Chapter 9

Europe and Israel: The Effects of EMU on Development and Growth

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Introduction

The decision to set up a monetary union in Europe was adopted at a time when the main target of economic policy was to keep inflation at a low level. The exchange-rate mechanism (ERM) led to a reduction in the inflation rate of the EC countries and to a convergence of the inflation rates with the German one. The European Monetary Union (EMU) was perceived as a natural continuation of the ERM agreement by "tying one's hand" into a single currency. It was an elaboration of a system adapted to fight a problem that was already passé; the problem we face today is no longer inflation, but the long-term growth of countries. The long-term effects of EMU on development and growth were not an aspect of the debate during the deliberations on the Maastricht treaty. The economic debate focused on the monetary and financial aspects of the economy. However, there is no dichotomy between the monetary side and the real side of the economy; a common currency will affect the rate of growth of nations. The passage from national currencies to a single currency can affect investment, the technology level, and the localization of new firms. The purpose of this chapter is to analyze the effects of EMU on the real side of the economy. The focus will be on European countries as well as on small countries trading with Europe.

The chapter first analyzes the implications of a monetary union for the European countries, and shows that a monetary union will affect the specialization of countries. It will also affect the technology race. All these effects lead to higher productivity and growth. The second part of the chapter analyzes the effects of European concentration on countries trading with Europe. The focus is only on

small countries in the vicinity of Europe that have a high ratio of human capital to labor. Israel is a perfect example of such a country since its human capital is very high (see Table 1; years of schooling is a proxy for the stock of human capital). An important point is that in order to gain from the European Union, Israel should adopt policies that reduce the barriers with Europe.The economic implications of a political union are then examined, in light of the fact that the Maastricht treaty does not refer only to a monetary union but also to a political agenda.

Table 1
Average Years of Schooling in the Labor Force: Selected Countries

	1970	1985
Israel	6.2	10.1
Algeria	1.7	4.7
Egypt	5.7	
Morocco	1.2	3.5
Tunisia	2.0	5.7
Syria	3.1	6.6
Jordan	2.9	7.4
Malta		6.8
Turkey	2.7	6.3
Switzerland		7.3
Sweden	6.6	9.6
Austria		8.5
Belgium	8.1	9.3
France	8.6	9.6
Germany	9.1	10.3
Greece	6.3	8.4
Ireland	6.2	8.8
Italy	6.6	9.1
Luxembourg	4.5	6.9
Netherlands		9.5
Portugal	3.9	6.5
Spain	4.1	9.6
U.K	7.0	8.5
Denmark	6.5	6.9
Japan	7.2	9.5
U.S.	9.8	12.0

Sources: UNESCO; G. Kyriacou, "Level and Growth Effects of Human Capital," New York University, 1991 (mimeo).

Effects of EMU on the Growth of European Countries

From the creation of the ERM in 1979 until last year, the volatility of intra-European exchange rates has significantly diminished, but not disappeared; a monetary union should lead to a complete removal of this volatility. The disappearance of the exchange rate risk has numerous effects on the economy—specifically, on the cost of capital; productivity and competition; competition and technology; and on localization and specialization.

The Cost of Capital

The cost of capital faced by firms includes two components: the risk idiosyncratic to the firm as well as the return on the market portfolio. Firms trading internationally add to their risk, which is specific to their sector, the risk premium being related to exchange-rate movements. Under a monetary union, the risk premium disappears and therefore the cost of capital decreases.

The second component in the cost of capital is the return on the market portfolio. The unification of currencies results in a complete unification of capital markets. The appropriate market portfolio faced by companies will no longer be the home-country market portfolio but the European market one. Since a risk that is systemic in the context of the home country may well be diversified in the context of a European portfolio, the risk related to the market portfolio is therefore reduced. This greater portfolio diversification reduces the cost of capital. A reduction in the cost of capital faced by firms leads to more investment, a higher stock of capital, and therefore to a higher rate of growth of the European countries.

Nevertheless, investment and the stock of capital do not have the principal role as the "motor" for growth and economic development. Abramovitz, Solow,[1] and the new-growth economists have pointed out that only a small fraction of per capita growth was associated with an increase in the ratio of capital to labor. The main and central factor of growth is, in fact, an increase in productivity, also called total factor productivity.

