
Private Sector Investment in Ireland

National Economic and Social Council

nesc

No. 103 February 1998

An Chomhairle Náisiúnta Eacnamaíoch agus Sóisialach

NATIONAL ECONOMIC AND SOCIAL COUNCIL

Constitution and Terms of Reference

1. The main tasks of the National Economic and Social Council shall be to provide a forum for discussion of the principles relating to the efficient development of the national economy and the achievement of social justice, and to advise the Government, through the Taoiseach, on their application. The Council shall have regard, inter alia, to:
 - (i) the realisation of the highest possible levels of employment at adequate reward;
 - (ii) the attainment of the highest sustainable rate of economic growth;
 - (iii) the fair and equitable distribution of the income and wealth of the nation;
 - (iv) reasonable price stability and long-term equilibrium in the balance of payments;
 - (v) the balanced development of all regions in the country; and
 - (vi) the social implications of economic growth, including the need to protect the environment.
2. The Council may consider such matters either on its own initiative or at the request of the Government.
3. Members of the Government will meet regularly with NESC on their initiative or on the initiative of NESC to discuss any matters arising from the terms of reference and, in particular, to discuss specific economic and social policy measures and plans and to explore together proposals and actions to improve economic and social conditions. Any reports which the Council may produce shall be submitted to the Government, and shall be laid before each House of the Oireachtas and published.
4. The membership of the Council shall comprise a Chairperson appointed by the Government in consultation with the interests represented on the Council, and
 - Six persons nominated by agricultural organisations;
 - Six persons nominated by the Irish Business and Employers Confederation and the Construction Industry Federation;
 - Six persons nominated by the Irish Congress of Trade Unions;
 - Fifteen other persons nominated by the Government, including one from the National Youth Council of Ireland, the Secretaries General of the Department of Finance, the Department of Tourism, Sport and Recreation, the Department of Enterprise, Trade and Employment, and the Department of Social, Community and Family Affairs.Any other Government Department shall have the right of audience at Council meetings if warranted by the Council's agenda, subject to the right of the Chairperson to regulate the numbers attending.
5. The term of office of members shall be for three years. Casual vacancies shall be filled by the Government or by the nominating body as appropriate. Members filling casual vacancies may hold office until the expiry of the other members' current term of office.
6. The numbers, remuneration and conditions of service of staff are subject to the approval of the Taoiseach.
7. The Council shall regulate its own procedure.

NATIONAL ECONOMIC AND SOCIAL COUNCIL

PRIVATE SECTOR INVESTMENT IN IRELAND

PUBLISHED BY THE NATIONAL ECONOMIC AND SOCIAL COUNCIL

Copies of this Report may be obtained from
THE NATIONAL ECONOMIC AND SOCIAL COUNCIL
Dublin Castle, Dublin 2.
or the Government Publications Sales Office.

Price £5.00

MEMBERSHIP OF THE NATIONAL ECONOMIC AND SOCIAL COUNCIL

Chairman:

Mr Paddy Teahon

Government Nominees:

Ms. Carol Fawsitt (Fawsitt & Co. Solicitors)
Prof. Patrick Honohan (ESRI)
Dr. David Jacobson (DCU)
Ms. Anne Maher (The Pensions Board)
Prof. Alan Matthews (TCD)
Mr. Dara Murphy (Variety Supplies and Party Rentals Ltd.)
Ms. Mary Murphy (INOUE)
Ms. Michelle Norris (National Youth Council)
Dr. Ann Ryan (St. Patrick's College, Maynooth)

Observer from European Communities:

Mr Brian O'Loughlin DG II Office, Brussels

Nominees from Government Departments:

Mr. P. Mullarkey Secretary, Department of Finance
Mr. P. Haran Secretary, Department of Enterprise,
Trade & Employment
Ms. M. Hayes Secretary, Department of Tourism,
Sport & Recreation
Mr. E. Sullivan Secretary, Department of Social,
Community & Family Affairs
Ms. J. O'Neill Assist. Secretary, Department of Tourism,
Sport & Recreation

Nominated by Irish Business & Employers Confederation:

Mr. John Dunne
Mr. Brian Sweeney
Mr. Tom Toner
Ms. Lorraine Sweeney
Ms. Rosemary Steen

Nominated by the Irish Congress of Trade Unions:

Mr. Peter Cassells
Mr. Phil Flynn
Mr. Owen Nulty

Mr. Jimmy Somers
Ms. Patricia O'Donovan
Ms. Lenore Mrkwicka

Nominated by the Irish Co-operative Organisation Society:

Mr. Gregory Tierney

Nominated by the Irish Creamery Milk Suppliers' Association:

Ms. Betty Kehoe
Mr. Ciaran Dolan

Nominated by Macra na Feirme:

Mr. Tom Curran

Nominated by the Construction Industry Federation:

Mr. George Hennessy

Nominated by the Irish Farmers' Association:

Ms. Mairead Lavery
Mr. Michael Berkery

Secretariat:

Dr. Síle O'Connor (Director)
Mr. Joe Larragy (Social Policy Analyst)
Mr. Noel Cahill (Economist)
Ms. Aisling Byrne (Research Assistant)
Ms. Catherine O'Brien
Ms. Jacqui Mullally
Ms. Tracy Curran
Ms. Sinéad Somers

** Dr. Kevin Hannigan served as Economist in the Secretariat until November 1997.*

Contents

	<i>Page</i>
ACKNOWLEDGEMENTS	v
ABBREVIATIONS	vi
 CHAPTER 1: INTRODUCTION	
1. Background to the Report	1
2. Investment and Growth	2
(i) Output	2
(ii) Employment	3
(iii) Evidence From the Irish Economy	4
3. Outline of the Report	6
 CHAPTER 2: INVESTMENT PERFORMANCE AND TRENDS	
1. Introduction	8
2. Investment Performance	9
(i) International Comparison	9
(ii) Comparison with Main Economic Aggregates in Ireland	11
3. Sectoral Analysis	14
(i) Changes in the Capital Stock	14
(ii) Sectoral Performance 1990-95	17
(iii) Incentives and Investment	18
(iv) Investment in Manufacturing by NACE Sector	20
(v) Investment in Services	23
4. Conclusion	26

CHAPTER 3: EXPLANATIONS OF INVESTMENT PERFORMANCE

1. Introduction	29
2. Existence of Funding Constraints	30
(i) Adequacy of National Savings	30
(ii) Access of SMEs to Finance	33
3. International Capital Flows	36
(i) Foreign Investment	36
(ii) Role of the Pension Funds	37
(iii) The Capital Account and the Balance of Trade	40
(iv) Institutional Features	40
4. Changes in Fixed Capital Requirements	42
(i) Capacity Utilisation	42
(ii) Structural Changes	44
5. Risk and Reward	46
6. Conclusion	48

CHAPTER 4: ECONOMETRIC ANALYSIS OF INVESTMENT AND RISK

1. Introduction	49
2. Econometric Analysis of Investment in Manufacturing	50
(i) Basic Equations	50
3. Modelling Risk and Investment	52
(i) Structural Change in the Irish Economy	52
(ii) Measures of Risk	53
(iii) Dynamic Models and Risk	54
4. Conclusion	56

CHAPTER 5: PERCEPTIONS AND MANAGEMENT OF RISK IN IRISH FIRMS

1. Introduction	57
2. Survey on Investment	59
(i) Brief Description	59
(ii) Results for the Total Sample	59
(iii) Disaggregated Results by Sector	61
(iv) Impact of Firm Size	63
(v) Risk, Diversification and Foreign Direct Investment	63
3. Summary of Results	64

CHAPTER 6: SUMMARY OF FINDINGS AND CONCLUSION

1. Main Findings	67
2. Implications of these Findings	69

APPENDIX TO CHAPTER 2	75
-----------------------------	----

APPENDIX TO CHAPTER 5	76
-----------------------------	----

BIBLIOGRAPHY	79
--------------------	----

LIST OF TABLES

Page

Table 2.1	Investment in European OECD Countries	10
Table 2.2	Gross Capital Stock in Manufacturing	16
Table 2.3	Gross Fixed Capital Formation at Constant 1990 Prices . .	17
Table 2.4	Non Agricultural Private Investment and Grants	19
Table 2.5	Net Acquisition of Capital Assets (1993, 1994 and 1995) and Employment Growth in Manufacturing	22
Table 2.6	Employment in Services by Main Sector	24
Table 2.7	Investment in Services	25
Table 3.1	Savings 1980-1996	32
Table 3.2	Manufacturing Industry Equity Requirements	33
Table 3.3	Selected Lending Rates (%).	35
Table 3.4	Net Acquisition of Financial Assets	36
Table 3.5	Capacity Utilisation and Perceived Sufficiency in Ireland and EU (1988-97)	44
Table 4.1	R-bar-squared for Basic and Modified Equations	55
Table 5.1	Risk Perceptions by Sector	61
Table 5.2	Reasons for Foreign Investment	64

LIST OF FIGURES

Figure 2.1	Growth Rates of Gross Domestic Fixed Capital Formation (GDFCF) and GNP at Constant Prices (1960-96)	13
Figure 2.2	Gross Fixed Capital Formation 1960-96	15

ACKNOWLEDGEMENTS

The Council and the Secretariat of the NESC acknowledge the co-operation and assistance of many individuals and organisations in the preparation of this report.

Dr. Ciaran Driver of the Imperial College, London, was commissioned to prepare a report on investment in Ireland. Chapters 4 and 5 of this report are summaries of some of the findings of Dr. Driver's report, although there is some difference in emphasis and some of the conclusions diverge from those identified by Dr. Driver. Dr. Driver's report is available on request from the NESC Secretariat. Chapter 4 is based on a sample survey administered by IBEC and the ESRI. The survey results were collated at the ESRI under the direction of Professor Whelan.

A number of other individuals provided useful information or advice: Gerry Maloney of Forbairt and Dr. Peter Bacon; officials in the Department of Enterprise, Trade and Employment, the Department of Finance, the Central Statistics Office, the Revenue Commissioners, Forfás, Bord Fáilte and Shannon Development. The Council is responsible for the contents of this report.

The administrative staff of the Council's Secretariat - Ms. Catherine O'Brien, Ms. Jacqui Mullally, Ms. Sinéad Somers and, in particular, Ms. Tracy Curran - provided valuable support in the production of the various drafts of the report.

