Globalization, heterogeneity, and imperfect information
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Chapter 1

Introduction and Outline

1.1 Introduction and Motivation

The 1990s marked a period of hope and disappointment about the development of both emerging and more mature economies. Over the decade, hope was brought about by the expansion of international finance and the many years of fast economic growth and improved living conditions in East-Asia. Yet, disappointment ensued when the economic boom turned out to be a bubble which eventually burst and led to the financial crises in Thailand, the Philippines, Malaysia, Indonesia, and South Korea. There has been the widespread hope stemming from the potential benefits offered since trade in goods and services, sometimes embodying new technologies, had increased to levels not observed since the turn of the 19th century. However, opponents of this process of globalization as well as some empirical studies suggest that such benefits come at the price of higher, and persistent, unemployment and increased income inequality in mature economies. Hope has been given after the development and refinement of new technologies and its potential to increase well-being all over the world through a process of adaptation. This was followed by disappointment because new technologies apparently had almost no measurable effect on productivity while at the same time technological development, alongside international trade, has been suspected to have caused increased unemployment of low skilled workers as well as increased income inequality.

This dissertation contains six essays that primarily focus on the above mentioned drawbacks of financial integration, intensified trade relations, and the development and widespread use of new technologies. All chapters rely on the assumption that the behavior of heterogenous market participants is constrained by the amount and quality of the information they possess. As a consequence, we analyze some key macroeconomic issues related to globalization by studying the microstructure of the market involved.
The purpose of the essays collected in this thesis is to contribute to our understanding of the factors that trigger a financial crisis as well as the impact on labor markets of trade liberalization and the usage of new technologies. The dissertation consists of two empirical studies and four theoretical essays. The issues involved have profound effects on the economic well-being in developing, emerging, and developed economics. As a consequence, we not only restrict ourselves to analyzing why promising developments could end up in a situation of financial crises, unemployment, or increased income inequality. Throughout the thesis we also try to give specific recommendations to avoid such undesirable side effects of globalization to take better advantage of the opportunities offered.

The empirical Chapter 2 sketches some patterns of globalization during the 1990s which provides the point of reference for the other chapters. We start with financial integration and discuss the trends of, especially short-term, capital flows to emerging markets. The picture that emerges is that the maturity of capital flows to countries in East-Asia and Latin-America had shortened and that such short-term inflows could easily become outflows possibly resulting in a financial crises. Then, in Chapter 3, we analyze empirically for emerging markets the factors that determine this maturity structure of external debt. Chapter 4 considers, from a theoretical point of view, which determinants cause capital inflows to come to a sudden stop when speculators are both credit and information constrained. Then, Chapter 5 studies the respective roles of domestic and international investors during a period when investments are reversed and turn into capital outflows.

Additionally, Chapter 2 paints a picture in which increased trade in goods and services and technological development occurred during the same time as OECD countries showed signs of persistently higher unemployment of low-skilled workers as well as increased income inequality. The theoretical Chapters 6 and 7 of this dissertation discuss mechanisms through which further international integration of product markets, respectively innovations and technology transfer, can have such undesirable implications for labor markets.

1.2 Financial Integration

The 1990s are the second era of global finance, the first having been prior to World War I. Then, scaled by the incomes of the countries concerned, international capital movements reached levels never matched subsequently, international migration reached high levels, and there was faster growth in trade than in incomes (see Bordo et al. (1998)). Although the extent of financial integration is comparable to a century ago, its nature is different.
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As Bordo et al. (1998) point out, the difference is that today new information-generating and information-processing technologies have made markets more integrated than ever. Moreover, the range of financial claims that are traded internationally have broadened and the vehicle for direct foreign investment nowadays is multinational firms.

Although the extent and nature of financial integration has offered many benefits, further financial market integration has not prevented currency collapses from occurring regularly, and has possibly even contributed to their intensity. Indeed, one major additional difference between financial integration then and now is that at the beginning of this century we had a stable monetary framework, the gold standard, which is lacking today.

The number of factors that have been identified as causing speculative capital outflows have increased after the experience with the Exchange Rate Mechanism (ERM) crises that hit several European countries in 1992-1993, and the financial crises in emerging markets starting with Mexico in 1994-1995, then in East-Asia in 1997-1998, followed by Russia, Brazil and several other Latin American countries in 1998-1999, and recently in Turkey. The ‘first generation’ crises model stressed that factors such as excessive domestic money creation, fiscal expansions, and current account deficits ultimately laid the ground for the collapse of a fixed exchange rate regime.

