A tale of two cities: the regional dimension of the Ecuadorian securities market

Andrés Chiriboga-Tejada

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Introduction

This paper is part of a research project on the emergence and particular evolution of a small financial market in South America, the Ecuadorian securities market. This text will explore the regional dimension of trading, relying on networks as a way of representing social systems.[1] The network metaphor is used to study the structure of interdependencies that exist among its members, its influence on them, and the processes that emerge from the way they manage those interdependencies (Lazega 2014). Understood as a social network, the Ecuadorian securities market is approached as a set of trading relationships comprising transactions between actors in the market (Baker, 1984). I study the structure of trading as a way of gathering evidence about the social devices and processes that determine decision-making in the market, whether they are used in order to overcome uncertainty and achieve efficient setups (Beckert, 1996) or to maintain incumbents (Fligstein and Dauter, 2007).

Following economists such as De la Torre and Schmukler (2007) this case could be considered a reflection of the broader underdevelopment of local capital markets in Latin America compared with the larger financial centers in North America, Europe, and the flourishing economies of East Asia. On the other hand, compared with the vertiginous development of financial markets that has happened elsewhere, this exceptional case might not necessarily be a failure, but a structure with a functional role for particular interests and contingent to specific social devices. In this paper I will discuss the fact that the trading structure of the Ecuadorian securities market provides evidence of an important device that influences economic action in this market: The role of the historical – but also political and economic – division between two cities in the country, Guayaquil and Quito.

A tale of two cities

In Ecuador,[2] the Quito–Guayaquil[3] division and by extension the rivalry between the highlands and the coast, is transversal to almost everything: The political system, the economy, the cuisine, and even football, the country's national sport. According to historians such as Juan Maiguashca (1992) the *regional issue* has been present throughout the country's history. Regional disputes started with independence from Spain and the establishment of Ecuador as a sovereign republic in 1830.[4] The *regional issue* goes beyond a spatial and economic division. It includes those elements, but must be understood as a complex politico-historical phenomenon (Maiguascha, 1992: 180).

I will certainly not claim that regional division is the only explanatory variable of economic action in the Ecuadorian securities market. Nor does it explain all the economic and social processes that result from this. For instance, we cannot deny the economic factors that have impacted the general development of capital markets in Latin America. There are also other political and social elements that are relevant to explaining this market. For example, the relations between local politics and large economic groups are certainly reflected in market dynamics. The state also plays a relevant role in the market as a regulator and as an economic actor. These elements interact with the regional dimension and some of them are intertwined in it. In this sense, the regional division should be understood as a dual device: It is one of several elements at play but it is also a complex device in its own right

Andrés Chiriboga-Tejada is a doctoral fellow at the Max Planck Sciences Po Center on Coping with Instability in Market Societies (MaxPo). His doctoral dissertation investigates the Ecuadorian securities market as an exception to trends of financialization and the way particular social devices played a role into that. He received his bachelor degree in Sociology from the Pontifical Catholic University in Quito, Ecuador. He also holds a master degree in Finance from the Monterrey Institute of Technology and Higher Education in Mexico and master degree in Economic Sociology from the London School of Economics and Political Science. Along with his academic career, he has worked in the area of economic regulation. *andres.chiriboga@sciencespo.fr*

that explains the market to a certain extent. Regarding its complexity and invoking Zukin and DiMaggio (1990) we could say that the *regional issue* may capture different types of embeddedness: Cultural, political, and structural. This adds richness to the analysis of a complex fact but, at the same time, poses challenges for rigorous empirical analysis of the explanatory variables for the particular development of this market. The *regional issue* is certainly not enough to fully understand the Ecuadorian securities market and at the same time its explanatory power will have to be critically inspected.

Before we arrive at the point of dissecting the regional dimension of the market it is necessary to establish that there is such a device and that it can help us understand how the market works and in what respects it is functional. It is along these lines that this paper is written. Here, I will provide evidence of and discuss why the regional division, captured by the bipolarity of Guayaquil and Quito, should be a relevant part of the explanatory corpus of this case. I will show mainly how social network analysis has been helpful in arriving at this point. Further disaggregation of this complex issue and more detailed analysis are part of the larger enterprise of this research.

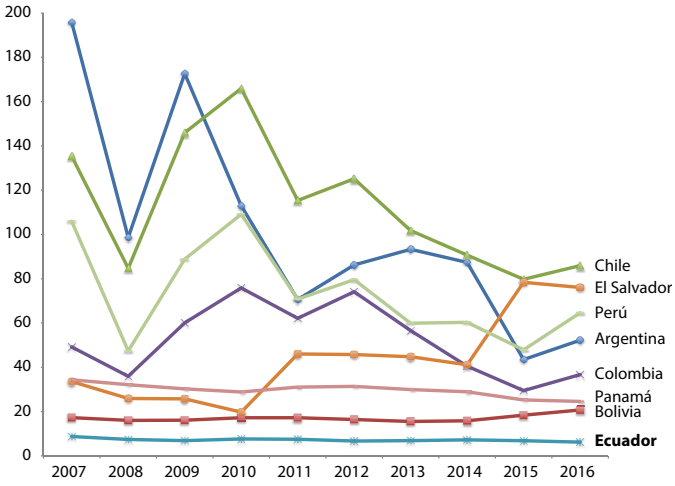

Figure 1. Market capitalization of several Latin American economies as a percentage of GDP (2007–2016)
Note: The sample selected corresponds to space limitations, but mainly to the following criteria: neighboring economies (Colombia and Peru), commodity producer-exporter economies (Bolivia, Argentina, Chile), and dollarized economies (El Salvador, Panamá).
Source: Iberoamerican Federation of Exchanges (FIAB)

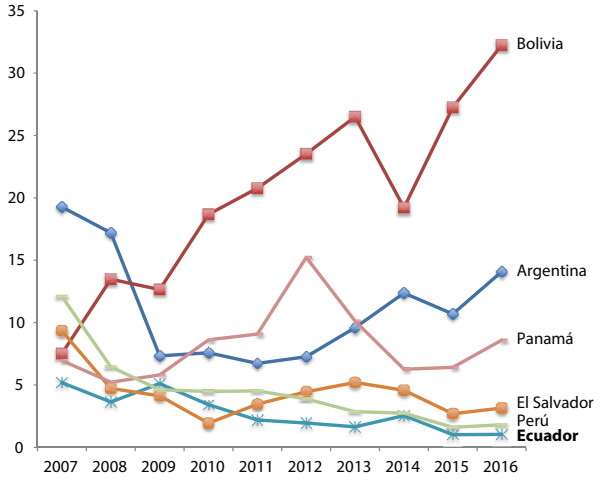

Figure 2. Total value of securities trading of several Latin American Economies as a percentage of GDP (2007–2016)
Note: Chile and Colombia have been excluded from this figure as the volume of trading there is much higher than in the other economies and poses problems for visualization.
Source: FIAB

The case

As mentioned above, the Ecuadorian securities market is a small local securities market, even by Latin American standards. The Ecuadorian securities market is at the bottom level of development compared with those of neighboring and similar economies (Figures 1 and 2). The curious thing about this case is that it has remained like that, despite changes in regulation, external shocks, and public–private efforts to make it flourish. Part of the larger endeavor of my research is to explore why has this happened beyond traditional economic explanations and what particularities can this case contribute to the sociological discussion on markets.

