What is Political Economy?

What problems does political economy address? What questions does it ask? On what analytic foundations does it build?

Modern political economy provides an accessible approach to the study of economic issues. It seeks to 'illuminate the world in which we live so that we may act in it intelligently and effectively'. This introductory chapter explains how this ambition can be achieved. It suggests three ways of defining political economy:

- in terms of the real-world problems on which it focuses
- in terms of how these problems are analysed
- in terms of the currents of economic thought from which it draws.

It also indicates how political economy can generate more interest than is usual in the study of economics.

Relevance to real economic problems

Economic concerns beset us individually in our everyday lives—earning a living, managing our incomes, and making decisions about spending and saving. They also beset us collectively, generating political choices about how to balance economic growth against environmental concerns, how to redistribute income through taxes and government spending, and how to deal with national and global imbalances in international trade and economic development.

How these issues have been addressed in economic analysis and policy has been strongly influenced by one particular economic theory, neoclassical economics, which emerged in the late nineteenth century and is still the dominant economic orthodoxy today. This theory stresses the beneficial effects of competitive markets as a means of allocating economic resources. From the neoclassical viewpoint, the role of government is, at most, that of an adjunct to the free-market economy. The underlying view is that the capitalist economy is a stable, self-equilibrating system.

A frequently recurring charge against this economic orthodoxy is that the theoretical model of market exchange under competitive conditions fails to illuminate the world in which we actually live.2 However, the theory has had a strong influence on economic policies in practice, and therefore does have an awesome relevance, for better or worse. This has been particularly evident in the last four decades. Orthodox economic reasoning has given rise to particular policy prescriptions, such as the liberalisation of trade, the deregulation of financial markets, and the privatisation of public enterprises. It is as if the real world is being reconstructed in the image of a particular economic theory. Major political economic problems have resulted, most obviously the dramatic worldwide economic crash that began in 2007-08. The resulting global economic crisis has made necessary a fundamental reconsideration of orthodox economic theory and policies.3

Modern political economy provides an alternative that seeks to deal directly with the current political economic problems and policy issues. In addition to the lessons from the global financial crisis, there are many other contemporary concerns: the challenge posed by the power of multinational corporations, the tension between economic growth and ecological sustainability, the economic insecurity and inequality intensified by contemporary structural economic changes, the proliferation of speculative financial activities and their adverse consequences for economic stability and productivity, and the continuing problems of promoting balanced economic and social development, especially in poorer nations.

The immediate appeal of the political economic approach is its direct engagement with these big issues. A link is thereby established between studies in economics and what is reported in the daily newspapers and on radio and television current affairs programs. Simultaneously, links are created with other areas of study, such as geography, history, social studies, political science, and industrial relations. Indeed, this interdisciplinary character of political economy is one of its strengths. Real-world phenomena do not fit neatly into boxes labelled 'economic', 'social', 'political', or 'cultural'. Those categories have been constructed for academic convenience, and the disciplinary divisions—between economics, sociology, and political science, for example—can impede a full understanding. Political economic analysis is enriched by drawing from these other disciplines, leading towards a more holistic approach to social science.4

The political economic questions

Major explorations require an orderly procedure. In the case of political economy, this means interrogating each issue systematically by posing basic political economic questions such as:

- What is happening?
- Why?
- Who gains and who loses?
- Does it matter?
- If so, what can be done and by whom?

First, to assess 'What is happening?' requires a stocktaking of the facts of the matter. This sounds simple, but is seldom straightforward, because judgment is usually necessary in deciding which aspects are most important and which are relatively inconsequential. The 'Why?' question shifts attention to the analysis of causal factors: the forces, people, or institutions driving the political economic processes in question. Taking stock of winners and losers requires careful study of how the various participants in the economic drama are affected. The question 'Does it matter?' introduces more explicitly evaluative considerations. This provides the link between the analysis of problems and the discussion of responses, leading into the final question about remedial policies and strategies. We are not simply passive observers of political economic change: as active participants, our effectiveness depends on how we address the strategic question of what can be done. Box 1.1 illustrates these five steps applied to the analysis of 'qlobalisation'.

BOX 1.1

GLOBALISATION

It is commonly asserted that our lives are now being radically changed by the integration of economic activities on a global scale. Globalisation is said to be breaking down the territorial boundaries that used to limit the opportunities (and threats) that we experienced. According to this view, technological and economic changes are transforming society and culture. We fail to adjust at our peril, individually and collectively.

