

The Barcelonnettes: an Example of Network-Entrepreneurs in XIX Century  
Mexico. An Explanation Based on a Theory of Bounded Rational Choice  
with Social Embeddedness.

by

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Abstract

A theory of network-entrepreneurs or 'spin-off system' is presented in this paper for the creation of firms based on the community's social governance. It is argued that firm's capacity for accumulation depends on the presence of employees belonging to the same social/ethnic group with expectations of 'inheriting' the firm and becoming entrepreneurs once they have been selected for their merits and loyalty towards their patrons. Such accumulation is possible because of the credibility of the patrons' promises of supporting newcomers due to high social cohesion and specific social norms prevailing in the community. This theory is exemplified through the case of the Barcelonnettes, a group of immigrants from the Alps in the South of France (Provence) who came to Mexico in the XIX Century.

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## 1.- Introduction

A socio-cultural approach is used to analyze why a group of Frenchmen who came to Mexico from the town of Barcelonnette and its valley were very successful entrepreneurs in the XIX century.<sup>1</sup> In this paper, it is argued that besides psychological attitudes and upbringing there are sociological reasons for explaining entrepreneurialism. That is, individuals in certain communities may be prone to entrepreneurial activities when there is an adequate socio-cultural structure or social governance, which is defined as the set of mechanisms (social norms and ideologies) that conditions individuals' behavior because of their embeddedness in specific social networks and communities.<sup>2</sup> Using a theory of "bounded rational choice with social embeddedness", BRACSE for brief, an *homo-socioeconomicus* is modeled through an apparatus of decision-making, where means are used to achieve certain ends under the premise that individual motivations, constraints, and cognitive mechanisms of selection are conditioned by ideologies and social interaction.<sup>3</sup>

The BRACSE approach follows an historicist/functionalist logic since, in a first methodological step, the historical process gives shape to the community's social governance and then, in a second methodological step, human beings are modeled following incentives and searching continuously for the solution of problems. In other words, the study of economic problems under this framework combines the analysis of possibilities with the analysis of incentives. Therefore, the dilemma between methodological individualism, which characterizes the neoclassical school, and methodological collectivism, represented by the old historicist school, is not longer relevant when the role of social norms (beliefs or social habits) in decision-making is made explicit.<sup>4</sup>

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<sup>1</sup> This region is located in the Ubaye Valley in the low Alps, Provence, to 30-40 kilometers from the Italian border.

<sup>2</sup> This definition is borrowed from the idea of communitarian governance described in Bowles and Gintis (2000), and the concept of social capital presented in Durlauf (1999).

<sup>3</sup> For more details on this theory see Castañeda (2004).

<sup>4</sup> For a very good description on the historicist approach and the methodological debate see Hodgson (2001).

In sociological terms it is possible to differentiate between two types of entrepreneurs: individual-entrepreneurs and network-entrepreneurs. The former is more common in societies where a generalized trust prevails (bilateral reputation, extensive social networks), which is a precondition to establish formally coded property rights. With the backing of the law, individual incentives to innovate grow on fertile land; likewise, the economic domain in these societies presents solid institutions for financial intermediation, and there is a strong market for professional managers. Contrary to this, network-entrepreneurs make possible economic activity in societies where their social governance precludes the possibility of public order property rights, and the political domain is such that governments cannot make credible and universal commitments for the lack of third parties with enforcing capabilities.<sup>5</sup>

These network-entrepreneurs should have adequate personal attributes, but more importantly they should have the proper connections and social backing to develop productive businesses and to exploit market niches. This capability evolves from shared values and social networks embedded in specific societies. A businessman is supported by the community's socio-cultural structure, when social norms encourage trustworthy behavior and long term relationships, when social sanctions do not discourage the pursuit of individual success, and when parochialism does not inhibit the possibility of specialization and cooperation beyond a close circle of associates. Under this social setting it is likely that a relatively large amount of network-entrepreneurs will emerge in the community.

A 'system of spin-offs' –or *sistema comanditario*– for the creation of network-entrepreneurs has frequently been used in different ethnic communities. Through this system, a group of immigrants is attracted to a specific country with the help of friends and family members who have previously achieved certain success as businessmen in the host country. After experiencing a period of hardship, hard work, and low wages, some of these newcomers begin to develop their own business, either due to having received a family inheritance or the financial backing of the community. This support being the result of a promise made while the immigrant was recruited in exchange for a long and loyal behavior

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<sup>5</sup> For the socio-economics of property rights see Greif (2003).

toward the firm. In these societies, patrons have the moral and social obligation to fulfill the promises made to their families and talented employees. This commitment is credible due to the existence of social pressures and a value system that encourages familial or communitarian lineage.<sup>6</sup> Obviously, the nature of this *sistema comanditario* is very different from one community to another. In the Barcelonnette case, there was a ‘communitarian spin-off system’ where social norms made it feasible that talented and well-integrated individuals of the ethnic group had the opportunity to receive their patron’s support for the creation of a business of their own, despite the fact that there was no blood relationship between bosses and laborers.<sup>7</sup>

While the Barcelonnettes’ businesses spread throughout Mexico during the XIX century, they were able to keep their ethnic identity for many years.<sup>8</sup> Although the origins of the Barcelonnettes’ immigration chain in Mexico was an historical accident,<sup>9</sup> the inflow of humble peasants, artisans, merchants and commissioners from the Valley was considerable for Mexican standards, because in the peak year of 1910 there were 4,800 Barcelonnettes residing in México.<sup>10</sup> This number was also astonishingly high from the

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<sup>6</sup> Scranton (1993) refers to a spin-off system when explaining the continuity of family firms in Philadelphia during the XIX century, and its capacity to smooth transition from one generation to another.

<sup>7</sup> Here we follow Barth (1969) description of ethnic groups, not as a set of genetically related individuals but, as a ‘cultural bearing-unit’. For this author, the cultural content of these groups is broken down into two categories: symbols of identity (language, religion, rituals, dress style, diet), and the underlying values, social norms, shared beliefs and expectations.

<sup>8</sup> Although in the north of the country the presence of Barcelonnettes’ businesses was very limited, they had retail shops in a large number of cities, including some not very big ones. Arnaud (1898, p 31-33, 46-52) and Chabrand (1897 p 29) present evidence of the colony’s economic activities in 41-49 Mexican cities and towns.

<sup>9</sup> The first immigrants from the Valley in America went to Louisiana when it was still a French colony in the XVIII century. Among the families that settled along the Mississippi river to work in agriculture were the Gilly, Caire, Couttolenc, Teissier, Bellon, Jaubert, and Graugnard. Then, Jacques Arnaud arrived and settled in the north of La Fayette, Louisiana in 1804, later on he became the pioneer of the Barcelonnette colony in Mexico, see Homps-Brousse (2002, p 8). The Mexican immigration took place despite the fact that between 1811 and 1880 article 17 of the French Civil Code, ruled that civic rights would be abolished for those Frenchmen settling abroad without permission, see Proal and Martín Charpenel (1998, p 15). The situation was reversed at the end of the XIX century since a French military law of 1889 exempted conscription to youngsters living abroad as long as they did not re-enter the country before they were 30 years old, this policy reduced the average migration age. Thus, as indicated in Aranéga-Mirallès (1992, p 32), the average age of Barcelonnette immigration decreased from 30 years of age on average during 1850-1880 to less than 20 for the following years. Arnaud (1898, p 65) estimates that 3 out of 10 men aged 21 in the Valley went to Mexico in the 1881-1890 period.

<sup>10</sup> See Genin (1933, p. 436). Although Barcelonnette is only a district in the Valley, this generic name is used for all the immigrants coming from the surrounding area ( *Certamussat, Enchastrayes, Faucon, Larche, Jausiers, Lans, Meyronne, Saint-Paul, Saint-Pons, Saint Ours, Serennes, Thuiles, Uvernet, among other*

supply side since the Valley had approximately 17,500 inhabitants at the end of the XIX century.<sup>11</sup> All in all, it is estimated that around 7,000 individuals from the Valley arrived in Mexico in a span of 137 years, from 1818 to 1955.<sup>12</sup> It is argued that around 40-50 individuals departed annually to Mexico during the period of the highest emigration from Barcelonnette, which ranges from 1870 to 1911.<sup>13</sup> While in 1850 there were only 9 dry-goods stores –retail stores selling clothes - in México, in 1864 there were already 32 retail shops and 45 establishments as a whole, employing 400 Barcelonnettes. Then in 1890, when the large department stores started to be built for supplying a well-to-do Mexican clientele, there were 110 commercial houses, 30 of them being wholesale stores.<sup>14</sup> At the end of the Porfirian period in 1910, Barcelonnettes had a consolidated empire composed of 214 commercial houses and 257 establishments in general, 114 of them in the provinces.<sup>15</sup>

The rest of the paper is structured as follows. In the second section the economic importance of the Barcelonnette business empire in the XIX century is briefly highlighted, and some exogenous factors of their success are commented. The social background of the Barcelonnettes is presented in section three by reviewing their long tradition as travel-salesmen in France. In section four a narrative explanation is offered for their expansion and the workings of the ‘communitarian spin-off system’ based on the BRACSE approach. A game theoretical model is built in section five in order to formalize some of the arguments set forth in the previous section. In section six a narrative explanation is given for the demise of this entrepreneurial group by the turn of the century. The formal model emphasizing the key features of the theory is presented in section seven, and finally the paper ends with the corresponding conclusions.

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*towns*). According to data presented in Mantoy (1994, p 130), 30 out of the 72 Barcelonnettes who came to Mexico between 1845-1852 declared they were merchants and commissioners.

<sup>11</sup> Barcelonnettes’ liberal vein and their resistance towards the monarchy of Napoleon III forced some of them into Mexican exile around 1850, see Gouy (1980, p 30).

<sup>12</sup> See Portillo (2000, p 6, 24). Sylvie Aranéga-Mirallès (1992, p 31) asserts that around 4,500-5,000 individuals from Ubaye emigrated to Mexico.

<sup>13</sup> See Aranéga-Mirallès (1992, p 32, 34). According to records from la chancellerie de la Légation de France à Mexico, there were 72 individuals from the Valley that emigrated to Mexico between 1845 and 1852 out of the 969 Frenchmen departing to Mexico in that period, that is, only 7.5% of the total, see Mantoy (1994).

<sup>14</sup> See Arnaud (1898, p 31-33, 46-52) and Génin (1933, p 429).

<sup>15</sup> See Gouy (1980, p 60).

## 2.- The importance of Barcelonnettes' economic activity in Mexico

Seventy years after the Arnaud brothers (Jacques, Dominique and Marc Antoine) from Jausier settled in Mexico around 1818-1820 and founded *Las Siete Puertas*, a dry-goods store (*cajón de ropa*) in association with Ernest Maillefert a non-Barcelonnette Frenchman,<sup>16</sup> the business empire built by this ethnic minority became a mayor force in the Porfirian industrialization, and in the modernization of the commercial and financial sectors. The accumulation process of the Barcelonnette community started in the commercial sector, as was typical in the XIX century. They integrated backward into textile production until 1883 when a group of respected merchants bought the *Cerritos* factory on the outskirts of Orizaba.<sup>17</sup> In fact many of their textile firms were fully integrated encompassing spinning, weaving and finishing and even incorporating repair shops for the machinery and the production of hydroelectric power for their mills.<sup>18</sup> These factories produced coarse cloth (*manta*) as most textile mills did in the 1880's but also started the production of bleached and printed cloth (e.g. percale, cretonne, muslin, organdy, drill, and flannel) in Mexico.<sup>19</sup>

Examples of the enormous impact of this group of immigrants on the Mexican economy were the development of retail and wholesale department stores like *El Puerto de Liverpool*, *El Palacio de Hierro*, *Fábricas de Francia*, *Fábricas Universales*, *El Centro Mercantil*, *Al Puerto de Veracruz*, *Al Progreso*, *La Ciudad de Londres*, *La Nueva Paris*, *La Reforma del Comercio*, *La Francia Marítima*, *El Correo Francés*; the foundation of large textile factories like *Compañía Industrial de Orizaba, S.A. (CIDOSA)*, *Compañía Industrial Veracruzana (CIVSA)* and *Compañía Industrial Manufacturera (CIMSA)*; their involvement in mining companies producing gold and silver like *Dos Estrellas* located between the States of Mexico and Michoacán; their participation in several important

<sup>16</sup> See Coste (1994) and Mantoy (1994) for details on the family tree and emigration of the Arnaud brothers to Louisiana and their entry to Mexico, see also Arnaud (1898, p 11,12) and Homps-Brousse (2002, p 8). Although Joseph-Antoine Couttolenc arrived in 1818 and settled in San Andrés Chalchicomula Puebla (nowadays known as Ciudad Serdán, Puebla), where he became a successful businessmen, he did not participate in the Barcelonnettes' network. Moreover, his son became an important Mexican general and governor of the state of Puebla.

<sup>17</sup> See Proal and Martin Charpenel (1998, p. 28).

<sup>18</sup> See García-Díaz (1981, p 41) for the case of the Santa Rosa factory. See also Gómez-Galvarriato (2002, p 56,57). Textile mills produced 44% of Mexico's electricity in 1900, which was especially concentrated in the Valley of Orizaba encompassing 29% of the total.

