

**COMPETITION LAW FROM A
DEVELOPMENTAL PERSPECTIVE**

**THE IMPACT OF COMPETITION LAW REGIMES
ON DYNAMIC EFFICIENCY**

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ABSTRACT

This thesis assesses the appropriateness of different competition law regimes for developing economies, from the objective of attaining economic development through technological progress. It provides an empirical analysis of the effects of a dynamic approach to competition law – a rule-of-reason doctrine and flexible legal provisions – on dynamic efficiency and technological deepening in developing countries. The results confirm that countries with a rule-of-reason doctrine in place have significantly higher rates of R&D expenditures. Moreover, the validity of doctrine as a determinant of R&D expenditures holds in a multivariate context. Consequently, recommendations by international agencies for developing economies to implement a simple competition law with a per se doctrine, seem inappropriate and may have adverse effects on economic development.

CONTENTS

1.	Introduction	4
2.	The Economic Rationale of Competition Law	5
2.1	Competition Defined	5
2.2	Economic Efficiency	5
2.2.1	Welfare Effects of Perfect Competition	7
2.2.2	Welfare Effects of Distortions of Competition	8
2.3	Dynamic Efficiency	9
2.3.1	Monopoly Power as an Incentive to Innovate	9
2.3.2	Oligopolistic Rivalry and the Pace of Innovation	10
2.3.3	Competition as an Incentive to Innovate	10
2.4	Theoretical Approaches to Competition Law	11
2.4.1	Structuralist School	11
2.4.2	Chicago School	12
2.4.3	Austrian and Evolutionary Schools	12
2.5	Summary	13
3.	Legislative Frameworks for Competition Law	14
3.1	Objectives	14
3.2	Instruments	15
3.2.1	Structural Provisions	15
3.2.2	Behavioural Provisions	16
3.3	Practical Approaches to Competition Law	17
3.3.1	Antitrust Law in the United States	17
3.3.2	Competition Law in the European Union	18
3.3.3	Competition Law in Transition Economies	19
3.3.4	World Bank-OECD and UNCTAD Model Competition Laws	20
3.4	Summary	21
4.	International Trade and Competition	22
4.1	Competition as a Source of International Trade	22
4.2	International Trade and Economic Efficiency	22
4.2.1	Trade between Perfectly Competitive Markets	22
4.2.2	Trade under Imperfect Competition	23
4.3	International Trade and Dynamic Efficiency	24
4.4	Trade Policy	25
4.5	Interactions between Competition Law and Trade Policy	26
4.5.1	Import Liberalisation as Market Discipline	26
4.5.2	Strategic Application of Competition Law	26
4.5.3	Complementary Enhancement of Effectiveness	27
4.6	Summary	28

5.	Competition and Competition Law in a Developmental Context	28
5.1	Characterisation of Developing Economies	28
5.1.1	Intensity of Competition	28
5.1.2	Market Failures	29
5.1.3	International Trade and Trade Barriers	29
5.2	Drivers of Economic Development	30
5.2.1	Competition and Economic Growth	30
5.2.2	Technological Progress and Economic Development	30
5.3	Implications for Competition Law	31
5.3.1	Optimal Rate of Competition	32
5.3.2	Dynamic Approach to Competition Law	32
5.3.3	Practical Implications for the Design of Competition Law	32
5.4	Summary	33
6.	Empirical Analysis	34
6.1	Analytical Framework	34
6.1.1	Dynamic Efficiency and Technological Deepening	34
6.1.2	Characteristics of a Dynamic Approach to Competition Law	35
6.1.3	Other Determinants of R&D Expenditures	35
6.2	Data	36
6.3	Methodology	38
6.4	Results	39
6.4.1	Determinants of Competition Law Doctrine	39
6.4.2	Bivariate Analysis: Competition Law and R&D Expenditures	41
6.4.3	Multivariate Cross-Section Analysis	42
6.4.4	Multivariate Analysis with Time Dimension	45
6.5	Summary	47
7.	Discussion and Policy Implications	48
7.1	Elements of a Dynamic Approach to Competition Law	48
7.1.1	Rule-of-reason Doctrine	48
7.1.2	Other Dynamic Provisions of Competition Law	50
7.1.3	Trade Policy	51
7.2	Policy Implications	51
7.3	Suggestions for Further Research	52
8.	Conclusion	53
	References	55
	Appendix 1: Competition Laws	62

1. INTRODUCTION

It is a conventional belief that a competitive economic climate could substantially enhance economic efficiency, benefit consumers by keeping prices low, and herewith spur economic development. For these reasons, many developing countries have adopted competition laws over the past twenty years. The primary objective of competition law is to protect competition by prohibiting certain forms of firm behaviour that are assumed to distort a competitive climate. Most of the competition laws adopted in developing countries were drafted after the example of competition legislation in the United States or the European Union, or based on competition law templates drafted by the World Bank, the OECD and UNCTAD.

However, these competition laws that were taken as an example, are tailored to specific conditions in developed, industrialised economies. Since economic as well as institutional conditions in developing countries differ substantially from those in developed countries, it is questionable whether the use of these laws as legal templates would be appropriate for developing economies. Under deviating market conditions, it is likely that competition has additional effects on economic performance, different from the alleged efficiency benefits and perhaps even compromising them. From this perspective, a strict competition law, enforcing a vigorous competitive climate, is not necessarily in the interest of economic development.

From a development-driven perspective, another aspect to consider is the specific role competition plays in supporting or fulfilling the requirements for economic development. One of the key drivers of economic development is thought to be technological progress. Various channels to obtain technological advances are affected by the competitive climate in domestic or international markets. Competition, however, does not unambiguously spur technological progress. Departing from the objective to enhance economic development through technological improvement, the unequivocal promotion of competition might not be appropriate. It is in this context that recently, various scholars have called for a flexible approach to competition law in developing countries, different from the legal regimes currently applied (Metcalf and Ramlogan, 2005; Singh, 2002 and 2003; Singleton, 1997; amongst others). Based on these considerations on the role of competition in long-term economic development, the core problem statement of this thesis was formulated as follows.

What approach to competition law is most appropriate for developing countries, from the objective to enhance economic development through technological progress?

In order to address this question stepwise, several sub-questions were identified that will be embarked upon in the following chapters.

1. *What functions of competition constitute the rationale for its regulation?*
2. *What theoretical approaches to the regulation of competition can be distinguished?*
3. *What practical approaches to competition law can be distinguished?*
4. *Does international trade alter the effects of domestic competition and its regulation?*
5. *Do deviating market conditions in developing economies alter the effects of competition?*
6. *How can technological progress be achieved in developing economies?*
7. *What approach to competition law maximises technological progress?*

While the first six sub-questions are examined through a review of the literature alone, the seventh sub-question will also be addressed by an empirical analysis of the economic and legal determinants of general expenditures on research and development (R&D).

Chapter 2 will provide a theoretical overview of the different functions of competition that constitute the economic rationale for its protection (*sub-question 1*). Not only the merits of competition regarding economic efficiency are emphasised, but also the ambiguous effects of competition on technological progress are highlighted. This chapter will also provide a review of the different schools of thought on competition and its regulation (*sub-question 2*). Chapter 3 will address various practical aspects of the design of competition legislation, and will subsequently introduce the competition law regimes of the United States, the European Union and transition economies in Central and Eastern Europe. Additionally, the model competition laws drafted by the World Bank, OECD and UNCTAD will be evaluated (*sub-question 3*). Chapter 4 can be considered as an intermezzo that illustrates the effects of international trade on economic efficiency and technological progress on trading economies. It will subsequently discuss the coherence between competition law and trade policy (*sub-question 4*). Chapter 5 will provide a market characterisation of developing economies, emphasising the deviating effects of competition under such conditions (*sub-question 5*). It will further discuss the various channels for technological progress (*sub-question 6*). Based on these theoretical considerations, implications for competition law in developing countries will be drawn (*sub-question 7*). The features of competition law identified here will form the basis of an empirical assessment of their impact on R&D expenditures. The statistical results of the analyses are presented in Chapter 6, while Chapter 7 will discuss the results and their implications for competition legislation. Chapter 8 will provide a conclusion on the main findings and recommendations.

2. THE ECONOMIC RATIONALE OF COMPETITION LAW

Since long, competition is considered to be a desirable mechanism in the market that can enhance economic efficiency and, inherently, social welfare. Most countries, either industrialised or developing, have therefore adopted competition laws with the objective to protect a competitive economic climate. The following chapter will in its first section provide a short overview of the different views on the concept of competition. In order to illustrate the economic rationale for competition law, sections 2 and 3 will then respectively introduce the concepts of economic and dynamic efficiency as functions of competition. The fourth section will present a review of the main schools of thought on the appropriate role of competition law, based on different views on the concept of competition and its functions.

2.1 Competition Defined

Adam Smith (1776) already acknowledged that competition, or, more appropriately, rivalry in the marketplace could function as an ‘invisible hand’ that would lead to efficient resource allocation, which would be in the interest of both consumers and producers. He regarded competition as a firm-level, behavioural concept, defined by a striving for potentially incompatible positions in the market (Scherer and Ross, 1990, p. 16). In the competitive process, each firm ultimately desires to be a monopolist. This definition is distinguished from the characterisation of competition that emerged in the late nineteenth century. Competition was then defined by the number of sellers and the nature of the products as determinants of market structure (Table 2.1). In this structural approach, firm concentration ratios serve as an indicator of competition intensity. ‘Perfect’ competition is thus perceived as an end-state equilibrium, in contrast to the perception of competition as a continuous process of rivalry.

Table 2.1 Market Structure

	Number of sellers		
	One	A Few	Many
Homogeneous products	Pure monopoly	Homogeneous monopoly	Perfect competition
Differentiated products	Pure multiproduct monopoly	Differentiated oligopoly	Monopolistic competition

(Source: Scherer and Ross, 1990, p. 17)

2.2 Economic Efficiency

The primary function of competition is to enhance *economic efficiency* in the market. Economic efficiency is also known as *static efficiency*, as it considers the welfare effects of competition at a certain point in time, namely, in a competitive equilibrium. Distortions of

competition can diminish these welfare effects, specifically at the burden of consumers. In this static context, technological change and economies of scale are left out of consideration.

2.2.1 Welfare effects of perfect competition

A market is considered to be perfectly competitive when there are many firms selling a homogeneous product and no individual firm is able to substantially influence the market price by varying the quantity of its output (Scherer and Ross, 1990, p. 16). Other conditions for perfect competition are free entry and exit, resource mobility, perfect information, no transaction costs and no externalities (Martin, 1994, p. 15). In a perfectly competitive market, an equilibrium can be attained that is Pareto optimal. *Pareto efficiency* or *economic efficiency* requires that net social welfare cannot be increased without harming others (Pareto, 1906). The essential features of the competitive equilibrium are illustrated in Figure 2.1.

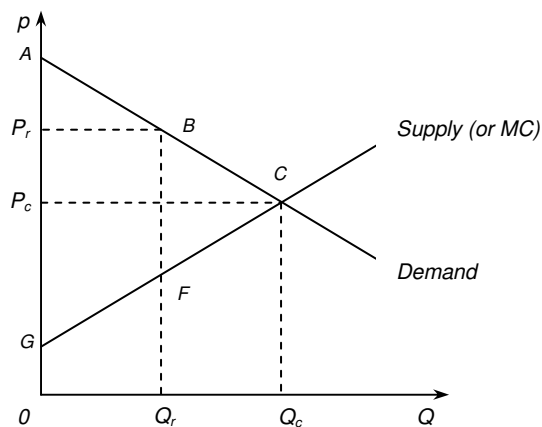


Figure 2.1 Welfare effects of perfect competition

From the objective of profit maximisation, any firm as a price taker will choose its output at a level that equalises marginal cost (MC) and market price (p). It would only be profitable to expand output as long as the marginal revenue (MR) from selling one more unit exceeds MC (Carlton and Perloff, 2000, p. 59). This ultimately leads to an equilibrium market price (P_c) and output (Q_c). Industry profit or *producer surplus* is maximised when $MC = p$ and encompasses area P_cCG . Area AP_cC represents *consumer surplus*. At any point on the demand curve before reaching P_c , consumers gain, as the price they have to pay is lower than the price they are willing to pay. *Total surplus* is the difference between total willingness-to-pay and total cost, and equals the sum of consumer surplus and producer surplus (area ACG). The inference that competition ultimately leads to a maximisation of total surplus (analogous to total welfare) implies an efficient allocation of society's overall resources (OECD, 2004). One of the subsets of economic efficiency is therefore described as *allocative efficiency*. Other aspects of economic efficiency are *productive efficiency*, since competition stimulates the efficient use of firms' resources, and *distributive efficiency*, when production factors are rewarded in accordance to their market value (Lachmann, 1999).

2.2.2 Welfare effects of distortions of competition

To the detriment of economic efficiency, competition can be distorted by the manifestation of *market power*. Market power is defined by Motta (2004, p. 40) as ‘the ability of firms to set prices above marginal costs’. One example of a competitive distortion is the emergence of a *cartel*, under which firms agree to raise or fix prices. Figure 2.1 illustrated that when output is restricted to Q_r , price will increase to P_r . Depending on demand elasticity, producer surplus could then increase (area P_rBFG), but consumer surplus will decrease. Most importantly, compared to the case of perfect competition, total surplus will decrease with area BCF . This is considered to be a welfare or *deadweight loss* for society as a whole (Tirole, 1990, p. 67).

The exercise of *monopoly* power, the most extreme form of market power (Motta, 2004, p. 41), may also result in economic inefficiencies, illustrated in Figure 2.2. Even though a monopolist is a price maker (Martin, 1994, p. 23), he still faces a downward-sloping demand curve, which implies that price levels must decrease in order to sell additional units. Elasticity of demand determines the change in demand as a response to a one percent price increase and therefore controls marginal revenue. To maximise profit, the monopolist will choose an output level that equalises marginal cost (MC) and marginal revenue (MR). For convenience, we assume that average cost (AC) is constant and equals MC . Consequently, the monopolist will supply output Q_m against price P_m . The price level P_m , exceeding MC , implicates that less is sold than in a competitive market where p equals MC (Carlton and Perloff, 2000, p. 97).

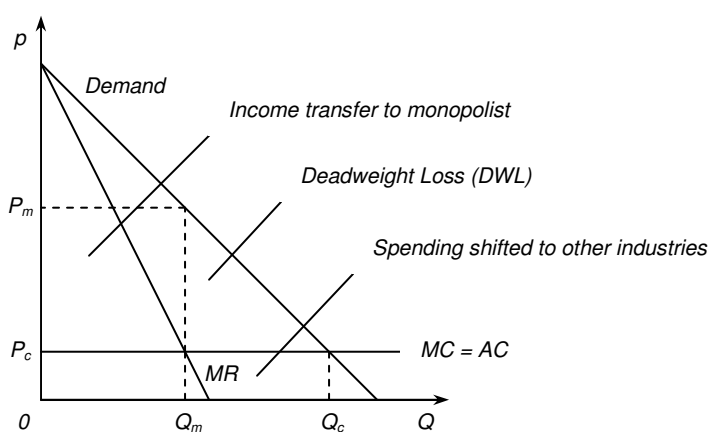


Figure 2.2 Monopoly (Source: Martin, 1994, p. 28)

In exceptional cases, a monopoly can be efficient. When a monopolist can produce at lower cost than two or more firms, it is called a *natural monopoly* (Carlton and Perloff, 2000, p. 101). Yet in general, if market power is employed, society not only suffers a deadweight loss but will also face a welfare transfer from consumers to the monopolist or colluding producers, implying a loss of consumer surplus. Therefore, competition law aims to curb the exercise of market power, in order to prevent resource misallocation that has total welfare reducing as well as income-redistributing effects (Martin, 1994, p. 29).

