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Measuring social capital: Culture as an explanation of Italy's economic dualism

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This article presents a quantitative test of the oft-repeated view that Italy's backward and poor South suffered from low 'social capital', a tendency to defect from co-operative engagements. The problem with such assertions is that they run the risk of taking as evidence in favour of the hypothesis the very observations that need to be explained. The analysis carried out in this work tries to break out of this impasse by analysing the conditions under which it was *ex ante* welfare-improving for farmers in early twentieth century Italy to join an unlimited liability rural co-operative bank which would give them access to cheaper credit, but also exposed them to the risk of their neighbours' defection. These 'co-ops' are a prime testing ground for the cultural explanation in that they spread rapidly throughout Northern Italy in the late nineteenth century, but never gained a similar popularity in the South. I estimate the switching function for these co-ops in different parts of the country to test whether Northern and Southern farmers faced significantly different choice sets when making the decision to join. Identical choice sets but differential responses would of course favour the cultural explanation of the South's backwardness. The results suggest that for the same parameter values, the choice sets for North and South were indeed different.

Economists have increasingly recognised that high social capital, understood as sustained group-level co-operative behaviour, constitutes an essential lubricant to economic and political systems (Arrow 1972, Coleman 1990, Glaeser *et al.* 1999). In particular, Dasgupta (1988) has argued that the foundation of social capital, trust, depends on credible sanctions and correct incentives. Since observable behaviour may be motivated by opportunism or strategic considerations, trust derives from knowledge of others' awareness that future benefits depend upon current honesty, or on efficient enforcement mechanisms. Social capital is thus cumulative and shares some of the characteristics of public goods, in that it has extensive externalities and does not diminish with use – in fact, it may increase. In addition, trust implies unobservability in a complex world. Unobservability and complexity mean that individuals routinely come into contact with others about whom they have limited or no information but whose co-operation must be

engaged. Reliance on third-party enforcement may play a role, but it hardly needs stressing that enlisting this help is not costless. It follows that besides being cumulative, social capital is also general, meaning that for it to work effectively (that is, to solve multiple prisoner's dilemmas), there has to be a 'culture of trust'. This may sound disturbingly woolly, so it has to be given analytical incisiveness. A culture of trust exists when the overwhelming majority of players expect that, in the overwhelming majority of transactions, other parties whose behaviour cannot be fully monitored will not defect, that is, will not seek to seize a greater-than-agreed share of the cumulative benefits. A culture of trust is a systemic bias in favour of co-operative resolutions to multiple prisoner's dilemmas.

Low social capital is often blamed for economic backwardness, as is witnessed by the stress currently laid by international development agencies on fighting corruption. In this view, a culture of trust is an essential component of what Abramovitz (1986) has called the 'social capability' underlying convergence. The point is intuitively appealing, since it seems reasonable that productive investment, which involves trading current claims upon resources for future claims contingent upon third party behaviour, will be discouraged where income streams are insecure, and empirical research (Mauro 1995) confirms this. Arguing in this vein, Putnam (1993), drawing on earlier work by Banfield (1958), suggested that Italy's underdeveloped South was plagued by a lack of 'civil culture'. The argument, supported in part by A'Hearn (2000), is that Southern Italians never overcame their reciprocal mistrust in order to produce networks of mutual engagement, so that incentives to defect were never reduced by social sanctions. The equilibrium was disastrous but stable, in that the dominant strategy was to avoid engagement outside narrowly restricted circles where effective sanctions and reciprocity operated, that is, in practice, within the family (Sinisi 1989, Basu 1995). 'When your neighbour's house is on fire', admonishes a Southern Italian proverb, 'bring water to your own'. One consequence of this may have been the very backwardness of the area: in the early twentieth century, the South's *per capita* output was barely three-quarters of the national average and its personal income one half of the industrial North's (Zamagni 1993, p. 39). Literacy, infant mortality, life expectancy, or any other index told the same story, and the situation is not too different today.

The approach is challenging, and this article offers a test for the 'culture-of-trust' explanation of Southern backwardness. At this stage, proving that low trust hurt the South's development chances is not possible. I will instead focus on whether there is evidence of significantly different levels of trust in Northern and Southern Italy by calculating a measure of the trust Southern Italians had for one another using a form of revealed preference approach. Specifically, I will model their decision to join a rural co-operative bank (*cassa rurale*) in the early years of the twentieth century,

a period when these banks were spreading rapidly in the rest of the country, though they remained few in the South. These banks, modelled on the Raiffeisen co-ops, are a prime testing ground for any claim about social capital because members accepted, by law, unlimited liability for the co-op's debts. Indeed, low social capital is central to Guinnane's (1994) account of why these institutions failed in Ireland. Against the benefit of borrowing at lower rates than those of the village moneylender ('formal' banks were noticeable for their absence from Italy's rural areas before the interwar years: Muzzioli 1983), farmers had to weigh the possibility of being ruined by their neighbours' defections. By and large, Northern Italians felt this was a gamble worth taking, and joined. Southerners did not. Does this mean that Southerners trusted one another less than their Northern cousins? Or were other constraints affecting their different response?

The 'low social capital' approach to the South is, of course, wider than the test I can carry out in this article. Banfield and Putnam are, after all, referring to problems of *co-operation* in society at large, that is, to the presence of diffused and generalised trust. All I can do is focus on a specific decision (whether to join a *co-operative*), and that decision is not *per se* unambiguously indicative of diffused trust in society. However, framing the question of trust in these narrow terms is convenient for two reasons. In the first place, the payoff matrix is well defined. Attempts to measure trust at a more diffuse level encounter a number of specification and computational problems dictated by the complexity of the relationships under scrutiny. In this case, on the other hand, the *ex ante* benefits accruing to prospective members are rather more clearly identifiable, which allows me to study whether Southern Italians refused to work with co-operatives even though this would have been welfare-improving. Secondly, the differential success of co-ops in the North and in the South is sufficiently striking to suggest that some systemic force may have been at work. At the very least, then, the article offers a specific test of a wider hypothesis.

In the next section I will sketch a brief history of rural co-operative lenders in Italy, and set the stage for the test presented later in the article. Section 2 will introduce a simple framework to model 'trust' in this context, and section 3 will use official data to compare the revealed degrees of trust farmers in Northern and Southern Italy felt for their neighbours.

1. Rural credit co-operatives in Italy, 1883–1926

The salient facts relating to rural co-operative credit in Italy are easily stated. The first (non-denominational) *cassa rurale* was founded in June 1883 near Padua with a membership of 14. By December 1899 over 6,000 farmers had joined similar co-ops, and loans financed by these banks had grown in real terms by more than 2,800 per cent (Agostini 1985, p. 133; Zalin 1985, p. 37). In the 1890s, a number of Catholic credit co-ops were

also organised thanks to the initiative of parish priests spurred by the Vatican's ideological relaxation signalled by the encyclical *Rerum Novarum* of 1891 (Preziosi 1985). The capillary organisation of the Church helped in the diffusion of these experiments, and the involvement of the clergy acted as a kind of guarantee of probity. Only seven years after the founding of the first Catholic *cassa* (August 1892), Catholic co-operatives in Italy numbered almost 800 and loans financed by them went from less than 40,000 *lire* per year to over 10,000,000 (Cooperazione 4 November 1894, p. 44; Tramontin 1974; Tamagnini 1952, p. 101). While no census of co-ops was ever taken before the interwar years, it appears that by December 1916, some 2,100 *casse rurali* existed in Italy, with a total membership of 115,000 (Tamagnini 1952, p. 105). The evidence, limited though it is, also strongly suggests that rapid growth was not bought at the expense of solvency: few *casse* ever failed and borrowers seldom defaulted (Tamagnini 1952, p. 100; Bresolin 1980, p. 138).

This success is all the more remarkable because there were good reasons to expect that few people would join. Legally, a credit co-operative was constituted when no less than three individuals signed the articles of incorporation, the main feature of which was that members were 'jointly and severally responsible with all their property' for the co-op's liabilities. Co-operatives raised funds either by accepting deposits from the public, or by obtaining backing from larger financial institutions in the form of a loan note secured on the property of members. Lending was almost exclusively short term (1 year) and was restricted to members. In addition, shares were not tradable, no dividends could be distributed, and each member only had one vote regardless of the number of shares held. Finally, the co-op required a commitment of time and effort, which by law could not be remunerated.

In spite of the risks and drawbacks associated with these legal requirements, the co-ops soon attracted a large membership. While the backgrounds of members have not yet been analysed in detail, some data from the late 1890s give the following cross-section: in 1898, 57.7 per cent of co-op members were small landowners; 29.2 per cent fixed rent tenants or sharecroppers; 9.1 per cent artisans, shopkeepers or small merchants; 4 per cent farm hands. In the same year, 30.4 per cent of co-op loans by value were used to buy livestock; 19.1 per cent financed trade or small scale manufacturing; 16.3 per cent were used to purchase fertilisers, herbicides, or fungicides; 13.3 per cent went into land improvement; 11.8 per cent to buy food; 6.1 per cent to buy fodder; 1.7 per cent financed seasonal migrants; and 1.3 per cent to buy farm tools (Caputo 1989, pp. 28–9).

These data are interesting, if vague. It is not clear, for example, what is meant by 'small landowner' or 'small scale manufacturing', yet the flavour of the information points to localised micro-credit. This is confirmed by one of the few instances of recorded collateral accepted by a *cassa*, the one in Treviglio (40 km east of Milan). From 29 March to 12 September 1899, this

co-op extended credit on the security of cattle (120 heads in 62 loans), horses (12 in 10 loans), donkeys (15 in 15 loans), carts (3 in 3 loans), and even a borrower's garlic crop (Treviglio 1899). At this level of micro-credit, the advantages offered by co-ops to small borrowers are well known and need not detain us here (Besley *et al.* 1993, Banerjee *et al.* 1994, Besley and Coate, 1995).

The portfolio of the *casse* appears to have consisted mostly of loans, secured and unsecured, and deposits with larger banks. Only very occasionally did they invest in government or commercial paper: each of these accounted for less than 1 per cent of assets in 1905 (Ruggieri 1964). Important regional differences existed, however, in their liabilities, which were mostly current and savings accounts in Northern Italy (less commonly term or time deposits), while they included a significant portion of loans from banks of issue in the South, particularly in Sicily (Sannucci 1990, Polsi 1996).

