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STABILITY AND MACROECONOMIC POLICY:

The Lesson of the 1970s

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INTRODUCTION

In the 70s the world economy shifted from orderly growth to disorderly stagflation. That shift forced the economic profession to abandon the orthodox Keynesian macroeconomics of the postwar years. By the 80s, the profession was divided between alternative and often extreme macrotheories and their implied policy prescriptions.

But out of disillusionment and controversy, a new consensus view of macro policy is gradually emerging. The traditional Keynesian emphasis on demand management now tends to be counterbalanced by a revived interest in supply behavior, in price- and wage- setting, and in the processes by which real markets and firms adjust to changing relative prices. Inflation is no longer discussed simply in terms of aggregate excess demand or excess liquidity. Traditional fiscal and monetary policy tools are increasingly viewed as complementary to policies directed towards the functioning of markets and the expectations of price- and wage-setting firms. Intensified research into market search behavior and price-signal transmission and dispersion is a vital part of attempts to furnish the microeconomic underpinnings of a new macro theory.

That better macro theory should help us explain what went wrong in the 70s, and should also help us design policies for the 80s. We can even hope for a deeper understanding of the meaning of and the conditions for economic stability in industrial economies and in the world economy as a whole.

The papers brought together in this volume aim at providing material for this on-going reconstruction of macroeconomic theory, and a point of departure for a better understanding of the 70s. Three different kinds of papers are included. The first presents and summarizes empirical evidence on the price and quantity disturbances that plagued the advanced economies in the 70s. The second set of papers analyzes the results of simulations of dynamic adjustment to supply-price shocks in three different kinds of macro

models. The final set is concerned with the policy and decision problems confronting national policy bodies, business firms, and private individuals in the disorderly macro environment of the 70s and 80s.

The next section of this introduction presents some "snapshot" pictures of developments during the 70s. We then move to an overview of the evidence, and to the formulation of some tentative explanations of what happened. After examining the methods and results of the different papers in more detail, we conclude the introduction with some preliminary conclusions about the macro stability problems we are facing and the macro policies we might adopt.

WHAT HAPPENED AFTER 1973?

Even a brief glance at the macroeconomic record of the 70s forces some disturbing questions upon us. Why did output growth among western industrialized countries fall by 2 to 3 times as much as can reasonably be explained by the direct effects of the terms-of-trade induced demand contraction caused by the oil-price hike in 1973/74? Why did growth rates then stay at about half pre-shock growth rates? How could inflation run much higher than can be explained by the direct-cost effect of higher oil prices, and why did it remain high for so long?

Why did growth rates among countries diverge so much after 1973? Why, for example, did Swedish industry, which earlier grew at the OECD average rate, fall into last place along with the industrial sector of the U.K. (Figure 1)?

Most economic postmortems of the 70s have prominently featured the oil price hike illustrated in Figure 2, and the automatic transmission of this "cost increase" to all countries in the form of inflation. But the diagram also shows at least two other things. Real oil prices had been declining since the end of the war, well before the shock. With the shock they recaptured the ground lost in earlier years. Then they began a new decline which lasted until the second oil price shock of 1979. Moreover, the aggregate price level in the industrial world had been on an increasing trend for many years before 1973. That period also saw steady growth rates and a downward trend in excess capacity. In fact, many observers during that time claimed that the business cycle was a thing of the past.

After 1973 came a protracted inflationary period characterized by a wide dispersion of relative prices lasting several years (see the papers by Josefsson & Örtengren and by Faxén in this volume). It became increasingly harder to predict future prices from current and past prices. The same was true of exchange rates once the Bretton Woods agreement had broken down (Figure 4). There was a marked

deterioration of the information content of price signals within and across countries.

Policy-makers in different countries responded very differently. In Sweden attempts were made to bridge the world recession of 1975 by stimulating domestic demand along traditional Keynesian lines. At the time this policy was praised by the OECD organization. West Germany chose the opposite policy and was severely criticized abroad (Figures 5). World trade decreased dramatically (Figure 3).

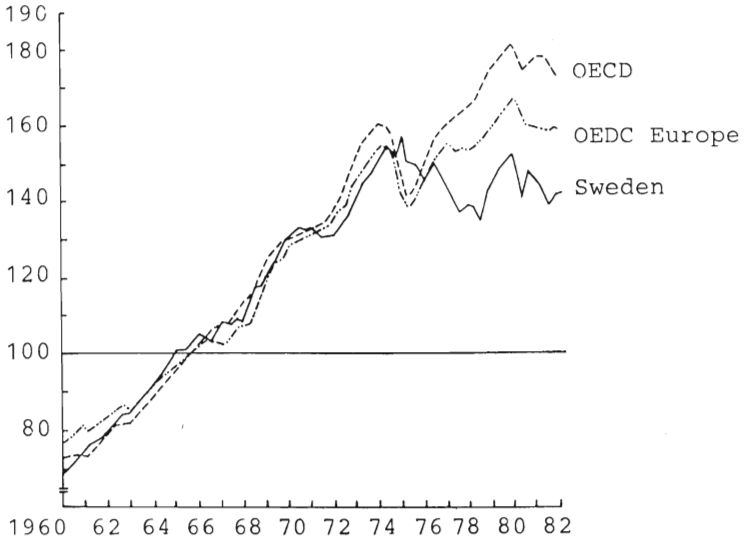
Thus there were substantial policy and performance differences between OECD countries in the 70s. In Sweden, an extreme factor-price ("wage-cost") explosion followed the oil price hike, and the Swedish export shares were drastically curtailed. The Germans, on the other hand, allowed their exchange rate to rise substantially, and German domestic inflation was stopped dead relative to that of the rest of OECD (Figures 5E, F and G).

The picture becomes even more puzzling when we include Austria. That country expanded both private and public consumption relatively more than Sweden and West Germany. It controlled domestic inflation about as well as West Germany through appreciations of the currency. Austria scored best in terms of long-term GNP and industrial output growth rates among these countries (Figures 5).

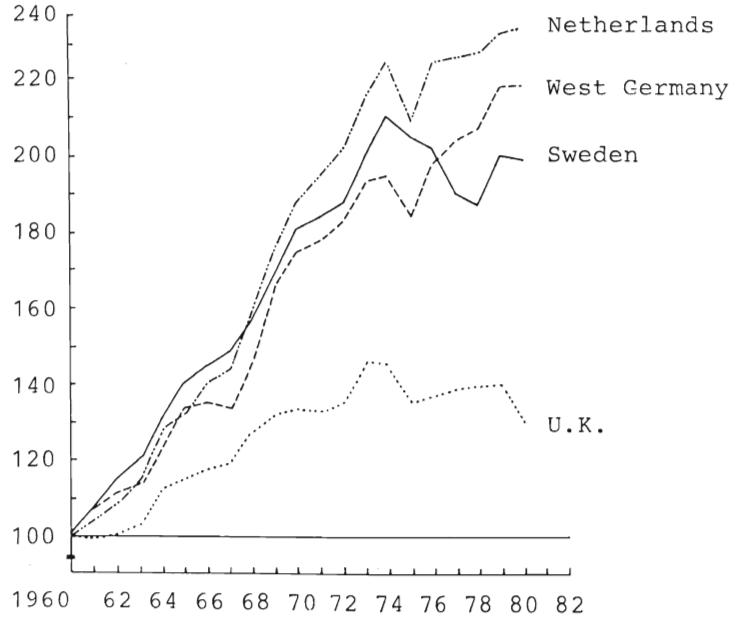
But the real puzzle comes when we look at investment in manufacturing (Figure 5D). Sweden had the "best" investment performance and by far the worst output performance. Sweden also performed better than the other countries in keeping capacity utilization rates high during the initial years of the oil crisis. A comparison between Swedish and Dutch manufacturing after 1973 (cf Fries' paper) raises some new questions. Swedish industry invested more, and maintained higher employment than Dutch manufacturing. But Dutch manufacturing outpaced Swedish manufacturing in growth performance by a wide margin (Figure 1).