Is this really so? Asking the five key political economic questions listed on p. 3 can reveal a more sophisticated story.

First, to answer 'What is happening?' requires important distinctions to be made between the globalisation of finance and trade, of culture, of environmental concerns, and of human rights. Focusing on the globalisation of business activities, for example, requires careful study of the changing patterns of international trade in goods and services, international investment, and/or international finance (including the proliferation of speculative activities worldwide).

Answering the question 'Why?' requires analysis of the drivers of change, including the complex interactions between the forces external to nation states and the forces nurtured within them. The influences of consumerism, technology, and government policies towards multinational corporations, for example, come into the spotlight.

The question 'Who gains and who loses?' is equally complex. The changing international distribution of jobs and incomes needs to be considered. Large multinational companies, seeking to take advantage of differential labour costs, have often relocated parts of their manufacturing activities to developing nations. As a result, significant numbers of workers in those countries have gained industrial employment previously unavailable to them; however, although usually better paying than the traditional occupations, these jobs are frequently associated with particular health and environmental risks. Whether the industrialisation, often localised in enclaves called 'export-processing zones', has trickle-down benefits for the rest of the society is also uncertain: it depends on how and

where the extra income is spent and on whether the companies pay significant amounts of money in local taxes. Meanwhile, the employees in more affluent nations face pressures for wage reduction in order to try to keep the local manufacturing businesses competitive, or face unemployment if the firms go under.

Does globalisation matter? Certainly, the political economic changes have major social and environmental implications. The advantages for consumers of being able to shop in the global marketplace need to be balanced against the greater economic insecurity that many workers face. The socially destabilising effects of changing patterns of economic inequality demand attention. And the environmental impacts of worldwide sourcing of raw materials, increasingly extensive transport, and use of non-renewable energy sources are further sources of tension.

So, what is to be done? Is the capacity for national economic management undermined by the greater mobility of capital? To what extent, and in which policy fields, are governments able to shape the terms on which nation states engage with the global economy? If governments are losing their managerial capacity, to which other institutions—local, non-governmental, or supranational—can we instead look to control the processes of change? Can labour, environmental, or consumer movements, for example, go global in order to counteract the globalisation of business and finance? These are the kinds of big, strategic questions that globalising processes generate for modern political economists.

Contributory conceptual currents

Describing political economy as a means of understanding a changing world is a down-toearth beginning to our explorations ... The contest of economic ideas then enters the story, when we recognise that for any economic issue there are competing explanations. Among the different schools of economic thought that have developed during the last two and a half centuries, the following have most obvious relevance in the construction of modern political economy.

Classical political economy

Scholars such as Adam Smith and David Ricardo wrote about economic affairs when capitalism was emerging from feudalism to become the dominant economic system in Western Europe. Although the economy then looked very different from today's-with less sophisticated production and transport technologies, and smaller businesses that usually served only local markets—Smith's and Ricardo's insights into economic interests and political processes are of enduring relevance. The notion of an economic system producing goods and services surplus to what is required for social reproduction remains valuable. Understanding how that surplus may be expanded—whether through trade and an increasingly complex division of labour, for example—is central to the analysis of economic growth. Understanding how the surplus is

generated also leads to an explanation of how incomes are distributed—among capitalists, workers, and landowners, for example. Classical political economy is generally held to have conservative political implications, but the underlying conceptions of economic production, distribution, and economic growth can be given a progressive, modern twist. The emphasis on the troublesome issue of land and land ownership, ignored by much economic theorising over the last century, is particularly important.

Marxist economics

Marxist economics also warrants careful consideration. Its roots are in the tradition of classical political economy, but it provides a quite different, more critical, interpretation of capitalism. It emphasises the basis of the capitalist economy, in particular property relations, class structures, and the relentless drive for amassing wealth. Marxist analysis asserts that the source of the economic surplus is the exploitation of labour. The resulting class conflict creates the potential for radical political economic change. Marxist economic analysis can help to understand dramatic shocks to the economic system, such as financial crises, and the persistence of poverty in affluent societies. However, like all economic theories, Marxist analysis needs to be critically reevaluated to test its applicability to the modern economy. Generally, though, the holistic character of Marxian political economy and its emphasis on the conflicts and contradictions driving economic change have evident resonance in the current context. Globalisation, for example, can be interpreted from this perspective as the drive by capitalist business interests to break through the constraints on their growth formerly imposed by national boundaries.5