2.3 Dynamic Efficiency

Besides achieving economic efficiency within a short timeframe, it is important that an industry is able to increase efficiency and social welfare in the long run. Accordingly, technological progress or *dynamic efficiency* is important to an industry when we consider economic performance in a long-term perspective. A *product* innovation can shift the demand curve to the right, while a *process* innovation can lower the marginal cost of producing a product and herewith lower the supply curve. In a competitive market, dynamic efficiency will eventually increase future economic efficiency and social welfare (Creusen, 1997).

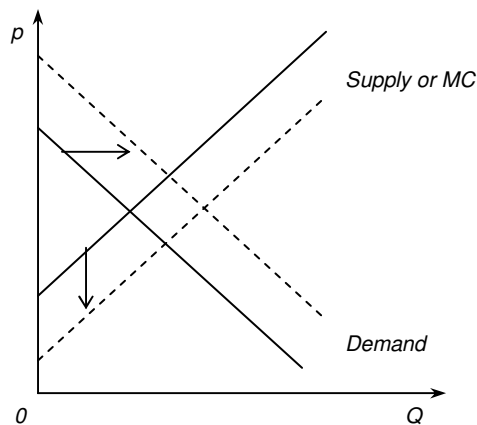


Figure 2.3 *Dynamic efficiency* (Source: Creusen, 1997)

While most economic scholars concur that competition promotes static economic efficiency, there is considerable disagreement on the impact of competition on dynamic efficiency. As technological change requires substantial investments in R&D with returns that are far from secure, firms need to be provided with an incentive to make these investments. Whether monopoly power or competitive pressure will spur these incentives is subject to discussion.

2.3.1 *Monopoly power as an incentive to innovate*

Joseph Schumpeter (1942), in his dynamic view of the economy, considered perfect competition to be an ‘utopian’ market structure and even contested its desirability (Blaug, 2001). He stated that monopoly situations would render more innovation. First, as monopolists face less market uncertainty and reap higher profits, they can more easily fund R&D. Second, the incentive to invest in R&D is greater for monopolists, as the prospect of monopolistic rents is more attractive than profits earned in a competitive market, particularly in consideration of the risk of imitation (Rey, 1997). Arrow’s ‘replacement effect’ (1962) further nuanced this claim by distinguishing between incentives provided by the *prospect* of monopoly and an *actual* monopoly. Arrow contended that a monopolist would proportionally gain less from innovation than a competitor, as he essentially cannot improve his position on the marketplace, while a competitor can *become* a monopolist. Hence, the incentive to innovate would be lower

for a monopolist. Conversely, when his monopolistic position is threatened by potential entry, a monopolist is encouraged to innovate in order to *remain* a monopolist. This incentive could even be greater than the incentive of a new entrant to become a duopolist (Tirole, 1990, p. 393).

2.3.2 *Oligopolistic rivalry and the pace of innovation*

Scherer and Ross (1990) captured the *pace* of innovative activity in a time-cost trade-off function, taking into account the number of competitors. Accelerating the pace of R&D is more expensive, but allows the firm to recoup its investment earlier, avoiding the threat of imitation. In setting the time frame for innovation, a firm maximises the difference between the discounted present value of the marginal profit from early innovation and the discounted present value of the marginal cost of accelerating innovation. The risk of imitation might even become too high for innovative activity to occur at all (Scherer and Ross, 1990, pp. 630-633). One should thus expect that the relationship between market concentration and the level of R&D is inversely U-shaped. Aghion *et al.* (2002), Levin *et al.* (1985) and Scott (1984) found strong empirical evidence for this hypothesis. Boone (2001) also argues that the relationship between the intensity of competition and the incentive to innovate is non-monotone. He contends that, as competition intensity (but not necessarily market concentration) increases, the identity of the innovator will change, for the leader will reinforce its dominance.

2.3.3 *Competition as an incentive to innovate*

Geroski (1990) found that higher seller concentration and increases in other monopoly-related variables negatively influenced innovative activity. However, his results also revealed that monopoly power led to larger time-lagged profit margins, which had an indirect favourable impact on innovation. Yet, the direct negative effect of increased seller concentration on innovation greatly offset the indirect positive effect (Scherer and Ross, 1990, p. 649). Rey (1997) argues that, when *agency problems* are substantial, measured by the need for external finance, firms tend to behave conservatively by delaying R&D investments. They only innovate in order to prevent to be driven out of the market. When competition intensifies, this moment will occur sooner and thus the rate of innovation will be higher.

It can so far be concluded that the relationship between competition and technological progress is rather ambiguous. Yet, it is acclaimed that enhancement of dynamic efficiency might entail a certain degree of static inefficiency due to (temporary) exercise of market power. This implies that a maximisation of competition intensity is not always desirable. This could have critical implications for the strictness of competition law and its enforcement, as unequivocally condemning the exercise of market power might negatively affect long-term dynamic efficiency.

2.4 Theoretical Approaches to Competition Law

Considering these divergent views on the effect of competition on economic and dynamic efficiency, it is not surprising that scholars think differently on the appropriate role and design of competition law and policy as instruments to regulate the intensity of competition. Three schools of thought form the foundation of current approaches to competition law.

2.4.1 *Structuralist school*

The Structuralist school has its roots in the Harvard school of Industrial Organisation that rejected the model of perfect competition as a prescription for economic policy and adopted more realistic norms for judging market conditions. Clark (1940) introduced the concept of 'workable competition' as the new competitive ideal and developed a set of criteria for the market (Cook *et al.*, 2003). These criteria referred to market structure, conduct and performance. The Structure-Conduct-Performance paradigm, subsequently introduced by Bain (1951) and refined by Scherer (1970) emphasises the causal relationship between market structure, anticompetitive business conduct and industry performance. It is based on the assumption that firms operating in highly concentrated markets are more likely to engage in strategic anticompetitive behaviour (Khemani and Dutz, 1995). Its resulting improved performance further enables a firm or group of firms to exercise market power, which reversely influences market structure (Cook *et al.*, 2003). From this perspective, high market concentration will inherently lead to a low degree of competition, appointing market structure as the source of strategic anticompetitive behaviour of firms. The Structuralist school nevertheless acknowledges the need of a certain degree of market concentration to provide capacity to invest in R&D, eventually resulting in an increase in dynamic efficiency (Voigt and Schmidt, 2003).

The Structure-Conduct-Performance paradigm accordingly dictates a highly interventionist competition policy, concentrating on market structure. Competition law and its enforcement should be stringent, in order to restrict anticompetitive conduct and to control the level of market concentration. In the Structuralist approach, legal provisions prescribing norms of fair conduct and constraining the growth of large firms are important instruments. Also deconcentration and improved income distribution are seen as valid objectives of competition law (Khemani and Dutz, 1995). Incidentally, lagging technological progress may require active intervention in market structure in a reverse direction, increasing firm concentration by, for example, encouraging mergers (Voigt and Schmidt, 2003).

2.4.2 *Chicago school*

The Chicago school, represented by Alchian (1950), Peltzman (1976), Posner (1972), and Stigler (1971), criticised the Structuralist assumption that firm behaviour and market performance are solely associated with market structure (Cook, 2002). According to the Chicago school, competition is considered to be a process wherein economic efficiency can be attained, irrespective of market structure. Even highly concentrated industries can be associated with efficiency, as firm profits are perceived as a result of higher efficiency through economies of scale and innovation. Prohibiting firms to achieve these efficiencies would be irrational (Voigt and Schmidt, 2003). Accordingly, also dynamic efficiency gains are acknowledged in this respect. In the long run, only the most efficient firms survive in a competitive market, which results in an equilibrium-resembling market situation.

Emphasising the efficiency benefits of the competitive process, the Chicago school advocates a minimalist, *laissez-faire* approach to competition policy. Government intervention in competitive markets is perceived as the main source of inefficiencies (Martin, 1994 p. 2). Government should thus refrain from disciplining firms that, for example, have achieved a dominant position or that have co-operated vertically with the purpose of enhancing firm efficiency and innovation (Singleton, 1997). Competition legislation is not to be completely abolished though, as the Chicago school recognises that in some cases, market dominance or collusive practices can lead to static inefficiency. As predictability is highly valued in this approach, simple, straightforward rules are applied (Voigt and Schmidt, 2003). Competition policy in general should be primarily directed towards the removal of governmental and regulatory barriers.

2.4.3 *Austrian and Evolutionary schools*

The Austrian and Evolutionary schools share the Chicagoan view of competition as a dynamic process in which firms constantly adapt to changing market opportunities. However, these schools differ fundamentally from the Structuralist and Chicago schools of thought, as they reject the possibility and objective of reaching a competitive equilibrium in the long run. They consider the market to be inefficient by nature and in constant, endogenous change, which is of an innovative (Austrian school) or evolutionary character. The works of Schumpeter (section 2.3.1, p. 9) form the foundation of both schools. Profits that are earned are not seen as inefficiencies, but as a sign of firms adapting to a changing environment by differentiating their behaviour (Cook, 2002). Accordingly, competition not simply occurs on the premise of price competition, but is predominantly driven by technological progress, being the essential force in attaining long-term social welfare gains (Metcalf, 2000). Dynamic efficiency instead of static efficiency is therefore emphasised in both schools as the primary function of competition.

The Austrian and Evolutionary schools prescribe a relatively laissez-faire but broad competition policy that provides incentives for investments in technological progress. Government should be reluctant to intervene in the competitive process as this may hamper innovation. Only monopolies that display very little innovative activity could be regulated, but this is not considered crucial, as competition will ultimately ensure that market power is only temporary (Audretsch *et al.*, 2001). A judicial case-by-case analysis of the dynamic efficiency effects is therefore required when excessive market power is diagnosed. Free entry and exit should be protected and institutions such as property and contract law that provide incentives should be strengthened (Singleton, 1997). In essence, government's main role to fulfil is to ensure that sufficient market capacity for innovation is available.

2.5 Summary

This chapter provided an illustration of the effects of competition on market performance. Economic efficiency, supposedly maximised in a perfectly competitive market, is considered to be a principal function of competition. The economic rationale for competition law is therefore to prevent distortions of competition due to the exercise of market power, by regulating market structure and by prohibiting anticompetitive behaviour. The effects of competition on dynamic efficiency are tentative, however. It is generally acclaimed that economic and dynamic efficiency require a trade-off. The various schools of thought reviewed all take a distinct approach in defining the role of competition and its regulation, from either a structural or dynamic perspective. As such, these schools form the foundation for the design of competition laws around the world. The next chapter will therefore provide a review of various competition law regimes in force, often functioning as a template for competition law design in developing countries. It will discuss in further detail the practical design of competition law and the various legal instruments available to regulate the intensity of competition, incorporating both economic and dynamic considerations.

3. LEGISLATIVE FRAMEWORKS FOR COMPETITION

While legislation in the field of competition or anti-trust is not a new concept, in developing economies it gained enormous momentum since the early nineties. Between 1995 and 2003, the number of countries with competition law regimes in place rose from 35 to more than 100. Additionally, many more countries are currently in the process of drafting competition laws (Nicholson, 2004). Industrialisation and new opportunities to exploit economies of scale and scope in a large single market appear to function as incentives for the adoption of competition legislation (Motta, 2004, p. 2). Canada and the United States were frontrunners by being the first to introduce competition legislation in 1889 and 1890, respectively. In the European Union, both at a national and supra-national level, enactment of competition legislation emerged in the post-war 1950s. The recent proliferation of competition law in developing countries is spurred by economic development and market-oriented reform policies.

This chapter will elaborate on the design of competition law in practice as opposed to the theoretical approaches proposed in the previous chapter. The first section will shortly indicate what objectives generally are included in competition laws around the world. The second section will introduce the instruments provided in the law that are used to achieve these objectives. The third section will highlight and position the competition law regimes of the United States, the European Union and transition economies. Additionally, this section will elaborate on the models of competition law proposed by the World Bank-OECD and UNCTAD to serve as templates for competition law in developing countries.

3.1 Objectives

According to an OECD survey (2003), most competition laws include as their principal objective ‘the protection and promotion of the competitive process in order to maximise economic efficiency’. Obviously, differences in terminology exist across countries in expressing these objectives: ‘greater economic or societal welfare’, ‘protecting consumer interests’ or ‘the freedom of economic action of market participants’ are also frequently mentioned as primary objectives (OECD, 2003). This rather general terminology often leads to interpretative confusion regarding the distribution of welfare among consumers and producers. For instance, a distinction between static or dynamic efficiency is often not made, while it is also unclear whether ‘welfare maximisation’ is intended to encompass consumer welfare or net social welfare. An objective to ‘enhance economic efficiency and protect consumer welfare’ is assumed to fit within a structuralist or Chicagoan approach to competition law.

In their competition law objectives, many countries expose a clear preference for economic efficiency and the protection of consumer interests over dynamic efficiency (Rodriguez and Williams, 1994). Swayed by the issues of the day, politicians prefer to materialise short-term goals. Promoting dynamic efficiency, requiring a trade-off with short-term consumer welfare, would be a long term and therefore non-popular policy issue.

In addition to a principal objective, many countries have integrated multiple secondary objectives in their legislation. These are often of a socio-political character and extend beyond the core objectives of competition law. According to the OECD survey (2003), such secondary goals may include the promotion of employment, regional development, small and medium enterprise development, economic stability, poverty alleviation, democratisation or other interests. A major drawback of including multiple objectives is the increased risk of conflicting interests and ensuing inconsistent application of competition law due to political compromising. Hence, it would be preferable to pursue non-competition related objectives through separate governmental policies (Khemani and Dutz, 1995). It is worth noting that in developed countries, there has been a shift away from the inclusion of public interest objectives, in contrast to developing countries, where this is still common practice.

3.2 Instruments

Based on the distinct perspectives on competition, focusing on either market structure or firm behaviour, different legal instruments can be applied to prevent distortions of competition. Depending on the influences of different schools of thought, priorities in the application of these provisions vary across countries. Countries with competition law regimes rooted in the Structuralist school will generally emphasise structural provisions in their laws. In contrast, countries with a Chicagoan approach usually put more emphasis on conduct provisions.

3.2.1 Structural provisions

The core provision on market structure would be the condemnation of *market dominance*. Many countries have qualitative definitions of market dominance; other countries determine market dominance by a quantitative benchmark for market share (World Bank, 2002, p. 140). Benchmarks of market dominance vary greatly across the world: 20-45 percent in Africa, 30-40 percent in Eastern Europe and Central Asia, 50-75 percent in East Asia, 40-50 percent in the European Union and two-thirds or more in the United States (Harris *et al.*, 2001). Developing economies thus seem to apply lower benchmarks, which is rather illogical and can be considered extremely stringent, for small economies in general already expose higher concentration rates. A possible explanation for this stringency could be that under the pressure of market-oriented reforms, developing economies take an overly strict approach. The World

Bank – OECD model competition law (section 3.3.4, p. 20) also applies rather strict thresholds in this respect. It is explained in Chapter 4 that it can be in the interest of developed economies to have trading partners that have intense competition in their home markets. These recommendations for a strict approach might therefore partly stem from self-interests.