This anecdotal evidence brings us back, with renewed interest, to the questions we started with. To understand the 70s we must go back and examine what happened with the various determinants of economic stability during the 50s and 60s.

Figure 1 Industrial output in various countries 1960-80



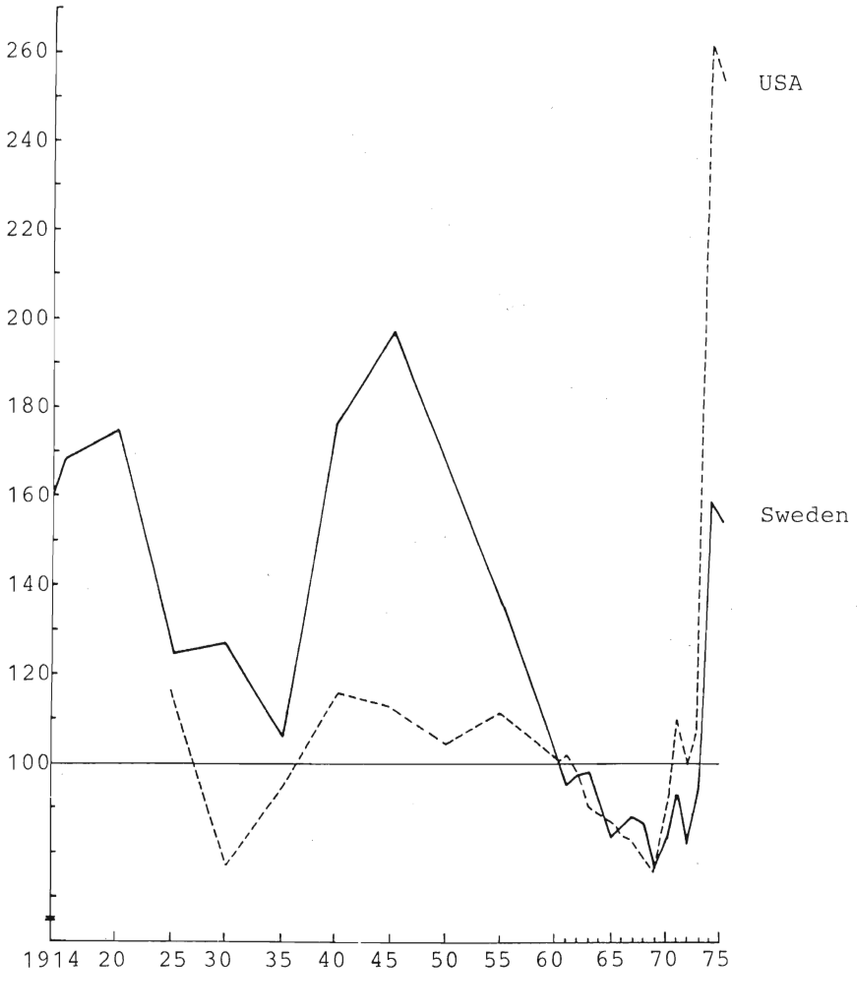
Index 100 = 1960-1970



Index 100 = 1960

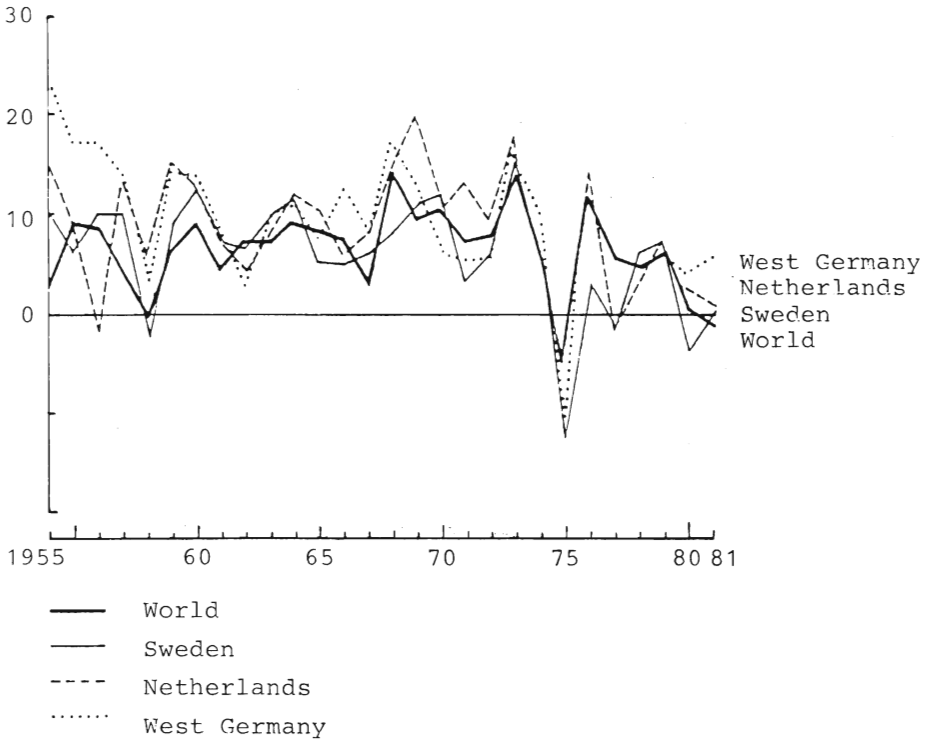
Sources: OECD and national sources.

Figure 2 **The real price of heavy oil, 1913-80, defined by consumer price index, Sweden and USA**



Source: Carlsson, Bo, Relative Energy Prices and Their Impact on Energy Consumption. Industrial Structure and Choice of Technology: An International Comparison. Repri from Ds I 1977:17, 1978, 87 pp.

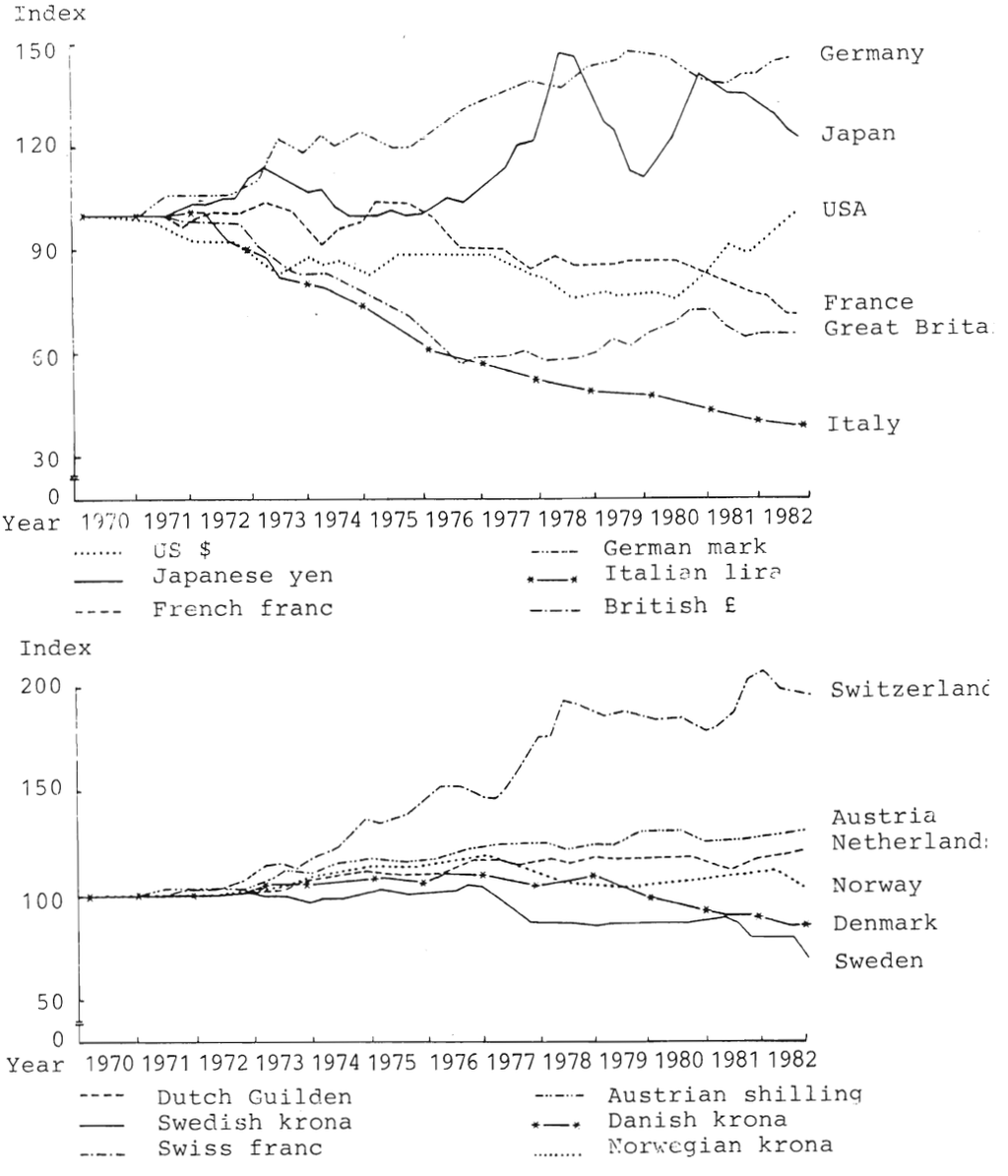
Figure 3 **World trade 1955-81**
Annual percentage volume changes