BES	Business Expansion Scheme
EBR	Exchequer Borrowing Requirement
EMU	Economic and Monetary Union
ERDF	European Regional Development Fund
ESRI	Economic and Social Research Institute
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GNP	Gross National Product
IBEC	Irish Business and Employers' Confederation
IFSC	International Financial Services Centre
NACE	General Industrial Classification of Economic Activities in the European Community
NPV	Net Present Value
OECD	Organisation for Economic Co-Operation and Development
SME	Small and Medium-sized Enterprises

INTRODUCTION

1. BACKGROUND TO THE REPORT¹

The rate of growth of GNP and employment in the 1990s has been higher than in any period since the 1960s. This has occurred in a period of consistently low inflation and moderate wage increases. The period has also been characterised by stable public finances, with the Exchequer Borrowing Requirement (EBR) averaging just 2 per cent of GNP in 1991-95 compared to 13 per cent in 1981-85. These factors have led to the conclusion that recent growth is more balanced and sustainable than that observed in earlier periods. However, investment rates, which declined during the 1980s, were low for much of the 1990s. A relatively high savings rate has resulted in financial surpluses in both the household and business sectors. One result is that Irish residents have been acquiring foreign assets rapidly. In the most recent years the rate of investment has recovered: the ESRI *Quarterly Economic Commentary* (December, 1997) is projecting an investment rate of almost 20 per cent of GDP for 1998.

Incentives to increase the level of investment in private sector business in Ireland are a long-standing element of public policy. Although the level of public involvement in the promotion of investment, in fixed capital in particular, could be criticised for being, at times, unsustainable, for example in the late 1970s and early 1980s, it must also be acknowledged that there have been some notable elements of success. Chief among these has been the creation of a modern industrial sector in Ireland, largely as a result of state policy to encourage inflows of foreign direct investment. However, this success has not been properly reflected by developments in Irish indigenous industry, although there are some indications of improved performance since 1994. A number of reports, for example *European Economy* (1996) and the Forfás Report, *Shaping our Future*, have identified the low investment rates of the Irish indigenous sector. These reflect the historically weak output and employment growth as a result of the poor overall competitive position of these sectors but could also constrain future growth.

1. Following discussion by the Council, this report was drafted by Dr. Kevin Hannigan, who was a member of the Council's Secretariat until November 1997. It was subsequently revised and updated by Mr. Noel Cahill.

The conclusion that investment is important for achieving a higher sustainable income is well supported in economic theory and empirical analysis, although some of the main economic theories which underlie the analysis of international growth differ sharply in their conclusions regarding the role of investment in determining the long-run growth rate. Theoretical developments in recent years have increasingly identified the importance of investment in promoting growth and development through spill-over effects. The link between the growth of output and employment growth is less definite, however. Internationally, the data lead to a somewhat ambiguous conclusion. In fact, it can be argued that a higher rate of investment and, in particular, policies to encourage higher investment, could reduce the employment intensity of production overall, and of growth in particular.

The Council's Report No. 94, *The Association between Economic Growth and Employment Growth in Ireland (NESC, 1992)*, explored this relationship in Ireland. The report showed that fears that Ireland had entered a period of jobless growth were not borne out. However, it concluded that greater employment creation in Ireland required an increased rate of growth of output and, more importantly, higher growth in labour intensive sectors of the economy. It identified the need for more balanced growth to overcome unemployment. One result of this finding is that the Council has focused on the importance of stimulating investment in the indigenous and labour intensive sectors of the economy.

The report is designed to answer three questions:

- (i) What are the facts regarding the rate of investment in Ireland?
- (ii) What factors have led to the fall in the rate of investment?
- (iii) Are there implications for the sustainability of economic growth?

2. INVESTMENT AND GROWTH

(i) Output

Economic theory, and to a certain extent, empirical observation, indicate that investment has an important role to play in determining the level of national income and rate of growth in the economy. Investment is important since it creates productive capacity and is also a major component of domestic demand. However, the common assumption of diminishing marginal returns from capital investment means that while the relationship between investment and growth is positive, it is

approaching zero as the capital stock increases, assuming the employed labour force remains constant. As a result, economic theory has generally placed a limit on the role of investment in determining the long-run, growth rate of an economy. Thus, a higher rate of savings and investment can increase the long run level of output, and thus income, but has no effect on the long-run rate of growth in the economy.

Recent research has suggested that the diminishing returns assumption might be unwarranted since investment may improve the technology applied and may create spill-over effects which improve output in related firms. As a result new capital may lead to constant or increasing returns. This has an important implication for the relationship between investment and growth since it will remain strictly positive irrespective of whether the country is in a catch-up situation or not. In other words the rate of growth of an economy as well as its level of output will be positively affected by the rate of savings and investment. For countries still in the process of "catch-up", new capital will embody new technology, postponing the operation of diminishing returns. Therefore, diminishing returns set in only at the technological frontier. So while it is undoubtedly true that an economy can over-invest beyond the point at which further growth will result from extra investment, higher growth is likely as a result of investment for countries in the process of creating a sufficient and modern stock of capital.

Sabel (1994, p.140) summarises the findings of research on this issue as follows. "Many mainstream economists now doubt that markets work to equalise growth rates in all economies. More to the point, they suspect that strength can breed strength and the strong can continue to grow faster than the weak." The implication of accepting this conclusion is that adequate investment in fixed capital and other forms of capital formation is not only a major requirement but, in the absence of severe institutional constraints may be a sufficient requirement for economic growth, even beyond any phase of catch up. However, it should be noted that while this report concentrates on investment in fixed assets, other types of assets have a key role to play in bringing about this result. In addition, empirical testing has not yielded unqualified support for Sabel's view.

(ii) Employment

Quite apart from the role of investment in output growth there is a theoretical debate over the effect of investment on employment. One view could be summarised as stating that net investment which increases the capital stock increases productive capacity and thus employment. Rowthorn (1996) analyses data for a range of OECD countries over the period 1960 to 1992 and concludes that the capital stock has a significant

impact on employment. This is true for the economy as a whole and for the manufacturing sector when disaggregated, but the picture is not so clear in the case of services where investment does not seem to have such an impact on employment. However, no general conclusion can be drawn about the impact of investment on employment independent of its effect on economic growth.

The alternative view suggests that the relative costs of capital and labour are the key variables and, as a result, increased employment requires an emphasis on reducing the unit cost of labour. Merely attempting to improve investment would be likely to reduce the relative cost of capital and thus increase the capital labour ratio of production. This view dominates the work of writers such as Layard *et al* (1991). In their model an increase in investment and the capital stock, with a given labour force, causes the real wage to rise. This induces industry to substitute away from labour and, as a result, although the extra capital stock could increase employment, the effect is offset by the substitution towards more a capital intensive production. This argument can be criticised at the level of the economy as a whole since it assumes that the elasticity of substitution between capital and labour is one. This is arguably very high for the economy as a whole and too high for many industries. If the elasticity of substitution between capital and labour is less than one, unemployment is influenced by the capital stock and while an increase in capital intensity may indeed increase real wages there will also be an increase in employment.

(iii) Evidence From the Irish Economy

An important conclusion of Council's Report on *The Association between Economic Growth and Employment Growth in Ireland*, (NESC, 1992) was that an improved employment performance required not just a higher level of economic growth but a more balanced structure of growth. Specifically it advocated the need to ensure a greater level of growth in employment intensive, mainly indigenous sectors. This has important implications for any conclusion to be reached regarding the relationship between investment and employment creation in the Irish economy.

Much has been written about the unprecedented sustained growth over recent years. One of the most notable features of this growth is that, unlike earlier periods of growth, employment has also grown rapidly. The ESRI *Medium Term Review* (Duffy *et al*, 1997) identifies a broad range of factors which have contributed to this growth. These have included long term factors such as the investment which has occurred in education in Ireland and demographic change as well as medium-term factors such as macro economic stability, relatively peaceful industrial relations, wage

restraint and infrastructural development. It is also notable, and pointed out in the report, that the high rate of growth of output and, subsequently, employment has taken place against a background of a number of years of declining and relatively low investment by the private sector in productive capacity. As a result, the topic of debate has moved from the previous jobless growth to analysis of the ability of employment to grow in the absence of investment. 'While investment is estimated to have picked up strongly in 1996/97, this slow growth in physical investment in the 1990s, at a time when output was growing strongly, has focused some attention on a so called investmentless growth phenomenon.' (Duffy *et al*, 1997 pp. 41-42).

European Economy (1996) also notes the low rate of investment. It is extremely concerned about low investment by the indigenous sector despite the strong growth which has occurred. It points out that:

- Ireland's investment rate as a proportion of GDP is one of the lowest in the EU;
- Net capital stock² as a proportion of GDP is the lowest in the EU;
- Despite the restructuring which has taken place and high productivity rates in the foreign owned sector, capital intensity, defined as net capital stock per employee, is among the lowest in the EU.

This report agrees with the ESRI *Medium-Term Review* in assigning a major role to human capital formation and to new technologies being introduced. However, the Commission concludes that the rate of investment in physical capital needs to grow substantially to rates comparable to other member states. It points out that the potential exists for investment to continue to grow as a result of the high savings rate, infrastructural developments which are ongoing, and the large balance of trade surplus, but remains concerned that a substantial proportion of domestic savings is invested abroad rather than at home. It concludes that: "while this may be understandable in the case of a country enjoying full employment and capacity constraints, it is a notable weakness for a country with a major unemployment problem and a low investment ratio as is the case in Ireland" (p.70).

Kenny (1996), in an examination of the sources of economic growth in Ireland found that 'strong employment growth tends to be associated with strong capital accumulation' (p.46). He identifies a close association

2. The net capital stock is the market price which the working capital stock could command. The gross capital stock assumes that working capital retains its full productive capacity, and therefore its full value, for its working life and then fully expires. The net capital stock is thus the gross capital stock less financial depreciation.

between the performance of both in various periods and concludes that 'a measure of complementarity in production exists between capital and labour at the aggregate level'. He concludes that this underlines the importance of macroeconomic stability and low interest rates, as opposed to relying on labour market adjustments, to reduce unemployment. This is much closer to the view of Rowthorn than the conclusions of Layard *et al.* In summary, increased investment is more likely to promote than threaten employment.

These reports point to a number of areas which must be clarified. First, it is necessary to ascertain in more detail the precise nature of the investment in physical capital which has been occurring in Ireland. Second, it is necessary to attempt to clarify further the structure of growth which has been taking place and, if possible, to try to identify in more detail the relationship between investment and employment creation on a sectoral basis. Finally, some further thought needs to be given to the extent to which structural change in the Irish economy, which has also been observed in other economies, means that previous experience of the relationship between investment and growth is no longer relevant.

3. OUTLINE OF THE REPORT

Chapter 2 begins by identifying the trend in the rate of investment in Ireland. It compares Ireland with a number of other European countries and compares performance during the 1990s with the investment which took place in earlier decades. Aware of the major differences which exist between the various sectors of the Irish economy, Chapter 2 also looks at investment on a subsectoral level and identifies a number of important differences between the various sectors. While it is clear that there has been a major change in the rate of investment, this change must be placed in the context of an economy which has undergone substantial restructuring.

On the basis of the changes which have taken place, Chapter 3 suggests a number of possible explanations for the decline in the rate of investment. Similar but more moderate declines have been observed in many countries. These are generally related to changes in the technology of production. In addition, however, the clear divergence between the level of savings and the rate of investment in Ireland requires comment. In general, research on the determinants of the rate of investment has focused on the impact of the relative costs of capital and labour and changes in demand. Research has also included the impact of changes in profitability and the effect of risk on investment decisions. Chapter 4 presents the results of an econometric analysis of investment, undertaken

by Dr. Ciaran Driver, to discover the relative importance of these variables. A variable representing risk, based on the volatility of economic indicators in Ireland in the period up to 1990, is constructed and equations estimated.

