Introduction

Issues

In a typical competitive economy most policy interventions cause some distortions and thus reduce national welfare. In other words, laissez faire is the best option for the government in charge. In a real world, however, there are various preexisting distortions that introduce non-competitiveness in product and/or factor markets, and these make some interventions welfare enhancing. Oligopoly and unemployment are two common and important such examples.

In the presence of oligopoly, for example, producers, because of their market power, are able to reduce output so that they earn excess profits at the cost of a decrease in consumers' surplus.[1] Hence, it is commonly believed that a policy that encourages more competition among firms is desirable. In fact, this belief forms the backbone of most antitrust policies in the world. If as an extreme measure oligopolistic distortions can completely be removed, first-best will be achieved. In reality, however, such an extreme measure is difficult to implement for, *inter alia*, political-economic and technological reasons. We are then left in a second-best scenario and more competition may not always be welfare improving in such situations. When oligopoly and unemployment co-exist, the interactions between these two distortions may work in unexpected ways giving rise to more perverse outcomes in terms of second-best policies.

There is of course a very substantial literature on trade and industrial policies under oligopoly, both in the presence and absence of unemployment (see Brander, 1995; Helpman and Krugman, 1986, 1989 and Suzumura, 1995 for surveys of the literature).[2] However, in the bulk of

[1] For a lucid exposition of oligopoly theory see Dixon, 2001; Friedman, 1983; Norman and LaManna, 1992. Empirical aspects of oligopolistic industries are discussed, among others, in Bernhofen, 1998; Choe, 1999; Haskel and Scaramozzino, 1997; Krugman and Smith, 1994.

[2] Some of the more recent contributions are Agarwal and Barua, 1994; Asplund and Sandin, 1999; Bhattacharjee, 1995; Caho and Yu, 1997; Collie, 1998; Cordella, 1998; Cordella and Gabszewicz, 1997; Fine, 1999; Fung, 1995; Gatsion and Karp, 1992; Gisser

this literature firms, particularly those belonging to nationals of the same country, are assumed to be symmetric in terms of their cost structure. In contrast, in the analysis of this book an asymmetry in the marginal cost level among firms plays an important role in generating surprising results.[3] An illustration should drive the point home. Suppose that there are two firms with technology differentials. Naturally, the marginal profit rate of the more efficient firm is higher than that of the less efficient firm. Thus, a policy that restricts the minor firm's production may increase the total producers' surplus through a reallocation of production from the less efficient firm to the more efficient firm, although the total production declines, causing consumers' surplus to decrease. It will be shown in the next chapter that if the technology differential is sufficiently large then this increase in total profits may even dominate the decrease in consumers' surplus. This property can be extended to prove that monopoly may well realize higher welfare than duopoly. This can never occur under symmetric oligopoly.

Such an analysis can be extended to an international context in a very straightforward manner. In the presence of foreign firms, total surplus is shared by consumers, domestic producers and foreign producers. Since the surplus distributed to foreign producers is repatriated abroad, from the domestic country's viewpoint these firms are, for all intents and purposes, like very inefficient domestic firms (who make very low profits). Thus, a policy that reduces the foreign producers' output and raises the domestic ones' output may enhance domestic welfare by increasing domestic producers' surplus even if it decreases total output and hence reduces consumers' surplus.

The first half of this book examines these and other properties by analysing the welfare effects of various policies – trade policies such as tariffs and quotas and industrial policies such as elimination of firms, production subsidies and R&D subsidies – in various contexts, viz., a closed economy, an open economy and vertical relations between producers and sellers. It is shown, *inter alia*, that competition-promoting policies may well be welfare reducing although they increase total production.

The second half of this book deals with another distortion mentioned above, namely, unemployment. In the presence of unemployment a

and Sauer, 2000; Greaney, 1999; Holm, 1997; Hwang and Schulman, 1993; Ishikawa and Spencer, 1999; Klette, 1994; Kojima, 1990; Maggi, 1996; Rowthorn, 1992; Tanaka, 1992; Ushio, 2000.