<sup>19</sup> See Gómez-Galvarriato (1999, p 78).

banks in the country like *Banco Nacional de México*, *Banco de Londres y Mexico*, *Banco de Morelos* and *Banco Agrícola e Hipotecario*; the creation of a wide variety of industrial firms like *Fábrica de Papel de San Rafael y Anexas* (paper), *Cervecería Moctezuma* (beer), *Clemente Jacques* (processed food), *Compañía Mexicana de Dinamita y Explosivos* (gun powder); moreover, they were also associated with entrepreneurs from different regions and nationalities in large firms like the steel company *Fundidora Monterrey* and *El Buen Tono*, which was the main cigarette factory in the country at that time, and whose founder was a non-Barcelonnette Frenchman called Ernest Pugibet.<sup>20</sup>

Entrepreneurs from this community modernized the commercial sector. Not only because they went from simple *cajones de ropa* to large stores to the image of *Au Bon Marché* and *La Samaritana* in Paris, but also because they started to change sales practices and the management of inventories.<sup>21</sup> Specialized salesmen were introduced with the creation of departments in stores, and the idea of a clerk behind a desk disappeared slowly. Prices were fixed -not subject to bargaining- and all items were clearly tagged. They introduced the home delivery service for bulky merchandise. The location and architecture of stores were used as marketing strategies, and hence corners in centric areas were used to build magnificent buildings to attract socialites and those pretending to be members of high society.<sup>22</sup> These department stores continued operating a wholesale department well beyond the beginning of the XX century, from which many outlets in the provinces bought their merchandise.<sup>23</sup> Their warehouses were used to avoid bottlenecks; moreover, these stores had different workshops to produce some of the merchandises like furniture, shirts, ties, umbrellas, and other items.<sup>24</sup>

## **2.a.- Exogenous factors of their success**

As in any entrepreneurial history, Barcelonnettes' success was accompanied by a series of events that could be considered exogenous to their strategies; although these

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<sup>20</sup> For a very entertaining novelized version of the Barcelonnette immigration and entrepreneurial drive see Derbez (2001).

<sup>21</sup> See Gouy (1980, p 58-63).

<sup>22</sup> See Gamboa (1989).

<sup>23</sup> At that time, this strategy was not longer used by their American counterparts (Macys); this can be explained by deficiencies in the Mexican postal system, see Gómez-Galvarriato (2002, p 31).

<sup>24</sup> See Gómez-Galvarriato (1999, p 65). This phenomena was not observed in the American department stores, see Chandler (1977, p 229).

immigrants knew how to take advantage of business opportunities. Among these circumstantial events, there are five that are worth being mentioned here. Nonetheless, it is considered that the economic performance of Barcelonnettes and their capacity to produce many network-entrepreneurs were mainly related to their socio-cultural environment, as the arguments in the following subsections will try to convey.

(i) The Mexican resentment against Spaniards which arose with the War of Independence, and the decrees requiring their expulsion in 1827. This exodus left many business opportunities open to dynamic individuals, especially in commercial activities, some of which were taken by non-Spanish immigrants like the Arnaud brothers. A favorable environment for French ventures was possible because France started commercial relations with Mexico in 1824, signed a maritime treaty in 1826, and granted Mexico official recognition as a nation in 1827, well ahead of US and other European countries.<sup>25</sup>

(ii) The French intervention, the Maximilian Empire and the Restoration of the Republic. Although Barcelonnettes were fervent liberals in political causes and had historic animosities against Napoleon III,<sup>26</sup> they were very pragmatic in terms of their business relationships with the French regiments (30,000-40,000 men) whose daily needs had to be supplied.<sup>27</sup> This situation allowed Barcelonnettes to continue accumulating capital. Moreover, their liberal ideology was helpful when the defeat of the conservative government came and Juárez's regime replaced it, and hence their economic interests were not affected after 1867 despite their French nationality.<sup>28</sup> The Intervention also left a regular maritime connection between St-Naziere and Veracruz that drastically reduced importation costs and facilitated mercantile relationships between Barcelonnettes in Mexico and their countrymen in Europe.<sup>29</sup> Furthermore, during the Porfirian regime, the *científicos* courted French businessmen and politicians since the government wanted to balance American influence with a closer relationship with Europe.<sup>30</sup>

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<sup>25</sup> See Gouy (1980, p 53).

<sup>26</sup> Even José Couttolenc, a descendant of a Barcelonnette fought against the invasion army, see Proal and Martin Charpenel (1998, p 11).

<sup>27</sup> See Gouy (1980, p 55-57) and Gamboa (1989, p 31).

<sup>28</sup> See Arnaud (1898, p 45), some of them were even benefited with the disentanglement of church property.

<sup>29</sup> Because of this maritime line, the cost of 100 kilos of merchandise fell from 320 to 20 francs, that is to only 6% of the original cost, see Meyer (1974, p 62). This made it possible for the Barcelonnettes, as French nationals, to be able to dodge German wholesalers.

<sup>30</sup> See Cosío Villegas (1955)



(iii) The Secession War in the United States of America created a boom in the Mexican textile industry as well as in the Barcelonnetes' dry-goods stores. The Confederation's demand for cotton cloth was satisfied South of the border. These businessmen also benefited speculating with the customs rights for cotton imports. Moreover, this war encouraged many Barcelonnetes to start wholesale businesses and to open commercial houses in Europe.<sup>31</sup>

(iv) The Franco-Prussian war of 1870 induced many Barcelonnetes to join forces and boycott their textile suppliers in Mexico, many of them being German residents. This incident made the expansion of Barcelonnette activity into industrial production easier and set the tone for a further diversification of their investments. Moreover, the propensity of the Barcelonnetes to return to Europe when old and wealthy made it possible for many of them to start their commercial houses in Manchester and Paris beginning in 1873, acting as commissioners for their countrymen in Mexico.<sup>32</sup>

(v) The competitive advantage offered by the French fashion and retail industry. At the end of the XIX century French culture and dresses were fashionable and thus Frenchmen had more chances of success when venturing in this industry.<sup>33</sup> Furthermore, the links of Barcelonnetes with commercial houses in Paris lubricated the flow of information with regard to the profitability of certain innovative retail and marketing strategies. Needless to say, Barcelonnetes became the leaders in developing large department stores throughout the country.

### 3.- Socio-cultural background

The immigrants from this isolated region of the southeast of France were used to the hardship of severe geographical conditions and the difficulties of making a living. The Valley surroundings are very mountainous and their lands are very rocky and unfertile;

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<sup>31</sup> See Gouy (1980, p 55).

<sup>32</sup> See Proal and Martin Charpenel (1998, p. 25). While in 1870 there were 80 import houses owned by Germans, by 1892 there were none, see Meyer (1974, p 63).

<sup>33</sup> For Arnaud (1898, p 42), the taste for French apparel by Mexican socialites was boosted during the French intervention; moreover, the clothing habits of the peasants were also modified. See also Arias (1998, p 93), Pérez-Siller (1999) and Gamboa (2004).

likewise, the region is covered with snow for more than six months a year.<sup>34</sup> Consequently, the possibilities of economic expansion were very limited at that time. The population density was very low (13 habitants per sq. kilometer in 1891) and productive activity depended on grazing land for 30,000 rams hibernating in the region and for 25,000 sheep owned by local peasants.<sup>35</sup> The Barcelonnettes produced mainly rough cloths (*cadis* and *cordeillats*) made with their sheep's wool and serge with a mixture of wool and hemp, and there was also some silk yarn in the towns of Jausiers and Uvernet. During the cold season, these peasants became traveling salesmen and sold their products in many regions of the country, especially Provence, and in neighboring countries like Italy, Belgium, Holland and Luxembourg.<sup>36</sup> For more than a century, around three quarters (1,500-2000 men) of the household-heads traveled to sell their product on credit, beginning their journey in early fall, and collecting the money during spring on their way home.<sup>37</sup>

The Barcelonnette's artisan industry was seriously damaged around 1860 when French textiles started to be produced with cotton in large factories, and the delicate cotton apparel became more attractive to consumers than that made out of wool. They were not able to reconvert their workshops and were practically swept away in the industrialization processes when production fell to just one tenth of what it had been.<sup>38</sup> Undoubtedly, this situation reinforced their propensity to emigrate; although, they always retained an attachment to their birthplace.

By the XVIII century the inhabitants of these regions were very well educated by French standards; primary education was free, and women were 100% literate. By the XIX century, secondary education started to operate, and a teachers' school was founded. Many Barcelonnettes combined their long-distance retail activities with teaching in and out of the region. This district contributed a large share of Provence's teachers and priests up until the

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<sup>34</sup> For more on the geography and history of the Valley of Ubaye and the Ville of Barcelonnette see Gouy (1980).

<sup>35</sup> See Proal and Martin Charpenel (1998), p 16.

<sup>36</sup> See Arnaud (1898, p 7,8).

<sup>37</sup> According to Arnaud (1898, p 3) Barcelonnettes' colportage started in 1689 when their production surpassed internal demand. This activity was reinforced after 1713 when the Valley was reincorporated to France by the treaty of Utrecht, making it possible that their inhabitants move freely within the country, see Gouy (1980, p 36).

<sup>38</sup> See Proal and Martin Charpenel (1998, p 20).

period when Mexican emigration became important.<sup>39</sup> Consequently, although they had a humble background and did not receive technical education as in other regions of France, they could be considered well educated for the period and with sufficient skills to develop professionally. This situation fit in harmoniously with their progressive stance, helping them to be a proud and autonomous ethnic group. The stringent economic conditions, the severe weather, and their prolonged absenteeism (7 months a year) motivated them to cooperate and appreciate the benefits of solidarity, enhancing their chances of survival as a community.

This socio-cultural background was, undoubtedly, mentally codified when their long-distance colportage to search for economic well-being for the family was detoured to exploit the Mexican market. One immigrant after another gave a supporting hand to the newcomers starting with the first settlers, who came to Mexico after a temporary stay in New Orleans.<sup>40</sup> A decade after the Arnaud brothers left their textile workshop in Jausiers, unable to compete with the more modern machinery used in other parts of France,<sup>41</sup> they were followed by three of their former employees: Eugène Caire, from Briançon, and Alphonse Jauffred, from Jausiers, and by Teissier from L'Hubac. After being received by the Arnolds as employees, the first two individuals became rich and returned home in 1845 with a considerable fortune, accumulated through their mercantile activities in the *Portal de las Flores*, a *cajón de ropa* founded jointly with Gabriel Derbez. This heroic return created demonstration effects in the region of Barcelonnette, and many more waves of immigration followed. This store became a landmark for the community since it always gave support to newcomers, ameliorating immigrant's transition in their new home by providing moral and credit backing.<sup>42</sup>

Their nationalism and their strong ties to their ancestors' land made their return home an important goal in their lives.<sup>43</sup> Thus, the objective of improving the economic

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<sup>39</sup> See Gouy (1980, p 40).

<sup>40</sup> See Arnaud (1898, p 11).

<sup>41</sup> See Proal and Martin Charpenel (1998, p 21). Jacques and his brothers did not have a humble background, their ancestors (the Laugier-Arnaud family) were respected bankers, silk traders and lawyers, see Homps-Brousse (2002, p 8).

<sup>42</sup> See Arnaud (1898, p 13,14), who gives some additional numbers and names on the first chains of immigration.

<sup>43</sup> See Proal and Martin Charpenel (1998, p 22).

conditions of the close family members that remained in the Valley, plus the motivation of returning as successful entrepreneurs made them extraordinarily hard-working individuals with a large propensity to saving.<sup>44</sup> It was very common to find that their personal and affective life came to a halt, and hence many of them decided to marry only once their businesses were already consolidated. It was typical that they married girls from the Valley, therefore, they often went home for short periods to find the loved one. This strong link to their birthplace helped to sustain demonstration effects for many years, and to maintain a long immigration chain.<sup>45</sup> This would explain why the number of immigrants that lived in Mexico during the 1890-1910 period was very large in relation with the inhabitants of the Valley at the beginning of the XX century. Furthermore, their strong nationalism and regional attachment fed the social cohesion of this group.<sup>46</sup> This ethnic solidarity strengthened the relevance of codes of honesty in their minds as well as the worthiness of trustworthy relationships.

The identity as a Barcelonnette and the reinforcement of the community's social norms in Mexico took place through different means: (a) endogamy and marriages at a late age,<sup>47</sup> (b) isolation from Mexican society, strong nationalism and regional attachment (c) the continuous recruitment of labor among Barcelonnettes from France,<sup>48</sup> (d) housing practices that encouraged employees from the colony to live on the stores' top floors,<sup>49</sup> (e) common dining areas, sharing meals with owners, and continuous interactions among Barcelonnettes from different stores.<sup>50</sup> (f) the formation of social institutions where

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<sup>44</sup> Usually, the Barcelonnettes had only six days off work in the year (Good Friday, the 16<sup>th</sup> and 27<sup>th</sup> of September, all Saints' day, Christmas and the 1<sup>st</sup> of January). Sunday mornings were used to unpack items and to arrange the stores. They very often preferred to stay in the stores during their free time in order to abstain from consumption, see Arnaud (1898, p 24).

<sup>45</sup> According to García-Díaz (1991, p 11) around 150 Barcelonnettes built or bought houses in the Valley once they became rich in their Mexican adventure. In the towns of Barcelonnette and Jausiers 68 'Villas Mexicanas' were built; 14 in 1870-1890, 32 in 1891-1910, and 22 in 1911-1931. The last three Villas were built in 1931: villa Bleue, villa Dalette and villa Édouard Caire, see Homps-Brousse (2002, p 17)

<sup>46</sup> See Proal and Martin Charpenel (1998, p. 27).

<sup>47</sup> A tacit acceptance by the bosses was needed for the Barcelonnettes to get married. The cases where someone married young or with a non-French woman were very rare, many got old being still single. In general, there was a paternalistic relationship with bosses, see Gouy (1980, p 91) and Arias (1998, p 94).

<sup>48</sup> Several anecdotic experiences on the recruitment procedures of the Barcelonnette community are presented in Gouy (1980). In case the newcomer did not have relatives or friends in Mexico a language (*pattois*) exam was practiced to determine if he was a true immigrant from the Valley.

<sup>49</sup> See Gouy (1980, p 62) and Gamboa (1989, p 37).

<sup>50</sup> See Gouy (1980, p 90).

community support was offered and where the colony could socialize,<sup>51</sup> (g) low initial wages and harsh working conditions where newcomers had to endure very low profile jobs like sweeping and packing.<sup>52</sup>

Preserving identity is a very important tool for achieving cooperation and economic success in personalized markets where the enforcement of property rights by authorities is highly discretionary. As stated by Sen (1985, p 349) “*If the sense of identity takes the form of partly disconnecting a person’s choice of actions from the pursuit of self-goals, then a non-inferior outcome can well emerge even without formal contract and enforcement*”. Furthermore, as suggested by Landa (1994, p 29), symbols of identity have an important role to play as screening devices that allow individuals to identify trustworthy partners that are more prone to meeting their commitments without the need of legal sanctions.