A second set of provisions that can be classified as structural, are provisions that prevent *mergers and acquisitions* from reducing the number of competing firms (Khemani and Dutz, 1995). Other forms of corporate unification, for example joint ventures, may also fall in this category. Mergers and acquisitions are generally initiated with the purpose of increasing efficiency from economies of scale and scope. Firms that intend to amalgamate may be required to notify the competition authority of their plans, prior to or after closure of the merger. Competition laws will therefore often include pre- or post-merger notification requirements.

An advantage of a structural approach, emphasising structural provisions, is that these rules can be fairly mechanistically applied, which might be preferable in developing countries with low institutional capacity. Yet very often, market shares do not adequately indicate if competition is distorted. Enterprises may then be unreasonably punished (Cook *et al.*, 2003). Furthermore, a strict, structural approach may also prevent firms from reaching the efficiency level that is needed in order to be competitive in international markets (Khemani, 1997).

3.2.2 Behavioural provisions

Competition law provisions that can be classified as behavioural condemn anti-competitive conduct, either unilateral or collusive. *Horizontal restraints* are explicit or tacit collusive agreements between firms, also known as cartels. With the intent to artificially raise profits, firms may agree to restrict output, raise or fix prices, allocate customers, refuse to deal, or bid collusively (Lee, 2004). If domestic consumers are not injured, export cartels are sometimes exempted from these prohibitions, allowing firms to penetrate foreign markets more easily (Khemani and Dutz, 1995). *Vertical restraints* - upstream or downstream agreements between suppliers and purchasers - can occur in similar modes, with the exception of collusive bidding. Vertical restraints raise concerns for competition, as market power of major players can be increased and foreclosure effects may occur. However, cooperating vertically can also promote efficiency by overcoming certain market failures (Khemani and Dutz, 1995). Besides interfirm co-operation, also the behaviour of *single* firms exerting market power can distort competition. Prohibited unilateral conduct would be predatory or discriminatory pricing, refusal to deal, or other behaviour that can be classified as an *abuse of dominance*.

A comparison of both approaches leads to the inference that a behavioural approach, requiring extensive research to find proof of malignant intent, is more skill intensive and therefore more costly than a structural approach (Cook *et al.*, 2003). If, as a result of limited capacity, enforcement of competition law is poor or even erroneous, it can have adverse consequences and even hurt a competitive climate.

3.3 Practical Approaches to Competition Law

In practice, the various schools of thought that were introduced in Section 2.4 (p. 11) have shaped competition laws in the United States and the European Union quite differently. The approach to competition law taken, reflects the trade-off between economic and dynamic efficiency.

3.3.1 Antitrust¹ law in the United States

In the United States, the flourishing ‘trusts’ of the 1880s triggered a strong lobby by farmers and small enterprises, who were hurt by the excessively high prices and unfair business practices these large corporations adopted (Motta, 2004, p. 5). Accordingly, the enactment of the Sherman Act in 1890 was a political response to this socially strong lobby and led to the dissolution of several large monopolies and cartels.

The core objective of the Sherman Act is to curb behaviour that restricts competition and enables monopolisation. In Section 1, the Act targets *horizontal restraints* by prohibiting ‘every contract, combination in the form of trust or otherwise, or conspiracy in restraint of trade or commerce’. *Market dominance* is condemned in Section 2, prohibiting monopolisation, attempts to monopolise and conspiracies to monopolise. The sole existence of a monopoly is not illegal though. Infringements of these provisions lead to a criminal conviction punished by a fine or imprisonment (Motta, 2004, p. 5). As the Sherman Act was drafted in rather vague wording, the Clayton Act of 1914 was enacted to target more specifically defined anticompetitive practices, outlawing price discrimination, exclusive dealing and tying contracts, acquisitions of competitors and interlocking directorates. In their *effect*, however, these practices had ‘to substantially lessen competition or tend to create a monopoly’. In spite of more recent legislation, the Sherman Act and the Clayton Act still form the core framework of antitrust policy in the United States (Viscusi *et al.*, 2000, p. 66).

The antitrust regime in the United States can be classified as relatively strict. Until the 1980s, the Structuralist school had a significant influence on US competition policy. The federal

¹ Strictly interpreted, ‘antitrust’ concerns only monopolistic power and interfirm co-operation that might inhibit competition. However, in general the term ‘antitrust policy’ in the United States is used as a synonym of ‘competition policy’ and can be used interchangeably, as is done in this thesis.

government regularly intervened on market structure by dissolving monopolies and vigorously controlling mergers prior to their closure. Horizontal agreements were declared illegal at all times. The clear, unequivocal drafting and strict interpretation of legal provisions in US competition law is characteristic of a *per se* doctrine, reflecting the belief that competition is a desirable thing ‘per se’ (Singh, 2002). By the 1970s, the Chicago school increasingly gained influence on antitrust policy in the United States. Together with a strong increase in foreign competition, this led to a shift towards a more lenient antitrust regime wherein government intervention was strongly curtailed (Singh, 2002). This opened up the way for the counterpart of the *per se* doctrine: the *rule-of-reason* doctrine. This approach allows for exemption after a case-by-case analysis of the economic and dynamic effects of the acts of conduct or dominance under consideration. In spite of this, antitrust policy in the United States is still considered to be one of the strictest regimes of the world.

3.3.2 *Competition law of the European Union*

In Europe, most countries adopted competition laws in the 1950s or later, addressing domestic competition. Simultaneously, the European Union enacts regulations on competition on a European level. Core legislation is centred on Articles 81 and 82² of the EC Treaty (1957). Member States’ legislation has gradually been amended in order to incorporate the principles of Articles 81 and 82. Therefore, national competition laws are fairly uniform (Audretsch *et al.*, 2001).

A remarkable aspect of EU competition policy is that European market integration is one of its core objectives. Competition policy should ensure that firms are allowed to compete on a level playing field in all Member States. Economic and dynamic efficiency are also primary objectives of EU competition legislation: ‘competition policy also serves as an instrument to encourage industrial efficiency, the optimal allocation of resources, technical progress and the flexibility to adjust to a changing environment’ (European Commission, 2000, p. 6).

Article 81(1) of the EC Treaty addresses horizontal and vertical agreements by prohibiting agreements that restrict competition by fixing prices, reducing output, sharing market or other anticompetitive practices. While this paragraph emphasises economic efficiency gains, Article 81(3) provides a loophole for the benefits of dynamic efficiency arising from inter-firm co-operation. It declares Article 81(1) inapplicable if an agreement ‘contributes to improving the production or distribution of goods or to promoting technical or economic progress, while allowing consumers a fair share of the resulting benefit’. Article 82 condemns abuse of a dominant position, but offers no exemption as Article 81(3), nor does it refer to any social welfare objective. Mergers are not regulated by the Treaty, but by Merger Regulation 4064/89

² The Treaty of Amsterdam amended the numbering: before 1997, Articles 81 and 82 were Articles 85 and 86.

that provides a legal basis for rather strict pre-merger control. According to Article 1 though, the European Commission only has jurisdiction if the merger is among large firms with a strong market position in several EU countries (Motta, 2004, p. 37).

At its emergence, European legislation reflected the influence of the Structuralist school. This can be recognised in the initial choice of legal instruments, emphasising structural provisions. (Audretsch *et al.*, 2001). However, the Austrian and Evolutionary schools had considerable impact on the European regime as well, providing flexibility in case of dynamic efficiency considerations and dictating a *rule-of-reason* doctrine of analysis. In contrast to the principal objective of U.S. antitrust policy to protect the competitive process at all times, the European Union may occasionally protect competitors with the intent to increase dynamic efficiency and consumer welfare in the long run.

3.3.3 *Competition law in transition economies*

During the nineties, as a component of their transition process, most countries in Eastern Europe and Central Asia adopted competition laws (Dutz and Vagliasindi, 2000). Currently, all countries in this region have competition laws in place. Initially, many transition economies applied a strict, structural regime in order to dissolve former state monopolies. Market concentration was therefore rigorously controlled, breaking up many dominant firms, sometimes even beyond efficiency levels. Later, most countries complied with the more dynamic competition law approach of the European Union, implementing a rule-of-reason doctrine. Nevertheless, several aspects of competition law were approached differently.

As historic relations between government and particular industries often remained tight, many transition economies explicitly declared their competition laws also applicable to national and regional government bodies (OECD, 2004). This deviation from the general application of behavioural provisions proved to be effective in targeting anticompetitive behaviour by governmental institutions at regional and local levels (Dutz and Vagliasindi, 2000; Yacheistova, 2000). The competition law of the Ukraine, for example, includes in its definition of an 'economic entity', all government bodies that engage in the production, sale or purchase of products or in other economic activities (UNCTAD, 2001). Another distinctive aspect of competition policy in transition economies is the concern that reforms can initially lead to high levels of unemployment and other social hazards. With the intent to curb these costs, firms are occasionally protected from competition and too rigorous economic reforms (OECD, 2004). For the same reason, the protection of various social interests is therefore often stated as a secondary objective of competition law. Yet as said in section 3.1, multiple objectives may conflict, ultimately inhibiting the achievement of primary goals and leading to inconsistencies in legislation (Khemani and Dutz, 1995).

3.3.4 World Bank-OECD and UNCTAD Model Competition Laws

As an encouragement to adopt and implement competition laws, several international organisations have drafted model competition laws. The World Bank and OECD published a model competition law in 1999, UNCTAD in 2003. These models are intended to serve as a template for developing countries wishing to enact competition laws.

The World Bank-OECD model (1999) states as its main objective 'to maintain and enhance competition in order ultimately to enhance consumer welfare'. The UNCTAD model (2003) intends 'to control or eliminate restrictive agreements or arrangements among enterprises, or acquisition and/or abuse of dominant positions of market power, which limit access to markets or otherwise unduly restrain competition, adversely affecting domestic and international trade or economic development.' The approach of both models is thus slightly different: the World Bank-OECD model focuses on economic efficiency and consumer welfare, while UNCTAD's model incorporates developmental objectives and includes the means to attain the goals mentioned (Lee, 2004).

Furthermore, both models follow the Structure-Conduct-Performance paradigm, including both structural and behavioural provisions. Most horizontal restraints are subject to *per se* illegality, while a few agreements can be exempted on the basis of efficiency gains to the benefit of the public. In the WB-OECD model, the remarkably low threshold criterion for horizontal agreements is a cumulated market share of 20 percent, whilst the critical market share for the establishment of dominance is only 35 percent. UNCTAD on the other hand adopts qualitative norms on these issues, which are then again more complicated to apply.

Both models can be considered to contain elements of the structuralist school as well as the Chicago school, possibly due to the strong influence of the United States in the international organisations that drafted these models. As further explained in section 4.2.2 (p. 23), the application of a strict approach in developing economies might also entail self-interests. Particularly the WB-OECD model is rather strict, proposing a *per se* doctrine and tight quantitative benchmarks. While this may provide legal certainty, ease enforcement and fit the lack of institutional capacity that developing countries often cope with, instruments can easily be applied wrongly. Herewith, dynamic efficiency gains can be disregarded or optimal business practices can be erroneously penalised (Lee, 2004).

3.4 Summary

After a review of the main objectives and provisions of competition law, the inference can be made that many jurisdictions have the promotion of economic efficiency and consumer welfare as the core objective of competition law. In several countries, through the influence of the Chicago school and the Austrian and Evolutionary schools, considerations of dynamic efficiency have gradually received more attention. This is reflected in the application of the rule-of-reason doctrine and a relatively permissive policy toward mergers, acquisitions and specific forms of interfirm cooperation. Besides the competition laws of the United States and European Union, model competition laws drafted by the World Bank, OECD and UNCTAD function as templates for competition law in developing countries. Overall, these models take a relatively strict approach to market concentration and anticompetitive conduct. It remains debatable whether these models or the approaches of the United States and the European Union are appropriate frameworks for competition law in developing countries. Deviating market conditions and requirements for development might lead us to conclude otherwise, which will be discussed later, in Chapter 5. First, Chapter 4 will demonstrate the effects of international trade on domestic competition and economic and dynamic efficiency. It will highlight trading partners' mutual interests in the implementation and enforcement of competition law, and will discuss the coherence between trade policy and competition law.

4. INTERNATIONAL TRADE AND COMPETITION

With global economic integration advancing, markets can no longer be considered to be purely domestic. International trade is an important source of competition in the marketplace, herewith impacting the economic and dynamic performance of national economies. International trade policy thus interacts with competition law in regulating the intensity of competition in the market. This chapter can be considered as an *intermezzo* that highlights the areas of interaction between trade and competition policy. After a short explanation on competition as a source of trade in the first section, the second section will illuminate how international trade affects economic and dynamic efficiency in trading partners' economies under conditions of perfect and imperfect competition. The third section will then expand on the coherence between and interchangeability of trade policy and competition laws.

4.1 Competition as a Source of International Trade

Classic explanations of international trade were based on the theory of comparative advantage, developed by Ricardo (1817) and extended by Heckscher and Ohlin (1933), Stolper and Samuelson (1941) and Rybczynski (1955). In essence, these models explain international trade by country differences in endowments of production factors. Trade on the basis of relative capital or labour abundance would improve both nations' net social welfare and increase international economic efficiency. This theory of *inter-industry* trade (Kenen, 2000, p. 127) could not be verified empirically, however. In contrast, Leontief (1953) found that the United States, relatively rich in capital, on balance exported labour-intensive goods and imported capital-intensive goods. This phenomenon of countries trading rather similar goods, is known as the *Leontief-paradox*. These *intra-industry* trade flows create competition on an international level. Explanations for these trade patterns revert to the field of industrial organisation and are based on industry-level models that focus on domestic market structure. According to these models, intra-industry trade flows are driven by imperfect competition, economies of scale and product differentiation rather than by differences in factor endowments (Martin, 2002, p. 383). In this context, trade is not necessarily welfare enhancing for all countries.

4.2 International Trade and Economic Efficiency

4.2.1 Trade between perfectly competitive markets

Under the assumption of two perfectly competitive markets, homogeneous goods, no transportation costs or other trade barriers, international trade can enhance economic efficiency

(Figure 4.1). Instead of two autarkic equilibria, a joint international equilibrium (P_E) is attained under which country A will import $s_0 - d_0$, from the low-cost producers in country B. Consumers in country A will gain from the price decrease (areas F and G), while producers will experience a profit loss due to increased competition from abroad (area F). In country B, increased exports ($g_0 - h_0$) will cause an increase in producer surplus (areas T, U and V) but a fall in consumer surplus (areas U and V) due to a price increase from P_B^* to P_E . International free trade will thus cause a net gain in social welfare equal to areas T and G and is therefore Pareto-improving (Södersten and Reed, 1994, p. 193; Winters, 1994, p. 83). Consequently, under perfect competition, international trade will lead to a more efficient allocation of goods, which enhances static efficiency. A reservation to this contention should be made in the case of *foreign direct investment* (FDI). If multinational firms earn profits in low-cost foreign markets, producer surplus will not accrue to domestic producers but flow abroad. As the loss in consumer surplus remains, net social welfare in the low-cost country will decrease. Under these circumstances, trade is not in the interest of both trading partners.