Productivity and Competition

The single market has reduced the barriers that existed between European countries, which has resulted in increased competition between firms all over Europe. The monetary union is a continuation on the same path: a disappearance of the volatility of exchange rates between European countries leads to increased com-

petition. Indeed, projects with large up-front and irreversible investments are very sensitive to risk; when the risk is reduced, firms do invest. The extrasensitivity to risk of firms with start-up costs is attributable to the fact that even when a project is profitable, i.e., with a positive Net Present Value (NPV), firms might, instead of investing immediately, decide to wait a while in order to get additional information on the elements affecting their decision. Thus, a reduction of risk due to a monetary union will promote cross-border investments and therefore cross-border competition.

Competition triggers development and productivity since it forces firms to improve, and to become more efficient. Porter emphasizes that through domestic rivalry, companies progress and increase their productivity:

> Among the strongest empirical findings from our research is the association between vigorous domestic rivalry and the creation and persistence of competitive advantage in an industry.... In global competition, successful firms compete vigorously at home and pressure each other to improve and innovate.... Rivalry has a direct role in stimulating improvement and innovation.[2]

A monetary union that ends up increasing competition can therefore lead to higher efficiency and productivity. This is not the only side effect of increased competition on productivity; competition can also affect the technology race and the adoption of new innovations.

Competition and Technology

We saw that EMU will lead to competition and to higher productivity. Technological progress may also affect productivity in two different ways: firms may adopt new and more efficient technologies, or firms may retain the same technology but, through learning-by-doing or through spillover effects from other sectors, the productivity may increase. Empirical research has shown that these effects are significant in the increase of total factor productivity.

The reduction of barriers in Europe means that know-how will circulate more rapidly between firms; there will be an increase in the general level of "knowledge." These positive spillover effects will result in an increase in the rate of growth of the European economies.

When firms adopt new technologies, the effect of competition on productivity is ambiguous. On the one hand, firms will try to innovate in order to gain the market; on the other, the product developed can become obsolete more rapidly

when the rate of innovation increases. Therefore, prospects of competition can deter present research by threatening its outcome with rapid obsolescence. Decreasing monopoly power, i.e., increasing competition, decreases the amount of research in the steady state. The implications of EMU for the rate of technological progress are therefore unclear.

Concerning technical progress, even if the rate of innovation falls, it does not mean that a reduction in welfare will occur. Innovation creates gains but also losses by rendering obsolete old skills, goods, and manufacturing processes. It may be that the rapidity of obsolescence of techniques nowadays is already too high, that is, that the rate of innovation is already higher than the social optimum. It will be a Pareto improvement to reduce the rapidity in the adoption of new technologies. An increase in competition could then just do that, and therefore increase welfare.

Thus, the European Monetary Union could have wide effects on the real side of the economy—on the level of investment, the efficiency of the economy, and the technology race. The monetary union can also affect the geographic distribution of firms.

Localization and Specialization

International trade theories have stressed three reasons why countries and regions gain from being specialized in their production. First, by concentrating firms of the same sector in one place, it allows a formation of a pooled market with specialized skills. Second, an industrial center attracts the establishment of intermediate inputs linked to their production. Finally, because information flows more easily at the same location, concentration generates technological spillover.[3]

Since production displays economies of scale and spillover effects, firms from the same sector gain from being located in the same region; production should therefore be concentrated in one location. However, Europe is less specialized than the United States. From the size and the population of both, "one might expect that the degree of economic differentiation among U.S. regions and that among European nations might be roughly similar."[4] Yet they are not: the U.S. has a greater regional difference in production and has an industry that is far more localized. In Europe, barriers of tariffs, language, and cultural differences partly account for the lack of specialization. Another barrier is that each country in Europe has its own currency.

Indeed, because of exchange rate risks, firms have diversified their localization and do not concentrate production in one country. It must be recalled that foreign risk management has real effects on the allocation of capital and production despite the sophisticated financial development as future, forward, and options. A firm

facing transaction exposure can hedge it; however, real operating transaction exposure cannot be hedged. The firm is left with the decision about the location of its plant. Long-term decisions cannot always be completely free of foreign risk exposure. The best example is the case of Japanese car producers who, while the dollar depreciated rapidly, preferred to reduce their risk by locating near the market, and started production in the United States.

The optimal localization of firms in a specific sector is therefore a resultant of two forces. On the one hand, increasing returns lead to localization of production in a single place. On the other, when facing multiple currencies, firms do not cluster in one location but diversify.

The consequence of a single currency is the disappearance of the need to diversify, which will eventually lead to specialization. This may be illustrated with a simple numerical example of how the European Monetary Union will remove one of these costs and lead to greater specialization.