While the aggregate risk variable is found to be relevant as a determinant of the rate of investment, this analysis is insufficient to fully explain investment patterns due to the differences which exist within the economy. Chapter 5 presents the results of Dr. Driver's survey of firms in Ireland to uncover features of the perception of risk, how this varies between firms in different sectors and by size of firm and to uncover the impact of these perceptions on the investment decision. Dr. Driver's results show that clear differences exist between firms according to ownership, size and sector in which they are engaged. The final chapter presents the summary of the findings of this report and the Council's conclusions regarding the observed trend in investment and the likely impact of this trend on growth.

INVESTMENT PERFORMANCE AND TRENDS

1. INTRODUCTION

This chapter gives an overview of the performance of investment in the Irish economy. It provides long-term data to show the trend in investment since 1960 and then concentrates on disaggregated analysis to identify differences in the performance of investment in various sub-sectors of the economy. The long-term data show change in the performance of the rate of investment and other principal economic aggregates. As mentioned in the first chapter, there is some disagreement concerning the relationships between investment growth and employment creation. However, it appears likely that a positive relationship will continue to exist between investment and growth and that, given the particular structure of the Irish economy, a positive relationship exists between investment and employment creation although these relationships could change over time. This is particularly the case in Ireland given the wide swings in economic performance and the substantial economic restructuring which has occurred in recent decades.

Section 2 of this chapter identifies aggregate investment performance in Ireland on three measures. First, it draws on work by the European Commission to compare investment rates and the capital stock in Ireland with other European countries. Second, it provides a time series on the growth of investment and GNP and shows the trend in investment as a proportion of output in Ireland. Third, it identifies the trend in the capital stock in Ireland and compares this with employment in manufacturing. It should be noted that there are major measurement difficulties in relation to the capital stock and that problems may arise with the comparability of international data.

Although this aggregate analysis suggests particular conclusions, it is not necessarily the case that conditions are similar across all sub-sectors of the economy. Section 3 provides data on recent performance of various sub-sectors. It analyses investment in manufacturing for various sub-sectors and identifies important differences between the performance of investment in sectors which are largely Irish-owned and those dominated by FDI. It also draws on data from investment in services and suggests the importance of taking into account the continuing restructuring of the Irish economy and, in particular, the growth and importance of the service sector, before reaching any conclusions on the implications of the aggregate trends observed.

2. INVESTMENT PERFORMANCE

(i) International Comparison

Investment in fixed capital in Ireland over the period since 1980 has been extremely volatile. This is not unique when compared to other small European countries, but the volatility in Irish investment rates has been combined with a particularly low average growth rate. (OECD Economic Outlook, 1996). O'Grada & O'Rourke (1995) also express concern that the Irish rate of investment over a long period was less than what might be expected when compared to other European countries, particularly since Ireland was in a period of catch-up. In addition, they point out that the quality of much of the investment in Ireland in earlier years was poor and that public policy possibly resulted in substantial misallocation of factors and resources.

European Economy (1996) noted that along with having one of the lowest investment ratios in the EU, Ireland also had the lowest capital stock as a percentage of GDP in the EU and the lowest capital intensity of production. The data show that an index of the capital stock in Ireland as a proportion of GDP, with 1960 equal to 100, had declined to 85.5 by 1996. In every other country of the EU the index exceeded 100 and stood at 112.7 for the EU as a whole. Among the cohesion countries the increase is generally well above the average, the exception being Spain. One reason for this relative decline in the case of Ireland, a decline which has become much more evident during the 1990s than in earlier decades, is undoubtedly the rapid growth in GDP in Ireland during the 1990s. Since GDP is a measure of output, which considerably exceeds GNP in Ireland, it is arguable that the such a comparison is inconclusive. However, given Ireland's relatively low capital stock at the beginning of this period it does raise a number of questions.

In the five years up to 1994, the share of investment in real output in Ireland fell more than in any OECD country outside the Scandinavian Bloc (OECD, *Main Economic Indicators*, December 1996).¹ Detailed international comparisons are difficult because of differences in the industry mix across countries and because of differences in definitions. Furthermore, conclusions should only be drawn with reference to the stage of the economic cycle in each country in these years. However, it appears that business investment in Ireland as a ratio of business value added fell below the OECD average level in the mid to late 1980s. This should be seen in a context were the investment ratios of all major OECD

1. However, with the recovery in investment, this was not the case for the 5 years up to 1996, as shown in Table 2.1.

countries have been in decline, falling about 3 percentage points since the 1960s.

The investment performance in Ireland in the 1990s is compared with a range of other OECD countries in Table 2.1. This table shows that the rate of investment as a percentage of GDP in 1996 was towards the middle of the range of European OECD countries. The (unweighted) average for these countries was 18.5 per cent in 1996, so the Irish figure (17.2 per cent) was somewhat below average. In earlier years, the figure for Ireland was below most other European countries.

TABLE 2.1
Investment in European OECD Countries

	% of GDP (1996)	Annual Percentage Change* 1991-1996
Ireland	17.2	-1.0
Austria (1995)	23.8	1.0
Belgium	17.3	-0.9
Denmark	16.7	-0.3
Finland	16.1	-5.6
France	17.4	-2.5
Germany	20.6	-1.2
Greece (1995)	17.0	-0.8
Italy	17.0	-2.4
Netherlands (1995)	19.4	-0.9
Norway	20.5	-1.2
Portugal (1995)	23.7	0.4
Spain (1995)	20.6	-2.2
Sweden	14.8	-5.7 (1995)
UK	15.5	-0.8

Note: *The figures under this heading indicate the average annual percentage growth of the ratio of gross fixed capital formation to GDP over the previous 5 years.

Source: OECD, *Main Economic Indicators*, December, 1997.

Economic theory and international evidence would suggest that investment will generally be higher among catch-up countries. Among the cohesion countries of the EU, to which Ireland is often compared, the rate of investment in Ireland appears particularly low. Although, direct comparisons may not be valid due to the unique industrial structure in the Irish economy, the fact that these rates of investment occurred in Ireland at the time of very rapid growth in the economy, well above rates in most other European countries, raises questions concerning the economic impact of investment and the adequacy of recent investment rates to sustain growth.

(ii) Comparison with Main Economic Aggregates in Ireland

Growth Rates of Investment and GNP

The rate of investment will be determined by a range of factors. Some of these are discussed in the next chapter and analysed further in subsequent chapters. Most data series on investment in developed countries show two features. The first feature is long-term decline. A number of explanations for this trend have been put forward, the most relevant of which are discussed in Chapter 3 in the Irish context. The second notable feature is the volatility of growth rates of investment when compared to other principal economic aggregates. This is not altogether surprising since investment is not a stationary concept but is the first difference of the capital stock. The growth rate of investment is the second difference of the capital stock. Figure 2.1 clearly shows the volatility of this series since 1960.

The difference in the relative growth rates of investment and GNP before and after 1980 is notable. In most years before 1980, investment grew at a rate close to, or greater than, GNP in most years. The only exceptions are 1960, 1966, 1970 and the post-oil crisis years of 1974 and 1975. These were also the only years in which investment declined in real terms. From 1982 on, the picture is rather different. The growth of investment was negative and less than GNP every year from 1982 to 1993 with the exception of 1989 and 1990. Indeed, for any five year period from the early 1980s to 1994 average investment growth was substantially less than GNP growth, and was negative in any period which does not include 1989 and 1990.

The high rates of investment in Ireland in the early 1980s may have been unsustainable due to the size of the public deficits which accompanied them. However, the rate of investment declined substantially in the 1980s and, following growth in 1989 and 1990, has continued to decline until 1993. Irish output has been growing at a rate which has exceeded the

growth of the capital stock over a long period, particularly during the 1990s. This performance indicates a substantial correction has occurred, but also leads to questions regarding the role of investment in growth. The situation has changed somewhat since 1994 and the growth of investment in last couple of years substantially exceeds the growth of GNP. It remains to be seen whether or not this indicates a substantial change in the trend or is simply a continuation of the volatility which has characterised this series. The main question which arises is whether or not the investment performance has been adequate to sustain recent economic growth. The conclusions presented in *European Economy* (1996) and Forfás (1996) suggests concerns over this adequacy. The alternative interpretation, that there is not a major problem, argues that the previous experience of high rates of investment in the early 1980s and the changes which have occurred in the Irish economy mean that earlier trends do not give a good indication of future requirements.

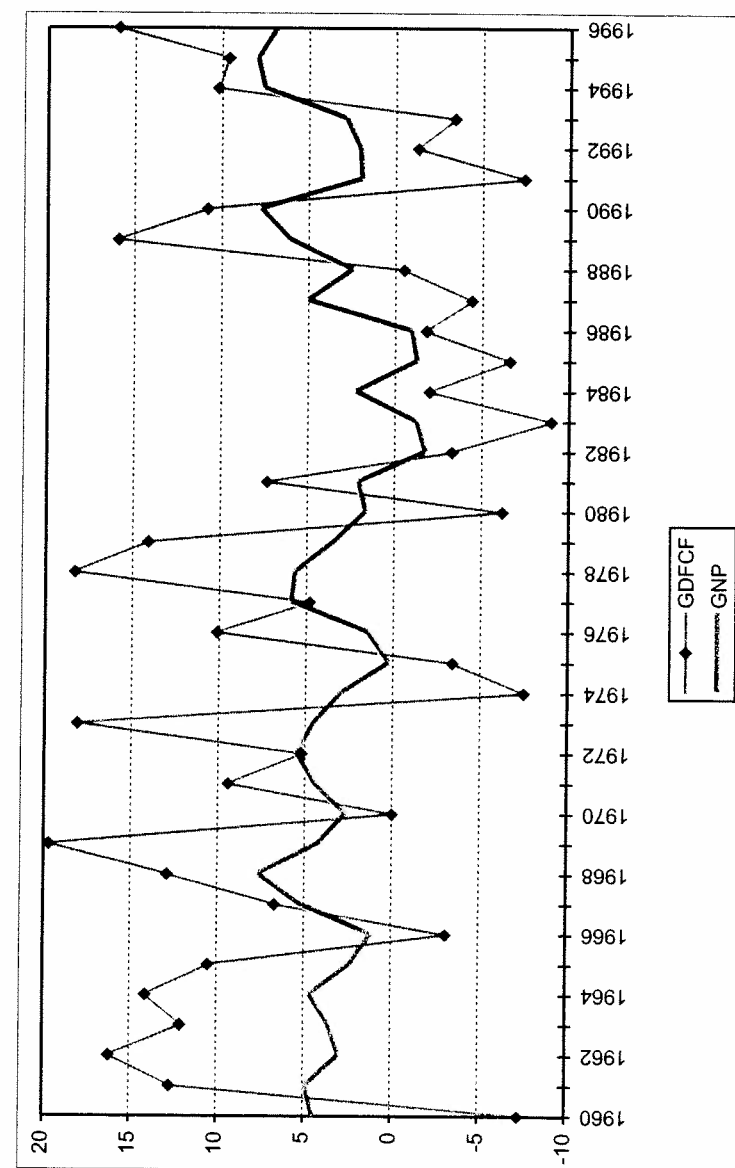
Public investment as a per cent of GDP has been fairly constant during the 1990s. Over the period 1990 to 1993 expenditure on housing amounted to just over 26 per cent of total investment, road construction accounted for just over 4 per cent and other building and construction for 27.7 per cent. Purchase of machinery and equipment accounted for the remaining 41 per cent of total investment. However, as GDP has begun to grow rapidly, the proportion accounted for by expenditure on gross capital formation in the private sector has declined by about one third between 1990 and 1994. This has recovered since 1994.