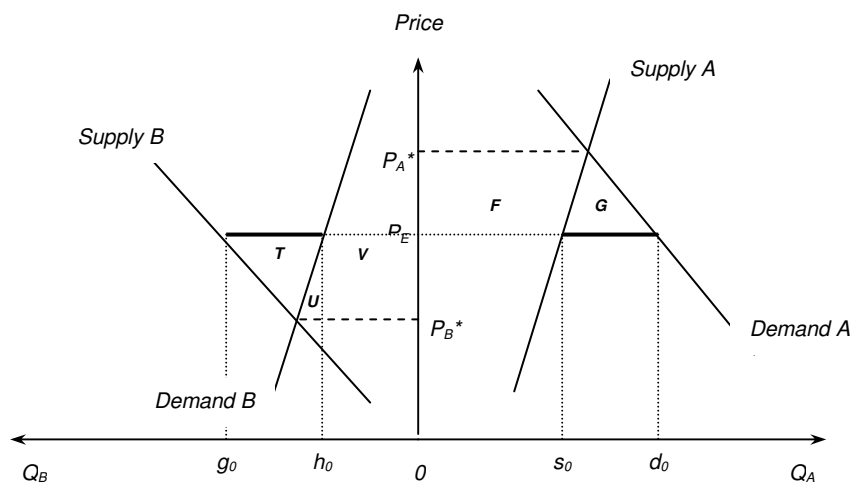


Figure 4.1 Joint equilibrium in countries A and B under free trade
(Source: Södersten and Reed, 1994, p. 192)

4.2.2 Trade under imperfect competition

Departing from the assumption that imperfect competition instigates intra-industry trade, different scenarios can come to mind. In a Cournot (1838) oligopoly model in which firms are situated in different countries and produce *substitute* goods, trade will occur on the single condition that profit margins are greater than transportation and tariff costs. Social welfare consequences of international trade under Cournot oligopoly conditions are ambiguous, however. With foreign competition and imports increasing, marginal profit of domestic firms will fall initially, but can be compensated by additional profits to be earned on the foreign market. The decrease in domestic price level will conversely improve consumer welfare. The net impact on social welfare will therefore depend on the trade-off between increased consumer surplus and firms' profit loss, which varies with the relative size of both markets

(Krugman and Venables, 1990; Martin, 2002, p. 386). Intra-industry trade will be beneficial for a small country, as the relatively large export market offers additional sales opportunities that can offset the initial profit loss. Reversely, large countries may experience a negative welfare effect, as the substantial profit loss due to increased competition in the domestic market may overwhelm the increase in consumer surplus, particularly in consideration of the limited possibilities for additional sales in the smaller foreign market (Martin, 2002, p. 386).

Considering that market structure in trading partners' industries affects levels of producer and consumer surplus domestically, it is not surprising that it is of interest to know and even to affect foreign trading partners' market structure. Under imperfect competition, producers in large countries experience negative welfare effects. In a perspective of advanced economies versus small developing economies with imperfectly competitive markets, it is not unthinkable that the former have strong interests to enforce and maintain a competitive climate in the latter. A strict approach to competition law will reprimand manifestations of monopoly or oligopoly, which would be in the interest of developed trading partners. The exerted pressure to adopt a strict competition law regime would therefore presumably contain certain elements of self-interest.

4.3 International Trade and Dynamic Efficiency

It is generally acclaimed that free trade has positive effects on growth (Edwards, 1992; Dollar, 1992; Sachs and Warner, 1995; Frankel and Romer, 1999; Alesina *et al.*, 2000; amongst others). As technological progress is an important driver of growth, this might lead us to expect that international trade exerts a positive impact on dynamic efficiency.

International free trade through imports and exports is indeed often recognised as a vehicle for technology transfer across countries, as it exposes firms to advanced technology. Domestic producers can subsequently imitate and incorporate these foreign technologies and herewith improve their own productive processes (Edwards, 1992). Particularly for developing countries, exposure to foreign technology is an important means to improve their own technological knowledge and expertise, as imitations of product and process innovations are often less costly than the innovative process itself (Heitger, 1985, p. 85). Technology transfer can also occur in a more permanent way, through foreign direct investment (FDI). FDI directly transmits technology to the host country through the acquisition of capital goods and through diffusion of knowledge and skills (Grossman and Helpman, 1991). Domestic firms can subsequently imitate the new technology they are exposed to, and workers employed by multinationals can accumulate knowledge, which they can later apply in the domestic market (WTO, 2004).

International trade can also *indirectly* affect dynamic efficiency in a country by influencing the intensity of competition in domestic and foreign markets. Imports are claimed to have a pro-competitive effect on domestic firm concentration, which generally leads to lower price-cost margins (Neumann, Böbel and Haid, 1985; De Ghellinck, Geroski and Jacquemin, 1986). Reverting to the ambiguous relation between competition intensity and dynamic efficiency, described in Section 2.3 (p. 9), the dynamic effects of trade expectedly are not solely positive, which was empirically confirmed by Zimmerman (1987). Import competition can nevertheless have a positive spin-off effect on innovative activity of non-exporting firms, as these have to compete with innovative exporting firms on the domestic market.

One final aspect of the relationship between international trade and dynamic efficiency to be considered is the reverse effect of technological enhancement on trade flows. Improved technology can expand productivity and stimulate exports as it positively impacts a firm's competitiveness on foreign markets. Lastly, technological advances also allow for economies of scale and product differentiation, which can be a source of intra-industry trade.

4.4 Trade Policy

Contrary to the alleged economic and dynamic efficiency benefits of free trade, protectionist objectives have led governments to impose trade-restricting policies. For a variety of reasons, and with a large array of instruments, governments have attempted to limit the impact of foreign competition in domestic economies. Tariffs have historically been the most important instrument for countries to protect their home markets and have been particularly high in developing countries. The intended effect of imposing a tariff is to artificially raise the price of imported goods relative to domestically produced goods, which will reduce their competitiveness and herewith decrease imports relative to domestic production. In competitive markets, the artificial price increase due to the imposition of a tariff will lead to a deadweight loss in both the importing and exporting country, since the allocative efficiency merits of international competition are distorted (Södersten and Reed, 1994, p. 195). For the tariff-imposing country, government revenue will increase though, which constitutes one of the core arguments to apply them in developing economies.

As section 4.2 showed, in imperfectly competitive markets, free trade is not necessarily welfare-enhancing. Under these conditions, restricting trade by imposing quotas or tariffs can shift rents from foreign to domestic producers (Krugman, 1989). The gains from these strategic trade policies though depend on the relative size of the home and foreign markets (Kenen, 2000, p. 146; Martin, 2002, p. 422). However, as a response to these unilaterally beneficial trade restrictions, foreign governments may retaliate by restricting trade themselves. This

evidently diminishes the alleged benefits of these measures for both countries, floundering social welfare on an international level.

4.5 Interactions Between Competition Law and Trade Policy

Since trade, competition and their welfare effects are clearly interrelated, trade policy and competition law overlap as well. Competition law and trade liberalisation in essence share the same objective, namely, the preservation of open and competitive markets, herewith optimising economic efficiency (OECD, 1999). This provokes the question whether both policies would be complements or substitutes, and to what extent they would affect their mutual effectiveness.

4.5.1 Import liberalisation as market discipline

As showed in Section 4.2, increased import liberalisation can enhance domestic competition intensity, lowering price-cost margins of domestic firms. This relationship was supported by Levinsohn (1993), Harrison (1994), Grether (1996) and Djankov and Hoekman (2000). It is therefore repeatedly argued that, in terms of social welfare effects, trade liberalisation could substitute for a strict domestic competition policy, particularly for small countries (Levinsohn, 1996; Neven and Seabright, 1997). This proposition fits quite well in the non-interventionist, entry-based approach to competition policy of the Chicago and Austrian and Evolutionary schools of thought. The imports-as-market-discipline hypothesis could however be rejected on the position that anti-competitive conduct in sectors of non-tradables would not be penalized in the absence of domestic competition law. Moreover, certain anti-competitive practices, such as vertical arrangements, may undermine import liberalisation by constituting entry barriers. Also, product differentiation and other forms of non-price competition may protect domestic producers from foreign competition and maintain imperfectly competitive markets (Cadot, Grether and de Melo, 2000).

4.5.2 Strategic application of competition law

From the perspective of a single country that intends to maximise national welfare at the cost of foreign producers and consumers, competition law may be applied strategically. Certain anticompetitive practices may be excluded or exempted from application of domestic competition law, as long as they do not (initially) harm domestic consumers and increase social welfare in the home country (Hoekman, 1997). Tolerating *export cartels* allows industries that predominantly produce for export markets, to collusively restrict sales in foreign markets and herewith raise prices. This, however, will conflict with the objective of trade liberalisation to promote global efficiency. Moreover, overt collusion abroad may induce tacit collusion in domestic markets, which may ultimately harm domestic consumers (Martin, 2001, p. 186).

4.5.3 Complementary enhancement of effectiveness

Many institutions and scholars claim that competition law and trade policy should be applied complementary, as they can mutually reinforce their effectiveness. Implementation of competition law without a considerable degree of trade openness would lead to an internationally sub-optimal outcome in terms of economic efficiency and domestic market contestability (Vandenbussche, 2000; OECD, 1999). Reversely, trade liberalisation in absence of competition law will compromise its benefits, as the benefits of international trade under perfect competition are greater than under imperfect competition.

4.6 Summary

This chapter assessed the relationship between competition and static and dynamic efficiency from an international perspective. In addition to competition law, trade policy can function as an instrument to regulate the intensity of competition in the domestic marketplace. The interplay between foreign and domestic competitive conditions will determine the height of the gains from trade, but can also be a source of intra-industry trade. Due to complementarity of objectives, trade policy can strongly impact the effectiveness of competition law. Together with the previous two chapters, this chapter set the stage for an assessment of the effectiveness of competition law from a developmental perspective.

5. COMPETITION AND COMPETITION LAW IN A DEVELOPMENTAL CONTEXT

Most developing countries that adopted competition laws in the past decade have often based their legal frameworks on the approaches of either the United States or the European Union, and sometimes the World Bank – OECD or UNCTAD model competition laws. In most of these approaches, emphasis is on the promotion of economic efficiency and consumer welfare through lower prices. It is questionable, however, whether these are appropriate templates for competition law in developing countries. Lately, many scholars have called for a more flexible approach to competition law with emphasis on dynamic efficiency (Rodriguez and Williams, 1994; Singleton, 1997; Cook, 2002; Singh, 2002 and 2003; Metcalfe and Ramlogan, 2005). Departing from the fundamental objective of any kind of economic regulation – long-term economic development – this chapter will theoretically assess the appropriateness of different approaches to competition law for developing countries. The first section will assess to what extent deviating market conditions affect the intensity of competition in developing countries. The second section will examine the requirements for economic development and the role of competition in this context. Based on these considerations, the third section will then draw implications for an effective approach to the regulation of competition from a developmental perspective.

5.1 Characterisation of Developing Economies

5.1.1 *Intensity of competition*

Often it is contended that the degree of competition in developing countries is relatively low, based on the fact that barriers to domestic as well as international trade are high, due to heavy government regulation, bureaucracy and corruption. Relatively high concentration ratios support this contention (World Bank, 1993). Other research, in contrast, indicates that the intensity of competition in developing countries might even be higher than in industrialised countries, based on the significant share of small enterprises in total employment. These data, seemingly contradictory, show that many developing economies have in fact a *dualistic* market structure (Singh, 2002). A large part of the economy encompasses a relatively modern sector, composed of a few large enterprises that account for a considerable share of total production. Not seldom, these monopolies or oligopolies are the former state-owned enterprises, and still have strong political ties. The majority of production consists of low technology, labour-intensive food processing and light industries, such as apparel. These products often are very competitive in international markets and, thus, attractive for exports.

Next to this relatively concentrated sector, most countries have a large traditional sector of many independently operating small and medium-sized enterprises (Singh, 2002). These enterprises mostly produce agricultural products and work in informal market conditions, where entry and exit barriers are relatively low. Competition is usually fierce. This small-scale entrepreneurial sector accounts for almost half of the total output and can herewith usually meet the needs of low-income consumers (Cook, 2002). Other research shows that developing countries are not subject to less competition than advanced countries. For instance, an examination of persistency of profits in emerging markets (Glen, Lee and Singh, 2001) shows that the persistency coefficients observed in developing countries are lower than those observed in advanced countries. Moreover, data on turnover, entry and exit of firms in developing versus developed countries indicate that job and plant turnover is higher in developing countries, as is entry and exit of firms (Tybout, 2000).

5.1.2 Market failures

Numerous market failures, commonly present in developing economies, may nevertheless disturb a competitive climate. Perfect competition assumes many market participants, no information asymmetries, free entry and exit, fully rational economic agents, complete markets, a solid legal infrastructure to ensure property rights and contract enforcement and other attributes (Singh, 2002). These requirements for attainment of a competitive equilibrium are hardly ever fulfilled in reality. While advanced economies can sometimes meet several of these conditions and attain a level of competition that approximates perfect competition, in developing economies market imperfections constitute a more severe obstacle. Unemployment, poorly developed infrastructure and imperfect capital markets are all signs of market failures that inhibit the development of competitive markets (Lachmann, 1999). Also agency problems are large in developing countries (Rey, 1997). A low level of institutional quality and abundant government regulation and bureaucracy often constitute high entry and exit barriers and increase market risk (Gal, 2001).

5.1.3 International trade and trade barriers

The majority of developing countries have restricted competition from imports, having relatively high tariffs in place. For example, the simple average of applied tariffs on agricultural products mounts to over 70 percent in Tunisia (WTO, 2004, Appendix Table 2). The main reasons for protection are government revenue and protection of infant industries. Exporting firms from developing countries often face high trade barriers as well. Many advanced countries still protect several domestic industries; often those that are of primary export interest to developing countries. Tariff barriers are highest in sectors of agriculture, textiles and clothing, food products and footwear. Moreover, agricultural production is heavily subsidised in OECD countries, aggravating the relative competitive position of developing

country exports. Estimates of the income gains from the elimination of trade barriers, in advanced as well as in developing countries, range from US\$250 to US\$620 billion annually, with approximately 30 to 50 percent accruing to developing countries (Geithner and Nankani, 2002). Hence, it can be said that imports to and exports from developing economies are severely restricted.

A recent trend that also affects competitive conditions in developing countries is an international, cross-border merger wave that occurred in the nineties (Singh, 2002). In many developing economies, large multinationals, by engaging in FDI, acquired dominant market positions rather easily. Referring to section 4.2.1, this implies that monopolistic or oligopolistic profits accrue to foreign investors, often at the expense of domestic consumers.

5.2 Drivers of Economic Development

5.2.1 Competition and economic growth

Competition and economic development are thought to be two sides of one coin. Numerous studies on the relationship between domestic competition and the rate of productivity growth exhibit a positive correlation, as established by Nickell (1996, 1997) and Porter (1990). Moreover, international competition or trade openness is also believed to be able to explain differences in economic growth (Edwards, 1992; Sachs and Warner, 1995; Frankel and Romer, 1995; Burnside and Dollar, 1997; Dollar and Kraay, 2001). Rodriguez and Rodrik (1999), however, question the direction of causation, arguing that domestic performance stimulates international trade, rather than international competition enhancing domestic performance.