Certain industries can locate either in Italy or Germany. In order to benefit from economies of scale, manufacturers prefer to produce in a single location. The simplest way to model increasing returns is in situations where there are high fixed setup costs (and constant marginal costs). For various historical reasons the production costs (including the fixed costs) are lower in Italy for the ceramic tiles industry, whereas chemical industries have lower production costs in Germany. We assume that computer software industries have the same fixed costs in both countries since they were started in the same way. Table 2 offers such an example. If firms are not localized in the same country, they do not enjoy the spillover effects of being clustered; therefore production costs are higher when production takes place in both countries.

Table 2
Industrial Location due to EMU

Localization of production	Production costs			Transaction cost (including exchange rate exposure)	
	Ceramic	Chemicals	Computers	Before EMU	After EMU
Italy only	6	10	5	10	3
Germany only	10	6	5	10	3
In both countries	12	12	8	0	0

In addition to production costs, firms face costs of exposure to exchange rate risks. To simplify, we assume that demand for every good is given and equal in every country. This example shows that when an exchange rate risk exists, it is optimal to produce all the goods everywhere. This explains the small amount of country specialization.

On the other hand, when the exchange rate risk is removed because of a single currency, we see a localization of production: Italy producing ceramic tiles and Germany chemical goods. In this example computer software is still produced in both countries. Concentration is increasing total factor productivity. However, it must be stressed that this effect depends crucially on some degree of economies of scale. The existence of economies of scale means that a large center of production is more efficient than a small one. This process of concentration, which will occur as a consequence of the adoption of a single currency, therefore enhances growth.

Overall, then, the removal of trade barriers between countries profoundly affects the economy. A monetary union leads to a removal of one more barrier: the use of national currencies. The use of a single currency will affect the pattern of trade, and allocation of capital will become efficient. Furthermore, there will be a process of concentration and the rate of innovation might decrease. The next section analyzes the implications of these effects for the economy of countries outside the EC.

Effects of EMU on the Rest of the World

A monetary union will promote growth in Europe by increasing the efficiency of factor of production and creating a lower cost of capital. During the period of adjustment to the new steady-state levels, it is quite foreseeable that Europe will attract foreign capital and that there will be greater inflows of capital into Europe. For given worldwide savings, this could be harmful to the less developed countries. However, this effect is only a consequence of a partial equilibrium, and should not be exaggerated. The growth of Europe will increase total savings and also its imports from the rest of the world. This will balance out the negative effects of the single market. Indeed, Neven shows that the consequences of the single market might be negative for the world, since the terms of trade will be affected and world exports reduced through trade diversion. A growing Europe will increase its imports and induce output growth to the rest of the world through an increase in demand.[5]

Two major consequences of EMU will be the phenomenon of concentration and the change in the rate of technological innovation. Let us turn now to the effects of these on the rest of the world.

Technology and Productivity

We have considered the implications of EMU for technology. On the one hand, more competition could lead to smaller monopoly power, so that firms would invest less in R&D and the rate of innovation might decline. On the other, greater spillover effects between firms could lead to technological improvements and to a higher total factor productivity.

As for EMU's effects on the rest of the world, a greater diffusion of knowledge in the European Community will, through transfers of technology and imitation, increase the productivity of other countries.

Specialization and Localization

In the preceding section it was shown that the removal of exchange rate risks will induce a process of specialization between countries inside EMU. This process will enhance growth, especially in the sectors of goods exhibiting economies of scale and based on human capital. How will this process affect countries outside of Europe? Here we shall focus on countries that have the human capital required to develop and to produce goods exhibiting spillover effects; among countries surrounding the European Union, Israel will serve as a good example. Compared to other countries, especially those in the Mediterranean area, it has a high level of human capital (see Table 1).Moreover, the costs of producing high-tech goods are lower than in Europe because wages of skilled workers are lower. On the other hand, an industrial center for high-tech goods already exists in Israel.

For a country such as Israel, the process of specialization due to the monetary union could mean that if the barriers of trade with Europe, and more specifically exchange rate risks, are not too high, then Israel could become one of the poles of specialization.

A numerical example will illustrate this point. In Table 3 we begin with our previous example, and add data on Israel. As noted, Israel already has an industrial center for high-tech goods in general, and for computer software in particular. It is assumed that production costs in Israel are lower than in Europe since wages are lower (though the technical spillover is not less than in Europe).