The *casse's* local character was never compensated by a strong federal structure, unlike the Raiffeisen banks in Germany or the Cr dit Agricole in France (Gueslin 1984). At a reasonably early stage, interbank lending appeared as co-ops that had grown faster than others acted both as clearing houses and as providers of discount facilities (Ristorio 1971, p. 80; Lanzavecchia 1986, p. 171; Bermond 1996, pp. 15–6). In most cases, however, the local savings banks, which were predominantly urban, acted in the secondary market for co-ops (Veneruso 1982, pp. 575–6; Saguatti 1989, pp. 234–54; Cafaro 1996, pp. 96–7). While a number of federations of *casse rurali* were founded from the mid-1890s onward, they were almost always local affairs, at times consisting of no more than half a dozen co-ops. These organisations never became large enough to act as discounters or lenders of last resort for the *casse*, which, outside of a few privileged areas such as Sicily, did not have easy access to the banks of issue for liquidity. Several national conventions resolved to set up a nationwide bank to provide better rediscount and secondary market facilities, but in practice fewer than 20 per cent of existing *casse* ever bothered to join (Cafaro 1985, pp. 53–72). In fact, the *casse* were either actively opposed to, or at least suspicious of, wider groups, precisely because their strong local character made them uneasy with organisations based in other parts of the country (Cooperazione 25 October 1914; Pessina 1987, pp. 294–5; Di Taranto 1996, p. 512; Lo Giudice 1996 pp. 572–3). This disintegrated structure and the extreme reliance of the co-ops on the local economy did not cause important liquidity problems in the years before the First World War. The 1907 financial crisis did bring about a decline in the number of co-ops, but only because some failed as a result of losses suffered when larger financial institutions closed their doors (Bonelli 1971). In any event, the loss in numbers was made up reasonably quickly. However, except for 1907, when their financial support simply vanished, failures were rare among co-ops (Cafaro 1985,

p. 34), and those that did occur appear to be related to individual mismanagement or, more rarely, fraud (Pretelli 1990; Gallo 1996, p. 486). The inflationary experience of the war years changed this situation dramatically.

The fragmented structure of co-operative credit in post-First World War Italy meant that as a rule co-ops used a few larger intermediaries (at times only one) as providers of rediscount facilities or as placement for excess liquidity. Wartime inflation and rationing from 1915 onwards brought about a rapid rise in the *casse*'s liabilities, the proceeds from which were often simply placed on term with larger local banks with which co-ops already had long-standing relationships. In fact, what the co-ops lacked was a diversified investment strategy, which left them open to important, often critical, losses when the larger institutions found themselves in difficulties in the postwar deflation (Caroleo 1986; Zamagni 1993, p. 217). The early 1920s saw a sharp decline in the number of *casse*, partially masked in the official data by the high number of co-ops located in the territories gained by Italy with the Treaty of Versailles (Bof 1996; Cafaro 1996, p. 86; Leonardi 1996).

The financial difficulties of many *casse* in the early to mid-1920s gave the Fascist régime the excuse to intervene, bringing them under direct supervision by the Ministry of Finance and the central bank, forcing a number of mergers, and setting up a federal structure. The *casse* were thereby removed from the influence of the Catholic clergy and brought under the control of the Fascist party (Roggi 1982, pp. 34–5; Caroleo 1986; Caputo 1989, pp. 47–53). From that point on, the *casse* lost their purely rural character, as a number of legislative measures merged them with urban co-operative and mutual aid societies, forming larger bodies whose operations were still geographically restricted, though on a somewhat wider scale than before. The effect of these reforms was to reduce the number of banking co-operatives. The 1930s depression, though less acute in Italy than elsewhere (Mattesini and Quintieri 1997), further weakened their position. The 2,263 *casse* active in 1926 had by 1937 declined to 1,748 (–22.8 per cent), while total liabilities fell by 43.4 per cent in the same period, and the value of their portfolio declined by over two-thirds (Caputo 1989, p. 53). In fact, it was only with the Italian 'economic miracle' in the 1950s that co-operative banks experienced renewed growth (Gigliobianco 1996).

If these were the broad national trends, regionally the co-ops underwent widely varied experiences. In Northern Italy (the 30 provinces¹ constituting the regions of Piedmont, Liguria, Lombardy, Venetia, Emilia) their growth was extremely rapid, and the area came to have a disproportionate number of *casse*. The only region outside the North where co-ops were common was Sicily which, with 9 per cent of Italy's farm labour force, accounted for 17.6 per cent of credit co-ops in 1910. Excluding Northern Italy and the

¹ A province in Italy is an administrative subdivision corresponding to the British County. At this time, regions consisted of up to eight provinces.

anomaly of Sicily, the rest of the country had fully half the farm labour force but fewer than 20 per cent of all co-operative lenders, and only 13.3 per cent of their assets (Caputo 1989, p. 38; Galassi and Cohen 1994, p. 594). The *casse* thus mirrored the North-South gradient that characterises the Italian economy.

Sicily had a high concentration of rural co-op lenders, which made it an anomaly in the North-South gap. The Bank of Sicily, which was a bank of issue, subsidised co-operative banks in rural areas by assisting in setting them up and extending credit over the years (Lorenzoni 1909; La Loggia 1914, pp. 708ff; Lo Giudice 1966; Muzzioli 1983, pp. 175–8). In most cases, however, these co-ops remained dependent on loans from the bank of issue for capital, and only a few developed into active financial intermediaries of their own (Lo Giudice 1966).

The following table reports summary statistics to illustrate the situation at the end of 1910 (the choice of year is determined by the availability data from the agricultural census of 1911: see Cohen and Galassi 1990, and Galassi 2000). Part of the issue here is how to define North and South. I am including in the Centre-South some regions that are traditionally seen as closer to Northern levels, such as Tuscany, exclusively because they also had few co-ops.

The data show, first, that in the South farmers were less likely to join, and co-ops were smaller and poorer, than in Northern Italy. However, the gap varies. While Northern co-ops were on average 4.5 times more numerous and 5 times richer than Southern co-ops when standardised by the provin-

Table 1. *Summary statistics of rural co-operative banks in Italy on 31 December 1910, by region, weighted averages of provincial means.*

Areas	Rural co-op banks per 100,000 farm workers	Rural co-op assets per farm worker (current <i>lire</i>)	Assets per rural co-op bank (current <i>lire</i>)	Rural co-op assets per 1,000 <i>lire</i> of savings bank assets
North ^a (n = 30)	24.3 (s.d. = 24.04)	18.52 (s.d. = 4.5)	71,410 (s.d. = 66,395)	27.5 (s.d. = 45.37)
Centre/South ^b (n = 39)	6.8 (s.d. = 7.38)	6.11 (s.d. = 8.63)	43,972 (s.d. = 66,364)	24.16 (s.d. = 71.98)
Centre/South excluding Sicily (n = 32)	5.61 (s.d. = 6.52)	3.66 (s.d. = 3.86)	37,660 (s.d. = 50,722)	20.75 (s.d. = 80.67)

Notes: (n) = Number of provinces. ^a Regions: Piedmont, Liguria, Lombardy, Venetia, Emilia; ^b Regions: Tuscany, Umbria, Latium, Marche, Campania, Abbruzzi, Apulia, Basilicata, Calabria, Sicily, and Sardinia.

Sources: MAIC 1911, 1912; Galassi and Cohen 1994; Galassi 2000.

cial labour force, they were only about twice as rich on a bank-by-bank basis. Secondly, while the means are significantly different in three of the four columns, in all columns Northern data are markedly more clustered than Southern data. Finally, Northern co-ops do not seem markedly more adept at attracting savings deposits than Southern co-ops.²

In principle, the North-South differences in the first two columns of Table 1 (and to a smaller degree in the third) may reflect some variable other than differential 'civic culture'. What are the possible candidates? The difficulty here is that, since most socio-economic indicators in Italy present some form of North-South gradient, quantitative tests might well produce seemingly solid but actually spurious correlations. The process of elimination must therefore rely on inductive reasoning. There appear to be fundamentally two possible reasons (other than 'civic culture') why the *casse* were more common and prosperous in the North. In the first place, the gap might reflect differing labour productivity in the two areas. Poorer workers save less and may need fewer deposit facilities. Secondly, the gap may reflect the agrarian structure. Since *casse* membership seems to have been fundamentally drawn from among the small landowners, if Southern agriculture was dominated by latifundia farmed with wage-workers it would not be surprising that the *casse* performed less convincingly there. Are there reasons to believe that either factor is the source of the gap?

The answer is, no. First, the productivity gap. As a crude but effective way of testing whether this is the source of the differences in Table 1, the correlation coefficient between co-op assets per worker, number of *casse*, and labour productivity in agriculture by province (Cohen and Galassi 1990 for methodology) is reported in Table 2.

When these coefficients are positive, they are also strikingly small. In one case, the relation is actually negative, though very weak. This is not surprising: rural co-ops were particularly common in North-Eastern Italy, where output per worker was low (Cohen and Galassi 1990). In any event, there was evidently something other than the productivity gap at work.

Could then landownership structures account for the differences? The 1911 Census reports that 64.4 per cent of Southern farm workers aged ten and over were wage earners and 11.6 per cent were owner-operators, as

² The fourth column of the table does not include post office accounts, because there are methodological difficulties in these data as it makes little sense to compare bank assets with savings accounts, which is what the post office data report. A direct comparison of savings accounts in both banks and the post office is made impossible by the way in which the Ministry published the bank data, reporting different kinds of deposits together. However, it has to be noted that post office savings deposits were higher in Northern Italy than in the South, so that by excluding them I am in fact overestimating the share of the savings market the co-ops had in the North by a greater margin than elsewhere. The relative ability to attract savings of Southern co-ops is therefore *under-represented*.

opposed to 44.1 per cent and 25.3 per cent in the North (MAIC 1912). Even accepting these figures at face value, the gap in the relative incidence of owner operators is simply not large enough to account for the differences outlined in Table 1. Northern owner operators were just over twice as frequent as Southern owners, while the gap in the incidence of co-ops per farm worker is in the order of 3.6 to 4.3 times greater in the North. Furthermore, there are good reasons to believe that the 1911 census greatly underestimated the number of farm owners in the South (Galassi and Cohen 1994). Finally, even in those areas in the North where landownership was concentrated (the region of Piedmont), there were 14 to 16 *casse* per 100,000 farm workers, a figure rarely attained in the South.