There is no doubt that the social cohesion of this ethnic community made possible a large distribution network for their merchandise. Their networks compensated some legal difficulties in contracting, situation that put them in a competitive advantage over Mexican or any other socio-ethnic group exhibiting reduced cohesiveness. Moreover these networks gave a first-mover advantage to the Barcelonnettes when the time came to build large textile factories and benefit from economies of scale. As stated by Gómez-Galvarriato (2002, p 13,14), Barcelonnettes’ strong sense of identity and social norms helped to solve information problems at three levels: recruitment of new personnel, cost of supervision within the firm, and transactions between clients and suppliers.

#### 4.- Barcelonnette expansion and spin-offs

The social networks prevailing in the community made it possible for many new firms (spin-offs) to be formed with the support of the employees’ previous bosses, who extended credit, provided inventories and allowed new entrepreneurs to establish dry-good

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<sup>51</sup> A French beneficiary society was created and became an entity for tightening social cohesion. According to Gouy (1980, p 89) “*The beneficiary society....took care of the proper functioning of the institutions under its control [a savings fund, a French club, a hospital, a retirees home, a cemetery, a school], sending home the individuals who did not integrate into the colony and managed scandals and misbehavior of countrymen so that the colony’s shine did not become tarnished*”.

<sup>52</sup> Although the directors’ sons moved much faster to sales positions, see Gouy (1980, p 82).

stores in the province.<sup>53</sup> Moreover, when large department stores opened outside Mexico City, this was usually done with the permission of keeping the company's name, and irrespectively of having an independent ownership. Gamboa (1989, p 36) has documented that, up to 1933, there had been 9 stores called *Las Fábricas de Francia*, 7 *La Ciudad de México*, 6 *El Puerto de Liverpool*, and 4 *La Primavera*, among the most common names. As an example of the ownership affiliation, the author presents the case of the stores named *La Ciudad de México* in 1910 in Puebla, Jalapa and México City, whose owners were Lions brothers and Co., Ollivier brothers and Co. and F. Manuel and Co., respectively. In many cases, the dry-goods stores and department store were owned by former traveling salesmen (commissioners) of the Mexico City stores, who later became representatives. This business model was closer to the franchise system than to a corporation with branches or divisions. This system could only be sustained by the strong social cohesion of the community; otherwise, the lending of the brand name could be a disastrous strategy.

The practice of 'communitarian spin-offs' has been observed by different authors like Gouy (1980, p 59), who asserts that "*the most capable immigrants were in charge of creating some sort of branches. Thus, for instance, when the owner of a dry-good store decided to buy another one, he formed a partnership with a trusted employee making a good deal. The latter, well paid for several years [but surely not their first years in the firm] could pay for his part and become an owner himself...in a neighboring city...Sometimes, the important stores lent the needed capital for the establishment of a retail shop. There could be no problem...given that all Barcelonnettes knew each other and were obliged to be honest and respect what was convened*".

All these features are to a large extent explained by the Barcelonnettes' social governance, where their rules and strict codes of behavior easily surpassed the boundaries of any specific region given their strong ethnic bonds and a high propensity to spread geographically. Consequently, trust and multilateral reputation-building were always essential ingredients in all business transactions. Furthermore, the fear of ostracism in this very cohesive community was a key social sanction which precluded opportunistic behavior among members. The honesty and reputation of the Barcelonnettes were

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<sup>53</sup> See Gouy (1980, p 59).

constantly defended by the whole community as a main concern to sustain profitable business relationships with outsiders, and in this fashion the Barcelonnette ethnicity could work as an identification tag.<sup>54</sup> The cohesiveness of the group and their hierarchical structure facilitated the enforcement of these social rules.

#### **4.a.- An explanation for their success in terms of the community's social governance**

As mentioned in the previous section, the Barcelonnettes had a high rate of entrepreneurialism and many of their more successful members became part of the Porfirian economic elite. Independent of the fact that some of them were able to build up businesses because of their individual psychology and dynamism, the large number of immigrants from this community that became entrepreneurs in the second half of the XIX century is still remarkable. In this section a socioeconomic theory is outlined to explain this outcome. In particular, the BRACSE methodology offers an analytical argument that closely fits some of the stylized facts and explains the formation of network-entrepreneurs.<sup>55</sup>

The elements of social governance that can be used to characterize the rules of the game to explain Barcelonnettes' business practices are the following: (i) a strong social cohesion among community members; (ii) easy acceptance of newcomers as long as they belonged the Valley of Ubaye; (iii) a strong motivation to obtain recognition by the community through productive means and hard work; (iv) priority to economic success over affective satisfaction; (v) moral inclination to defend honesty and to honor personal commitments made to others; (vi) members were inclined to support each other, and those who were more successful had additional responsibilities to sustain the community's well-being. These elements when combined produce three effects, which are critical to explain their capabilities to accumulate faster than other firms with equivalent technology and to generate more spin-offs: entrepreneurial aspiration effect, long-term horizon effect, ostracism effect, as it will be explained next.

It is hypothesized that the Barcelonnette's social governance was conducive to the formation of the '*sistema comanditario de tipo comunitario*' and network-entrepreneurs,

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<sup>54</sup> See Gómez-Galvarriato (2002, p 16).

<sup>55</sup> Moreover, anecdotic evidence suggests that many of the Barcelonnettes that integrated into Mexican society became active entrepreneurs in small and middle size businesses, improving their standard of living well above the one they had in the Valley, see Portillo (2000, p 25).

that is, they took advantage of their relational assets and social norms to be innovative and to create many businesses with national coverage. The first settlers that achieved certain economic success because of their individual entrepreneurialism were able to extend their businesses further because they could count on trusted employees coming from the Valley. That is, according to points (i), (ii) and (v) these individuals were trustworthy employees from the moment they were hired, which reduced monitoring costs and ameliorated agency problems for Barcelonnettes' firms in general, boosting their profitability; that is, trustworthiness was an available input not only because honesty was codified in the cultural background of individuals coming from this region, but also because the social cohesion offered sanctioning mechanisms that made reputation concerns important for precluding opportunistic behavior –ostracism effect-.<sup>56</sup>

The community's firms and their entrepreneurs also benefited by paying a relatively low salary and by requiring a long work week from many of their Barcelonnette employees without affecting their motivation and thus, firms' productivity. This was a feasible option for the employers since these employees willingly accepted harsh working conditions for several years given the possibility of becoming entrepreneurs some years later.<sup>57</sup> That is, because of point (iii) and (iv), these immigrants were able to endure long periods without substantial retribution if that facilitated the attainment of wealth; moreover, the long sacrifice was possible since they did not have any remorse about not establishing a marital and family relationship until their material objectives were satisfied –long-term horizon effect-.<sup>58</sup> According to Gouy (1980, p 83,84) “*with the objective of leaving the firm [in the community]...an individual who had accumulated a fortune between 150,000 and 200,000*

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<sup>56</sup> According to Gouy (1980, p 85) “*all Barcelonnettes were attached to the firm by the force of things [the social context]. Apprentices and personnel were comforted by the advantages received from the colony, and those that violated the community's code would suffer a bitter future*”.

<sup>57</sup> For an example of this pattern see the life story of Anselme Charpenel, who arrived in Mexico in 1910 and returned home to retire in 1935 after an intermission during WW I where he joined the French army. Anselme came to Mexico to work with Sebastian Robert, the main owner of *El Centro Mercantil*, since both were from the same town (Certamussat). Over the years his salary and responsibilities increased. In 1919, Anselme was invited to participate in *La Francia Marítima*, managed by one of Robert's brothers, as an “*employé intéressé*” for three years, during which he should perform outstandingly in order to then become a full partner in the store or ‘*associé*’. By 1926 Anselme worked 14 hours a day and Sundays were also working days. In 1930, he traveled to France to look for a wife, following the Barcelonnette tradition. See Charpenel and Charpenel (1994).

<sup>58</sup> According to Arnaud (1898, p 25), Barcelonnettes were able to endure between 15 to 20 years of hard work and humble life before becoming successful and willing to go to the Valley to proudly enjoy their quiet and lavish lives.



*francs should retire leaving 3/4 or 2/3 of his capital to keep the business going [in Mexico]. In exchange of this he would receive a rent that allowed him to live in the Valley for a long time”.*

Moreover, because of points (i), (v) and (vi), recently recruited employees knew that there was a high probability of becoming spin-offs of the company –entrepreneurial aspirations effect-.<sup>59</sup> That is, some of them would be selected as successors of the original entrepreneur after a long period of hard work and solidarity devoted to the patron’s business success, either by directly receiving control of the firm or by forming an associated store or factory in another region of the country, which was supported by credit and provisions from the mother firm. These resources were added to the new entrepreneur’s savings obtained through a system of payment related to results and not only fixed salaries.<sup>60</sup> In other words, when employees were hired by the firm, they received an implicit offer that stated that some of them could be selected to become network-entrepreneurs. This offer was usually fulfilled since the putting-off of entrepreneurs’ marital engagement made their offspring very limited. Having often only one son, who was too young when it came time to retire, made it credible that the successor had to be looked for outside the family circle. But most importantly, social cohesion created the pressure for entrepreneurs to comply with their responsibility towards the community and, thus, transfer part of their wealth through spin-offs. Therefore, merits became more relevant in comparison with other family-firms in the Mexico of the XIX century.

Consequently, the social governance characterized by elements (i)-(vi) helped many Barcelonnettes’ firms to be profitable. At the same time as entrepreneurs accumulated wealth they received status in the community and the Valley; moreover, they had to sustain

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<sup>59</sup> *“Toujours aussi forts d’une solidarité exemplaire, les Barcelonnettes, pour gérer et maintenir l’empire qu’ils sont en train d’édifier, ne font appel qu’à d’autres Barcelonnettes qu’ils impliquent plus ou moins dans les affaires, mais qui tous, au départ ont une chance aussi minime soit-elle de réussir à la condition expresse de faire partie intégrante d’une organisation communautaire (celle des Barcelonnettes) hors de laquelle, aucune possibilité ne leur sera offerte”*, cite taken from Aranéga-Mirallès, Sylvie (1992, p 35).

<sup>60</sup> In general, workers from the Valley did not know in advance what their salaries would be for the following months. Meals and lodging were given directly by their patrons inside the company's property or in a nearby location, other expenses were financed using loans from the company, thus, at the end of the fiscal year ‘liquidations’ were offered to each employee who received a cash payment only when their ex-post salaries exceeded the accumulated debts. For a more detailed description of this payment system see Charpenel (1994), who presents the harsh working conditions for recently recruited personnel through an overview of the letters sent by Léon Martin to their relatives.

the community's lineage beyond the narrow family circle. Therefore, this theory explains the observed high rate of network-entrepreneurialism within this minority ethnic group in the second half of the XIX century.

A clear picture emerges of these 'communitarian spin-offs' after reviewing the biography of some of the most recognized members of the colony during the Porfirian regime. Joseph Ollivier came as an employee of *La Ciudad de Londres* in 1850, founded *La Estrella*, a similar store, and five years later became associated with Jauffred his first employer. Sebastian Robert came to Mexico in 1865 when he started working with Jauffred and Ollivier as a simple employee. Some years later he became the main partner of the company. In 1884, S. Roberts returned to France and from Paris he created and managed *El Centro Mercantil*, jointly with Émile Meyran.

Another chain of spin-offs was detected around *Fábricas de Francia*; this department store was founded by Alexandre Reynaud. Then Joseph Tron, who arrived in 1864 to work as one of the many employees in the store, became its owner together with his brother Jules and with Joseph Léautaud. The latter came also to Mexico in 1864 as an employee of *La Valenciana*, which was owned by S. Robert. Jules Tron came 8 years later than his brother to work also in Mr. Gassier and Reynaud's *Fábricas de Francia*. The Trons and Léautaud founded *El Palacio de Hierro* in 1888, once they had sold *Fábricas de Francia*. Finally, León Signoret, who had come to Mexico in 1873 as an employee of Tron and Co. left the store to establish one of his own, *Al Puerto de Veracruz*, in association with his brother Antoine and with León Honnorat.<sup>61</sup>

## 5.- A socio-cultural game model for explaining 'communitarian spin-offs'

In this section a formal model with which to explain Barcelonnettes' business practices is built along the lines stated in Greif (1993). The paper's model does not assume asymmetric information on the principal-agent relationship, yet it addresses a moral hazard problem since the agent can gain a short term financial benefit if not performing the action required. In particular, the analysis describes the 'communitarian spin-off system' as an equilibrium outcome of the Barcelonnettes rules of the game or historically inferred social

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<sup>61</sup> See Proal and Martin Charpenel (1998), pp 55-64.

governance. Here, the BRACSE methodology follows the Historical and Comparative Institutional Analysis (HCIA), outlined in Greif (1998), where some stylized facts are derived from the historical process and, then, their consistency with the hypothesis is tested by checking whether other empirical findings can be derived as an equilibrium outcome.

Although the mathematical model presented here is built to understand the logic around a long-term employer-employee relationship, it is conceivable that the social governance described in the previous section can produce similar effects in terms of firm's profit margins and accumulation when the supplier-client or the lender-borrower relationships are the key ingredients of the analysis. As the historical narrative suggested, when Barcelonnettes started to form spin-offs commerce was their main economic activity and, hence, a model where wages are the most important cost seems to be a good description of reality. Then, when the business network grew and other input costs became also important, the social cohesion of the community was still critical for sustaining good profits and making credible an 'inheritance promise' in favor of hard working and loyal employees (or small suppliers). Nevertheless, the relationship of entrepreneurs with suppliers and lenders is not analyzed in this paper.

The model follows the literature on labor discipline in the sense that employees' cooperative behavior is induced by paying positive rents.<sup>62</sup> However, in the communitarian version of the model described below, it is possible that cooperative workers are willing to receive wages below those offered in other alternatives. This equilibrium is the result of the Barcelonnettes' dual role as workers and soon-to-become-entrepreneurs, where employees' inter-temporal income is composed of current wages and expected future profits and, hence, the incentives of workers and entrepreneurs are more aligned than those exhibited in the traditional labor model.<sup>63</sup> Accordingly, it is found that, in the Nash equilibrium, communitarian firms are more profitable than other firms with similar technology.

