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**Credit Union Governance and Survival of the  
Cooperative Form**

**Kevin Davis\***

Colonial Professor of Finance

Centre of Financial Studies

University of Melbourne

Parkville, Vic 3010

Australia

Ph (61) 3 8344 5098

Fax (61) 3 9349 2397

Email [k.davis@ecomfac.unimelb.edu.au](mailto:k.davis@ecomfac.unimelb.edu.au)

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# **Credit Union Governance and Survival of the Cooperative Form**

## **ABSTRACT**

Credit unions are cooperative financial institutions which typically operate on a one-member-one vote governance rule. This paper demonstrates that such a governance rule may enhance the survival of such organisational forms in the face of adverse incentives created by accumulated financial surpluses, and identifies factors which may prompt conversion to a joint-stock form. The analysis is based on noting that current members have collectively “inherited” accumulated surpluses of the cooperative from past members. Older members have an incentive to extract maximum personal private benefit from that inheritance by voting to convert from a cooperative to a joint stock company, even though such an outcome may be socially suboptimal. A simple overlapping generations model is used to develop a “sustainability constraint” which must be met if conversion is not to occur, and examine how a one-member-one-vote governance rule contributes to the survival of the institution in a cooperative form.

## **Credit Union Governance and Survival of the Cooperative Form**

### **1. Introduction**

Credit Unions are cooperative (mutual) style financial institutions found in the retail financial sectors of many countries<sup>1</sup>. They are characterised by several significant ownership and governance features. First, such institutions have no separate group of owners distinct from other stakeholders, but are “owned” by their member-customers (traditionally limited to individuals who belong to some common bond of membership). Second, ownership entitlements are typically ill defined and not transferable. Thus, member/owners severing links with a credit union have no entitlement to a share of its accumulated communal wealth. Third, non-withdrawable share capital (the accumulated communal wealth) is traditionally generated only by retention of surpluses (profits) made from transactions with members. Fourth, governance is based on (some version of) a one-member-one-vote principle.

Such features generate conflicting incentives and agency costs, including conflicts between depositing and borrowing owner-members, and potential management entrenchment and autonomy in decision making. Reflecting this, a substantial literature has developed examining the problems of identifying an appropriate managerial objective function in credit unions (Taylor, 1971, Smith, Cargill and Meyer, 1981, Smith, 1984, Patin and McNiel, 1991, Emmons and Mueller, 1997, for example) and investigating the significance of the agency problems involving management in cooperative and mutual organisations (Mester, 1981, provides an overview). This paper identifies a further, previously ignored, conflict of incentives – the intergenerational conflict between older and younger members of the credit union which arises when credit unions have accumulated financial surpluses. It demonstrates that older members have an incentive to vote for

either wind-up<sup>2</sup> or conversion to joint stock form of the institution, even if this would involve net social costs from destruction of any inherent competitive advantages possessed by the cooperative form of organisation. It is shown that this “conversion bias” is mitigated by the existence of a one-member-one-vote governance structure. Thus, despite the other incentive conflicts and agency costs which it induces, such an ownership and governance structure can contribute to the survival of the particular organisational form of the institution.

As well as contributing to the literature on credit unions, this paper is related to the extensive literature examining the inherent advantages and disadvantages of one organisational form over another and reasons for conversions from one form to another. Rasmusen (1988) and Hart and Moore (1996) provide valuable analyses of the sources of any competitive advantage which mutual (or cooperative) style institutions may have over joint-stock companies and illustrate how changing economic and regulatory conditions may affect such advantages. Masulis (1987) and Mayers and Smith (1986) provided early empirical studies of conversions from one organisational form to the other and find that conversion appears to provide gains for all stakeholders, consistent with an efficiency hypothesis for conversion (rather than an alternative hypothesis of expropriation). Notably, despite widespread conversions of other types of mutual financial institutions to joint-stock form in recent decades, the credit union movement (world-wide) has not (yet) undergone a similar transformation. While in some countries legislation has inhibited credit union conversion to joint-stock form, the analysis of this paper illustrates how the governance structure mitigates the influence of those with incentives to initiate conversion. It also provides a potential rationale for the existence of such inhibiting legislation to deal with situations in which a

majority vote for conversion might otherwise occur, despite that outcome not being socially optimal.