5.2.2 Technological progress and economic development

Solow (1957) already emphasised the crucial role of technological progress in enhancing productivity growth, with his discovery that only a small proportion of per-capita growth was related to increased capital intensity (Tirole, 1990, p. 389). A rise in productivity growth can only be accomplished through technological advances that enable firms to produce more goods and services with fewer resources (Stelzer, 2002). One of the reasons for the disparity in economic performance between developed and developing countries is the contention that developing countries operate inside a production possibility curve that is backward in terms of technology. Technological progress can push this frontier outward (Lachmann, 1999). Dynamic efficiency thus seems to occupy a crucial role for long-term economic development.

For developing countries, three channels for technological progress can be identified: imports, FDI and investments in domestic R&D. International trade and FDI function as the primary vehicles for knowledge transfer (Section 4.3, p. 24). However, an obvious additional way to

acquire technological advances is by generating it domestically through investments in R&D. While in developing countries R&D is perhaps not expected to generate high-technology innovations, it is crucial for *technological deepening*. New machinery or product designs obtained through trade or FDI will only add value when a firm and its employees are able to use them in and adapt them to local circumstances. Technological progress therefore requires that additional ‘national learning capacity’ be created, which is thought to be a function of R&D expenditures (Lederman & Maloney, 2003). Technological advancement is thus not merely a matter of imitating processes and ideas (Clarke, 2001). For this reason, adoption of technology through international trade and FDI cannot substitute for local R&D investments. In contrast, ignoring the importance of local R&D efforts would even undermine the technology spillover effects from trade by leaving the newly acquired technology of limited use. Hence, domestic R&D spending can enhance the ability of enterprises to use, adapt and even improve acquired technologies, and herewith increase technological depth and productivity growth (Clarke, 2001).

Considering the importance of domestic R&D, the ability of firms to generate profits plays a critical role. High and rather stable profit rates are essential in two separate ways. In the first place, they are the primary source of investments in R&D. Particularly in developing countries, where financial markets are often missing or underdeveloped, funding can normally not be secured by external institutions as banks or stock markets, but has to be raised internally (Singh, 2003). Secondly, prospective profits can be a stimulus to invest, as investments will generally not be undertaken if prospective profits are low (Section 2.3, p. 9).

5.3 Implications for Competition Law

5.3.1 Optimal rate of competition

From the sections above, it may be concluded that several contentions considering the intensity of competition as to promote economic development, conflict. On the one hand, it is empirically confirmed that domestic and international competition can enhance economic efficiency and accelerate economic development (sections 2.2, 4.2 and 5.2.1). Moreover, economies with a higher level of competition are thought to be more capable of withstanding economic shocks and commonly have higher levels of growth in per capita GDP (World Bank, 2002). The fact that the industrialised sector in many developing countries is concentrated, due to either state protection or dominant multinationals, would raise concerns in this respect. On the other hand, several factors call for a relaxation of these competitive requirements. First of all, the presence of market failures in developing economies led Laffont (1998) to reconsider the extent to which competition should be promoted. As the conditions for perfect competition would be violated in such markets, he recommended competition to be restricted, in order to

achieve a *second-best* but under these conditions optimal market solution. Secondly, the importance of dynamic efficiency in general, and technological deepening as a channel for its achievement specifically, stresses the need for profits as a source of funding for domestic R&D. In the view of the theoretical ambiguity concerning the relationship between competition and incentives to invest in R&D, encouragement of competition does not always seem appropriate.

5.3.2 *Dynamic approach to competition law*

The tension between the positive effect of competition on economic efficiency and its assumed harmful effect on technological deepening, especially in regard of market failures in developing economies, calls for an approach to competition law that takes these conflicting interests into account. Several scholars (Singleton, 1997; Audretsch, Baumol and Burke, 2001; Stelzer, 2002; Singh, 2002 and 2003; Metcalfe and Ramlogan, 2005) therefore propose a dynamic approach to competition law, founded on the theories of the Austrian and Evolutionary schools. To recall the essential features (section 2.4.3, p. 12), these schools consider competition as a process driven by technological change, in which markets are inefficient by nature and firms can exercise market power and earn profits on the basis of innovative superiority. Competition law should therefore provide considerable flexibility towards market concentration on the basis of dynamic efficiency benefits. The focus on economic efficiency and consumer welfare that characterises competition law in developed economies and the various model competition laws, would thus be inappropriate for developing countries (Metcalfe, Ramlogan and Uyarra, 2002). Krugman (1994, p. 173) stresses the desirability of deviating from this objective, emphasising that temporary monopolies can enhance technological progress. The exercise of market power would only be harmful if impediments to innovation and technological progress are erected.

5.3.3 *Practical implications for the design of competition law*

The foremost important feature of a competition law in a dynamic approach would be the application of a *rule-of-reason* doctrine. This doctrine would allow for the exercise of certain forms of market power when this is in the interest of technological or economic progress. Nevertheless, case-by-case analyses would ensure that dominant firms that do not display any efforts on technological advances are penalised. This should also apply to dominant multinationals. A *per se* doctrine, in contrast, would lack this flexibility in striking a balance between economic and dynamic efficiency. Under this doctrine, legal provisions are applied mechanistically, condemning any exercise of market power. Consequently, the need for firms in developing economies to generate profits for R&D investment would be disregarded. Adherence to a rule-of-reason doctrine would constitute a deviation from the recommendations of the World Bank, OECD and UNCTAD concerning competition law. Indeed, a rule-of-

reason doctrine entails several drawbacks with respect to ease of enforcement and legal certainty in comparison to a per se doctrine (section 3.3.4, p. 20). Moreover, tolerating the temporary exercise of market power incorporates a price increase, which will compromise consumer surplus. This would imply a departure from the protection of immediate consumer interests. A recommendation might be to set a time horizon in which both dynamic efficiency and consumer welfare interests are balanced.

Another practical aspect of a dynamic approach to competition law concerns the strictness of merger notification requirements. Strict pre-merger notification requirements may have a discouraging effect on mergers and acquisitions that might have efficiency-enhancing effects. Post-merger notification requirements are considered to be somewhat more flexible. A truly dynamic approach would nevertheless call for complete abolishment of any merger notification requirements, providing firms the freedom to amalgamate in order to achieve scale economies or technological advances. Absolute benchmarks for market dominance would also be inappropriate under a dynamic approach, as these would disregard the benefits generated by dominant but dynamically efficient firms. Particularly in small developing economies, the application of strict benchmarks would be misplaced (section 3.3.4, p. 20). Also, in order to minimise government intervention in the market, subjecting government bodies to the competition law would be appropriate. Including legal provisions on export cartels may also express a flexible approach to the exercise of market power.

Lastly, while free trade will not always benefit social welfare under imperfectly competitive conditions, its technological spillovers are highly valued. A dynamic approach to competition law would therefore be incomplete without a policy that ensures trade liberalisation. However, when foreign competition becomes exceptionally fierce, hampering domestic firms to invest in technological knowledge and skills, temporary trade restrictions could be applied.

5.4 Summary

Departing from the assumption that technological progress is crucial to economic development, competition laws should provide sufficient flexibility to firms to generate profits to invest in R&D. This is particularly the case in developing economies that cope with deviating market conditions and various market failures. Considering this, the conventional approach to competition law taken by most developed economies would not be appropriate for developing countries. A rule-of-reason doctrine, the abandonment of economic efficiency as a primary objective, a relaxation of merger policy strictness, and subjecting government bodies to competition legislation are recommendations for competition law in developing countries. The validity of these recommendations will be tested empirically in Chapter 6.

6. EMPIRICAL ANALYSIS

This chapter will provide an empirical analysis of the effects of a dynamic approach to competition law on dynamic efficiency in general and technological deepening in specific in developing countries, within a framework of other factors of influence. The first section will present the analytical framework, identifying the various legal and economic factors that bear influence on dynamic efficiency. In the second section, data attributes will be reviewed, while the third section will discuss the methodology used. The fourth section will present the results from the statistical analyses that were conducted.

6.1 Analytical Framework

An empirical assessment of the impact of competition law regimes on technological deepening and dynamic efficiency would essentially require the investigation of two separate but complementary relationships: the effects of economic regulation (competition law, but also trade policy) on the intensity of competition, and the influence of competition on dynamic efficiency. However, the ambiguity in the relationship between competition and R&D investment incentives complicates the use of competition intensity as a determinant variable in empirical research. Moreover, competition intensity is rather complex to measure, particularly in developing economies, where data on industry concentration are scarcely available. This empirical analysis will therefore assess the immediate relationship between competition law and R&D expenditures, within a framework of other influential factors.

6.1.1 *Dynamic efficiency and technological deepening*

In section 5.2 (p. 30), the importance of technological deepening for economic development was emphasised. As said, technological deepening is assumed to be a function of domestic R&D efforts. In this empirical analysis, general R&D expenditures as a percentage of GDP will be used to approximate the level of technological deepening in developing economies. However, technological deepening can be considered to be a subset of dynamic efficiency in general, next to other channels for acquiring technological progress, such as trade and FDI. As outlined below, these channels are interrelated in their effects on R&D. Therefore, R&D expenditures can also serve as a proxy for dynamic efficiency in general (de Bijl, 2004; Zimmermann, 1987). Nevertheless, R&D expenditures only provide information on the input for technological improvements. Therefore, in practice, rates of technological progress may vary according to the effectiveness of the usage of these financial means.

6.1.2 Characteristics of a dynamic approach to competition law

In order to assess the effects of a chosen approach to competition law, several legal provisions that distinguish a dynamic approach from a static, structural approach were identified. These legal elements follow the recommendations made in section 5.3.3 (p. 32).

- *Doctrine:* Rule-of-reason (dynamic) or per se approach (structural);
- *Objectives:* Attainment of economic efficiency and promotion of consumer welfare as primary objectives (structural);
- *Merger policy strictness:* No merger notification requirements (dynamic), post-merger notification (intermediate) or pre-merger notification requirements (structural);
- *Government bodies:* Subjecting government bodies to competition law (dynamic);
- *Export cartels:* Inclusion of provisions on export cartels (dynamic).

6.1.3 Other determinants of R&D expenditures

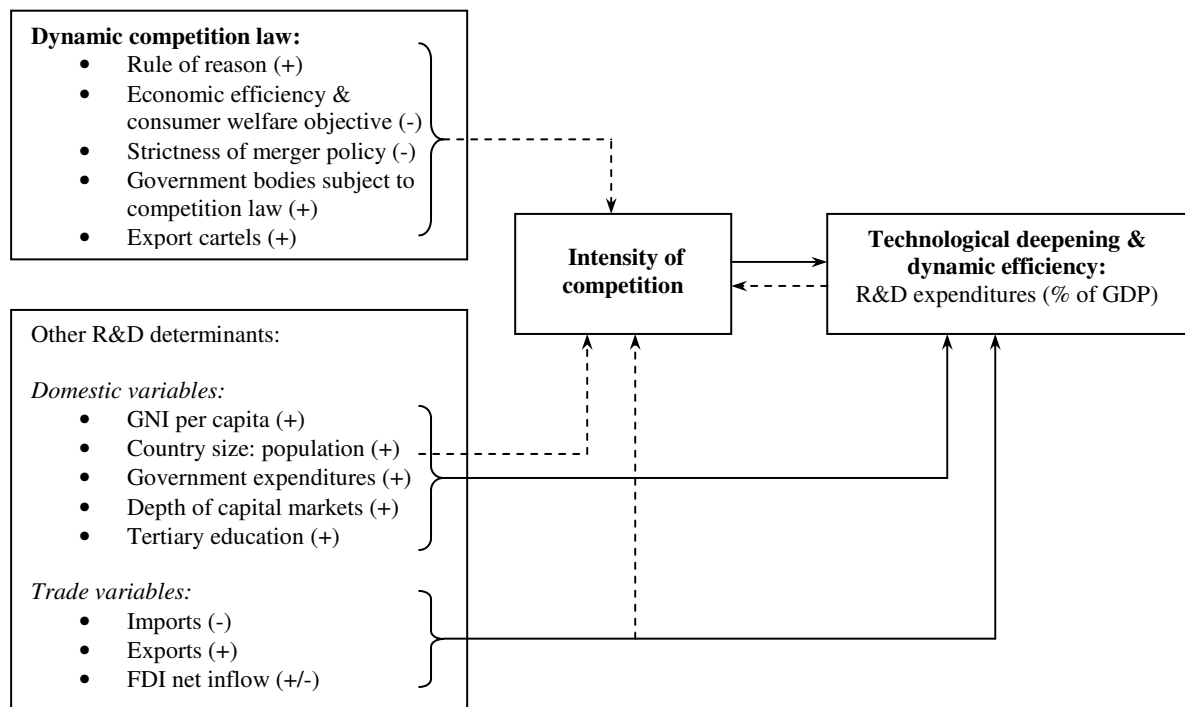
While competition and its regulation are expected to influence R&D incentives of firms, other factors are assumed to have a considerable impact on levels of R&D expenditures as well, either directly or indirectly by influencing the intensity of competition in a market.

- *Per capita GNI:* The level of development of a country, to be measured by gross national income (GNI) per capita, is acknowledged to be positively correlated with R&D expenditures (in absolute terms and as a percentage of GDP). This positive correlation may also capture the effects of other, possibly omitted explanatory variables that vary systematically with the level of development (Clarke, 2001).
- *Market size:* Small markets are generally considered to have lower rates of R&D than large markets, as diseconomies of scale impede R&D investments (Gal, 2001). Also, the higher concentration rates of smaller markets exert ambiguous influence on R&D incentives. Population is used as a proxy for market size.
- *General government expenditures* will be included as a factor of influence, reflecting governments' capacity to mobilise resources for R&D (Lederman and Maloney, 2003). This will control for the use of aggregate R&D expenditures as a measure of dynamic efficiency.
- *Development of capital markets:* An important factor for R&D activities of private entities is the accessibility of funding. If capital markets are underdeveloped or absent, firms will strongly depend on profit margins for their investments. Domestic credit to the private sector (% of GDP) will act as a proxy for the availability of capital.
- *Education:* Human capital, in addition to funding another important factor of input for R&D, is likely to impact on the level of R&D expenditures. Enrolment rates in tertiary education should be able to capture a positive correlation with R&D expenditures.
- *FDI* is assumed to positively impact on the general level of technology in developing countries, which can stimulate domestic R&D efforts. However, instead of functioning as a complement to domestic innovative efforts, the simple adoption of foreign technology may act as a substitute for R&D investments (Clarke, 2001).

- *Imports*: Technology transfer through imported products might substitute for domestic R&D efforts in a similar way as FDI. On the other hand, imports may increase the intensity of competition domestically, affecting levels of dynamic efficiency.
- *Exports* are expected to expose a positive correlation with R&D spending, as competition on the international market may stimulate producers to invest in process and product innovations.

Figure 6.1 incorporates these factors and the expected sign of their relationship with dynamic efficiency in a framework. A direct relationship is depicted by a straight line, while an indirect relationship through competition intensity is represented with a dotted line. It should be noted that technological progress might reversely affect the intensity of competition.