The origins of securities markets in Ecuador can be traced back to the end of the nineteenth century. However, it was in 1935 that a first commercial exchange started working in Guayaquil. In 1969, two securities exchanges – one in Quito and one in Guayaquil – were created by law in order to have a modern and supervised market. In 1993, the first Securities Market Law was passed by the Ecuadorian Congress and has been amended several times. Today it is part of the broader Organic Monetary and Financial Code. Deals are done mainly in the primary market and mostly fixed rent securities are traded. The Superintendence of Companies, Securities and Insurances serves as the regulator of this market in a manner comparable to the Securities and Exchange Commission (SEC) in the United States.

In the period of analysis for this paper, 51 brokerage houses were registered as dealers and nine state institutions traded in the market. There are 516 firms and state entities registered as issuers and their securities were traded in the market.

Data and methods

The data used correspond to a ten-year set of market transactions (2007–2016) recorded by the Guayaquil and Quito Exchanges and reported to the Superintendence of Companies, Securities and Insurances at the request of the author. In that dataset each transaction is recorded and, among other things, it allows us to see the date, type of security, issuer, dealers (buyer and seller), and the amount of the operation, which are relevant to the analysis that will be presented.

As already remarked, the trading relations in the market will be accounted for in terms of the transactions between brokers (Baker, 1984) of a diverse range of securities.[5] Transactions are the relational variable of this design. In network analysis terminology they are the *edges* of the network. *Nodes* are represented by brokerage houses that act as dealers in the Ecuadorian securities market. Public financial institutions such as the Ministry of Finance, the Central Bank, and a handful of public banks can deal directly in the market. For this analysis focused on the regional dimension of the market, state actors will be excluded. Nevertheless, I must insist that the role of the state as an economic actor and as a regulator is very important for fully understanding this market. Other relevant *nodes* in the design are issuing private firms and issuers from the public sector. For the most part, I analyze the dealers (brokerage houses) network and issuing firms will be included only at the end.

Transactions between dealers happen numerous times and especially if an extended time frame is considered for analysis. Most network studies tend to collapse edges into single ones and to delete loops in order to focus on binary relations. In part of my design I have indeed added transactions between two nodes in order to account for the strength of relations. But additionally, I look at them separately as the recurrence of transactions accounts for relevant long-lasting relations. I have also analyzed *loops*, as they show what I have called *egoist trading*. When a dealer "trades with itself" it really means it is doing it on behalf of pairs of its own clients.[6] With these considerations, I should say that this network is studied sometimes as a simple graph with binary weighted edges, but also as a weighted complex graph (Wasserman and Faust, 1994) or a multigraph that includes loops (Shafie, 2015).

A single attribute of nodes will be explored in this article: Domicile. This will allow us to focus the discussion on the regional dimension of trading. To do so, the addresses of traders and issuers were retrieved from the public information of the Superintendence of Companies, Securities and Insurances, the Superintendence of Banks and the Superintendence of Solidary and Popular Economy. The online *Guía de Negocios* of the magazine *Ekos*[7] was also used to crosscheck some firms' addresses.

The findings discussed in this paper are the product of modeling and analyzing 165,052 transactions that correspond to the ten-year data set mentioned above. In terms of amounts, this accounts for nearly 52.4 billion USD in trades. In this paper, analysis and results will be presented generally for the full 2006–2017 network. Some results will be presented on a yearly basis to overcome limitations of the full set[8] or when a longitudinal observation has show interesting evidence.

Findings

Network components

Figure 3 and Figure 4 show network graphs of trading relations corresponding to the years 2007 and 2016, the first and last years of the series analyzed. Transactions have been collapsed into single edges to facilitate observation but loops have been kept. This leaves plots that combine simple and multigraph displays. Edges are weighted and show direction depending on the existence of single or reciprocal trading. Nodes are displayed in colors that refer to the respective domicile of each dealer. Graphs were plotted using the Kamada-Kawai force directed algorithm (Kamada and Kawai, 1989) that makes it possible to obtain a first idea of possible components in the network.

In both graphs displayed here, as well as for all years, plotting shows a persistent two-side division between the Guayaquil (orange) and Quito (yellow) nodes.[9] The extreme with nodes corresponding to Quito dealers is also more intertwined within itself than the one corresponding to Guayaquil. This graphical examination leads us to think that we could be in the presence of a *community formation*. A *community* is defined by Porter *et al.* (2009: 1083) as "a group of nodes that are relatively densely connected to each other but sparsely connected to other dense groups in the network." Closer inspection of the connectedness of the network and its communities, relying on several metrics, will help us to challenge or reinforce these early claims.

At this point it is important to point out again that the Ecuadorian securities market works with a structure of two exchanges, one in Quito and the other in Guayaquil.[10] However, this does not impede any dealer from trading with counterparties of the other domicile. The large majority of brokerage houses operate in both exchanges and some even have offices and personnel in both cities.[11] In fact, although nine out of 29 (31 percent) brokerage houses domiciled in