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<sup>62</sup> The 'labor discipline model' is also called the 'efficiency wage model'; however the latter name is misleading since employees' positive rents create Pareto inefficiencies (an alternative allocation improves the welfare of all parties involved) as well as technical inefficiencies (an alternative allocation produces the same output with less of one input and not more of any other); for a formal textbook discussion on these issues see Bowles (2004, Chapter 8). In these agency models, the positive rent obtained by agents is the result of asymmetric (or unverifiable) information and the need to offer incentives for them to behave according to the principal's interests.

<sup>63</sup> The modeling of the current behavior of workers in terms of an expected future income is commonly used in the modern literature on labor to analyze the provision of incentives in firms, see Prendergast (1999) and

The profitability of firms induced by special institutional features of the labor market has also been described in other settings. For instance, under the framework of a rural economy, Rosenzweig and Wolpin (1985) show that when there are returns to specific experience, kinship members are the highest market bidders for their family land after they have worked many years with their parents receiving a relatively low salary, in comparison with that of non-kin labor. That is, the intergenerational transfer of land in these economies is associated with profitable farms where the family offspring offers a bonus to the elders given the fact that they were employed in the land, so that specific experience was accumulated.

While the ‘rural economy model’ is built essentially on the grounds of the neoclassical approach, the ‘communitarian model’ also relies on sociological features which are not formally endogenized, but only assumed given historical facts that seem to describe Barcelonnettes’ social governance. That is, while in the model of Rosenzweig and Wolpin parents are willing to sell the land to their offspring because the latter make a better offer, in the model of this paper patrons are willing to bequest a spin-off to good and loyal employees because of communitarian social norms, and the franchising is feasible because the system contributes to the firm’s profitability. Consequently, the model depends on individuals’ incentives as well as on individuals’ possibilities derived from their historical background. Therefore, the use of game theory as a tool for understanding decision-making in a strategic environment is conditioned to culturally specified beliefs as explained in Greif (2002).

Obviously, the mathematical model presented in this section does not intend to describe the entire Barcelonnette social governance through the specification of the rules of the game, nor to fully explain the spin-off system, as was done in the analytic narrative of

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Hutchens (1989). As in the tournament theory, where there is a prize for those employees who performed well after being engaged in a competition, in this paper the prize is inheriting the firm on the basis of merits. As in the theories of deferred compensation and seniority-wage relationships, where young workers are underpaid – below productivity- but this is compensated once they become old, in this paper overpayment comes from profits to be made once the Barcelonnette becomes an entrepreneur; the delayed compensation scheme presented here coincides with Salop and Salop (1976) who argue that this dynamic mechanism helps to sort workers by their merits. As in the theory of promotions in hierarchies, where a promise of increased income and responsibilities in the future provides incentives for current good performance and helps to sort workers to jobs. The latter approach is also the point of departure used in ‘implicit contract’ theory, see Carmichael (1989).

the previous section. However, the abstraction is a worthwhile endeavor since it helps to precise cause-effect relationships, and the channels through which culture influences economic behavior. Likewise, mathematical modeling helps to detect the specific conditions under which the *sistema comanditario de tipo comunitario* operated. The key result is that Barcelonnette social governance reduced opportunistic behavior in the community's firms, at the same time that their ethnic employees were willing to do their job for relatively low wages; that is, below those paid in the Mexican outside market. These two factors allowed these Frenchmen to have a competitive advantage vis-à-vis other business groups in Mexico, and greater chances for accumulation and the generation of network-entrepreneurs.

### **5.a.- The model's basic features**

Say that in each Barcelonnette firm there are  $T$  employees, where competition for workers within the community is ruled out and, thus, immigrations flows are enough to cover firms' demands.<sup>64</sup> Due to transportation costs, the only alternative for these workers is the outside labor market prevailing in Mexico, where a fixed real wage ( $\underline{\omega} > 0$ ) can be obtained. Each immigrant decides whether to work in a Barcelonnette firm or in the outside market. Since labor contracts are not enforced by law, it is assumed that a working relationship is established through a reputation mechanism where entrepreneurs and workers have infinite horizons.

The model states only a one-sided prisoner dilemma since reputation considerations may deter workers from opportunistic behavior; while entrepreneurs always meet their commitments on wage payments and extended job opportunity through the enforcement of a third party. The latter is not modeled explicitly and it is considered neutral since it does not have incentives of its own. It can also be argued that the social cohesion of the community performs the role of the third party, making entrepreneur's commitments credible.

The norms prevailing in the Barcelonnette's social governance require that workers forego a periodic salary ( $\omega$ ) and their job forever within the community in case of opportunistic behavior; thus, the only option available for them is the Mexican outside

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<sup>64</sup> For simplicity it is assumed that only Barcelonnettes worked in the community's firms but, obviously, this was not the case; nonetheless, the key positions were usually held by members of this ethnic group.

market. Moreover, because of the close nature of this ethnic group, ‘violators’ of the social codes are ostracized from community social life and receive a ‘punishment’ that in pecuniary terms is the equivalent to a fraction ( $\epsilon$ ) of the wage rate.<sup>65</sup> This parameter can also be interpreted as an entry barrier to participate in firms belonging to other ethnic groups. Presumably, a high entry cost into firms associated with other ethnic groups should be an incentive to keep Barcelonnettes loyal towards their community’s business network.<sup>66</sup> Finally, as a result of social practices, it is also assumed that workers believe that they have the possibility of becoming the entrepreneurs’ heirs, in the sense that they can become entrepreneurs in the future with the support of their patrons. This is mathematically formalized by specifying a positive probability ( $\pi$ ) that their income flows will switch from wages to profits ( $\rho - T\omega$ ), where  $\rho$  is the periodical revenue generated by the representative firm. It is assumed that the probability is fixed, but in section seven it will be endogenized to describe the effect of workers’ competition for being selected as a spin-off within each firm. For the time being, it is argued that the patrons’ social norm of transferring a large share of their wealth within the community in Mexico and the practice of very late marriages make credible the commitment that non-related employees will be helped in materializing their entrepreneurial goals.<sup>67</sup>

### **5.b.- The equilibrium solution.**

Barcelonnette workers maximize the present value of their future stream of income, as stated in the following equations:

For workers with honest behavior

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<sup>65</sup> Because this punishment is applied by all members of the community, its cost can be considered negligible on an individual basis.

<sup>66</sup> This transaction cost approach is used by Landa (1994, pp 101-114) to explain the formation of ethnically homogeneous entrepreneurial groups

<sup>67</sup> A transfer of productive assets within the Barcelonnette community can also be explained under the assumption of selfish preferences. It can be argued that patrons are more inclined to sell their firms to members of the community, and especially to their employees, if the profitability of the firm depends on physical and social capital. When an outsider buy the firm, he receives only the physical assets and, thus, lacking the proper connections these assets are less valuable under their control that when they are owned by a Barcelonnette who has social or relational assets. Accordingly, patrons have incentives to sell their assets to the best bidders, who in this case are members of the community; hence, the probability that an employee will receive profitable assets in the future is credible. Notice, however, that this argument is not entirely neoclassical since a firm’s profitability depends on the fact that it operates embedded in Barcelonnettes’ social networks.

$$V_{\text{honest}} = \omega + \delta(1 - \pi) V_{\text{honest}} + \delta\pi V_{\text{entrepreneur}}$$

.....(1)

where  $0 < \delta < 1$  is the discount factor. Notice that with probability  $\pi$  workers receive the opportunity to become entrepreneurs, and hence from this moment on they start receiving profits ( $V_{\text{entrepreneur}}$ ) instead of wages, and with probability  $(1-\pi)$  they keep their salary for being honest workers ( $V_{\text{honest}}$ ).

For dishonest workers:

$$V_{\text{cheater}} = \alpha + \delta V_{\text{outside market}}$$

.....(2a)

$$V_{\text{outside market}} = \frac{\omega (1 - \varepsilon)}{1 - \delta}$$

.....(2b)

where  $\alpha$  is the current income received by workers in case they behave opportunistically, taking a short run advantage on employers' trust, such that  $\rho > \alpha > \omega$ . Notice that because of multilateral sanctions, dishonest workers lose the opportunity for a job within the whole community, where information flows freely.

For entrepreneurs:

$$V_{\text{entrepreneur}} = \frac{\rho - T\omega}{1 - \delta}$$

.....(3)

This later expression is based on the fact that under equilibrium honest behavior will prevail and, thus, firms will operate as expected and entrepreneurs will pay the wage bill in each period.<sup>68</sup> In order to find the Nash subgame perfect equilibrium (NSPE), dishonest behavior on the part of workers has to be ruled out; that is  $V_{\text{honest}} \geq V_{\text{cheater}}$ . This is possible when wages are above a certain threshold ( $\omega^L$ ), as stated in the following expression:

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<sup>68</sup> Notice that expression (3) assumes that when an individual becomes an entrepreneur he keeps running the firm forever. Obviously this is only a simplifying assumption, but it can be rationalized in the model by arguing that proprietors only bequest relational assets when 'franchising' their businesses to loyal employees. This 'inheritance' can also be understood as the use of patrons' saving for the formation of spin-offs.

$$\omega \geq \frac{(1-\delta)[1-\delta(1-\pi)]\left\{\alpha + \frac{\delta\omega(1-\varepsilon)}{1-\delta}\right\} - \delta\pi\rho}{(1-\delta-\delta\pi)} = \omega^L$$

.....(4)

**Proposition 1.** The incentives to be disloyal, and hence the value of wages to sustain reputation ( $\omega^L$ ), increase with income from disloyal behavior ( $\alpha$ ) and with the outside market opportunity cost ( $\omega$ ), and decrease when the cost of social ostracism increases ( $\varepsilon$ ) and when revenues ( $\rho$ ) increases; as long as the number of workers is relatively low; that is

$$\text{when } T < T^o = \frac{1-\delta}{\delta}$$

This proposition is easily derived by differentiating (4), as done in the Appendix. The stated assumption is necessary to generate the typical results of this proposition. For a larger  $T$ , the signs are reversed and hence an increase in  $\alpha$  is associated with a lower threshold wage. This paradoxical result is intuitively explained by the fact that employees in this inter-temporal maximization problem contemplate the possibility of becoming entrepreneurs in the future. They are interested in salaries when they are workers, but they are also interested in profits when acting as entrepreneurs; consequently, when the horizon is long-term, workers have a good opportunity to become profit-makers and hence to be uneasy with a high salary policy. Thus, workers-soon-to-become-entrepreneurs will prefer lower wages to reduce the wage bill associated to a relatively large  $T$ , given that the wage stream is fixed through time.

This paradoxical result is no longer an equilibrium outcome when  $T$  is relatively small, since converted entrepreneurs do not have to distribute their revenues among many members of the community. In this scenario, the effects on the threshold wage ( $\omega^L$ ) stated in Proposition 1 will prevail and the incentives to preserve reputation will be sided with the individual's role as a worker. Notice that multilateral sanctions also work by means of the social ostracism effect ( $\varepsilon$ ); hence, communities with relatively high social cohesion, such as the Barcelonnettes, will be more likely to sustain reputation and profit from business opportunities.



**Proposition 2.** As long as  $T < T^o$ , a marginal increase in the probability of ‘inheriting’ a firm ( $\pi$ ) is negatively related to the threshold wage ( $\omega^L$ ) for a relatively high revenue ( $\rho > \rho^o$ ).

$$\text{where } \rho^o = \frac{\alpha(1-\delta)}{\delta} + \underline{\omega}(1-\varepsilon)$$

Proof of this proposition is presented in the Appendix. This proposition suggests that an increase in the probability of ‘inheriting’ induces more worker loyalty (lower  $\omega^L$ ) when the perspectives of income due to entrepreneurial activities are high enough. Notice that with a very short term horizon it is less likely that the profit motive can be an attractive incentive for workers to behave cooperatively and, hence, wages have to increase. It also implies that with better opportunities in the outside market ( $\Delta\underline{\omega}(1-\varepsilon)$ ), it is less likely that threshold wages and  $\pi$  can be negatively related.

**Proposition 3.** The dual role of Barcelonnettes, as worker and as entrepreneurs, produces a threshold wage lower than the outside market wage ( $\underline{\omega}$ ) for a relatively high revenue ( $\rho > \rho^o$ ); where

$$\rho^{o\circ} = \frac{\underline{\omega}\Omega + \alpha(1-\delta)[1-\delta(1-\pi)]}{\pi\delta}, \text{ with } \Omega = \delta(1-\varepsilon)[1-\delta(1-\pi)] - [1-\delta(1+\pi T)]$$

so that  $\Omega > 0$  for  $\varepsilon < \varepsilon^*$  and  $\Omega \leq 0$  for  $\varepsilon \geq \varepsilon^*$  where  $\varepsilon^* = 1 - \frac{1-\delta(1+\pi T)}{\delta[1-\delta(1-\pi)]}$

The probability of becoming an entrepreneur makes Barcelonnettes interested in profits; hence, honest reputation can be sustained even if equilibrium wages are lower than periodical outside wages ( $\underline{\omega}$ ). Despite of the fact that the community may apply a relatively small social punishment, a high enough revenue makes the outside option very unattractive discarding disloyal behavior by workers and, hence, threshold wages are set below  $\underline{\omega}$ . Notice from  $\Omega$  that the larger is the social sanction the lower is the required revenue. That is, a strong social cohesion makes loyalty also possible for firms with less revenue.

These results open up the possibility of observing a negative rent for workers in terms of periodical wages, contrary to a plain ‘labor discipline model’, where the rent has to be

positive to induce honest behavior.<sup>69</sup> It is easy to show that when workers cannot become entrepreneurs ( $\pi=0$ ) and there is no social ostracism ( $\varepsilon=0$ ) honest behavior is guaranteed when  $\omega \geq \alpha(1 - \delta) + \delta\underline{\omega}$ , hence there is a positive rent as long as it is assumed that the gain from opportunism is relative large ( $\alpha > \underline{\omega}$ ) which implies  $\omega - \underline{\omega} \geq (1-\delta)(\alpha - \underline{\omega}) > 0$ . In contrast, in the ‘communitarian spin-off model’ a negative rent is possible given the fact that  $\omega^L$  in (4) is negatively related with entrepreneurs’ expected revenues ( $\pi\rho$ ) and social ostracism. These parameters are not only positive in the Barcelonnettes’ social governance, but also relatively large.

