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The Implications of North Korean Collapse

Aban eɛgu a, ɛfiri yam. (If the state falls, it is from the belly.)

—Akan proverb

The previous chapter explored the potential economic payoffs of fundamental reform. Unfortunately, there is little evidence that the North Korean regime is contemplating reforms on this scale. Policy stasis under conditions of growing economic distress raises the possibility (though not the necessity) of collapse and absorption along the lines of the German experience.[1] This chapter first reviews the German unification experience and then compares Germany prior to unification with the situation today on the Korean peninsula. The quantitative implications of this scenario are then explored using a computable general equilibrium (CGE) model. The chapter concludes with some ruminations on what a collapse on the Korean peninsula that did not occur as smoothly as East Germany's might imply.

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1. See Ahn (1998) and Pollack and Lee (1999) for a careful analysis of how a North Korean collapse might come about.

The German Experience

The remarkable thing about German unification is the rapidity with which it occurred. Rumors of a Soviet deal on Germany initially surfaced in May 1987, but they were generally discounted. Two years later, the rumors were widely circulating in the press, and, in May 1989, Hungary began allowing East Germans to transit to the West, thereby releasing a wave of emigration.[2] Mass demonstrations against the East German regime began in September of that year, and by November the Berlin Wall had come down and the borders had opened.[3] Shortly thereafter, the communist regime began to implode, and West German Chancellor Helmut Kohl made a series of decisive overtures to the East. What proved to be a transitional elected East German government under Christian Democratic leader Lothar de Maizière took office in April 1990. A currency reform took place in July, and by October 1990, less than a year after the Wall came down, East Germany had ceased to exist. No one predicted it (though a theory of unanticipated revolutions does exist [Kuran 1989, 1991]).

Economic logic pushes centrally planned economies (CPEs) toward dictatorship. The maintenance of internal prices far at variance from those of the rest of the world necessitates a massive police apparatus to prevent people from exploiting the latent gains from trade. This point could be seen most clearly in East Germany, which had only to look west to see the alternative. Sinn and Sinn (1992) argue that the Marxist emphasis on materialism was ultimately the East German regime's undoing. Once it was clear to all that capitalism would generate greater material prosperity than socialism, the *raison d'etre* of the socialist state evaporated. Indeed, they attribute the bloodless collapses of the communist regimes throughout Central Europe to the communist authorities' respect for the iron laws of history: Once the masses were in opposition, resistance was pointless. Ironically, the sudden reversal of fortune recalls Lenin's remark to Trotsky on the Winter Palace balcony: ''*Es schwindelt*!'' (It's dizzying!).

Economic Policies

Confronted with a collapsing East Germany, West German economic policy had a number of possibly conflicting goals.[4] Among these were to

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2. In the 18 months between January 1989 and June 1990, East Germany lost 7 percent of its working population, with the losses concentrated among the young and skilled (Flassbeck 1994).

3. If the USSR and Hungary effectively were able to pull the plug on the East German regime, China could presumably do the same to North Korea if so inclined.

4. For useful analyses of German unification see Lipshitz and McDonald (1990), Sinn and Sinn (1992), Dornbusch and Wolf (1994), Carlin and Meyer (1994), Thimann and Breitner (1995), Hughes Hallett, Ma, and Melitz (1996), Dyck (1997), von Hagen (1997), and Lange

stem the flood of immigrants and to protect West German wages. Another was to achieve restitution for property owners whose assets had been seized by the communist regime.[5]

The standard prescription for economies in transition from central planning to the market is macroeconomic stabilization, liberalization of domestic trade and prices, current account convertibility, privatization, creation of a social safety net, and the creation of a legal framework for commercial transactions. Through monetary union and absorption into West Germany, most of these goals were achieved in a decisive fashion. The outstanding issues for East Germany concerned the terms of the monetary union and the method of privatization.

Monetary union occurred in July 1990. The goals of the monetary union were threefold: to establish a competitive wage; to give the new economy the right amount of liquidity; and to give East German residents sufficient capital for their participation in the unified economy. Under the terms of the agreement, an exchange rate of 1:1 between East and West German currencies (ostmark and deutsche mark) was adopted for wages, government transfers, and savings accounts up to certain limits. An exchange rate of 2:1 was adopted for remaining household savings, enterprise and government deposits, debts of the state, enterprises, and individuals, and 3:1 for accounts outside East Germany. Pensions were based on East German wages but calculated using West German formulas.

Most observers thought that the 1:1 exchange rate was probably too high. They thought the overvaluation of the ostmark would generate uncompetitive costs in the East and a bout of consumption-led inflation (cf., Cline 1990, Sinn and Sinn 1992, and Yeon 1993b). In reality, inflation did not occur, though a peacetime depression in East Germany unparalleled in modern history did.

Product Market Adjustment

In East Germany, GDP fell by 30 percent, industrial output by 67 percent, and the unemployment rate rose to 30 percent (Sinn and Sinn 1992, Dornbusch and Wolf 1994). Economically, this was worse than the situation during the Great Depression.

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and Pugh (1998) among others. See Sinn and Sinn (1996), Watrin (1998), and Wolf (1998) for Korea-oriented summaries of the German experience.

5. The then West German Foreign Minister and leader of the junior government coalition partner, the Free Democrats, Hans-Dietrich Genscher, spearheaded the push for restitution. The transitional East German government of Lothar de Maizière supported compensation but opposed restitution, seeking to preserve East German residents' effective control of assets in East Germany. Revelations of connections between de Maizière and the *Staasi* secret police weakened his government, which in the end was forced to accept the principle of restitution. In hindsight, the pursuit of restitution was undoubtedly one of the blunders of German unification.

Why did output collapse so precipitously? There were several contributing factors. The East German economy was in bad shape at the time of the currency union. The flood of emigration had taken away many of the best and brightest. As a result of these skilled labor shortages, both the government and the enterprises were having trouble functioning prior to the currency union. In addition, the *Treuhandanstalt* had closed some uncompetitive enterprises, contributing to the decline of output and the rise of unemployment.[6]

These direct impacts, though non-negligible, were not the fundamental reasons for the depression, however. More fundamentally, the centrally planned East German economy was not ready to compete in the market. Incentives were not conducive to success in competitive markets; the structures of enterprises (in terms of horizontal and vertical integration) were not appropriate; and the enterprises were engaged in a variety of social welfare activities that typically would be handled by other institutions in a market economy.

Moreover, the technical aspects of production (techniques, input mix, output mix) were sub-optimal for a market economy facing world prices. Sources cited in Sinn and Sinn 1992 estimate that anywhere from 50 to 67 percent of the East German capital stock was obsolete. In addition, the state guarantee of employment led to disguised unemployment. (To cite but one example, in East Germany 260,000 workers worked 14,000 kilometers of rail lines; in West Germany 230,000 workers operated 27,000 kilometers of track [Yeon 1993b].) Given the nature of technology, resources could not be reallocated instantly or costlessly, even under the best of circumstances.

To compound these problems, the economy was hit with a series of macroeconomic shocks. Two were on the demand side. First, the economy suffered from declines in trade with its former partners in the COMECON. (Though given the relatively low reliance of East Germany on COMECON trade, this trade shock was actually smaller than what hit the other Central European transitional economies.)

Second, and more important, was a temporary autonomous fall in the domestic demand for home goods. East German consumers began buying Western-made goods that had been previously unavailable but were known to East Germans via the West German media (table 8.1). Dornbusch and Wolf (1994) note that this shift away from home goods was greater in East Germany than in the other Central European transitional economies. They ascribe this to the greater familiarity of East German consumers with Western products and to the relatively powerful marketing and distribution push by large West German consumer products firms in the East German market.

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6. The *Treuhandanstalt* was a trust agency created in March 1990 to oversee all state-owned firms in East Germany. It was dissolved at the end of 1994.

Table 8.1 Western goods penetration

Product	Western product share of East German sales, Sept. 1990
Margarine	35
Cooking Oil	41
Detergent	53
Black Tea	66
Cooking Fat	76
Dishwashing Liquid	81
Fruit Yogurt	90
Canned Soup	94
Chocolate	96

Sources: Sinn and Sinn (1992), Dornbusch and Wolf (1994).

On the supply side, the East German economy was hit both by relative price shocks and by a massive real exchange rate appreciation engendered by the 1:1 exchange rate and the subsequent high wage policy. The conventional wisdom at the time of the monetary union held that the 1:1 exchange rate priced East German producers out of the market and was a fundamental mistake of unification policy—a view that still holds popular currency. In hindsight, the situation looks more complicated.

A number of studies summarized in Sinn and Sinn convincingly demonstrate that the purchasing power exchange rate at the time of unification was probably something on the order of 1:1. (The much higher black market rate at the time of unification reflected not only the usual black market premium but also the steady fall in value of the ostmark as speculators bet against the East German currency.) The problem was that the relative prices existing in Germany at the time not only reflected the lower relative prices of nontradables typically found in low income countries, but also reflected an additional distortion imposed by the central planners (table 8.2). The shadow price of foreign exchange (which appears to have varied significantly across exporters) was on the order of 4:1 (Sinn and Sinn 1992, Dornbusch and Wolf 1994, Flassbeck 1994). As a consequence, when the currencies were unified at 1:1, the traded-goods sector suffered a massive cost shock *and* suddenly had to compete against foreign producers who could in effect provide an infinite supply of goods at the going prices.

The price shock was compounded by subsequent wage policies. (Indeed, both Sinn and Sinn and Dornbusch and Wolf argue that the wage policies would have been sufficient to price East German producers out of the market regardless of the conversion formula at the time of monetary union.)[7] In the non-traded sector, it was politically difficult to

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7. Dornbusch and Wolf write: ''The one to one conversion had no lasting effect on relative wages: since the conversion, relative wages in the East have increased steadily, and outright parity is the avowed objective of the unions on both sides'' (p.159). This does not mean,

Table 8.2 East German relative prices

Product	Ratio of East German to West German prices, May 1990 (percent)
Tape recorder	600
Pineapple	550
Camera	530
Women's nylons	510
Calculator	490
Refrigerator	390
Coffee beans	390
Chocolate	310
Electricity	24
Housing	18
Coal (for heating)	17
Newspaper	17
Bread	16
Haircut	15
Streetcar fare	10
Kindergarten fees	5

Source: SPD-Bundestagfraktion, *Wochentext* No. 10 (19 May 1990) cited in Lim (1996).

resist the demand for equalization of wages, especially in the public sector.[8]

In the traded goods sector, West German unions pressed for a high wage policy in the East to prevent an eastward migration of jobs.[9] At the same time, wage negotiations in the East were subject to a particularly pernicious principal-agent problem: since no one was negotiating for the future (privatized) managements of East German enterprises, the incumbent lame duck managers simply gave in to demands for higher wages.[10] The *Treuhand*, which might have acted to halt this, did not participate in wage negotiations because it saw itself as representing the state, not capital, and the state was not supposed to participate in private wage negotiations under German law. Moreover, under German law the dominant parent company in a group is responsible for the debts accrued by insolvent subsidiaries. The *Treuhand* wanted to ensure that it was not held

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however, that the conversion rate is irrelevant in all circumstances. Under a different set of wage policies (such as those that might obtain in Korea) it could be quite important.