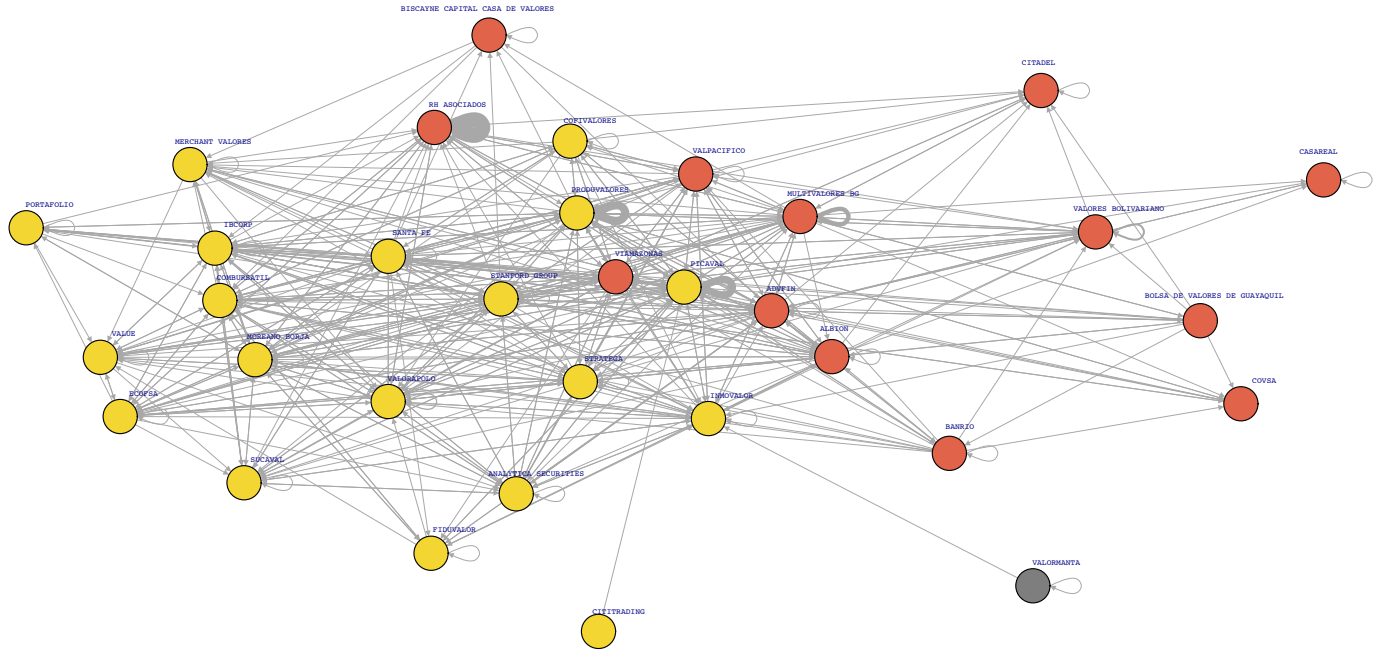

Figure 3. Private dealing in the Ecuadorian securities market (2007)

Quito in the period of analysis were not operational in the Guayaquil Exchange and four out of 21 (19 percent) brokerage houses domiciled in Guayaquil did not deal through the Quito Exchange, all have traded with numerous counterparties from the other domicile on both or a single exchange.

Despite some limitations, density[12] is a good first way to approach the connectedness of a market in which basically everyone can deal with each other. The density of the whole network and subgroups of nodes than can potentially be connected to one another provide a first idea of whether we are in the presence of a

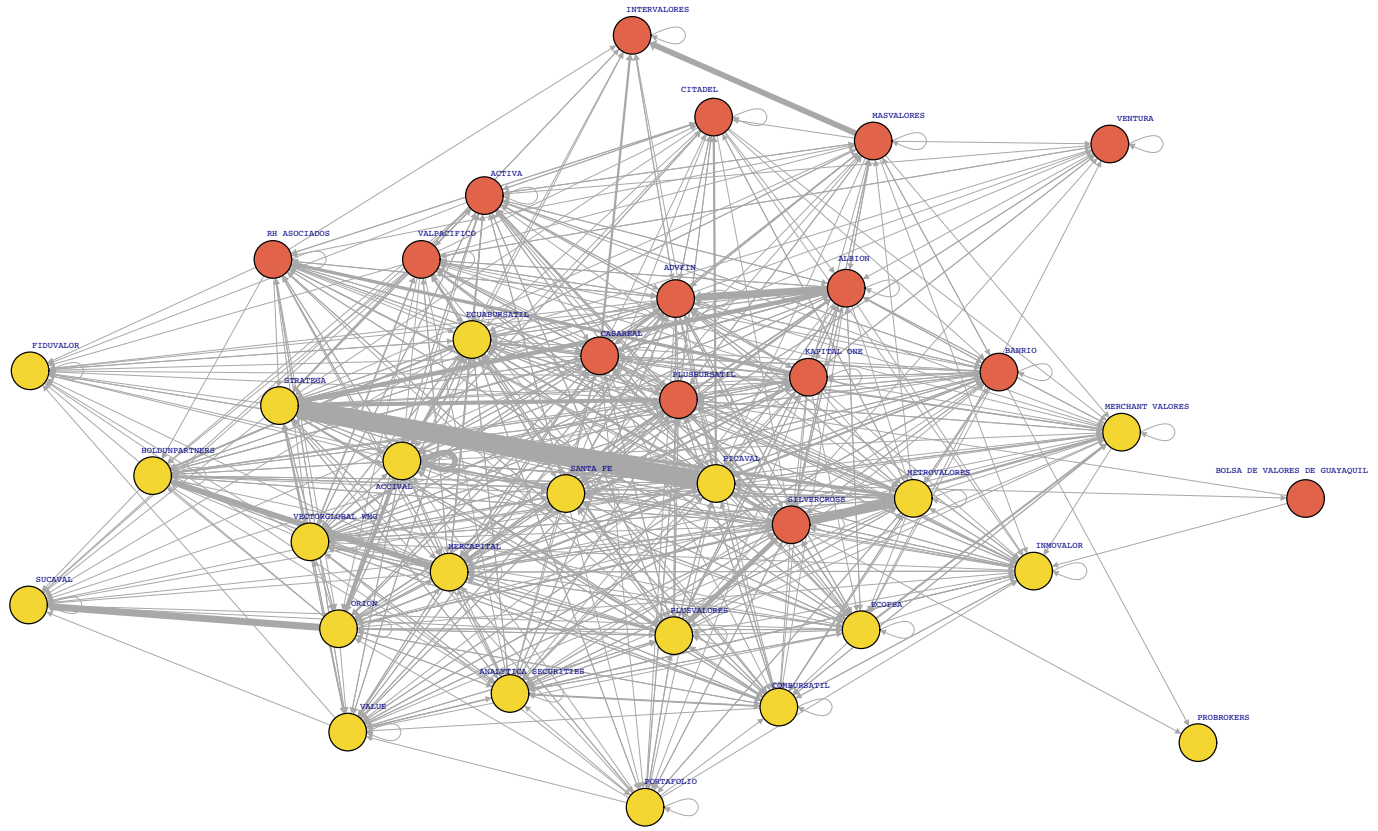

Figure 4. Private dealing in the Ecuadorian securities market (2016)

