market decisions, which are mainly related with regular microeconomic behavior. In that sense, this paper is inheritor of all of those three traditions.

b. The emergence of banking in Antioquia

The banking system of Colombia during the last part of the 19th century can be characterized as a collection of regional subsystems that gathered a few set of relative small banks that played under quite regular free banking conditions. The reasons behind that pattern can be identify in the liberal and federal project of the national government (los Radicales) and in the particular geographical conditions of the country, which made difficult any interregional productive effort.

In particular, the banking projects in Antioquia during that period were closely related with commercial activities, but, in contrast with what happened in other regions, they had also a deep connection with mining businesses. In fact, the first banks in the region became, for the decade of 1880, in a key piece of the commercial channel that joined the exports of gold and the imports of European goods. Their importance can be found in their role as intermediary between local miners and international commercial houses (see Botero, 2007).

More in detail, the banking system of Antioquia, for 1888, was composed by 5 banks: *Banco de Antioquia*, *Banco de Medellín*, *Banco Popular*, *Banco del Progreso* and *Banco de Oriente*, and 3 banking houses: *Vicente B. Villa e Hijos*, *Restrepo & Cía.* and *Botero Arango e Hijos*. Those banking houses were not the only commercial societies that traded with letters and gave credit, but were the only that issued paper money. The basic difference between banks and banking houses was their property structure, while banks were joint-stock companies, banking houses were family business.

As it is presented in table 1, the shareholder structure of banks was very heterogeneous; in one hand, some of them seem to have being regular corporations, as Banco de Medellín and Banco de Oriente, based on a significant number of shareholders and, in average, participations by shareholder relatively small. On the other hand, other institutions, as Banco del Progreso, were established as companies with a medium share capital offered by a few number of shareholders.

Table 1. Shareholder structure of banks. Antioquia. 1872-1888

	YEAR OF	NUMBER OF	NUMBER OF	VALUE OF EACH	SHARE CAPITAL	AVERAGE PARTICIPATION
--	---------	-----------	-----------	---------------	---------------	-----------------------

	FOUNDATION	SHAREHOLDERS	SHARES	SHARE (PESOS)	(PESOS)	BY SHAREHOLDER (PESOS)
BANCO DE ANTIOQUIA	1872	61	1.389	500	649.500	10.645
BANCO MERCANTIL	1875	4	40.000	1	40.000	10.000
BANCO DE MEDELLIN	1881	442	15.392	100	1.539.200	3.482
BANCO POPULAR	1882	22	60	1000	60.000	2.727
BANCO DEL PROGRESO	1883	7	1.000	100	100.000	14.285
BANCO DE ORIENTE	1883	227	6.321	20	126.420	557

Fuente: Mejía (2012)

III- Social Network Analysis in economic history

Despite the longstanding recognition of the importance in social phenomena of persistent links between people, it was just during the first years of the 20th century when it is possible to mention systematic explorations of social networks. Some of the classic works in the subject are Simmel (1908), Moreno (1934) and Köning (1936). After those developments, a long series of contributions in sociology and graph theory allowed the emergence of Social Network Analysis (SNA) as a multidisciplinary approach, process and set of tools that reveal networks and patterns of relationships between individuals or entities (Cross, Parker & Borgatti, 2002). Nowadays, SNA has reached almost all social sciences, being a regular approach in a great variety of research questions (see Freeman, 2004).

In particular, the expansion of SNA in historical studies has old roots (see Sánchez, 2002). The initial purpose of the use of SNA was trying to offer a more precise description of historical phenomena through the depiction of networks structures at several moments, interpreting patterns of continuity and change in view of the processes that had occurred (Schisani & Caiazzo, 2014). For instance, maybe the most representative paper in the early years of the field was Padgett and Ansell (1993), which explored the centralization of political power that underlay the birth of Renaissance state in Florence, by analyzing the structure and evolution of the marital network of elite families.

Lately, the improvements in computational capacity and the increasing availability of historical microdata, have allowed a recent explosion of studies that use social network analysis, considering each time more complex networks (Düring & Eumann, 2013). Maybe the most significant evidence of the recent boom in the subject is its success in the International Network for Social Network Analysis Annual Conference of 2013 (Sunbelt meeting) carried out in Hamburg.

In the first place, the keynote speaker of the conference was John F. Padgett, which entitled his lecture Networks and History. On this lecture he presented an idea that explores in more detail in Padgett and Powell (2012) and in short articles of wider diffusion as Padgett (2014). In those, Padgett presents the use of SNA into history as an alternative for the comprehension of social evolution in a non-deterministic sense, as a reflection of history closer to evolutionary biology, which analyzes a branching bush of diversifying path-dependent trajectories, not a teleological optimum toward which all are heading.