8. Wolf (1998) cites the example of East Berlin bus drivers who demanded the same pay as their West Berlin counterparts.

9. Sinn and Sinn argue that either there should not have been a monetary union (thereby preserving the exchange rate as an adjustment mechanism), or the wage increases should have been legally prohibited.

10. As Soltwedel (1998) aptly put it: ''There was a severe principal-agent problem in the wage policy in the last months of the GDR; in fact, there were no principals at all'' (p.276).

liable as the parent of these enterprises and their debts (Scheremet and Zwiener 1994).

Privatization

These problems were compounded by delays in privatization. The key was not privatization *per se*—the evidence from other transitional economies is ambiguous on this point, but that without privatization one would not get investment, and *investment* was the key for at least two reasons.[11] First, at the microeconomic level, new investment would be the mechanism by which new market-competitive products and processes would be introduced at the level of the firm. Second, from an economy-wide standpoint, in contrast to the existing allocation of capital, new investment would be carried out on market principles and hence would be the mechanism for the sectoral and regional restructuring of the economy (Lange and Pugh 1998).

In point of fact, the privatization of the East German economy proceeded slowly for two reasons. Restitution claims were one.[12] As Lange and Pugh (1998) observe, by mid-1991, 1.5 million restitution claims had been filed, simply overwhelming the administrative capacity of the system. In Dresden, for example, only 700 of 40,000 claims had been decided.

Another contributing factor was the *Treuhand's* preference for selling firms to single buyers and normally requiring payment in cash.[13] The *Treuhand* in effect tried to sell the entire East German economy to individual bidders for cash. Not surprisingly, it did not find too many takers. (Even if it had, the process of putting so many assets on the market at

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11. See Sinn and Sinn (1992) on the German case and World Bank (1996) chapter 3 and Nellis (n.d.) for summaries of the broader international experience with privatization. In a very interesting paper, Frydman et al. (1999) present evidence from a large panel of Central European firms that the ownership of the privatized enterprise is critical: enterprises under ''outside'' ownership show markedly improved performance, while those under ''insider'' ownership are indistinguishable from state owned enterprises. This could be related to the observation of Eickelpasch (1998) that East German enterprises in the traded goods sector transferred to ''outside'' owners had better access to financing and distribution channels. Indeed, Frydman et al. (1999) find that it is revenue growth, not cost reduction, that differentiates enterprises sold to outsiders. In any event, the experience in most transitional economies (including Romania, as discussed in the following chapter) is that increased industrial output has come from new firms—not from newly privatized existing firms.

12. In 1991 the German Constitutional Court separated in principle the issue of claims of dispossessed previous owners from the issue of compensation. Other countries, such as Hungary, have either rejected the restitution principle or narrowed its application. See Barna (1998) for more discussion.

13. See Sinn and Sinn (1992), Carlin and Mayer (1994), and Lange and Pugh (1998) for extensive reviews of *Treuhand* practices.

once would have surely pushed prices down to fire sale levels for the benefit of the largely West German investors.)

Indeed, residents of East Germany were effectively frozen out of this process. The paucity of financial instruments in East Germany prior to unification meant that the portfolios of East German households were extremely concentrated in cash and demand deposits. East German households had very few financial claims on state or enterprise assets. Sinn and Sinn estimate that the limits on the 1:1 convertibility of bank accounts wiped out almost one-third of household financial wealth. Indeed, Sinn and Sinn estimate that about half of this loss (or one-sixth of East German household financial wealth) ended up in the coffers of the *Bundesbank*, which actually made money off of the currency unification. Given their lack of financial resources (and consequent inability to borrow) and the *Treuhand's* preference for single buyers, only 6 percent of industrial properties had been sold to East German buyers through 1991 (Carlin and Mayer 1994, table 14.4).[14] This was truly unfortunate, since the East Germans were likely to be among the most interested, informed, and motivated potential buyers.[15] Foreigners only accounted for another 2 percent of sales. A vast majority of the industrial assets in East Germany were sold to residents of West Germany.

The *Treuhand* also took responsibility for restructuring enterprises and breaking up the giant *Kombinaten*, which lengthened the time to market and created more enterprises to be privatized.[16] The consensus (by no means unanimous) among economists is that this policy was mistaken. Given that speed was of the essence, it would probably be better to allow markets to value and restructure these assets.[17] (Parenthetically, this would have given the East German managers an advantage, especially since they probably understood both the enterprises and the local environment better than outsiders.)

The pace of privatization was further slowed by concerns about anticompetitive effects. There was an understandable tendency for West Ger-

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14. This is in contrast to other transitional economies, where ''spontaneous privatizations'' by the *nomenklatura* have been closer to the norm.

15. The potential parallels to the North Korean case, in which financial assets are even more likely to be concentrated in cash, is obvious.

16. Lichtblau (1998), in a very interesting paper, argues that the *Treuhand* understood the costs of delay and tried to expedite the process as best it could, but was organizationally incapable of doing so.

17. Again, another principal-agent problem potentially arises, this time between the government selling authority (the *Treuhand*) and the dispossessed property owner. The seller recognizes a social cost associated with the existence of non-privatized enterprises and, as a consequence, has a higher rate of time discount than the dispossessed owner interested in compensation. In other words, the seller prefers to sell the property, while the dispossessed owner prefers to hold out for a higher price.

man firms to attempt to purchase potential rivals in the East, either to operate them or, more likely, shut them down or turn them into sales offices. Potential sales of this sort were disallowed by the Cartel Office. (Given the extreme degree of concentration in the South Korean economy, unification might present a good opportunity to increase competition in some sectors. It is hard to imagine the Korea Fair Trade Commission blocking enterprise sales, though.)

The economic environment in East Germany created a final disincentive for potential buyers. A survey of potential investors found that poor infrastructure, especially transportation and telecommunications infrastructure, was a major disincentive for investment (Sinn and Sinn 1992). This disincentive would be particularly acute if production were to be characterized by close horizontal and vertical networking of firms. Networks would create economies of agglomeration, which would likely work against ''pioneers'' in relatively inaccessible environs.[18] As pointed out by Soltwedel (1998), regional development priorities had influenced the East Germans' construction of the *Kombinaten*—in essence, industrial plants were located with no regard for regional comparative advantages or transport costs. The *Treuhand* administrators were faced with the unenviable task of privatizing East German industrial assets without completely closing local economies. A similar problem is likely to confront future attempts to restructure North Korea, where the geographic pattern of economic activity has been strongly conditioned by non-economic criteria.

Labor Market Adjustment

As a result of the fundamental lack of competitiveness, combined macroeconomic shocks, and slow privatization, East Germany experienced a dramatic decline in output and employment. East German employment was 9.8 million in 1989. More than 3.5 million jobs in East Germany were subsequently lost, though only about one-third of these turned up on the unemployment rolls. Approximately one-third found jobs in West Germany, either as commuters or migrants, and about one-third either entered training programs, took early retirement, or simply left the labor force.[19] Survey data reported in Dornbusch and Wolf indicate that willing-

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18. In part, this can be overcome by strengthening links between the core and the border region of the periphery. The relevance of this for the Korean case is obvious: The North Korean infrastructure is abysmal and provides a disincentive to investors. However, strengthened links between North and South Korea would enhance the attractiveness of both North and South as locations for production. (The South would no longer effectively be an island if one could transport goods via rail directly to Western Europe.)

19. In this regard, it is notable that a large share of those exiting the labor force were women. It is impossible to determine to what extent this was an expression of underlying personal preference or to what extent this reflected social pressure or coercion. By extension it is impossible to determine whether women were better off after unification or not. There is

ness to migrate was driven first by fears of unemployment, second by environmental concerns, and only third by wage differentials. Ironically, the high wage policy, which narrowed income differentials but at the cost of unemployment, probably increased migration.[20] Given the proximity of Seoul to the border, it is hard to imagine that Korean unification would be accompanied by insufficient southward migration.

Despite these problems, by 1991 production in East Germany was expanding even in some tradable sectors such as nonmetallic minerals, parts of iron and steel, printing, plastics processing, and some processed foods. These were typically sectors that had been engaged in exporting prior to unification. They were less dependent on collapsing domestic demand and presumably knew something about international markets and competition. While East German growth has continued to be concentrated in nontradables, some tradable sectors also have continued to expand.[21]

All in all, the experience in Germany has proved to be more protracted and costly than analysts anticipated at the time of unification, with transfers running at 6 to 10 percent of GDP annually.[22] Although macroeconomic variables have been moving in the right direction (the economy of the former East Germany grew nearly 10 percent in 1994, the fastest rate in Europe), the economy remains plagued by high unemployment. Transfers have been larger (net of taxes, they account for 40 percent of East German income) and have gone on longer than expected.[23] Even with this largesse, East Germany has gone through a truly wrenching transformation.[24] While the replacement of the socialist centrally planned

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no natural rate of employment independent of incentives. Relative to West Germany, East Germany prior to unification tied more social benefits to employment, while providing benefits such as child care that facilitated women's participation in the labor force. It is not surprising, then, that East Germany exhibited high labor force participation by women. Under the West German system, benefits were not tied to employment, and the facilitating devices were absent. Thus, it is not surprising, that fewer women chose to work. Under which regime their welfare was higher is impossible to tell.

The potential parallels to the Korean case, in which North Korean women exhibit extremely high labor force participation rates, are clear.

20. To be clear, this does not mean that the elasticity of migration with respect to wages was zero. Even so, Sinn and Sinn argue that generous transfers created a stay put premium, with the result that the amount of westward migration was sub-optimal.

21. See Eickelpasch (1998) for a detailed analysis of enterprise restructuring and the sectoral pattern of recovery.

22. See Yang (1998a) for figures on public expenditure and net financial transfers from West to East.

23. See Heilemann and Rappen (1997).

24. Eberstadt (1994c) reports very sobering demographic data indicating that the immediate effect of unification and the ensuing depression was a collapse in the birth rate and a rise in the mortality rate at levels completely unprecedented in German history (including the

society with a democratic capitalist one will undoubtedly benefit East Germans in the long run, after reviewing the demographic data, one cannot help but come away with the impression that the transition has been extraordinarily costly in human terms.