The ‘second generation’ crises models are based on the observation that often the above mentioned fundamentals are not out of control when there is widespread speculation against a currency. For example, this was the case with the French franc and the pound sterling in September 1992 when these currencies were under speculative pressure which ultimately was the prelude to the collapse of the European Exchange Rate Mechanism in August 1993. These latter models stressed the importance of policymakers often giving higher priority to policy targets such as low unemployment, than to firm commitment, at times of speculative pressure, to the fixed exchange rate. Thus, these models focus on political factors, such as the political cost of high unemployment and foregone output that are associated with a tough defense of the currency against a speculative attack (see Eichengreen, Rose, and Wyplosz (1995) and Frankel and Rose (1996)). These models, characterized by multiple equilibria, give rise to the possibility of self-fulfilling attacks and are similar in spirit to bank run models such as in Diamond and Dybvig (1983).

In the case of East-Asia, and earlier in Mexico in 1994, unemployment had been low. Instead, their crises seem to have been caused by a sudden fall in investor confidence as reflected in the fact that short-term foreign currency denominated debt was larger than the amount of official reserves, which are used to provide confidence in the fixed exchange rate regime, in the afflicted countries. This potential for illiquidity facing the countries
that recently experienced financial fragility has now been added to the list of leading indicators of speculative capital outflows. Chapters 3, 4, and 5 of this dissertation follow this theoretical line of reasoning and are funded in the empirics of Chapter 2.

First, Chapter 3 examines empirically for emerging markets which factors affect the maturity structure of external debt. This will give us some insight in whether a high share of short-term in total debt can be attributed to good causes such as trade and growth, or to less benign reasons which are not under the control of policymakers in countries at the receiving end of capital flows. Also, we will argue that short-term capital flows tend to be pro-cyclical, increase volatility, and call for additional automatic stabilizers in emerging markets. In Chapter 4 we study the consequences of assuming that speculators have imperfect information and limited speculative funds in a multi-country extension of a ‘first-generation’ crisis model. Our framework allows easy extension to cases in which other fundamentals than inflationary domestic policies cause the abandonment of the fixed exchange rate regime and is able to explain and replicate important stylized facts. Then, Chapter 5 considers a model in which the borrowing country finds itself in an illiquid situation, because of both an asset-liability and a maturity mismatch. We analyze when investors refuse to roll-over their investments and study when and why resident investors can play a leading role during episodes of capital flight. After briefly having mentioned the empirical and theoretical background of recent developments related to financial integration, we will now turn to a more detailed account of what this dissertation has to say about this part of globalization.

1.2.1 Short-Term Capital Flows to Emerging Markets

The way the East-Asian miracle imploded lends credibility to the bankers’ adagium that ‘it’s not speed that kills, it’s the sudden stop.’ Like communist countries in the 1950s, the East-Asian economies were growing at very rapid speed until the sudden stop in 1997. For example, the Singaporean economy grew at 8.5 percent per annum between 1966 and 1990 with per capita income growing at 6.6 percent. Average growth between 1978 and 1997 in Indonesia, Thailand, South Korea, and Malaysia amounted to, respectively, 7.7, 7.4, 7.7, and 7.2 percent. Such fast economic growth was partly driven by, and drove, social progress as indicated by falling poverty, increased life expectancy, and rising levels of education.

At early stages some authors pointed out that at least a soft landing to more sustainable levels of economic development in Asia should be expected. Authors such as Krugman (1994), Young (1995), and Park (1996) argued that growth in Asia was predominantly
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driven by increased usage of factors of production instead of improved technology and, as a consequence, growth would have to slowdown sooner or later as this factor accumulation cannot produce such fast growth indefinitely because of diminishing returns. In other words, growth was mainly due to perspiration, instead of inspiration, of working harder not smarter (see Krugman (1997a)). Nevertheless these and other observers did by far not predict the severity of the crises in 1997-1998, but only a gradual loss of momentum (see also Radelet and Sachs, 1998b). Growth rates during 1998 for the countries listed above dropped to respectively −13, −9.7, −5.8, and −6.7 percent. Also, these countries suffered large depreciations of their real effective exchange rates.