Figure 6.1 Analytical Framework



6.2 Data

The data set constructed for this analysis comprises 45 low and middle income countries³. Dummy indicators on competition law were construed on the basis of the competition laws that were provided by the Global Competition Forum, UNCTAD, or national government sources. Amendments in competition laws during this period were reviewed, but these did not alter the indicators. Countries that adopted competition legislation in the year 1999 or later were not included in the regression analyses, for the effects of their laws on R&D expenditures are not

³ Countries were classified as developing economies according to the method used by the World Bank (2000). Economies with an average level of GNP per capita of \$755 or less classify as *low income (LI)*, \$756 - \$2,995 as *lower middle income (LMI)*, \$2,996-9,265 as *upper middle income (UMI)* and \$9,266 or more as *high income (HI)*.

observable within our timeframe of 1998-2001. Appendix 1 provides an overview of the countries included in the sample, as well as the titles and year of adoption of their competition laws.

Other data were primarily drawn from the World Development Indicators database (World Bank, 2005). For Jamaica, Kazakhstan, South Africa, Sri Lanka and Zambia, values on R&D expenditures were included from the UNDP Human Development Report (2004) and from UNESCO Statistical Yearbook (2004). Estimates on tertiary education enrolment rates in Sri Lanka were taken from a World Bank Report 'Treasures of the Education System in Sri Lanka' (2005). In case of missing values, averages were constructed or the latest available values were taken. Unfortunately, for countries in the Middle East and Africa in particular, data on R&D expenditures and several other variables were scarcely available. For this reason, Algeria, Côte d'Ivoire, Kenya, Malawi, Senegal and Zimbabwe, but also Albania and Indonesia were excluded from the sample that was used in the regression analyses. The Ukraine exposed values on R&D expenditures that could be considered to be extreme outliers. It appeared that the Ukraine accommodates much of the research equipment and activity of R&D organisations in Russia (Yegorov, 2005). Moreover, alternative computations state that its percentage of R&D spending in GDP is considerably lower than the official data. Much of the expenditures does not appear to relate to any R&D efforts, while double calculations are not uncommon either (British Council, 2005; Yegorov, 2005). While this might also be the case in other developing countries, the statement that Ukrainian research results are largely overestimated (British Council, 2005) may serve as another indication of unreliability of data. Lastly, the Ukraine changed its competition law regime from a per se doctrine to a rule-of-reason doctrine in 2001, which complicates the use of these data. For these reasons, the Ukraine was omitted in the regression analyses.

In the World Development Indicators, *general expenditure on research and development as a percentage of GDP* is defined as to include 'fundamental and applied research and experimental development work leading to new devices, products or processes' (World Bank, 2005). Consequently, not solely highly advanced science is captured, but also investments in adoption and adaptation of existing technologies. This is important for the use of R&D expenditures as a proxy for technological deepening. While it would be preferable to study the effect of competition law on private expenditures on R&D exclusively, most data sources did not distinguish between public and private R&D expenditures. In order to correct for the use of data on aggregate R&D expenditures, government expenditure as a percentage of GDP was included as an indicator, measuring governmental capacity to mobilise resources (Lederman and Maloney, 2003). Table 6.1 presents descriptive statistics for all variables over the period 1998 – 2001 ($n = 128$).

Table 6.1: Descriptive statistics

	Min.	Max.	Mean	Std. Dev.
R&D Expenditures (% of GDP)	0.0012	1.2338	0.4280	0.2843
GNI per capita	250	8,230	2,403.05	1,712.14
Population	1364000	1,03E+09	63242014	175829041
Government expenditures (% of GDP)	5.69	29.14	15.42	5.08
Tertiary enrolment rates (% gross)	1.32	69.79	29.42	17.46
Domestic credit to private sector (% of GDP)	2.97	155.90	29.41	30.49
Imports (% of GDP)	9.94	92.11	39.79	19.46
Exports (% of GDP)	7.31	88.26	35.44	18.43
FDI net inflow (% of GDP)	0.16	23.01	3.90	3.23
Competition law				
Doctrine (rule-of-reason)		Dummy	0.56	0.498
Objectives (econ. efficiency & cons. welfare)		Dummy	0.25	0.435
Pre-merger notification requirements		Dummy	0.50	0.502
Post-merger notification requirements		Dummy	0.22	0.415
No merger notification requirements		Dummy	0.28	0.451
Government subject to competition law		Dummy	0.56	0.498
Export cartels		Dummy	0.13	0.332

6.3 Methodology

Since complete data were available for a set of 32 countries over a period of four years (1998-2001), the dataset is composed of repeated observations on the same units (countries) through time. The assumption of independent observations is, thus, no longer appropriate. The individual values per year would not be independent, but are likely to show progression over time. Using them simultaneously in any analysis would artificially improve significance of the results, as approximately the same values are used. Therefore, for the first part of the multivariate analyses presented below, the means over the four-year period were calculated for all variables. Furthermore, SPSS Statistical Package was used to perform all analyses.

First, using these average data, bivariate analyses will test the individual relationship between the various elements of competition law identified, and R&D expenditures. For the four dichotomous variables, independent-samples *t* tests are performed. These evaluate the difference between the means of R&D expenditures in countries with and without dynamic provisions in the law. To assess whether means of R&D expenditures are significantly different among countries with pre-merger, post-merger or no notification requirements, a one-way ANOVA test was executed, allowing for factors with multiple levels. With these bivariate analyses, the underlying hypotheses – whether the inclusion of different dynamic provisions in competition law will render higher rates of R&D expenditures – can be tested.

Second, multiple regression analysis will be used to examine the relationship between R&D expenditures and the other independent variables identified. Also the relative strength of the

independent variables, as well as possible interrelationships between among them, will be assessed (Hair *et al.*, 1998). Using the mean values over the period specified, the following equation will be estimated in order to assess the effects of domestic variables, trade variables and competition law variables on R&D expenditures in country i :

$$\bar{Y}_i = \beta_0 + \beta_1 \bar{X}_{1,i} + \beta_2 \bar{X}_{2,i} + \beta_3 \bar{X}_{3,i} + \varepsilon_i \quad i = 1, \dots, 32 \quad (6.1)$$

With

- Y_i = R&D expenditures (observed)
- $X_{1,i}$ = Domestic variables (observed)
- $X_{2,i}$ = Trade variables (observed)
- $X_{3,i}$ = Competition law variables (observed)
- β = Vectors of unknown subject-specific regression parameters
- ε_i = Error term

Third, in order to allow for variability across time, we will estimate the parameters for each year independently. Subsequently, we will test with simple regression analyses whether these parameters vary significantly over time (t). If this is the case, a relationship between the parameter and t will be defined. The other, time-invariant parameters will remain fixed. The equation to be estimated under this method will assess the effects of domestic variables, trade variables and competition law variables on R&D expenditures in country i in year t :

$$Y_{i,t} = \beta_{0,t} + \beta_{1,t} X_{1,i,t} + \beta_{2,t} X_{2,i,t} + \beta_{3,t} X_{3,i,t} + \varepsilon_{i,t} \quad i = 1, \dots, 32 \quad t = 1, \dots, 4 \quad (6.2)$$

With: $\beta_t = c + \gamma \cdot t \quad (6.3)$

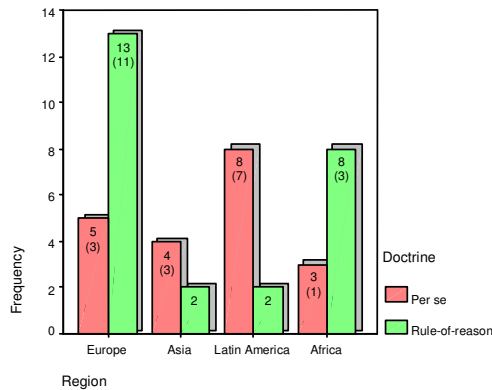
6.4 Results

6.4.1 Determinants of doctrine

Before pursuing to the bivariate and multivariate analyses, a short examination of possible determinants of choice of doctrine is appropriate. This section assesses region and income level as determinants, using a sample of 45 countries, not restricted by missing data on R&D expenditures or the critical year of adoption. Values for the restricted dataset are included between parentheses. Figure 6.2 displays the distribution of rule-of-reason and per se doctrines across regions. The majority of countries in Europe and Central Asia, seeking alliance with the European Union, apply the rule-of-reason doctrine embedded in EU legislation. Most Latin American and Caribbean countries with close ties with the United States maintain a per se doctrine. Asian countries seem to have a slight preference for a per se doctrine, while countries in Africa and the Middle East tend to prefer a rule-of-reason approach. However, as many

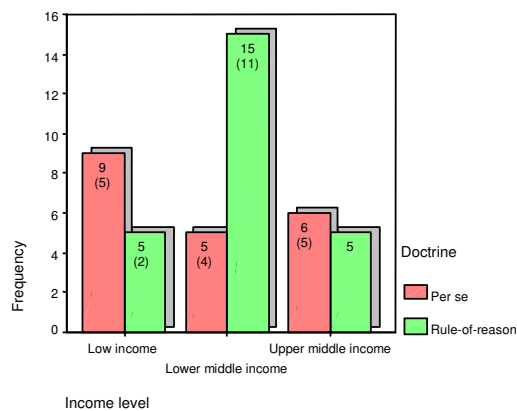
countries in the African and Asian regions have not yet adopted competition legislation, these numbers should not be considered indicative for the entire regions. A χ^2 -test was performed to test the null hypothesis that the proportion of countries with a rule-of-reason doctrine is the same across the four regions. The Pearson χ^2 -statistic is 9.659, $p = .02$, which indicates that the null hypothesis can be rejected and that the observed regional differences in choice of doctrine are significant.

Figure 6.2 *Competition law doctrine per region*



Income level does not seem to have a substantial impact on the choice of competition law doctrine. A χ^2 -test, based on a classification of countries according to income level, evaluated the null hypothesis that the proportion of countries with a rule-of-reason doctrine is the same across these income levels. It appeared insignificant (Pearson $\chi^2 = 5.749$, $p = 0.06$), which leads us to conclude that choice of doctrine is not significantly affected by income levels. Yet, a bar chart on the distribution of competition law doctrine according to income level (Figure 6.3) suggests that low-income countries prefer a per se approach, probably due to capacity restraints. Our small sample size might be an explanation for the close insignificance of the test.

Figure 6.3 *Choice of doctrine according to income level*



6.4.2 Bivariate analysis: competition law and R&D expenditures

Bivariate analyses evaluated the five aspects that are indicative of a dynamic approach to competition law, on their individual relationship with R&D expenditures. For all variables, a parametric test comparing means was performed. Table 6.2 presents the results.

Table 6.2 *Dynamic aspects of competition law and R&D expenditures*

Variable	Factor	<i>n</i>	Mean	St. Dev.	Independent samples <i>t</i> -test	
Doctrine**	Per se	14	0.31398	0.20240	<i>t</i>	-2.142
	Rule-of-reason	18	0.51801	0.30774	<i>p</i> (2-tailed)	0.040
Economic efficiency & consumer welfare objective	No	24	0.46413	0.30173	<i>t</i>	1.239
	Yes	8	0.32259	0.19133	<i>p</i> (2-tailed)	0.225
Government subject to competition law*	No	14	0.32409	0.28279	<i>t</i>	-1.929
	Yes	18	0.51015	0.26101	<i>p</i> (2-tailed)	0.063
Export cartels	No	28	0.44060	0.29003	<i>t</i>	0.622
	Yes	4	0.34578	0.23651	<i>p</i> (2-tailed)	0.539
					One-way ANOVA	
Merger policy*	No merger notif.	9	0.29383	0.25575	<i>F</i>	3.058
	Pre-merger	16	0.41950	0.24825	<i>p</i>	0.062
	Post-merger	7	0.62334	0.31424	η^2	0.174

* Significant at a 10% level

** Significant at a 5% level

Our initial contention that doctrine would be the strongest indicator of a dynamic approach seems to be confirmed by these results. An independent samples *t*-test assessed the null hypothesis that the means of R&D expenditures are equal for countries with a rule-of-reason doctrine and countries with a per se doctrine. The *p*-value of .04 allows us to reject this null at a 5% significance level, which confirms our contention that countries with a rule-of-reason doctrine have higher rates of R&D expenditures than countries with a per se doctrine. An effect size index, η^2 , indicates the proportion of variance in the dependent variable (R&D expenditures) that is explained by the independent variable (doctrine) (Green and Salkind, 2004). A calculated η^2 index indicated that 13% of the R&D expenditures variable was accounted for by the choice of doctrine, which is a relatively large size effect.

When attainment of economic efficiency and promotion of consumer welfare were included as objectives of the law, countries on average had lower levels of R&D expenditures. While this is in conformity with our expectation, the mean difference among these groups was insignificant. An assessment of the difference in means of R&D expenditures for countries that subject government bodies to competition legislation and countries that do not, showed that the null hypothesis of similar means can be rejected at a 10% significance level, but not at a 5% level. The η^2 index of 0.11 nevertheless establishes a modestly large size effect, indicating that

11% of the variance of the R&D expenditures variable was accounted for by the inclusion of this provision in the competition law. Incorporating provisions on export cartels in the law, which occurred in only 4 countries, did not significantly relate to R&D expenditures. Merger policy, in contrast, is statistically related to R&D expenditures at a 10% significance level. On the basis of an ANOVA F -test ($F = 3.058$, $p = .06$) we can reject the null hypothesis that means of R&D expenditures are similar for countries with pre-merger, post-merger or no merger notification requirements. The high η^2 index of 0.17 indicates a large size effect. Countries with pre-merger notification requirements on average had lower rates of R&D expenditures in comparison to countries with post-merger notification requirements, which would be conform expectations. However, our earlier assumption that countries without any merger notification requirements would raise higher levels of R&D spending was contradicted by these results. These countries on average spend less on R&D.

Table 6.4 presents bivariate correlation indices among the various competition law variables. Spearman's ρ was used as a correlation coefficient. This nonparametric coefficient replaces the actual data values with ranks, which would be appropriate here in consideration of the non-metric character of the legal variables (Norusis, 2002, p. 425). The coefficients show that adherence to a rule-of-reason approach is associated with the application of post-merger notification requirements at a 10% significance level. Furthermore, most countries with provisions on export cartels have the promotion of economic efficiency and consumer welfare as their core objective. Naturally, the dummies for merger policy are interrelated.

Table 6.4 *Bivariate correlations of competition law variables*

Bivariate correlations <i>Spearman's ρ</i>	Doctrine	Econ. eff. / consumer welfare	Government bodies	Pre-merger notification	Post-merger notification	No merger notification
Econ. eff. / cons. welfare	-0.218					
Government bodies	-0.143	-0.073				
Pre-merger notification	0.000	0.144	0.126			
Post-merger notification	0.314*	-0.131	0.010	-0.529**		
No merger notification	-0.289	-0.040	-0.149	-0.626**	-0.331*	
Export cartels	0.143	0.436**	-0.238	0.000	0.257	-0.236

* Correlation is significant at the 10% level (2-tailed)

** Correlation is significant at the 5% level (2-tailed)

6.4.3 *Multivariate cross-section analysis*

Before proceeding to the presentation of the various regression models and their results, table 6.5 presents a correlation matrix as a first indication of the strength of the individual determinants and to detect for the possibility of multicollinearity. Significantly correlated with R&D expenditures are GNI per capita, government expenditures, tertiary education enrolment and doctrine. Imports and exports are highly correlated with government expenditures and tertiary education. A significant relationship between government expenditures and choice of doctrine was confirmed by an independent-samples t test ($t = -2.179$, $p = 0.04$). Countries with

a rule-of-reason doctrine on average have higher rates of government expenditures than countries with a per se doctrine. Yet, the direction of causality of this relationship remains uncertain and will be further discussed in Chapter 7. The possibility of encountering problems related to multicollinearity will be taken into account in the multiple regression analyses.