Relevance to Korea

Any attempt to draw lessons for Korea from the German case must start with a comparison of the two pairings. In some ways, the Korean case presents a gloomier picture than the German case: North Korea is larger and poorer relative to South Korea than East Germany was in comparison to West Germany; North Korea's economy is probably more distorted than East Germany's was; and South Korea is not as rich as West Germany. On the other hand, demographically, the combined Korea is younger than the combined Germany, and North Korea has a younger demographic profile than East Germany.

Size

At the time of unification, East Germany's population was roughly one-quarter of West Germany's. Today, North Korea's population is about half that of South Korea. Moreover, under current demographic trends, the ratio of South Korean to North Korean population would fall from 2:1 to 1.7:1 by 2010 (Chun 1994).

Per capita income comparisons are quite hazardous, due mainly to the fundamental problem of comparing output baskets of widely differing composition and quality, and the differences in national accounting conventions between the two systems. Estimates from Germany indicate that per capita income prior to unification was perhaps one-half to one-third that of West Germany, though this cannot be determined with any real precision. Comparisons for North and South Korea are even more speculative due to the paucity of reliable statistical information about the North. Yet, as argued in chapter 3, the ratio of per capita income is probably something on the order of 8:1 to 11:1 and growing by the day.

Demographics

While North Korea is bigger and poorer than East Germany, it has the advantage of having a younger population. Today, the median age in the

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inter-war years and the period of military defeat) and comparable only to disasters such as China's Great Leap Forward. Though some of the declines in marriages and births presumably represent time-shifting and not permanent reduction, the same cannot be said for the increase in mortality rates. In addition, social maladies such as racist and neo-Nazi groups have grown in the fertile ground of anomie and alienation.

combined Korea would be around 26 years, while in Germany at unification it was around 38 years. The share of the North Korean population under 15 is around 29 percent, while in East Germany it was around 20 percent (Chun 1994).

This latter point is quite important since, in the case of East Germany, it has been estimated that 80 percent of workers will have to undergo retraining (Eberstadt 1995a). The younger population of North Korea would make it possible to handle more of this retraining through the conventional educational system, minimizing both economic costs and personal dislocation.

At the other end of the life cycle, the combined Korea would be carrying fewer retirees than the combined Germany. Eberstadt (1995a) reports that the ratio of workers to retirees was 5:1 in Germany, while it is 15:1 in Korea. There would be more workers in Korea available to finance the costs of unification.

Economic Dislocation

As noted earlier, a combination of fundamental competitiveness problems, macroeconomic shocks, and poor policy choices initially caused an enormous fall in output and employment in East Germany. Obviously, one cannot predict what would happen in North Korea. Nevertheless, one can point to some comparisons.

With respect to competitiveness, the North Korean economy is probably even more distorted than the East German economy was. Its exposure to international trade, which might be taken as a proxy for competitiveness, is lower than that of East Germany. The shifts in relative prices in response to liberalization reported in figure 7.4 are on the same order of magnitude as the shifts actually experienced by East Germany. Moreover, the degree of industrial concentration may well be even greater than the degree of concentration in East Germany.

North Korea exhibits the same extremely high rates of labor force participation as East Germany did prior to unification, which probably reflects disguised unemployment. The infrastructure is in poor condition. A report by the Korea Transport Institute concluded that it would cost $30.6 billion to refurbish the North Korean transportation infrastructure and integrate it with the South's in the event of unification. It is not difficult to imagine North Korean dinosaur-like enterprises—subject to massive relative price shocks, exposed for the first time to international competition, burdened with excess labor and working with decrepit infrastructure—failing.[25]

In addition, North Korea is the most militarized society on Earth, with 1.05 million men under arms, fully one-fifth working age men. As pre-

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25. Indeed, Bazhanova (1992) cites a disconcerting number of instances in which shoddy North Korean products were not accepted even by other centrally planned economies!

viously noted, this figure may be a bit misleading, however, as the North Korean military engages in many non-military activities that would be performed in the civilian sector in other countries. Nonetheless, it would not be too much of a stretch to say that unification accompanied by demobilization would probably generate a significant number of new entrants into the labor market, though this could generate a considerable peace dividend as well.

Three obvious channels of labor market adjustment exist. First, as demonstrated in the previous chapter, the production of labor-absorbing light manufactures would grow in a liberalized North Korean economy. Second, as in the case of Germany, there might well be a reduction in labor force participation, especially of women. The final channel for labor market absorption would be migration.

Both the relatively young structure of the North Korean population and the proximity of Seoul to the border would appear to encourage southward migration, though some have suggested that the DMZ could be maintained as a barrier.[26] An alternative to migration would be commuting, which could be encouraged by strengthening the transport links between North and South Korea. This would facilitate commuting from North Korea to jobs in the South, and the relocation of production from the South to the North.

Home ownership has been robustly and negatively correlated with willingness to move. Prior to unification, more than half of East German farmland and nearly half of the housing stock was privately owned (Yeon 1993b). In contrast, private ownership in North Korea is practically nonexistent. Yeon (1994) suggests that North Koreans should be given title to their housing to discourage migration. Another possibility would be to tie property rights to housing (and other assets) to some specified period of post-unification residence or employment.

The eventual equilibrium distribution of the population across the two regions is contingent on the policies applied. As a point of reference though, Chun (1994) observes that the per capita income of the poorest region of South Korea is only 60 percent of the richest area, and the simple average provincial income is only 76 percent of that of the richest. Within West Germany, wage differentials of 70 percent have existed without inducing large-scale migration. In the United States, the poorest state has income per capita only around half as great as the richest. Presumably, a united Korea could maintain substantial regional difference in per capita income without undue social strain.

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26. Various researchers have attempted to estimate the possible number of migrants that might head south if the border were opened. These estimates range from 1.4-2.8 million to 4 million (Hyundai Research Institute 1997). Compare Foster-Carter 1992, Koh 1994, and Young, Lee, and Zang 1998.

Table 8.3 Inter-German and inter-Korean exchange

Inter-German exchange	1970		1980		1990	
Trips (thousand)[a]	1,254		2,746		2,410	
Migration (thousand)[b]	12.5		8.8		11.5	
Two-way trade (million DM)	4,411		10,873		14,014	

Inter-Korean exchange	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Trips[c]	1	474	412	360	na	na	na	146	1015	3337
Two-way trade (million $)	18.7	13.6	111.8	174.5	187.4	196.4	293.7	259.0	319.9	234.9

a. Number of trips from West to East Germany.

b. Migration from East to West Germany.

c. Trips in both directions.

Sources: Yeon (1993b); Ministry of National Unification.

Imponderables

Finally, there are a whole series of points of comparison that are difficult to analyze but could have a major impact on final outcomes. The most obvious qualitative difference between the German and Korean cases is the much greater degree of isolation of North Korea. East Germans were in the middle of Central Europe, with Berlin serving as a point of contact between the East and West. Many East German residents could receive West German radio and television broadcasts and had a fairly good idea of conditions in their western neighbor. Table 8.3 reports some data on inter-German personal contacts prior to unification and inter-Korean contacts today. In comparison to the German figures, the numbers for Korea are vastly smaller—even with the recent increases due to the South's engagement policy.

How this relatively greater isolation will play out is hard to predict. Analyzing the path to unification, Foster-Carter (1992, 1994a, b), for example, makes much of the lack of political passivity that the North Koreans may display when the truth of their relative deprivation becomes clear. Knowledge is a necessary precondition for this to come about, however, and there is no reason to believe that the average North Korean is particularly well-informed.

Similarly, knowledge of the West surely contributed to the surge of migration that occurred when the borders were initially opened in Germany. Those migrants were not sailing off into the unknown: They had a pretty good idea of their destination. Indeed, Dornbusch and Wolf argue that the East German residents' pre-unification familiarity with West German products contributed to the temporary demand shock that the East German economy suffered at the time of monetary union. North Koreans

are undoubtedly more ignorant of conditions in the South than East Germans were of conditions in West Germany, so their expectations may be lower. This potentially means less migratory responsiveness and less of a shift away from home goods.[27] South Korean policy could affect both of these developments.

It is interesting to ponder Sinn and Sinn's observation about East Germany: "It is possible that the problem engendered by the difference in living standards might have been less severe if the communist government had been able to indoctrinate the people with a self-denying idealism that would have made them resistant to the lure of material prosperity" (p.7). In the case of North Korea, it has been argued that the *juche* ideology of Kim Il-sung replaces the Marxist emphasis on materialism with an emphasis on purity of spirit (see box 3.1). Indeed, references to Marxism-Leninism have been expunged from the constitution. Perhaps North Korea will prove ideologically more resilient and less enticed by the creature comforts of the South.

The issue of expectations raises the final imponderables—politics, attitudes, and spirit. Germany and Korea differ considerably in history and political culture; German unification was shaped by specific characteristics of the German situation, and Korean unification will be shaped by its unique circumstances as well.

Several characteristics strongly shaped German decision making about unification. First, Germany is a democracy, and West German Chancellor Helmut Kohl saw the East Germans as potential voters. (Indeed, he was criticized in 1990 by his predecessor, Helmut Schmidt, for promising unification without increasing taxes in the West and for not making a "blood, toil, and tears" appeal for sacrifice.) Second, Hans-Dietrich Genscher and the Free Democrats were an important focal point for restitution demands. Third, the West German unions were an important interest group in German politics and were successful in pursuing their own interests. Lastly, and intriguingly, Sinn and Sinn argue that the Germans approached the task of reunification with a lack of patriotism:

> The wave of patriotism that could have triggered a vigorous policy of rebuilding was nowhere to be seen. Some people reacted skeptically to the poor Eastern relatives, responding to the appeal of the outstretched hands by nervously protecting their wallets. Others, conveniently forgetting the fortunate circumstances of their own success, arrogantly and wrongly attributed the poverty of their Eastern relatives to differences in mentality rather than to differences in systems. Most

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27. Unlike the East German case, North Korean consumers presumably are not especially familiar with Western consumer goods. However, like the German case (and in contrast to the situation in countries such as Poland, the Czech Republic, and Hungary), the South Korean *chaebol* are probably in a good position in make a marketing push into North Korea in the event of unification. If maintaining production in the North is a high priority, the South Korean government might want to discourage this.

> people, however, acted as if the whole thing was no business of theirs and deceived themselves into thinking that German unification would in no way disturb the even tenor of their ways (p.xii).

Certain prospective similarities and differences exist in the Korean case. Unlike Germany, the unions in Korea are relatively weak. South Koreans have been unable to restrict the government's right of eminent domain, suggesting that the politics of South Korea are such that it might be able to avoid the twin pitfalls of the high wage policy and the principle of restitution that bedeviled German unification policy (Mo 1994).

Mo (1994) argues further that Helmut Kohl (the most powerful German Chancellor since Bismarck) acted too hastily because of his insecure domestic political position. In contrast: ''A South Korean leader will have a secure domestic power base . . . and if the German experience is any indication, North Koreans will vote for the ruling South Korean party'' (pp. 61-62). Foster-Carter (1992, 1994a,b) similarly claims that North Korean voters will be a conservative force in Korean politics.