Consequently, the social governance of the Barcelonnettes, represented with a relatively high value for  $\delta$  (long-term effect),  $\pi$  (entrepreneurial aspiration effect), and  $\varepsilon$  (ostracism effect), and the credible commitments of these businessmen toward their community, are prone to sustain working relationships and relatively low wages, with no negative side effects on labor productivity.<sup>70</sup> Barcelonnettes’ businesses are likely to accumulate more than other similar firms whose technology also requires cooperation to produce efficiently, when the owners and employees in the latter businesses have less social cohesion and when the possibility of their workers becoming entrepreneur is bleak.<sup>71</sup> Likewise, the larger potential for accumulation is associated with more possibilities of producing large amounts of network-entrepreneurs. It can be argued that the relatively high profits generated by this ethnic system of business governance makes it feasible to fulfill the promises made to the members of the community recruited on the basis of a wealthy future. Accordingly, the Barcelonnettes’ social governance underlying these business practices explains the success of the ‘communitarian spin-off system’.

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<sup>69</sup> However, when experience is important for achieving a high labor productivity, it is possible to explain an upward-sloping earnings profile with a simple neoclassical model and, hence, a scenario where rents are initially negative (i.e. wages are below productivity), and become positive in the late periods of one’s work-life. Despite of the fact that in net present value wage-income is identical to the worker’s output contribution, the earning profile is relatively more tilted in order to encourage effort in the years previous to retirement. For a model of this type see Lazear (1995), chapter 4. Notice that in the model of this paper, the earning profile is also upward-sloping, however, in the first stages earnings are derived from wages, and once the employee becomes an entrepreneur they are derived from profits. That is, rents can be permanently negative for those employees who are not successful in creating a spin-off, despite that in present value terms their expected earnings are identical to income derived from market wages.

<sup>70</sup> This latter statement is only assumed in the model.

<sup>71</sup> Here, it is assumed that  $\rho$  is identical for Barcelonnettes’ firms and those belonging to outsiders, hence larger profits depend on offering a lower wage. However, it can also be asserted that relational assets make the return on capital higher for the firms within the community.

## 6.- The demise of the Barcelonnette empire due to a fracture in their social governance.

The BRACSE model presented in the previous sections is very robust since it is also capable of explaining the demise of this community in Mexico as a dynamic entrepreneurial group. With this aim, five empirical facts have been added to the story. (vii) The inflow of Barcelonnettes was curtailed by the immigration laws enacted in 1913 by dictator Victoriano Huerta and the limit of 10% percent of foreign employees imposed on *sociedades anónimas* (limited liability companies) in the 1920's.<sup>72</sup> (viii) The nationalism of Barcelonnettes reduced the highly trustworthy labor force, this was not only because many youngsters in the Valley were recruited in the First World War in 1914, but also because the colony sent many of their members to this war (1,238 men or 30% of the total), and many of them died during the conflict.<sup>73</sup> (ix) The steep hierarchical structure in the cluster of Barcelonnette's business networks, which was reached at the end of the Porfirian regime.<sup>74</sup> (x) With the passing of time the community invested in a wider spectrum of activities, in large companies that required substantial funding, and in state of the art technology. (xi) The community made heavy investments in the textile and banking sectors. Unfortunately, the latter was severely damaged during the Revolutionary War, while the profitability in the former diminished sharply after this war due to the animosity created between unions and businessmen.

Continuous waves of immigrants from the Valley were required for the Barcelonnettes' socioeconomic system to operate, so that low-paid but productive and trustworthy labor could be recruited. However, because of points (vii) and (viii) the future generation of network-entrepreneurs was seriously diminished by the second decade of the

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<sup>72</sup> Only immigrants bringing a capital of 10,000 pesos or more to be invested in a six month period were allowed to enter, see Proal and Charpenel (1998, p 74). Later on, restrictions were also imposed on the foreign ownership of capital (51%) in firms operating in Mexico, see Gouy (1980, p 101) and Aranéga-Mirallès (1992, p 51).

<sup>73</sup> Store owners gave financial support for the traveling cost. However, Gouy (1980, p 94-96) offers a very cynical explanation of this event arguing that many businessmen were ready to liquidate the stores during the revolutionary turmoil, and thus this repatriation to Europe was a cheap way to reduce the labor force.

<sup>74</sup> A reflection that identity differences between the rich 'Mexicans' and the other residents in the Valley widened is the fact that before 1870 the successful Barcelonnettes returning home improved their old homes and adopted their traditional way of life, while after that year they tended to build luxurious mansions surrounded by large gardens, see Homps-Brousse (2002, p 12)

XX century.<sup>75</sup> Evidence of the lack of a new generation of entrepreneurs from Barcelonnette is the case of Jerónimo Arango, a Spaniard from *Asturias*, who in the 1930's was sponsored with supplies, knowledge and credit by the owners of CIDOSA to distribute the firms' production in large areas of the north of Mexico. With his retail and wholesale store, *El Mayoreo*, Arango became an exclusive agent of these Barcelonnettes in a growing segment of the Mexican market.<sup>76</sup> Thus, the need to rely on trustworthy individuals outside the community is a reflection of the scarcity of good candidates for spin-offs within the Barcelonnette community. This reliance on outsiders might have contributed to the dismantling of the community's social cohesion even further.

The steep hierarchical structure, indicated in (ix), created the possibility of a fissure in the community between the elite and the rest, which diminished social cohesion in the community as a whole.<sup>77</sup> Situation that was aggravated when the loose connection observed at the end of the XIX century between the countrymen in the Valley and the wealthy 'Mexican repatriates' diminished the Barcelonnette sense of identity. The vertical hierarchy observed in the clustering of networks at the end of the Porfirian period was the result of the diversification undertaken by large business groups, when they moved from commerce to industry and finance, creating with the passing of time a large gap between the very rich and the rest of the community.<sup>78</sup> Although Barcelonnette's business groups in the provinces

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<sup>75</sup> The last Barcelonnette immigrants arrived in Mexico in the 1950's and the descendants are estimated at more than 60,000, see Portillo (2000, p 13,14). Likewise, Pierre Audibert (1992, p 84), the Mexican Honorary Consul in Barcelonnette, estimates that there were around 30,000 descendants at the beginning of the 90's, and 330 last names of families living in Mexico whose background originated in the Valley. Jean Jaubert from Frêche de Saint-Points came to Mexico in 1955 to work in his uncles' store, El Puerto de Liverpool in Morelia, Michoacán, see Proal and Charpenel (1998, p 75).

<sup>76</sup> In the late 1950's Arango with other two businessmen, Carlos Trouyet and Manuel Senderos, bought CIDOSA, and retired from the business world when this company was sold in the mid-1970's to the family Del Valle. See Herrero (1999, p 23-27, 34-35).

<sup>77</sup> Cohen (1992), in his study of the German minority in Prague at the end of the XIX century, finds that class differences in an ethnic community produce divergent identities with the passing of time. In particular, poor Germans became closer to Checks whose identity was assimilated in the end. This hypothesis is used by Portillo (2000, p 45) to explain the integration of many Barcelonnettes and their descendants into Mexican society.

<sup>78</sup> At the end of the Porfirian regime, the different business networks in the Barcelonnette community were anchored in a hierarchical system whose elite members belonged to at least one of the two groups set around textile firms (CIDOSA and CIVSA) –see Galán (2002, p 76A), Gómez-Galvarriato (1999, p 139-140), and Gómez-Galvarriato (2002, p 25). Thus, the upper echelon of this hierarchy was formed mainly by firms closely associated to the Tron, Signoret, Reynaud, Olivier, Robert, Gracín, Manuel, Ebrard, Jacques, Richaud, Gassier, Caire, Leáutaud, Meyrán, Michel, and Honnorat families, who usually resided in Mexico City and later moved to France. The second tier was composed by the main groups of some of the capitals in the

were associated with regional banks, the limited financial access conditioned the extent of growth for some networks. In contrast, financial availability reduced dependence on the community's social cohesion for the most privileged members established in Mexico City. Moreover, industry and finance required, in relative terms, a lower amount of trustworthy employees as well as more technically oriented personnel, where the latter usually came from outside the community.<sup>79</sup> This situation eased the "moral" commitment of the well-to-do to generate spin-offs and offer social mobility in the community.

The diminished social ties can also be explained with Émile Durkheim's theory on solidarity and the division of labor. For this French sociologist, the scant division of labor in traditional societies made possible a mechanistic solidarity, that is, a form of solidarity based on common experiences and shared beliefs due to the similarity of the occupation. In this environment the community has strong social norms, and any deviant behavior is heavily punished. However, when society experiences industrialization and tasks become more specialized with a growing social differentiation, then a space is open for more organic forms of solidarity. In the latter, social cohesion is retained through the people's economic interdependence and recognition of other people's achievements. Thus, the diversification of the Barcelonnettes' businesses through the years, and the growing gap in

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provinces, like the Lions brothers in Puebla, and the firms associated to the *Compañía Industrial de Guadalajara S.A.* (CIGSA), and whose coverage was more regional. In the third tier, there were those Barcelonnettes who had successful commercial businesses but did not participate actively in industry and banking, most of them being located in the provinces - see Gamboa (1989, p 56). Obviously, at the bottom of the hierarchy there were all those Barcelonnettes who did not become entrepreneurs and remained employees most of their lives, either within or outside the community. The descendants of the last two tiers became professionals and were integrated into Mexican society throughout the XX century -see Portillo (2000)-. From this evidence, it is clear that the higher the groups were in the hierarchy, the wider was their coverage of the national market, the more diversified their business networks, the closer their linkage with the banking community and more likely were their business ventures with outsiders of the Barcelonnette community -see histories of entrepreneurs presented in Galán (2002), Gómez-Galvarriato (2002) and Gamboa (1989)-.

<sup>79</sup> Although large factories had professional technicians external to the community in their business networks -who were usually foreigners and very often from Mulhouse, Alsacia-, the companies' directors and most top administrative positions were held by Barcelonnettes -see Gómez-Galvarriato (2002, p. 43-44) and García-Díaz (1981, p 34, 42). For instance, in CIVSA's Santa Rosa factory most heads of departments and superintendents were foreign. According to Gómez-Galvarriato (1999, p 191), 20 of the 28 clerical and staff personnel had foreign names in 1919, while in CIDOSA there were 30 foreigners in similar positions; obviously, this list includes many Barcelonnettes. This practice seems to be an indication that Barcelonnettes were aware of their technical shortcomings and had interest in hiring outsiders as long as they were closely monitored by trusted members of the colony. However, they did not give strong support to the technical formation of their sons and employees. The French Liceo in Mexico was sponsored to offer primary and secondary education to members of the colony, but its main role was to reinforce the colony's values and cohesion. Few of them were sent to the School of Arts and Manufacturing in Paris to receive technical education, see Gouy (1980, p 91).

the success of community members from different socioeconomic strata might have fractured the mechanistic solidarity observed in this ethnic group during the second half of the XIX century. Yet, it is not clear that an organic solidarity emerged as a substitute, instead, the revolutionary period could be characterized by an *anomie*, using Durkheim's terms; in the sense that the community's old values were lost and that there was not a replacement to shape the Barcelonnette identity.<sup>80</sup>

The way the cluster of business networks evolved, producing diversified groups with large capital investment as stated in (x), was also conducive to the breakdown of the Barcelonnettes' social contract. While investment took place within the commercial sector in middle-sized firms, the 'communitarian spin-off system' was a very robust and credible mechanism to develop a continuous flow of 'franchises' and network-entrepreneurs; and hence the system operated smoothly from the 1820's to the 1880's; however, the *sistema comanditario* slowly lost some of its key features once the large textile plants were founded, the department stores grew immensely big, and the Barcelonnette's elite owned and administered some of the Porfirian banking concessions. That is, the economic performance and the evolution of Barcelonnette's organizational architecture itself became very damaging for this socially-backed form of entrepreneurialism. Four lines of causality can be brought into the explanation.

(a) A size effect. Firms with large capital investments cannot so easily be transferred by their patrons to a small number of well-behaved and talented employees. If franchising in middle-sized commercial companies was no longer a reasonable option because of market saturation, the possibility of receiving a large company required not only the blessing of the bosses but also some important outside funding; and thus, the patrons' commitment to sponsor a franchise was less credible at the end of the Porfirian regime.

(b) A control dilution effect. Inheriting these large companies was, perhaps, quite troublesome; however, a new form of promise could have entered into the scene. Instead of receiving the full ownership of a large company, executive positions made up part of the inter-temporal contract. This being the case, there should have been a fragmentation of the control rights, and presumably of the prerogatives that go with it; especially if these firms

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<sup>80</sup> See Durkheim (1984) and Giddens (2000, p 34,35).

were part of a diversified business network where the interests of different owners and their families did not coincide. Consequently, the attractiveness of becoming an entrepreneur in the future was reduced and a short term bias on workers' behavior was induced.

(c) A sunk capital effect. The country was in constant turmoil all through the XIX century, and thus businesses always were at risk of closing down abruptly; however, this possibility did not have important consequences on the long term horizon of community members when the capital was easily redeployed in a safe heaven and, then, invested anew once the political situation calmed down. This seemed to have been the case when the community invested mainly in the commercial sector; however, once the community diversified into large manufacturing and banking, important sunk investments in physical capital were made (in the latter case, indirectly, through credit granting). Therefore, the revolutionary turmoil and the possibilities of property expropriation did affect the probability of firm continuation, reducing the long term horizon of hopeful-entrepreneurs; hence, the workers' commitment to discard opportunistic behavior was weakened.