Underpinning the analysis of this paper is recognition of the existence of an implicit intergenerational contract between members of a credit union. Credit unions exist as cooperative organisations because of “ownership” of some specific asset (a “franchise” value) or because of some imperfection in the market place (such as preferential tax treatment) which gives the credit union a competitive advantage and enables it to create benefits for its members<sup>3</sup>. Current members benefit from this competitive advantage, and from benefits arising from the credit union’s accumulated financial capital<sup>4</sup>, during their association with the credit union. These benefits take the form of better prices (higher deposit interest rates, lower loan rates, etc.) for transactions undertaken with the credit union than available elsewhere. Departing members have no entitlement to a share of the net communal wealth (both “franchise” value and accumulated financial capital) of the credit union, implicitly bequeathing benefits from use of this wealth to existing and future members. New members “inherit” the net communal wealth and gain benefits flowing from it and, in turn, upon exiting bequeath that net wealth (perhaps augmented by financial surpluses accruing during their association) to subsequent members.

The focus of this paper is upon the conditions under which this implicit intergenerational contract can be sustained when some existing members of the credit union have an incentive to vote for winding up or conversion to a joint-stock form. Even though this may destroy the competitive advantage of the organisation and thus the flow of future benefits to them (and to future generations) current members receive a one-time benefit, in the form of a share of accumulated financial surplus (and market value of any ongoing franchise value), which may outweigh those

costs. Older members, with limited time remaining to enjoy a flow of future net benefits from their dealings with the credit union, are more likely to perceive a net private benefit from conversion, and vote for conversion.

To capture the nature of this implicit intergenerational contract and the conditions under which it is sustainable, a simple continuous-time overlapping generations model of a credit union is developed. At each point in time a cohort of individuals is born who become members of the credit union and receive a flow of net benefits over their (fixed) life span from their dealings with the credit union. At any point in time, the credit union has a membership of different ages with different preferences for continuation of the credit union as a cooperative versus conversion to a joint-stock company. For members greater (less) than some particular age, the present value of remaining net benefits from dealing with the credit union will be less (greater) than the value of tradable stock obtained if the credit union were converted to a joint stock company. The survivability of the credit union as a cooperative depends, under a one-member-one vote rule, on a majority of members being younger than this “preference switching” age. The model illustrates the importance of certain key parameters such as the population growth rate, retained profit rate, membership longevity, size of the credit union’s natural competitive advantage, and members’ discount rate in determining whether a majority will vote for continuance or conversion. These parameters are the key ingredients of a “sustainability constraint” (Besley, Coate and Loury, 1993) which must be met for credit unions to be established and survive as cooperatives.

The results of this paper demonstrate that a majority vote by members of a credit union in favour of conversion to a joint-stock form can occur even if such a change is not socially optimal. This could occur as a result of factors such as financial deregulation, increased competition,

technological change, increased capital adequacy requirements, changes in preferential tax treatment and common bond restrictions reducing the inherent competitive advantage of the cooperative structure. However, the model also demonstrates that a credit union with accumulated financial surpluses will not survive as a cooperative (with all members voting for conversion) unless there is some inherent competitive advantage arising from the cooperative structure per se. In that regard, the model highlights the dilemma for policy makers charged with designing a regulatory environment to deal with possible conversions of credit unions to joint-stock form. If the cooperative form retains no inherent advantage, conversion would appear warranted, whereas if some inherent advantages exist, regulatory impediments to conversion (including the design of rules which affect benefit sharing (stock allocations) upon demutualisation and thus voting incentives) may be warranted. Also important is the implication that imposing higher capital adequacy requirements on credit unions will induce heightened interest in conversions and, paradoxically, lead to the demise of the credit union movement (at least in its traditional cooperative form). Because higher capital requirements mean that accumulated surpluses relative to institutional size are larger, and because the generation of capital (via operating surpluses) requires dealing with members at prices less favourable to the members, the incentive for members to vote for conversion to joint-stock form is increased.

The following section of the paper outlines the model used to capture the implicit inter-generational contract in credit union activities, demonstrates how incentives to vote for conversion depend upon member age, and derives a “sustainability constraint” which must be met if the credit union is to survive in the cooperative form. A simple numerical illustration is used to demonstrate the significance of key parameters in the model. In Section 3, implications of the

model for survival of credit unions as cooperatives and policy implications are discussed. Section 4 provides concluding comments.