An alternative interpretation of the German experience is that in a democracy an incumbent leader facing a potential third or more of the electorate (which is what the North Koreans will be) will be relatively responsive to their interests and, at least initially, will be rewarded. Beyond this, the recent electoral trends in Central Europe suggest that the newly enfranchised voters will remain conservative free-marketeers until shortly after the subsidies run out. Regionalism has long played a role in Korean politics, and it is not hard to imagine an essentially regional response dominating any particular ideological orientation.

The closer relationship between business and government in South Korea should allow the South Korean government to guide the activities of South Korean firms to a greater extent than the West German government could. It is not difficult to imagine the *chaebol* being encouraged to rehabilitate failing North Korean enterprises.

Unfortunately, the malaise with which Sinn and Sinn claim the average German greeted unification appears to have gripped South Korea as well. Lim (1996) writes that the ''unification fever'' of 1989 ''has all but evaporated, and disillusionment has begun to set in'' (p.1). Indeed, a review of the literature on the costs of unification suggests that Korean economists interpret the German experience as a costly failure.[28] This view appears to be shared by the general public. Han (1998) and Yang (1998b) both cite

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28. Yeon (1993b) is typical: ''It is difficult to identify economic gains that rapid unification and elimination of the border could entail for the South Korean people. When free flows of commodity and production factors, including labor, are allowed, the economic gain could only be the consequence of eased labor migration. Thus, if a significant labor shortage, especially for unskilled labor, prevails in the South, it may derive a small benefit from rapid unification. Otherwise, an important influx of labor will simply raise severe social problems'' (p.29).

results of a 1997 public opinion survey conducted by the Sejong Institute, a South Korean think tank. Although nearly 90 percent of those South Koreans surveyed regarded unification as ''somewhat'' or ''very'' important, they did not appear to be ready to pay much for it. More than 70 percent of the respondents agreed with the view that ''since unification can create many problems, it must proceed slowly,'' and, when asked about the appropriate tax increase to finance unification, more than half supported the view that it should be ''only to the extent that it does not burden the average household, even if the amount is insufficient to help reconstruction'' (Han 1998, tables 2, 3 and 4).

A General Equilibrium Perspective on Collapse and Absorption

Noland, Robinson, and Wang (2000c) extend the computable general equilibrium (CGE) model described in the previous chapter to include both North and South Korea in a Korean Integration Model (KIM).[29] They use this model to analyze the impact of the formation of a customs union on the Korean peninsula in the context of a ''preferential opening'' reform strategy on the part of North Korea. Since the North Korean economy is so distorted, the main result is that the formation of a customs union with South Korea would amount to a tremendous move toward free trade on the part of North Korea. The qualitative results obtained in the preferential and non-preferential opening scenarios are similar from the standpoint of North Korea. From the standpoint of South Korea, the formation of the customs union and integration of product markets would not have much effect because of the relatively small size of the North Korean economy.

However, if North Korea were to collapse and be absorbed by South Korea, one would expect at least partial integration of factor markets. In this section, the results that Noland, Robinson, and Wang (2000c) obtain using the Korean Integration Model are reviewed for a number of interesting issues: the integration of product markets, the integration of factor markets, and the impact of foreign capital inflows in the context of simple comparative static experiments in which there is no explicit reference to time.[30] Dynamic issues of South-North technology transfer, income

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29. See Noland, Robinson, and Wang (2000c) for an algebraic rendering of the model.

30. The KIM is used to examine alternative famine relief strategies, the static reallocation gains to trade liberalization, the obsolescence shock to North Korean capital stock, and the potential peace dividend to military demobilization, as outlined in the previous chapter. See Noland, Robinson, and Wang (2000c) for details.

convergence, and the costs and benefits of unification are taken up in subsequent sections.[31]

Finally, it is worth noting that the results reported in this section, while motivated by a collapse and absorption scenario, strictly speaking are not logically dependent on collapse and absorption. Although it is unlikely, an independent North Korea could decide to enter into a monetary union with the South, or the South could decide to allow an inflow of a substantial number of Northern immigrants. The results in this section could thus be interpreted as an extreme version of the preferential opening strategy described in the previous chapter.

Product Market Integration

As indicated in the previous chapter, the formation of a customs union would have a significant positive effect on North Korea and a modestly beneficial impact on the South. Economic integration of this sort would presumably require an enormous reduction in political tensions (or even political integration). If, in this circumstance, North and South Korea (or a unified Korea) were to reduce military expenditures to the OECD average of 2.5 percent of GDP, this would generate for South Korea a small "peace dividend" of less than $300 million.[32] However, for the far more

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31. Given that much of the preceding discussion has been based on the German experience, it is worthwhile to indicate how this has been incorporated into this modeling work. Given the KIM's medium-to-long-run orientation, the focus is primarily on sectoral adjustment issues in the context of a simple macroeconomic framework. For two principal reasons a number of interesting macroeconomic issues, such as exchange rate overshooting, that have been prominent in the literature on German unification are not addressed. First, the dissimilarity of factor endowments is far more pronounced in the Korean case than in the German case, and, as a consequence, integration may have more dramatic sectoral implications in the Korean case compared to the German case. This fact, combined with the far larger differences in economic size between the two Koreas compared to pre-unification Germany, suggests that in certain respects the North American Free Trade Area (NAFTA) may be a closer analogue to the prospective Korean situation than the German experience. The KIM is well suited for examining these integration issues.

Second, history does not operate by analogy. There is no particular reason to believe that adjustment issues that arose in the German case (which were at least partly due to avoidable policy mistakes, such as the wage equalization policy), would occur in the Korean case. Indeed, the Koreans can learn from the German experience and avoid some of the German errors. To cite a specific example, in contrast to the German wage equalization policy, most Korean analysts expect the maintenance of the existing DMZ to control population movements after economic integration. They also expect the perpetuation of greatly differing wage structures in the two halves of the peninsula for some extended period of time (cf. Young, Lee, and Zang 1998). These "lessons" from the German experience are taken up in the final chapter on policy recommendations.

32. This is the efficiency gain associated with military demobilization. The direct budgetary impact would be higher. Bae (1996) estimates that, with unification, the elimination of duplicative intelligence operations, diplomatic missions, etc., might generate budgetary savings of around $500 million for the peninsula as a whole.

militarized North Korea, the impact would be much larger, adding another 10 percent to GDP on top of the gains from joining the customs union. For the peninsula as a whole, the peace dividend would be 0.3 percent of GDP. In this scenario, North Korea would achieve the FAO/WFP/UNDP total normal demand food target of 7.8 million metric tons. Per capita income in the North would remain less than a tenth of that in the South under this scenario.

Factor Market Integration

This basic picture—a large impact on North Korea, a small impact on South Korea—would change considerably if factor markets were allowed to integrate. In the case of exchange rate or monetary unification, it is natural to expect the capital market, if not the labor market, to integrate. For heuristic purposes, however, a hypothetical case initially considered in which the inter-Korean labor market integrates, but the inter-Korean capital market does not (that is to say, labor flows from North to South, but capital does not flow in the other direction). This could happen if, for example, North Korea suddenly were to collapse *a la* East Germany before political rapprochement and cross-border capital flows had occurred. To examine this possibility, consider a situation in which labor migrates until per capita income in the North is 60 percent that of the South, as previously discussed. In this case, North Korea would be virtually depopulated (more than 90 percent of the population would migrate) before the 60 percent per capita income target was attained. This extreme result serves to underscore the critical importance of generating capital inflows into North Korea.[33]

In the more plausible converse case (capital flows North and North Korea adopts South Korean technology, but labor is not permitted to move South), nearly $700 billion of new investment (more than a quarter of the South Korean capital stock) would be required to move in order to attain the per capita income target, underlining the implicit trade-off between capital and labor flows as equilibrating adjustment mechanisms.[34]

Having established the extreme bounds of the cross-border factor mobility necessary to achieve the per capita income convergence target, it is useful to focus on an intermediate case in which there is a degree of cross-border movement in both labor and capital. J. Park (1997), on the basis

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33. It is assumed that this migration solely takes the form of North to South Korea. It is quite possible that in reality there might also be emigration to other destinations, in particular to China. If this were the case, it would obviously affect the precise calculation of migration necessary to achieve the income convergence target.

34. The capital movement has been treated as a pure grant. It is also possible to calculate the rents and impute them to South Korean national income as remitted profits, as is done in the following section.

of the German experience, estimates that with unification, two million North Korean workers might migrate south. Koo (1998) obtains a similar result, estimating that under contemporaneous labor market conditions in the South, 1.4 million to 2.8 million North Koreans might migrate south, while B. S. Lee (1998) puts the figure at 2.1 million. The Hyundai Research Institute (1997) estimates that the figure could be four million, mostly from the ''hostile'' or dissident class. Assuming that two million workers did cross the border and that total factor productivity (TFP) increased by 18 percent, South Korea would have to invest more than $500 billion in the North (more than a fifth of the South Korean capital stock) for North Korea to attain the 60 percent per capita income target.[35] If this transfer were to occur over ten years, it would imply a transfer of roughly 10 percent of GDP annually—a share comparable to that in the German case.

In this scenario, real GDP would rise tremendously in North Korea and fall slightly in South Korea in response to these factor movements. Output would rise in all sectors in North Korea, except in the public administration and military sectors, which, by construction, remain constant. Conversely, output would fall in all sectors in South Korea (except in public administration and the military).[36]

However, the existence of cross-border factor flows raises the possibility that GDP could differ significantly from GNP if migrants were to remit wage income or if foreign investment were to generate repatriated profits.[37] In the extreme case in which all incomes earned by migrants and

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35. In the North, the increases in the capital-labor and land-labor ratios, together with the increase in TFP, would generate a considerable increase in North Korean agricultural wages, which would converge to the South Korean level. Urban wages in the North would remain significantly below the South Korean level, however. In this sense, the attainment in this scenario of the 60 percent per capita income target and the posited implications for cross-border migration and social stability may be a bit misleading. For most North Koreans, wage income would still be far less than that earned by equivalent labor classes in the South.

36. Chang (1997), using a CGE model of South Korea in which North Korea is represented as a set of import and export demand and supply equations, examines two scenarios involving factor movements. In the first, 10 percent of the North Korean labor force (roughly one million workers) migrates to South Korea. The result is to increase South Korean real GDP by 5 percent and increase output in all sectors. In the second scenario, South Korea transfers 10 percent of its capital stock to North Korea. South Korean real GDP falls by just over 5 percent, and output falls in all sectors except textiles and apparel. This last result presumably reflects the reduction in South Korea's capital-labor ratio, together with the assumption of capital mobility across sectors.