In the second place, at the Sunbelt meeting there were three different sessions focus exclusively in historical studies and one on archeological studies. In addition, an important part of the papers presented in other sessions as collective action, economics and markets, and entrepreneurial networks were historical cases of study.

All of this suggest the consolidation of SNA in historical problems as an active field. Nevertheless, most of the advances in the subject have being focus in a few particular areas. Basically, the conformation and evolution of kinship and marital networks (see Hamberger, Houseman & White, 2011), financial networks (see Badia-Miró et al. 2013) and elite networks (see Musacchio & Read, 2007; Hillmann & Aven, 2011).

IV- Data

We put together two data set we built up from economical, demographical, historical and biographical data.

On the one hand, we use data from around 1000 people belonging to the Antioquian 19th century elite. These data are extracted from the biographical dictionary of Mejía (2012b), which details genealogical information of each individual and biographical facts, such as the places and dates of birth and death and their regular entrepreneurial activity. Based on this information we to construct a kinship network, which presents the parental, sibling and marriage links among this population.

On the other hand, we compile evidence from stock ownership data from private banks and commercial houses since 1860s - 1880s and match it with the individual information of the Antioquian economic elite. These data are constructed based on the founding acts of each institution; therefore, our analysis has particular validity for the period in which the great majority of the banks were founded, 1880s.

V- Methodology

We construct the kinship network for the Antioquian elite using all the entries from the biographical dictionary by Mejía (2012b). Each node represents a character mentioned in the dictionary and each link a kin relationship between two nodes. We have a total of 956 nodes and 3,026 undirected kinship relationships. Although the network includes three types of links, all were given the same weight. All the parental, sibling and marriage relationships reported in the dictionary were accounted in the network configuration. We assumed that the network is undirected, i.e., if node A has a relationship with node B, then node B has a relationship with node A. This assumption is very plausible in kinship networks.

The network was constructed using Gephi (Bastian et al. 2009). For simplicity, and to reduce the likelihood of omitted relationships, the observational unit used to enter the information into the software was the link instead of the node. We compute three different measures of network centrality: the degree, measuring the number of connections per node; the betweenness, measuring the relative importance of each node connecting other nodes; and the closeness, measuring the average distance for a node with respect to the other nodes.

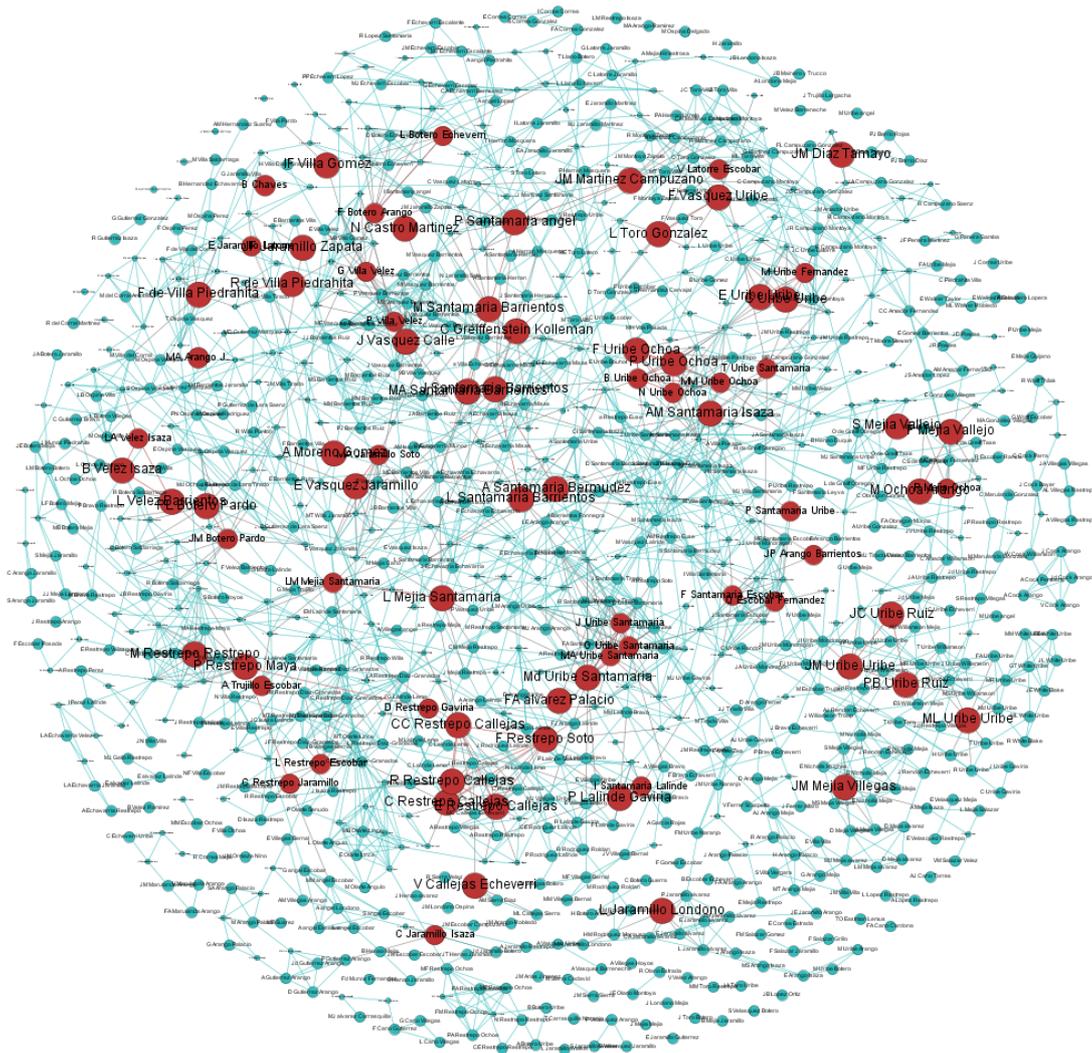
Data on stock ownership from private banks and commercial houses is linked to network data. According to the founding acts, eighty characters from the Antioquian elite were majoritarian shareholders of these financial institutions, the 8.4% of our sample.