One way to interpret these facts is that in the South there was a co-ordination failure in the initial set up of these co-ops: once a *cassa* was in operation and demonstrated its reliability, depositors came forth in the South as much as in the North. The stumbling block was finding people willing to sign the original incorporation and manage the co-op in the early stages of its existence. Is there other evidence to support this interpretation?

Some telling information does in fact exist. In the 1890s, a number of Catholic newspapers, observing the growing gap between the diffusion of rural co-ops in different areas, suggested setting up a number of 'demonstration' co-ops in Southern Italy. Their incorporation would last for only one year, at the end of which the co-op would be dissolved and any assets distributed among members. It was hoped that this would convince people of the workability of the idea and so they would join 'real' co-ops (Tosti 1996, p. 416). The idea was never tried out because of the high set-up costs associated with incorporation,³ yet the very fact that this proposal was made is consistent with my interpretation of Tables 1 and 2.

Table 2. *Correlation coefficients between provincial output per farm worker and numbers and assets of rural co-operative banks in Italy, 1911.*

Range	Correlation coefficient between number of rural co-operative banks and output per farm worker, by province	Correlation coefficient between rural co-operative bank assets and output per farm worker, by province
All of Italy (n = 69)	0.091	-0.023
Italy exc. Sicily (n = 62)	0.066	0.035

Sources: MAIC 1911, 1912; Cohen and Galassi 1990; Galassi and Cohen 1994; Galassi 2000.

³ In an example of bureaucratic insanity, the articles of incorporation had to be registered with each of four different government offices and published in three different official bulletins, all at the signatories' expense. The process took months.

Other evidence also confirms that the co-ops' poor showing in the South stemmed from the initial co-ordination problem. In 1897 one of the first Catholic *casse* in Southern Italy completed its first year of operation. In their report, the managers thought the experience 'highly satisfactory ... considering local conditions, [people being] still unfamiliar with the functioning of these institutions, still in the grip of mistrust, while at the same time [there is] a great fear after so many bankruptcies, so many frauds, suffered at the hands of dishonest folks' (Di Taranto 1996, p. 529).⁴

Final confirmation of this diffidence should emerge from interest rate data, if they were available, which unfortunately they are not in a systematic way. Some scanty information exists, however, and it is consistent with the idea that these co-ops operated in Southern Italy in a climate of suspicion. Cerruti (1896) complained that the cost of raising funds in the province of Rome was so high that local *casse* were compelled to charge '9 per cent and more' to remain solvent. Elsewhere in the South, it was difficult to find people who both possessed the skills to manage an undertaking of this sort and at the same time enjoyed the trust of the community. In many areas it was believed that the managers of a co-op would run it for their personal advantage, either to enrich themselves and their families, or as a step to further a political career (Di Taranto 1996, pp. 516–7; Rossi 1977, pp. 332–3; Gallo 1996, pp. 502–3).

Such suspicions just do not appear to have surfaced in the North. Does this difference reflect what Banfield (1958) called 'amoral familism', the idea that the basic organisational criterion of the Italian South was loyalty to one's family, and Putnam (1993) has recently argued was a 'lack of civil culture' in Southern Italy? The co-ops would, in this perspective, be yet another victim of low social capital. Lacking credible mutual engagements, Southerners expected others to defect. Given the cost of others' defection, the prudent Southerner stayed clear of the co-ops.

Appealing though this answer is, one may legitimately ask whether its analytical content is in the end as incisive as it appears. Is 'amoral familism' or 'low trust' really more than a description of the phenomenon under a different guise? There is, after all, a reasonable alternative to this cultural explanation. It may be that the net benefits one could expect from joining a co-op were smaller in Southern Italy. The gap highlighted in Table 1 would then reflect not a lower propensity to engage in co-operative games but the smaller payoffs available from the games themselves. Whether or not this hypothesis is generally true for Southern Italy (or other 'low trust' societies) cannot be answered in this article. All I intend to show in the next two sections is that joining one of these co-ops was not equally rewarding everywhere. To do this, I need to estimate and compare the switching function where joining became attractive in the South and in the North.

⁴ The bankruptcies referred to are those of the 1893 financial crisis, which did not involve co-ops.

2. To join or not to join: a simple model

This section models the decision to join a co-operative lender of the kind described above. I am not concerned here with the design of the co-operative, its policies or investment decisions (Braverman and Guasch 1989; Banerjee *et al.* 1994). Rather I am trying to establish under what circumstance a rational decision-maker would 'switch' from not joining to joining, and thereby gain access to cheaper credit but also accept the risk of defection by other members, which would rebound against them because of the unlimited liability clause. This will allow me to define a switching locus in relation to 'trust,' which can be estimated for the *casse rurali* in different parts of Italy in 1911 (Section 3).

Assume that capital is discontinuous, and that a representative individual has an investment project costing x with probability π of yielding ρ and $(1 - \pi)$ of yielding 0.⁵ This individual has net wealth w , assumed to be in fixed assets complementary to the inputs that have to be purchased with x to carry out the investment,⁶ such that $w < x$. This, plus the usual assumptions about asymmetric information and unobservability, means that the individual will find it difficult, and probably impossible, to obtain credit in the 'formal' market. A local moneylender, with informational advantages unavailable to 'formal' lenders (Galassi 1996), is willing to finance the project at interest rate r_f . The potential borrower has to choose between this form of financing, and joining a cooperative of m members. At any one time, n ($< m$) members borrow from the co-op, so that a credit note is issued on the market for the amount X ($\equiv nx$). Each member pays the same interest rate i . The co-op raises X by offering a competitive interest rate r . I assume that the co-op is not a profit maximiser, but that it will choose the lowest possible i consistent with meeting its obligations (repay $(1 + r)X$ at maturity: Galassi 1996). This in effect means that the co-op must *ex ante* set what it expects to receive from its borrowing members to be at least equal to its obligations in the capital market. Using γ to indicate the proportion of m who are expected to repay their loans, this means that

$$\pi\gamma(1 + i)X = (1 + r)X + A \quad (1)$$

where A indicates the change in amount of reserves the co-op will hold at the end of the period. Note that π is now indicating the probability of the average investment project paying off. If, *ex post*, $\pi\gamma(1 + i) > (1 + r) + A/X$, the difference is assumed to become part of reserves A . If, on the other hand, receipts turn out to be lower than commitments, the co-op is assumed to reduce first reserves and then, once $A = 0$, to call upon the assets of members to make up the shortfall. Hence:

⁵ Probability π is assumed to be exogenous, that is, not affected by agent's efforts or skill.

⁶ One way to think about this is that the investor owns land and some tools, but has no capital to finance an irrigation project or the purchase of a machine.

$$i = \frac{1 + r + \frac{A}{X}}{\pi\gamma} - 1. \quad (2)$$

Two points need to be emphasised here. The first is that A/X is an endogenous ratio because, once i is set, the *ex post* values of π and γ will determine A . *Ex ante*, the co-op can ‘aim’ for a particular value of A/X by choosing i . It then seems reasonable to expect that co-ops that operated in areas where they had difficulty attracting funds (that is, r was high) would try to aim for as low an A/X ratio (that is, choose as low an i) as possible. This is borne out by the data (Section 3).

The second point is that I am somewhat artificially separating π and γ . In reality, of course, the two are difficult to distinguish, in that borrowers may behave strategically by applying less diligence to a project than would be desirable from the lender’s viewpoint (Stiglitz and Weiss 1981). More generally, the co-op’s return is assumed to be unrelated to the interest rate it charges. This is of course a simplification, but it should not affect the results discussed in Section 3 provided that interest rates charged by co-ops did not differentially affect realised returns in different parts of the country. In any event, as I outlined earlier, the evidence is that defaults by members were extremely rare, so that if there was strategic behaviour in this sense it appears to have been quantitatively insignificant.

In a complete model, a borrower wishing to join a co-op offering loans at i would have to invest resources into acquiring a positive reputation (Dasgupta 1988). In this simple framework, however, I treat reputation as given, and focus instead on whether an individual would find joining to be an attractive proposition. This individual will evaluate the net benefit (B) of joining by setting the reduction in borrowing costs against, first, the value of inputs which will have to be provided free to the co-op, and, second, against the probability of default by other co-op members. Using λ for the value of inputs a member will have to devote to the co-op and s for his/her share of any defaulting members’ repayment, B can be written as

$$B = (i - r_l)x - \lambda - s \quad (3)$$

where:

$$s \equiv \frac{(1 - \pi\gamma)nx(1 + i)}{m - (1 - \pi\gamma)n}. \quad (4)$$

Substituting (2) and (4) into (3) and setting $B=0$ yields

$$\pi^2\gamma^2 + \left(\frac{m}{n} - 1\right)\pi\gamma - \frac{1 + r + \frac{A}{X}}{1 + r_l - \frac{\lambda}{x}} \frac{m}{n} = 0. \quad (5)$$

This quadratic form defines a locus in $[\pi, \gamma]$ space along which a rational actor will switch from wishing to remain outside the co-op and incur high

borrowing costs to wishing to join. Solving for γ , and noting that only the positive root is of interest in this context, yields

$$\gamma(B = 0) = \frac{1 - \frac{m}{n} + \sqrt{\left(\frac{m}{n} - 1\right)^2 - 4 \frac{1 + r + \frac{A}{X} m}{1 + r_l - \frac{\lambda}{x} n}}}{2\pi} \quad (6)$$

This solution is important and warrants some discussion. In effect, $\gamma(B=0)$ represents the minimum proportion of co-op members whom an individual must trust in order to be strictly indifferent *ex ante* between joining and not joining. I will denote this by γ^* . For any π , if $\gamma > \gamma^*$, the individual is *ex ante* unequivocally better off by becoming a member. Note that γ^* is a decreasing hyperbolic function of π , the exogenous probability that the ‘average’ investment project will actually pay off. This is reasonable, as the riskier the natural environment is (recall the *casse* were rural lenders), the greater the trust in other co-op members must be in order to find joining attractive. However, while the hyperbole is defined by π , its actual position in $[\pi, \gamma]$ space is affected by ‘structural’ variables: the m/n ratio, relative interest rates (r_l and r), the cost of resources devoted by members to co-op affairs relative to loan size (λ/x), the co-op’s ratio of assets to loans (A/X). The combinations of $[\pi, \gamma]$ which result in $\gamma > \gamma^*$ I will call the ‘feasible set’ and denote by **F**.