37. One could think of the transfer of capital from South to North Korea taking the form of grants or private investment. In the former case, capital would be transferred to the North, and there it would remain, providing economic benefits to the Northern economy. In the latter case, Southern investors would retain ownership, and the investments would yield a stream of remitted profits adding to Southern income. In the event of unification, actual transfers would probably reflect a mix of grants (perhaps funding public infrastructure) and private profit-making investments (factories, etc.).

foreign investment are remitted to their sources, profits from investment in the North largely would offset the negative impact in the South of the monetary union with the North. The North would still come out substantially ahead. Income for the combined Koreas would rise as the returns to factors are equalized in the two economies, and the combined income would exceed the base by roughly 12 percent.

Foreign Capital Inflow

In the comparative static simulations thus far, the process of capital transfer literally amounts to taking capital from the South Korean capital stock and moving it north. It would be desirable to model external capital inflows as well. In the comparative statics setup, one could model capital inflow as either an exogenous increase in the capital stock (which would not affect the current account balance) or an exogenous increase in the trade or current account deficits (which would not affect the capital stock). One could think of the latter as representing the moment when imported capital goods are purchased, and the former as representing the moment when they are installed.

In the extreme case, all investment in North Korea could come from abroad. In this scenario, more than $600 billion of capital inflow (together with the emigration of two million workers) would be necessary to reach the per capita income target. More capital would be necessary than in the previous internal transfer case, since the South Korean capital stock would be unaffected, and South Korean per capita incomes would be commensurately higher.

A key issue is the effect of the inflow of foreign capital on the real exchange rate. To explore this issue, Noland, Robinson, and Wang (2000c) took the unified exchange rate and subjected it to a series of trade balance shocks that would leave the measured capital stocks in the two countries unaffected. (These should be thought of as medium-to-long-run effects, abstracting from short-run monetary shocks that the KIM is poorly suited for modeling.) The experiments are summarized in figure 8.1, which depicts the real exchange rate appreciation in response to foreign capital inflows. Suppose the $600 billion inflow were to occur at a steady linear rate over a decade (i.e., $60 billion annually). As the real exchange rate appreciated, the level of output in the South Korean traded goods sectors would fall, while the non-traded goods sectors (construction and services) would exhibit increases in output (figure 8.2). (Public administration and the military are fixed by assumption and show no output response.) The real exchange rate appreciation also would adversely affect the traded goods sector in North Korea, though some traded goods sectors such as light manufacturing and mining would continue to register significant increases in output relative to the highly distorted base (figure 8.3).

Figure 8.1   Capital inflow and exchange rate appreciation
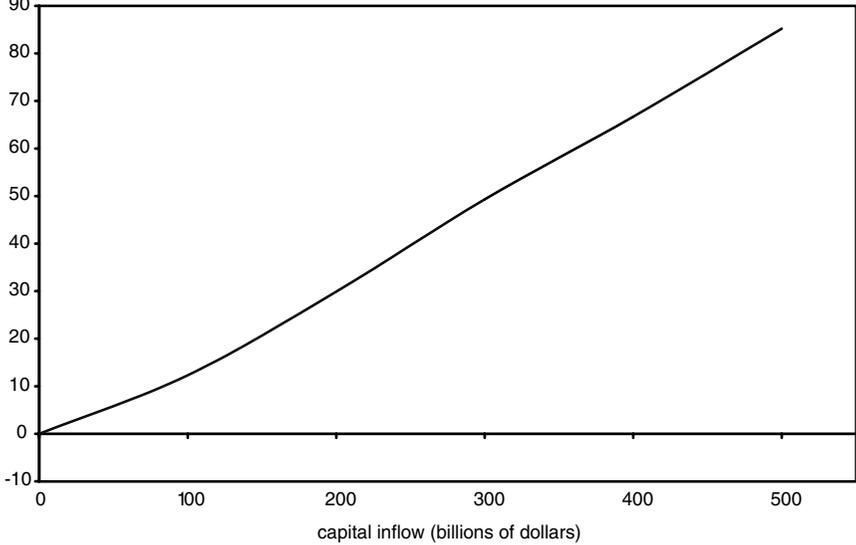
change in exchange rate
(percentage)

capital inflow (billions of dollars)

Figure 8.2   External capital inflow case: composition of output change in South Korea
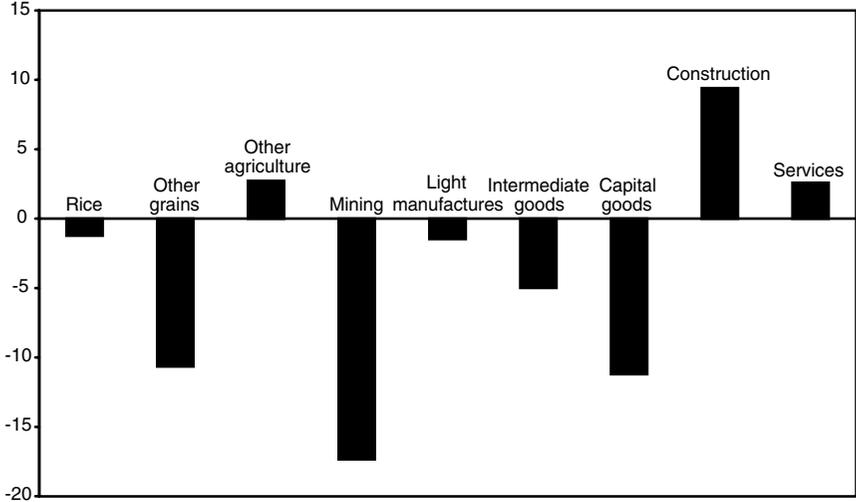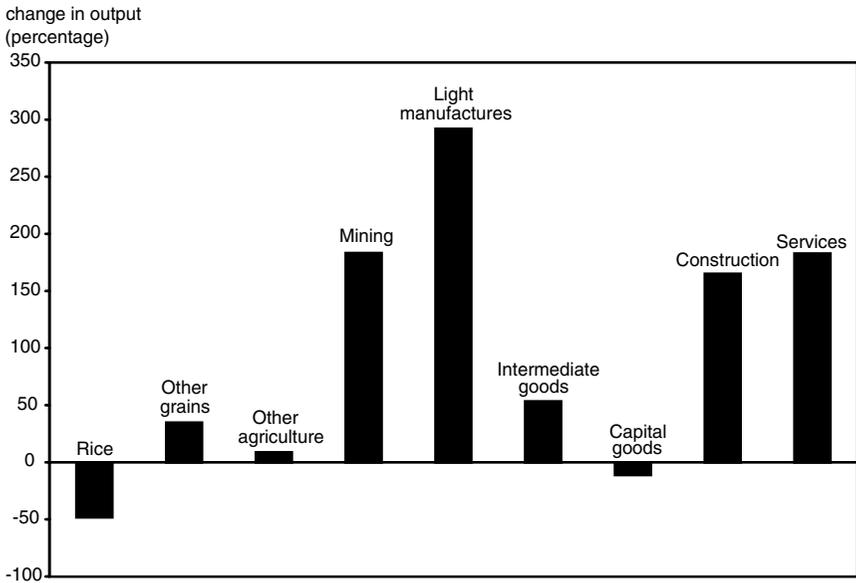
change in output
(percentage)

Figure 8.3 External capital inflow case: composition of output change in North Korea

Conceptualizing the Costs and Benefits of Unification

A veritable cottage industry devoted to the estimation of the prospective costs of Korean unification now exists. These ''costs'' are typically found to be in the hundreds of billions of dollars. (Some of the more notable studies are summarized in table 8.4.) Most existing studies have adopted one of two conceptually inadequate approaches. The first is to apply data from the German experience to the Korean case (S. M. Lee 1993, Bae 1996). Costs are measured in terms of budgetary expenditures, which are relatively straightforward to calculate, and benefits are viewed through a similarly narrow prism of offsetting possibilities for budgetary expenditure reduction (primarily through military demobilization). For example, in the case of German unification, one can measure net transfers from the West to the East (i.e., expenditures less taxes paid). Likewise, budgetary benefits associated with things like military demobilization, reduction in expenditures on duplicative diplomatic activities, etc., can be measured in terms of spending. These are the initial direct budgetary impacts. Most analysts, Bae (1996) for instance, stop there.[38] This is not the end of the

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38. Bae (1996) concludes that, in the mid-1990s, the annual ''peace dividend'' for the two economies, broadly defined, would have been on the order of $7 billion. However, this estimate (like earlier ones) is based on military budget expenditures rather than on the more

Table 8.4 Estimated costs of unification

Source	Methodology	Definition of cost	Unification date	Results
Hwang	Income Target	Total investment (including private)	1990	$300 billion, over (1993) undefined period[a]
			1995	$700 billion, over an undefined period[a]
			2000	$1,200 billion, over an undefined period[a]
S.M. Lee (1993)	German Comparison	Government Expenditure	2000	$200 billion over 10 years
Yeon	Income Target	Government Expenditure	2000	$230-250 billion over (1993) 10 years
Y.S. Lee	Income Target	Government Expenditure	1990	PDV $330 billion over (1994) 40-50 years
		South Korean Income Foregone		PDV $841 billion over 40-50 years
Bae	German Comparison	Government Expenditure	1993	$488 billion over 5 (1996) years
Noland, Robinson, Scatasta (1996)	Income Target	Total investment	1990	$600 billion
	(CGE model, North Korean capital-output ratio)		1995	$1,378 billion
			2000	$3,172 billion
	(CGE model, market economy capital-output ratio)		1990	$319 billion
			1995	$754 billion
			2000	$1,721 billion
Noland, Robinson, Liu (1998)	Dynamic CGE	PDV of national income relative to no unification base	1997-2006	Difference between without unification PDV and with unification PDV range from $35 billion to –$541 billion.

a. This figure can be doubled to include the cost of ''socio-economic adjustment.''

story, however. Take the example of military demobilization. Both East and West Germany maintained conscript armies (as do both North and South Korea). Conscripts are presumably paid less than what they could earn in other activities in the civilian economy. Their wages are not the true measure of the cost to the economy of maintaining the army; the wages they would have otherwise earned are. So, when the army demobi-

appropriate opportunity or shadow cost measure of resources used by the military. The modeling work reported below implicitly embodies the latter approach in its treatment of the reallocation of resources in the context of economic integration.

lizes, labor and other resources are released from relatively low productivity activities (the army) into relatively higher productivity activities in the civilian economy. National income increases. So does the tax base. In other words, those lowly paid conscripts leave the army, join the civilian economy, and begin paying taxes on their higher wages.

This logic applies to the whole economy, not just to the government budget. The process of unification will be accompanied by a reallocation of resources throughout the economy as factors are deployed in more productive ways. The result is an increase in national income and an increase in tax receipts. Calculations such as Bae's, which ignore these general equilibrium effects, systematically underestimate the benefit side of the cost-benefit calculus.