Table 6.5 *Bivariate correlation indices*

Bivariate correlations - <i>Pearson r</i>	R&D Expend.	GNI per capita	Pop.	Govt. Expend.	Credit to private sector	Tertiary educ.	Imports	Exports	FDI net inflow
GNI per capita	0.358*								
Population	0.322	-0.180							
Govt. expenditures	0.372*	0.155	-0.135*						
Credit to priv. sector	0.133	0.208	0.013	0.089					
Tertiary educ. enrolment	0.362*	0.370*	-0.219	0.405*	-0.111				
Imports	0.012	-0.079	-0.372*	0.448*	-0.042	0.391*			
Exports	0.163	0.043	-0.312	0.390*	0.125	0.482**	0.928**		
FDI net inflow	0.042	0.257	-0.314	0.138	-0.058	0.239	0.402*	0.389*	
Doctrine	0.364*	-0.077	-0.160	0.372*	0.068	0.189	0.153	0.132	-0.320

* Correlation is significant at the 5% level (2-tailed)

** Correlation is significant at the 1% level (2-tailed)

Multiple regression analyses were conducted to assess the strength of various determinants of the height R&D expenditures in developing countries for the period 1998-2001. The sets of determinants were ordered to distinguish between domestic variables ($X_{1,i}$), trade variables ($X_{2,i}$) and variables related to competition legislation ($X_{3,i}$). Equation (6.1), presented on p. 40, was estimated in order to assess the effects of domestic variables, trade variables and competition law variables on R&D expenditures in country i :

$$\bar{Y}_i = \beta_0 + \beta_1 \bar{X}_{1,i} + \beta_2 \bar{X}_{2,i} + \beta_3 \bar{X}_{3,i} + \varepsilon_i \quad i = 1, \dots, 32 \quad (6.1)$$

The results of the various multiple regression models are presented in Table 6.6. Included in parentheses are t -values. For each model, several statistics are reported: R^2 , the coefficient of determination, indicating the explanatory power of the regression; adjusted R^2 , taking into account the number of independent variables and used as a measure of goodness of fit; and the F -statistic and its significance level, assessing the statistical validity of the overall model. Column (1) shows our most parsimonious regression model, including GNI per capita, population and government expenditures. All variables are significant determinants of general expenditure on R&D. Including in column (2) two other domestic variables, tertiary education and domestic credit to the private sector, slightly improves the model by increasing R^2 by 0.049 and adjusted R^2 by 0.009. In spite of this, a partial F -test shows that inclusion of these variables is not a significant contribution to prediction accuracy (F change = 1.191, $p = 0.32$). Both variables appear insignificant. Column (3) expands the parsimonious model by including various trade variables, of which only imports and exports appear significant. Imports seem to affect R&D expenditures negatively, while exports enhance R&D efforts, which is conform

their expected signs. Model (4) confirms that removal of the insignificant FDI variable constitutes an improvement of the model in terms of adjusted R^2 , which increases by 0.022. A partial F -test also proves that including FDI as an explanatory variable in the model is not a significant contribution (F change = 0.057, p = 0.81). In columns (5) and (6), the competition law variables are included, which improves the model by increasing adjusted R^2 . The dummy for choice of doctrine appears highly significant in both models. As this variable indicates adherence to a rule-of-reason doctrine, this result implicates that the difference in the rate of R&D expenditures as a % of GDP between countries with a rule-of-reason doctrine and countries with a per se approach is approximately 0.20%. This is equal to the mean difference of 0.20% found in the independent samples t -test (Section 6.3.2). Lastly, model (6) presents the results of the regression model that includes all other legal variables that were significantly related to R&D expenditures in the bivariate analyses (section 6.3). However, in this multivariate context, these additional variables appear insignificant, and their inclusion is not a significant contribution to the model presented in column (5), in terms of additional explanatory power (F change = 1.584, p = 0.27).

Table 6.7 Multiple regression models

Variable	Parameter	(1)	(2)	(3)	(4)	(5)	(6)
GNI per capita	β_1	6.2E-05** (2.562)	4.5E-05 (1.708)	4.2E-05 (1.508)	4.4E-05 (1.690)	5.7E-05** (2.432)	4.9E-05* (2.010)
Population	β_2	7.0E-10** (2.985)	7.4E-10** (3.139)	6.3E-10** (2.492)	6.3E-10** (2.527)	7.5E-10** (3.303)	7.3E-10** (3.158)
Government expenditures (% of GDP)	β_3	0.021** (2.538)	0.016* (1.780)	0.023** (2.490)	0.023** (2.526)	0.014 (1.517)	0.013 (1.511)
Tertiary educ. enrolment (% gross)	β_4		0.004 (1.501)				
Credit to private sector (% of GDP)	β_5		0.001 (0.715)				
Imports (% of GDP)	β_6			-0.012* (-1.790)	-0.012* (-1.812)	-0.010 (-1.654)	-0.007 (-1.128)
Exports (% of GDP)	β_7			0.013** (2.084)	0.013** (2.112)	0.012** (2.091)	0.009 (1.556)
FDI net inflow (% of GDP)	β_8			0.004 (0.239)			
Doctrine	β_9					0.211** (2.747)	0.192** (2.377)
Government bodies	β_{10}						0.111 (1.476)
Pre-merger notification	β_{11}						0.008 (0.940)
Post-merger notification	β_{12}						0.113 (0.977)
Constant	β_0	-0.093 (-0.645)	-0.128 (-0.881)	-0.088 (-0.569)	-0.080 (-0.542)	-0.121 (-0.908)	-0.224 (-1.595)
n		32	32	32	32	32	32
R^2		0.416	0.465	0.505	0.504	0.619	0.679
Adjusted R^2		0.354	0.363	0.386	0.408	0.527	0.548
F -test		6.662	4.528	4.251	5.281	6.767	5.183
Sig.		0.002	0.004	0.004	0.002	0.002	0.001

* Significance at the 10% level (two-tailed).

** Significance at the 5% level (two-tailed).

Model (5) is thus selected as the most efficient regression model for R&D expenditures. An *F*-test for overall goodness of fit evaluates the significance of the model by testing the hypothesis that R^2 is not zero. This would imply that the amount of variation explained by model (5) is more than the variation explained by the simple average (Hair *et al.*, 1998). As reported in table 6.7, the *F* ratio for model (5) is 6.767, $p < .01$, which confirms the significance of overall regression model (5). The estimated equation is as follows:

$$\begin{aligned}
 R\&D = -0.121 + 5.7E-05 \cdot GNI + 7.5E-10 \cdot Population + 0.023 \cdot Govt.Exp. \\
 &- 0.010 \cdot Imports + 0.012 \cdot Exports + 0.211 \cdot Doctrine
 \end{aligned}
 \tag{6.4}$$

The appropriateness of this model estimation was confirmed by an analysis of the residuals, which showed that the error terms had a constant variance, were mutually independent and normally distributed. A matter of concern in this regression analysis is the fact that several variables are correlated (table 6.5), and that multicollinearity might compromise the results. Particularly the significant correlation coefficient between government expenditures and choice of doctrine and the coefficients between government expenditures and imports and exports should be regarded with caution. Examination of the *tolerance* statistics shows that multicollinearity only affects the results concerning imports and exports. The tolerance statistic indicates the degree to which an independent variable is explained by another independent variable (Hair *et al.*, 1998, p. 193). The tolerance values for government expenditures (0.620) and doctrine (0.807) are relatively high and therefore indicate a low level of collinearity. This indicates that these regression coefficients can be interpreted without any adverse effects due to multicollinearity (Hair *et al.*, 1998, p. 208). The tolerance values of 0.097 for imports and 0.116 for exports, in contrast, are relatively small and around the common threshold of 0.10. This shows that collinearity explains a substantial portion of the variance of these variables. The regression coefficients for imports and exports can therefore not be interpreted properly. Nevertheless, as collinearity only concerns these two variables, multicollinearity does not pose a serious threat to the significance of the regression results presented above.

6.4.4 *Multivariate analysis with time dimension*

In addition to this regression analysis using mean values of the period 1998-2001, a second analysis was performed in order to allow for variability across time. With this purpose, for each year independently, the parameters were estimated for model (5), identified as the most efficient model in the previous section. Consequently, β_4 (Tertiary education), β_5 (Credit private sector), β_8 (FDI), β_{10} (Government bodies), β_{11} (Pre-merger) and β_{12} (Post-merger), were not estimated. The results closely resemble the estimated parameters of the regression performed above (table 6.6); doctrine appears highly significant throughout all years.

Table 6.7 Multiple regression models 1998-2001

Variable	Parameter	1998	1999	2000	2001	Pooled
GNI per capita	β_1	7.4E-05** (3.245)	7.0E-05** (2.828)	5.5E-05** (2.381)	4.8E-05** (2.212)	6.1E-05** (5.490)
Population	β_2	8.4E-10** (3.562)	8.0E-10** (3.448)	7.5E-10** (3.356)	7.1E-10** (3.427)	7.7E-10** (7.003)
Government expenditures (% of GDP)	β_3	-0.001 (-0.131)	0.005 (0.678)	0.023** (2.524)	0.024** (2.527)	0.014** (2.807)
Imports (% of GDP)	β_6	0.005 (0.947)	-0.004 (-0.714)	-0.011** (-2.277)	-0.017** (-3.428)	-0.007** (-2.781)
Exports (% of GDP)	β_7	-0.001 (-0.222)	0.008 (1.523)	0.012** (2.440)	0.019** (3.524)	0.009** (3.816)
Doctrine	β_5	0.225** (2.807)	0.227** (2.916)	0.228** (2.911)	0.237** (3.265)	0.219** (5.850)
Constant	β_0	-0.089 (-0.664)	-0.117 (-0.865)	-0.209 (-1.576)	-0.194 (-1.457)	-0.120* (-1.864)
<i>n</i>		32	32	32	32	128
<i>R</i> ²		0.518	0.584	0.669	0.702	0.571
Adjusted <i>R</i> ²		0.402	0.484	0.590	0.630	0.550
<i>F</i> -test		4.477	5.838	8.421	9.792	26.883
Sig.		0.003	0.001	0.000	0.000	0.000

* Significance at the 10% level (two-tailed).

** Significance at the 5% level (two-tailed).

By a subsequent regression analysis of the various parameters on time (*t*), it appeared that the following parameters were time-variant at a 5% significance level: β_1 (GNI per capita), β_2 (Population), β_6 (Imports) and β_7 (Exports). While the other parameters remain fixed, a relationship between each time-variant parameter and *t* was defined in the following format:

$$\beta_{i,t} = c + \gamma \cdot t \quad (6.3)$$

The relevant individual equations for the time-varying parameters are estimated as below:

$$\beta_{1,t} = 8.5E-05 - 9.3E-06 \cdot t \quad (6.4)$$

$$\beta_{2,t} = 8.8E-10 - 4.4E-11 \cdot t \quad (6.5)$$

$$\beta_{6,t} = 0.012 - 0.0073 \cdot t \quad (6.6)$$

$$\beta_{7,t} = -0.0065 + 0.0064 \cdot t \quad (6.7)$$

The complete equation that was estimated under this method, assessing the effects of domestic variables, trade variables and competition law variables on R&D expenditures in country *i* for year *t*, is therefore as follows:

$$Y_{it} = \beta_i X'_{it} + \varepsilon_{it} \quad i = 1, \dots, 32 \quad t = 1, \dots, 4 \quad (6.8)$$

With

$$\beta_t = \begin{pmatrix} \beta_{0,t} \\ \beta_{1,t} \\ \beta_{2,t} \\ \beta_{3,t} \\ \beta_{6,t} \\ \beta_{7,t} \\ \beta_{9,t} \end{pmatrix} = \begin{pmatrix} -0.120 \\ 8.5E-05 \\ 8.8E-10 \\ 0.014 \\ 0.012 \\ -0.0065 \\ 0.219 \end{pmatrix} + \begin{pmatrix} 0 \\ -9.3E-06 \\ -4.4E-11 \\ 0 \\ -0.0073 \\ 0.0064 \\ 0 \end{pmatrix} \cdot t \quad (6.9)$$

As this model allows for the parameters to vary over time, all observations in the period 1998-2001 can be used to fit the model, which enables us to obtain a more accurate estimation of the regression coefficients. The results indicate that the influence of GNI per capita, country size, imports and exports alters over time.

6.5 Summary

The results from the empirical analysis conducted in this chapter show that, from the various dynamic elements of competition law, the dummy for choice of doctrine exerts a significant influence on R&D expenditures in developing countries. Not only are countries with a rule of reason doctrine associated with higher levels of R&D expenditures, its significance as a determinant of R&D expenditures holds amongst other factors of influence. Multiple regression analysis established that GNI per capita, country size, government expenditures, imports, exports and choice of competition law doctrine are all statistically significant determinants of general expenditures on R&D. After allowing for a time dimension, the specification of the estimated model was refined. Chapter 7 will provide a further discussion of these results and will draw implications for the design of competition legislation in developing countries.

7. DISCUSSION AND POLICY IMPLICATIONS

On the basis of the results of the empirical analysis conducted in Chapter 6, various implications on the effects of competition law design on technological deepening and dynamic efficiency can be drawn. Section 7.1 will first provide a critical review of the results concerning the various competition law variables. Subsequently, section 7.2 will formulate policy recommendations for competition law adoption and amendment in developing countries. Proposals for further research will be made in Section 7.3.

7.1 Elements of a dynamic approach to competition law

7.1.1 *Rule-of-reason doctrine*

The core focus of the performed analysis was to assess the extent to which a dynamic approach to competition law would render higher rates of R&D expenditures in comparison to a structural approach. Certainly, the most important result obtained is that application of a rule-of-reason doctrine yields higher levels of R&D spending in developing economies. Not only did the dummy indicator, when indicating the existence of a rule-of-reason doctrine, show a higher mean of R&D expenditures in a univariate analysis, its supremacy on this aspect to a per se approach persisted in a multivariate analysis. The mean difference in R&D expenditure rates of 0.20% is remarkably high, relative to the overall mean of 0.43% of GDP. The positive investment incentives from increased flexibility under the rule-of-reason doctrine apparently outweigh the negative incentives of this approach, for example, legal uncertainty. Based on these results, it would be tempting to conclude that a rule-of-reason doctrine in competition law would increase technological deepening and enhance dynamic efficiency in developing countries. However, several reservations should be made to nuance this contention.

First, it is plausible that the causal effect between doctrine and R&D expenditures is reverse, reflecting government priorities concerning technology policy. Governments that spend more on innovation are likely to apply a rule-of-reason doctrine that emphasises and preserves these priorities. Another possibility of a reverse effect would be the likelihood that in the process of adoption of the competition law, firms and institutions engaged in R&D have exerted considerable political pressure to adopt a rule-of-reason approach. A strong research industry has vast interests in legal flexibility, and is more likely to express these interests. For these reasons, it would not be appropriate to conclude that the direction of causality exclusively runs from doctrine to R&D expenditures.