Institutional economics

Institutional economics is another tradition that contributes significantly to modern political economy. It emerged from the German historical school of the nineteenth century and flourished in the twentieth century, partly as a reaction to the abstract character of much orthodox economic theory. Its leading exponents, from Thorstein Veblen to J. K. Galbraith, have persistently emphasised the need to come to terms with the changes in institutional form associated with the ongoing development of capitalist economies. The focus is on economic evolution. Distinctive themes are the growth of big business, transnational corporations, the varied governmental economic activities that occur in different nations, and the influence of trade unions. Although coming from politically diverse positions, the institutional economists have provided powerful ideas for shaping economic reform. A particular focus is the potential for more extensive interventions by the state to reduce the inequality and instability of free-market capitalism.

Keynesian economics

Keynesian economic analysis also has continuing importance. John Maynard Keynes was probably the most significant economist of the twentieth century. He explained why

capitalism cannot quarantee full employment, and identified the necessary remedial policies at a time when more conventional economic prescriptions had failed. He showed that the economy did not function simply as the aggregation of economic markets and that, without enlightened government intervention, unemployment would recur. So, too, could the problem of inflation. Orthodox economists responded to the ideas of Keynes by producing a 'neoclassical synthesis',6 combining a microeconomics emphasising market freedoms with a macroeconomics emphasising the necessity of government intervention. This lacked coherence, both analytically and politically. The assault by monetarists and other new classicists on Keynesian economic interventionism during the last quarter of a century produced a more consistent capitalist free-market ideology. But it spurned the practical insights that Keynes made. As post-Keynesians remind us, there is much in the original work of Keynes about the inherent instability of a monetary economy and about policies conducive to long-run expansion of productive capacity that is worth rescuing.7 Moreover, the global financial crisis showed how important Keynesian policies are in coping with the instability of modern capitalism.

Neoclassical economics

The role of neoclassical economic theory is more problematic. As already noted, it has been the dominant economic orthodoxy. As such, it needs to be carefully understood. But much of the impetus for modern political economy comes from the quest for an alternative. One approach is to consider neoclassical economics pragmatically, as a possible source of contributions to the modern political economist's tool kit. Some elements within neoclassical economics can be salvaged for this purpose. Later chapters in this book will look at, for example, the analysis of 'externalities' and the measurement of demand and supply elasticities as illustrations of this pragmatic approach. However, the problem is that neoclassical theory also embodies a distinctive ideology—presenting a particular image of a free market capitalist economy serving societal preferences. It is this ideological character of neoclassical theory that makes it difficult to 'mix and match' with other currents of economic analysis that present a more critical view of capitalism. These orthodox economic ideas are better understood when treated comparatively with classical, Marxist, institutional, and Keynesian views. This is the essence of the liberal educational principle applied to the study of economic issues.

Modern political economy

Modern political economy is not a return to the economic ideas that prevailed before neoclassical economics became dominant. Focusing on the conditions for the broad progress of the economy and society is certainly more in tune with the classical tradition than with the narrower, neoclassical focus on market equilibrium. However, modern political economy also draws on the currents of economic thought that have been developed by subsequent scholars, including Joseph Schumpeter, Joan Robinson, Nicholas Kaldor, Michal Kalecki, Paul Sweezy, and Gunnar Myrdal, as well as Veblen, Galbraith, and Keynes. Institutional, Keynesian, and post-Keynesian ideas thereby exert a strong contemporary influence. A common theme is the

desire for a down-to-earth approach that addresses real political economic problems and makes values explicit.

PART I: CURRENT ECONOMIC PROCESSES AND PROBLEMS

Political economy is the study of the economy from a social science perspective. It also extends the subject to embrace environmental concerns. Indeed, probably the greatest challenge for us in the twenty-first century is to reconcile the economic with the ecological. There are some relevant concepts that can be drawn from existing economic analyses for this purpose. Neoclassical economists, for example, commonly concede that recurrent market failures occur when 'environmental goods' such as clear air and water are not properly priced. This leads them to advocate policies of extending private property rights to those environmental goods so that their use can be better controlled through markets. Other social scientists arque instead for a fundamentally different 'ecological economics'.8 That means seeking not only to build on, but also to transcend, the legacy of existing currents of economic analysis. A similar stance is appropriate in relation to other contemporary challenges, such as the concerns with gender inequalities, work-life balance, and the political economy of human rights. Creative application of existing currents of thought within political economy has to be blended with continued reformulation of the discipline.