[3] There is now a small literature on trade and industrial policy under asymmetric oligopoly. See, for example, Denicolò and Matteuzzi, 2000; Lahiri and Ono, 1988, 1997; Leahy and Montagna, 2001; Leahy and Neary, 2000, 2001; Neary, 1994; Ono, 1990; van Long and Soubeyran, 1997.

country may encourage more inward foreign direct investment (FDI) so as to create job opportunities. Since there is no opportunity cost of employing labour, any income paid to the workers employed by foreign firms becomes a net surplus to the host country. Thus, once a foreign firm enters, some intervention that compels it to employ more local workers benefits the host country. Local content requirements are usually imposed for this purpose. A profit tax on FDI is also beneficial to the host country. However, these policies reduce profits of foreign firms and induce them to relocate to another country, reducing job opportunities. Therefore, the host government has a balancing act to do in deciding the optimal local content and tax-subsidy policies.

The optimal combination of these policies should depend on a number of factors such as how efficient and how labor intensive foreign firms are, and the number of domestic firms that exist in the market. The interaction between oligopoly and unemployment may lead to interesting policy dilemmas. For example, an efficient foreign or domestic firm is good for consumers' surplus, but it may not be so good as far as employment creation is concerned. We shall analyse these issues under various market structures including export-oriented FDI and cross-hauling with differentiated commodities. We also extend the analysis by introducing lobbying activity by domestic agents.

Contents

The book analyses various industrial and trade policies in a multi-country trade-theoretic framework in the presence of Cournot oligopolistic interdependence in production. The existence of firms with different levels of efficiency within a country plays an important role in our analysis. We define 'trade' broadly to include trade in commodity as well as trade in capital (foreign direct investment, to be specific).

In chapter 1, we start with a closed-economy model in order to establish the importance of a particular mechanism which has been neglected in the literature. This mechanism, which was explained in the previous section, is about the reallocation of profits among asymmetric domestic firms. It is commonly believed that the exit of minor firms and policies that impair them strengthen the oligopoly position of major firms and consequently decrease national welfare. In this chapter we show that by eliminating or impairing minor firms a government can actually increase welfare, as outlined in the previous section.

Chapters 2 and 3 are two different extensions of chapter 1. Chapter 2 endogenizes marginal costs by explicitly considering R&D investments. The question of optimum R&D subsidies is analysed in the context of

a two-stage asymmetric Cournot duopoly model. For the special case of symmetric duopoly, whether the firms should be subsidized in their R&D activities crucially depends on the concavity/convexity property of the demand function. It is also shown that a firm with some initial cost advantage should be subsidized in its R&D activities and the other one should be taxed. In this way, we once again obtain policy implications which cast doubt on the universal applicability of competition policies.

Chapter 3 extends the analysis of chapter 1 to an international context. The effect of restricting foreign penetration – by import quota and/or controls on FDI – on domestic and foreign welfare is examined under an oligopolistic setting. A restriction on imports or FDI lowers consumers' surplus but increases domestic producers' surplus in the host country. Comparing the two effects, we find conditions under which the restriction increases domestic total surplus. Furthermore, we show that the beneficial effect of the restriction may be so large that the host country could benefit even after compensating the foreign firms for the loss caused by the restriction.

Chapter 4 synthesizes the analyses in chapters 1 and 3 as well as a number of different results found in the literature on trade and industrial policies under oligopoly. It develops a general model that nests many of those in the existing literature on trade and industrial policies under oligopoly. It analyses the relationship between market shares and welfare under the assumption of Cournot oligopolistic interdependence in production. The model is general enough to deal with multiple countries, oligopolists with different levels of marginal costs within each country, and any distribution of world demand across countries. It is found that elimination of a 'minor' firm harms the country if the country's total production is 'very little'. However, such a policy always benefits the country if it exports the commodity. The welfare effect of production subsidies and the case of foreign ownership of firms are also discussed.