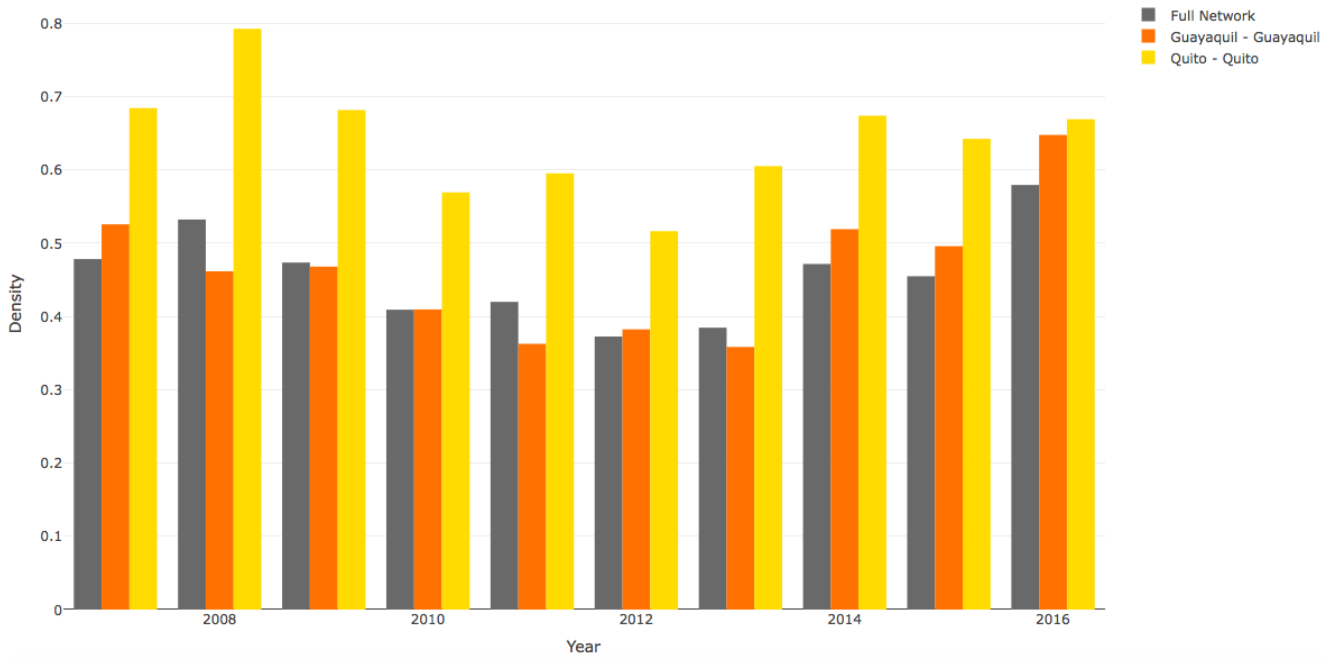

Figure 5. Network density, 2007–2016

network with communities. Throughout the period analyzed, the Network has an average density of 0.46 (sd=0.06; min=0.37; max=0.58). Any claim about whether a density ratio is high or low is always tentative. It always depends on the type of network that is being observed and to the fact that this type of measure is sensitive to the number of nodes considered. However, compared with both the "ideal market" in which everyone can deal with everyone and also the potential connectedness of the empirical Ecuadorian securities market measured by density metrics, firstly, it is possible to say that this network is not highly connected.

Density on its own tells us that the Ecuadorian securities market is far from being an "ideal market." However, we are interested in testing whether there is a regional division in the market that is accounted for by some type of assemblage(s). As mentioned above, graphical inspection provides evidence that there might be one or two communities in this market that coincide with the historical *regional issue* of the country. In that sense, we can analytically divide the network subsets containing (i) the edges that connect dealers from the same domicile and (ii) those that connect dealers from opposite domiciles. Only the first type can be subject to density analysis as in this type of subset all nodes can be potentially connected and can trade with each other. By doing this, we can check whether each domicile displays community formations that are more densely connected among them and get an idea of whether they are loosely connected to the rest of the network or to other formations.

Throughout the ten years analyzed, we may always identify a denser group among the dealers from Quito. This group always displays a higher density when compared with the whole network and behaves more clearly as a community. It has an average period density of 0.64 (sd=0.08; min=0.52; max=0.79). The Guayaquil group is always less cohesive than the Quito community, with an average density of 0.46 (sd=0.09; min=0.36; max=0.65) that matches the period average of the whole network. With this information in hand, it is not clear that Guayaquil dealers may be organized as another community. Nevertheless, it can certainly be stated that dealers with this domicile appear to participate in the market in a different way. Figure 5 summarizes and shows the annual evolution of density measures for full networks, and the Quito and Guayaquil subsets.

However, our data and type of analysis impose some limitations on the use of density to solely determine the existence of communities in this network. Although the difference is not too large, the number of dealers (nodes) is not exactly the same between domiciles. This difference also varies slightly from year to year. Additionally, when we compare the full network with its subsets we are clearly looking at groups with different numbers of nodes. To overcome problems due to the sensitivity of density metrics to the number of nodes and also to complement the evidence coming from those measurements, clustering coefficients have been calculated for each year in the series.

I have used the average clustering coefficient measure for weighted networks as proposed by Barrat *et al.* (2004), which better fits a multigraph setup. This measure looks at each node in the respective network or selected subset and computes the proportion of its neighbors that are connected to each other in relation