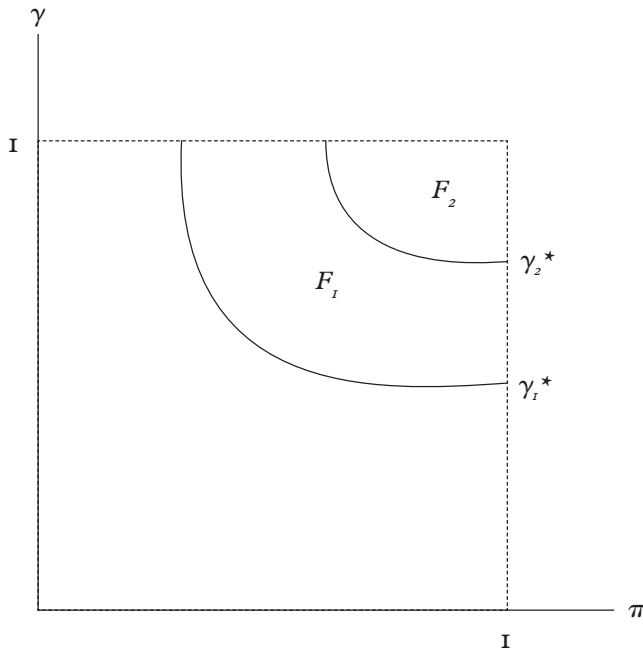


Figure 1. The feasible sets in $[\pi, \gamma]$ space.

The diagram illustrates different feasible sets. For an individual facing combination F_1 with γ_1^* , becoming a member of the co-op is welfare-improving *ex ante*, and participation will be attractive. If, however, what I am calling structural factors (changing relative interest rates, or increased demands on co-op members' resources) shift the switching locus to γ_2^* , F_1 will drop out of F , while combination F_2 will still be inside. The point is that joining a *cassa* was not unambiguously desirable: membership paid *ex ante* only for some parameter values.

The attractiveness of this formulation, simple though it is, is that it allows me to test the cultural explanation for varying responsiveness of Italian farmers to the *casse rurali*, and therefore, by implication, the Banfield-Putnam 'low social capital' view of Italy's poor South. I argued in Section 1, and elsewhere (Galassi 2000), that the problem in the South was that farmers were not willing to join, though if a co-op could get on its feet it was by most standards successful. The test therefore hinges on defining the *ex ante* size of feasible sets for farmers in Northern (F_n) and Southern (F_s) Italy. There are two possibilities. First, if $F_n > F_s$, the low success rate of Southern *casse rurali* may be the result of fewer feasible combinations existing in the South than in the North because of structural factors. This would cast serious doubt on the cultural explanation. Of course it may be that F_s is smaller than F_n by a factor greater than the gap in the relevant parameter of comparison. For example, the North's feasible set could be twice as big as the South's but the North might have more than twice as many *casse*. In this case, farmers in the South faced more stringent constraints than their Northern compatriots, but may still be said not to have made the best of existing opportunities for co-operative behaviour, which would point to a modified cultural explanation. If, on the other hand, $F_n \leq F_s$, the implication would be that Southern farmers failed to take advantage of the same (or greater) opportunities than their Northern cousins. This would provide support for the cultural explanation.

The idea underpinning this view is that the greater is F , the greater the probability of a co-op being set up. This does not mean that at a particular time and space all possible combinations implied in a given F will have been exploited. There is, in other words, no reason to deduce optimality from particular observed outcomes, even if such a concept could be unambiguously defined in this case. The point is simply relative performance: given the North as a benchmark, did the South behave in proportion?

Before proceeding with a numerical test, it is imperative to make clear what would constitute evidence of equal or different F . I will consider $F_n = F_s$ if $\gamma_n^* = \gamma_s^*$ for the same value of π , because this implies that the *position* of hyperbolic function dictated by structural variables is the same in the North as in the South. If, on the other hand, $\gamma_n^* < \gamma_s^*$ for the same value of π , this will constitute unambiguous evidence that $F_n > F_s$. The interpretation of this result is that Northern *casse* were more common because it was

easier in the North to find the correct combination of structural variables to set up a co-operative. Putting this differently, Northerners could establish a successful co-op with greater *ex ante* tolerance for defection than could Southerners. In this case, culture becomes of doubtful value as an explanation of differential success.

The simple framework outlined in this section has a number of shortcomings. The most important is that the assumptions and specifications necessary to arrive at a computable formulation of F may affect the actual results. Measurement error in official data used to compute γ^* also cannot be ruled out. In addition, actors are depicted as engaging in a once-off game, no attempt is made to model the decision to defect, and reputational issues, repetitive interaction, evolutionarily stable solutions, and risk aversion, are among the many issues not brought to the fore here.

The results outlined below must, therefore, be taken with a great deal of care, because while they are indicative and convincing so far as they go, they are not necessarily free from biases. Equally true, however, is that no reason is immediately apparent why any possible bias should affect North and South differentially, and it is on the differences in the outcomes of the two areas that the contribution of the article rests. The framework does have one decided advantage, which is that the limited data available for Italian co-ops at the beginning of the twentieth century permit the estimation of the feasible set for this kind of institutional arrangement in different parts of the country. In the next Section I estimate the values of γ^* for different areas in 1911.

3. A measure of trust

The Credit Inspectorate of the Ministry of Agriculture was responsible for collecting the balance sheets of *casse rurali* before the 1926 reforms. The Inspectorate issued detailed guidelines on the form the return had to take, and non-filing *casse* could have their licences suspended. In practice, however, only about two in three co-ops bothered to send their balance sheets to the Inspectorate, and many seem never to have sent one, without suffering any adverse consequence. In addition, those balance sheets that were sent did not always conform to Ministry guidelines, so data are often inconsistent. The Inspectorate published the returns, such as they were, in a bulletin (MAIC 1911), listing the number of *casse* in existence per province and the number considered 'active' (though there appears to be no clear definition of what this meant). The same publication also reported balance sheet highlights, usually the value of capital, reserves, and the amount of loans and deposits (though not their number). No membership data were collected.

The Inspectorate's bulletin for 31 December 1910 constitutes the source of data used to estimate γ^* . The choice of date was dictated by the need to

have observations close to a census (one was taken in June 1911: MAIC 1912, Galassi and Cohen 1994) and yet refer to as dormant a time of the agricultural year as possible to prevent different local farming cycles from affecting relative values. This in effect leaves only the winter months. While other dates would have served as well, the number of *casse* returning their balance sheets in the early months of 1911 or December 1911 were found to be considerably fewer than the 719 out of 1,144 ‘active’ ones of late 1910. Even so, inconsistencies in information provided by the *casse* mean that for only 28 out of 30 Northern provinces, and 20 out of 39 Centre and Southern ones, can the value of γ^* be computed. Still these 48 provinces accounted for 70 per cent of Italy’s provinces, 73 per cent of farmland, and 78 per cent of farm labour (ISTAT 1910–4).

Aside from inconsistencies or gaps in the dataset, two objections may be raised against using these data to estimate F_n and F_s . In the first place, the existence of a rural co-operative lender in a Southern province means that the original co-ordination problem had been solved, at least once. It is then difficult to see how comparing the F estimated from existing co-ops can give an insight into why in other areas of the South the co-ordination problem had *not* been solved. The very nature of the data may bias the results toward the (possibly incorrect) finding that $F_n = F_s$. The weakness in this objection is that if the economic or natural environment in the South made it less attractive to join a *cassa* than in the North, the estimated γ^* should still give a higher value whether or not co-ordination had been achieved. Putting it differently, successful co-ordination should not change the *size* of F . The link flows the other way: the size of F makes co-ordination more or less easy.

Secondly, and more generally, γ^* is an *ex ante* value, but of course all I can estimate is an *ex post* value, which I will call g^* . It may be, first, that $\gamma^* = g^*$, in which case my estimation accurately represents this choice faced by Italian farmers. However, if $\gamma^* < g^*$, that is if the feasible set was at the time believed to be greater than it proved to be, some individuals would join even though they *ex post* would have benefited from staying out. Lastly, if $\gamma^* > g^*$, the feasible set was underestimated at the time and individuals did not join who would have benefited. Because the value of γ^* cannot now be estimated, how can we be sure that the value of g^* is really giving an insight into the choices faced by these farmers 90 years ago?

Referring back to equation (6) above, some variables involved in calculating γ^* would have been in the public domain, namely the rates charged by the co-op, r , the rates charged by moneylenders, r_p , exogenous risk π , and m , membership in the co-op. Variables that may have been more difficult to observe were those ‘internal’ to the co-op, that is the number of loans made, n , the reserve to loan ratio A/X , and the demands made on members’ time, λ/x . None of them would have been actually impossible to find if inquiries were made, however: certainly the reserve deposit ratio was published in the Ministry bulletin, and the other two could have been gathered by asking

members of the co-op. The information available was therefore substantially the same as that which can be collected to-day, except for π , which was assuredly known in a general way to the farmers at the time, while the actual outcome of the upcoming harvest, known today thanks to official output data, was unknown at the time. No way around this exists⁷ except to estimate g^* in the form of ranges of values, calculated by taking into account other evidence as discussed below.

One last point needs to be made before the actual data are discussed: the issue at hand is not whether *ex ante* estimates of γ^* made at the time were revealed as accurate (that is, whether $\gamma^* = g^*$). The point is rather whether, given a reasonable approximation to γ^* , behaviour in Northern and Southern Italy was consistent with these values. If g^* in the South is not significantly different from g^* in the North, then the differences described in Table 1 must be of cultural origin.