Studying political economy is not easy; indeed, the emphasis on competing currents of economic thought and their association with rival political philosophies adds complexity to the subject. But this engagement with controversial issues creates more intellectual excitement than the narrow, seemingly technical, treatment of orthodox economic analysis. The link between political economy and current affairs, as discussed in newspapers, and on radio and television, is also more explicit. There are theories to be studied, of course, but their relative plausibility can be discussed with reference to real-world observations. For all these reasons, the approach of political economy can have substantial appeal for students who are interested in how they fit into the world around them, and how they might contribute to changing it for the better.9

Conclusion

There is considerable continuity in the economic activities in which people engage—using natural, human, and manufactured resources to produce goods and services, and distributing the fruits of those endeavours according to the relative economic power of the participants. There is also considerable change, particularly in the present period of rapid technological innovation, global integration, structural economic adjustment, and ecological stresses. In political economic analysis, a similar dualism exists: continuity comes from building on the existing stock of economic knowledge, but change comes through adapting and extending it to deal with the evolving political economic problems and new challenges. The need for creative political economic thinking is evident and urgent.

KEY POINTS

- Political economy addresses real-world concerns in a way that emphasises the connections between economic problems, social structures, and political processes.
- There is a rich heritage of economic thought from which modern political economy draws, including classical political economy, Marxist economics, institutional economics, and
- Neoclassical economic analysis also needs to be carefully considered because of its major political economy is to go beyond critique to the formulation of effective alternatives.

The Personal is Political Economic

Who makes economic decisions?

What is the current political economic context in which those decisions are made?

What are the principal political economic challenges we face?

Many people come to the study of economics expecting that it will offer guidelines for getting rich. They are usually disappointed to find that it is about how the economic system works, rather than how the system can be worked for personal advantage. The former may help the latter, of course, because people are likely to make more astute financial decisions if they know about the economic, social, and political forces shaping the business and financial environment. Concurrently, it is also to be hoped that understanding how the economy works will stimulate more concern with strategies to achieve better social outcomes.

Generally, the study of economics should serve the needs of intelligent citizens who wish to make sense of the world around them. This is particularly important in the current era of economic uncertainty, when individuals have to cope with major changes to their material circumstances, often with little understanding of what is driving those changes and the potential to change direction.

The economic context: risk and uncertainty

We live in exciting if unsettling times. Dramatic changes in technology are transforming the way goods and services are produced and, particularly, the way information is transmitted. The barriers once imposed by the tyranny of distance and national boundaries, though still significant, are being eroded. This process has cultural and political, as well as economic, dimensions, but its most notable feature is the growing economic power of transnational corporations. Some of these companies have budgets larger than national economies. Understandably, many individuals feel dwarfed and powerless in these circumstances. The capacity of the democratic institutions within nation states to exercise control over the enormously powerful private corporations is under challenge; in many cases, governments do not even seem to have the will to exercise such control.

Meanwhile, the nature of work is also rapidly changing. A significant proportion of the potential workforce is excluded from making a direct, productive contribution, even when economic growth is taking place. Solving this problem of persistent unemployment is one of the continuing political economic challenges. For those who are in work, the emphasis is now increasingly on casual, part-time, or contract employment. In the advanced industrial nations the number of manufacturing jobs relative to service-sector jobs continues to shrink. More women are in the waged workforce, but the overall allocation of household tasks according to gender has not changed correspondingly. The proportion of older people in the population continues to grow, albeit slowly, posing the challenge of developing appropriate mechanisms for intergenerational income transfers. The capacity of governments to manage these and other processes of income redistribution is impaired by their reluctance to raise taxation to generate the necessary revenue.

Increased income inequalities, within and between nations, are a predictable feature of these circumstances. They repeatedly undermine the conditions for effective cooperation in seeking solutions. The presence of glaring economic inequalities within a nation is not conducive to the cooperative behaviour necessary for the simultaneous achievement of higher productivity and social cohesion. Similar problems exist on an international scale. Imbalances of trade and debt between rich and poor countries accentuate the long-established problem of economic inequality. Some of the poorer nations, most notably China and India, have achieved impressive economic growth rates in the past two decades, but others, especially in sub-Saharan Africa, have been slipping even further behind.