Source: IMF and estimates by Eva Christina Horwitz, IUI.

Figure 4 **Effective exchange rates in various OECD countries 1970-82**

Index 100 = 1970



Source: Lars Oxelheim, Foreign Exchange Risk Management in Swedish Corporations, Working Paper, Stockholm, 1982.

Figure 5 **Country comparisons, Austria, Sweden, West-Germany and all OECD, 1972-80**

Index 100 = corresponding value for OECD

Figure 5A **GDP development**

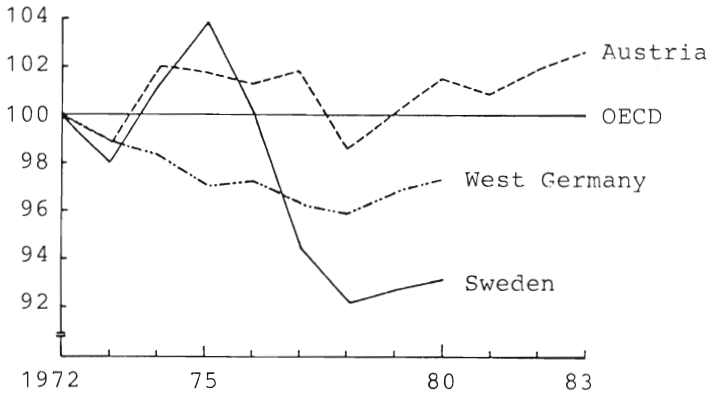


Figure 5B **Public consumption**

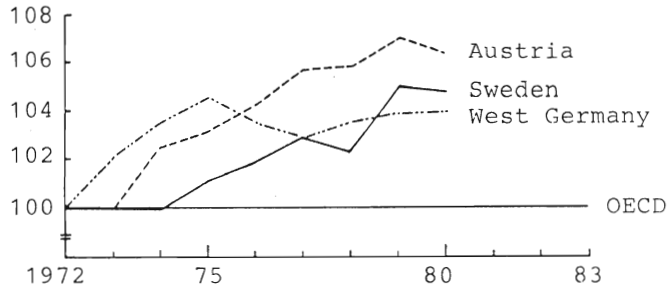


Figure 5C **Private consumption**

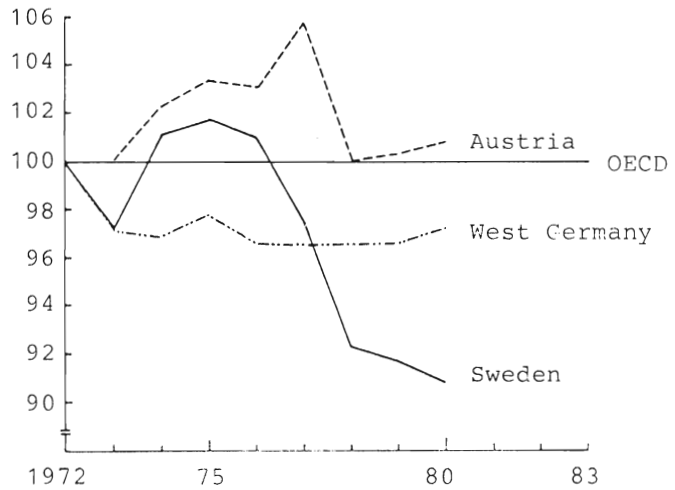


Figure 5D Manufacturing investment

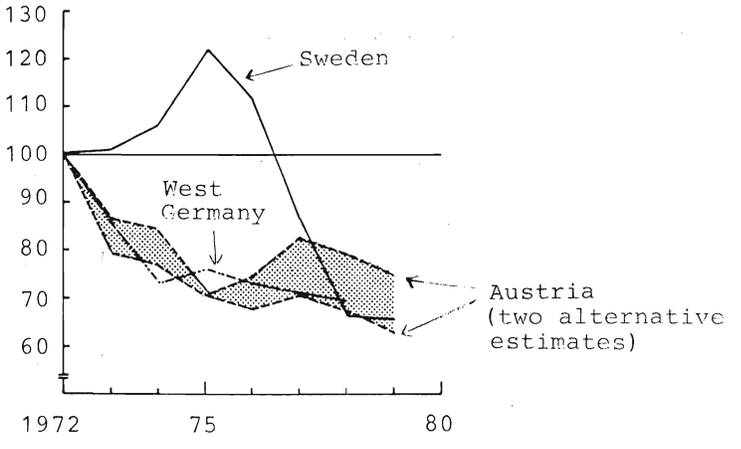


Figure 5E Exports

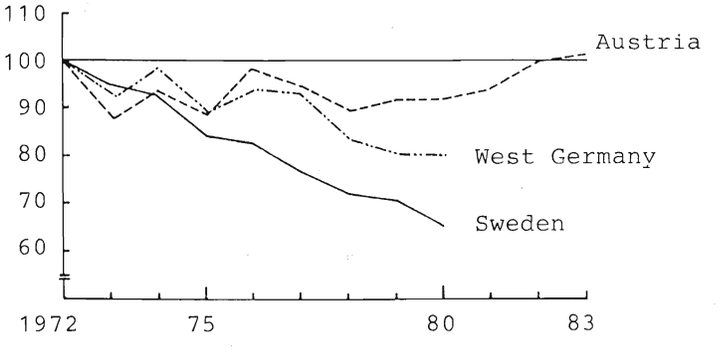


Figure 5F $ Export prices

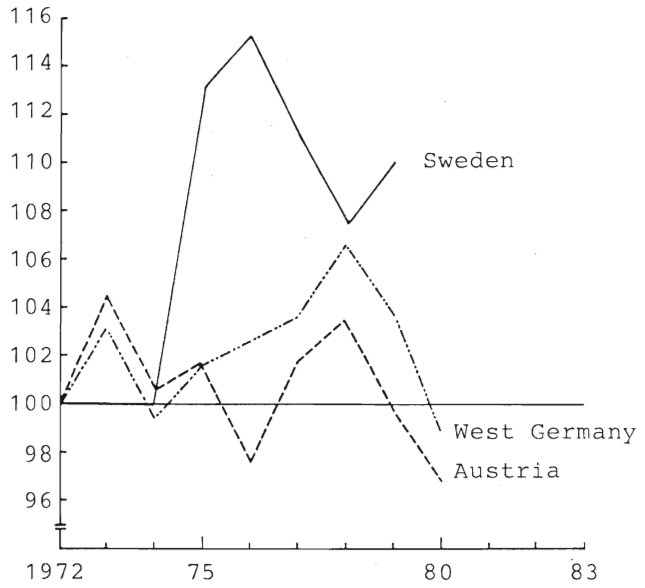
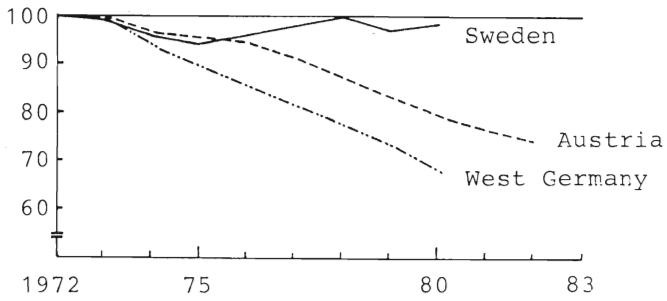


Figure 5G Consumer prices



Sources: OECD and nations sources.