The crises have resulted in major output losses, increases in unemployment and poverty, while marked increases in consumer prices have put considerable strain on existing social safety nets. Also, the crises have contributed to social and religious unrest and to such problems as with Thailand’s irrigation system, which was unable to cope with the number of construction workers, food vendors, and petty traders, returning to farming as a way of survival. In order to understand the move from the miracle to the sharpest financial crises hitting the developing world since the 1982 debt crisis, many post-crisis studies argued that the speed of development contained the seeds of the inevitable sudden stop.

The economic crisis in Asia exposed major weaknesses, not just in the balance sheets and operations of the region’s financial institutions but also in the supervisory and regulatory regimes under which they functioned (see IMF (1999)). The fixed or pegged exchange rate regimes stimulated borrowing externally and limited the ability of the government to act as a lender of last resort. Banks borrowed extensively because they were able to do so on the basis of explicit or implicit public guarantees of bank liabilities. Much of the proceeds were used to finance a stock market and a real estate bubble, implying that assets either were illiquid in a direct sense or depreciating in the event of a loss in investor confidence. Additional factors prompting and reinforcing the sudden stop include large and growing current account deficits, reckless lending by conglomerate-controlled banks, relationship banking, the policy response of international financial institutions, financial liberalization, and the exhaustion of official reserves in an ultimate, but fruitless, attempt to avoid a collapse of the overvalued currency.

These structural weaknesses of the Asian economies were highlighted in the large levels of especially short-term, foreign currency denominated, external debt. As was the case with the infamous Tesobonos in Mexico in 1994, high ratios of short-term foreign debt in foreign currency to official reserves implies illiquidity and makes a country vulnerable to a loss of investor confidence, possibly culminating in a creditor panic. Whether one sees
short-term debt as the cause of the financial crises, or just as a symptom of a deeper cause making a financial crises possible, it is worthwhile to investigate which factors determine the maturity structure of external debt in the first place. This is the subject of Chapter 3. In that chapter we not only focus on the determinants of the maturity structure of external debt, but also on the issue of whether short-term debt is pro- or counter-cyclical, and the relation between short-term debt and volatility in emerging markets. Ultimately, insight into the above will provide policymakers with the information whether, and if so to what extent and how, to regulate capital flows.

In theory there are well-founded reasons why borrowing short-term may be beneficial for both emerging and more mature economies. Indeed, we find that increased trade openness shortened the maturity structure of debt since trade credits are mostly short-term. Also, trade and foreign direct investment move hand in hand, where the latter shortens the maturity structure of debt because of the need for working capital. Another positive cause contributing to a higher share of short-term debt is fast domestic growth, which offers policymakers in emerging markets at least some control of their country’s maturity structure.

Nevertheless, we find that other causes for the maturity structure of external obligations pointing to the shorter end are less benign. International interest rates, growth in industrial countries, regulation through the Bank for International Settlements accords that made longer term investments less attractive, and the extent of capital account convertibility are found to be important determinants of a countries share of short-term debt in total debt in Chapter 3. Although our analysis of the maturity structure suggests that short-term debt can play a useful role, the sustainability of these flows is not entirely under the control of policymakers in emerging markets.

Another theoretical reason why borrowing short-term externally may be beneficial for a country, is that it allows consumption smoothing in the presence of an adverse shock. For this benefit to materialize, short-term debt should be counter-cyclical. However, we will report evidence that short-term capital flows tend to be pro-cyclical and that this cyclical nature of capital flows is not ‘benign’. We find some support for the view that pro-cyclical capital flows may be the result of a negative, but non-symmetric, response of risk perception by lenders to economic conditions in emerging markets. In other words, during times when economic conditions in developing countries are relatively sound, investment flows in while it flows out much stronger when the first signs of trouble are monitored. Then, instead of allowing a country to smooth consumption in the presence of adverse shocks, the behavior of short-term capital flows proves to reinforce volatility in expenditures in case of both domestic shocks and changes in the international en-
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environment, requiring additional domestic adjustment, and contributing to an imminent financial crisis.