Even if one were to implement the budgetary analysis properly, it is not at all clear that budgetary saving is the best measure of net benefits. The government's budget balance in and of itself is not very interesting. What is relevant is not the size or direction of any imbalance, but rather its implications for income and consumption growth, which are the ultimate measures of economic welfare. For example, most people would choose a future of slight budget deficits and steady robust growth over one characterized by fiscal balance and negative growth.

The second set of studies, which measure the costs of unification in terms of overall resource transfers, could be interpreted as heading in this direction. They measure the transfer costs necessary to raise North Korea to some share of South Korean income, but they do not measure the benefits (Hwang 1993, Yeon 1993b, Y. S. Lee 1994b, Noland, Robinson, and Scatasta 1997). Cost in these studies is measured in terms of resource transfers, typically taking the form of investment capital or government expenditure. Benefits are usually ignored. For example, if the transfers were to take the form of investment in the North by Southern owners of capital, then those investments would yield a stream of profits remitted to Southern investors that would directly add to Southern income. Moreover, to the extent that the rate of return on capital investment is higher in the North than in the South, those investors will earn higher returns than if they had invested in the South. More generally, the opening of exchange between the North and South could be expected to be accompanied by a reallocation of resources that would raise the level of income in both economies. Unfortunately, none of these studies attempt to measure the impact of economic integration in either the narrow or broader sense noted above. With one exception, all are based on simple spreadsheet calculations; only Noland, Robinson, and Scatasta (1997) use a behavioral model as the basis of calculation.

A conceptually superior measure of the costs and benefits of potential unification would be the present discounted value (PDV) of income (or consumption) under alternative scenarios about unification. Noland, Rob-

inson, and Liu (1998) calculate precisely this measure using a CGE model calibrated to 1990 (the most recent year for which the requisite data were available at the time that study was undertaken) and updated to 1996 on the basis of the Bank of Korea's estimates of North and South Korean growth in the interim. They find that under one scenario, the South Korean PDV income stream is higher than the one associated with the baseline scenario of no unification.[39] This scenario, in which unification yields positive net benefits to South Korea, is characterized by relatively low levels of South Korean private investment in the North, combined with relatively high levels of North-South labor migration. The result depends on two critical assumptions: first, that capital invested in the North take the form of profit-generating private investment that yields returns to its South Korean owners; and second, that the rate of technological convergence is relatively rapid. Nevertheless, this result highlights two crucial points. First, it indicates that a wide range of outcomes is possible, and that the policies applied have a significant impact. Second, it makes an apparently plausible case for the possibility of a Pareto-improving unification scenario in which everyone is potentially made better off.

Noland, Robinson, and Wang (2000c) reexamine this result using a model calibrated directly to 1996 and find that the earlier result rested on two problematic foundations. First, the situation in North Korea had deteriorated more than originally thought, and, as a consequence, the income gap to be closed had widened significantly. Second, the result depended critically on the rapidity of technological convergence between the North and South. In the potentially Pareto-improving case, the North adopts South Korean technology over a decade, attaining not only Southern levels of total factor productivity, but the Southern input mix as well.[40] Noland, Robinson, and Wang (2000c) reexamine these issues making use of new data that had become available since the earlier study and the considerable literature on the rate of technological convergence emerging from the studies on German unification.

Dynamic Results

Thus far, the process of economic integration has been analyzed using comparative static models to examine a number of key issues. The integration process, however, is inherently time dependent, for investment and technological upgrading cannot occur instantaneously. The divided country nature of the case at hand distinguishes it from the generic case

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39. It also should be noted that they report seven scenarios in which unification leaves South Korea worse off.

40. It appears that North Korea wastes a lot of intermediate inputs, as is typical of centrally planned economies.

of technological convergence in two ways. First, North Korea would presumably be converging on South Korean technology, not just in terms of the level of total factor productivity, but in terms of primary factor and intermediate input usage as well. In other words, one would expect North Korea to more or less adopt South Korean technology.[41] Second, the literature on German unification suggests that, in the context of such a fundamental regime change, the rate of technological upgrading could be much more rapid than is usually the case.

With respect to the first issue, the discussion thus far has treated technological change as a sectorally uniform process, and the amount of total factor productivity increase has been calibrated from the work of Coe, Helpman, and Hoffmaister. However, the Korean situation may differ importantly from the generic phenomenon they analyzed. For the purposes of their regression model, Coe, Helpman, and Hoffmaister classify South Korea as a developing country. Thus no technological spillovers would be attributed to the importation of South Korean capital goods. Moreover, in the exchange rate unification and monetary union simulations, one would expect cross-border factor flows; in particular, one would expect capital to flow from South to North Korea. In this case, it would be plausible to expect that the North would adopt the South Korean technologies embodied in the capital. The rationale is that, as the two economies integrated, the relative price structure of the smaller North Korean economy would begin to converge toward that of the larger South Korean economy. Moreover, as new plants in North Korea were built using South Korean capital, and new production technologies were adopted in the North, this process would change the allocation of basic inputs and produced intermediates. As South Korean techniques become the norm, the input-output coefficients in the North should converge to those of the South. These coefficients would presumably be optimal, given the existing factor prices and distortions in South Korea, so their adoption by North Korea would imply the elimination of those internal distortions that were not modeled explicitly.[42] Operationally, the parameter shift of the North's production functions (its productivity level) would increase to the level of the South's, and the North would adopt South Korea's intermediate input mix in the form of the South's input-output coefficients.[43]

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41. Obviously there would be investment and technological transfers from non-South Korean sources as well, most probably from Japan. This already occurs to a limited extent today.

42. One could also rationalize the linkage of capital investment and productivity convergence along the lines of the management perspective of Dyck (1997), who argues that, in the German case, replacement of East German managers with West German managers was key to enterprise rehabilitation and viability.

43. Noland, Robinson, and Liu (1999) develop a decomposition, a graphical explication, and some modeling results pertaining to these two effects. In the interests of brevity, only the case in which North Korea adopts South Korean technology is reported here.

That said, cross-border investment and technological change will not occur instantly, so the speed of technological convergence is a crucial issue. Barro and Sala-i-Martin (1992, 1995) present evidence that countries with low initial levels of per capita income tend to exhibit higher per capita income growth than countries with initially higher per capita income levels. That is, there is a tendency toward per capita income convergence. Indeed, Barro and Sala-i-Martin argue that, in a variety of contexts (among US states, among members of the OECD, among all countries) there is a tendency for the incomes of poorer regions to converge on the incomes of richer regions at a rate of roughly 2 percent annually.

Yet this ''2 percent rule'' is probably inadequate for the task at hand. Rather than convergence based on the steady state growth paths of regions with access at least to similar production technology, the economic integration of North and South Korea would arguably put North Korea on a new growth path, at least transitionally. The critical question concerns the rapidity at which this convergence would occur. Evidence from the German case suggests that the speed of technological convergence between East and West Germany has been considerably higher than 2 percent annually. The estimates of this vary enormously, with upper end estimates of technological convergence on the order of 10 to 12 percent annually.[44]

The economic implications of this uncertainty are illustrated in figure 8.4, which displays the results obtained when the Korean Integration Model is run by imposing 2 percent to 12 percent annual technological convergence, with both the sectoral level of TFP and the input-output mix in North Korea converging to the South Korean norm over a period of ten years. The amount of capital transfer necessary to reach the 60 percent benchmark was then calculated for each of these cases. This calculation assumes that the rate of technological convergence and the volume of capital flows are independent—at least above an investment threshold. Assuming 2 percent technological convergence and no labor migration, it would take more than $600 billion of investment in the North to reach the 60 percent per capita income benchmark after ten years. This figure falls by more than half, to less than $300 billion, if 12 percent convergence is assumed. Indeed, convergence rates of less than 10 percent imply larger transfers as a share of GDP than in the German case.[45]

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44. See Hughes Hallet and Ma (1992), Burda and Funke (1993), Herz and Roger (1995), Sinn (1995), Schalk and Untiedt (1996), Boltho, Carlin, and Scaramozzino (1997), Keller (1997), Rummel (1997), and Lange and Pugh (1998). The estimates of convergence appear to vary for two reasons. First, it is difficult to disentangle productivity gains from the large increase in public and private investment in East Germany that had occurred post-unification. Second, the sample period is relatively short. Hence the coefficient estimates appear to be sample and specification sensitive.

45. This comparison is a bit inexact, in that the transfers in the German case are measured as public transfers, while in our case the figure could include private investment flows.

Figure 8.4 Rate of convergence and capital investment requirement

Capital investment necessary to reach
60 percent per capita income target
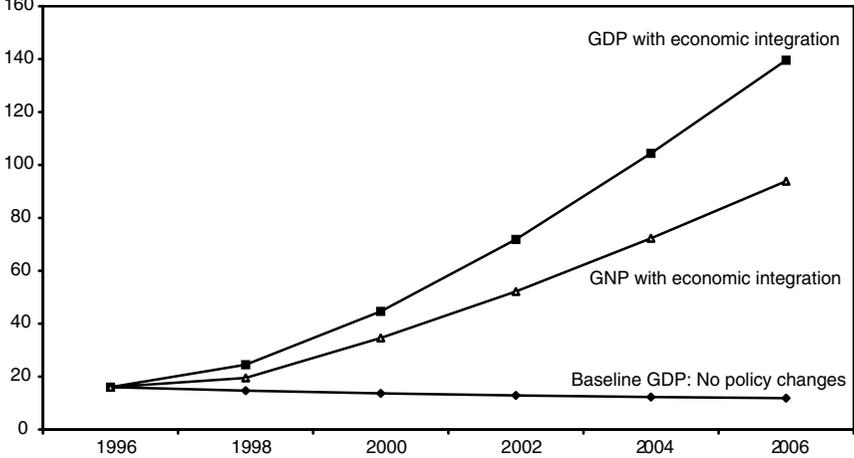