A second reservation concerns the appropriateness of R&D expenditures as a proxy for technological deepening and dynamic efficiency. Data on general expenditure on R&D only allow us to make inferences on the input for technological development, but not on its results. Actual improvements of technological deepening and dynamic efficiency are dependent on effectiveness and efficiency in usage of these financial means. This can be affected by public and private conditions, such as corruption, bureaucracy, and other factors. While the concept of technological deepening is primarily based on the benefits of local R&D spending, dynamic efficiency is an even broader concept, affected by many other factors. The capacity of R&D expenditures to explain technological deepening and dynamic efficiency is therefore limited.

A third reservation refers to the appropriateness and strength of the doctrine dummy to indicate a rule-of-reason doctrine. Strength and effectiveness of law enforcement may cause a scale effect between a rule-of-reason and a per se doctrine. By nature, the requirement to perform case-by-case analyses under a rule-of-reason approach incorporates uncertain and condition-dependent results. Furthermore, many developing economies cope with a lack of technical expertise to execute these case-by-case analyses properly. Due to capacity constraints, competition law enforcement in general may also be weak, which will compromise the reliability of the doctrine dummy. A more technical limitation for the use of a dummy for doctrine, is the possibility that this dummy, to a great extent determined by region, captures the effect of other regionally dependent factors that might account for differences in R&D expenditure rates. One could think of factors as the use of subsidies, the quality of institutions, the legal and political system, or other factors that might differ across regions and affect R&D spending levels. This suspicion is strengthened by the fact that the dummy accounts for a relatively large share of the regression explanation. It is quite unexpected that competition law doctrine alone would have such a large impact on aggregate R&D expenditures.

A final aspect to be discussed is the correlation between government expenditures and the choice of doctrine. While collinearity did not pose a considerable threat to the statistical interpretation of the coefficients, it does cause a certain bias. It is expected that a rule-of-reason doctrine, whose case-by-case analyses would require more resources than a per se approach, would be associated with higher levels of government expenditures. However, for the exact same reason of a rule-of-reason doctrine being more costly, a per se approach might be preferred by countries with fewer governmental resource capacity. As governmental expenditures are positively related to R&D expenditures, this reverse causal relationship might inadvertently enhance the effect of the choice of doctrine dummy variable.

7.1.2 Other dynamic provisions of competition law

In the bivariate analyses, besides doctrine, two other factors appeared to be significantly related to R&D expenditures. Incorporating a legal provision that subjects national, regional and local government bodies to the competition law is associated with higher levels of R&D spending. Participation of governmental entities as equal players in the marketplace enhances the intensity of competition. Also, inclusion of such legal provisions might be indicative of broader market-oriented reforms that not only enforce competition in the domestic market, but also encourage firms to be competitive internationally, herewith stimulating innovative efforts.

Different policy choices concerning merger notification requirements also significantly affect the level of R&D expenditures. Countries with post-merger notification requirements, considered fitting in a dynamic approach, were associated with higher rates of R&D expenditures than countries with pre-merger notification requirements. Yet, countries without any merger notification requirements presented the lowest levels of R&D expenditures. This was contrary to our hypothesis that increased flexibility in merger notification would enhance R&D efforts. However, a decisive factor in the choice of legal provisions on merger policy is the availability of governmental capacity, in a financial sense as well as with regard to practical capability. Merger review is considered to be a costly, time-consuming and rigorous process, for which many low-income countries simply do not have sufficient financial resources. Countries without merger notification requirements therefore on average expose lower levels of government expenditures than countries with pre- or post-merger notification requirements.

While the other legal factors did not affect R&D expenditures significantly, it is worth noting that the difference in means for countries that did and did not include economic efficiency and consumer welfare objectives, were according to our expectation. Overall, despite the positive effects of dynamic legal elements that were established here, the lack of correlation among the individual factors (Table 6.4) indicates that a comprehensive dynamic approach to competition law is often not implemented consistently.

The considerations mentioned above put the importance of including dynamic elements in competition law, and adopting a rule-of-reason doctrine in particular, somewhat in perspective. Nevertheless, on the basis of the empirical results, it can still be established that a dynamic approach to competition law, particularly adherence to a rule-of-reason doctrine, is associated with higher levels of R&D expenditures and, thus, dynamic efficiency. Irrespective of the inconclusiveness on the direction of causality, this is a meaningful conclusion in the light of the importance of technological deepening for economic development.

7.1.3 Trade policy

In conformity with the literature, the empirical results demonstrated that the signs of the effects of imports and exports on R&D expenditures were as expected. However, due to collinearity, these results cannot be interpreted with certainty. Nevertheless, while trade can facilitate transfer of technology from developed to developing economies, import competition may exert a hampering effect on incentives to invest in domestic R&D efforts. An open trade policy regime would therefore not inherently be beneficial to technological deepening in developing countries.

7.2 Policy Implications

Recognising the importance of technological deepening through domestic R&D efforts was identified in Chapter 5 as a key element for the enhancement of economic development. The importance of maximising dynamic efficiency would imply a fundamental deviation from the traditional competition law objective of maximising economic welfare. On the basis of the empirically established positive relationship between a dynamic approach to competition law and technological deepening, regardless of its direction of causality and its interrelationship with competition intensity, several recommendations for competition law and policy design can be made.

First of all, application of a rule-of-reason doctrine, providing firms with increased flexibility to exercise market power and cooperate, would enhance technological deepening in developing economies. Mechanistically applied legislation, as under the per se approach, would decrease this flexibility. Secondly, requirements for merger regulation should preferably be imposed after execution of the merger. Post-merger notification requirements, if any at all, are therefore preferable to pre-merger notification requirements. While this may increase uncertainty, requirements that are too strict may also have a deterring effect on their closure. Thirdly, government bodies engaging in anticompetitive activities should be subjected to and penalised under competition legislation. These recommendations imply that adoption and application of a strict competition law, as applied in the United States or as proposed by the World Bank, OECD and UNCTAD, would not be appropriate for developing economies. The more flexible rule-of-reason approach of the European Union would be a better fit in consideration of the importance of technological progress. For countries that already have a competition law in place that is too strict according to these recommendations, legal amendments are advisable.

7.3 Suggestions for Further Research

As indicated in Section 6.1 (p. 34), competition law and trade policy do not directly influence dynamic efficiency, but do so indirectly by regulating the intensity of domestic and international competition. While for various reasons, the analysis conducted here did not take into account this two-step relationship, it would be valuable to examine in a more profound manner the effect of regulation and legislation on the intensity of domestic and international competition. For these purposes, using industry or firm level data (e.g., concentration ratios or perceptions of competitive pressure as indicators of competition intensity, but also the number of innovations or patent applications as proxies for dynamic efficiency) would presumably be most appropriate. Further clarification on the relationship between competition and incentives for innovation and R&D investments, particularly under deviating conditions in developing markets, would evidently contribute to the formulation of an optimal competition policy for developing countries.

Another aspect of competition legislation that deserves further examination would be the implications of regime choice for economic efficiency. This would be of particular relevance for developing countries, where consumer welfare is to be perceived in a different context than in developed economies. Emphasizing the benefits of future welfare improvements through technological progress might hurt consumers in the short term, which can have separate negative effects in the long term. Price increases in developing countries, even temporarily, may cause considerable harm to the poor, above all when it concerns products that are considered fundamental for life support. Negative long-term effects of short-term price increases to the benefit of technological progress, may therefore hamper development.

In addition, it would be valuable to assess the static and dynamic effects of competition law within a broader framework of competition policy. Other aspects of competition policy would certainly deserve further examination, such as trade policy, economic regulations, subsidies or (strategic) industrial organisation policies.

Finally, certain aspects of the legal and political system in general may affect the effectiveness of competition legislation and its implementation. Whether a civil law or a common law regime is in place might affect the execution of competition legislation; civil opinion may play an important role under a common law regime. Also the quality of governmental institutions and their regulations would be expected to affect effectiveness (Dutz and Vagliasindi, 2000), and herewith the attainment of dynamic efficiency. Political structure in general and the stability of the political climate may also affect the effectiveness of regulatory enforcement.

8. CONCLUSION

The trend of developing countries adopting competition laws after the example of legislation from the United States, the European Union or model competition laws drafted by international agencies, raised questions about the appropriateness of these laws for developing countries. Deviating market conditions, together with the necessity for these economies to achieve technological advancements, are expected to alter the traditional contention of competition being a desirable market mechanism. In this context, the problem statement of this thesis was formulated as follows:

What approach to competition law is most appropriate for developing countries, from the objective to enhance economic development through technological progress?

The economic rationale for implementation of competition law is rooted in the theoretical contention that economic efficiency is maximised in a perfectly competitive market. Competition legislation attempts to prevent distortions of this competitive equilibrium, by prohibiting anticompetitive behaviour and regulating market structure. In spite of these asserted beneficial effects on economic efficiency, competition exerts an ambiguous influence on dynamic efficiency. Incentives to invest in R&D are affected by the ability of firms to generate profits, which requires a certain extent of market power. Promoting competition by strict enforcement of competition law might therefore not be in the interest of technological development. The merits of competition are, thus, not undisputed.

On the contrary, based on divergent views on the nature and effects of competition, several schools of thought prescribe different competition policies. Competition laws that were influenced by the Structuralist and Chicago schools focus on the attainment of economic efficiency by protecting a competitive climate. A strict regime is applied in the United States, adhering to a ‘per se’ doctrine that unequivocally condemns anticompetitive firm behaviour and strictly controls market concentration. For reasons of legal transparency and ease of enforcement, the World Bank, OECD and UNCTAD also recommend this approach for developing economies. Competition legislation in the European Union, under a ‘rule-of-reason’ doctrine, provides for exemption of alleged anticompetitive firm behaviour in case dynamic efficiency is promoted. This relatively permissive approach towards the exercise of market power was introduced under the influence of the Austrian and Evolutionary schools, emphasising the importance of dynamic efficiency.

While competition is often assumed to stimulate economic growth, under the deviating economic and institutional conditions in developing countries, a competitive equilibrium is

unlikely to be attained. A vigorous competitive climate, domestically as well as internationally, may even have adverse effects on economic development in the presence of market failures, such as unemployment, imperfect capital markets and poorly developed legal infrastructure. This suggests that strict drafting and enforcement of competition law is inappropriate for developing countries. Another factor that requires a certain extent of leniency in competition law, is the importance of technological progress for economic development. While international trade can facilitate the adoption of foreign technologies, domestic investment in R&D is crucial for *technological deepening*. This would enhance the ability of domestic firms to use and adapt acquired technologies and, herewith, spur technological progress. In the absence of capital markets, firms in developing countries strongly depend on profits as a source of investments. Referring to the ambiguous relationship between competition and incentives to invest in R&D, again, a vigorous competitive climate, protected by a strict competition law, is not necessarily in the interest of economic development.

The empirical analysis that was conducted assessed the hypothesis that a flexible, dynamic approach to competition law would enhance technological deepening and dynamic efficiency in developing countries. The results confirmed that over the period 1998-2001, countries with a rule-of-reason doctrine had significantly higher levels of R&D expenditures than countries with a per se doctrine. The mean difference was as high as 0.20%, which is substantial in consideration of the fact that developing countries on average only spend 0.43% of GDP on R&D. The statistical validity of the dummy indicator for doctrine persisted in several multivariate analyses that additionally included GNI per capita, population, government expenditures, imports and exports as determinants. Subjecting government bodies to competition law, and applying post-merger notification requirements were other dynamic elements of competition law that were positively associated with R&D expenditure rates.

Providing several reservations, these results confirm that, in order to enhance technological deepening and dynamic efficiency in developing economies, the application of a rule-of-reason doctrine in competition legislation would be most appropriate. In spite of the alleged negative aspects of this approach with its case-by-case analyses (legal uncertainty and enforcement capacity requirements), a rule-of-reason doctrine provides flexibility and positive incentives to the private sector to invest in R&D. This contradicts with the recommendations made by international agencies, contending that simple and strict competition legislation would be most suitable for developing countries. Based on our results, developing countries with a per se doctrine in place are recommended to amend their legislation in order to provide for occasional legal exemptions for the exercise of market power. A dynamic approach to competition law in the sphere of the Austrian and Evolutionary schools corresponds with these recommendations, emphasising the merits of dynamic efficiency in the trade-off with economic efficiency.

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APPENDIX 1: COMPETITION LAWS

Country	Competition law	Year of adoption
Albania**	Law No. 8044 On Competition	1995
Algeria**	Ordonnance No. 95-06 relative a la concurrence	1995
Argentina	Ley No. 25.156 Defensa de la Competencia	1980
Armenia*	Law on Protection of Economic Competition	2000
Azerbaijan	Law No. 526 on Antimonopoly Activity	1993
Belarus	Law No. 2034-XII	1992
Brazil	Law No. 8.884	1960
Bulgaria	Law on Protection of Competition	1991
Burkina Faso	Loi 15/94 Portant Organisation de la Concurrence	1994
Chile	Decree-Law No. 211	1959
Colombia	Ley No. 155 & Decree No. 2153	1959
Costa Rica	Ley No. 7472 Promocion de la Competencia y Defensa del Consumidor	1992
Cote d'Ivoire**	Loi No. 91-999 relative a la Concurrence	1991
Croatia	Competition Act	1995
Estonia	Competition Act	1993
Georgia	Law on Monopolistic Activity and Competition	1992
India	Competition Act	1969
Indonesia**	Law No. 5 concerning Ban on Monopolistic Practices and Unfair Business Competition	1999
Jamaica	Fair Competition Act	1993
Kazakhstan	Law on Competition and Restriction of Monopolistic Activity	1991
Kenya**	Chapter 504: Restrictive Trade Practices, Monopolies and Price Control Act	1989
Latvia	Competition Law	1997
Lithuania	Law on Competition	1992
Macedonia FDR*	Law Against Unfair Competition	1999
Malawi**	Competition and Fair Trading Bill	1998
Mexico	Ley Federal de Competencia Economica	1992
Mongolia	Law on Prohibiting of Unfair Competition	1994
Morocco*	Law on Free Pricing and Competition	1999
Pakistan	Monopolies and Restrictive Trade Practices Ordinance	1970
Peru	Ley No. 26.878 & Decreto Legislativo No. 701	1991
Romania	Competition Law No. 21/1996	1996
Russian Federation	Law on Competition	1991
Senegal**	Loi No. 94-63 sur les prix, la concurrence et le contentieux economique	1994
Serbia & Montenegro	Antimonopoly Law No. 29/96	1996
Slovakia	Act No. 136 on Protection of Competition	1994
South Africa	Competition Act (Act No. 89)	1955
Sri Lanka	Fair Trading Commission Act No. 1	1987
Thailand	Competition Act	1979
Tunisia	Loi No. 91-64 relative a la concurrence et aux prix	1991
Turkey	Act on the Protection of Competition No. 4054	1994
Ukraine*	Law on the Protection of Economic Competition	1992
Uruguay*	Ley No. 17.243	2000
Venezuela	Decreto No. 2.775	1992
Zambia	Competition and Fair Trading Act Chapter 417	1994
Zimbabwe**	Competition Act	1996

Countries marked with a * were not included in the multiple regression analysis, for reasons mentioned in Section 6.2. Countries marked with ** were not included due to a lack of data on 'General Expenditures on R&D'.