(d) A productivity effect. While the size of the company grew, the highly mechanized factories and more innovative administrative operations boosted firms' productivity in the last decade of the XIX century. In theory, this effect does not replace trustworthy employees; on the contrary, it increases the absolute demand for Barcelonnette workers. However, while the boost in labor demand is conducive to higher relative wages, the increase in the recruitment of Barcelonnettes does not always go through given a downward sloping labor supply where immigrants are discouraged when the wage bill increases and profits decrease. Hence, it is possible that the ensuing constant excess demand in the labor market may produce the collapse of this communitarian system of governance. Chronologically, the boost in productivity took place before 1907, while the cut in immigration flows due to (vii) and (viii) were after 1913; therefore, it can be argued that the productivity effect, as stated here, was only a theoretical possibility that did not materialize. On the contrary, the upward shift in the labor demand curve might have produced only a reduction in equilibrium wages given the shape of the supply curve; hence, Barcelonnette's firms might have improved their relative competitiveness at the end of the Porfirian regime.

Added to explanations (vii)-(x), which are related to the BRACSE model, it is important to recall that the particular business interests indicated in (xi) were, indeed, seriously hit with the Revolutionary War, affecting the process of capital accumulation by Barcelonnettes; although, these events could have been only temporary if their capacity to foster network-entrepreneurs would have been untouched.

From the above mentioned description it should be evident that Barcelonnettes' business governance and practices relied heavily on an ethnic identity. When this identity was fractured because of exogenous –(vii), (viii)- and endogenous reasons –(ix), (x)-, it was very difficult for them to keep firms very profitable and to sustain a credible commitment for the creation of spin-offs and, hence, the incentive for the young generation to be cooperative despite low salaries and a harsh working schedule disappeared. In fact, the new generation that was supposed to replace the wealthy Barcelonnettes who owned large banks, department stores and manufacturing plants never took control of these firms in the 20's and 30's during the XX century.

This socioeconomic explanation formalizes Gouy's (1980, p 84) argument when he states that "*it is understandable that once on his way to the fortune, the young immigrant could handle this exploitation and low profile, the employee was the central element of the firm. Under the pyramid, his existence conditioned the renewal and especially the expansion of the colony*". Consequently, very few Barcelonnettes entrepreneurs and firms were able to survive many years in the post-revolutionary period, e.g. the large department store *El Puerto de Liverpool*, founded by Jean Baptist Ebrard in 1847 as a '*cajón de ropa*'; and few other which were developed in the XX century, e.g. men's clothing manufacturer *Soria*, steel company *Industrias de Monterrey Sociedad Anónima (IMSA)*, which started in 1936 as a clothing and wooden furniture factory, and several insurance companies (*La Comercial, La Metropolitana, La Territorial*).<sup>81</sup> Some Barcelonnettes and their descendants would continue being successful entrepreneurs due to the fact that they were astute individuals and modified their corporate governance practices to some form that relied much less on the ethnic identity.<sup>82</sup> But in any case, the community lost its ability to

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<sup>81</sup> See Gouy (1980, p 100).

<sup>82</sup> Old and well established Barcelonnettes' firms survive until these days, but in the 1950's they stopped being owned by community members because of family feuds, as in the case of *Cervecería Moctezuma* and



generate a large amount of network-entrepreneurs in the 1920's despite the fact that between 80-90% of these immigrants remained in Mexico.

Those Barcelonnettes that returned to their hometown wealthy and successful (5-10% of the total) did not industrialize the Valley at the beginning of the XX century, which lacked the conditions for this type of activity, yet they revitalized the region through the construction of luxurious mansions, and their donations for important public works, such as hospitals, churches, markets, water and electricity networks, the city hall, school building renovations. It seems that they invested heavily in real state, especially in hotels along la *Côte d'Azur*, where they envisioned the future prosperity of this region and, particularly, the development of *Cannes* and *Saint-Tropez*. Likewise, their banking tradition that started with the *Banque Gassier* founded in 1822 and the *Banque de Barcelonnette* founded in 1895 continued until 1959 with their investments in the *Banque Nationale du Commerce et de l'Industrie*.<sup>83</sup>

## 7.- A socio-cultural game model for explaining the Barcelonnette's downturn

The model presented in section five is extended on three fronts. Firstly, the probability of inheriting a Barcelonnette spin-off is endogenized in terms of competition inside the '*sistema comanditario*'. Secondly, the amount of personnel in each firm is made an endogenous variable depending on entrepreneurs' decision-making and immigrants' decision on labor supply. Thirdly, the immigration rate of growth is explicitly laid out so that the implications of community size can be characterized more precisely. Besides replicating the previous results, this richer model allows for a description of the downfall of the Barcelonnette business empire.

This version of the model, despite its static nature, helps to explain how the large reduction in the flow of Barcelonnette immigration, observed in the second decade of the XX century, affected the performance of the '*communitarian spin-off system*'. Furthermore, the model explains why the working of the system was in itself the cause of

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*Palacio de Hierro* that forced the Tron and Signoret families to sell the colony jewels to Bailleres, a Mexican businessmen, see Gouy (1980, p 106,107).

<sup>83</sup> See Aranéga-Mirallès (1992, p 58, 61, 67, 70, 71) and Homps-Brousse (2002, p 13). Initially, the *Banque de Barcelonnette* was established by Eugène Lions, Joseph Tron, Antoine Signoret and Antoine Lions to ease the repatriation of their capital to France, see Proal and Charpenel (1998, p 50).

its demise. This system had the propensity of creating very unequal income distribution within the community which, in turn, fractured the commitment of the elite toward the community, making the system unviable.

### 7.a.- The endogeneity of the probability of inheriting a ‘franchise’

It is assumed that the colony of Barcelonnettes in Mexico is composed of (b) individuals and that the number of immigrants working in community firms is L. The latter is an endogenous variable determined in the labor market, once entrepreneurs have selected their level of employment when maximizing profits and once recruited immigrants have decided the amount of labor to be supplied. The rest of the non-proprietors in the colony are employed in the outside labor market, or devoted to non-productive activities. In this static model, it is assumed that the number of proprietors of Barcelonnette firms (E) is exogenously given.<sup>84</sup>

An important incentive for these workers to be loyal for long periods relies on the probability of inheriting a ‘franchise’, which in this case is not considered fixed, but a function of the number of Barcelonnettes working in a particular firm ( $T=L/E$ ) as the following formulation implicates:

$$\pi = \gamma h \left[ \frac{L}{E} \right] = \pi(T)$$

.....(5)

where  $\gamma$  is a parameter that helps to standardize the expression so that  $0 < \pi < 1$ .

Moreover, a smaller  $\gamma$  can be interpreted as a lower commitment to support community members, perhaps because of the existence of a conflicting norm that encourages succession along familial lines; this seems to have been the case of many Spanish immigrants operating in Mexico.<sup>85</sup> A poor commitment can also be associated with the weakening of social cohesion due to the stratification of the community when some of its members become extremely wealthy. The function  $h(T)$ , with  $h(0)=h_0>0$ ,  $h'<0$ , and  $h''<0$  for  $T<T'$  and  $h''>0$  for  $T>T'$ , represents the effect of internal competition among the

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<sup>84</sup> This assumption is made for reasons of simplification; however, it does not preclude the existence of spin-offs, since it is considered that a retiring entrepreneur is substituted by his spin-off. Consequently, in this second model, when a proprietor leaves a firm he bequeaths his relational assets while keeping a steady flow of income, which can be thought as the dividends from ‘franchising’.

<sup>85</sup> See Bello (2004)

Barcelonnette employees to be selected by their bosses for inheriting a spin-off. The larger is the pool of employees per-firm, the least likely is that a particular member will be chosen.<sup>86</sup> The assumed functional form incorporates the idea that the probability of ‘inheriting’ a spin-off decreases with a larger pool of workers in the firm, and that after passing a certain threshold such a probability is negligible.

### **7b.- The endogeneity of employment per-firm**

So far the model has not considered entrepreneurs’ strategic behavior and, thus, for the NSPE to be completely characterized the amount of personnel within the firms has to be derived endogenously. With that aim, it is assumed that the representative community’s firm output is produced as a function of the size of the labor input; that is,  $f(T)$  with  $f(0) = 0$ ,  $f' > 0$ ,  $f'' < 0$  and the Inada conditions hold so that first order conditions are necessary and sufficient. Therefore, the labor demand in Barcelonnettes’ firms is determined by solving the following maximization problem:

$$\max_T V_{\text{entrepreneur}} = \frac{f(T) - \omega T}{1 - \delta}$$

.....(6a)

$$\text{s.t.} \quad f(T) - \omega T \geq K$$

.....(6b)

where the constraint indicates that entrepreneurs also have a periodical opportunity cost to invest within the ‘communitarian spin-off system’. The non-negative periodical profits assumed in this constraint emphasize the idea that the immaturity of the financial system in XIX century Mexico precluded the possibility that non-liquid firms could operate for prolonged periods of time.<sup>87</sup> Thus, the first order condition is given by the following expression:

$$f'_T(T) = \omega$$

.....(7)

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<sup>86</sup> The probability can also be made a function of the community size ( $b$ ), given that the value of this parameter may be associated with the strength of the Barcelonnette identity and the possibility of spreading common beliefs among community members. However, this approach will not be used here since the algebra becomes cumbersome and little understanding of the problem at hand is added.

<sup>87</sup> However, this assumption is not critical for the conclusions derived below.

With regard to the supply side, the threshold wage for being cooperative while working inside a Barcelonnette firm was already analyzed in the previous model and, thus, it will be redefined below in terms of the new notation. However, it is necessary to specify the decision rule for working in a community firm vis-à-vis devoting time to leisure activities or working in the outside labor market. Consequently, the labor supply is given by the following expression:

$$T^s = s(\omega, b)$$

.....(8)

where  $(b)$  is the size of the Barcelonnette community and  $s'_\omega > 0$  and  $s'_b > 0$ . That is, once the Barcelonnettes are in Mexico, it is assumed that their labor decision is made on a two stage basis. Firstly, their decision is made exclusively on their role as workers and, thus, higher wages in a Barcelonnette firm makes these immigrants more willing to work within the community. In other words, the labor decision is based on plain wages despite the fact that they emigrated with the expectation of becoming successful entrepreneurs and, hence, firms' profitability was an important encouragement to make the trip to Mexico. Accordingly, immediately after arriving, these immigrants' only concern is to receive a salary to satisfy their daily needs. Secondly, once hired by a Barcelonnette firm, community workers face the decision of being opportunistic or cooperative and, with that aim, they take into account wages as well as the possibility of becoming entrepreneurs within the community. In terms of the model, this two-stage decision implies that for wages above a certain threshold Barcelonnettes prefer to work within the community and to maintain the possibility of inheriting a firm's spin-off in the future; possibility that remains positive as long as cooperative behavior is observed.

Notice that the size of the colony positively affects the supply of labor for working in the representative Barcelonnette firm. This variable is incorporated with the purpose of emphasizing that community size modifies wages paid in the labor market and the possibility of sustaining cooperative behavior in the colony's economic activities. As will be described in the next paragraphs, immigration flows are related to profits made by Barcelonnette firms in Mexico and, consequently, wages exert two different effects on the labor supply with opposite signs. A positive direct effect, which is typical in a work-leisure

decision framework, and a negative indirect effect caused by the reduction in profits (due to a wage increase) which, in turn, reduces the incentive to emigrate by individuals encouraged by the possibility of becoming entrepreneurs in the host country.<sup>88</sup>

### 7.c.- The endogeneity of immigration flows

For determining a particular  $(T, \omega, b)$  as an equilibrium outcome it is necessary to adopt a general equilibrium view of the problem. With this aim, a dynamic system which specifies the growth of the community size is explicitly modeled. Because of Barcelonnettes' social norms, entrepreneurs return to their homeland once they become rich enough and, hence, newcomers are attracted to Mexico through a demonstration effect. Consequently, the community growth rate is associated with profits made by the representative firm, as stated in the following expression.

$$\dot{b} = \left[ \frac{\mu[f(T) - \omega T - A]}{b} - c \right]$$

.....(9)

where  $0 < \mu < 1$  is the speed of contagion and parameter  $A$  is identified with the minimum value of periodical profits that induces emigration among the people living in the Valley and, thus, it is associated with job opportunities and wages in France; therefore, when economic conditions improve in France, low emigration to Mexico is expected.<sup>89</sup> Parameter  $c$  represents certain exogenous factors to the community's social governance that modify the migration flows; for instance an immigration quota –as the one imposed by dictator Victoriano Huerta, or the sudden death of young members of the community –as exemplified by the death toll during World War I-.

Notice that a differential equation instead of a difference equation is formulated, this is with the purpose of emphasizing that the adjustment in colony size is made rapidly,

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<sup>88</sup> The fact that profits enter into the supply function  $[ S = s(\omega, b(\text{profit}(\omega))) ]$  through the value of  $b$  makes the assumption of the two-stage labor decision, stated in the text, not crucial for the implications of the model. In the end, labor supply in the model is defined not only in terms of wages but also as a function of profits, yet the model specified here is algebraically more simple than one where an immigrant makes a decision, once in Mexico, in terms of wages and future profits  $[ S = s(\omega, \text{profit}(\omega), b(\text{profit}(\omega))) ]$ .

<sup>89</sup> This differential equation describes a stable system when  $f(T) - \omega T - A > 0$ . This inequality holds due to constraints (6b) and assuming that the opportunity cost in France is lower than in Mexico ( $A < K$ ). The latter assumption makes sense since Barcelonnettes would not have emigrated to obtain a lower income in Mexico as businessmen.

in the sense that in each period immigration size adjusts immediately according to observed profits and, hence, in terms of demonstration effects in period  $t$ .<sup>90</sup> In other words, a certain form of bounded rationality is assumed, since individuals cannot internalize the consequence of their actions on the system, and in particular on the possibility of changing the colony size.

The steady state community size is derived from (9) and, then, substituted into the labor supply function (8), so that the resulting expression (10) makes explicit the direct and indirect effect of wages. Notice that the labor supply curve might not have the typical positive slope because of the latter effect.

$$T^s = s(\omega, \frac{\mu}{c}[f(T) - \omega T - A]) \quad (10)$$

**Proposition 4.** When it is assumed that the ratio of marginal effects in the labor supply of changes in wages to changes in community size is relatively small ( $s'_\omega/s'_b < \mu T/c$ ), then, an initially upward sloping supply curve becomes downward sloping before crossing the labor demand.