There are two general explanations for these patterns. The first is that the changes in the Irish economy mean that output can be increased with substantially less investment in fixed capital. The second possibility is that experience has differed substantially between sub-sectors and that the increase in output has been as a result of a strong performance in a limited number of sectors where investment has been maintained and which, at least in the years up to 1994, were not typical of performance across the economy in general.

Investment as a Proportion of GDP

One of the most striking features of the performance of investment over the past decade has been its long-term decline as a proportion of GDP. This is shown in Figure 2.2. However, Figure 2.2. also shows the importance of putting this trend in context. Even before account is taken of the major changes which have occurred in the Irish economy and the observation that investment as a proportion of GDP has been declining in most OECD countries, it is clear from this figure that investment over the past decade had declined to a level somewhat similar to that which existed

FIGURE 2.1
Growth Rates of Gross Domestic Fixed Capital Formation (GDFCF) and GNP at Constant Prices (1960-96)



before the 1970s. Investment rose in the early 1970s as rising inflation made real interest rates negative in many circumstances. This rise was boosted in the late 1970s by public sector deficits which eventually proved unsustainable. Investment exceeded 25 per cent of GDP in almost every year from 1974 to 1982. Much of the high investment of these years was a direct result of public investment funded by foreign borrowing and a result of the stimulus this gave to the economy. This rate declined rapidly in the early to mid-1980s as public investment fell. Thus, the long-term decline since 1980 may be a correction from the historically high levels which existed in the late 1970s and early 1980s.

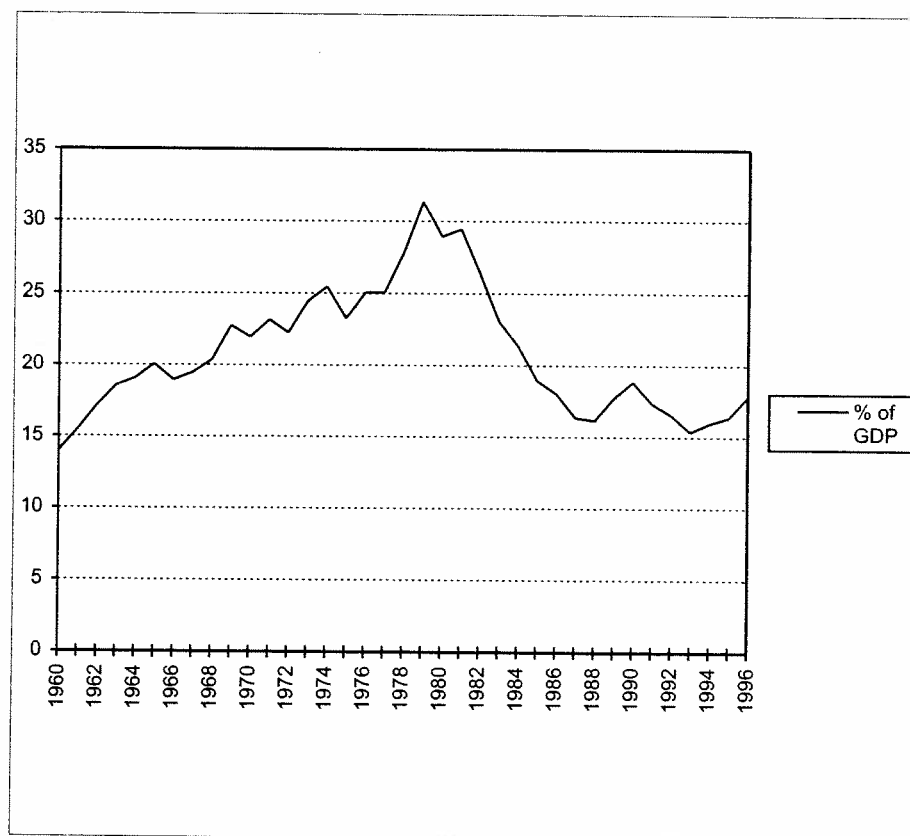
3. SECTORAL ANALYSIS

(i) Changes in the Capital Stock

Recalling the differences between the rate of growth of investment, the rate of investment and the capital stock, knowledge of the growth rate of investment tells us little regarding what is happening to productive capacity. The picture is complicated not only by the need to identify net investment in order to remove the effect of depreciation, but also since capital productivity can change. To obtain an indication of productive capacity, it is necessary to determine what is happening to the capital stock. However, this gives no indication of changes which may be happening in the relationship between the capital stock and growth as a result of changes in the labour force, changes in human capital or other productivity factors.

Some information on the capital stock in the Irish economy is available as a result of the work of Henry (1989). The method used by Henry - the Perpetual Inventory Method - calculated a starting value for the capital stock in various sectors of the economy in 1950. Henry estimated the stock for three types of capital: buildings and land, machinery and vehicles. Subsequent years' capital stock was found by applying a multiple to each previous year, the value of which was found from disaggregation of national accounts figures for gross domestic fixed capital formation. Including an appropriate assumption for the working life of capital, and then subtracting the value of each piece of capital after the appropriate number of years, provides an estimate for the gross capital stock in the economy. All prices were re-based to 1980. Henry's work has been updated recently by Denny and Guiomard (1997). Table 2.2 contains these updates along with the annual percentage growth of the capital stock.

FIGURE 2.2
Gross Fixed Capital Formation 1960-96 (% of GDP)²



2. GDP, rather than GNP, is used in the calculation of this figure. As argued in European Economy (1996) the total for investment includes FDI but GNP excludes much of the output generated from this investment, which appears in the form of repatriated profits. Expressing investment as a percentage of GNP would therefore give a misleading picture by overstating the proportion of expenditure on capital formation. This would be particularly important in the case of international comparisons but is also relevant in identifying time series trends, due to the growth in importance of the foreign sector in the period under consideration and cyclical changes in the level of FDI inflows.

TABLE 2.2
Gross Capital Stock in Manufacturing

	Capital £m (1980 prices)	Stock Growth (%)
1987	8793	3.6
1988	9062	3.1
1989	9366	3.4
1990	9735	3.9
1991	10059	3.3
1992	10343	2.8
1993	10610	2.6
1994	10802	1.8

Source: Denny and Guiomard (1997).

This table shows that the rate of growth of the capital stock in manufacturing did indeed decline in the early 1990s. The important point however is that it continued to grow at a positive rate. In other words, net investment remained positive. As a result, irrespective of what may have been happening regarding productivity factors and human capital in the Irish economy, productive capacity, that is, the physical capital stock in manufacturing, continued to grow, in real terms, throughout the 1990s.

Capital Stock and Employment Growth in the 1990s

The capital stock grew by 11.0 per cent in real terms between 1990 and 1994. In the same period, GNP grew by 16.8 per cent, employment in manufacturing increased by 3.1 per cent and total employment by 4.2 per cent. Thus, over this period the capital stock grew at a much faster rate than employment in manufacturing and in total. Employment in services grew at 10.4 per cent. This indicates that, for the manufacturing sector in aggregate in the 1990s, there is no evidence of investmentless growth, although the reasonably steady growth in the capital stock is not matched by the much more volatile performance of employment growth. This should not be totally unexpected, of course, since a certain amount of flexibility, in terms of movements between part-time and full-time employment and changes in overtime, means that employment figures do not necessarily track output or other factor input growth figures.

Explaining the observed slowdown in the 1990s in the rate of growth of the capital stock is difficult, particularly given the way in which these figures are compiled. The rate of return on capital invested in Ireland, as

measured by the OECD, rose consistently after 1987. This is projected to increase further, approaching 16 per cent by 1998, a rate which would be equivalent to that elsewhere in the OECD. The evidence also shows that the rate of return on capital employed in this period exceeded the rate of depreciation of the industrial capital stock by a substantial and increasing margin. Thus, changes in the return to capital do not appear sufficient to explain the changes in the rate of investment observed.

(ii) Sectoral Performance 1990-95

Table 2.3 breaks down expenditure on gross fixed capital formation by sector of use and compares expenditure in 1990 and 1995 at constant prices. The table shows that expenditure on investment grew by 5.2 per cent in real terms over this period, a much slower rate than the rate of growth of GDP which amounted to 27 per cent between 1990 and 1995.

TABLE 2.3
Gross Fixed Capital Formation at Constant 1990 Prices (£m)

	Machinery and Equipment		Buildings		Total	
	1990	1995	1990	1995	1990	1995
Agriculture	334	323	244	157	578	480
Manufacturing	691	525	183	253	874	778
Construction	118	105	0	0	118	105
Private Services	883	771	724	665	1607	1436
Private Non-Residential Total	2026	1724	1151	1075	3177	2799
Public Services	141	162	335	398	476	560
Housing	-	-	1073	1611	1073	1611
Total	2167	1886	2559	3084	4726	4970
Percentage Change 1990-95	-13.0		20.5		5.2	

Note: Agriculture includes the mining industry.

Private Services includes distribution, wholesale, retail, banking, financial, professional and other services. Investment by Telecom Eireann and by CIE in equipment is included in distribution.

Public services includes electricity, gas and water, public authorities, health education but excludes residential construction.

(Deflator used: 1990 = 1995 / 1.17. Source: CSO).

Source: CSO.

Closer examination of the table shows, however, that private non-residential investment fell in real terms over this period and that all of the increase was accounted for by increased investment in public services, which grew by just under 18 per cent in real terms, and a large rise in residential investment, which increased by just over 50 per cent in real terms. Investment in public services grew between 1990 to 1995 at a slower rate than the growth of GNP, when inflation is accounted for, but investment in residential development was growing over this period at approximately twice the rate of real GNP.

Table 2.3 breaks down investment in private non-residential investment into four major sectors. The service sector - it should be noted that this includes some investment in publicly owned distribution services - accounted for just over 51 per cent of total investment, manufacturing about 28 per cent, agricultural investment about 17 per cent and investment by the construction industry accounting for just under 4 per cent of the total in 1995.