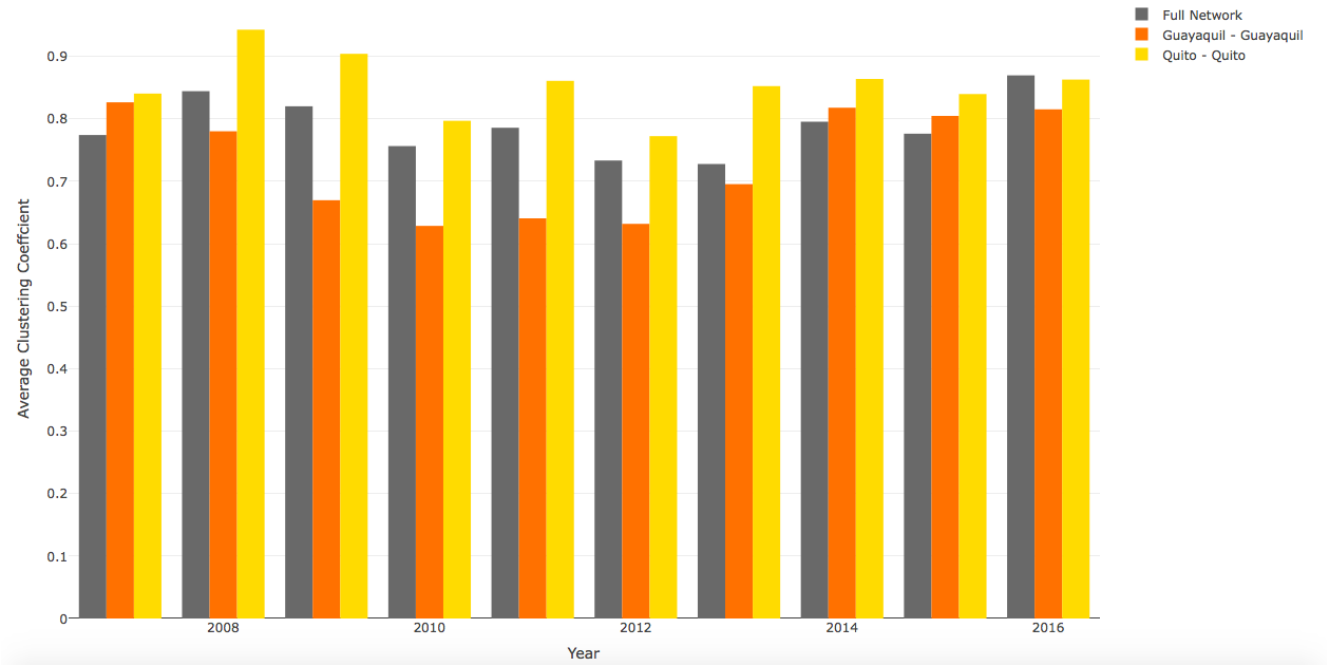

Figure 6. Network average clustering coefficients, 2007–2016

to the number of all potential connections. At the same time, it assigns each edge of the graph a weight proportional to the strength or capacity of connections among nodes (Barrat *et al.*, 2014: 3747). As the measure is provided for each node in the respective network (egocentric analysis), the network average clustering coefficient is the mean of the measures of all its nodes.

The clustering coefficients analysis shows that the Quito group still has the largest density, with an average coefficient of 0.85 (sd=0.05, min=0.77, max=0.94) throughout the period of analysis. The Guayaquil subset shows an average clustering coefficient of 0.73 (sd=0.09, min=0.63, max=0.83), which is below the full network result, with 0.79 (sd=0.05, min=0.73, max=0.87). This adjusted analysis confirms the higher density of the Quito Community. It also provides further evidence that the Guayaquil dealers do not appear to be engaged in the market network in the same way as the Quito group. Figure 6 displays the

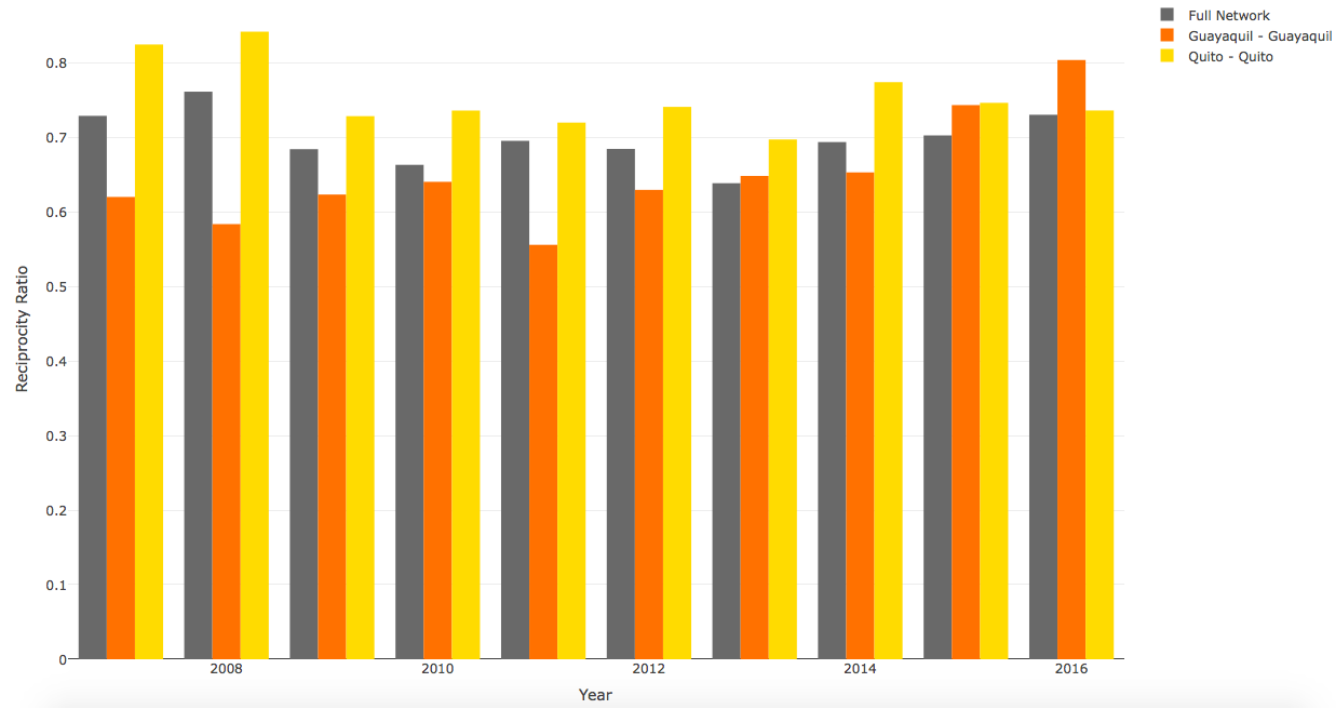

Figure 7. Network reciprocity, 2007–2016

annual evolution of the network average coefficients for full networks, and the Quito and Guayaquil subsets between 2007 and 2016.

When nodes are connected to each other or, in other words, when trading exists between dealers in the Ecuadorian securities market, it largely tends to be reciprocal. The evolution of reciprocity[13] is depicted in Figure 7. If we look at the different subsets, the Quito community is more reciprocal in its trading than the Guayaquil subset. However, the difference diminishes towards the end of the series and reverts in 2016. Reciprocity is an important cohesion measure in directed networks like the one studied here. In this case, it adds some additional evidence, while the density measures presented earlier are more relevant to determine the way the groups of dealers domiciled in Quito and Guayaquil operate in the market.