## 2. The Model

### 2.1. Aggregate Net Benefits

Members of the credit union benefit from the natural competitive advantages arising from the cooperative organisational structure and may also benefit from the protection afforded to individual member's deposit funds by the accumulated financial capital of the organisation. The competitive advantages generate benefits for current and future members in that the credit union can provide services for members at better rates than other institutions. Accumulated financial capital generates benefits for current and future members by reducing the "leverage" of the credit union, thereby increasing the safety of member deposits<sup>5</sup>.

At any point in time, the aggregate net benefit conferred upon members of the credit union by its operations is the maximum net profit which could have been earned by transactions with members (if it simply matched the prices of its less advantaged competitors) less the actual profit earned and retained<sup>6</sup>. It is assumed that the aggregate rate of net benefit is linked to the size of the accumulated financial surpluses of the organisation, which is used as a measure of scale. The aggregate rate of benefit at time  $\tau$ ,  $B(\tau)$ , can be written as:  $B(t) = (r^* - g)E(t) = E_0 e^{gt} (r^* - g)$

[1]

where  $r^*$  is the maximum rate of return the credit union can achieve on its accumulated surplus  $(E(\tau))^7$ , given its competitive advantage, and  $g$  is the actual rate of return achieved (and thus the growth rate of its accumulated surplus). In interpreting equation [1] it should be noted that  $g.E(\tau)$



represents the profit which the credit union makes in its dealings with members, while  $r^*.E(\tau)$  is the maximum profit which it could have made.<sup>8</sup>

## 2.2 Membership, Growth, and the Distribution of Benefits

It is assumed that the number of individuals born at date  $t$  (generation  $t$ ) who are eligible to join the credit union is given by

$$N(t) = N(0)e^{gt} \quad [2]$$

where each individual lives for a time of  $m$  years<sup>9</sup>. Given this birth and mortality rate, the membership alive at time  $t$  is

$$P(t) = \int_{t-m}^t N(0)e^{gt} dt = \frac{1}{g} N(0)[e^{gt} - e^{g(t-m)}] = \frac{N_0}{g} e^{gt}[1 - e^{-gm}] \quad [3]$$

and at time  $t+i$  is

$$P(t+i) = \frac{N_0}{g} e^{g(t+i)}[1 - e^{-gm}] \quad [4]$$

Thus, the share of generation  $t$  in the membership at date  $t+i < t+m$  is given by

$$S_{t,t+i} = N_0 e^{gt} / \frac{N_0}{g} e^{g(t+i)}[1 - e^{-gm}] = g / [e^{ig}(1 - e^{-gm})] \quad [5]$$

It is assumed that the business undertaken by all members with the cooperative is equal and constant throughout their lifetimes, and that benefits received are proportional to business undertaken. The present value of the remaining benefits from cooperative membership for generation  $t$  at date  $t+i$ , ie individuals of age  $i$ , is obtained by discounting the future benefit flow from  $t+i$  to  $t+m$ , at a discount rate  $r < r^*$  to give<sup>10</sup>

$$\int_{t+i}^{t+m} \frac{g}{e^{(t-t)g}(1-e^{-gm})} E_0 e^{gt} (r^* - g) e^{-r(t-t-i)} dt \quad [6]$$

$$= \frac{g E_0 (r^* - g)}{r(1 - e^{-gm})} e^{gt} [1 - e^{-r(m-i)}] \quad [7]$$

### 2.3 The Consequences of Conversion

In determining whether to vote for continuance or conversion, each generation will compare the costs of conversion (future benefits foregone as given in equation 7) with the benefits received from wind up or conversion of the credit union. Benefits received by each generation will depend on the rule for distribution of the accumulated surplus, and upon the extent to which the competitive advantage possessed by the credit union is lost<sup>11</sup>. It is assumed, for simplicity, that the rule for distribution of benefits is that each generation gets a share of the surplus equal to their population share<sup>12</sup>.

