

EXPANDED ABSTRACT

The sectoral dimension of Colombian cooperativism through a Social Network Analysis

Context. An unprecedented increase in the constitution and productive activity of cooperatives took place in Colombia in 2003-2010 period, reaching a very significant weight in the economy. Subsequently, the regulation of the Associated Work Cooperatives supposed the disappearance of a very important number of them, that it explains the temporary delimitation of this paper. This period was also limited by the availability of information, which was aggravated by the disappearance of the Center for Research on Cooperativism of Colombia and the consequent deceleration in the investigations on the issue because of it was the main user and possessor of disaggregated data of cooperativism.

However, according to the comparative information that has been consulted for the Colombian economy and its cooperative segment, the cooperatives were more than 8,500, which paid compensations to 140,000 employees; they gave work to almost 540,000 people if the workers of Associated Work Cooperatives were included, and they were generating of just over Colombian Pesos 8.5 trillion GDP -12 digits-. This assumed 0.4 percent of the active entities in Colombia, according to the data from CONFECOOP and the DANE's Annual Survey of Manufacturing, which represented almost 1.5 percent of employees in Colombia, proportion that rose up 3 percent if the employees in Associated Work Cooperatives were considered. At the same time, cooperativism GDP reached almost 1.7 percent of the national GDP, starting in 2003 with the half of that participation.

Thus, it is showed the remarkable importance of the cooperative sector in the Colombian economy, which achieved very similar sectoral proportions of the national employment and entities as the case of *Mining* branches, that weighted half of the GVA generated by *Energy or Financial Intermediation* sectors in the Colombian economy -3.5 and 5.1 percent of the Colombian GVA, respectively- and they assumed 1.2 percent of total entities and 1.1 percent of total employment. In parallel, cooperativism employees of the *Construction* branches were 5 percent of the Colombian employees. These aspects were technical consequences of the productive specialization of the Colombian cooperativism services sectors in production, entities and employment, such as *Financial Intermediation, Education, Health and Social Services*, which also increased their specialization index.

Methods. It is possible to study what extent it is possible to create an intersectoral relations network as a centralized structure through the Social Networks Analysis. On this issue, three indicators bring us the required knowledge: *density*, the percentage of the links over the possible -total- relationships; *cohesion*, defined in theory of networks as the effort to relate between nodes, what determines the number of relationships on the shortest path between two nodes; and the degree of centralization -*Network Centralization Index, NCI*- which is the variability in degrees as a percentage of the maximum centralization; that is to say, in relation to the star network structure, that shows the maximum power of a single productive sector.

Graph Theory principles allow us to observe the differences between the national and cooperativism networks (inter-sectoral relations) in order to determine the power of certain productive sectors or the meaning of the centrality and centralization indicators in them. Always under a different approach, which could enrich the conventional interpretation with the (*Social Networks*) *Graphs* and their indicators.

In addition, the intermediate position of a productive sector between other sectors means their power over the transactions between non-adjacent branches; that is to say, counting relations between two sectors not directly related. Thus, the indicator reflects the power of the mostly intermediary productive branch, either to spread their beneficial or damaging effects. The *Financial Intermediation* is a good example of a sector with intermediary power, which would reach alternative consequences according to growth or recessive dynamics.

Results and future research. On a sector basis, the Colombian cooperativism was concentrated in *Education, Health and Other Personal and Community Services, Financial Intermediation and Trade and Hospitality*: they obtained almost 75 percent of GVA and employment, while the same national sectors contributed to those indicators between 40 and 50 percent. Moreover, the cooperative concentration grew in *Manufacturing, Financial Intermediation and Education, Health and Other Personal and Community Services*.

Furthermore, if it is compared the structures of intersectoral relations between total economy and cooperativism in the period we find some differences although the *motor branches* are the same: *Manufacturing, Construction, Trade and Hospitality and Transport and Communications*. However, the cooperative sectors were adapted to business cycle and increased their participations, especially in *Trade and Hospitality* branches.

In parallel, the cooperatives of the *Financial Intermediation* sector had -and they have- a considerable weight, both in the cooperativism and in the same national sector. Moreover, they increased their participations, both in the cooperativism and in the national sectors, and they maintained their backward and forward effects below the average of the Cooperative sector, as the case of the national *Financial Intermediation* sector.

The effects of the cooperativism in that period, either on employment or on inter-sectoral terms, were lower than the same effects on the national economy, and they were generating more indirect employment than the same national sectors, in response to the increases in demand. That might imply that cooperativism it had a competitive disadvantage with respect to the national productive structure, which was more specialized in weak-medium demand sectors. In addition, under the Social Networks Analysis, cooperatives were adapted to the economic expansion by increasing the cohesion of their inter-sectoral graphs, so they will have opposite effects in recessive phases, with the exception of *Electricity, Gas and Water Supplies, Construction, Trade and Hospitality and Financial Intermediation*, the branches which cooperativism achieved the greater proportion of the direct employment.

The graphs of the cooperativism -their inter-sectoral relations- were more centralized structures than the national economy ones because of *Manufacturing, Financial Intermediation and the Agricultural sector*. Whereas *Manufacturing, Business Services, Agricultural sector and Transport and Communications* -a key sector in the dynamics of globalization- centralized the network of the national economy, which did not and still does not have the same role in the cooperative graphs. Consequently, the *graphs* that represented the networks of the Colombian national economy were more dense and *cohesive than cooperative ones*, while they were evolving, which meant a certain convergence between them.

In short, the adaptation of the Colombian cooperativism to the economic and social development stage, between 2003 and 2010, supposed cohesion of its networks, although some differences is maintained in the productive core of the national economy based on the quantity responses to the business cycle.

All the foregoing figures redounds in a good help to support the initial studies of the impact of cooperativism on the national economy, particularly to promote the strengthening of peaceful coexistence in Colombia. Consequently, the Colombian cooperatives are seeking to optimize their possible functions as organizers of the territory and mediators of peaceful coexistence. Thus, the studies on sectoral impact and on the impact evaluation of public policies will need to know many more social and economic indicators as essential elements to ensure a construction of public policies bringing together Cooperatives, Solidarity Organizations, Academy and Government.

KEYWORDS: Social Networks Analysis, System National Accounts, Cooperativism, Impact Evaluation, Sectoral Analysis, Public Policies, Colombia.