A closer look at trading and domicile

Graph inspection and networks metrics are a good way to start exploring networks for subgroups. Relying on that, we have drawn evidence to support the proposition that dealers from Quito display a denser subgroup or *community*, while Guayaquil seems to participate in the network differently. In order to further explore the *regional issue* of this market, I opted to take a closer look at the edges that connect nodes in the same domicile and those that connect them to counterparties in the opposite domicile. Looking at *community*-type formations, one simple question worth asking is: Do dealers from one domicile actually trade more with each other compared with how much they trade with others? Will this follow the two-side division between the Quito community and the less dense group of Guayaquil dealers?

Once the state nodes and loops are excluded, we see that 5.37 billion USD[14] in transactions happen between private dealers with domiciles of either Quito or Guayaquil throughout the 10 years of trading. I have inspected these transactions for regional preferences in trading. I have recorded and analyzed what I call "local trades" (transactions that happen between either Guayaquil or Quito dealers) and "outside trades" (a transaction that involves dealers from each different domicile). I have also looked at amounts traded between nodes but also the number of trades, which is relevant to the multigraph design used.

The frequencies of local and outside trades for Quito and Guayaquil were organized as pivot tables. Those were compared with similar tables containing the expected frequencies of trading, without any regional preferences. The analysis was done first on a year-by-year basis to avoid the distortions discussed at the beginning of this section. Afterwards, the results were aggregated (Table 1) to show and enable a discussion of general findings for the whole period.

Approached in terms of amounts traded and number, local transactions from Quito and from Guayaquil altogether are expected (no local preference) to account for the majority of this section of the market: 52 percent for amounts traded and 55 percent for number of trades. On the observed market, this participation goes up four points to 56 percent in amounts traded and even more in terms of number of trades, where we find a difference of 10 points (up to 65 percent). On the other hand, observed outside trading is less that expected, with regard to both numbers of trades and amounts traded. The differences provide evidence that the empirical market seems to favor local trading more and the disparity is more pronounced when intensity of trading (number of ties) is taken into account.

If we look specifically at how each domicile trades (Table 1, row percentages) we see that Quito is expected to sell more within its domicile and less to Guayaquil. By contrast, Guayaquil is expected to sell more outside and less locally. In the empirical market these differences shrink, as dealers from each domicile prefer higher amounts and numbers of local rather than outside trading. Quito dealers show 65 percent

Table 1: Pivot tables of local and outside trading with (observed) and without (expected) regional preference, 2007–2016

Number of transactions

Observed

	GUAYAQUIL	QUITO
GUAYAQUIL	8,388	10,191
QUITO	6,899	22,807

Expected

	GUAYAQUIL	QUITO
GUAYAQUIL	6,072.75	12,506.25
QUITO	9,214.25	20,491.75

Row percentages

	GUAYAQUIL	QUITO	Total
GUAYAQUIL	45%	55%	100%
QUITO	23%	77%	100%
Total	32%	68%	100%

	GUAYAQUIL	QUITO	Total
GUAYAQUIL	33%	67%	100%
QUITO	31%	69%	100%
Total	32%	68%	100%

Amounts traded in USD

Observed

	GUAYAQUIL	QUITO
GUAYAQUIL	1,036,499,684	1,243,904,104
QUITO	1,092,533,536	1,993,718,898

Expected

	GUAYAQUIL	QUITO
GUAYAQUIL	922,054,170	1,358,349,620
QUITO	1,206,979,053	1,879,273,381

Row percentages

	GUAYAQUIL	QUITO	Total
GUAYAQUIL	45%	55%	100%
QUITO	35%	65%	100%
Total	40%	60%	100%

	GUAYAQUIL	QUITO	Total
GUAYAQUIL	40%	60%	100%
QUITO	39%	61%	100%
Total	40%	60%	100%

rather than the expected 61 percent on local sales in terms of amounts and 77 percent rather than 69 percent in terms of number of transactions. Guayaquil dealers sell to Quito counterparties in 55 percent of their trades rather than 60 percent in terms of amounts and 55 percent rather than 67 percent in terms of number of transactions. Quito sells to Guayaquil 35 percent instead of the expected 39 percent in terms of amounts and 23 percent instead of 31 percent in terms of number of transactions. Guayaquil dealers sell 45 percent within their domicile instead of the expected 40 percent in terms of amounts and 45 percent rather than 33 percent if we look at number of transactions. In contrast to what would be expected in a market with no regional preference on trading, the empirical Ecuadorian securities market shows a higher propensity towards local trading in the close-knit and more localised community of dealers from Quito, as well as in the less dense group of dealers from Guayaquil, which is more favorable to outside trading.

Egoist trading

Figures 3 and 4 present several edges displayed in the form of loops. This means that the same brokerage house is the buyer and seller in the transaction. This is possible as private dealers can trade on behalf of several clients. I have called this "egoist trading" and it is possible and important in a complex or multigraph model.

Egoist trading is very significant in the Ecuadorian securities market. At 12.98 billion USD it accounts for 28 percent of the entire private market. Without a multigraph model that includes loops, important information for understanding the Ecuadorian securities market would be missing. In fact, analyzing such edges provides new evidence about the regional dimension of the market.

One way to address loops in a regional analysis like this is to include them as part of a corresponding domicile. After all, a node containing a loop has its domicile in either Quito or Guayaquil and therefore belongs to the groups we have studied as regional subgroups. The consequence of doing this is that differences between local trades and those between domiciles are inflated and one may be too hasty in concluding that there is a clear two-community division in the market. By contrast, I have preferred to inspect the regional dimension of loops.

Egoist transactions in the ten years analyzed account for 52.4 percent with regard to dealers with their domicile in Quito and 47.6 percent as regards those from Guayaquil. There is a slight difference in favor of actors in Quito in the global result, but more interesting is the participation of each domicile when data are examined year by year (Figures 8 and 9).