Two alternative (polar) cases for the effect of the conversion on the credit union's competitive advantage are considered. One case is where conversion destroys the competitive advantage which the credit union possesses. (A simple example is where conversion leads to a loss of some favourable tax treatment afforded to cooperative institutions). The present value of conversion for any generation in that case is thus the share of that generation in the membership multiplied by the accumulated surplus at that date. For generation  $t$  at date  $t+i$ , this is given by

$$\frac{g}{e^{ig}(1 - e^{-gm})} E_0 e^{g(t+i)} = \frac{g}{(1 - e^{-gm})} E_0 e^{gt} \quad [8]$$

In the other polar case, where no competitive advantage is lost from conversion, the amount

available for distribution is the market value of the accumulated surplus. This exceeds the accounting value of accumulated surplus, since the credit union would have been (and remains after conversion) able to earn a return  $r^*$  on those funds, which is in excess of the discount rate  $r$ . In this case, the cash flow available to owners at date  $z$  is, assuming continued growth at rate  $g$ ,

$$p = E_0 e^{gz} (r^* - g) \quad [9]$$

with present value

$$\int_{t+i}^{\infty} E_0 e^{gz} (r^* - g) e^{-r(z-t-i)} dz \quad [10]$$

$$= E_0 e^{g(t+i)} \frac{r^* - g}{r - g} \quad [11]$$

Generation  $t$ 's share is thus

$$\frac{g}{e^{ig}(1 - e^{-gm})} E_0 e^{g(t+i)} \frac{(r^* - g)}{(r - g)} \quad [12]$$

## 2.4 Majority Voting - Case (a): No Loss of Competitive Advantage on Conversion

In the extreme case where the competitive advantage of the credit union is not destroyed upon conversion from cooperative to a joint stock company, it is easily shown that all generations will vote for conversion. Generation  $t$  will vote at time  $t+i$  for continuation as a cooperative if the benefits from continuation (equation 7) exceed the benefits from conversion (equation 12), ie if

$$\frac{gE_0(r^* - g)}{1 - e^{-gm}} e^{gt} \left[ \frac{1 - e^{-r(m-i)}}{r} - \frac{1}{r - g} \right] > 0$$

which can be written as

$$\frac{1 - e^{-r(m-i)}}{r} - \frac{1}{r-g} > 0 \quad [13]$$

The net present value difference between continuance and conversion is easily shown to be monotonically decreasing in  $i$ , so that preference for conversion increases with age. Notably,  $r^*$  (reflecting the credit union's competitive advantage) does not influence the preference, for the reason that on conversion, the market value of the member's equity will reflect the present value of that continuing advantage. Moreover, it can be shown that if  $r > g$ , the inequality in equation 13 is violated, so that all members of the credit union, regardless of age, will vote for its conversion. Thus unless the credit union has some competitive advantage as a cooperative per se, it will not survive in that form.

## 2.5 Majority Voting - Case (b): Loss of Competitive Advantage on Conversion

Now consider the case where the specific advantage of the cooperative form is lost, such that the amount of conversion proceeds received by generation  $t$  is given by equation [8]. The present value of benefits from continuance less the value of conversion proceeds is given by equation [7] minus equation [8] which is

$$\frac{gE_0(r^* - g)}{r(1 - e^{-gm})} e^{gt} [1 - e^{-r(m-i)}] - \frac{g}{e^{ig}(1 - e^{-gm})} E_0 e^{g(t+i)} \quad [14]$$

$$= \frac{gE_0 e^{gt}}{(1 - e^{-gm})} \left[ \frac{r^* - g}{r} (1 - e^{-r(m-i)}) - 1 \right] \quad [15]$$

For the members of generation  $t$  at date  $t+i$  (ie individuals of age  $i$ ) to vote for continuance rather than conversion<sup>13</sup>, it is necessary that equation [15] is positive, ie that