Of the variables in equation (6), two can be derived directly from Ministry publications: the reserve/loan ratio (A/X) and the rate co-ops paid to raise funds (MAIC 1910, 1911). It is important here to return to the issue of A , the reserves accumulated by the co-op. As stated in Section 2, A is really the *change* in reserves. However, the variable only enters into the estimation of g^* as a ratio (A/X). While the year to year change in reserves can only be calculated for a handful of co-ops, therefore, what matters is that the A/X ratio should be accurate, that is, that reserves should change proportionally to loans. In all cases where the year to year change in reserves can be calculated, the A/X is remarkably constant (varying by less than 1.5 per cent). Thus the ratio is, if not wholly exact, certainly accurate enough. Data on money market rates paid by the co-ops are available in the Ministry bulletin that reported data on savings banks by province (MAIC 1910).

Of the other variables, the probability of the average investment project financed by a co-op being successful (π) is more involved, and its estimation is described in detail in the Appendix. Suffice it to say that, as calculated, π represents the probability that the average farmer in the 48 provinces could meet repayment of the estimated average loan at current interest rates given the (known) riskiness of crops in that area. The problem with this measure is that it reflects a province-wide risk measure because of course crop fluctuations on the land farmed by co-op borrowers are not observable. This may well result in an underestimate of π , which however does not matter to the overall relative results for different areas provided underestimation does not systematically vary with locality.

The ratio of members to borrowers in each co-op (m/n) is not available, yet contemporary evidence from Germany suggests that values of 2.5 to

⁷ In principle I could use the outcome of previous years' harvests with adjustable weights to estimate an expected value of π . The problem here is that Ministry data do not report long enough data series prior to 1910 to allow me to do so.

1.67 would be reasonable. Guinnane (1997) found that between 44 and 64 per cent of farmers in two German co-operatives he studied in this period took out loans within the first six months of operation, and between 51 and 71 per cent borrowed in the first two years. Virtually the same value (2.38) results from the only case I am aware of where both membership and borrowers can actually be counted, that of the *cassa* in Treviglio (1899).

The λ/x ratio, resources owned by members but provided free of charge to the co-op as a fraction of the value of the loan, is simply unknown, and I have somewhat arbitrarily chosen two values, 0 and 0.05. The first suggests that prospective members would not expect to be asked to help run the co-op in the early stages of their membership. The second is based on the average loan value derived from MAIC (1911) and Caputo (1989, p. 38). This gives an estimated average loan of between 300 and 400 *lire* in 1911. If λ/x is set at 0.05, given that agricultural wages for adult males were 2.10 *lire/day* at the time (Zamagni 1993, 199, Table 6.4), this implies that the average member devoted between seven and ten full days per year to help run the co-op. This seems a reasonable amount, considering that this time was most likely spread over several months. Adjusting this estimate upwards, in any event, makes no difference to the relative standing of co-ops from different areas.

Finally, data on r_p rates charged by local moneylenders are difficult to find. While the complaints about 'usurious' borrowing costs were widespread at the time (Lorenzoni 1909, Placanica 1990), actual figures are scarce. Some evidence, however, suggests that 40 per cent was a reasonably typical rate in the South (Lorenzoni 1909, p. 708). This rate, which is in line with current observations from LDC money markets (Gillis *et al.* 1988, p. 512), turns out to be exactly 6.25 times the market rate charged by savings banks in the same area at that time (MAIC 1910). This opens up two possible ways of estimating r_l province by province. One is simply to adopt the same 40 per cent as a national figure in the informal money market. The other is to use the ratio of the informal rate to the known savings bank discount rates in the same province, and estimate the informal market rate for each province by multiplying this ratio by local savings bank rates. Because savings bank rates were lower in the North than in the South, the first method is more questionable, in that it attributes to local moneylenders in the North a greater market power than in the South. The second assumes an equal degree of market power, and is definitely preferable.

Table 3 reports estimates of g^* for the ranges of λ/x [0, 0.05]; and m/n [1.67, 2.5] as discussed. Regional figures have been calculated as follows. On the basis of [6], g^* has been estimated using each individual co-op's A/X and interest rate, the relevant values for parameters λ/x and m/n , and the province-wide estimate of π . The regional figures were then computed by weighing each co-op's g^* by its share of assets in the regional total. To avoid

burdening the article with numbers, the Table only reports minima and maxima in parameter ranges, omitting intermediate values.

Ignoring the last two rows of the Table for the moment, the first conclusion to be drawn is that the feasible sets seem *not* to have been the same in Northern and Southern Italy. With the same parameter values, Southern estimates of g^* are significantly different from the North's: on average, the South registers values some ten standard deviations higher than the North's mean. Interestingly, however, the opposite is not true: Northern values are well within one standard deviation from the South's mean. As in Table 1, Northern values cluster markedly more than Southern ones. Some regions in the South have 'Northern' characteristics, and others are definitely distinct, especially Abruzzo, Sicily and Calabria.

These results suggest that it was objectively more difficult to set up a co-op in Southern Italy, or at least in some Southern regions, than in the North. Southerners needed to trust a greater proportion of their neighbours to find that membership was worth the risk, and thus not surprisingly started fewer co-ops, than their Northern colleagues. The correlation coefficient between the values of g^* in Table 3 and the number of co-ops enumerated by the Ministry (MAIC 1911) varies between -0.21 and -0.25 , depending on the parameter range. This makes sense: the higher the estimated switching point for joining, the more difficult it was to solve the co-ordination problem and organise a co-op.

The source of the North-South difference is intriguing: π values are considerably lower in the South, reflecting the riskier environment. If the average π for the 28 Northern provinces is used when estimating g^* for the 20 Southern ones, as was done in the last two columns of Table 3, the difference, for given values of other parameters, disappears entirely. Southerners had to trust one another more than Northerners not because of 'structural' problems, but because they lived in a riskier area. This is interesting, because it suggests that the Italian capital market was reasonably well integrated in the early twentieth century. Borrowing costs differed (savings bank rates were on average one percentage point higher in Southern Italy) in all likelihood precisely because the South, having an economy still closely tied to the vagaries of weather, faced higher default rates. But it was not just the cost of capital that made starting a *cassa* such a difficult undertaking. The problem was that exogenous risk was higher in Southern Italy.

On closer inspection, however, this interpretation needs to be qualified. In the first place, the correlation coefficient between g^* and the number of co-ops, while it has the 'right' sign, is also rather low. Secondly, if instead of using the national sample the data are disaggregated to calculate the correlation for the 28 Northern provinces and the 20 Southern ones separately, the Northern coefficient is indistinguishable from 0 (-0.0093), and the Southern one is actually positive (0.058), though weak. This is obviously the influence of the particular situation in Sicily, but even without that region

Table 3. Estimates of g^* by region

Regions	Provinces included		Co-ops included		$\lambda/x = 0.05$		$\lambda/x = 0$		$\lambda/x = 0.05$		$\lambda/x = 0$		$\lambda/x = 0.05$		$\lambda/x = 0$	
	out of	total in	out of	total in	$m/n = 1.67$	$m/n = 2.5$	$m/n = 1.67$	$m/n = 2.5$	$m/n = 1.67$	$m/n = 2.5$	$m/n = 1.67$	$m/n = 2.5$	$m/n = 1.67$	$m/n = 2.5$	$m/n = 1.67$	$m/n = 2.5$
North	28/30	571/808	0.8854	0.8463	0.8854	0.8463	0.8835	0.8443	0.8835	0.8443	0.8835	0.8443	0.8835	0.8443	0.8835	0.8443
<i>s.d.</i>			0.0038	0.0041	0.0038	0.0041	0.0663	0.0633	0.0663	0.0633	0.0663	0.0633	0.0663	0.0633	0.0663	0.0633
Piedmont	4/4	67/112	0.8822	0.8432	0.8822	0.8432	0.8831	0.8443	0.8831	0.8443	0.8831	0.8443	0.8831	0.8443	0.8831	0.8443
<i>s.d.</i>			0.0017	0.002	0.0017	0.002	0.0022	0.0023	0.0022	0.0023	0.0022	0.0023	0.0022	0.0023	0.0022	0.0023
Liguria	1/2	3/3	0.8914	0.8497	0.8914	0.8497	0.8939	0.8585	0.8939	0.8585	0.8939	0.8585	0.8939	0.8585	0.8939	0.8585
<i>s.d.</i>			0.0027	0.003	0.0027	0.003	0.0058	0.0086	0.0058	0.0086	0.0058	0.0086	0.0058	0.0086	0.0058	0.0086
Lombardy	8/8	124/181	0.8843	0.8445	0.8843	0.8445	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
<i>s.d.</i>			0.0025	0.0024	0.0025	0.0024	0.8869	0.8486	0.8869	0.8486	0.8869	0.8486	0.8869	0.8486	0.8869	0.8486
Venetia	8/8	337/408	0.8847	0.846	0.8847	0.846	0.024	0.036	0.024	0.036	0.024	0.036	0.024	0.036	0.024	0.036
<i>s.d.</i>			0.0027	0.003	0.0027	0.003	0.9238	0.86	0.9238	0.86	0.9238	0.86	0.9238	0.86	0.9238	0.86
Emilia	7/8	40/104	0.8897	0.8515	0.8897	0.8515	0.0057	0.0061	0.0057	0.0061	0.0057	0.0061	0.0057	0.0061	0.0057	0.0061
<i>s.d.</i>			0.0039	0.0044	0.0039	0.0044	0.8849	0.8454	0.8849	0.8454	0.8849	0.8454	0.8849	0.8454	0.8849	0.8454
Centre/South	20/39						0.0027	0.0012	0.0027	0.0012	0.0027	0.0012	0.0027	0.0012	0.0027	0.0012
<i>s.d.</i>							0.8857	0.8457	0.8857	0.8457	0.8857	0.8457	0.8857	0.8457	0.8857	0.8457
Tuscany	2/8						0.003	0.0014	0.003	0.0014	0.003	0.0014	0.003	0.0014	0.003	0.0014
<i>s.d.</i>							n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Marche	3/4						0.9505	0.908	0.9505	0.908	0.9505	0.908	0.9505	0.908	0.9505	0.908
<i>s.d.</i>							0.0671	0.0631	0.0671	0.0631	0.0671	0.0631	0.0671	0.0631	0.0671	0.0631
Umbria	0/1						0.9365	0.896	0.9365	0.896	0.9365	0.896	0.9365	0.896	0.9365	0.896
<i>s.d.</i>							0.0634	0.061	0.0634	0.061	0.0634	0.061	0.0634	0.061	0.0634	0.061
Latium	1/1						n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
<i>s.d.</i>							0.9238	0.86	0.9238	0.86	0.9238	0.86	0.9238	0.86	0.9238	0.86
Abbruzzi	2/4						0.8877	0.8509	0.8877	0.8509	0.8877	0.8509	0.8877	0.8509	0.8877	0.8509
<i>s.d.</i>							0.0054	0.0045	0.0054	0.0045	0.0054	0.0045	0.0054	0.0045	0.0054	0.0045
Campania	3/5						0.8834	0.8463	0.8834	0.8463	0.8834	0.8463	0.8834	0.8463	0.8834	0.8463
<i>s.d.</i>							0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004
Apulia	2/3						0.8831	0.846	0.8831	0.846	0.8831	0.846	0.8831	0.846	0.8831	0.846
<i>s.d.</i>							0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
Basilicata	0/1						n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Calabria	2/3						0.8862	0.8494	0.8862	0.8494	0.8862	0.8494	0.8862	0.8494	0.8862	0.8494
<i>s.d.</i>							0.0023	0.0025	0.0023	0.0025	0.0023	0.0025	0.0023	0.0025	0.0023	0.0025
Sicily	5/7						0.8863	0.8494	0.8863	0.8494	0.8863	0.8494	0.8863	0.8494	0.8863	0.8494
<i>s.d.</i>							0.0045	0.005	0.0045	0.005	0.0045	0.005	0.0045	0.005	0.0045	0.005
Sardinia	0/2						n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
<i>s.d.</i>							0.0045	0.005	0.0045	0.005	0.0045	0.005	0.0045	0.005	0.0045	0.005