Summing up, Chapter 3 supports the view of short-term capital flows being a mixed blessing. On the one hand, such flows are associated with trade, FDI, and growth. On the other hand, their sustainability is not entirely under the control of policymakers in emerging markets and their destabilizing nature exposes these countries to increased volatility and vulnerability to financial crises calling for increased reliance on automatic stabilizers.

1.2.2 The Timing of Speculation and Capital Flight

Balance of payments crises, with or without a banking crisis, have been a recurrent phenomenon during the 20th century (see Kindleberger (1996)). The output losses appear to be especially severe if a currency and a banking crisis occur simultaneously. The 1990s was an interesting decade in this respect with the speculative pressure against most currencies in the ERM, affecting the process of European monetary integration, currency and banking crises in former communist countries, the hope given by the smooth adjustment to the Mexican crisis of 1994, and disillusion after financial fragility in emerging markets and the inability of international financial organizations during the contagious crises in East-Asia, Russia, and Brazil. Related to identifying the causes of a balance of payments crises, explaining the timing of a speculative attack and capital flight has received considerable attention in the literature.

Concerning the timing of the occurrence of an episode of capital flight especially delay is fascinating. About delay, often a country finds itself vulnerable to loss of confidence by investors for a considerable period of time before finally this vulnerability shows-up in trading characteristics. One indicator of this confidence is the extent to which there is a mismatch between a country’s assets and liabilities. This can easily be operationalized by the ratio of short-term debt to official reserves. If this ratio exceeds unity, the country may find itself in an illiquid position, as was the case for the economies hit during the East-Asian crises. However, this ratio of short-term debt to reserves exceeded unity throughout the 1990s, although it had been increasing in the run-up to the ultimate financial crises (see Figure 1.1). This raises the question when a crisis starts. With respect to the ERM crises, for example, Obstfeld and Rogoff (1995, p.86) ask: ‘the speculative attack on the British pound in September 1992 would certainly have succeeded had it occurred in August - so why did speculators wait?’

The delayed response of financial markets to weak fundamentals gives capital flight
and speculative attacks a seemingly arbitrary nature in the sense that for many observers there was nothing unusual that triggered the loss of confidence of market participants exactly at such a moment. As a consequence, observers often relate the start of a crisis to investor sentiments and the inherent instability of the market, instead of news about fundamentals. On the other hand, the multiple-equilibria models mentioned above, as well as models stressing the difficulty of aggregating information give rational explanations to volatility and crashes in financial markets even in the absence of news about fundamentals (see Romer (1993) and Caplin and Leahy (1994)). Obviously, these differing views have broad implications as to whether, and if so to what extent and how, financial markets should be regulated. Chapters 4 and 5 of this dissertation deal with this issue of the timing of a balance of payments crisis and capital flight.

In Chapter 4 we study the issue of delay in a model where currencies are vulnerable to an attack because of excessive monetary expansion, as in Krugman (1979) and Flood and Garber (1984). In contrast to them, in our framework the currency is not attacked as soon as, due to the state of fundamentals, a fixed exchange rate starts to deviate from its equilibrium exchange rate. This delay of the speculative attack is explained by coordination problems faced by illiquid speculators that communicate imperfectly through their trading decisions.

In a sense, all the information is present at the decentralized level but, because speculators need each other to attack the fixed parity successfully, this information has to be aggregated in order to reflect it in market prices. In other words, by means of taking short-positions in vulnerable currencies, speculators communicate with each other, but this communication is far from perfect and a common target for the attack is not selected instantaneously. The moment of the speculative attack is shown to depend on initial beliefs, the degree of imperfect communication, the rate of domestic credit creation, and the number of countries that have overvalued currencies, since all these factors affect the ability of speculators to coordinate their attack.

As a consequence, we offer a rational explanation to a delayed response of financial markets to weak fundamentals and this allows us to explain a number of important stylized facts observed when a balance of payments crises occurs. For example, we explain why a currency is overvalued before the attack and is devalued at the moment of the attack, with profits for speculators as a result. Communication among speculators results in fluctuating stocks of reserves prior to the attack.

Since our model comprises several currencies with weak fundamentals, contagion arises naturally. Subsequent balance of payments crises occur faster and faster since one successful attack increases the speed with which coordination on the next currency becomes
successful. This is the case because after each successful attack, speculative funds of traders increase. Also, the remaining number of countries with weak currencies decreases and their fundamentals have deteriorated further.