$$\frac{r^* - g}{r} (1 - e^{-r(m-i)}) - 1 > 0 \quad [16]$$

It can thus be seen that the preference for continuance versus conversion of any generation of age  $i$  (with  $m-i$  years to live) will depend upon age ( $i$ ), the credit union growth rate and retained profit rate ( $g$ ), the maximum rate of return ( $r^*$ ), and the discount rate ( $r$ ). Provided that  $r^* > g$ , the incentive to vote for continuance as a cooperative declines with age. In particular, for any member to vote for continuance, it is necessary that  $r^*-g > r$ , ie that the rate of benefit on accumulated surplus accruing to current members ( $r^*-g$ ) exceeds the discount rate,  $r$ , used by members. For larger values of  $m$  (ie longer lived individuals) the age at which preferences change from continuance to conversion increases, reflecting the longer period over which the member may gain net benefits from the cooperative's competitive advantage. For larger values of  $r^*$  the preference switching age also increases, reflecting the larger net benefits arising from the cooperative's activities which would be lost on conversion. For larger values of  $g$  the preference switching age declines, also reflecting the lower net benefits from the cooperative's activities (due to the higher retained profit rate) and the impact of the membership growth rate upon the cohort's share at any given age. While the impact of changes in the discount rate,  $r$ , on the preference switching age cannot be analytically determined, numerical simulations indicate that increases in  $r$  consistently lead to a lower preference switching age, as would be expected.

Thus, the ability of the credit union to survive as a cooperative will depend upon the relative numbers of younger versus older members, and the particular parameters describing the cooperative's value adding capabilities. Under a one member - one vote rule, a majority vote at time  $t$  for continuance would occur if

$$\int_t^{t+i^*} \frac{g}{e^{jg}(1-e^{-gm})} dj > \int_{t+i^*}^{t+m} \frac{g}{e^{jg}(1-e^{-gm})} dj \quad [17]$$

where  $i^*$  is the preference changeover age, and the integrands are the membership share of cohort  $j$ . This condition can be rewritten<sup>14</sup> as

$$\frac{1}{r} \ln\left(\frac{r^*-g-r}{r^*-g}\right) + m > -\ln\left(\frac{1+e^{-mg}}{2}\right) / g \quad [18]$$

which can be interpreted as a “sustainability constraint” for the cooperative form (using the language of Besley, Coate and Loury, 1993) and which is used below to show the influence of certain parameter values on survivability as a cooperative

## 2.6. A Numerical Illustration

The intergenerational conflicts and likelihood of a majority vote for survival of the cooperative can be demonstrated with the aid of some numerical simulations. Figure 1 provides examples of the present value differential of cooperative survival relative to conversion (ie values of equation 15) for various age groups. Specific assumptions are that the current accumulated surplus is \$272,  $m=25$ , and  $r^*=.13$ , and various values for  $g$  and  $r$  are used. It can be seen that (for the parameter values assumed) younger members of the cooperative would vote for continuance, while older members would vote for conversion. The preference switching age (when the present value differential turns negative) decreases as  $g$  and  $r$  increase (for a given value of  $r^*$ ).

Insert Figure 1 here

The ability of the cooperative form to meet a “sustainability constraint” is examined in Table 1 where the preference switching age ( $i^*$ ) and the proportion of members voting for continuance is shown for various values of  $r^*$  and  $g$  (and values of  $m = 25$  and  $r = 0.05$ ).

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Insert Table 1 here

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It is apparent that for the credit union to remain as a cooperative, the natural competitive advantage lost on conversion ( $r^*$  relative to  $r$ ) must be sufficiently large relative to the growth rate of the credit union (which determines the flow of current benefits to members). There are circumstances (low  $r^*$  and high  $g$ ) where no members would vote for continuance, and the cooperative would not be established, even though the cooperative has some natural advantage.

### **3. Discussion**

The simple model developed in the preceding section highlights the intergenerational conflict which can arise in a credit union which accumulates financial surpluses. Older members, for whom the future benefits arising from the cooperative form’s competitive advantage are becoming less significant, will have an incentive to vote for conversion to a joint stock form in order to acquire a share of the present value of the wealth of the institution, even if this involves destruction of the cooperative form’s competitive advantage.

#### **3.1. Sustainability of the Cooperative Form**

The model of the preceding section provides insights into conditions under which a financial cooperative will be a preferred form and thus emerge as an institutional form, as well as conditions under which conversion is likely to occur. For the cooperative form to emerge and survive, it is necessary that a majority of members will continue to vote for its survival. This

requires, first of all, some competitive advantage which is lost if conversion occurs - otherwise all members will vote for conversion, and the cooperative form will never be established. Second, the credit union must meet a “sustainability constraint” (Besley, Coate and Lounie, 1993) in the form of equation 18 if it is to survive as a cooperative organisation. Conditions conducive to survival as a cooperative include: a large competitive advantage ( $r^*$  relative to  $r$ ), a long membership tenure ( $m$ ), and a low growth rate ( $g$ ) so that there is thus a low siphoning off of competitive advantages from member benefits into retained earnings. As panel b of Table 1 indicates, for example, a higher growth rate must be offset by a larger competitive advantage if the proportion voting for continuation as a cooperative is not to fall.