Figure 1 shows the network connections for shareholders (nodes in red) and the rest of the population (nodes in blue). The visualization of the network corresponds to the Fruchterman Reingold force-directed algorithm (1991), based on spring-like attractive forces and electrical repulsive forces between nodes. The goal of the algorithm is to minimize the energy of the system (composed by the set of nodes and links), producing intuitive and symmetrical graphs once the equilibrium is reached.

VI- Results

We find that nodes representing the shareholders of the different financial institutions have more central positions within the Antioquian elite kinship network. Figure 1, used only for visualization purposes, gives us a glance of this result. Red nodes are, on average, closer to the center of the network. A closer look also allows us to check that the density of links is larger for these nodes.

Figure 1. Social network for the Antioquian elite.



We compute three different measures for the centralization degree at the node level, and show that they are positively and significantly correlated with the likelihood of having stock participation in private banks or commercial houses.

Let us begin by the most straightforward centrality measure, the degree of each node. It corresponds to the number of connections that each node has. Given that our network is undirected, the in-degree equals the out-degree so we can simply talk about the degree of

each node. The mean degree is 10.04, which means that on average each node has 10 connections to other nodes. The variance of the degree is 43.12.

However, as is shown in panel (a) on Figure 2, the distribution of the degree differs between shareholders and the remaining population. The red line, representing those members of the elite whom were owners of the financial institutions of the time, is shifted to the right, indicating a largest centrality degree. Differences between groups in the degree are confirmed using a non-parametric test for mean differences (see Table 2). Shareholders have on average 4.18 connections more than the comparison group.

Our second measure of centrality is the closeness (centrality). The closeness is the inverse of the average distance from one node to all other nodes. This means that the higher the closeness, the more central is the node. Unlike the degree of the node, the closeness measure captures the relative position of a node within the network.

In our network, the closeness measure goes from zero (very isolated nodes) to 12.3 (highly connected and centralized nodes). The average closeness is 6.24 with a variance of 5.64. As is shown on panel (b) in Figure 2, the closeness follows a symmetric, normal-like distribution in our two comparison groups. Nevertheless, the statistical test shows that the mean values are statistically different.

Figure 2. Distributions of the centrality measures for shareholders and the rest of the elite.