Chapters 5 and 6 extend chapter 3 in two different directions. Chapter 5 considers the trade aspect of chapter 3 and extends the model to allow for a vertical relationship between producers and sellers. The literature on trade policy ignores one important aspect of real life, viz., the fact that often producers and sellers of a commodity are different entities. For example, Toyota cars are sold abroad by dealers that are nationals of the country where the cars are sold. Another example is the clothing industry where items are usually sold by big stores under their own brand names (e.g., St. Michael for Marks and Spencer) but often produced not by the stores but by other domestic and/or foreign producers. Therefore, in deciding an optimal tariff on a commodity, clearly one has to take into account its effect on the domestic seller's profits. In chapter 5 the

distinction between producers and sellers is explicitly treated. A number of alternative market structures are considered. It is found that the sign of the optimal tariff may depend on the nature of the producer–seller relationship, viz., who the leader is. In particular, we find that the optimal tariff is negative when the only seller is the leader and there is only one foreign producer. There is also a case where it is optimal for the government of the home country to subsidize imports no matter who the leader is.

Chapter 6 on the other hand considers the FDI aspect of chapter 3. Since one of the main reasons for attracting FDI is to promote employment in the host countries, this chapter assumes the existence of unemployment by incorporating wage income explicitly in the welfare function.

Chapters 7–10 extend the model of chapter 6 in different directions. However, the common thread in these extensions is the endogeneity of FDI. Whereas in chapter 6 the magnitude of FDI is treated in an exogenous manner and is directly controlled by the host government, in chapters 7–10 we assume that the host country is small in the market for FDI and that there is free entry and exit of foreign firms. Thus the number of foreign firms located in the host country is endogenous. It needs to be pointed out that our treatment of FDI is rather novel and significantly different from the traditional treatment in which one considers *one* firm's choice between investing in *one* host country or exporting to that country. Although this traditional treatment made a lot of sense when the extent of FDI was rather limited, in today's world, where FDI is pervasive, a new approach is called for. It is not only because the number of countries that actively welcome FDI is numerous, but also because the number of firms that take part in FDI is very large.

In order to address the new reality in FDI, we introduce a concept of *small open economy in FDI* which faces an exogenous reservation profit rate for investors. Foreign firms enter and exit this small open economy until the profit rate equals the reservation level. The 'outside option' for a foreign firm taking part in FDI is not to export but to locate in one of many other locations.

Within this overall approach that we follow in chapters 7–10, in chapter 7 FDI takes place for a non-tradeable commodity, and the number of domestic firms is exogenous. The host country uses two instruments, viz., profit taxation and a local content requirement (LCR), to compete for FDI in the international market. The foreign firms, in the absence of any restriction, would buy all their inputs from the home country. However, the host country imposes restrictions on the input use of the foreign firms. In particular, it specifies that a certain minimum proportion of the inputs should be bought from the host country. This promotes domestic employment and the profits of domestic firms, but

reduces consumers' surplus via a reduction in the amount of foreign supply. It also reduces the number of foreign firms (and thus employment by them) by decreasing their profits. By taking into account all these effects we establish the structure of optimal policies and their relationship to the number, and the relative efficiency levels, of the domestic firms.

In chapter 8 FDI is completely export oriented in the sense that the commodity produced with FDI is fully exported to another country where there is a domestic firm. The host country earns surplus only by setting an LCR so that FDI uses local labour to some extent. FDI in one of the countries within an economic union often creates tensions between the host country and another member country which is a target of exports. For example, Nissan's investment in the United Kingdom created tensions between the United Kingdom and France in the late 1980s because France refused to accept Nissan cars as 'European' to protect French automobile producers. Chapter 8 develops a model which can examine such tensions. In particular, we analyse the conflict between the two countries in the specification of the level of local content of inputs for the foreign firms. We find situations where the host country would want a less severe restriction on local contents than the other country, and vice versa. We consider two cases depending on whether or not the foreign firms have the outside options of investment.