In Chapter 5 we again analyze the timing of speculation against a fixed exchange rate regime. Also here the issue of delay is important, but additionally we discuss the implications of adding heterogeneity of investors stemming from locational differences for the timing of a financial crisis. This additional feature is motivated by recent empirical studies that tend to argue that it often is domestic investors that play a leading role in starting an episode of capital flight, possibly eroding the value of the exchange rate, and inducing a financial crisis.

We study this issue in a model in which the debtor country finds itself in an illiquid position, due to both a maturity mismatch because long-term investments can only be terminated at some loss and due to an asset-liability mismatch as the level of short-term debt exceeds the amount of reserves. In our framework, these investments are financed by diversified agents who lend both in the home and foreign currency. The assumption that a fraction of each players' investment is denominated in the local currency and the other part in the foreign currency implies a very tractable model with one objective.
function. Interestingly, the fractions of domestic and foreign wealth can be interpreted as the fractions of local versus international investors. Additionally, if an investor refuses to roll-over existing claims because of perceived deterioration of fundamentals, it is also optimal for him to engage in direct speculation. This allows us to determine when a situation of illiquidity combined with weak fundamentals results in capital flight due to cancellation of investments as well as because of outright speculation. The model used contains heterogeneity stemming from locational differences that is operationalized by utilizing the concept of diversified investors.

Location matters in Chapter 5 because it not only affects the moment of a financial crisis, but also its ultimate determinants depending on which players take the lead during an episode of capital flight. This in turn has important implications for the question of how, if anything, we want to regulate capital flows to emerging markets to prevent excessive volatility on their financial markets. Domestic players are different from international investors for a number of reasons. First of all, foreign investors are exposed to exchange rate risk in case there is partial default when the borrowing country is unable to fully service debt repayments due to a fall in the domestic currency. Also, they incur higher costs on their short-positions in case they cancel their investment and start to speculate instead. Moreover, after a financial crisis, taxes are often raised and it are domestic parties that have to pay this in case they were too late with transferring their wealth abroad. Furthermore, the quality of information possessed by local investors may be better than that of international players, and they may also have more common knowledge about each others information than foreign players do.

For each of these reasons we show that it is more likely that resident investors take the lead, compared to international investors, in shipping their wealth abroad. They move first in the sense that if they were the same as foreign players, the fundamentals of the economy would have to deteriorate to a larger degree before investors are unwilling to roll-over existing claims and instead start to speculate in the expectation that they will benefit from the collapse of the fixed parity. On the other hand we show that (implicit) government guarantees to the banking sector that discriminatory work in favor of residents make it more likely that international investors play a dominant role in starting a period of speculation against a fixed exchange rate regime.

As in Chapter 4, this model looks at the microstructure of the financial market and utilizes the concept of imperfect information among traders about each others actions. We also discuss the policy implications of our model for the effectiveness of increasing transparency, introducing capital controls, stimulating portfolio diversification, and utilizing asset-liability management for reducing the incentives of market participants to create a
1.3. Trade, Technology, and the Labor Market

About globalization, officials, market participants, and academics, are all concerned whether a world characterized by high levels of trade and large international capital flows would jeopardize social cohesion and economic and financial stability and therefore requires additional policies to maintain the social infrastructure (see also Bordo et al., 1999). For example, many observers argue that recent OECD labor market trends, such as increased income inequality, longer unemployment duration, and higher unemployment of especially low skilled workers, are primarily driven by commercial integration and/or technological developments. Therefore, not only further financial integration can be characterized as a mixed blessing requiring adequate monitoring and additional supervision, but also globalization of trade in goods and services and the arrival of new technologies has both costs and benefits.

Chapters 6 and 7 are theoretical in nature and analyze possible interactions between trade reform or new technologies and the labor market. Like in earlier chapters, imperfect information constraining the incentives of heterogenous agents plays a crucial role. Chapter 6 shows that a country opening up to trade can be confronted with unemployment increasing persistently. However, this should not stop the process of globalization since there are Pareto superior alternatives to import protection that can achieve the same employment goals. We will also analyze whether any adverse effects of trade liberalization are concentrated among workers which are found at the lower end of the skill distribution.