The table shows that investment in all four major sectors of private industry declined, not only as a proportion of GDP but in absolute terms, when inflation is accounted for, over the period 1990 to 1995. The main decline took place in the earlier part of this period, which followed quite rapid growth of investment in the years 1989 and 1990 and a long decline of the mid and late 1980s. All sectors have recovered since 1994. The greatest decline over the period was experienced in agriculture which fell by 17 per cent with manufacturing and services both falling by close to 11 per cent, giving an overall decline of almost 12 per cent. These data indicate that the trend in investment in fixed capital formation in Ireland in the 1990s is mainly a result of the private non-residential sector with all of the major sectors of private industry experiencing initial declines and a partial recovery in later years.

(iii) Incentives and Investment

Research over the years has suggested that an incentive exists in Ireland, because of direct incentives and as a result of the tax system, which leads to a bias in favour of more capital intensive development (EC, 1991). Table 2.4 details non-agricultural private investment and grants during the 1990s. Construction of a table such as this presents particular problems because data from a number of different sources must be used. As a result, the conclusions arrived at are indicative of magnitudes only. Total investment under Forfás aided companies amounted to about £1.5 billion over this period which is similar to the estimate for total investment in the tourism industry since 1990. The annual figures for Bord Fáilte given in this Table are estimates since grants payable by Bord

Fáilte are calculated only on the basis of three year programs. In addition, Bord Fáilte grant aided investment accounts for only about 60 per cent of the investment which is grant aided in the tourism industry. A further proportion of grants to tourism enterprises is included in the Shannon Development figures.

TABLE 2.4
Non-Agricultural Private Investment and Grants (1990-96) (£m)

	1990	1991	1992	1993	1994	1995	1996
Total Private	2598	2437	2322	2383	2395	2714	n.a
Forfás (Irish)	88	76	72	63	65	70	128
Forfás (Foreign)	122	229	213	251	200	229	346
Shannon Development (Irish)	21	23	10	26	21	44	19
Shannon Development (Foreign)	8	22	21	4	28	54	23
Tourism	273	273	273	273	179	179	179
BES (year ends in April)	79	61	61	21	25	52	77
CEB	-	-	-	-	5	14	13
Other (calculated as residual)	2007	1753	1672	1745	1872	2072	n.a

Note: Tourism includes grants administered by Bord Fáilte and other sources under the Operational Programme, excluding Shannon Development. It also includes grants administered under LEADER Programmes, INTERREG and Agri-tourism schemes but excludes BES, subsidised loan capital and renewal schemes. Investment under these amounted to almost £ 550m. in 1989-96.

Source: CSO, Forfás, Shannon Development, Bord Fáilte and Department of Finance.

The category labelled 'other investment' is not an estimate of investment which has taken place in the absence of any state aid, for two reasons. First, this category includes investment which has been grant aided from sources other than those listed above. The 'other' category also includes investment by Telecom Eireann and CIE in transport equipment and investment by firms which may have benefited from venture capital schemes operated by the Department of Enterprise, Trade and Employment. Second, many other types of incentives exist in addition to grants, in particular those associated with the tax system, but do not fall under the heading of the BES.

It is likely that much of the investment in the 'other' category, as well as that which is listed elsewhere in the table, is assisted by provisions in the tax laws. Despite these provisions, however, the size of the 'other' category, which accounts for about 75 per cent of the total private non-agricultural investment over this period, would indicate that investment by firms which is not grant aided is the key category for examination to discover the determinants of the trends observed in investment in fixed capital in the economy during the 1990s. This suggests that the firms of most interest for examination are established Irish firms serving the local market. This is not to suggest that the level of investment by foreign firms is in any sense unimportant, since they constitute such a large part of employment in Ireland. In addition, investment by such firms results in indirect effects, either through the multiplier or other routes, which can impact substantially on the investment decisions of Irish firms.

(iv) Investment in Manufacturing by Sector

The EU business surveys provide information on the performance of investment broken down into a number of broad industrial sectors. These are basic materials, metallurgical industries, equipment, processing and food industries. At this level of disaggregation, the annual figures for the change in investment show huge volatility for Ireland. This is not unexpected given that a major investment by a single foreign company in a particular narrow sector in one year can increase the total investment for that sector substantially. Over the period 1989 to 1996 however, the survey returns indicate that investment performance in these broad sectors has differed substantially. In terms of value, investment across all manufacturing industries approximately doubled in this period. This was driven by above average performance in basic materials and equipment and, in particular, by the sector classed as metallurgical industries, where investment in 1996 may have been as much as ten times as great as in 1989. In the processing and food industries on the other hand, investment in Ireland in 1996 was lower in value than in 1989 and considerably less when allowance for inflation is made. It is well known that foreign direct investment in the Irish economy is concentrated in a couple of sectors which, in the classification used by the EU, would place pharmaceuticals under basic materials and the computer industry under metallurgical industries and equipment goods. The processing and food industries are predominately Irish-owned.

Census of Industrial Production

The annual CSO Census of Industrial Production (CIP) collects information on the annual value of fixed capital formation in Irish and foreign manufacturing industry located in Ireland. A big advantage of the CIP is the extent of disaggregation available into NACE (General Industrial Classification of Economic Activities in the European Community) two and three digit sectors. In addition, information is collected on ownership and a broad range of variables connected with firms. The main disadvantage of this source has, in the past, been its poor timeliness, with the most recent full census, published in 1997, being 1995. In addition, from 1993, the census is based on the revised NACE classifications which means that the sub-sectoral totals cannot be compared to earlier years. Other CSO sources, for example sub-sectoral levels of employment, provide more recent data, but continue to use the original NACE classifications. The Census of Industrial Production does not provide universal coverage of all employment in manufacturing and, in fact, the total employed in firms covered by the census, which stood at about 227,000 people in 1994, is only about 70 per cent of total employment in Irish manufacturing industry as estimated by the 1994 Labour Force Survey. However, the availability of data on employment and net additions to capital assets, considerably disaggregated and broken down between Irish and foreign firms, illustrates some important features.³

As identified earlier, 1994 was the year in which the aggregate rate of investment began to recover. However, in the firms covered by the CIP the value of investment actually fell from £1,163 million in 1993 to £1083 million in 1994. Employment in these firms increased by about 5,500 to 205,000 while net output increased by 13.7 per cent to £13.3 billion. In 1995 total investment in CIP firms increased substantially, by over 18 per cent. At sectoral level there tends to be large year-to-year fluctuations in investment, so it is difficult to draw any conclusions on changes over a short period. Total investment in the four predominantly foreign owned sectors (NACE classifications 223, 24, 30 and 31-33)⁴ declined by almost 18 per cent on 1994, but there was a large increase in investment of over 32 per cent in these sectors in 1995. The data also indicate an increase in investment in Irish-owned manufacturing in 1994 and 1995. In those

3. The NACE sectoral divisions used in subsequent paragraphs broadly correspond to those used by the CSO in its publications but some further aggregation has been done to summarise sub-sectors where no great differences between sectors are evident. Definitions of these NACE codes are given in the Appendix to this chapter.

4. The definitions of the NACE classifications are given in the Appendix for this chapter.

sectors in which over 50 per cent of employment is in Irish owned firms, investment increased by 9 per cent in 1994 and by 18 per cent in 1995.

Investment per person employed was considerably higher in three of the four predominantly foreign owned industries in 1993 and 1994 compared to other industries and was higher in all four of these sectors in 1995 (Table 2.5).

TABLE 2.5
Net Acquisition of Capital Assets (1993, 1994 and 1995)
and Employment Growth in Manufacturing

NACE	Net Acquisition of Capital Assets Per Person Employed £000			Employment Growth (%)		
	1993	1994	1995	1993	1994	1995
Mainly Irish-Owned Sectors						
15-16	5.6	6.3	5.1	7.6	8.1	2.9
17-20	2.3	2.2	2.1	12.3	11.1	-0.1
21	3.0	4.1	1.6	7.1	9.8	5.4
221-222	2.8	1.7	2.2	8.2	4.7	-0.9
25-29	2.3	2.9	3.7	7.1	8.4	4.1
34-35	1.9	1.3	2.5	7.9	4.7	24.9
36-37	3.3	3.4	3.8	9.4	9.4	6.3
Mainly Foreign-Owned Sectors						
223	9.8	7.4	12.0	3.2	1.9	31.8
24	18.1	14.8	15.0	11.1	8.0	4.0
30	28.6	17.3	9.9	27.5	17.7	40.8
31-33	3.5	5.1	8.0	8.3	11.5	12.6
Total						
15-37	5.8	5.3	5.8	9.9	8.1	7.3

Note: Sectors are classified as mainly Irish-owned if over 50 per cent of employment is in Irish-owned firms, while the remaining sectors are classified as foreign-owned. Definitions of NACE sectors are given in the Appendix.

Source: Calculated from CSO, *Census of Industrial Production* 1993, 1994 and 1995.

This table clearly shows that the sectors dominated by foreign firms differ from those in which Irish firms are most important in terms not only of growth but also regarding the rate of capital acquisition. However, there has been quite strong growth of investment in indigenous sectors in 1994 and 1995. Given the improved performance of the main economic aggregates in the Irish economy in 1994 and the increase in demand, this would suggest that demand is a key determinant of the rate and level of investment by Irish-owned firms. This issue is returned to and further explored in Chapter 4 below.

It is interesting to note the correspondence between investment per person employed and employment growth in subsequent years in this table. Both these figures are highest in the predominantly foreign-owned sectors with only NACE 15-16, which includes the food industries, showing substantial investment per person without employment growth.⁵ This close correspondence between investment and employment growth is important in terms of assessing the overall role of investment in growth. Data from the CSO Survey of Industrial Employment, reclassified to be compatible with these revised NACE categories, show a continuation of this trend up to 1996.

(v) Investment in Services

The 1997 Labour Force Survey shows that employment in service firms had grown by around 31 per cent since 1987, which is similar to the growth rate of 29 per cent in industry (including building) while there was a decline of employment in agriculture. Services have accounted for 66 per cent of the total growth in employment since 1993 and now account for just over 61 per cent of total employment up from 57.5 per cent in 1987. Table 2.6 shows employment and employment growth since 1987 in the major service sector classifications of the Labour Force Survey.

This table shows that the most rapid growth has been in personal services which has grown by over 67 per cent since 1987. The two largest classifications, commerce, insurance and finance - which broadly equate to business services used in other CSO surveys - and professional services, which together account for over 500,000 employees, have grown by 31.3 and 67.2 per cent respectively. Employment growth in public administration was just over 4 per cent from 1987 to 1997.

5. The level of investment declined in this sector in 1995.

TABLE 2.6
Employment in Services by Main Sector (000's)

	1987	1990	1993	1997	Growth (%) 1987-97
Commerce, Insurance & Finance	214	226	244	281	31.3
Transport, Communication & Storage	66	68	69	84	27.3
Professional Services	193	193	209	238	23.3
Personal Services	64	69	80	107	67.2
Public Administration & Defence	71	65	67	74	4.2
Total	608	621	669	784	28.9

Note: A miscellaneous 'other' category is not included in the Table, so the total in the Table differs slightly from the overall figure for services in the text. Some employment in transport and communication is in public companies.