Notes: (a): Simulation of g^* for the South using the mean value of π for the Northern provinces. *s.d.* = standard deviation.

the value falls to 'only' -0.079 . Thirdly, inspection of Table 3 will reveal that while the values of g^* cluster in the North, the number of co-ops reported by the Ministry varies widely.

Finally, and most importantly, there is no denying that any North-South differences are small. The gaps are also extremely sensitive to specific parameter values. If Southern co-ops imposed fewer demands on their members or financed fewer loans, the gap with the North, even with the higher π values for the South, tends to disappear. Southern co-ops appear to have been aware of this: the A/X ratio is lower on average in the Centre-South than in the North (the lower A/X , the lower is g^*). They were, in other words, trying to make joining as easy as possible. This confirms what has already been mentioned in Section 1, that while co-ops seemed to have trouble starting in the South, they performed as well as those in the North once they were in place. The obstacle was breaking down initial diffidence.

The reason for that diffidence is therefore the heart of the matter. A culture of mistrust is the obvious candidate, and the estimates certainly make it difficult to exclude that out of hand. No discussion of the Italian South is complete without invoking yet again the centuries of mismanagement at the hands of various foreign rulers, and the clan-oriented, fractured society that resulted from subjection to an authority that was perceived as alien and interested only in extracting rents. But what appears out of the present analysis is a slightly different picture, one that remains to be confirmed but is nonetheless potentially just as important as more orthodox historical accounts. In a risky environment with imperfect information, the uncertainty involved in entering into any co-operative game is compounded by the difficulty in determining whether any specific outcome is due to non-co-operative behaviour on the part of other players or just 'unlucky' circumstances. In these conditions, evolutionarily stable co-operative behaviour may be difficult to arrive at. All evolutionarily stable strategies, such as those studied by Nowak and May (1995) and Boyd (1992), depend on there being *ex post* no uncertainty concerning the actions of other players. Retribution or further co-operation can then be meted out depending upon whether others have defected. But if defection is difficult to separate from ill luck, it may be in a player's interest in the long run not to engage in co-operative games at all except where information channels are very efficient and/or repeated engagement on several simultaneous fronts reduces the probability of defection to very low values. Aside from lowering the odds of suffering defection by keeping engagement within narrowly confined lines, a player would also avoid the problem of mistaking ill luck for defection, and thereby arousing ill-will in other, innocent but unlucky, players, which may then make future co-operative engagement even more difficult. It would be hard to find a clearer rationale for Banfield's 'amoral familism'.

The link between high exogenous risk and a culture of low trust remains of course to be proven in theoretical work, and this is not the place to pursue

it. But what the numerical exercise reported in Table 3 has shown is that there was indeed a difference between the choices faced by Southern and Northern Italians, and that this difference was not, or not wholly, man-made. To overcome the less predictable environment they lived in, Southerners had to accept a stricter discipline than their colleagues in Northern Italy. Whether this was at all possible given the culture that may have been engendered by that very environment has to remain for the present at least a moot point. But the evidence is reasonably clear that they lived under different objective constraints, and if as a result they adopted strategies that appear in retrospect to have damaged their chance of development, invoking 'culture' as if it were a 'first mover' cannot suffice as an explanation. Their reaction to the *casse rurali* strongly suggests that they faced different opportunities, and these may have done more to shape their choice set than conventional histories give them credit for.

4. Conclusion

The answer to the riddle of the poor South goes well beyond the scope of this article. Still, the results presented here are challenging. North and South faced constraints that appear, with the necessary qualifications due to poor and incomplete data, to have been sufficiently different for Southerners to be at a disadvantage even if their cultural baggage had been identical. To make a *cassa rurale* an attractive proposition, the data suggest that Southerners had to trust a higher proportion of their neighbours than their Northern compatriots. This was not uniformly true: there were areas in the South where the parameters suggest that it would have been as easy (or difficult) to set up viable co-ops as in the North. Yet the gap is there overall. At one level this is further evidence that Italy's underdeveloped area was not a uniform backward economy, but varied substantially from place to place, something that contemporary studies on the South have emphasised repeatedly (Lumley and Morris 1997). In a different way, however, the article opens a research agenda on the economics of persistent backwardness whenever this has been explained as the result of cultural factors. Culture, understood as a set of probabilities favouring a type of outcome over another, may simply be the adaptation of behaviour and expectations to objective constraints. If Southern Italians found that the payoffs to co-operative engagement were subject to a great deal of 'noise', it would not be surprising that they chose to limit co-operation to those social relations in which noise could more easily be detected. This approach to a low trust equilibrium does not dispense with the specific historical background of the Italian South. History, on the contrary, retains its weight, but equally it is true that other areas in the developed world have been misgoverned for long periods of their history and have not necessarily ended up in a position such as the *Mezzogiorno*. Besides, the very ease with which foreign powers were

able at different times to take over Southern Italy may itself be a reflection of the same basic disinclination of Southerners to co-operate in the provision of a public good (defence). In any event, appealing to the explanatory power of culture as if it were an immutable given may, in fact, hide more than it reveals, and may even deflect attention from the logic that underlies particular attitudes.

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References

- A'HEARN, B. (2000). Could Southern Italians cooperate? Banche Popolari in the Mezzogiorno. *The Journal of Economic History* **60**, pp. 67–93.
- ABRAMOVITZ, M. (1986). Catching up, forging ahead and falling behind. *The Journal of Economic History* **46**, pp. 385–406.
- AGOSTINI, F. (1985). Leone Wollemborg (1859–1932), pioniere del credito agrario. In G. Zalin, *Un secolo di cooperazione di credito nel Veneto: le Casse rurali ed artigiane 1883–1983*. Padova: Signum.
- ARROW, K. J. (1972). Gifts and exchanges. *Philosophy and Public Affairs* **1**, pp. 343–62.
- BANERJEE, A. V., BESLEY, T. and GUINNANE, T. W. (1994). Thy neighbor's keeper: the design of a credit cooperative with theory and a test. *Quarterly Journal of Economics* **109**, pp. 491–515.
- BANFIELD, E. C. (1958). *The Moral Basis of a Backward Society*. Glencoe, IL: Free Press.
- BASU, K. (1995). Civil institutions and evolution: concepts, critique and models. *Journal of Development Economics* **46**, pp. 19–33.
- BERMOND, C. (1996). L'area piemontese e valdostana: un progetto di modernizzazione. In S. Zaninelli (ed.), *Mezzo Secolo di Ricerca Storica sulla Cooperazione Bianca*, vol. I. Verona: Società Cattolica di Assicurazione.
- BESLEY, T., COATE, S. (1995). Group lending, repayment incentives, and social collateral. *Journal of Development Economics* **46**, pp. 1–18.
- BESLEY, T., COATE, S. and LOURY, G. (1993). The economics of rotating savings and credit associations. *American Economic Review* **83**, pp. 792–810.
- BONELLI, F. (1971). *La crisi del 1907*, Torino: Einaudi.
- BOF, F. (1996). L'area friulana e giuliana: una capillare diffusione di esperienze a supporto dell'economia agricolo-pastorale. In S. Zaninelli (ed.), *Mezzo Secolo di Ricerca Storica sulla Cooperazione Bianca*, vol. I. Verona: Società Cattolica di Assicurazione.

