

redistributive state. Since all modern democracies use the majority rule to a considerable degree to make collective decisions – indeed the use of the majority rule is often regarded as the mark of a democratic form of government – all modern democratic states must be redistributive states in part, if not in toto.

5.2 **Cycling**

Given that majority rule must induce some element of redistribution into the collective decision process, we take up next an attribute of majority rule when a pure redistribution decision is to be made. Consider a three-person committee that must decide how to divide a gift of \$100 among them using majority rule. This is a pure distributional issue, a simple zero-sum game. Suppose that V_2 and V_3 first vote to divide the \$100 between themselves, 60/40. V_1 now has much to gain from forming a winning coalition. He might propose to V_3 that they split the \$100, 50/50. This is more attractive to V_3 , and we can expect this coalition to form. But now V_2 has much to gain from trying to form a winning coalition. He might now offer V_1 a 55/45 split forming a new coalition, and so on. When the issues proposed involve redistribution of income and wealth, members of a losing coalition always have a large incentive to attempt to become members of the winning coalition, even at the cost of a less-than-equal share.

The outcome of a 50/50 split of the \$100 between a pair of voters is a von Neumann-Morgenstern solution to this particular game (Luce and Raiffa, 1957, pp. 199–209). This game has three such solutions, however, and there is no way to predict which of these three, if any, would occur. Thus, the potential for cycles, when issues involve redistribution, seems quite large. It is always possible to redefine an issue to benefit one or more members and harm some others. New winning coalitions containing some members of the previously losing coalition and excluding members of the previously winning coalition are always feasible. But, as we have seen from the discussion of majority rule, when issues can be amended in the committee, any pure allocative efficiency decision can be converted into a combination of a redistribution and an allocative efficiency change via amendment. Thus it would seem that when committees are free to amend the issues proposed, cycles must be an ever-present danger.

The possibility that majority rule can lead to cycles across issues was recognized over two hundred years ago by the Marquis de Condorcet (1785). Dodgson (1876) analyzed the problem anew one hundred years later, and it has been a major concern of the modern public choice literature beginning with Black (1948b) and Arrow (1951, rev. ed. 1963).³ Consider the following three voters with preferences over three issues, as in Table 5.1 ($>$ implies preferred). X can defeat Y , Y can defeat Z , and Z can defeat X . Pairwise voting can lead to an endless cycle. The majority rule can select no winner nonarbitrarily.⁴

If we define Z as a payoff to voters V_2 and V_3 of 60/40, Y as the payoff (50, 0, 50), and X as (55, 45, 0), the ordinal rankings of issues in Figure 5.3 correspond

³ For a discussion of these and other early contributions, see Black (1958), Riker (1961), and Young (1997).

⁴ See A.K. Sen's discussion (1970a, pp. 68–77).