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WHY DID IT HAPPEN?

The Origins of Inflation

With hindsight, we can trace the origins of the stability problems that became manifest in the 70s back to policies and developments of the preceding decades. The western economies that were hit by the supply shocks of the 70s were already inflation-prone from years of expansive demand policies exerting pressures on increasingly rigid supply structures. An accelerating inflationary drift was observed as early as the end of the 60s.

Stable and high economic growth rates in the 50s and 60s, unprecedented in recorded western economic history, led governments and electorates to view the future with confidence. Those governments were also led to neglect the adjustment problems associated with supply inflexibilities. Economists, politicians and the public at large tended to believe that cyclical variations in growth would shortly be compensated by government policies capable of returning the economy to stable and high long-term trend growth rates. Though unfavorable trends in world trade were already evident in the 60s, western industrial countries were, in their consumption behavior, discounting continuing high rates of economic growth.

That ill-founded optimism and sense of security not only led governments to institute long-term spending and redistributional schemes based on fast economic expansion, but also raised the aspirations of labor in regard to job security and steady wage increases, and made business less risk-conscious and willing to accept smaller safety-margins.

Investment levels in industrialized countries had long been propped up by low interest rate policies. Those policies sustained low rate-of-return capital vintages, which were very sensitive to competitive change in world markets, and particularly sensitive to increases in capital cost.

Concurrently, increasing specialization in trade and production,

supported by a regime of fixed exchange rates, contributed to rapid increases in world output, but at the cost of increased structural inflexibility.

Expansive monetary and fiscal policies, aimed at maintaining full employment, also served to reinforce the trend towards increased rates of capacity utilization, increased wage shares in value added, and gradually declining rates of return in industries. Business risk-buffers (profit margins, financial gearing ratios etc) tended to be adjusted downwards in response to a perceived greater predictability in markets. Wage-increase expectations were at the same time conditioned on past, relatively high productivity growth rates.

Rigid supply structures, and market behavior characterized by monopolistic competition, meant that price disturbances, once initiated tended to bounce back and forth "within the system", sometimes in a cumulative fashion ("overshooting"; see Genberg's and Eliasson's papers). With wage- and price-setting becoming increasingly institutionalized in terms of wage norms, mark-ups and other rules-of-thumb, price flexibility and price competition were downgraded. Creeping inflation went largely unnoticed.

The Price Shocks

The supply shocks of the early 70s had all the more impact because they occurred in a world that had come to think of itself as shock-proof, as successfully and permanently riding a stable and high trend growth rate. Increasing supply inflexibility combined with constant inflationary demand pressure help explain why the oil price shock of 1973 so destabilized the industrial economies.

By chance, that oil price hike occurred almost simultaneously with other major supply disturbances. Food and other raw material prices increased substantially just before the oil price hike. Environmental controls and costs were beginning to be imposed in the wealthier industrial nations, notably on energy-producing facilities. Low interest-rate policies were generally being abandoned in industrialized countries towards the end of the 60s, principally because of the growth of an efficient, international credit market. The organized actions of labor were beginning to work in a supply-contracting direction, and the Bretton Woods system had collapsed in the early 70s. The industrial competence of the nonindustrial world was rapidly

improving, and those countries were making competitive inroads in the markets for unsophisticated basic and engineering industries.

Those trends enhanced world-market competition, and squeezed profitability among firms in the industrial world from both the demand and the cost sides. Investment was discouraged, and a supply problem grew.

But the oil price shock was large in comparison with the other supply disturbances. It sent an immediate expectational wave of severe quantity cut-backs through the world economy. The resulting large relative price change between oil and other products and services (Figure 2), and the strong dispersion of relative prices persisted for several years.

Those primary disturbances led to two secondary imbalances. The first, in the international market-pricing system, amounted to a degradation of the information content of market signals. And the second was a further deterioration in the competitive situation of some basic industries already under secular competitive pressure from the new industrial countries. Increased relative energy prices hit the world tanker market immediately, and soon afterwards affected such other major users of energy as the automobile industry. Shipyards and large automobile manufacturers – the main users of standard steel – were affected soon thereafter, sending a third wave of effects through all stages of the steel industry, and reaching as far down into the production chain as high-cost iron mining. Some countries had relatively more of these so-called basic industries, and thus bore a disproportionate share of the structural adjustment burden.

But the question remains: why did the initial round of disturbances and reactions become cumulative? The explanation is to be sought in the rules and attitudes of actors in the markets that had developed during the preceding 20 years of prosperity and steady growth. In a global economy characterized by segmented monopolistic competition, all actors responded in a destabilizing way. Governments honored existing welfare commitments out of dwindling output growth. Households, facing inflation, tried to maintain the real value of their savings, or moved planned consumption forward in time. Firms were in an inflationary mood, since there seemed to be ample leeway for price increases without negative quantity effects. Rates of return that had been declining for years could temporarily be restored

to higher, historical levels. Most signals – profits, for example – were, in an inflationary world, seriously biased measures and bad predictors. Money illusion was widespread; high profits and rapid inflation sparked a wage-compensation round that was easily accomodated by employers.

This initial inflationary wave had two immediate types of consequences. Price levels rose far beyond what a general mark-up for oil prices would suggest. That threw established relative prices out of line, preparing the way for future, inflationary adjustments. The second set of effects came in the form of cumulative quantity contractions.

Down We Go - Market Reactions

What was the nature of those quantity responses?

Within each national economy, initial quantity cut-backs driven by higher prices were seen shortly after the supply shocks. Producers then realized that factor prices, notably wages, had risen too far, and began idling unprofitable capacity. Unemployment rose; uncertainty increased, and producers increased their prices further to protect margins and cover perceived risks. The initial, significant price disturbance was now causing significant changes in both relative prices and quantities. A new round of the same chain of events was then initiated. Some producers, particularly in markets for staple basic products, were subjected to increased competition from the new industrialized countries, and first experienced an inflationary profit boom. They reacted perversely, by increasing investment and adjusting supply upwards, creating an oversupply in world markets.

The consequences of misinformation are well exemplified by the Swedish experience. Basic industries in Sweden registered a profit windfall immediately after the 1973 oil price hike. Those profit perceptions arose in part from biased information (price-inflated profits), and in part from biased expectation mechanisms (rules of thumb). These generated excessive optimism regarding future profits, leading to extraordinary wage increases throughout the labor market. A marked investment boom followed in the basic industries that later turned into crisis industries; the upwards drift of wages and

salaries spread through the entire economy, and led to factor prices distorted relative to world prices. Swedish industry went into a nose dive (Figure 1) from which it has not yet recovered.

At the same time, the profitability and debt situation in the business sectors of most industrialized countries deteriorated. This reduced both incentives and financial backing for further risktaking and long-term financial commitments: a few successful firms were the exceptions to this rule. At the same time inflation, in conjunction with an income tax written in nominal terms, created new opportunities for short-term financial operations, making investment in manufacturing even less attractive.