Source: CSO *Labour Force Survey*.

Service sectors are not covered by the Census of Industrial Production but some information is available on investment in services from the CSO's Services Inquiry which has taken place since 1988. This survey has covered the retail and wholesale distribution services annually since 1991 and covers three other broad categories of services - hotels and catering, business services and a miscellaneous grouping of ten service industries - on a rotating three year basis.

Part-time employment is important in some service sectors and the CSO Annual Service Inquiry gathers information on the numbers of part-time and full-time employees. Table 2.7 aggregates the various sectors covered in the service inquires into five major divisions, excluding the public sector. Total employment in these sectors accounts for about 250,000 people. Table 2.7 assumes that part-time employees are equal to 0.5 of a full-time job and recalculates the numbers employed in services accordingly. The service sector is extremely diverse and value added per person working in this sector varies considerably. For the five sectors identified in Table 2.7, value added in 1994 was equal to approximately £12,000 per person in hotel and catering, £19,000 in retailing, £25,000 in

personal services, £27,000 in business services and just over £36,000 in wholesaling. These figures for value added per employee are comparable to those in manufacturing sectors which are predominately Irish owned, with the exception of the hotel and catering figure. Almost no information is available on the capital stock employed in service sectors in Ireland but Table 2.7 presents some information on investment ratios in services for comparison with manufacturing.

TABLE 2.7
Investment in Services (1994 unless stated)

	Per Person Employed £ 000	As % of Value Added
Hotel & Catering	1.5	12.9
Wholesale	2.6	7.2
Retail	2.4	13.1
Business Services (1992)	1.9	7.3
Personal Services (1993)	2.8	11.2

Source: Calculated from CSO *Annual Services Inquiry*, various years.

In Table 2.7 investment is calculated simply by subtracting the figure for the disposal of assets from the figure for the gross acquisition of assets. Although it is arguable that this may not be technically sufficient to fully account for depreciation, it is similar to the definition of investment derived from the CIP and used in Table 2.5 and not unlike the methodology applied in the derivation of gross capital stock figures used earlier in this Chapter. Table 2.7 shows that, although services have generally been thought of as not being capital intensive - and indeed the rapid growth of service employment, in line with the output of the service sectors over recent years appears to confirm this when compared to the much slower growth of manufacturing employment compared to manufacturing output - the figures in Table 2.7 for investment per person employed are quite close to the figures in most of the predominately Irish owned sectors in Table 2.5. The exception to this is the hotel and catering sector where the figure is somewhat lower. It is possible that the adjustment made to total employment figures to account for part-time employment may not be sufficient to account for the widely observed high rates of part-time, casual and seasonal employment in this sector.

Investment as a per cent of value added in these service sectors compares very well to this measure in manufacturing. In fact, the figure for

investment as a percentage of value added for hotel and catering, retail and personal services exceeds the figure for investment as a percentage of net output for total manufacturing in 1994 of 8.1 per cent (1994 *Census of Industrial Production*). These figures suggest that investment in service sectors in Ireland has been buoyant when compared to Irish manufacturing and that the capital stock in service sectors has grown with the rapid growth in employment and output of the sector. This is in line with expectations given the generally accepted low substitutability of factors which exist in many service sectors.

In the absence of reliable estimates of the capital stock in services it is difficult to reach a definite conclusion regarding the extent to which 'investmentless growth' might be a phenomenon in this sector. The data presented in these tables would suggest that investment has been quite buoyant in services. This is further confirmed by data from Forfás which shows rapid growth of investment in internationally traded services. Without wishing to overstate this conclusion, it would suggest that, once again, the problem of a low rate of investment in the Irish economy existing simultaneously with a high rate of output growth, is a statistical artefact, emerging from the historically poor performance of Irish owned manufacturing industry, and the rapid growth of the service sector where the capital labour ratio may be different than in manufacturing, rather than a general phenomenon for the economy as a whole.

4. CONCLUSION

This Chapter has investigated the performance of investment in the Irish economy by disaggregating, in as far as possible, the data on investment, employment and output. The rate of investment for the economy fell from 1979 until 1988 and during the 1990s it has been low by international standards. There has been a recovery of investment since 1994 but the 1996 OECD figures still show that investment as a percentage of GDP is somewhat below the average for European OECD figures. However, the capital stock has continued to grow faster than employment. A more disaggregated analysis indicates that performance differed considerably depending on the sector in which it has taken place and the type of capital put in place. The data suggest that while the relationship between investment and output, even in narrowly defined sectors, may be affected by productivity factors and changes in capacity utilisation, the sectors in which output and employment growth has been strongest have also seen quite buoyant investment over recent years. On the other hand, a large part of Irish owned industry has performed poorly in terms of all three variables although there has been recent improvement. The division between Irish and foreign owned sectors must be modified somewhat

since some older foreign industry operating in Ireland is investing at quite low rates. The data also suggest that the service sector, where employment has been growing rapidly and which has accounted for about 75 per cent of employment growth in recent years, has been investing quite a high proportion of net value added in this sector. This was particularly evident in tourism where investment has been very high in recent years and this has been accompanied by rapid employment growth.

Some limited information is available on the capital stock in Irish industry and shows that, for the manufacturing sector, net investment continues to be positive, although the low investment rates of the 1990s have led to a reduction in the growth rate of the capital stock. This fact, in addition to the conclusions reached regarding the service sector, would suggest that Ireland has not been undergoing investmentless growth but that, no simple relationship exists due to the wide range of productivity factors which can impact on growth. A key long-term variable is the structural change which has been taking place in the Irish economy and which has accelerated in recent years due to the rapid growth of the service sector. These issues are discussed further in Chapter 3 below.

EXPLANATIONS OF INVESTMENT PERFORMANCE

1. INTRODUCTION

The data in Chapter 2 show the overall decline in the rate of investment in Ireland as a proportion of GDP which occurred for most of the 1980s and the early 1990s. They also indicate that the investment rate and capital stock were low compared to other European countries. Having ascertained these facts, the main question is to identify the implications of this for the sustainability of recent growth rates.

These data also show that the picture is not as simple as the aggregate figures suggest. Apart from the fact that the capital stock has continued to grow, and is in fact growing in advance of the rate of growth of employment, there are major differences between different sectors of the economy. In fact, Ireland has not been experiencing investmentless growth; there has been substantial investment in sectors which have been experiencing the highest rates of output growth and employment creation. The question remains, however, whether these rates are adequate for current requirements. Before looking at the principal determinants of the rate of investment in the next chapter, this chapter sets out a number of general explanations for why the rate of growth of investment would have been expected to have declined substantially from its level during the early 1980s. The purpose is to argue that no simple conclusions can be drawn from observation of the rates of investment and that investment performance must be placed in the context of long-term trends in the Irish economy and the changing structure and capital requirements of the economy.

One possible explanation for lower investment rates is that features of the economy could place constraints on the ability of Irish firms to access funds. It is generally thought that the rate of interest moves to equate savings and investment. Section 2 of this chapter looks at trends in the savings rate in Ireland to see if this is an issue. However, the aggregate trends could once again hide sectoral differences and it is important to note that while the overall savings rate may be adequate this does not imply that certain constraints could be imposed on certain categories of firms, in particular, small and medium size firms, and their ability to access funds.

The financial balances in the Irish economy give rise to a further issue of relevance. The excess of savings and the balance of trade surplus have

been balanced by outflows of significant importance since 1990. This has resulted in substantial acquisition of foreign assets by Irish residents. Section 3 quantifies these flows. It has been suggested that the action of Irish pension funds, which control such a large proportion of savings in Ireland, have exacerbated these outflows. On the other hand, a lack of suitable investment opportunities in Ireland and opportunities for risk diversification for the pension funds mean that investment abroad is an optimal approach. Section 3 also examines the suggestion that these outflows are an important determinant of the basic balance on the balance of payments. Over a long enough period, these outflows should be balanced and should provide income for the country. However, institutional deficiencies in the Irish economy, or asymmetries with regard to the more highly developed financial markets of Europe, could mean that flows are long-term and ongoing. The evidence for this is examined in Section 3.

While Sections 2 and 3 are concerned with the supply of funds for investment, Section 4 examines changes which have occurred in the demand for investment. In addition to the profound structural changes which have occurred in the Irish economy, there is evidence that capacity utilisation has improved. The structural changes mean a greater role for services as a proportion of output and for human capital as an input. For these reasons it is possible for output to grow at a greater rate than investment without constraints on growth emerging. A final issue, examined in Section 5, is the impact of changes in perceived risk and reward to investing in Ireland. These issues impact on both the availability of funds for investment and the demand for investment. A number of reports have emphasised the importance of improving the reward to investing in Ireland as a means of increasing the rate of investment. On the other hand, reductions in the risk associated with investing in Ireland will also improve the attractiveness of investing. These issues are discussed in Section 5 which serves as an introduction to the more in-depth exploration of risk in the Irish economy in succeeding chapters. The final section contains a brief conclusion to this chapter.

2. EXISTENCE OF FUNDING CONSTRAINTS

(i) Adequacy of National Savings

Despite the international integration of financial markets which has occurred, and which might be expected to undo the previously observed correlation between national savings and national investment, empirical research has indicated that for most countries, the supply of funds arising from the level of national savings is a key determinant closely related to

the level of investment. Indeed, much of the economic analysis of these issues can be reduced to a general proposition that interest rates will operate in a manner to equate savings and investment. One would expect however that such simple correlations would not hold precisely in a small open economy, even one with a fixed exchange rate. The evidence for Ireland suggests a very poor correlation between the level of, and trends in, national savings and investment. Table 3.1 shows the evolution of savings over the period since 1980. As outlined previously, investment, as a proportion of GNP, has fallen considerably over this period. It was noted, however, that a large number of changes had occurred in the economy and that the level of investment in the early 1980s was probably unsustainable.

It is interesting to observe the trends in savings. Table 3.1 shows that the level of gross national savings as a proportion of GNP rose somewhat during the 1980s and having reached a peak of just over 22 per cent in 1990 has declined slightly during the 1990s, but remains at a level in excess of that which pertained during the 1980s. Much of the rise during the 1980s can be accounted for by the reduction in the public deficit, that is a reduction in public dissaving, which raised the aggregate level of savings in the economy. This adjustment can be seen in the period following 1986 when private sector savings initially fell and then stabilised at a level well below that of the early to mid-1980s. Company savings which had risen substantially in the late 1980s peaked in 1987 and then declined. Personal savings which had declined during the 1980s recovered in the early 1990s.

The trends discussed in Chapter 2 indicate that over this period, investment initially fell, then recovered for a couple of years in the late 1980s, declined again during the 1990s and recovered from 1994. There is a clear divergence between these trends in savings and investment. The level of investment would appear to be better related to changes in the level of domestic consumption and, thus, negatively correlated with personal savings. Demand for domestic consumption would appear to be a key determinant of the investment decisions of Irish firms. Measures to promote savings would, thus, be expected to have little impact on domestic investment.