### **3.2. External Forces and Incentives for Conversion**

The conversion or winding up of previously long standing cooperatives can be predicted to occur when exogenous changes lead to particular changes in  $r^*$ ,  $r$ ,  $g$ , or  $m$ . For example, consistent with other literature, a reduction in  $r^*$  (reflecting a decline in competitive advantage) will increase the number of members voting for wind up and encourage conversion. This could result from reductions in the depositor - owner agency problem faced by other institutional forms as a result of deposit insurance, from lower informational advantage associated with the broadening of common bonds, or from removal of tax concessions. Alternatively, an increase in the growth rate of the credit union will encourage conversion, since less of the competitive advantage flows to current members, instead being retained as accumulated surpluses. Notably, a lowering of the length of time members expect to remain as members of the credit union will encourage votes for conversion. Increased competition in the financial services industry could cause such a change, as



could occupational trends and changes in geographical mobility. Finally, an increase in the discount rate used by members in valuing future benefits could encourage conversion.

Also, in these steady state comparisons, the majority of members of an existing credit union will, in the absence of exogenous changes in  $r^*$ ,  $r$ ,  $g$ , or  $m$ , always vote for continuance. This reflects the strong assumptions made about demographic conditions and thus the age distribution of members. In practice, variations in the size of age cohorts (through changes in birth rates or mid-life entry to the cooperative) could give rise to a situation in which a majority of members become sufficiently elderly to vote for conversion.

### **3.3. Conversion Entitlements**

Incentives to vote for conversion may be exacerbated if the rules for allocation of the cooperative's value are less strict than the equal share rule postulated in the model. For example, rules for dispersion may be biased towards older members, by linking entitlements to years of membership or to the amount of business conducted. Similarly, if conversion entitlements are not strictly defined a priori, some majority coalition of members may be able to capture a larger than appropriate share which would further exacerbate conversion bias. On the other hand, vagueness about entitlements on winding up could reduce the conversion bias. By making the allocation of entitlements uncertain, risk averse members will be less likely to vote for winding up, since they give up a certain future stream of benefits for an uncertain present value amount. The age at which preference switching occurs is then likely to be higher.

### **3.4. Alternative Voting Rules**

The role of the one member - one vote rule in reducing the likelihood of conversion vis a vis other voting rules such as one vote per dollar of funds invested is easily seen. Control of the credit union could be obtained by some group under that alternate rule by short term deposit of sufficient funds. To the extent that stock allocations on conversion are determined either by recent deposit volume or subject to some discretion of the controlling interests, speculative opportunities exist. Funds can be borrowed short term, deposited at interest in the credit union, and a large share of accumulated surpluses obtained once control has been established and a vote for conversion passed.

### **3.5. The Role of Accumulated Surpluses**

Notably, in the steady state comparisons of the model, the size of accumulated surplus does not influence the preference for conversion at any given age, but simply affects the scale of the comparative net benefits. That reflects the unrealistic assumption that benefits generated by the credit union are proportional to accumulated surpluses. In practice, it is likely that benefits increase less than proportionally as accumulated surplus per member increases. This makes a vote for conversion more likely as accumulated surplus increases, because benefits from continuation do not increase as much as the benefits to be gained from conversion.

The comparative steady state results considered also ignore the impact of transitions from one steady state to another. For example, the process of reaching a higher capital ratio requires that net benefits to members be temporarily reduced in order to increase profit and build up accumulated surplus. In that sense, higher capital ratio requirements are a double edge sword for the sustainability of credit unions as cooperatives. The process of achieving a higher capital ratio will reduce net benefits for members over some time horizon and increase incentives to vote for

conversion, while the subsequently greater pool of communal wealth available for distribution upon conversion has the same effect.