All this led to demands for political remedies. Those demands often took the form of patchy, legislative reforms, adding further to increased uncertainty in the market. In most countries governments initially tried to stem the rise in unemployment. In the process, large deficits on foreign and domestic accounts were created, but demand was expanded in such a fashion that structural adjustment was impeded. Inflation then followed, and in order to avoid additional unemployment, additional demand was injected. Rising interest rates and flexible exchange rates were other important elements of the new, risky environment to which firms, households and governments had to adapt.

Rapid and increasing inflation had destabilized relative prices in the global economy and degraded the information value of price signals, thus increasing the general level of uncertainty in the world economy. Wage rates, rates of return and the interest rate were frequently seriously distorted, both within the individual industrial countries and in world trade. Those misalignments led to further erratic adjustments in exchange rates, making profit calculation and investment decisions even more difficult and hazardous.

A natural reaction to increased risk and uncertainty is to try to "play safe" by reducing long-term commitments and making faster and smaller adjustments. The sector in which long-run commitments are most typical is manufacturing. The contracting or crumbling markets of the late 70s, and the inefficiency of the fiscal remedies attempted, can be interpreted and understood from this common-sense point of view.

Market responses in individual countries were subsequently multiplied throughout the industrial world. Those economies are

strongly interwoven by a network of trade, and inflation and other immediate effects were rapidly transmitted and reinforced. But even more important was the way macropolicies adopted by individual-country national authorities were augmented by international repercussions.

Wrong Go, Wrong Stop - the Policy Reactions

As illustrated above (Figures 5), policy responses throughout the industrialized world varied widely. The immediate post-1973 reaction was often protection of the domestic economy from mounting foreign deficits by demand restraint. That reaction was widespread, and world trade was severely contracted (Figure 3). When those depressive tendencies became apparent, most governments tried to protect employment by subsidizing crisis industries, honoring welfare commitments by generating public deficits and borrowing, and protecting domestic consumption levels by borrowing abroad. Even with accomodating monetary expansion, in many countries those responses pushed interest rates upward, further restraining investment.

As noted above, one important feature of most industrialized countries at the time of the first oil price hike was a reduced supply elasticity. With relative factor prices – especially after-tax wages and salaries – insulated from the supply shocks, and with obstacles to the withdrawal of resources from depressed industries, a mismatch of supply and demand structures developed.

Overcapacity could have rapidly disappeared through shutdowns. But policy authorities stepped in to support ailing or dying industries, preventing capacity from being scrapped and labor from searching new jobs, and supporting previously-negotiated relative wage and salary structures. Since basic industries, including shipyards and automobile manufacturing, had been high-wage industries, this meant that an existing relative wage structure providing no incentives for labor to move out of the crisis industries was made permanent by central policy decisions.

Next came growing public deficits and extensive foreign borrowing. It took some time for the authorities to realize the extent of the deficit problem, and to accept a share of the responsibility for creating a strong inflationary potential in the world economy and

undermining the traditional self-regulatory mechanisms of supply.

Budget deficits and foreign indebtedness gradually became self-reinforcing through interest payments, particularly when interest rates were adjusted upwards, both in real terms and to compensate for inflation. High interest rates and unpredictable prices further reduced investment incentives, and lowered activity levels, thereby increasing claims on compensatory public expenditures, and leading to a vicious spiral of unemployment and inflation.

In some countries, notably the U.K. and the USA, the fight against inflation was given first priority. But because of installed rigidities in supply and in price- and wage-setting procedures, that deflationary policy called forth massive unemployment and required extremely high interest levels. World trade then contracted, increasing the employment problems of all the trading partners, and seemingly leading the OECD countries into long-term stagnation. A one-sided emphasis on demand management had thus misled governments into exaggerated and ill-timed go-stop policies. Finding a way out of the present stagnation will require a coordinated but cautious global demand expansion, complemented and preceded by a more decisive change in the industrial structure of western nations. This requires fighting inflation where it starts – in the wage- and price-setting decisions of firms and labor unions – and accepting an adjusted factor-price structure. But we question whether such a consensus global policy can be agreed upon, and whether we know enough to implement such a policy even if a consensus is reached.

WHAT DO WE KNOW?

During the 1970s, the unprecedented boom enjoyed by the Western economies in the postwar years ended; for most of those economies, the 1970s were years of slow growth and high unemployment. We have been discussing what went wrong. On one point there is considerable agreement: the supply-side shocks of the 1970s, particularly the oil- and food-price shocks, were significant. And policy responses to those shocks, conditioned by long experience with demand-side disturbances during the postwar boom years, may have been counterproductive and destabilizing. The question arises: how much of the economic shambles of the 70s is the result of the demand policies of the preceding decade, how much of the shocks of the early 70s, and how much of policy reactions to those shocks by national authorities?

Can we answer that question? Do we really understand how industrial economies behave when subjected to external disturbances like those of the 1970s? Can we say that we have learned from those experiences, so that we can manage our economies better next time? The authors of this introduction would answer these questions in the negative. And the papers collected in the present volume are evidence that we have a long way to go before economists understand dynamic economics and before we can recommend policies to improve the performance of economies in the state of disarray that has marked the industrial economies since 1973. The papers by Sharefkin and Faxén suggest that we have an even longer way to go to an understanding of the policy issues.

The papers presented in this volume range over the approaches suggested by received theory, in places suggest where received theory is inadequate, and finally suggest what may be better. They are clearly preliminary and exploratory, and rather lead to new and more specific questions.

Price Shocks: Mining the Data Evidence

In trying to assemble the data evidence to be used in hedging against prospective future shocks, just what data evidence is relevant? Because data on the Western economies have grown explosively over the past fourty years, there is a natural tendency to confine the inquest to those years, and even to the period of the supply shocks of the 1970s.

That, we think, would be a mistake. It is true that recent data are generally better data. But institutional and structural changes have occurred and been recorded in the Western economies for more than fifty or so years. This record embodies information on past adjustments to shocks, and can tell us about the state of the economy during the decade preceding the 1973 shock. The shock appears to be a long-run phenomenon, if we include both its origin and the adjustment period. The last great periods of price upheaval in the international economy, the periods of commodity price shocks during and immediately following the two world wars of this century and the Korean war, can teach us something. In their paper, Josefsson and Örtengren examine that record for the Swedish economy.

Even for that time of far less institutional price rigidity, the progress of a major price shock through the real economy is anything but rapid and smooth. The evidence suggests that we should be wary of theories, or models, that predict (or assume) adjustments to price shocks that are rapid and relatively costless in terms of the real economy. Josefsson and Örtengren find that relative prices dispersed greatly after 1972. It took some 7 years for them to stabilize again, just in time for the new oil price hike of 1979. Contrary to experience from "war shocks" and the Korean cycle in 1950/51, relative prices of manufactured goods returned roughly to where they were before the "oil price shock".

Perhaps more typical of modern analytical methods are the papers of Horwitz and Genberg. Both aim at extracting, from the relatively recent record, information critical to an understanding of how external price shocks affect the domestic economy. The results of both papers reinforce the general impression that the uncertainties surrounding those responses are enormous.

The paper by Horwitz examines the problem of estimating price elasticities of the goods imported, and exported, by a small open

economy. The relevance of those estimates to, say, macropolicy makers making plans in the face of possible external price shocks is apparent. In the extreme case of unit price-elastic export and import demand functions, there is no problem: price shocks leave the values of imports and exports unchanged, and macroeconomic variables unchanged. In the very different extreme of large import-demand price elasticities, a sudden increase in the price of the imported commodity may result in excess demand on domestic resources. And in the related case of extreme export-demand price elasticity, that import-price shock may lead to domestic unemployment.

So much for the rather obvious point that those price elasticities carry important information for macropolicy makers. But how much do we actually know about those elasticities? The answer is clearly "too little", as demonstrated by the specification-sensitivity of the results reviewed in Horwitz' paper. It is not unusual for there to be a difference of a factor of 2 in estimates of import or export price elasticities, depending upon the inclusion or exclusion of restrictions imposed upon the estimating equation. The latter often involve variables which are proxies for incompletely-understood effects.