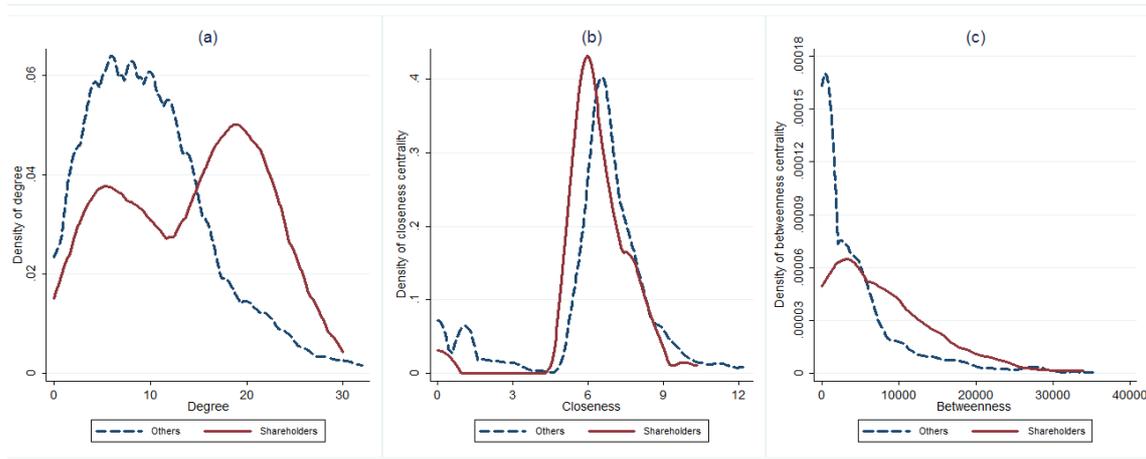


Table 2. Mean differences for all the centrality measures for shareholders with respect to other members of the Antioquian elite.

	Shareholders	Others	Test (z)	p-value
Degree	13.875	9.696	-4.785	0.0000
Closeness	6.286	6.235	2.303	0.0213
Betweenness	7284.9	4084.8	-4.706	0.0000

Two sample Wilcoxon rank sum test was performed for all three measures.

Finally, our third measure of centrality is the betweenness (centrality). The betweenness quantifies the relative importance of a node into connecting other nodes serving as the shortest path. A high value of betweenness means that if this node is subtracted from the network the shortest path between the remaining nodes increases, whereas a value close to zero suggests that subtracting this node from the network does not have a major impact on the connectivity between the other nodes. As the closeness centrality, this measure also captures the relative position of the node within the network. But unlike the closeness measure, the betweenness reflects the relative importance of the node into connecting subsets of a larger network.

In our kinship network, the betweenness goes from zero to 35679.87, with a mean value of 4352.58 and a variance over 3.6×10^7 . The betweenness is zero for all the nodes in the first quartile. The comparison between shareholders and the remaining nodes, in panel (c) on Figure 2, shows that the distribution for the owners of financial institutions is shifted to the right and the peak at betweenness equal to zero is less pronounced, an evidence of a larger centrality degree. Unlike the whole distribution, for the shareholders the value of betweenness in the first quartile is strictly positive (1574.15). The statistical test reveals the same results. The difference in means, reaching an average betweenness of 3200.1, is statistically significant.

The mean differences in two out of our three centrality measures are remarkably high and offer two different interpretations. The average degree for shareholders is 43% higher with respect to the rest of the population. This larger number of connections suggests that there is a positive relationship between larger offspring and having stocks on the starting financial institutions of the time. It is important to note that we are not claiming a causal effect, since it is not clear if bigger families are more likely to invest in early banking institutions, or if shareholding is a signal of wealth and therefore larger families could be economically sustained.

The other centrality measure with striking differences is the betweenness, which is 78% higher for shareholders compared to other members of the Antioquian elite. This larger importance within the network connectivity is not a signal of the correlation between financial investments and offspring size, but rather a signal of the correlation between hierarchical positions in the network and this kind of investments.

We interpret these correlations as evidence of the relevance of social capital among the first entrepreneurial elite in the emergence of banking systems in Latin America.

VII- Final remarks

Banks were the first entrepreneurial projects of mass capital in Latin America. In that sense, it was banking, rather than industry, the first stage of modern capitalism in the region. Our results are interesting because they present the relevance of familiar cohesion in the consolidation of that process.