### **3.6. Caveats and Possible Extensions**

The model developed in Section 2 abstracts from many of the complexities associated with credit unions. For example, it ignores management-owner agency problems. While managerial self interest (based on anticipated share allocations etc) may prompt proposals for conversion, ultimate decision control lies with the members who are required to vote on such an issue. Hence, analysis of the voting structure and member incentives is crucial to understanding the conversion decision. Likewise, agency costs arising from managerial self interest (and possible entrenchment) may be an important factor offsetting any inherent natural advantages of the cooperative form, and thus influencing the conversion vote outcome. In the model developed in this paper, such agency cost issues are subsumed within the size of the (net) inherent advantage (or franchise value) which the cooperative form is assumed to have.

In addition, the model ignores the distribution of benefits at any point in time between members, as for example between lender and depositor members in a credit union. It is worth noting that in practice there may be an inverse relationship between member age and borrower/ lender status. There may then be some interaction between intergenerational preferences for conversion and the extent of “borrower-depositor” orientation in price setting (or in the rate of growth of accumulated surplus) if the age structure of membership influences such decisions. Modelling these interactions, and allowing for demographic shifts in membership, may provide a fruitful area for future research.

Finally, the model is a simple steady state growth model, which provides insights into key determinants of the “sustainability” of credit unions as cooperative financial institutions. It can, however, hardly do justice to all of the real world factors which influence conversion activity (as observed in, for example, the US mutual savings and loan industry – but not, it should be noted, in the credit union industry world wide). As well as demographic factors and the role of managerial self interest as discussed above, the model has little to say directly about the extent to which macroeconomic or financial sector shocks might initiate conversion activity. Likewise factors relevant to the conversion decision, such as tax changes, legislative changes affecting potential membership (common bonds) or allowable changes to organisational form, imposition of capital requirements, changes in informational and operating cost advantages due to technological change, are not explicitly modelled. Instead, in the interests of simplicity and analytical tractability, the impact of such factors is subsumed within the assumed “franchise” advantage of the cooperative form, and discussed in the context of the effect of changes in the size of that franchise advantage. Explicit modelling of such factors is a potential avenue for further research.

#### **4. Conclusion**

The potential intergenerational conflict between members of a credit union has not previously been noted in the literature, which has focused upon other conflicts. The intergenerational conflict assumes importance when a credit union accumulates financial surpluses, and leads to situations where it is possible that a majority vote for conversion to a joint stock form is not socially optimal. The design of regulatory policy which can deal appropriately with this possibility, without simultaneously impeding socially optimal conversions, is a significant challenge.

Given the emphasis being placed by financial regulators upon capital adequacy and, in some cases the imposition of minimum capital requirements on credit unions, the likelihood of increased interest in conversions is high. While some sources of competitive advantage of the cooperative form may have been eroded by various developments in recent decades (and thus imply that conversion is warranted), conversions may occur even in cases where some competitive advantage still exists but will be destroyed upon conversion. If so, the increasing emphasis upon capital adequacy for institutions such as credit unions may, by stimulating increased conversions to the joint stock form, have some undesirable side effects.

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<sup>1</sup> Srinivasan and King (1998) provide a recent overview of the US credit union industry.

<sup>2</sup> For ease of exposition, subsequent discussion (unless explicitly noted) refers solely to conversion rather than wind-up.

<sup>3</sup> Such advantages may include: informational advantages in loan evaluation and monitoring arising from the common bond requirement; absence of owner - depositor agency conflicts; lower depositor - management agency conflicts arising from a higher level of managerial aversion to risk; favoured tax treatment; subsidisation of operating costs by an employer sponsor etc.. (See Rasmusen (1988) for an overview and Kane and Hendershott (1996) for further discussion specific to credit unions).

<sup>4</sup> Benefits from the accumulated financial capital may take the form of increased safety of depositors' funds, or may arise because there is no market discipline on the credit union to earn a required rate of return on the accumulated financial capital. See Davis (1994) for an analysis of the role of capital and impact of capital adequacy requirements for credit unions, and Miles (1994) for an analysis of the supposed "cost of funds" advantage.

<sup>5</sup> It is assumed, for simplicity, that deposits at both credit unions and competitors are insured, such that there is no net benefit flowing to credit union members from a higher capital ratio.