Nevertheless, those large bounds carry important information for macropolicy makers. They indicate the range of consequences – in terms of domestic inflation and employment – that should be associated with the risk of an external price shock. If those policy makers act like good statistical decision theorists, they will express their beliefs about future shocks and their effects as probabilities. Then they will associate with any given shock, and any given set of elasticities, a macroeconomic "consequence". Among other things, Horwitz' paper tells us that the marginal probability distribution on price elasticities must, on the data evidence, be relatively flat. In other words, the possibility of high elasticities, and large shock effects, cannot be excluded. That means that expected losses from shocks, and the value of policies aimed at insuring against or mitigating the effects of shocks, may be large.

The model underlying Horwitz' paper is an adaption of the standard neoclassical Walrasian model, and of course embraces the corresponding informational assumptions: information is costless and perfect. Over the last decade, economists have increasingly moved away from those assumptions, and toward a recognition of the importance of information costs and informational imperfections.

Genberg's paper is in this spirit. His results confirm those of Josefsson and Örtengren in that he observes a relatively long transmission period for external price impulses, and a transmission time that depends on the size of the external price shock. His results also confirm the existence of "overshooting": prices move away from their long-run "equilibrium" position for some time before they converge. That property of a dynamic economic system is demonstrated in simulation experiments in Eliasson's paper, and the quantity responses of the economy appear to be both large and long-lived.

Genberg first develops an apparatus for distinguishing, and then estimating, the effects of anticipated domestic inflation, on the one hand, and external inflation, on the other, on the domestic price level. The point of the exercise and its importance for policy vis-à-vis shocks is apparent. If external price shocks – in contrast to domestically-generated price rises – are unanticipated, then forecasts of the impact of price shocks must be based upon estimated inflation equations which distinguish between anticipated and unanticipated inflation (cf Faxén's paper).

The point is unarguable, and the econometric results are intriguing. Nevertheless, it is important to remember that Genberg's method is what electrical engineers call a "black box" method: a price-related equation is estimated from time series, with relatively little fuss about the variables and mechanisms excluded from that equation. There are "inputs", anticipated and unanticipated price shocks, and there is an "output", the change in the domestic price level. The "real world" of price and quantity changes in the real economy lies within the "black box".

Since the method is an attempt to confirm simulation results from the micro-to-macro model (see Eliasson's paper), one might use that model to explain the long lags. The main explanation seems to lie in the time needed to transmit price increases by way of economic agents through a multitude of markets. In the process mistakes are made, especially if initial price shocks are large. Disturbances are transmitted through the economy and may be magnified for some time. Both prices and quantities may overshoot and move away from their long-term positions for a considerable time before they begin to converge.

These simulation experiments also demonstrate (1) that the

character of the price transmission can significantly affect the allocation of resources in the economy, and hence economic growth, and (2) that policy-making on the part of national authorities can affect the properties of the price transmission mechanisms. One lesson from Fries' country comparison (the Netherlands, Sweden, the United Kingdom and West Germany) is that the four countries differed considerably in their real economic responses after 1973. The more governments interfered with resource allocation mechanisms, slowing down the adjustment process, the lower were realized rates of post-shock economic growth.

Learning From Shocks with Models

To go beyond "black box" statistical methods, we must impose prior information on the data evidence, information summarizing what we think we know about how economic agents act, and how the market and other institutions resolve conflicting demands for scarce resources. The papers by Sarma and Ysander, and part of Eliasson's paper tell us how to learn from the shocks of the 1970s. Each, in its own way, tells us how to use what we learn to deal with prospective future shocks. Each of those papers either constructs, or suggests construction of, a model or models relevant for those purposes. The conceptual device – the glasses – we put on to interpret what we observe in the economy tell different stories, and especially about what policy makers should do.

Agreement on measures for ex post evaluation of a policy aimed at preventing, or mitigating, the impacts of prospective shocks is quite general: we all want relatively stable growth and reasonable price-level stability. But the policy debates of the 1970s, and the postmortems of the 1980s, revealed sharp disagreement about "how to get there". Those disagreements often took the form of public disputation over the conflicting predictions and implications of various models of the economy and the energy subeconomy. But where models really differ is in their preconceptions. Those essential differences are often hard to bring to the surface.

The papers by Sarma, Ysander and Eliasson provide a setting for that important exercise. We suggest that they be read with the following questions in mind. What does this model assume about the ways firms and governments act during a price shock? What does this

model assume about the way the price mechanism links firms and the government? And how plausible are those assumptions?

The reader must conduct his or her own foray through this material. But the trip can be made more tempting if we hint at the richness of the questions raised by these papers. Begin with the Sarma paper. There, the Wharton Econometric Associates (or WEFA) and LINK models are joined to forecast the impact on the international economy of an oil price shock. Very roughly, the individual national economies are represented by econometrically-estimated macroeconomic models. Since macroeconomic disturbances in any one national economy propagate into all others through the international trade and the international monetary system, those interdependencies must be represented.

A look at the model runs suggest that the propagation of a price shock through the macroeconomy is relatively rapid and not very traumatic for the real economy. Inflationary consequences are constrained by implicit mark-up pricing and no overshooting assumptions. In fact, the quantity effects appear so minor that it seems natural to ask why. The 50 percent oil price hike in 1979 yields a world steady-state GNP effect of less than 0.5 percent. The OECD area has lost 1 percent of its GDP (relative to the base, reference case) by 1985, and no more. Are there no dynamic allocation effects, no price destabilization, no price overshooting among and between countries? That question naturally leads us to another: how are consumer and firm responses to price shocks and market mechanisms represented in conventional macroeconomic models?

The short answer is that such events are excluded from models of this kind by assumption. What serves instead is a set of equations describing how individual industries, or sectors, make price and output decisions. Those industry or sector equations typically include the quantity effects that are the hallmark of macroeconomic models. Industries and sectors respond to cost increases by mark-up pricing increases. Those mark-ups are usually constant percentage mark-ups independent of the magnitude of the cost increase. Quantity effects arise from the impact of aggregate pricelevel inflation on demand.

For that reason, large price shocks affect the WEFA-LINK model much as small shocks do, only proportionately more. After the shock, with a return to normal rates of inflation, the real economy rapidly returns to normal. Large shocks do not call into question the way in

which firms make price and quantity decisions, and neither do they force changes in the way in which government stabilization policy is conducted.

Is all this plausible? The answer probably depends upon the magnitude of the shock. Surely there are disturbances large enough to force changes in both firm and government behavior, though it is far from clear how to model such changes. The papers by Ysander and Eliasson both represent attempts in this direction. One way to look at Ysander's paper is as analyzing and evaluating government post-shock behavior. The essential insight is simple but important: government medium-term macroeconomic policy rules can be sources of poor long-term responses to shocks; rules for public sector employment and wage-setting can be particularly important. Note how different this is from the view of the economic agent called "the government" that is implicit in conventional macroeconomics. There, the government controls the fiscal and monetary policy instruments and runs stabilization policy. Its objectives are short-term, and success in short-term policy is assumed to guarantee success in medium-term policy.

Ysander departs from standard theory by taking explicit account both of the various possible political restrictions on public policy and of the different kinds of inertia or adjustment lags connected with capital structure, wage- and price-setting procedures etc. A rather detailed modelling of energy supply and use also makes possible a more direct tracing of the transmission of energy price hikes through the economy. In his model, existing medium-term stabilization policy can be a source of poor adaptation to shock-related structural imbalances.

Similarly, Eliasson's paper departs from standard macroeconomic theory in its description of the firm. The paper examines the effects of an oil price shock in a model setting in which there are real firms. Perhaps the contrast with the representation of the firm in conventional macroeconomic models makes the point best. In conventional macroeconomic models like the WEFA model, firms respond to cost shocks of whatever magnitude by mark-up price increases. But in the micro-to-macro model, firms are represented as organizations with real-world rules for transmitting price and cost change into employment, output and pricing decisions. Those decisions are in general not the same as, and are hopefully more

realistic than, mark-up pricing rules.