A simplified version of the model used in Chapter 6 is utilized in Chapter 7 to consider a possible mechanism through which the development of new technologies increases unemployment of especially low-skilled workers and raises income inequality. Also, we discuss why different countries can have different experiences with the same technologies in terms of their labor market impact. The latter is especially important in the current world where new technologies spread quickly across certain parts of the globe.

1.3.1 Trade and the Labor Market

At least since Ricardo, standard economic models have argued that commercial integration and, thus, eliminating barriers to international trade increase welfare. Besides a new stream of economic theory that argues that, in principle, although hardly perceivable in practice, governments intervening in international trade can raise domestic welfare, es-
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Especially special interests have raised loud voices concerning possible negative impacts of free trade on working conditions, the environment, unemployment, and the income distribution. Some recent studies argue that trade liberalization is a major cause of increased unemployment of especially low-skilled workers as well as rising income inequality.

Older trade theories have stressed that in a second-best world, for example with real wage rigidity, abolishing an import tariff in fact raises domestic unemployment, although only temporarily. However, other policy instruments, such as a wage subsidy, would achieve the same goal of protecting employment at lower cost. In Chapter 6 we present an equilibrium-search model with heterogeneous workers who search for a job in one of two sectors and who lose part of their skills during unemployment. This model has a relevance that is not necessarily restricted to the effects of trade liberalization on labor market dynamics.

We will show that an import tariff increases the wage and the employment prospects in the protected sector. This results in a labor market distortion because for some, non-specialized, workers it becomes attractive to search for a job in the protected sector, say agriculture, despite their higher productivity in the non-protected sector, say manufacturing. Notice that this result is a direct implication of heterogeneity of workers and does not depend on any form of diminishing returns. As a consequence, import protection not only frustrates specialization on the basis of comparative advantage for the nation as a whole, but also shifts the comparative advantage of workers.

Trade liberalization results in sectoral reallocation of workers. Contrary to standard models, the manufacturing sector is not able to absorb all the workers coming from the formerly protected agricultural sector. Although firms in the formerly unprotected sector enjoy more job seekers, the quality of the inflowing workers relative to the incumbents is uncertain and probably lower since these workers previously maximized their expected wage by searching for a job in the protected sector. Adding to this the assumption that workers lose skills during unemployment, we have all the ingredients to analyze the effects of trade liberalization on employment in both sectors, through these quantity and quality effects, and determine under what conditions aggregate unemployment increases persistently.

Which additional features should be included in the liberalization package to prevent such a persistent rise in unemployment after trade has been reformed? This question has a long history in the first-best literature on tariffs versus alternative instruments to accomplish a country’s goals. As is well known, a wage-cost subsidy is preferable to an import tariff since then the consumption side will no longer be distorted. Such a specific subsidy however, does not alleviate the labor market distortion. This is also the case in our
model since giving the formerly import protected sector a wage-cost subsidy still distorts the comparative advantage of workers. We argue that giving both sectors a subsidy can eliminate not only the standard consumption side distortion, but also the labor market distortion. Moreover, the fact that the comparative advantage of workers will no longer be distorted also implies that giving a subsidy to both sectors is cheaper than limiting the wage-cost subsidy to the formerly protected sector. In the latter case, too many workers search for a job in the agricultural sector and as a consequence too many jobs will be subsidized.

As a consequence, Chapter 6 mainly studies whether increased international trade can be responsible for the longer duration of unemployment observed in the 1990s in OECD labor markets. Additionally however, our model qualifies standard effects attributed to trade liberalization on income inequality and the skill-composition of unemployment. The specialized agricultural workers are the main winners of trade protection, and therefore the principal losers of trade reform. Agricultural generalists limit their loss after trade liberalization by switching from the formerly protected agricultural sector to the unprotected manufacturing sector. Finally, the manufacturing workers face fiercer competition for jobs. In general then, according to our framework, we cannot say that trade liberalization raises income inequality nor can we say that the increase in unemployment is concentrated among the least-skilled workers. Which workers stand to lose most from trade liberalization does not depend on the distinction between (low and high skilled) individuals, but on the different productivity levels of a single individual with respect to the different sectors of an economy.