- BOYD, R. (1992). The evolution of reciprocity when conditions vary. In A. H. Harcourt and F. B. M. deWaal (eds), *Coalitions and Alliances in Humans and other Animals*. Oxford: Oxford University Press.
- BRANZOLI-ZAPPA, E. and MAZZA, L. (1907). *Manuale Bancario. Annuario delle Banche e del Capitale*. Roma: Scotti.
- BRAVERMAN, A. and GUASCH, J. L. (1989). Institutional analysis of credit cooperatives. In P. K. Bardhan (ed.), *The Economic Theory of Agrarian Institutions*. Oxford: Clarendon.
- BRESOLIN, P. (1980). Il contributo delle casse rurali lombarde all'agricoltura locale (1886–1926). *Bollettino dell'Archivio per la Storia del Movimento Sociale Cattolico in Italia* 15, pp. 126–49.
- CAFARO, P. (1985). *Per una Storia della Cooperazione di Credito in Italia. Le Casse Rurali Lombarde (1883–1963)*. Milano: Franco Angeli.
- CAFARO, P. (1996). L'area lombarda: l'alternativa cooperativa nella regione a più intenso sviluppo economico del paese. In S. Zaninelli (ed.), *Mezzo Secolo di Ricerca Storica sulla Cooperazione Bianca*, vol. 1. Verona: Società Cattolica di Assicurazione.
- CAPUTO, L. (1989). *Cento e più anni di Storia e di Statistica nel Contesto delle Casse Rurali ed Artigiane Italiane*. Cosenza: Patitucci.
- CAROLEO, A. (1986). *Il movimento cooperativo in Italia nel primo dopoguerra 1918–1922*. Milano: Franco Angeli.
- CERRUTI, L. (1896). Il credito agrario in Provincia di Roma. *La Cooperazione Popolare. Rivista del Movimento Cooperativo Cattolico* 2, p. 4.
- COHEN, J. S. and GALASSI, F. L. (1990). Sharecropping and productivity: 'feudal residues' in Italian agriculture, 1911. *The Economic History Review* 43, pp. 646–56.
- COOPERAZIONE (several years). *La Cooperazione Popolare. Rivista del Movimento Cooperativo Cattolico*.
- COLEMAN, J. (1990). *Foundations of Social Theory*. Cambridge, MA: Harvard University Press.
- DARLING, M. L. (1922). *Some Aspects of Co-operation in Germany, Italy and Ireland*. Lahore: Punjabi Government Printing Office.
- DASGUPTA, P. (1988). Trust as a commodity. In D. Gambetta (ed.), *Trust*. Oxford: Blackwell.
- DE MATTIA, R. (1967). *I Bilanci degli Istituti di Emissione Italiani, 1845–1936*; vol. 2, part 1. Roma: Banca d'Italia.
- DI TARANTO, G. (1996). L'area del Mezzogiorno continentale. In S. Zaninelli (ed.), *Mezzo Secolo di Ricerca Storica sulla Cooperazione Bianca*, vol. 2. Verona: Società Cattolica di Assicurazione.
- DISTRIBUZIONE (1915). *La distribuzione del Credito nelle Casse Rurali* 22.
- FEDERICO, G. (1992). Il valore aggiunto dell'agricoltura. In G.M. Rey (ed.), *I Conti Economici dell'Italia: Una Stima del Valore Aggiunto per il 1911*. Roma: Laterza.
- GALASSI, F. L. (1996). Screening, monitoring and incentives in co-operative banks: the case of Italy's casse rurali, 1883–1926. Discussion Paper in Economic and Social History, no. ESH96/2. The University of Leicester.
- GALASSI, F. L. (2000). A measure of culture: trust and defection in southern Italy. In M. Casson and A. Godley (eds), *Culture and Economic Growth*. Berlin: Springer Verlag.

- GALASSI, F. L. and COHEN, J. S. (1994). The economics of tenancy in early twentieth century Southern Italy. *The Economic History Review* 47, pp. 585–600.
- GALLO, M. (1996). L'area laziale: tra stagnazione e nuovo protagonismo. In S. Zaninelli (ed.), *Mezzo Secolo di Ricerca Storica sulla Cooperazione Bianca*, vol. 2. Verona: Società Cattolica di Assicurazione.
- GIGLIOBIANCO, A. (1996). Banche locali negli anni 50: nascita e attività. *Cooperazione di Credito* 48, pp. 319–26.
- GILLIS, M., et al. (1992). *The Economics of Development*, 3rd edn. New York: Norton.
- GLAESER, E. L., LAIBSON, D., SCHEINKMAN, J. A., and SOUTTER, C. L. (1999). What is social capital? The determinants of trust and trustworthiness. NBER Working Paper 7216.
- GUESLIN, A. (1984). *Le Crédit Agricole*. Paris: Economica.
- GUINNANE, T. W. (1994). A failed institutional transplant: Raiffeisen's credit cooperatives in Ireland, 1894–1914. *Explorations in Economic History* 31, pp. 38–61.
- GUINNANE, T. W. (1997). Cooperatives as information machines: German agricultural credit cooperatives 1883–1914. Discussion Paper 97–20, Institute of Economics, University of Copenhagen.
- ISTAT, Istituto Centrale di Statistica (1910–14). *Annuario Statistico Italiano*. Roma: Istituto Poligrafico dello Stato.
- ISTAT, Istituto Centrale di Statistica (1976). *Statistiche storiche dell'Italia 1861–1975*. Roma: Istituto Poligrafico dello Stato.
- LA LOGGIA, E. (1914). *Il Movimento Cooperativo Agricolo in Sicilia*. Agrigento: Licudi.
- LANZAVECCHIA, R. (1986). Per una storia della cooperazione bianca nel basso Piemonte. *Quaderni del Centro Studi Carlo Trabucchi* 9, pp. 165–98.
- LEONARDI, A. (1996). L'area trentino-tirolese: la regione a più forte sviluppo cooperativo d'Europa. In S. Zaninelli (ed.), *Mezzo Secolo di Ricerca Storica sulla Cooperazione Bianca*, vol. 1. Verona: Società Cattolica di Assicurazione.
- LO GIUDICE, G. (1966). *Agricoltura e credito nell'esperienza del Banco di Sicilia tra l'800 e il 900*. Catania: Fattorre.
- LO GIUDICE, G. (1996). L'area siciliana. In S. Zaninelli (ed.), *Mezzo Secolo di Ricerca Storica sulla Cooperazione Bianca*, vol. 2. Verona: Società Cattolica di Assicurazione.
- LORENZONI, C. (1909). Sicilia: Relazione del delegato tecnico. Commissione d'Inchiesta Parlamentare, *Relazione della Commissione d'Inchiesta Parlamentare per Accertare le Condizioni dei Lavoratori della Terra nelle Province Meridionali e in Sicilia*, vol. 6. Roma: Bertero.
- LUMLEY, R., and MORRIS, J. (1997). *The New History of the Italian South: The Mezzogiorno Revisited*. Exeter: University of Exeter Press.
- MAIC (1910). Ministero dell'Agricoltura, Industria e Commercio, Direzione Generale del Credito della Previdenza, della Cooperazione e delle Assicurazioni, Ispettorato degli Istituti di Credito e della Previdenza. *Bollettino delle Casse di Risparmio Ordinarie. Situazione al 31 dicembre 1910*. Roma: Bertero.
- MAIC (1911). Ministero dell'Agricoltura, Industria e Commercio, Ispettorato Generale del Credito e della Previdenza. *Bollettino ufficiale delle società per azioni: situazioni mensili delle società che hanno per principale obiettivo l'esercizio del credito* 23 (12). Roma: Bertero.

- MAIC (1912). Ministero dell'Agricoltura, Industria e Commercio, Direzione Generale della Statistica, Ufficio del Censimento. *Censimento 1911: Relazione*. Roma: Bertero.
- MATTESINI, F. and QUINTIERI, B. (1997). Italy and the Great Depression: An Analysis of the Italian Economy, 1929–1936. *Explorations in Economic History* 34, pp. 265–94.
- MAURO, P. (1995). Corruption and Growth. *Quarterly Journal of Economics* 110, pp. 681–712.
- MUZZIOLI, G. (1983). *Banche e Agricoltura*. Bologna: Il Mulino.
- NOWAK, M. A. and MAY, R. M. (1995). The arithmetics of mutual help. *Scientific American* 272, pp. 50–5.
- PESSINA, M. (1987). Prime note sull'organizzazione federativa cattolica di credito. *Bollettino dell'Archivio per la Storia del Movimento Sociale Cattolico in Italia* 22, pp. 287–315.
- PLACANICA, A. (1990). Il mondo agricolo meridionale: usure, caparre, contratti. In P. Bevilacqua (ed.), *Storia dell'Agricoltura Italiana*. Venezia: Marsilio.
- POLSI, A. (1996). Financial institutions in nineteenth-century Italy: the rise of a banking system. *Financial History Review* 3, pp. 117–38.
- PRETELLI, S. (1990). *Le Casse Rurali nelle Marche. Storia e Problemi Attuali*. Ancona: Cerreti.
- PREZIOSI, A. M. (1985). Appunti sulla origine e sulla diffusione delle casse rurali nel padovano. In G. Zalin (ed.), *Un secolo di Cooperazione di Credito nel Veneto: le Casse Rurali ed Artigiane 1883–1983*. Padova: Signum.
- PUTNAM, R. D. (1993). *Making Democracy Work: Civic Traditions in Modern Italy*. Princeton, NJ: Princeton University Press.
- RISTORTO, M. (1971). Il piccolo credito e i cattolici cuneesi. *Bollettino dell'Archivio per la Storia del Movimento Sociale Cattolico in Italia* 6, pp. 67–95.
- ROGGI, P. (1982). Il fascino della sopravvivenza: la storia della Banca Toscana dalle origini al 1940. In *Banca Toscana: Storia e Collezioni*. Firenze: Sansoni.
- ROSSI, M. G. (1977). *Le Origini del Partito Cattolico*. Roma: Editori Riuniti.
- RUGGIERI, E. (1964). *Le Casse Rurali e Artigiane Italiane Ottanta anni dopo la Loro Nascita (1883–1963)*. Cosenza: Patitucci.
- SAGUATTI, A. (1989). La cassa di Risparmio di Parma negli anni della prima trasformazione dell'economia e della società. In G. L. Basini and G. Forestieri (eds), *Banche Locali e Sviluppo dell'Economia: La Cassa di Risparmio di Parma*. Milano: Giuffrè.
- SANNUCCI, V. (1990). Molteplicità delle banche di emissione: ragioni economiche ed effetti sull'efficacia del controllo monetario (1860–1890). In Banca d'Italia (ed.), *Ricerche per la Storia della Banca d'Italia*, vol. 1. Roma: Laterza.
- SINISI, A. (1989). *Economia, Istituzioni Agrarie e Gruppi Sociali in Basilicata (1861–1914)*. Napoli: D'Onofrio.
- STIGLITZ, J. and WEISS, A. (1981). Credit rationing with imperfect information. *American Economic Review* 71, pp. 393–410.
- TAMAGNINI, G. (1952). *Le Casse Rurali*. Roma: Ministero del Lavoro e della Previdenza Sociale, Direzione Generale della Cooperazione.
- TOSTI, M. (1996). L'area umbro-sabina. In S. Zaninelli (ed.), *Mezzo Secolo di Ricerca Storica sulla Cooperazione Bianca*, vol. 2. Verona: Società Cattolica di Assicurazione.