Generally speaking, dealers from Quito participate more broadly in egoist dealing, which adds to the findings about this close-knit community in the market. Nevertheless, it is interesting to observe the ups and downs in terms of participation (Figure 8) and also in amounts traded (Figure 9) between the years 2008–2009 and 2014–2015. In these years, Ecuador suffered external shocks after the 2008 world financial crisis and in 2014 with the collapse of oil prices and

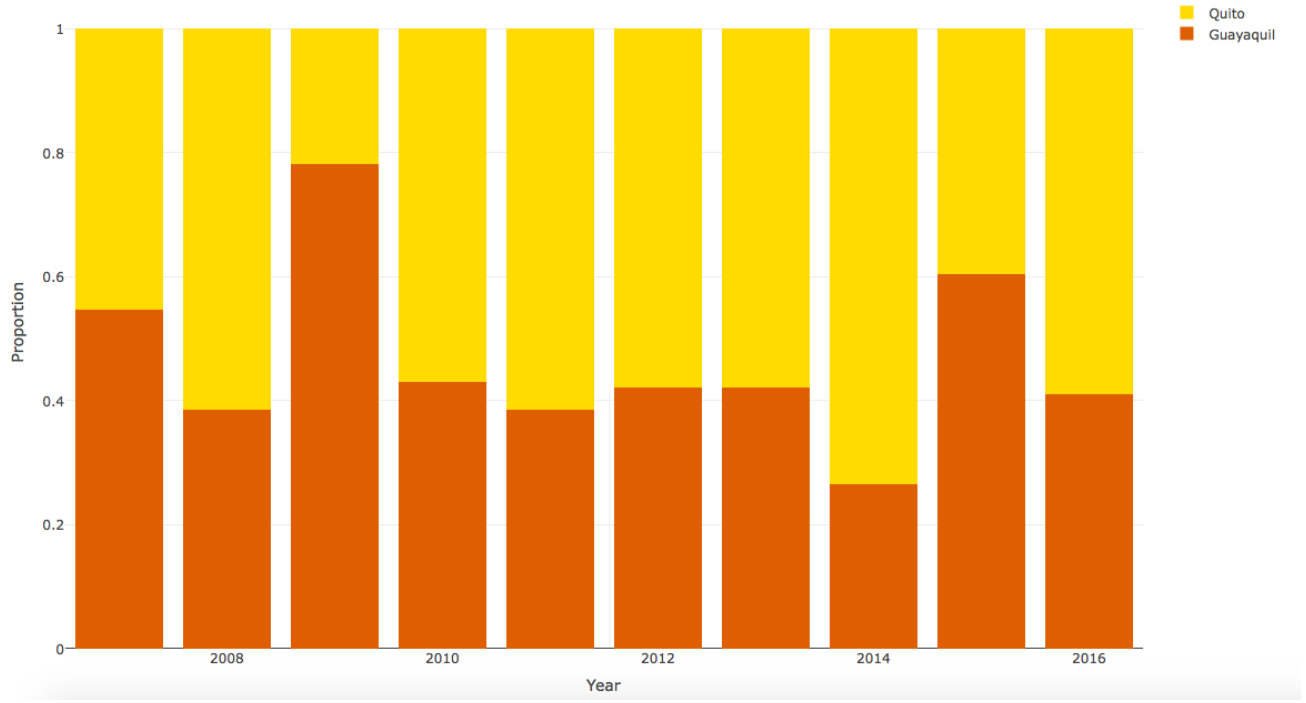

Figure 8. Participation of Guayaquil and Quito in egoist dealing, 2007–2016

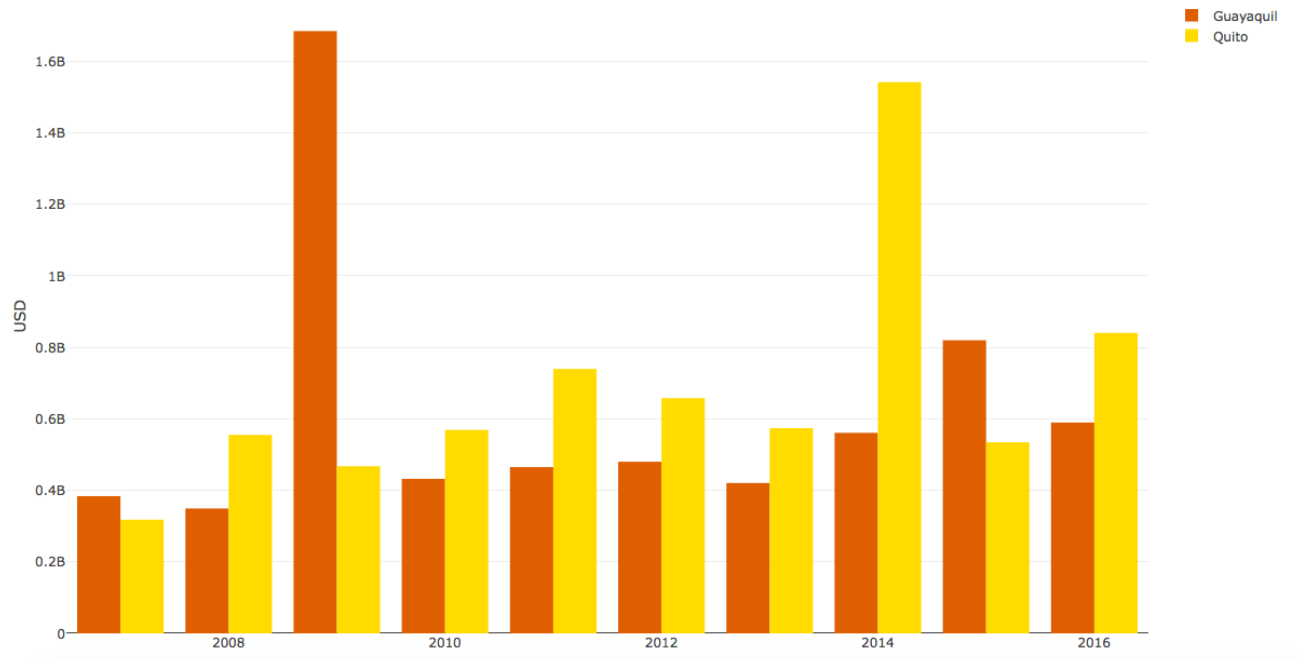

Figure 9. Levels of egoist dealing in Quito and Guayaquil, 2007–2016

the appreciation of the dollar exchange rate. Looking at the way dealers in each domicile coped differently with the external shocks could certainly be a subject for further research.

So far, I have reported on the differences in egoist trading in terms only of dealers from different domiciles. But we should not forget that, in the first place, egoist dealing is explained by the fact that a brokerage house can represent multiple clients. Can we extend the regional analysis beyond the brokerage network into the hiring network between clients and dealers? Unfortunately, secrecy regulations obstruct access to a more complete set of information. Nevertheless, the data currently available can be divided into primary and secondary market transactions, which makes it possible to match the issuing firm with the dealer that sells freshly structured securities for the first time. In Ecuador, brokerage houses are in charge of structuring issuances and of dealing those securities in the market for the first time. Because syndicated structuring processes are very rare in the Ecuadorian securities market, the match between the issuing firm (the client) and the dealer is a good proxy for hiring in the primary market.