In other words, one can imagine two workers which, in the presence of trade protection, work in agriculture. One, worker a, is low-skilled in both sectors, the other, worker b, is high-skilled in agriculture, but low-skilled in manufacturing. The latter will be found at the top of the income distribution, while the former is at the bottom. After trade liberalization, facing increased competition in the product market from abroad, worker a moves to manufacturing thereby limiting his loss. Worker b on the other hand, given his productivity difference between the two sectors, will continue to search for a job in agriculture despite being confronted with a large wage decline and a higher probability of unemployment. The income distribution will narrow after trade liberalization in this case. As a consequence, deviating from a crude distinction between high-skilled and low-skilled workers by taking heterogeneity more seriously, clouds standard judgements about the effect of trade reform on the distribution of wages. Trade liberalization affects each and every one in the labor market and, unless the reform package is sufficiently broad, will raise unemployment persistently.
1.3.2 Technology and the Labor Market

Besides, and sometimes instead of, citing trade liberalization as having some unwarranted side effects on the labor market, it is recent technological improvements that are often mentioned as having caused these changes in the labor markets of, especially, more mature economies. In Chapter 7 we use a simplified version of the model used in Chapter 6 to show one mechanism through which technological innovations both raise unemployment, especially of low-skilled workers, and make the income distribution more unequal.

The development and implementation of new technologies has an international besides a domestic component. Indeed, as Coe and Helpman (1995) argue, in a world with international trade in goods and services, foreign direct investment, and international exchange of information and dissemination of knowledge, the better a country takes advantage of technological advances in the rest of the world, the more a country’s productivity should be positively affected. Although new technologies spread across the globe through embodiment in capital goods as well as through direct learning, the impact of new technologies is country-specific, depending for example on labor market institutions, and can be characterized as a mixed blessing.

The mixed blessing refers to the impact of new technologies on the labor market as well as the apparent absence of large productivity gains of their implementation and widespread use. We illustrate these pitfalls in our model by studying, as an example, the computer revolution. Concerning the international context, the impact that a new technology such as the computer has on employment and income inequality depends, as we will see, on some key characteristics of a country’s labor market and this can explain different international experiences with new technologies.

The key premise of Chapter 7 is that if workers are heterogenous with respect to their degree of complementarity to innovations and if employers imperfectly observe worker quality, then new technologies reveal information. As a consequence, we will argue, new technologies such as the computer raise income inequality because of both skill-complementarity and because information a-symmetries between workers and firms are reduced. The revelation of previously unobserved worker heterogeneity that is a by-product of technological development, may increase unemployment of the least-skilled workers.

The main difference between our models in Chapters 6 and 7, is that trade reform causes a change in relative prices, whereas a general-purpose technology is seen as affecting the productivity in all sectors that implement it. Interestingly, about the debate whether it has been trade or technology causing recent labor market trends, we can say the following. From Chapter 6 it is hard to infer that it is trade that caused increased income inequality
and unemployment of the least-skilled workers. From Chapter 7 it may appear that technology is indeed the cause of the recent labor market developments, but, as we will see, if new technologies caused the drop-out of low-skilled workers from the labor market, why didn’t we measure a large increase in productivity?

### 1.4 Concluding Remarks

Although the extent of financial integration and liberalization of trade in goods and services is not unprecedented, predominantly under the influence of new information processing technologies and innovations, the nature and structure of globalization today is different compared to a century ago. The 1990s were a decade were two research questions, inspired by real world circumstances, attracted a lot of attention of officials, academics, and market participants in the field of international economics. The first one is related to the volatility of increasingly integrated financial markets, which featured several currency collapses with or without banking crises. The second relates to observed labor market trends such as increased income inequality, longer duration of unemployment, and higher unemployment of especially low-skilled workers.

The models used in this dissertation all employ the concept of imperfect information which constrains the behavior of heterogeneous agents and which has important consequences for aggregate market outcomes. The main objective of this dissertation is to obtain a better understanding of the timing of capital flight and currency crises, the composition of capital flows, the relation between trade liberalization and labor market dynamics, as well as the relation between technological development and labor market trends. Investigating these issues is not only interesting from an intellectual point of view. The research questions that underlie each chapter have had and continue to have important implications for social well-being in both developing, emerging, and more mature economies. The main focus of this dissertation is on the assumed drawbacks of globalization and technological innovations, but throughout the study we offer policy advice to limit and prevent any negative side-effects of these developments. In short, this thesis presents an attempt to explain when, how, and why sometimes bad things happen in a world with, in general, good economic progress.
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