Table 3.1 also shows that, when depreciation is taken into account, net national savings have risen over the period and have on average remained higher during the 1990s than during the 1980s. These figures would certainly suggest the availability of funds for investment greater than the level of investment which has been observed and that, at the aggregate level, the supply of funds, defined by national savings, should not place a constraint on the investment decisions of firms.

TABLE 3.1
Savings 1980-1996
(% of GNP)

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
Personal Savings	13.1	13.9	16.3	15.0	14.7	14.5	9.1	8.6	7.2	5.6	8.6	9.4	9.5	10.4	7.7	6.4	n.a.
Company Savings	2.5	2.2	2.8	2.9	2.1	1.7	5.1	6.5	4.2	4.0	2.5	2.1	1.0	2.1	3.3	6.2	n.a.
Net National Savings	5.2	3.5	7.5	7.2	8.5	7.9	6.0	7.3	6.9	7.8	11.4	10.6	8.3	10.1	9.5	11.0	12.1
Private Sector Savings	15.6	16.1	19.1	17.9	16.8	16.2	14.2	15.1	11.4	9.6	11.1	11.5	10.5	12.5	10.1	12.6	11.6
Gross National Savings	16.7	14.3	18.5	18.4	19.4	18.9	16.8	18.3	17.9	18.7	22.1	21.5	19.5	21.2	20.6	22.3	23.7

Note: Gross National Savings is defined as Net National Savings plus depreciation. It represents the gross total available for domestic investment before net foreign capital transfers and net foreign investment are included.

Source CSO, *National Income and Expenditure*.

(ii) Access of SMEs to Finance

The perception that capital constraints are inhibiting the development of certain sectors within the Irish economy, in particular, start-up situations and SMEs, has received substantial comment in a number of reports, such as the Culliton Report, the Report of the Task Force on Small Business and the Forfás Report, *Shaping Our Future*. The general conclusion of these reports has been that a wide range of factors mean that the aggregate surplus of funds in the Irish economy may not be channelled to certain sectors. Among the factors of most importance are the unwillingness of the financial sector to supply funds to these firms, either because of perceptions of risk or because of an unwillingness to incur the costs which relatively small loans imply. The equity capital survey undertaken by the Department of Enterprise, Trade and Employment appears to confirm that capital constraints are important. Table 3.2 shows that, although the situation is improving, a substantial majority of firms considered that raising funds continues to be difficult.

TABLE 3.2
Manufacturing Industry Equity Requirements

	Percentage of Respondents	
	1992	1995
Raising equity will be difficult	78	60
More difficult now than in previous 2 years	57	5

Source: Department of Enterprise, Trade and Employment.

The situation has improved in recent years. This is evidenced by the fact that only 5 per cent of respondents in 1995 believed it would be more difficult to raise funds than it had been in the previous two years. The general economic performance is important but the improvement is also partly the result of a wide range of schemes and initiatives introduced to ensure the availability of investment funds at competitive interest rates.

A Seed and Venture Capital Measure has been introduced under the Operational Programme for Industrial Development (1994-1999). Under this Measure provision is made for the co-financing of seed/early stage equity investment in growth oriented firms on a 50/50 basis between private investors and the ERDF. This measure is managed by Forbairt; initially Forbairt encountered resistance to the approach of a partnership between the state and private investors in which both the risk and return is shared by both parties. This problem has been overcome and new funds

are now coming on stream regularly. About 25 per cent of the investments are in start-up companies with the remainder being in early stage firms. Investments vary from as little as £20,000 to £1m. However, the main focus is on the £0.1m to £0.5m range.¹

The Access to Finance Scheme (AFS) under the Small Business Operational Programme aims to address the key needs of small business borrowing, i.e. low cost funds, certainty of repayment levels and simplicity of administration and banking. The current scheme has proven attractive and all available funds were drawn down on target before the end of 1996. The fund size is £208m and the relevant interest rate is 6.5 per cent. Loans can be from £20,000 to £500,000 over 7 years. Loans under the AFS were available from four participating banks, with the interest rate charged being subsidised by the Exchequer (9.5m), the EU (£18m) and the participating banks (£23m).

Forbairt, the County Enterprise Boards and the Business Innovation Centres have also aided SMEs through equity stakes, preference share holdings and grants. In rural areas, the LEADER programme also provides financial assistance to small firms. However, there is still resistance among some small companies to equity in their firms being taken by outsiders.

Another small but growing source of finance for small business is the credit union movement. In 1995, credit unions provided business loans with a total value of £128 million. Recent legislation will facilitate the expansion of credit union activity in the business sector.

In addition, an alteration in the eligibility threshold for cash basis of accounting for VAT from £0.25m to £0.5m and reductions in corporation tax will aid SMEs. The issue at the moment for SMEs is the speed of further reductions and the level of incremental change which might be involved.

Further evidence of the difficulties facing smaller borrowers, who rely on bank debt due to the small size of the Irish Stock Exchange and non-existence of a corporate bond market in Ireland, may be obtained by comparison of interest rates charged to small and large borrowers. The prime rate is the interest rate normally available to large business only, while most small business would be in a position to avail of the AA rates.

1. There is a small number of venture/seed capital funds which are oriented to smaller requirements. The Dublin Seed Capital Fund which is managed by the Dublin Business Innovation Centre is a £1 million fund which makes investments in the range of £3,000 to £100,000. First Step has a £3 million fund which makes investments of up to £30,000 in small or micro enterprises. This investment is in the form of interest free loan capital. (McCall, 1997).

However, it is not unusual for personal loans and overdrafts, which require a premium over these rates, to be used in the case of very small businesses in start-up situations. It is clear from Table 3.3 that larger businesses can avail of considerably lower interest rates on their borrowings. This is in addition to the sources of funds which may be available to these larger companies from outside the banking system.

TABLE 3.3
Selected Lending Rates (%)

	1993	1994	1995	1996	1997
Prime Rate	7.0-7.375	6.21-6.25	6.0-6.125	6.25-6.29	6.75-6.88
AA Overdraft	10.25-11.25	9.75-10.45	9.75-10.00	9.5-9.95	10.00-10.45
AA 1 to 3 years	8.75-10.75	7.75-10.00	7.25-10.00	7.15-9.75	7.65-10.00
AA 3 to 5 years	10.0-11.25	9.25-10.25	8.75-10.5	8.65-10.5	9.15-10.75

Note: Rates are for December each year except 1997 (October).

Source: Central Bank Annual Report/Bulletin.

It would appear, therefore, that the problem is not just one of the volume of funds which may be available, but also the cost of these funds. As already noted, the initiatives of recent years have helped alleviate these problems in some circumstances. This is the case not only as regards the availability of finance from the banking system, but from other parts of the financial system also. Some problems may arise as the result of imperfect information. The lack of integration of the banks with manufacturing firms, as has been the case in other countries, may also be detrimental.

It has been suggested that a culture has emerged in the Irish financial system which results in funds being channelled into relatively low risk projects rather than projects such as start-up ventures where risk may be substantially higher. A number of reasons for this have been put forward including the Irish taxation system and the development strategy pursued in earlier decades which created something of grant-seeking mentality. The Forfás (1996) report emphasised however that this type of explanation was probably insufficient and that the key to overcoming these problems may lie in improving the profitability of firms operating in sectors perceived to be subject to constraints on capital funds.

It would seem insufficient to simply maintain that the higher costs experienced by some firms are merely the result of some form of misperception of risk on the behalf of the banking system, or the extortion of a premium at the expense of small business. It must be accepted that the riskiness of the loans being given, and the returns being earned, both of which are a function of the profitability of the receiving businesses, are the key factors upon which to concentrate.

3. INTERNATIONAL CAPITAL FLOWS

(i) Foreign Investment

The excess of savings over investment when combined with the decline in public dissaving since the late 1980s has resulted in the net acquisition of foreign assets by Irish residents. Honohan (1993) identified these flows and showed that the net acquisition of assets - the surplus of savings over fixed capital formation when depreciation, capital grants, taxes and changes in stocks have been allowed for - of the household, business and government sector in the Irish economy are poorly correlated.

Examination of international flows such as these in the Irish economy is complicated by the increasing effect of the growth of the IFSC. Honohan and Kelly (1997) show that Ireland is rapidly reducing its net indebtedness to the rest of the world. This trend continues although revisions of balance of payments data over the past number of years mean that the flows may not be as great as previously thought. Table 3.4 shows the sectoral breakdown of funds which lead to this performance.

TABLE 3.4
Net Acquisition of Financial Assets
(% of GNP)

	1990	1991	1992	1993	1994	1995
Household	4.0	5.2	4.7	7.1	3.4	3.8
Business	-1.4	-0.3	1.0	1.8	2.3	1.9
Government	-2.6	-2.6	-2.8	-2.8	-1.8	-1.7
Total (Net Foreign Investment)	-0.0	-2.3	-2.9	-6.1	-3.9	-4.0

Source: CSO and Honohan and Kelly (1997).

This table shows that in recent years, the business sector has been able to more than finance its own investment. The relatively small disinvestment by the government sector has resulted in the acquisition of foreign assets to the equivalent of over 3 per cent of GNP per annum during the 1990s. The aggregate trend has been a gradual reduction in net foreign disinvestment during the 1980s and net foreign acquisition of assets since 1990. This change-around has been driven by the reduction in public dissaving rather than any increase in saving by the household and business sectors. The net acquisition of foreign investment assets is the result of Irish business looking for risk diversification, profit opportunities and financial services abroad. In addition to the largely positive explanations, it is possible that certain institutional factors could be important.

This situation is in contrast to what one would normally expect in a fast growing economy, such as the economies of South East Asia, where high investment means capital inflows to balance the current account deficit. Although later revisions in recent years mean that these flows may not be as great as previously thought, Irish business continues to look for opportunities abroad. For a country with high unemployment and a perception that capital constraints continue to operate in certain sectors, this raises questions concerning the reasons why this may be occurring, should the outflows become long-term and continuous.

(ii) Role of the Pension Funds

Irish pension funds control a major portion of national savings. In 1996, there was a net inflow to pension funds of almost £900 million. Total Irish pension fund assets are in the region of £19 billion, representing over 50 per cent of Irish GNP. These funds have shown major growth since the mid-1980s when total assets were approximately £2.5 billion in 1985, presenting only 17 per cent of GNP. As always, international comparisons can be misleading - particularly comparisons with continental European countries - but the Irish figure exceeds the US, where pension funds account for about 30 per cent of GNP, while it is well behind the UK figure, where pension funds account for 66 per cent of GNP.

Although the growth of pension fund assets has been rapid over the past decade or so, it is likely to continue for the foreseeable future, since many workers are not members of pension schemes and the state pension will be increasingly unlikely to provide the finances required to maintain the existing standard of living for those reaching retirement age. It is widely accepted that the overall financial implications of this are not as serious in Ireland as in many continental countries for demographic reasons and

because of the way in which pension schemes are funded. In Ireland, the major point of debate regarding the pension funds has been the extent to which the assets they control are invested abroad.