The proof of this proposition is presented in the Appendix. The marginal effects assumption states that the labor supply should be more sensitive to changes in immigration than to changes in wages. This assumption is reasonable in a scenario where cash-constrained immigrants tend to accept jobs offered by community members who provide housing facilities and credit for paying workers' settlement expenses, in comparison with jobs offered outside the community which lack this type of fringe benefits. Under these circumstances, the labor supply slopes downward when the marginal productivity of labor is relatively small, that is when an increase in labor is associated with a larger wage bill which is not offset with larger revenues. In such a scenario, the stronger indirect effect requires that wages should be reduced to induce a positive demonstration effect which, in turn, increases the quantity of labor supplied.

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<sup>90</sup> Obviously, this is only a simplifying assumption given the static nature of the model.

#### 7.d.- Supply's threshold wages for the extended model.

In the extended model, equilibrium wages are not only defined to sustain cooperative behavior, but also as a consequence of the interaction between the supply and demand for labor. In particular, and as mentioned above, the immigration flow is an important conditioning factor of the supply schedule; likewise, certain wages have to be discarded since they are conducive to non-cooperative behavior; thus, as done before, dishonest behavior for workers has to be ruled out for finding the NSPE; hence,

$V_{\text{honest}} \geq V_{\text{cheater}}$  produces the following threshold wage.

$$\omega \geq \frac{(1-\delta)[1-\delta(1-\pi(T))]\left\{\alpha + \frac{\delta\omega(1-\varepsilon)}{1-\delta}\right\} - \delta\pi(T)\rho(T)}{(1-\delta-\delta T\pi(T))} = \omega^L$$

....(11)

where  $\rho = f(T)$  and  $\pi$  is defined in (5) with  $\pi'_\gamma > 0$ ,  $\pi'_T < 0$ .

Due to the similarities in expression (4) and (11), the comparative static exercises indicated in propositions 1 and 2 also hold in this new version of the model. However, since  $\pi$  is now a function of  $T$ , proposition 2 is restated so that it refers to the negative impact on threshold wages when there is an increase in the exogenous component of the probability of inheriting; accordingly:

**Proposition 5.** Stronger social norms of inheritance within the colony in terms of merits ( $\Delta\gamma > 0$ ) are associated with lower threshold wages ( $\omega^L$ ) when revenues are relatively high ( $\rho > \rho^\circ$ ) and employment relatively low ( $T < T^\circ$ ).

#### 7.e.- Feasible and equilibrium wages in the 'communitarian spin-off system'

While expression (11) specifies the minimum level of wages ( $\omega^L$ ) required by workers to keep being honest for each size of the personnel per-firm, expression (6b) specifies the maximum wages ( $\omega^\circ$ ) that entrepreneurs are willing to pay to sustain the *sistema comanditario* operating for each quantity of employment. Consequently, the area overlapping these two regions produces all feasible  $(T, \omega)$  values and, thus, these pairs are candidates for equilibrium outcomes of this game, as can be observed from Figure 1.

The size variable ( $T$ ) exerts three different effects on the incentives of workers, as can be seen from expression (11). There is a probability effect, because higher employment per firm is associated with lower possibilities of becoming an entrepreneur. A revenue effect is also generated because more workers increase outputs and sales, which encourages workers' incentive to become entrepreneurs. Moreover, there is an offsetting payroll effect due to the loss in profits induced by the increase in the wage bill. The combination of all these effects creates non trivial behavior represented with the  $\omega^L$  line in the diagram, see the Appendix for more details of these functional forms.

For low levels of  $T$ , there are important chances of inheriting the firm and labor productivity is high, accordingly, the probability and revenue effects are relatively large and the wage bill effect is small. Under this range of values the threshold curve  $\omega^L$  presents a negative slope since a marginal increase in employment makes it very attractive for Barcelonnettes to become entrepreneurs and, hence, they are willing to reduce current wages. On the contrary, the threshold curve exhibits a positive slope for high levels of  $T$ . Under this range of values, there is too much competition for inheriting the firm, labor productivity has diminished substantially and the wage bill is considerable; therefore, Barcelonnettes are more concerned with the workers' motivation and current wages and, hence, an increase in employment is only viable offering higher wages to offset the drop in the incentives from the entrepreneurial side.

Similarly, it can be proven that for the entrepreneurs' threshold wage ( $\omega^e(T)$ ), derived from the binding inequality constraint (6b), the slope is initially positive and then negative, being the maximum point achieved when this line intersects with the curve  $\omega^f(T)$ —expression (7)—. The latter curve represents the first order condition of the entrepreneurs' problem, as stated in (6a), and hence all pairs  $(T, \omega)$  along this curve overlapping the feasible area correspond to the NSPE, as depicted with the negative sloping bold line in Figure 1.

For determining a particular  $(\omega, T)$  as the only equilibrium outcome it is necessary that the demand and supply schedules, curves (7) and (10) respectively, intersect within the feasible area. As will be clarified with the comparative static exercises below, the existence of equilibrium will depend on parameter values. In particular, the negative segment of the



labor supply curve makes it possible that no intersection occurs between this curve and the demand schedule. Notice also from Figure 1, that, as suggested in Proposition 3, it is possible that a set of equilibrium wages ( $\omega^*$ ) be lower than the outside market wage ( $\underline{\omega}$ ). This observation leads to the following proposition.

**Proposition 6.** The ‘communitarian spin-off system’ can operate with wages below those offered by the outside market.

That is, at intersection point  $E_0$ , wages are high enough to keep workers honest and low enough for the Barcelonnettes’ firms to be profitable, so entrepreneurs are willing to invest their wealth in the community. This result highlights the fact that for firms with identical technology, those in the community have a competitive advantage since  $\omega^* < \underline{\omega}$ .

Insert Figure 1

#### 7.f.- Comparative static when there is a reduction in immigration flows

**Proposition 7.** When there is a reduction in immigration flows, Barcelonnettes’ firms might become less competitive than regular firms, and when such cut is very steep the ‘communitarian spin-off system’ cannot operate any longer.

The setting up of quotas for the entry of foreign workers in 1913 ( $\Delta c > 0$ ), the departure of Barcelonnettes’ youngsters because of the French involvement in World War I ( $\Delta c > 0$ ), or the increased income expectation of Valley residents for deciding to emigrate ( $\Delta A > 0$ ), exert an upward shift in the labor supply curve.<sup>91</sup> Therefore, at intersection point  $E_1$  in Figure 2,  $\omega^* > \underline{\omega}$  and, then, Barcelonnettes’ firms lose competitiveness in the economy. However at intersection point  $E_2$ , where the fall in the immigration flow is steeper, the communitarian system stops functioning since it does not provide the minimum profits required by their entrepreneurs.

Insert Figure 2

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<sup>91</sup> This expectation can, in fact, be endogenous; for instance, when the repatriates generate, with their fortune, economic activity in the Valley and, thus, higher wages and job opportunities at home.

### 7.g.- Comparative static when there is a steep stratification in the community

**Proposition 8.** The ‘communitarian spin-off system’ might stop functioning if the probability of ‘inheriting’ a firm falls sharply. This probability can be reduced due to a diminished credibility of entrepreneurs’ commitment.

The observed deterioration in income distribution within the community at the end of the Porfirian regime might have caused a fracture in social cohesion, and with that, a weakening in entrepreneurs’ commitment toward the colony. This very competitive *sistema comandiatario* generated, with the passing of time, the accumulation of wealth of the elite, recalling that network connections and the access to funding were essential for determining the degree of success for entrepreneurs in XIX century Mexico. Therefore, the Barcelonnette identity entered into conflict with the sense of belonging to specific socioeconomic strata. The downfall in the communitarian system is represented in Figure 3 as a reduction in  $\pi$  ( $\Delta\gamma < 0$ ) and a steep upward shift in the  $\omega^L$  curve –see expression (11)-. Since clearing wages ( $E_0$ ) do not change in the diagram, at such wages no worker is motivated to behave cooperatively and, hence, the system collapses.

Insert Figure 3

### 7.h.- Comparative static when there is an increase in firms’ productivity

**Proposition 9.** An increase in productivity might collapse the labor market in the ‘communitarian spin-off system’.

In Figure 4, the labor market collapses when there is an increase in productivity that shifts the demand curve to the right; this is so, because the supply schedule is downward sloping for a relatively high level of employment. This no-intersection scenario is reinforced by the fact that the increase in revenues shifts the supply curve downwardly –see expression (10)-. Notice in the diagram that the collapse takes place despite the fact that the area describing feasible wages is enlarged –see expressions (6b) and (11)-. In other words, increased productivity and larger revenues imply that entrepreneurs are more willing to offer better salaries, and workers-soon-to-become-entrepreneurs more inclined to sacrifice current wages. Nonetheless, the increased demand for workers cannot produce equilibrium

wages since for relatively high levels of employment more wages generate only a reduction in profits and a fall in immigration flows that reduces the quantity of labor effectively supplied and, thus the labor market does not clear.

Insert Figure 4

## 8.- Conclusions

The Barcelonnette community in XIX century Mexico is a very interesting study case on the two-ways feedback between the society's culture and its economic performance. The analysis of this ethnic group shows, on the one hand, how social governance conditions individual's decision-making and, in turn, influences economic performance. In particular, the game model presented in this paper produces an equilibrium outcome where the community's social norms made possible the existence of network-entrepreneurs and very competitive firms. The set of beliefs and social sanctions prevailing in this community produced very loyal employees, a large capacity of accumulation for these firms and a spin-off system which kept the firms' community operating successfully for almost a century.

On the other hand, the analysis also shows, theoretically, that the 'communitarian spin-off system' itself breeds the forces of its own destruction. Firstly, the consistency offered by the presence of cohesive social norms is lost by the continuous deterioration in the income distribution within the community generated by the system itself. Secondly, the good economic performance of the community's business networks in terms of productivity makes less likely that such a system can be supported as an equilibrium outcome since Barcelonnettes' labor supply is not able to meet the increased demand.

Empirically, it is argued that, indeed, the system created an enormous wealth accumulation in the Barcelonnete elite and, hence, it was possible that the deterioration in income distribution within the community might have caused tension between individual behavior defined along ethnic identity and that influenced by social strata membership. The evidence also indicates the formation of diversified business groups, with large capital investments in different companies (e.g. department stores, banking, and manufacturing in beer, textiles and gun-powder). It is, then, suggested that this organizational architecture

produced a negative effect in the Barcelonnettes incentives to pursue an entrepreneurial career within the community's firms. This is explained in terms of control rights fragmentation, and lower probabilities of inheriting a spin-off because of the size of physical investments and the instability of the political environment once capital had been sunk

Added to these endogenous elements of the demise of their business empire, it should be said that the sharp fall in the immigration flow, due to Mexican regulations limiting the entry of foreign workers, and the departure and death of a large number of young Barcelonnettes in War World I, drastically reduced the future generation of entrepreneurs and created stress in the system by decreasing the number of trustworthy individuals.

The paper's model also highlights a theoretical scenario where the labor supply curve is downward sloping along certain range of employment. Since individuals from this region of Provence, France, were motivated to leave their region in the pursuit of an entrepreneurial career; the proper comparison to make when deciding to emigrate is not in terms of differential wages, but in terms of wages in France and the return of capital in the host country; where capital is defined with a mixture of physical, human and social assets. That is, the related assets and values that accompanied these humble immigrants when they established in Mexico became the major force for their entrepreneurial success. Consequently, the introduction of a profit function as an argument in the model's labor supply can produce a downward sloping supply curve for a certain range of employment.

## Appendix

**Proposition 1.** Assuming that  $T < (1 - \delta)/\delta$  and given the fact that  $0 < \pi < 1$ , then  $0 < 1 - \delta - \delta T \pi$ ; therefore, the denominators in the following derivatives of expression (4) are positive.

$$\frac{\partial \omega^L}{\partial \alpha} = \frac{(1 - \delta)[1 - \delta(1 - \pi)]}{1 - \delta(1 + \pi T)} > 0, \quad \frac{\partial \omega^L}{\partial \omega} = \frac{\delta(1 - \varepsilon)[1 - \delta(1 - \pi)]}{1 - \delta(1 + \pi T)} > 0, \quad \frac{\partial \omega^L}{\partial \varepsilon} = \frac{-\omega \delta [1 - \delta(1 - \pi)]}{1 - \delta(1 + \pi T)} < 0$$

,

$$\frac{\partial \omega^L}{\partial \rho} = \frac{-\delta \pi}{1 - \delta(1 + \pi T)} < 0 \quad \text{q.e.d.}$$

**Proposition 2.** Differentiating (4) with respect to  $\pi$ , it is found that

$$\frac{\partial \omega^L}{\partial \pi} = \frac{\delta(1 - \delta)[\theta - \theta\delta - \rho] + \delta T \theta(1 - \delta)^2}{(1 - \delta - \delta \pi T)^2} \quad \text{where} \quad \theta = \alpha + \frac{\delta}{1 - \delta} \underline{\omega}(1 - \varepsilon)$$

thus, the sign of the derivative depends on the sign of the numerator. By recalling that  $T < T^\circ$ , then, the new numerator with  $T^\circ$  instead of  $T$  is negative when

$$\rho^\circ = \frac{\alpha(1 - \delta)}{\delta} + \underline{\omega}(1 - \varepsilon) \quad \text{and hence} \quad \frac{\partial \omega^L}{\partial \pi} < 0 \quad \text{q.e.d.}$$

**Proposition 3.** From expression (4) and after some algebra:  $\omega^L = (\underline{\omega} - F)/G$ , where

$$G = \frac{(1 - \delta - \delta \pi T)}{\delta(1 - \varepsilon)[1 - \delta(1 - \pi)]} > 0, \quad \text{for } T < T^\circ, \quad \text{and } F = \frac{\delta \pi \rho - \alpha(1 - \delta)[1 - \delta(1 - \pi)]}{\delta(1 - \varepsilon)[1 - \delta(1 - \pi)]}; \quad \text{then for } \omega^L < \underline{\omega}$$

to hold it is required that:

(i)  $\underline{\omega} < F/(1 - G)$  when  $1 - G > 0$  which implies that

$$\rho > \rho^{\circ\circ} = \frac{\underline{\omega} \Omega + \alpha(1 - \delta)[1 - \delta(1 - \pi)]}{\pi \delta} \quad \text{with} \quad \Omega = \delta(1 - \varepsilon)[1 - \delta(1 - \pi)] - [1 - \delta(1 + \pi T)]$$

and  $\pi, \delta > 0$  (implying Barcelonnettes' dual role) is required when

$$\varepsilon < \varepsilon^\bullet = 1 - \frac{1 - \delta(1 + \pi T)}{\delta[1 - \delta(1 - \pi)]}, \quad \text{and thus } \Omega > 0$$

(ii)  $\underline{\omega} > F/(1 - G)$  when  $1 - G < 0$  (i.e.  $\varepsilon > \varepsilon^\bullet$ ), which also holds for  $\rho > \rho^{\circ\circ}$

(iii)  $\underline{\omega}(1 - G) - F < 0 \rightarrow F > 0$  when  $1 - G = 0$  (i.e.  $\varepsilon = \varepsilon^\bullet$ )

condition that is met for  $\rho > \rho^\bullet = \frac{\alpha(1 - \delta)[1 - \delta(1 - \pi)]}{\pi \delta}$  where  $\rho^\bullet = \rho^{\circ\circ}$  since  $\Omega = 0$  q.e.d.