Annual rate of technological convergence
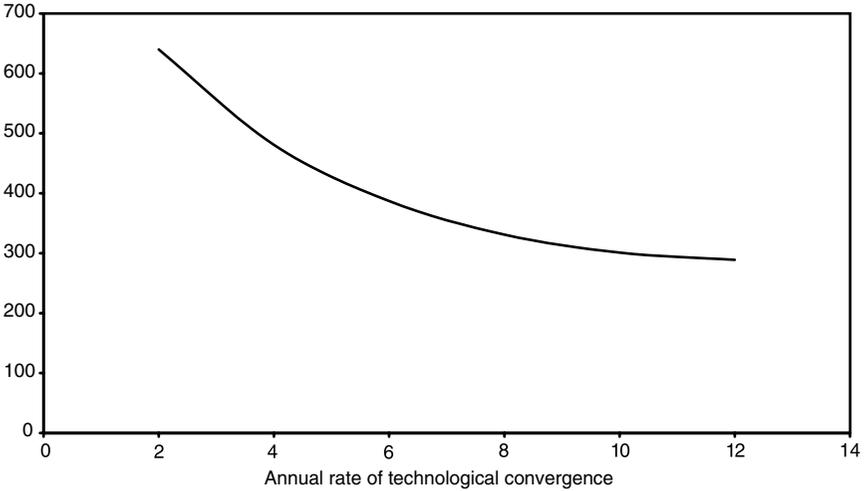
This treatment is not fully satisfactory for two reasons. It is inadequate in that it is not a truly dynamic model. It is simply the imposition of a temporal pattern of technological change on the comparative statics model, and the choice of a ten-year period is arbitrary (though Kwon (1997) argues that this was sufficient for convergence in Germany). Furthermore, as demonstrated in the previous section, labor migration can act as a substitute for capital investment, and so migration must be taken into account in estimating investment requirements. In a final set of experiments, a simple recursive dynamic model was specified in which labor force growth is set on the basis of demographic projections, capital is accumulated as a constant share of output, and the rate of TFP change is set exogenously.[46]

Suppose that monetary or exchange rate union occurred instantaneously in 1996 (the year for which the model is calibrated) and that over

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46. The labor force growth of the two economies was set exogenously, based on the basis of economically active labor force projections released by the Ministry of National Unification. TFP growth rates were set exogenously on the basis of econometric estimates. Capital accumulation was calibrated to reproduce the pattern of economic growth observed over the period 1991 through 1996. The KIM is essentially a long-run equilibrium model and is not designed to capture short-run cyclical effects. The assumption is that the cross-border factor flows occur at a constant rate over the course of a decade. In reality, these could occur with considerable abruptness. Endogenization of the cross-border factor flow is an obvious direction for future research.

Figure 8.5   North Korea: GDP and GNP

GDP and GNP (billions of dollars)

the course of ten years, two million North Koreans migrated to South Korea, technological convergence occurred at the mid-range estimate of 6 percent a year, and a portion of South Korean capital accumulation was invested in the North until the rate of return on capital equalized in the two Koreas.[47] This would imply a transfer in excess of $600 billion over ten years or about 11 percent of South Korea's annual GDP, which is significantly more than the value of public transfers in the German case.[48]

As shown in figures 8.5 and 8.6, this scenario would amount to a tremendous (to the point of implausibility) positive shock to the North Korean economy, a modestly negative shock to the South Korean economy, and a moderately positive shock from the perspective of the peninsula as a whole.[49] At the end of ten years, output on the Korean peninsula
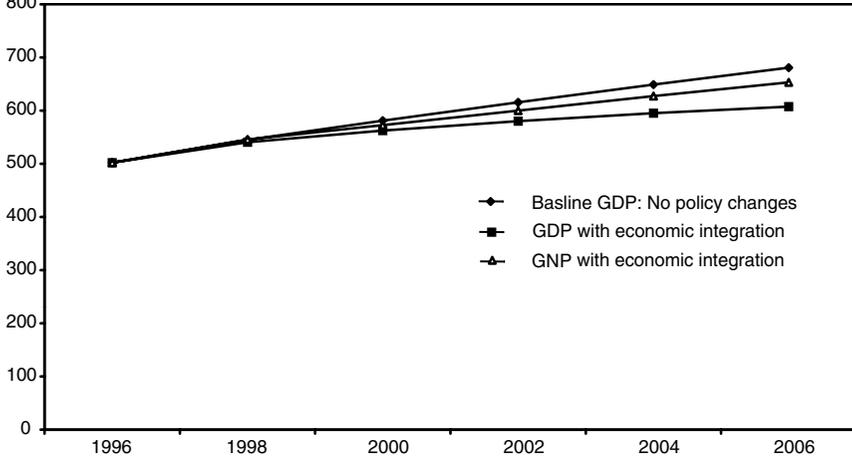
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47. It was assumed that the transfers to the North come completely at the expense of investment in the South (i.e., there is complete crowding out of investment, and no crowding out of consumption or FDI). This scenario would generate a bit more slowing of South Korea's rate of capital accumulation and growth than if investment in the North were allowed to crowd out all components of absorption. In this experiment, the role of foreign capital, which was discussed in a previous section, is ignored. To the extent that foreigners financed the capital accumulation in the North, the burden on South Korea would be commensurately less.

48. See Heilemann and Rapen (1997).

49. Meade (1997), using an input-output model imbedded in an exogenous macroeconomic framework, obtains a smooth adjustment path similar to that depicted in figure 8.5 (and aggregate results generally consistent with those reported here). East Germany actually exhibited a ''J-curve'' pattern in which industrial output initially fell by two-thirds before rising. A ''J-curve'' adjustment path can be generated in which output initially falls and

Figure 8.6   South Korea: GDP and GNP

GDP and GNP (billions of dollars)

Legend:
- ◆ Basline GDP: No policy changes
- ■ GDP with economic integration
- △ GNP with economic integration

would be around 7 percent higher than under the baseline projection. In South Korea, monetary union and cross border factor flows would reduce the rate of GDP growth in South Korea by about one percentage point a year. If one were to attribute to North Korea the income of all the migrants who went to the South, and assume that all profits on investment in the North were repatriated to South Korea, then the impact would be moderated, and the growth rate of South Korean GNP would fall by only about 0.5 percent.

Compared with the German experience (and indeed the experiences of most transitional economies) these results appear quite optimistic. Why is this the case?

Two specifics of this modeling differ from the German case. First, the level of transfers is somewhat higher. Second, the transfers are modeled as additions to the North Korean capital stock—not as supplements to current consumption. If Korean economic integration takes the form of integration by two sovereign states, then the predominant form of transfer would presumably be private direct investment—not grants or consumption transfers, and the model scenarios are probably broadly correct (though the magnitude of capital flows is probably overstated if private investment is the sole channel). However, if there were a collapse and absorption as in Germany, there might well be political pressures for

then rises by subjecting the North Korean economy to an instantaneous obsolescence shock to its capital stock while phasing in the trade reform and technological upgrading (cf. Noland, Robinson, and Liu 1998). In reality, the trajectory of output would be determined by the relative dynamics of these, and other, effects.

consumption transfers, even though the Koreans have had the opportunity to learn from the German experience.[50]

More fundamentally, the neoclassical nature of the model generates relatively frictionless adjustment, especially in the reallocation of factors across sectors, and the experience of the past decade with other transitional economies suggests that considerable institutional and policy reform are required to support successful adjustment. In this sense, the model results are surely overoptimistic.[51] Yet the existence of South Korea (and the Korean diaspora beyond the peninsula) provide the North Koreans advantages in terms of potential investors, opportunities for technological transfer, and access to worldwide distribution networks largely absent in the cases of other transitional economies (with the possible exceptions of East Germany and China).

This latter point raises the issue of distribution. There are three ways to think about the distributional effects in this setup: comparisons between North and South Korea, comparisons between the outcomes after economic integration relative to the 1996 base, and comparisons between these outcomes and what is projected without integration. The first is the simplest and possibly the most important: Rates of return for capital and labor would (partly) converge between North and South Korea, but the convergence would not be sufficient to attain the 60 percent per capita income target (figure 8.7). (The ratio of per capita incomes at the end of the period would be about 55 percent.) This result implies that, even in this relatively optimistic scenario, per capita income in North Korea would remain well below the level in South Korea for an extended period of time. This implies the need for either some method of restraining migration or, alternatively, higher levels of migration than contemplated in this experiment. Indeed, under the assumptions of a 6 percent rate of technological convergence and two million migrants, the capital transfers necessary to hit the 60 percent per capita income target would drive the rate of return on capital in North Korea below that in South Korea. If a more rapid rate of technological convergence (say, 12 percent instead of 6 percent) is assumed, it would be possible to attain the 60 percent target before the rates of return on capital were equalized. Allowing some of the North Korean capital accumulation to be financed by foreign capital inflows would reduce the direct burden on South Korea, but make achieving the 60 percent target more difficult. It would mean less crowding out of South Korean domestic investment, more rapid South Korean growth, and, as a consequence, a higher level of target income.

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50. See Heilemann and Rappen (1997) for a breakdown of the composition of West German transfers to East Germany.

51. Similarly, formal modeling work on German unification tends to underestimate the severity of the fall in output and the persistence of fiscal transfers (Gagnon, Masson, and McKibbin 1996).

Figure 8.7 Factor return equalization

rental rate on capital (percent) and
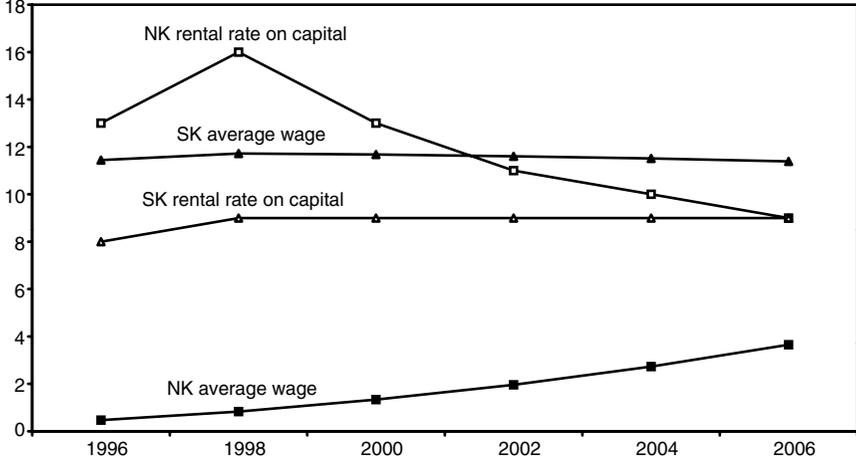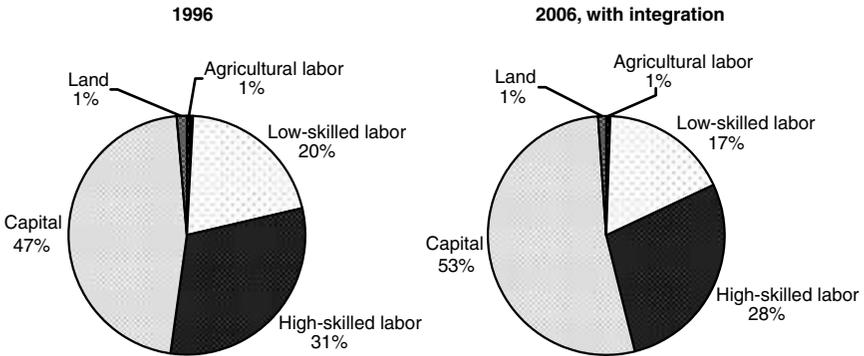average wage (thousands of US dollars per worker)

Figure 8.8 South Korean distribution of income

1996   **2006, with integration**

In South Korea, economic integration with North Korea would generate
a shift in income away from labor toward capital, regardless of whether
transfers to the North were considered grants or profit-making invest-
ments, and within labor away from less skilled groups and toward higher
skilled groups (figure 8.8). To the extent that higher skilled labor groups
tend to be the predominant owners of capital, this result implies that,
absent some compensatory redistribution policies, the process of economic
integration would be accompanied by increased income and wealth
inequality in the South. In comparison to the no-integration base, all
classes of labor would lose. However, compared to the base of 1996, the
wages of low-skilled labor would fall, while the wages of the higher

skilled would rise (albeit less than in the no-integration scenario). Capital would benefit in both comparisons.