Lobbying by domestic interest groups plays an important role in a government's policy-making decisions. Chapter 9 focuses on lobbying by trade unions in the determination of an LCR on foreign firms. Workers welcome FDI since it can generate employment. Without local content requirements, however, foreign firms may use only foreign parts and therefore reduce demand for domestic workers. Thus there is an incentive for workers to lobby the government to impose a local content requirement, which in turn harms consumers since it raises the price of the commodity. Furthermore, since stricter local content requirements may drive FDI out of the country, it may not be in the interest of the workers to lobby for the strictest control. We examine the properties of the level of the restriction on input contents that satisfies the political equilibrium.

One of the deficiencies in the analysis in chapter 7 is that we assume the number of domestic firms to be exogenously given but the number of foreign firms to be endogenous. This assumption was made because under free entry and exit of the two heterogeneous groups of firms in an oligopolistic market for a homogeneous good, only the more efficient group will exist in the equilibrium and the less efficient group will be driven out of the market. Chapter 10 extends the model of chapter 7 by endogenising the number of domestic firms and assuming that the foreign and the domestic firms produce differentiated commodities. This

chapter thus allows us to analyse the phenomenon of cross-hauling, i.e., the simultaneous inflow of foreign firms and outflow of domestic firms. The instrument used here is not an LCR but lump-sum subsidies to the two groups of firms. Therefore chapter 10 is not only different in terms of the model structure but also analyses an instrument which is widely used in practice to attract FDI. For example, subsidizing a site for the setting up of FDI is commonplace. We analyse the effect of discriminatory and uniform subsidies on the inflow/outflow of domestic and foreign firms and on employment. We also derive some properties of optimal subsidies.

1 Cost asymmetry and industrial policy in a closed economy

1.1 Introduction

Oligopolistic firms restrict their production and earn excess profits. Since an increase in competition is considered to raise each oligopolist's production and make it closer to the first-best level, it is commonly believed that increasing competition among firms raises national welfare. With this theoretical underpinning, antitrust policies are generally designed so that new entries are encouraged and entry barriers are strictly prohibited.

Recently, however, it has been found in the theoretical literature on industrial organization that more competition may well reduce welfare in various contexts. For example, Spence (1984), Stiglitz (1981) and Tandon (1984), while analysing R&D decisions under oligopolistic situations, have pointed out the possibility of welfare loss caused by the existence of potential entrants or by free-entry of identical rival firms. Schmalensee (1976), Suzumura and Kiyono (1987) and von Weizsäcker (1980a, b) found that in a Cournot oligopolistic sector the optimal number of (identical) firms may well be smaller than the equilibrium number of firms with free entry and exit.[1] In these models, the existence of fixed costs (or increasing returns to scale) plays a crucial role in deriving diseconomies of competition. While a new entry raises consumers' surplus, it requires an additional fixed cost. It is shown that the latter cost may well exceed the former benefits.

In this chapter we focus on an asymmetric oligopolistic industry with a fixed number of firms. An uneven technical level amongst firms provides the key ingredient. In the presence of marginal cost differential among firms, less efficient firms have lower market shares than the others. Thus, elimination of a minor firm raises the average efficiency of production in the industry, though at the same time it creates a more oligopolistic market structure that causes total output to decrease and thus consumers' surplus

[1] For a more recent analysis of entry–exit policy, see, for example, Agarwal and Barua, 1994; Asplund and Sandin, 1999; Hamilton and Stiegert, 2000.

to decline. This chapter shows that such an improvement in production efficiency may well exceed the welfare loss caused by a more oligopolistic market structure.

The mechanism is rather related to the effect of licensing in Katz and Shapiro (1985), in which they find that, under Cournot oligopoly, a firm's licensing to the other may well reduce total surplus. In order to highlight the difference in mechanism, we ignore the existence of fixed costs. In this setting the perverse beneficial effect of elimination of a firm presented by Schmalensee and others disappears, and yet elimination of a minor firm is shown to increase national welfare.