<sup>6</sup> To illustrate, consider a credit union which charges lender members an interest rate  $r_L$  less than that of its (noncooperative) competitors, denoted by  $r_L^*$ , and pays its depositor members an interest rate  $r_D$  greater than that paid by competitors of  $r_D^*$ . (For simplicity, assume no operating costs). Given a loan portfolio of size  $L$  and deposits of  $D$ , the net benefit to members is  $(r_L^* - r_L)L + (r_D - r_D^*)D = (r_L^*L - r_D^*D) - (r_L L - r_D D) = \pi^* - \pi$ , where  $\pi^*$  is potential profit from matching prices of less advantaged competitors and  $\pi$  is profit actually made.

<sup>7</sup> It is assumed that the credit union commences existence at date 0 with some positive endowment of accumulated surplus (perhaps bestowed upon it by an employer sponsor).

<sup>8</sup> In practice, the link between benefits and  $E(\tau)$  is likely to be convex, since  $r^*$  could depend upon  $E(\tau)$ . For example, with a given membership, higher levels of accumulated surplus ( $E(\tau)$ ) may not imply proportionately higher potential profits - since the competitive advantage is simply spread over a larger capital base.

<sup>9</sup> Because of the steady state assumption, the growth rate of membership and of accumulated surplus (ie the retained profit rate) are equal and assumed exogenous. An extension to the model would be to allow the membership growth rate to be endogenously determined by, *inter alia*, the rate of net benefits per member.

<sup>10</sup> To derive equation 6, note that benefits at date  $\tau$  are given in equation 1, membership share at date  $\tau$  is derived from equation 5 by noting that  $\tau = t+i$  and thus substituting  $\tau-t = i$ , and the discounting for date  $\tau$  is from date  $t+i$ . The discount rate,  $r$ , used is less than  $r^*$  since the latter is the maximum achievable rate of return which is in excess of the competitive market rate of return.

<sup>11</sup> Clearly, if the credit union is wound up the competitive advantage is lost. For conversion, some competitive advantages may be retained (such as superior information about borrowers) - at least for some period.

<sup>12</sup> An alternative assumption would be to link the size of distributions to the age of the member (reflecting past business with the credit union). This would increase the proportion of benefits going to older members, reduce the "preference switching" age, and reduce the survivability of the cooperative.

<sup>13</sup> It can be shown that it is optimal to vote for conversion as soon as the present value of immediate conversion exceeds the present value of continuation, by showing that, at this point, the present value of delaying conversion is less than that of immediate conversion. (Proof available from the author).

<sup>14</sup> Proof available from the author.

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**Table 1**  
**Preference Switching Age and Voting Outcomes**

Panel a illustrates, for particular parameter values, the age implied by the model at which members will switch from preferring the credit union to continue as a cooperative to preferring conversion to the joint-stock form. That preference switching age is shown for different combinations of the credit union growth rate ( $g$ ) and the maximum profit rate achievable by the credit union ( $r^*$ ), and the calculations assume a member life ( $m$ ) of 25 years and a discount rate ( $r$ ) of 5 per cent. Panel b shows, for the same parameter values the proportion of the membership voting for continuance as a cooperative.

**Panel a: Preference Switching Age<sup>a</sup>**

$g$	$r^*$				
	0.09	0.11	0.13	0.15	
0.01	5.4	11.1	14.2	16.2	
0.02	0	8.8	12.9	15.3	
0.03	0	5.4	11.1	14.2	
0.04	0	0	8.8	12.9	
0.05	0	0	5.4	11.1	

**Panel b: Proportion Voting for Continuance<sup>a</sup>**

$g$	$r^*$				
	0.09	0.11	0.13	0.15	
0.01	0.24	0.48	0.60	0.68	
0.02	0	0.41	0.58	0.67	
0.03	0	0.28	0.54	0.66	
0.04	0	0	0.47	0.64	
0.05	0	0	0.33	0.60	

<sup>a</sup> Values based on  $m = 25$ ,  $r = 0.05$

**Figure 1****Present Value of Continuance over Conversion Value**

This figure shows the present value differential between survival of the credit union as a cooperative and conversion to a joint-stock form (ie values of equation 15) for members of different ages. Constant parameter values used are: member life ( $m$ ) = 25, maximum rate of return achievable by the credit union ( $r^*$ ) = 13 per cent, and current accumulated surplus of \$272. It demonstrates how the present value differential declines with age, and the intersection with the horizontal axis shows the “preference switching” age. The graphs for different values of the discount rate ( $r$ ) and the growth rate ( $g$ ) indicate the effect of these variables on the preference switching age.