In addition to these effects, increased government expenditures would have to be financed either through taxes or bonds. In the case of taxes, the costs may not be borne equally, depending on tax incidence.[52] In the case of bond finance, there will be a redistribution from taxpayers to bondholders. Presumably the median taxpayer will be poorer than the median bondholder. More generally, a rise in real interest rates would benefit savers to the detriment of borrowers.

Thus unification will have an impact on income distribution through a variety of channels. The bottom line is that, if one is a low-skilled worker in South Korea, then unification could have some negative implications. If, on the other hand, one is a South Korean construction company executive with money to invest in unification bonds, then unification could be very, very good for you. Presumably, these differences in perspective will be reflected in South Korean politics. This issue will be revisited in the concluding chapter of this book.

Policy Lessons of the German Experience for South Korea

The lessons of the German unification experience are of two types: first, identification of mistakes to avoid and, second, identification of policy changes that can be made in anticipation of unification.

The first set of lessons is relatively straightforward. The consensus among economists is that the 1:1 exchange rate was not the primary cause of the depression in East Germany, but that the wage policy was. On the contrary, the overvaluation (if any) could be justified as a one-time wealth transfer to the East German population, which was entering the market economy with few financial assets.[53] Despite the fact that the increase in the money supply may have been greater than what would have been justified on the grounds of providing liquidity to the East German economy, inflation did not materialize. The lesson for Korea (if there is one) is that competitiveness problems are likely to be so severe that a little extra liquidity may not be a bad thing. It might help to attempt to dollarize North-South trade to try to get an idea of the real North Korean exchange rate and the North Korean shadow price of foreign exchange.

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52. On tax incidence, see Bahl, Kim, and Park (1986).

53. In fact, at a symposium held in Seoul, Deputy Minister of Finance and Economy Uhm Rak-yong argued that a mild overvaluation of the North Korean won at the time of unification should be undertaken precisely to effect the wealth transfer, discourage mass migration, and alleviate social discord. See SaKong and Kim (1998).

Rather than misspecifying the exchange rate, the Germans made two obvious mistakes. The first was the policy of driving East German wages beyond productivity. This policy had the effect of depressing output in East Germany (and probably encouraging westward migration). Labor union pressure was one reason for this error. The relative weakness of unions in North and South Korea suggests that this may not be a major problem in the Korean case. The other contributors to this outcome were the compliant managements of pre-privatized enterprises. These considerations simply reinforce the point that, when it comes to privatization, speed is of the essence.[54]

In this regard, the practice of restitution was a disaster.[55] It slowed the process of assigning property rights, thereby impeding investment and rehabilitation. Although compensation may be acceptable, restitution is to be avoided.[56]

Third, most observers have criticized the decision not to write off or otherwise reduce East German enterprise debt. The argument is that these debts reflected transactions based on the arbitrary internal prices and fundamentally irrational practices of East Germany's central planning system, and they left enterprises that otherwise might have been viable hobbled by financial liabilities which in turn made them very difficult to privatize. Blanchard et al. (1991) and Dornbusch and Wolf (1994) recommended simply wiping out East German enterprise debt, while Sinn and Sinn (1992) presented a proposal for reducing these debts. The *Treuhand* eventually adopted a procedure of constructing "confirmed" balance sheets, which involved writing off approximately three-quarters of enterprise debts (Carlin and Mayer 1994).

Beyond the debt write-offs, there is less consensus on how privatization should be carried out. Dornbusch and Wolf (1994) and Nölling (1994)

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54. In dissent, John Williamson has argued that maximum speed privatization "is a platitude that does not stand up to scrutiny," as the fastest growing Central European economy, Poland, has been the slowest to privatize large enterprises. Rather than privatizing, simply forcing enterprise managers to face a hard budget constraint prior to privatization creates the proper incentives and minimizes the principal agent problem. The drawback, as Williamson admits, is that this is not a steady-state equilibrium solution. Indeed, as the pre-privatization period lengthens, the enterprises are likely to look increasingly unattractive to potential buyers as their capital stocks are run down due to lack of investment. Moreover, as the extensive firm-level analyses of Eickelpasch (1998) and Frydman et al. (1999) show, enterprises sold to "outside" owners significantly outperform state owned enterprises or enterprises sold to "insider" managements.

55. In a bizarre twist, it was reported that former Nazis were using the procedure to reacquire assets that they themselves had stolen from Jews during the Third Reich (*Financial Times*, 4 May 1994).

56. Jung and Park (1998) examined this issue in the context of land ownership in North Korea and concluded that both compensation and restitution should be rejected. They also presented survey data that suggest that most South Koreans agree with this stance.

argue for maximum speed transformation, including shutting down non-viable enterprises and extending unemployment benefits to individual workers, as the only way to free up resources for viable enterprises and for the necessary resource shifts. They note that, while outside observers put the share of non-viable enterprises at around 30 percent, the *Treuhand* only shut down 10 percent. They recognize that, due to the extreme industrial concentration of centrally planned economies, shutting down some enterprises would be tantamount to shutting down a town or a region, and that this externality may lead to a divergence between private and social costs, a point emphasized by Carlin and Mayer (1994). This problem may be particularly acute in the case of North Korea, where anecdotal evidence indicates that industrial concentration is on a mind-boggling scale (cf. H. S. Lee 1994b). At the same time, Frydman et al. (1999), in an extensive analysis of Central European enterprises, found that the main effect of privatizing former state owned enterprises to ''outside'' managements was to increase revenue, not reduce costs. This suggests that the employment impact of privatization could be less than previously thought.

Sinn and Sinn (1992) present a privatization proposal that would allow agents who did not possess enough cash to purchase an enterprise outright or to take partial ownership by bringing some new asset (such as proprietary technology) to the table. The Czech system of voucher privatization is another possible alternative that in the Czech case has benefited the mass of the citizenry, improved corporate governance, and made its architect, Vaclav Klaus, Prime Minister.[57] C. H. Lee (1994) contains a detailed proposal for how a voucher system might work in North Korea. A final option would be simply to turn assets over to the user, formalizing the ''spontaneous privatizations'' that have occurred in other transitional economies.

Thinking Beyond the German Case

While a process of gradual, peaceful, integration may be desired, abrupt, possibly violent, disintegration and collapse might occur. The two gravest threats would be an external lashing out of force by North Korea or a collapse into civil war or anarchy in which one faction might appeal to one of the surrounding states for support, leading to intervention by and

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57. Eighty-two percent of adult Czechs participated in the voucher privatization program, which fostered the creation of banks and investment funds as financial intermediaries. These intermediaries have played an important institutional investor monitoring role, and, indeed, have organized networks of financially related industrial groups along the lines of German *konzern* or Japanese *keiretsu*, though perhaps at the cost of large transaction expenses, corruption, and non-transparency. See Claessens, Djankov, and Pohl (1996), Johnson (1997), and Mertlík (1998) for evaluations of the Czech experience.

possible confrontation among outside powers. The key in dealing with both situations is deep, serious, and high-level consultation and coordination among the militaries of the region, especially South Korea, the United States, and China. South Korea and the United States already maintain a high level of coordination, so the real issue is drawing the Chinese military into serious contingency planning. With respect to the explosion scenario, it is crucial that China communicate to North Korea that it will not condone any North Korean military adventures and will not oppose any retaliatory actions on the part of South Korea and the United States. At the same time, China potentially could play a very constructive role by offering, in advance, a comfortable safe haven to Kim Jong-il and his retinue. Such offers of asylum have played important roles in facilitating the exeunt of such dictators as East Germany's Erich Honneker (Chile), Haiti's Jean-Claude ("Baby Doc") Duvalier (France), and Brigadier General Raoul Cédras (Panama), to cite a few examples. Although it may go against political tendencies in South Korea, pre-announced amnesties for high-ranking North Korean officials might play an important role in defusing a potentially explosive situation.

Even more dangerous would be the civil war scenario, which creates the possibility of a military confrontation between China and South Korea (and possibly the United States). Probably the safest course of action would be an *ex ante* agreement that no outside power will intervene in internecine struggles within North Korea. The problem, of course, is that such commitments are not entirely credible and may not be completely verifiable. This situation simply underscores the importance of extensive military-to-military consultations prior to any emergency on the peninsula.

Even if North Korea's denouement is merely an implosion instead of an explosion, coordination among the region's militaries will be critical. The reason is simple: an implosion would undoubtedly be accompanied by large scale refugee movements, a breakdown of law and order, and possibly famine and pandemics. The militaries are the only social institutions with the logistical and management capability to take on such tasks on a rapid-response emergency basis.[58] It is important to engage China. Even the best case variant of this scenario—an international emergency relief operation invited into North Korea by a functioning North Korean government—would in all likelihood require South Korean, US, and Chinese military units to enter North Korean territory. This raises the possibility of confrontation between these forces and rogue elements of the (North)

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58. For an analysis of this issue from the standpoint of handling refugees, see Pilkington (1998). Hufbauer (1996) makes a number of interesting and provocative suggestions, including maintaining KPA units under South Korean command and providing short-term income and employment guarantees to members of the North Korean military in order to smooth a likely chaotic transition.

Korean People's Army (KPA) or, even more dangerously, between US and Chinese forces. This scenario underlines the imperative of close precrisis coordination among the military forces of South Korea, the United States, and China.[59]

In the previous chapter, it was argued that self-initiated fundamental reform in North Korea, while desirable, is unlikely. The bottom line of this chapter is that, even in the best case, a collapse of North Korea would raise a host of tremendously important long and short-run economic and political issues for South Korea and its partners. Many find this prospect so daunting that they hope for a less cataclysmic outcome in the North. It is to this possibility that we turn.

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59. Hufbauer (1996) observes that coordination of police activities with authorities in Japan and the United States will also be necessary to deal with the problems of organized crime that are likely to attend the social chaos. This could be particularly acute in light of the importance of illicit activities such as drug trafficking and counterfeiting in the North Korean external economy.