References

- Badia-Miró, M., Blasco-Martel, Y., Lozano, S., & Soler, R. (2013). Redes sociales y negocios. La red de inversión del Banco de Barcelona en la economía catalana a mediados del siglo XIX. *Investigaciones de Historia Económica (IHE) Journal of the Spanish Economic History Association*, 9(03), 143-154.
- Bastian M., Heymann S., Jacomy M. (2009). *Gephi: an open source software for exploring and manipulating networks*. International AAAI Conference on Weblogs and Social Media.
- Botero, M.M. (2007). Casas comerciales y circuitos mercantiles Antioquia: 1842-1880. *Sociedad y Economía*, 12, pp. 93-114.
- Brew, R. (1977). *El desarrollo económico de Antioquia desde la Independencia hasta 1920* (Vol. 38). Bogotá: Banco de la República.
- Cross R., Parker A. and Borgatti S., Making Invisible Work Visible: Social Network Analysis and Strategic Collaboration, in "California Management Review", 44 (2), 2002, 25-47
- Düring, M., & Eumann, U. (2013). Diskussionsforum Historische Netzwerkforschung: Ein neuer Ansatz in den Geschichtswissenschaften. *Geschichte und Gesellschaft*, 39(3), 369-390.
- Erickson, B. H. (1997). Social networks and history: A review essay. *Historical Methods: A Journal of Quantitative and Interdisciplinary History*, 30(3), 149-157.
- Fajardo, L. F. (1969). *La moralidad protestante de los antioqueños: estructura social y personalidad*. Departamento de Sociología, Universidad del Valle.
- Freeman, L.C. (2004). *The Development of Social Network Analysis: A Study in the Sociology of Science*. Empirical Press.
- Fruchterman, T. M., & Reingold, E. M. (1991). Graph drawing by force-directed placement. *Software: Practice and experience*, 21(11), 1129-1164.
- Hagen, E. E. (1962). *Cambio social y desarrollo económico*. Instituto de Desarrollo Económico y Social.

- Hamberger, K., Houseman, M., & Douglas, R. W. (2011). Kinship network analysis. *The Sage handbook of social network analysis*, 533-549.
- Hillmann, H., & Aven, B. L. (2011). Fragmented Networks and Entrepreneurship in Late Imperial Russia. *American Journal of Sociology*, 117(2), 484-538.
- König, O. (1936). *Theorie der Endlichen und Unendlichen Graphen*. New York, Chelsea, 1950 edition.
- Mayor, A. (1984). *Ética, trabajo y productividad en Antioquia*. Ediciones Tercer Mundo.
- Moreno, Jacob L. (1934). *Who Shall Survive?* Washington, DC: Nervous and Mental Disease Publishing Company.
- Mejía Cubillos, J. (2012). *Propuesta metodológica para el cálculo del riesgo sistémico financiero en estudios de Historia Económica: Aplicación para el caso de la banca libre en Antioquia, 1888* (No. 35460). University Library of Munich, Germany.
- Musacchio, A., & Read, I. (2007). Bankers, industrialists, and their cliques: elite networks in Mexico and Brazil during early industrialization. *Enterprise and Society*, 8(4), 842-880.
- Padgett, J.F. and C.K. Ansell (1993). Robust Action and the Rise of the Medici, 1400-1434. *American Journal of Sociology*, 98: 1259-1319.
- Padgett, J. F., & Powell, W. W. (2012). *The emergence of organizations and markets*. Princeton University Press.
- ROBINSON, J., & GARCÍA-JIMENO, C. (2010). Élités, prosperidad y desigualdad: Los determinantes antes de la detentación de cargos públicos en Antioquia durante el siglo XIX. *Economía colombiana del siglo XIX*.
- Safford, F. (2010). El problema de los transportes en Colombia en el siglo XIX. En A. Meisel & M.T. Ramírez (Eds.), *Economía colombiana del siglo XIX*. Bogotá, Colombia: FCE.
- Sánchez, M.I. (2002). *Análisis de redes sociales e historia, una metodología para el estudio de redes clientelares*. Memoria para optar al grado de doctor. Universidad Complutense de Madrid.
- Sanclémente, J.C. (2010). La colonización antioqueña, el emprendimiento y su aporte a la competitividad regional y nacional. *Estudios Gerenciales*, 26, 114, pp. 119-147.
- Simmel, G. (1908), *Sociology: Investigations on the Forms of Sociation*. Duncker & Humblot, Berlin Germany.

Uribe, M.T. & Álvarez, J.M. (1985) Minería, comercio y sociedad en Antioquia 1760-1800. *Lecturas de Economía*, 18, pp. 53-115.

Uribe, M.T. & Álvarez, J.M. (1987). La constitución de 1886 como respuesta a la crisis del modelo federal y la confrontación nación región en Colombia. *Lecturas de Economía*, 24, pp. 49-84.

Uribe, M.T. & Álvarez, J.M. (1998). *Las raíces del poder regional: el caso antioqueño*. Medellín, Colombia: Editorial Universidad de Antioquia.