Finally, note how the model chosen can condition the policy responses identified as feasible. Conventional macroeconomic models focus our attention on fiscal and monetary policy. Ysander's model directs us to government medium-term policy; Eliasson's model points us to those choices which can increase the adaptability of individual firms to post-shock conditions.

After the Shock: Stability and Reality

Whatever the model, it must be judged by its descriptive realism and by the extent to which it allows us to identify good policies. In some significant ways, the 1970s changed economists' preceptions of then-existing economic models. In particular, the feeling that neoclassical equilibrium concepts are seriously inadequate gained ground. The reasons are of course relevant to the issue central to the papers in this volume: what can be done about prospective shocks to the economy? Do we know more now about how to handle the next shock than we did in 1973 or 1979?

The sources of dissatisfaction with equilibrium economics are many and we must be selective here. One is at least as old as modern macroeconomics itself: the observation that there are long periods in which prices do not clear markets. At the onset, macroeconomic theory incorporated that assumption by fiat, simply declaring that certain prices were rigid "for institutional reasons". There have been subsequent attempts to rationalize that declaration, typically by establishing conditions under which rational economic agents – labor unions and firms – will choose rigid, long-term contract prices.

That seems to us to be a halfway measure, and one which overlooks an important and necessary source of "price rigidity", the large nonprice allocation systems we call "firms" and the public sector. In an influential paper, Coase (1937) argued that the extent of the firm is determined by the boundary at which the advantages of price and nonprice allocation mechanisms are equalized. Firms are, in effect, large decision systems with operating rules formulated in both quantity and price terms: while ultimately responsive to the price system, those rules need not be immediately responsive to even abrupt changes in "external" prices.

That separation allows the advantages of both allocation mecha-

nisms, quantity and price, to be exploited. But it seems likely that exploitation of both kinds of allocation schemes requires relatively stable prices. In this perspective, one source of persistent disequilibrium is the slow internal response of the nonprice allocation systems, and especially the public sector, to extraordinary rapid changes in external prices.

In such an economy, shocks can "overwhelm" the system, in effect requiring that existing institutions perish. New institutions with internal allocation systems better matched to the external environment must take their places before there can be a return to steady growth and reasonable employment levels.

A MORE SHOCK-PROOF ECONOMY?

Our Current Predicament: Some Perspectives

As we read and reread our own account of the transition – from the steady growth of the 60s to the disarray of the 80s – central to this book, we find it almost impossible to point to a single, dominant strand. Instead there are many. There is the broad problem of the *relationship* between the *micro and macro* levels of analysis, between stability at the macro level and flexibility at the micro level. We say relationship rather than micro foundations of macro, the standard formulation, because we believe that the determinancy runs both ways.

There is the *game-theoretic* problem: if all countries can agree to a demand expansion compatible with the correct long-run adjustment of supply, then we may be able to bring ourselves out of the current world recession. But if such an agreement cannot be reached then we all will hang together, perhaps indefinitely.

There is the theme, and the problem, of the gradual *disruption* and corruption *of the price system,* by governments and national authorities carrying out policies leading to inflation. The price system becomes increasingly noisy, firms find it increasingly difficult to distinguish signals from noise, and the decentralizing functions of the price system are lost gradually.

There is the theme, dating at least to Schumpeter, of the dynamic *welfare benefits of the business cycle.* The cycle, Schumpeter held, inspired winners and eliminated losers. Smoothing the cycle helps some in the short run but at the price of imposing costs on all of us, in the long run.

There is the theme of the conflict, or *tradeoff, between short-term stabilization and redistributional policies,* on the one hand, and long-term stability and flexibility requirements, on the other. Many of the policy measures that have evolved in the industrial countries since the depression of the thirties aim at moderating the rigors of the

business cycle. Most of those measures are necessarily redistributional, but many also have the effect of insulating major segments of our economies from the discipline of the price system. For that reason those measures contribute to increasing inflexibility, and greater instability. Flexibility is virtually synonymous with responsiveness to price signals indicating the need to reallocate resources. And stability at the macro level requires flexibility at the micro level: if resources cannot move relatively easily between firms and sectors, then the ensuing disequilibria, and high levels of unemployment in particular, will give rise to political pressures for the further distortion of the price system.

Finally, there is the theme of *increasing international competition,* particularly from the newly-industrialized countries. Many of the crisis industries in the advanced industrial nations are crisis industries because new competitors, armed with the latest technologies and unencumbered by outdated labor practices, have entered the field.

So much for a listing of our current problems. Any one of those perspectives can be, and has been, the point of departure for scholarly disputation and policy debate. In fact the choice of a particular perspective is perhaps the most important step towards analysis and subsequent advocacy, because it amounts to a choice of a way to look at what is important in the world. From there it is a short distance to defining a research agenda and only a slightly longer distance to policy recommendations. We want to emphasize caution here. No one of these perspectives alone explains the debacle of the 70s; they are all important and interdependent. And thus far we have no satisfactory method for integrating these perspectives: that is why we have a problem of understanding.

Our own view is eclectic, and partly conditioned by our views of what is possible. Thus increasing international competition is a fact of life, but from at least one point of view a humdrum fact: were the world economy working smoothly, and were the individual economies of the advanced countries functioning as they should, rising productivity in the newly industrialized countries could contribute to increasing the welfare of all countries. The real problem presented by the newly industrialized countries is the problem of understanding why the adaptation of the advanced industrial economies to those new competitors has, this time, been so sluggish and inadequate.

Similarly, we do not believe that the cooperative games perspective should be placed high on the research agenda. This is not to say that the perspective is either uninteresting or unimportant. To the contrary, the international monetary system, and the stabilization problem among the advanced industrial economies more broadly defined, are helpfully viewed as games that can be cooperative, but that can also degenerate into noncooperative, arrangements. In the relatively open economies that all the advanced countries have now become it is obvious, for example, that demand expansion in one country will fail if all other countries are deflating. To paraphrase a famous expression, Keynesianism in one country is impossible.

Then why don't we award this perspective pride of place on the research agenda? Because world models based on incorrect national macromodels may be misleading. We can of course try to model the world economy as a set of coupled macroeconomies, using standard models for each of the countries. But we believe that many of the features critical to an understanding of our current predicament are excluded from those models. For that reason we will have little confidence in the individual country models, and even less confidence in a world model built on those national models.

This exclusion leaves us with the following research agenda for the macroeconomics of the 80s and 90s. Three broad areas are defined: decision rules in large organizations, the relationship between micro and macro levels, and the general area of what might be called catching up with Schumpeter.

Decision Rules in Firms

In the 1965 blackout of the Northeast U.S. power grid, failure of a relatively small component of one power system led to failure of the power grid for the entire northeastern United States. In retrospect, it is easy to see what happened. A large, interconnected system is simply too complex to allow complete enumeration of all possible failure sequences: only the most likely sequences can be studied. The operating rules of each of the subsystems comprising the power grid are then designed to handle those "most likely" failure sequences: because operating rules must be simple and rapidly applicable, they cannot cover all possibilities. Inevitably, there will be some combination of component failures which, given the subsystem

failures, will trigger system failure. Again, the analogy with severe economic disruptions more or less suggests itself. The subsystems are the firms, the households and the government, the major economic agents. The operating rules are those agents' normal practice operating rules, derived from years of experience in "normal" economic environments. Unusual, disruptive events, like oil price shocks, combined with the responses they trigger via agents' operating rules, can lead to severe disruptions of the economic system. And the state of the system at the time of the shock will condition the nature of its response.

Models built along these new lines may have surprising properties. Underlying the relatively simple dynamic structure of the traditional models of price and quantity adjustment that economists work with are rather strong assumptions about what market agents – individuals and firms – know, and about how they act on what they know.