The basic model is spelt out in section 1.2. Section 1.3 then derives the welfare effect of a cost reduction in a firm, or elimination of it, under general demand and cost functions. It derives critical values of market shares of a firm below which helping the firm reduces national welfare or elimination of it maximizes national welfare. In section 1.4, we consider linear demand and cost functions and obtain numerical values of these critical shares for different values for the number of firms in the industry. Section 1.5 considers a tax-cum-subsidy policy (financed through lump-sum taxation) and derives a critical share of a firm below which subsidizing it reduces national welfare. Finally, in section 1.6 we draw some conclusions.

1.2 The model

Suppose there are n firms producing a homogeneous commodity. We assume constant returns to scale throughout and perfect factor markets so that the marginal (or average) cost of each firm – c_j for firm j – is constant.[2] The technical level of a firm may however differ from that of another firm, i.e., typically $c_i \neq c_j$ for $i \neq j$. Firm j maximizes profits given by

$$\pi_j = [f(D) - c_j]x_j \tag{1.1}$$

à la Cournot, where x_j is firm j's output, D is the total output or demand satisfying $D = \sum x_j$, and $f(\cdot)$ is the inverse demand function, i.e., $p = f(D)$, where p is the price of the commodity. The optimal behaviour of

[2] The model can be viewed as a part of a general equilibrium framework in which there is another competitive sector and one factor of production which is perfectly mobile within a country between the two sectors. The competitive sector, which produces the numeraire good, ties down the factor price. Therefore, as far as the oligopolistic sector is concerned, the marginal costs can be taken as given. Moreover, if one assumes the utility function to take a particular (quasi-linear) form as in Krugman (1979), the demand function would be independent of income as it is here.

firm j satisfies

$$\frac{\partial \pi_j}{\partial x_j} = f'(D)x_j + f(D) - c_j = \mathrm{MR}^j - c_j = 0 \tag{1.2}$$

for $j = 1, \ldots n$.

We make two standard assumptions:

$$f' < 0 \quad \text{and} \quad \mathrm{MR}^j_x \ (= f''x_j + f') < 0. \tag{1.3}$$

The first inequality simply means a negatively sloped demand function. The second is a conventional stability condition for Cournot oligopoly (see, for example, assumption (A2) in Hahn 1962).

National welfare W is given by the sum of producers' and consumers' surplus, i.e., $W = \sum_{j=1}^{n} \pi_j + \mathrm{CS}$. It is well known that consumers' surplus CS satisfies $d\mathrm{CS} = -Ddp$ so that

$$dW = d\left(\sum_{j=1}^{n} \pi_j\right) - Ddp. \tag{1.4}$$

Using the above model, in the following section we analyse the effect of technical progress – or, equivalently a reduction in the marginal cost – of a firm on national welfare. Without loss of generality, we deal with the effect of changes in firm 1's marginal cost c_1 on welfare.

1.3 Cost reduction and national welfare

Using the model developed in section 1.2 we examine the effect of a firm's cost reduction on national welfare. It will be shown that a minor firm's cost reduction reduces welfare.

Differentiating (1.1) and (1.2) totally and then substituting the relevant terms in (1.4) yield

$$(-\Delta) \cdot \frac{dW}{dc_1} = -x_1 \left\{ 2\left(f' + \sum_{j \neq 1} \mathrm{MR}^j_x \right) + \mathrm{MR}^1_x \right\} + \sum_{j \neq 1} x_j \mathrm{MR}^j_x \tag{1.5}$$

where

$$\Delta = f' + \sum_{j=1}^{n} \mathrm{MR}^j_x < 0. \tag{1.6}$$

The first term on the right-hand side of (1.5) is negative whereas the second term is positive. Therefore, a cost reduction in firm 1 has two opposing effects on welfare. These two effects can be explained as follows. First, a reduction in c_1 results in an increase in total output, which clearly