Meanwhile, in the wealthier nations the economic exuberance of the early 2000s has been replaced with a more troubled economic outlook. The capitalist system has always been prone to a cyclical pattern of boom and bust, but the global financial crisis that began in 2007-08 was a particularly harsh reminder of this systemic flaw. Even more worrying for the long term, because of the constraints imposed by the physical environment, is the increasingly unsustainable character of economic growth on a global scale. How to harmonise economy, society, and ecology most effectively is a question to which there is, as yet, no agreed answer.

It is not surprising that many individuals feel overwhelmed by these developments and problems. Therein lies the twin challenge for political economy: to analyse the underlying forces and to posit some effective solutions.

BOX 2.1

ECONOMIC DECISIONS

Our day-to-day lives involve many economic decisions. Most of these are fairly small scale and short term and of no apparent significance to anyone beyond our immediate family and friends. In the aggregate, they shape the economic environment in which we live. Some such decisions, illustrating our various social and economic roles, are described below.

- As students, we are investing in our economic future as well as—hopefully—pursuing personal development, How much education we undertake and how many qualifications we acquire are likely to have a bearing on our future economic opportunities.
- As consumers, we make daily decisions about which of the sometimes baffling array of products we will buy with our income. We also make decisions, if only by default, about how much we are prepared to forgo the immediate gratification of consumption in order to accumulate personal savings.
- · As workers, we are faced with constrained choices about the jobs we seek and the hours we work. We also have to make periodic decisions, individually or collectively, about the strategic stances to take in negotiations with our employers about wages and conditions of work.
- Meanwhile, business decision-makers make their own strategic decisions about employment and wages payments. They also periodically review the methods they use for producing goods and services, how much they will invest in new production facilities, the prices they will charge for their products, and their sales promotion practices.
- Speculators continually review their portfolio of assets, deciding what to buy and sell according to their judgments about future price movements and the possibility of capital gains. When media commentators refer to how 'the markets' respond to economic news or government policy initiatives, it is the behaviour of these speculators to which they are referring.
- Banks decide about making loans to their clients, usually according to set guidelines. They also make decisions about the interest rates offered to depositors and charged to borrowers. The margins between these borrowing and lending rates are a principal source of banks' profits, and so they are kept under continual review.
- Government ministers, especially those in key departments such as Treasury and Finance, also make frequent adjustments to economic policies. They do so in response to changing economic conditions in national and global markets, and to political pressures (including the speculative sentiments of the markets). These public policy positions are also significantly influenced by prevailing economic

Micro decisions: macro outcomes

There is a link between micro personal choices and macro societal choices. Individuals' economic decisions affect and are affected by broader political economic forces. Indeed, it is reasonable, as a first approximation, to see what is happening in the economy as the outcome of the sum of individual decisions. So, whether the economy is functioning well or notwhether the overall economic conditions are buoyant or stagnant, for example—is the result of whether the numerous interdependent decisions mesh effectively. There is, of course, much scope for inconsistency, conflicts of interest, and contradictory elements.

As political economists, we can step back from the individual choices and short-term decisions to see the bigger picture. This can help us understand the political economic structures that shape and constrain our options. It can also help to reveal the forces that change the context within which individual economic decisions are made.

Three trilogies

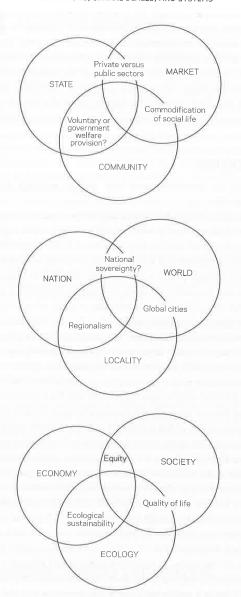
A simple device for considering some basic political economic principles is shown in Figure 2.1 (overleaf).1

The first diagram depicts the relationship between market, state, and community. It shows the three different ways in which economic activity can be organised: market, state, and community. Goods and services may be produced for exchange in the market. Many are. Alternatively, the production and distribution of goods and services may be organised by a central coordinating agency such as the state. The state may be responsive to the wishes of the society through democratic processes, or it may be authoritarian in character. The third possibility is that the production and distribution of goods and services results directly from community provision. People produce goods and services for themselves and their neighbours, and benefit from reciprocal relationships.2 The community may be quite small—perhaps just a household—or it may comprise a larger group of people whose voluntary cooperation results in purposeful economic activity without the need for markets or a state.