Typically, those actions are dictated by some optimizing model of individual or firm action. Many years ago, debates raged in the economics profession about the validity of such optimizing models, and about the relevance of alternative behavioral models, notably so-called satisficing models. Those debates generally ran in terms of statics, but the issue seems more important, and its outcome more critical, in a dynamic setting. There, the time lag within which firms must respond to significant changes in their operating environments is too short to permit the full accomodation implied by optimization models: in fact they use rules of thumb that have been "learned" by past experience. And it is not only in the private sector that we find decision rules that are only loosely related to optimizing principles in place: in the public sector such rules are typical, rather than exceptional.

But serious disruptions are ultimately overcome. The Northeast grid was restored to service, and firms, under pressure, abandon old rules and search for better ones. In a sense "the dynamic system" has simply been redefined at a higher level: it is now determined by all agents' choices of operating rules. But that second level of choice is crucial. It is the essential difference between physical systems, which follow invariable laws, and economies composed of agents who change the rules of the game while they play. That second level of choice must be adequately modeled – in a way reflecting the real information and decision procedures of the major agents – if there is

to be any hope of understanding major disruptions in the economy.

Beyond calling attention to this analogy as a general source of inspiration, we call attention to some implications. The most important has to do with method. To come straight to the point, we believe that future work on macroeconomics will have to make far greater use of simulation methods. The radical decreases in the cost of computation over the past few years make this recommendation feasible. Once we recognize that the economy is populated by major actors employing their own decision rules, the necessity of simulation methods is almost a foregone conclusion. Only highly-simplified full-optimization rules will allow easy, analytical assertions about system stability properties. Realistic sets of decision rules permit no such easy generalization from the micro-to-macro levels: simulation is necessary for serious analysis.

Micro and Macro Stability

It might be helpful, in facing up to our current predicament, if the economics profession recognized how limited, and how accidental, its current perspective on questions of stability is. The profession has learned much of what it knows about such questions by borrowing from physical science. This is not surprising: the oldest principle of learning is that something is easy to learn if you can assimilate it to one of your "own" models. The Walrasian general equilibrium model, from which we derive most of our notions of economics, was borrowed from Newton and Laplace: it is, down to the assumption that information is costless, the model of classical physics. And since there can be instabilities in classical physics, attempts have been made to borrow those as descriptions of the instabilities observed in economic systems.

This is illustrated by the physical phenomenon of turbulence, which occurs under certain conditions in all fluid flows through, or around, solid boundaries. For certain ranges of the system parameters – especially the fluid-solid relative velocity – the flow pattern is smooth, or "laminar", and changes only gradually with small changes in the parameters. The flow pattern might be said to be "resilient" to those parameter changes at those parameter values.

But there is one, or there are several, discrete critical parameter

values above which the flow pattern becomes anything but smooth: in this transition to turbulence, the flow appears to be unstable and chaotic, perhaps even "stochastic", despite the essential determinism of the basic equations defining the system. According to the modern theories of the onset of turbulence, such "stochastic" appearance is generated not by any "inherently" random mechanism, but by extreme sensitivity of the flow pattern to initial conditions. In that region, the flow pattern is no longer "resilient" to changes in the parameters. Since molecular fluctuations (if nothing else) always guarantee fluctuations in the initial conditions, the observed flow pattern will seem random or chaotic. But by analyzing the equations, we can determine where in the parameter space the "onset of turbulence" may occur: in this way we can try to design our systems to avoid, or mitigate, the problems associated with turbulence.

The temptation to apply such models to social phenomena is strong. Occasionally we do observe severe disruptions of "business as usual", such as large firm bankruptcies or severe depressions. Since we tend to think of the economy in normal operation as a kind of self-equilibrating dynamic system, disruptive events appear analogous to the "onset of turbulence". Our theories of economies operating in their "normal range" might at the same time define regions, in the space of the parameters defining the economic system, where severe disruptions are likely.

But we are skeptical about this analogy. The instabilities of classical physics arise from the interaction between the local and the global. And the components of the system are not agents with objectives of their own. Thus we believe there will be diminishing returns to continuing efforts to learn about the causes of economic disarray from this particular natural-science analogy. But there may be a better set of natural-science models to draw upon for a rigorous notion of the relationship between macro stability and micro flexibility. Look at firm entry and exit into industries, and at technical and organizational changes in existing firms, as kinds of diffusion processes. Diffusion is a generic name for physical processes which, though based upon the random motion of many individual particles, nevertheless exhibit some coherence in the aggregate. Those physical diffusion processes are typically driven by the thermal kinetic energies of the individual molecules or particules. To make the analogy explicit: individual firms are the diffusing particles, their

position coordinates are indexed by technologies and operating practices, and the processes are driven by profit incentives. The latter will vary over the business cycle, and thus so will the rates at which firms search over, and move between, "positions" – physical plant and operating practices. An industry is a cluster of diffusing firms, following and surrounding an "average firm" orbit. But in an industry of limited diversity, all firms cluster in a thin pencil about the orbit. In the former case macro shocks – shifts in the demand orbit – can be relatively easily tracked by the industry, because the initial spread of firms leaves some close to where the new orbit will lie. But in the latter case, a macro shock – a sudden shift in the orbit – will find almost all firms far away from the new, postshock, correct average-firm orbit. In the latter case, swings in industry output will be greater than in the former: thus the connection between micro diversity, or flexibility, and macro stability.

Within this kind of model we may be able to add a new, dynamic dimension to our understanding of industry structure, conduct, and performance. Most theories of industrial organization are essentially static: the model sketched above adds another, essentially macro and dynamic dimension to performance – the industry's contribution to macro stability. And in this kind of framework we may be able to sharpen our own notions of the tradeoff between a moderated business cycle and the longer-term welfare penalty from weakened incentives to dynamic efficiency.

Catching up with Schumpeter

Prosperity makes odd bedfellows, and no two have been odder than the Keynesian and Walrasian traditions that have dominated the thinking of the economics profession in the post-Second World War period. Paul Samuelson, in his famous text, came close to declaring the marriage permanent when he coined the phrase "the grand neoclassical synthesis". That phrase meant that Keynesian fiscal and monetary policies could keep the economy operating at or near full employment, in which operating range Walrasian general equilibrium theory became the correct theory of price formation and income distribution.

Much of the analytical effort of the economics profession rested upon that synthesis. And the general conviction that the macroecon-

omic problem had been solved diverted both analytical attention and professional energy away from another, and we believe deeper, vision of modern capitalism. We are referring to Schumpeter, today considered hopelessly outdated by many of those economists who have taken the trouble to read him at all. This, to say the least, is unfortunate. If Schumpeter has not received the analytical wrapping that has been given Walras, it is because formalization is intrinsically harder, and because the profession hasn't tried very hard.

It should, and soon. For many of the insights that we can draw upon in seeking ways of understanding, and in seeking policies for improving upon, our current predicaments are Schumpeter's. This is most clearly true of the dynamic welfare analysis of the business cycle. Having tried to eliminate the cycle, we may have both increased its amplitude and sacrificed its contribution to maintaining the flexibility and resilience of the agents populating the economic landscape. The formulation of a rigorous framework in which to think about the tradeoff between short- and long-term stability seems to us to merit serious attention.

Part of that effort will necessarily involve an attempt at understanding the cost, in efficiency losses, of policies which degrade and disguise the informational content of price signals. Firms, in making their investment and output decisions, lean heavily on those signals. And since all signals are composed of both information and noise, firms must be able to discriminate between the two when making decisions.

But such discrimination becomes harder as more and more noise is superimposed on the underlying information. And we are convinced that so-called general inflation, often described by economists as a simple rate of increase in the general price level, has this effect. That is because inflationary shocks are transmitted through different sectors at different speeds, so that it is very difficult to know what is inflationary noise and what is signal. Incidentally there is a discipline devoted to just this problem: control engineers try to build decision rules for controlling systems by first separating information from noise, and then acting upon the extracted information.

These suggestions represent an ambitious program for economic research in the coming decades. But they cannot be avoided if we are to do better during the next twenty years than we have done over the past twenty years. In fact, since what is acceptable as doctrine so

conditions what is thinkable as policy, we would go further: without such a program, we are unlikely to do better. We invite readers of this very preliminary volume to share in that effort.