Table 3
Industrial Location due to EMU (2nd case)

Localization of production	Production costs			Transaction cost (including exchange rate exposure)	
	Ceramic	Chemicals	Computers	Before EMU	After EMU
Italy only	6	10	5	10	3
Germany only	10	6	5	10	3
In both countries	12	12	8	0	0
Israel					
Producing for a small market	4	20	5		
Producing for a large market	3	20	5		

Before the process of unification, both countries, Germany and Italy, produce computer software. Because of the monetary union, exchange rate risk disappears, and the barriers to trade are reduced. Thus both countries could go on producing after EMU, or only one of them, since the gains from specialization are not high enough.[6] Israel, however, has lower costs of production that can be reduced even further, while widening its market. A possible outcome is that Israel specializes in producing computer software for Europe.

For this equilibrium to be sustained, the barriers to trade with Europe have to be low. This means that the Israeli currency should be closely pegged to the ECU; and that Israel should follow closely the European standards. It also means that government policies should not render imports and exports of services difficult. Israel might then enter the European area with its high-tech goods and services. Table 4 shows that exports of high-tech goods to Europe have already been increasing more than to the United States.

Table 4
Israeli Exports of High-Tech Industries
(index, 1985 = 100)

	1985	1986	1987	1988	1989	1990	1991
EU	100	102.5	136.3	188.8	222.3	282.4	366.1
U.S.	100	101.6	136.9	167.5	171.2	207.3	243.7

The main point of this example is that if Israel reduces its barriers costs, by linking itself to Europe, it could specialize in high-tech goods that require high levels of human capital, since in this sector it has a comparative advantage. The other point that needs clarification concerns timing. If the process of concentration is completed, and we assume that a European country (in our example Germany or Italy) is already producing computers, then the concentration benefits have already been gained. There is already an equilibrium and there is no reason for Israel to enter the market. The dynamics, then, are important. Countries such as Israel should now reduce their barriers with Europe before the process of concentration begins. Later it will be too late; even lower wages are not enough to compensate for the creation of large centers in Europe.

The Maastricht treaty involved not only a monetary union, but also some political decisions. The section that follows notes an important consequence of a political union: the technology race.

Political Union and Growth

The Maastricht treaty also carries a political message: the choice of a unified Europe. The monetary union was the easiest instrument to adopt in order to signal that political union is in fact the European goal. However, this political unification will affect the economics of the rest of the world even more than the monetary union.

The creation of a single European political entity means that there will be three blocs: NAFTA, Europe, and Japan with its Asian satellites. All sectors of the economy may be affected. Here, however, we shall focus only on the influence of this situation on the development of technologies. Nowadays, developed nations no longer struggle for power through war, but in the economic arena, and technology is the instrument of strength.

Competition could lead to duplication of research and hence to waste of resources. World cooperation in pure science and fundamental research would benefit everyone. Cooperation between blocs is particularly needed for projects that require huge fixed costs of research and development. If, for reasons of prestige and power, the three blocs were to fail to coordinate their R&D policy, the waste of resources could be tremendous. One could imagine, for instance, that both Europe and the United States would develop a superplane and, for purposes of industrial strategy or prestige, each would finance separate projects!

The three blocs, and particularly Europe, should realize that the balance of power does not lead to control of R&D as a crucial variable in the struggle for power. R&D policies should not become the pursuit of political aims by other means. Europe, as a political power, should weigh its policy carefully, since the economic consequences can go far beyond the monetary union itself.

Conclusion

This chapter has looked at some of the implications of a monetary union for the development of countries. For now EMU seems far away, but the process of unification of Europe seems inevitable, whatever form it will take. During the time needed to achieve unification and reallocation of resources, outside countries should strive to make the right moves. When Europe completes its process of restructuration, it will be more difficult for countries to overcome the new sectorization and productivity of Europe. To use a metaphor, it is possible to become a satellite of Europe when the mass of Europe is not yet in high density; this equilibrium is stable. However, if Europe already has a huge mass, then satellites are not viable as such.

Notes

1. M. Abramovitz, "Resource and Output Trends in the United States Since 1870," *American Economic Review* 46 (1956): 5-23; R. Solow, "A Contribution to the Theory of Economic Growth," *Quarterly Journal of Economics* (1956): 65-94.

2. M. Porter, *The Competitive Advantage of Nations* (New York: Free Press, 1990), p. 117.

3. These three principles were already emphasized in A. Marshall, *Principles of Economics* (London: Macmillan, 1920).

4. P. Krugman, *Geography and Trade* (Cambridge: MIT Press, 1991), p. 75.

5. D. Neven, "EEC Integration Towards 1992: Some Distributional Aspects," *Economic Policy* 10 (1990).

6. We have a case of multiple equilibria. Three equilibria are possible: (1) only Italy produces computer softwares; (2) only Germany produces them; (3) both countries produce them. Since the two centers already exist, it is quite natural that they will continue to exist after EMU.