**Proposition 4.** Expression (10) is totally differentiated with respect to wages ( $\omega$ ) and community size ( $b$ ); then, after rearranging some terms, the slope of the supply curve is given by:

$$\frac{d\omega}{dT} = \frac{s'_b \frac{\mu}{c} (\omega - f'_T) + 1}{s'_\omega - \frac{\mu}{c} s'_b T} \quad \text{Notice that the denominator in the mathematical definition of the}$$

slope is negative when it is assumed that  $s'_\omega/s'_b < \mu T/c$ , hence, at the intersection point with

the demand curve ( $\omega = f'_T$ ) the labor supply curve is negative, and  $d\omega/dT = 0$  for a  $T$  before such point since the production function is concave. q.e.d.

**Proposition 5.** The proof is similar to the one presented for proposition 2.

**Figure 1.** The threshold-wages curve for labor ( $\omega^L$ ) has the depicted shape in Figure 1 given that

$$\omega^L(T=0) = \theta = \alpha + \frac{\delta \underline{\omega} (1-\varepsilon)}{1-\delta}, \quad \omega^L(T \rightarrow \infty) = (1-\delta)\theta$$

Now for  $T < \infty$  there is a range of  $T$  values such that  $\omega^L(T) < \omega^L(T \rightarrow \infty)$ , since using expression (11) it is found that  $T < \frac{\rho(T)}{(1-\delta)\theta} - 1$ ; hence due to the concavity of the

production function either the curve described in the right-hand-side intersects the straight line described in the left-hand-side twice, or the curve is below the line for all  $T$ . The former case is more likely for relatively low  $\alpha$  and  $\underline{\omega}(1-\varepsilon)$  and high  $\delta$ .

The threshold-wages curve for entrepreneurs ( $\omega^e$ ) has the depicted shape since:

$\omega^e(T \rightarrow 0) \rightarrow \infty^-$ ,  $\omega^e(T \rightarrow \infty) \rightarrow 0^+$ . This curve also has a critical point (maximum) at the intersection of the labor demand curve, as can be seen by equating the derivative with respect to  $T$  to zero:

$$\frac{\partial \omega^e}{\partial T} = \frac{T f'_T - f(T) + K}{T^2} = 0 \Rightarrow f'_T = \frac{f(T) - K}{T}; \text{ since } \omega^e = \frac{f(T) - K}{T} \text{ and the labor demand}$$

curve is given by  $\omega = f'_T$ . at the critical point of  $\omega^e$  both curves intersect. Finally, the intersection of  $\omega^e$  with the horizontal axis is given for  $T > 0$  such that  $f(T) = K$ .

**Proposition 6.** Assuming that the demand and supply curves for labor have a particular shape so that there is an intersection in the feasible area, it suffices to show that  $\underline{\omega} > (f(T) - K)/T = \omega^e$  for all  $T$ . Accordingly, and after rearranging terms, the inequality condition  $\underline{\omega}T + K > f(T)$  holds for different combinations of  $(\underline{\omega}, K)$ , and hence it is possible that  $\underline{\omega} > \omega^*$  as depicted in Figure 1. q.e.d.

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Figure 1

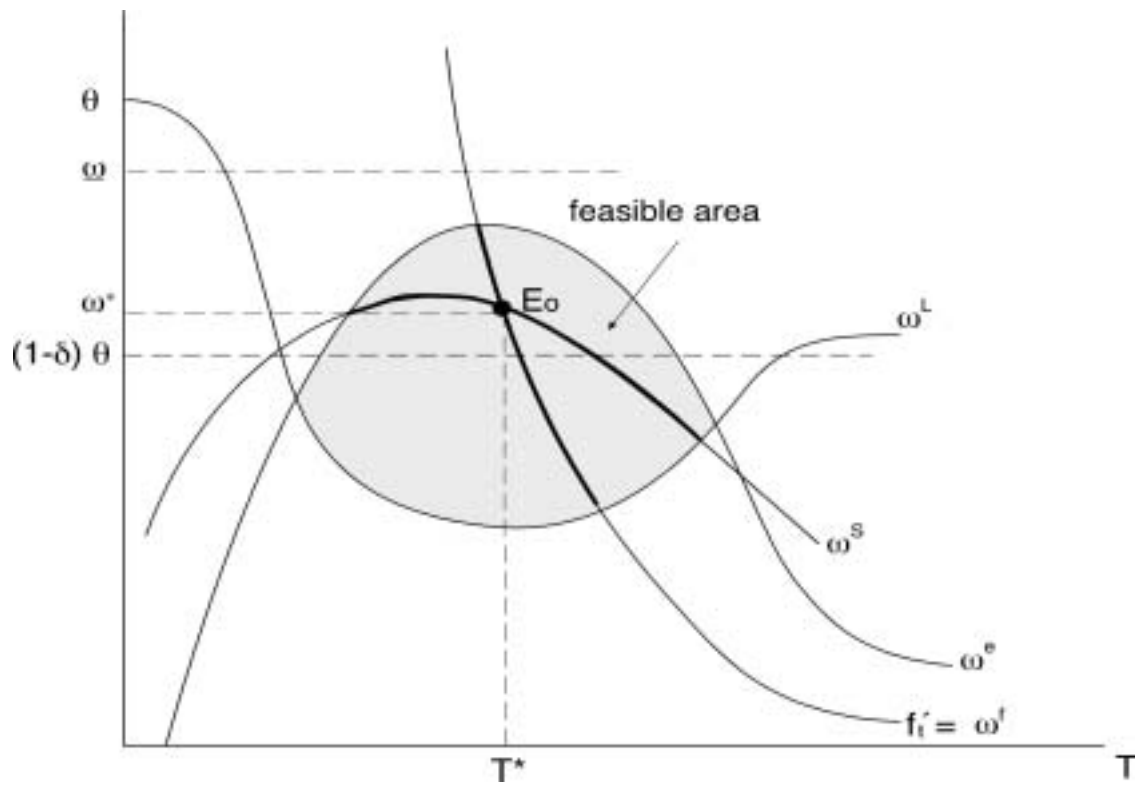


Figure 2

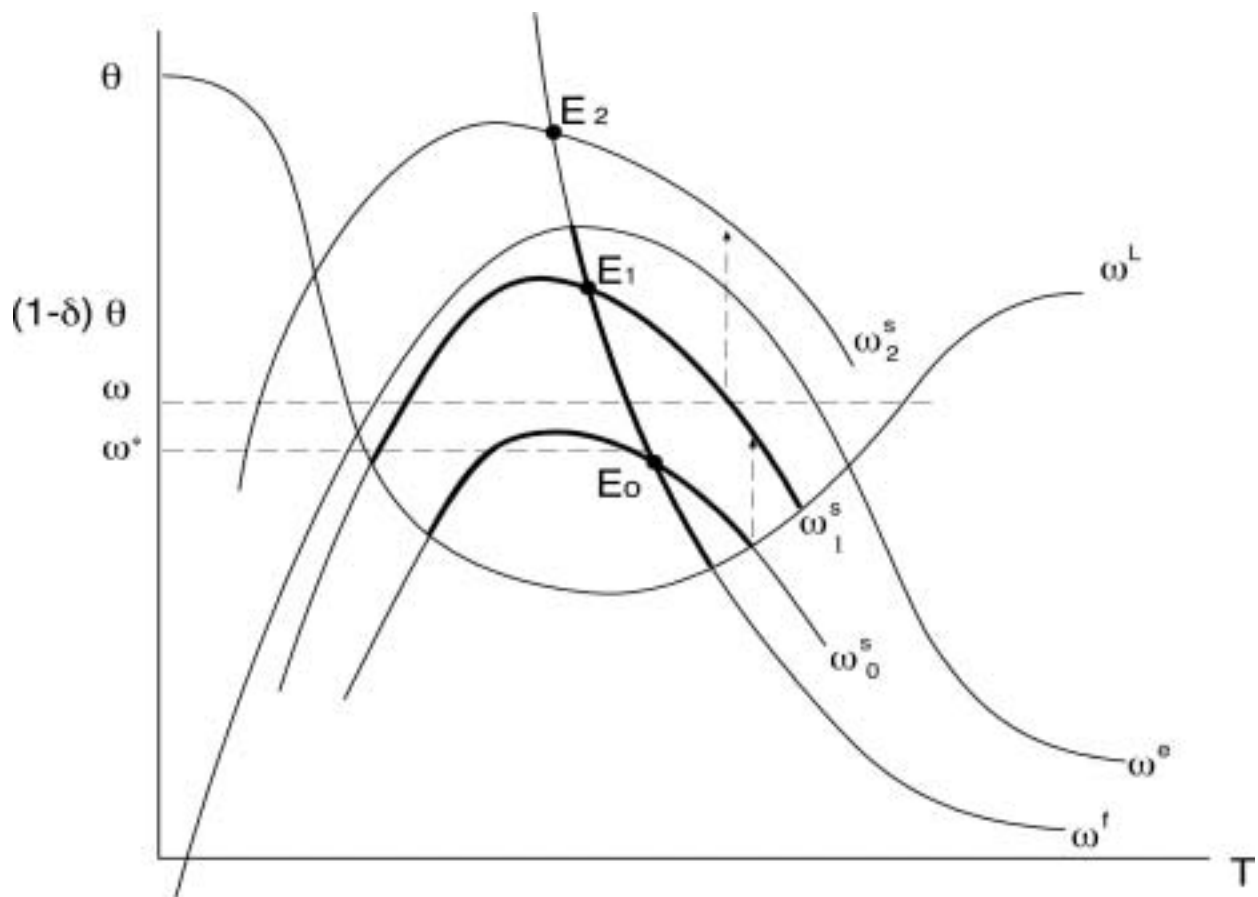


Figure 3

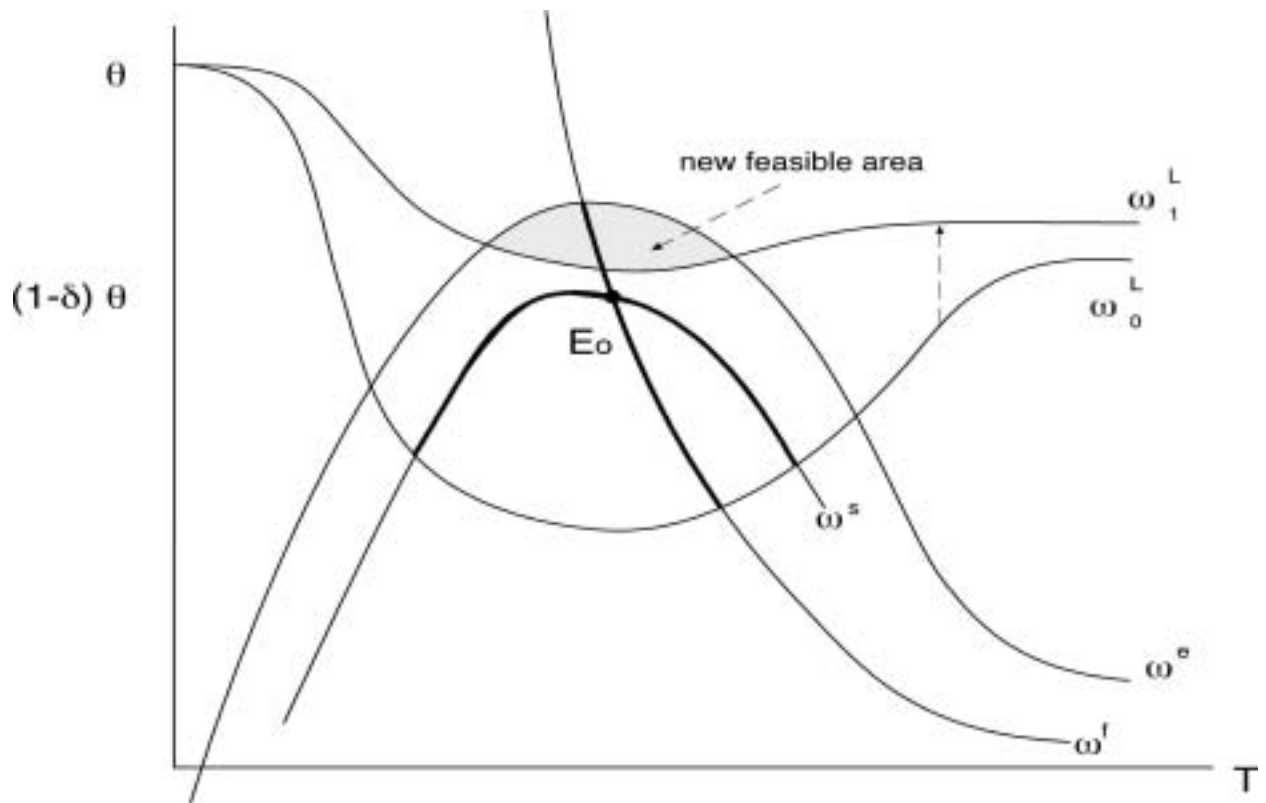


Figure 4