Running this analysis, I found the following results, with which I will conclude reporting on the findings of this paper. A total of 73 percent of primary market sales deals by Guayaquil brokerage houses are done on behalf of a client domiciled in Guayaquil; that corresponds to 80.4 percent when calculated not in terms of number of transactions, but in terms of amounts sold. For dealers from Quito, 77.9 percent of their primary market selling transactions are done on behalf of clients also with domicile in Quito; that corresponds, in amounts traded, to 79.7 percent of the selling operations of this group of dealers in the primary market. In the secondary market, it would not be surprising if local preference again played a role, but we cannot substantiate this claim from empirical evidence. Nevertheless, it seems that they keep their close and more important clients very local.

Final remarks

Economic sociology has shown how empirical markets are far from being the "ideal markets" that are assumed by neoclassical economic theory. Social devices that play important roles in facilitating efficiency or keeping incumbents are core objects of study of economic sociology (Beckert, 1996; Fligstein and Dauter, 2007). I have devoted this text to exploring whether the *regional issue* (Maiguashca, 1992) – a complex phenomenon that could be summarized as permanent tension between the two most important cities in Ecuador – is indeed a relevant explanatory of a securities market that behaves differently from the general trends of the development of financial markets both in the region and across the world. To do so, I have relied on social network analysis, using a model that combines simple and multigraph networks. By means of graphical analysis and several density metrics and also by taking a close look at local and outside trading I have provided evidence that seems to support the assertion that there is indeed a regional issue that needs to be explored carefully.

The analysis shows that there are preferences for local trading and doing business, despite the expected structure of trading and notwithstanding the fact that the market could certainly be more interconnected. In contrast to what might be expected in a market with no regional preference on trading, the empirical Ecuadorian securities market shows a greater propensity towards local trading in the close-knit community of dealers from Quito, as well as in the less dense group of dealers, more prone to outside trading, from Guayaquil. Egoist trading is an important feature of trading relations and also reflects the regional issue when it is explored in detail.

Turning to possible further developments, the evidence presented in this paper should be subjected to further exploitation and testing. Also, this network should be explored further to check for other formations that could be part of the regional dimension or interact with it, and other variables available in the data can be included to broaden the scope of the research. As I have commented throughout the text, it is important to include the state as an economic actor in the market and also account for its role as a regulator. Finally, it is important to note that other devices that are not easily grasped by the network metaphor might be in play and should be taken into account. This is part of the larger research in which the exploration discussed here is embedded.

Endnotes

1 In sociology, the use of networks as a way of representing social systems can be traced back to the work of Georg Simmel and his claim of the importance of the *triad* as the unit of analysis of sociological phenomena (Degenne and Forsé, 1999; Simmel and Wolff, 1964[1908]; White *et al.* 1976). Several decades later the *New Economic Sociology* reclaimed economic action as an object of study and some of its key exponents did so with the use of networks. It was then that Harrison White and Mark Granovetter, who had already used the network metaphor in empirical explorations of social capital (Lorrain and White, 1971; Granovetter, 1973), brought to light the first works on markets relying on social networks analysis. In 1971, White claimed that "networks will probably become as important to sociology as Euclidian space and its generalizations are to physics" (Lorrain and White, 1971: 77), while Granovetter, in his seminal paper "Economic action and social structure: The problem of embeddedness" (Granovetter, 1985) called for the use of network analysis as the key tool for a sociology of economic action. Following these emblematic claims, a broad and fruitful line of work was triggered and continues to be developed today.

2 Ecuador is an upper middle-income country, which in 2016 had a population of 16.39 million and a GDP of 97.8 billion USD (source: World Bank). Its economy largely relies on the production and export of primary goods. Ecuador has had a dollarized economy since the 1999–2000 economic and financial crisis.

3 Quito is the country's capital, sitting at 2,850 meters above sea level in the Andes mountain range. It is the second largest city. It holds most of the country's bureaucracy and its relevant economic activities are the service sector, commerce, and some industry. Guayaquil is the largest city and the country's main port. Its relevant economic activities are commerce and industry (mostly linked to the agricultural sector).

4 Maiguascha (1992) speaks of a third relevant region-city in the southern highlands, Cuenca, which could be included in this analysis. There are significant issuers in the market that are domiciled in Cuenca and there are records of a failed attempt to create a securities exchange there, to name a few considerations. Nevertheless, the *regional issue* has been to a great extent bipolar and that is how it is generally reflected in the Ecuadorian securities market.

5 In the period of analysis, 25 types of securities were issued and traded in both exchanges of the Ecuadorian securities market, as well as registered in the Public Registry of the Securities Market *(Catastro Público del Mercado de Valores)*, which is administered by the Superintendence of Companies, Securities and Insurances. There are securities, mostly from issuers from the SME and Cooperative Sector, which do not legally require formal registry and are still traded in the national exchanges. Those are available in the data and have been recorded as non-registered. Despite that, the analysis presented in this article makes no distinction between *types of securities* while accounting for transactions (edges), although it is certainly a subject for further exploration. The greater relevance of fixed income over equity trading, as well as the role of securitization processes in the market can be explored using this distinction.

6 Egoist trading exists also among state institutions. In this case, loops are not useful as state institutions always trade with another entity. Nevertheless, from a financial viewpoint, liquidity that moves from one institution to another but never leaves the state is a form of *egoist trading*. Local governments can issue securities but should be considered separately as they are not part of the central administration. It is also important to say that they need to hire a brokerage house to issue and trade on their behalf.

7 Available at: www.ekosnegocios.com/empresas/sectores.aspx

8 A few nodes either appear or disappear from the dataset during the 10-year period. This happens when a brokerage house emerged as a new dealer in the market at some point, closed its operations, merged or sold out and changed its name. To a great extent, the year-by-year analysis helps overcome this problem while also pointing to relevant changes in the period of analysis that could be the subject of further exploration.

9 On 2007 there was a single broker that had no domicile in Guayaquil or Quito, but in the coastal city Manta. It is depicted here but plays an insignificant role in the analysis.

10 Although not a limiting factor in this analysis the existence and stubborn persistence of two exchanges in such a small market is

pertinent evidence of the importance of the regional issue. This can be the subject of further quantitative analysis, as well as a historical explanation of why actors hold on to this scheme.

11 This is constant in the period of analysis even after 2015 when the transactional systems of both exchanges were interconnected by a regulatory instruction.

12 The number of ties in a network as a proportion of all possible connections: n(n – 1)/2

13 The proportion of mutually connected nodes compared with those not connected and those non-reciprocally connected.

14 This is less than 10 percent of the total amount of market transactions for the period analyzed. This shows the relevance of the egoist transactions and of the state as an economic actor. As mentioned before, the state will not be a subject of discussion in this paper but we will come back to egoist trading as it says something about the regional separation in the market.

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