These three different ways of providing for our material needs and wants normally coexist in any society, but their relative importance varies, and there are recurrent tensions between them. The same diagram illustrates the boundary tensions in terms of the balance between public and private sectors of the economy, the choice between voluntary and government welfare provision, and the extent to which social life is structured by market processes.

The second diagram in Figure 2.1 shows the spatial scales at which economic activities can be organised and coordinated: local, national and global. Local production can be for local consumption. Much is. National coordination of productive activity is also commonly attempted. The markets for some products are nationwide, and governments usually try, more or less successfully, to manage national economies. The global dimension is becoming increasingly important, however, as global markets, and even some embryonic forms of a global state, have developed. The articulation of these three spatial scales and the balance between them are key issues. As suggested in the second diagram in Figure 2.1, tensions may occur in relation to national sovereignty, the development of global cities, and regional development. Here is a gentle reminder of the importance of the spatial dimension in political economy. All economic activity—indeed, all of life—takes place in both time and

FIGURE 2.1 THREE TRILOGIES: INSTITUTIONS, SPATIAL SCALES, AND SYSTEMS



space, so we need analytical structures that pay due attention to these coordinates of our

The third trilogy shown in Figure 2.1 depicts the relationship between economy, society, and ecology. Economic activities always depend on certain social and ecological preconditions—the availability of labour and natural resources, for example—and they have major social and environmental consequences. Political economy necessarily focuses on these connections. It looks at how the balance between economic, social, and ecological concerns is affected by the relationships between market, state, and community, and between local, national, and global scales of economic organisation. In practice, balance is seldom achieved, and the resulting contradictions are manifest in ongoing concerns about distributional equity, ecological sustainability, and the quality of life.

These three trilogies shown in Figure 2.1 draw attention to social choices. Do we want our economic arrangements to be mainly market orientated, increasingly global in character, and prioritising the pursuit of economic growth? Would it be better to have a greater role for the state, and more emphasis on planned national economic development and the pursuit of social and/or environmental goals? Or would we prefer more focus on the role of the community and localised forms of political economic organisation? What combination of these arrangements would be best? How can we seek to achieve that outcome? These are fundamental questions facing us all as citizens. They are issues that political economy seeks to illuminate.

Conclusion

As individuals, we all participate in the political economic drama. The personal is political economic. However, our roles in the drama are not predetermined. As actors, we can improvise, even tear up the script. It helps to know what is going on and what our options are, individually and collectively. We need an understanding of the political economic processes and possibilities. We have to identify what can be done to produce political economic futures consistent with our individual and collective needs and aspirations.

We need, therefore, to understand the capabilities and limitations of markets as means of organising and integrating economic activities. We need to explore appropriate economic roles for community and government that are desirable and feasible in an increasingly global political economic context. We need to devise the most effective means for securing economic progress, and balancing concerns about economic efficiency with social justice and ecological sustainability. And we need to evaluate alternative strategies for the pursuit of greater economic security, stability, and equity.

To address these concerns we must look beyond the short-term, day-to-day economic decisions we make as consumers, workers, investors, or business managers. We need to deepen our understanding of the political economic forces shaping our lives.

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KEY POINTS

- Political economy emphasises the context within which an array of individual decisions are made: decisions about the production of goods and services, work and wages, consumption choices, savings and investment, and economic and financial management
- Economic activities can be organised in different ways, involving various combinations of market, state, and community decision-making. They can be organised at various scales: local, national, or global. The nature of these arrangements has a major bearing on the social and ecological impacts of economic activities.
- The current political economic context features substantial uncertainty and risks



What major political economic changes have taken place in the past two decades?

To what extent do they have common purposes?

Do they have contradictory characteristics?

In the complex array of political economic changes taking place in the world around us, it is sometimes difficult to see patterns. This has been especially true in the last couple of decades, when the changes have been particularly rapid and diverse. This chapter considers six interlocking dimensions of these structural economic changes:

- the application of new technologies
- the reorganisation of businesses through mergers and takeovers
- the globalisation of production
- the reorganisation of employment conditions
- ... changes in the economic role of governments
- changes in prevailing economic ideologies.

The application of new technologies

It is usually in the interest of businesses to implement new technologies that cut the costs of production. This often involves labour displacement; that is, producing more outputs of goods and services with fewer workers. Such has been the case throughout the history of industrial society when particular sectors of economic production have been transformed through technological innovation. The microelectronic revolution that began in the 1970s heralded a particularly dramatic wave of change in technologies of production and information