- TRAMONTIN, S. (1974). La prima cassa rurale cattolica. *Bollettino dell' Archivio per la Storia del Movimento Sociale Cattolico in Italia* 9, pp. 52–79.
- TREVIGLIO (1899). Cassa Rurale di Treviglio. *Verbali dei Consigli d'Amministrazione*, vol. 1, 29 March 1899–13 November 1907.
- VENERUSO, D. (1982). Le organizzazioni sindacali, sociali ed economiche cattoliche a Genova e in Liguria del 1918 al 1926. In S. Zaninelli (ed.), *Il Sindacalismo Bianco tra Guerra, Dopoguerra e Fascismo*. Milano: Giuffrè.
- ZALIN, G. (1985). *Un Secolo di Cooperazione di Credito nel Veneto: le Casse Rurali ed Artigiane*. Padova: Signum.
- ZAMAGNI, V. (1993). *The Economic History of Italy 1860–1990*. Oxford: Clarendon Press.

Appendix: Estimation procedure for π

In the framework presented in Section 2, π is the probability that an investment project undertaken with financing from a *cassa rurale* will succeed (= pay ρ). As already noted, this can be extended to the entire loan portfolio of the co-op, so that π comes to indicate the share of loans that have financed successful projects. While that is enough for a theoretical framework, empirical analysis requires a clearer definition of what constitutes 'success' in this context. One simple way to define it is to say that π is the proportion of investment projects financed by a co-op in which the increase in output generated by the project was at least equal to the interest payments on the loan. Taking this definition as a base, I develop in this Appendix an estimation of the value of π for the 48 Italian provinces in 1911 for which I have co-op data.

Since the *casse* at this time seldom financed loans for longer than one year, π has to be seen as the proportion of investments financed by a co-op in which the increase in output was at least equal to the interest payments plus principal. While loans were no doubt rolled over, we have no way of knowing now what the proportion of them was and for what amounts. Taking the position that borrowers had to repay the full amount in twelve months in effect means that we may be overestimating the repayment burden, thereby calculating a lower π than was the case. If there is any such bias in the procedure, however, the results suggest that it is extremely small.

Lack of data on the marginal product of investment projects can be overcome reasonably easily. Let v be the value of output per unit of land on which the investment project is carried out, and let $v \sim N(v, \sigma_v)$. The increase in output from the investment project will then be $v + \epsilon\sigma_v$, where $\epsilon \sim N(0, 1)$. Then

$$\pi = \Pr[v + \epsilon\sigma_v \geq (1 + i)x]. \quad (\text{A1})$$

This implies that:

$$\pi = \Pr\left[\epsilon \geq \frac{(1 + i)x - v}{\sigma_v}\right], \quad (\text{A2})$$

which can be estimated from a normal curve.

This brings the solution closer, in that v and σ can be estimated for the sample areas in the years before the First World War. However, there remains the problem of x and i , respectively the loan size and the interest rates charged by the co-ops.

For the latter, the evidence is that the *casse* typically charged 2.5 percentage points above their borrowing costs (Cooperazione 15 March 1904, p. 24; Branzoli-Zappi and Mazza 1907, p. 61; Darling 1922, p. 33). This brings the estimated rates charged on loans to around 7.5–8.5 per cent, consistent with the limited available evidence (Cerruti 1899; Darling 1922, p. 33).

The estimation of v and σ_v is reasonably straightforward. Ideally the information on yields would relate to the land tilled by the borrowers themselves and their particular crop mix. Failing that, it does not seem unwarranted to use province-wide data to estimate average expected income variance for farmers in a given area. What we need is to have provincial output, land and price data over a number of years for as many farm products as possible, so as to construct a meaningful estimate of the standard deviation of farm income in the 48 provinces. It turns out that these data are available only for a handful of products for the years leading up to 1911, namely wheat, wine, olive oil, corn, and potatoes (ISTAT 1910-4, Cohen and Galassi 1990, p. 655, for methodology). Even aside from the problem of excluding all livestock products, the list is obviously too short, yet these crops together accounted for over 50 per cent of the total value added in Italy's agricultural sector in 1911 (Federico 1992). A measure of variance derived from this list, if not exhaustively computed, will at least be broadly indicative. Using q_{jt} to indicate the yield per hectare of the j th crop in year t , μ_{jt} its price, ω_{jt} the share of land devoted to it, and T the number of years over which the data are available (in this case, 1909 to 1912), v and σ_v can be calculated for any given province as

$$v = \frac{1}{T} \sum_t \sum_j q_{jt} \mu_{jt} \omega_{jt} \quad (\text{A3})$$

and

$$\sigma_v = \sqrt{\frac{1}{T} \sum_t \left(\sum_j q_{jt} \mu_{jt} \omega_{jt} - \frac{1}{T} \sum_t \sum_j q_{jt} \mu_{jt} \omega_{jt} \right)^2} \quad (\text{A4})$$

The last variable to be estimated before equation (A2) can be computed is x , loan size. The average loan size used in Section 3 is of little use here, as it refers to average loan per member, while the only measure of income variance I can reconstruct is income per hectare. What has to be done is to relate loans to land tilled by members. Using the total loan portfolio of the 719 *casse*, an average loan/hectare ratio can be approximated provided that an estimate of borrowers for these co-ops can be developed. This involves four steps:

- (1) Calculating mean national membership size, and estimating how many people belonged to the co-ops located in each of the 48 provinces (this has to be done province by province, since the output variance data are only available province by province). National membership is known, but not provincial membership. However, since Southern *casse* were smaller in terms of assets per worker (Table 1), it is reasonable not to limit the estimation to a national mean membership figure. I have therefore used two extreme values in the estimate, one which consisted of assuming the same national mean applied in every province, and one where Northern *casse* have a membership three times the Southern mean.
- (2) Since not all members were net borrowers at any one time, this number has to be reduced by the fraction who did not borrow in 1911. As outlined in the text, this is estimated at between 2.5 and 1.67.

- (3) Since only one person per family could be a member of the co-op, the estimate of the number of borrowers has to be multiplied by mean number of workers per family to estimate the total number of farmers who were financed by the sample co-ops (family size data are from ISTAT 1976).
- (4) Finally, using the known provincial land/labour ratios, the number of farm workers benefiting from co-op credit can be used to estimate the number of hectares over which, in a sense, the credit was extended. Dividing the total loan portfolio by this estimate will give at least a rough value for x .

There is no need to emphasise the number of strong and weak assumptions involved in this methodology. The results have to be treated with great care and must not be seen as anything more than broadly indicative. Even so, what emerges is interesting.

I report below the actual calculation for two randomly chosen provinces (Forli in the North, an area of marshy land and extensive farming, and Catania in the South, an intensively farmed province), as an example of the procedure. The bias my methodology is likely to impart to the results is discussed at each stage.

1. Membership size and members per province

In 1911 national mean *casse* membership was 50 (Tamagnini 1952, p. 105; Caputo, 1989, p. 38). If membership was equal in each *cassa*, this implies that 1,100 farmers belonged to the 22 co-ops in Forli; and 1,755 to the 35 in Catania. At the other extreme, if Northern membership was three times Southern membership per *cassa*, Forli would account for 1,650 members and Catania for 875.

Direction of bias: the values are intended to represent extremes of a likely range, so no specific bias is introduced here.

2. Net borrowers in 1911

Reducing these totals by a factor of 0.6 and 0.4 yields:

Table A1. *Estimated borrowers in selected provinces.*

Province	National mean membership		Differential membership	
	<i>m/n</i> = 2.5	<i>m/n</i> = 1.67	<i>m/n</i> = 2.5	<i>m/n</i> = 1.67
Forli	440	660	660	990
Catania	700	1,050	350	525

Direction of bias. again, the values are intended to represent extremes of a likely range, so no specific bias is introduced here.

3. Farm workers financed by the sample co-ops

Average family size excluding people under 14 and over 70 in 1911 was 3.1 in Forli and 2.5 in Catania. Thus farm workers directly or indirectly financed by co-ops range from 1,365 and 3,069 in Forli, and from 875 to 2,625 in Catania.

Direction of bias: since family sizes are available only by province, not by sector of employment, the most likely error here is that urban families, which tend to be smaller than rural ones, are reducing the estimated number of farmers financed by the co-ops. While this could introduce a bias (underestimating the number of co-op financed farmers in more urbanised provinces), as a rule the more rural Southern provinces have a smaller family size than Northern ones.

4. *Loans per unit of land farmed by co-op members and their families*

Land/labour ratios in 1911 were 3.25 ha/worker in Forlì and 1.0 in Catania. Estimates of land farmed by borrowers and their families are reported below.

Table A2. *Estimated hectares farmed by co-op members in selected provinces.*

Province	National mean membership		Differential membership	
	$m/n = 2.5$	$m/n = 1.67$	$m/n = 2.5$	$m/n = 1.67$
Forlì	4,433	6,649.5	6,649.5	9,974.25
Catania	1,750	2,625	875	1,312.5

From this, using the loans reported by the Ministry (MAIC 1911), I can estimate the average credit 'load' per hectare of land farmed by co-op members.

Table A3. *Estimated loans per hectare farmed by co-op members in selected provinces (current lire).*

Province	National mean membership		Differential membership	
	$m/n = 2.5$	$m/n = 1.67$	$m/n = 2.5$	$m/n = 1.67$
Forlì	6.51	4.34	4.34	2.89
Catania	19.57	13.05	39.15	26.10

Direction of bias: if co-op members were richer than the average farmer, land estimates will be too low and loan/land ratios too high. However, there is no reason why this should affect the two provinces (or generally Northern and Southern provinces) differentially.

The last step in estimating π is to calculate the probabilities defined by equation (A2), recalling that $\epsilon \sim N(0, 1)$. I will just give one for each province, purely for exposition.

Forlì (Differential membership, $m/n = 1.67$):

$$\pi = \Pr \left[\epsilon \geq \frac{1.0845(2.89) - 210.19}{24.06} \right] = \Pr(\epsilon \geq -8.61) \rightarrow 1$$

Catania (Differential membership, $m/n = 1.67$):

$$\pi = \Pr \left[\epsilon \geq \frac{1.089(26.10) - 469.41}{86.43} \right] = \Pr(\epsilon \geq -5.1) \rightarrow 1$$

The estimated value of π for these provinces does not mean that investment projects in agriculture were riskless, but rather that the likelihood of a farmer being unable to repay a loan due to a general crop failure was, with these parameters, virtually nil. Interestingly, Catania was one of the few areas in the South with a large number of flourishing co-ops.