The growth of these assets has been a major factor in the sizeable outflows of funds from the Irish economy. The Irish Association of Pension Funds estimated that 39.4 per cent of the assets of Irish pension funds were held abroad at the end of 1996 compared to 38.9 per cent at the end of 1995. It is possible that the advent of EMU could increase the proportion held abroad. These figures have been contrasted with experience in other countries. For example, in Denmark and Germany it is estimated that about 90 per cent of pension funds are invested domestically, while the figure in the UK is in the region of 70 per cent. While the total value of Irish pension funds exceeds the total value of shares on the Irish Stock Exchange, only about 27 per cent of pension funds are held in Irish equities. This figure has been largely constant over the past decade and does not seem to have been affected by the abolition of exchange controls. Foreign institutions own about 30 per cent of Irish equities. The tendency for pension funds to invest abroad should not be over-emphasised, however. Relative to the size of Ireland in EU financial markets, Irish pension funds actually hold a very high proportion of their assets in Ireland and may be missing out on some possibilities for risk diversification.

Critics also point to the fact that only £11 million from Irish pension funds was invested as venture capital in Ireland in 1995 and that in earlier years the figure was negligible. Walsh and Murray (1993) estimated that in the early 1990s pension funds supplied about 15 per cent of venture capital in the EU, but were not a recognised source of venture funding in Ireland. In addition, insurance companies accounted for about 12 per cent of venture funds in the EC, but were again negligible in Ireland. Banks accounted for in excess of 35 per cent of EC venture funds, but only about 25 per cent of funds in Ireland. The difference in the venture capital requirements of Irish industry was made up by access to internal sources with realised capital gains, which accounted for less than 20 per cent of funds in the EC, making up about 50 per cent of the funding requirements in Ireland. This would certainly suggest that there may be deficiencies in the Irish financial system which mean that Irish firms must rely much more heavily on internal sources to fund expansion. However, this conclusion contrasts with the views of private venture capitalists who identify the problem not as a shortage of funds, but as a shortage of suitable projects in which to invest.

The main argument put forward is that, given existing conditions, opportunities and requirements, the fact that fund managers may be

operating in an optimal manner to maximise the profits from investing the funds under their control, does not imply that the investment outcome from this strategy maximises the potential benefits to the whole economy. It is possible, and indeed likely, that the difference in the time horizon adopted by fund managers and by society in general, in addition to the likelihood of benefits within the economy which cannot be appropriated by private fund managers, mean that potential social benefits are being foregone. The question therefore is to discover how this situation might be altered.

Two possible strategies present themselves. The first is to impose some restrictions on pension funds to enforce a particular level of investment in the Irish economy. In this case, although the private benefits might be reduced somewhat, social benefits could increase. Although some recommendations exist in this regard - and, in fact, there are restrictions in many other countries which are substantially more stringent than in Ireland - and some voluntary restrictions have been adopted by the pension funds, it is generally accepted that this route could lead to many problems with no guarantee that the potential benefits which are thought to exist would be realised. In addition, this would risk breaching EU rules of capital movement at a time when the Commission is attempting to reduce or eliminate existing restrictions in European countries. The second strategy centres around the identification of initiatives which would increase the opportunities for investment in the Irish economy. A 1996 study by Deloitte & Touche and Peter Bacon & Associates (Deloitte & Touche and Bacon, 1996) identified a number of initiatives. These include the possibility of joint private/public sector ventures, mostly in the area of infrastructure. The report envisaged that these could lead to investment opportunities of between £100 and £200 million a year. Other possible investment opportunities arise in forestry, mortgage bonds and for new national treasury index linked bonds. Bacon (1997), using updated information, reached similar conclusions. He identified the opportunities under three broad headings: those which would arise from improving the Irish Stock Exchange as a means for financing business development and expansion, the public floating of the equity of commercial state sponsored bodies and the development of mechanisms to finance infrastructural projects. Allowing the pension funds the opportunity to invest in the commercial state sponsored bodies would increase share ownership in Ireland, release funds to the government, provide access to equity for these bodies, improve the opportunities for diversification within Ireland for the pension funds and allow the state move towards the role of regulator rather than owner. In addition, the exposure to the requirements of capital markets could lead to greater efficiency in the state-sponsored bodies. The exposure to private sector

efficiency requirements and skills could also be a major benefit arising from the development of private/public finance initiatives in infrastructure. These recommendations suggest an assumption that general improvements in the return to capital in Ireland will not be adequate to induce pension funds to invest a substantially higher proportion in domestic assets.

(iii) The Capital Account and the Balance of Trade

Although most analysis of the effects of disequilibrium in the balance of payments has tended to concentrate on the balance of trade, the fact is that liberalised capital markets mean that the flows of highly mobile international capital are likely to be far greater, in terms of both their volume and impact on the capital account balance, than net trade flows. These flows on the capital account will be governed by long-term structural effects and short-term speculative capital movements. The main categorisation of flows on the capital account will be foreign direct investment and portfolio investment. These are fairly long-term in nature. The net sum of these two flows, when added to the current account gives the basic balance on the balance of payments. The importance of the basic balance was discussed in NESC Report No. 89, *A Strategy for the Nineties*. The Council there argued that there are strong arguments for considering a number of alternative measures of international accounting balance, including the basic balance. The reasoning is that these financial flows are autonomous and are thus a better indication of the true external situation of the Irish economy. Constructed in this way, the data show that Ireland's external transactions are much less prone to a surplus than is the trade balance or the current account balance.

This view is in contravention of the often accepted view that a surplus on the trade balance arises as a result of competitive Irish industry and simply leads to a balancing outflow of funds. This implies that the capital account has no determining role to play in performance and is thus of little concern to policy-makers. However, this ignores the fact that a balance of payments surplus can arise due to relatively depressed domestic demand and could persist if the non-traded sector were to be relatively uncompetitive in comparison with the traded sector.

(iv) Institutional Features

Although unemployment has now begun to fall, the fact remains that for a prolonged period of time Ireland has been experiencing major capital outflows in a period of high unemployment. These outflows are the result of financial surpluses in the business sector and the acquisition of foreign assets. At the same time certain categories of firms have experienced

difficulties in gaining access to finance. This poses the question regarding why Irish business is investing abroad rather than in the domestic economy. A number of the reasons for this are beneficial, such as gaining access to new markets, resources or new technologies.

A large part of the explanation for the increased international financial flows from Ireland is related to the increased opening up of the Irish economy. Fund managers now operate on a global basis and, inevitably, many of the investment opportunities will be outside Ireland. This process is further strengthened by the increased integration of the Irish economy into Europe. However, this is unlikely to be a full explanation since it would suggest that in the absence of underperformance or weaknesses in the Irish economy, such flows would be two-way and largely balancing over the long-term. It has been suggested, however, that financial outflows could be persistent with financial resources being attracted towards the more highly developed financial systems of certain other EU countries. If this is the case, some policy initiative may be required. However, this implies a divergence perspective of economic development which, in the context of Ireland's convergence performance over the 1990s now appears unlikely. The abolition of currency risk premia with the advent of EMU will further undermine this argument.

The relationship between a small peripheral country such as Ireland and a larger more highly developed entity such as the remainder of the EU is bound to contain many asymmetries. For example, Irish financial firms would know a lot more about the risk and returns from investment in European markets than counterpart institutions would know of the Dublin market. In addition, the possibility has been raised that structural or institutional features of the financial system may tend to channel savings into foreign assets. The view has been expressed that, as the process of integration proceeds, portfolio capital flows could be large and continuous. Reynolds (1988) stated that 'models of investment behaviour that predict flows of capital to less prosperous regions, where the marginal efficiency of capital is allegedly higher, seem to me to take inadequate account of various constraints on growth in these areas'. This suggests a strongly path-dependent model, where low growth and relative underdevelopment of an area which is integrating with a larger more prosperous region will result in an outflow of capital which compounds the relative underdevelopment. Other researchers have put forward similar possibilities. The implications for the Irish economy are obvious and quite a bit of attention has been focused on the features of the Irish financial system which may propel this development. This has generally centred on the action of the pension funds in Ireland which control such a large proportion of Irish savings. Alternatively suggestions have been forwarded which aim to encourage the investment of Irish savings in the

stock market and increase the attractiveness of a public floatation for companies. The role of brokers and associated costs is one area which may be worth examining, but most attention has focused on the level of capital gains tax which may affect the attractiveness of stocks for private investors. The rate of capital gains tax was halved in the 1998 Budget.

International research also suggests that links between domestic financial companies and manufacturing companies are particularly important. This point was emphasised in Forfás (1996), but there is not a great deal of research evidence in Ireland regarding the extent to which such linkages have developed.

Despite these outflows, there is little evidence to date that an overall funding deficit exists in Ireland. Rather, a number of other weaknesses mean that some firms have difficulty accessing finance. Among these weaknesses, the failure to date of the stock exchange to develop a small companies market and the non-existence of a corporate bond market in Ireland have been identified as particular problems. It has been suggested that elements of the Irish taxation system may have an adverse effect in this area. In summary therefore, it is unclear that the financial outflows which have been occurring have a direct impact on the rate of investment in Ireland. Neither is it obvious that policy intervention is required or desirable. However, certain weaknesses in the Irish financial system may be inhibiting the ability of some firms to access to finance at competitive rates.

4. CHANGES IN FIXED CAPITAL REQUIREMENTS

(i) Capacity Utilisation

The relationship between investment and output, and changes in the growth rates of these variables, will be affected substantially by capacity utilisation of the capital stock. Information on capacity utilisation is available from the monthly business surveys conducted by the European Union. Table 3.5 compares capacity utilisation in industry in Ireland and the EU. The EU figures have been fairly consistent over a long period of time. Capacity utilisation fell to 76.4 per cent in the recession of 1982/83 having risen to a peak of 84 per cent in 1979/80. The peak of the late 1980s and trough of the early 1990s are only slightly above these levels, indicating only a very slow increase in the average over time for the EU as a whole.

The rate of capacity utilisation in Ireland is consistently below that of the average of the EU. However, the rate in Ireland has risen substantially to

average almost 76 per cent in the period 1988 to 1996 following a low point of under 57 per cent in the recession of 1982 to 1983. At the peak of the boom in Ireland in the late 1970s, capacity utilisation remained below 70 per cent. This convergence towards the European average is compatible with the coexistence of a higher rate of output growth despite declining rates of investment. It also suggests that the earlier period was one of over-investment, probably accompanied by low rates of return. The rise in capacity utilisation in the 1990s has been less marked than in the 1980s. It declined during the recession of the early 1990s, but from 1993 to 1995, the utilisation rate rose by about 8.5 per cent. These trends, when combined with the growth in the capital stock evident from Table 2.2, have facilitated the consistent growth in output of the manufacturing sector in recent years. However, at close to 80 per cent in 1995, the figures for the norm of capacity utilisation in the EU as a whole would suggest that there is little room for a further increase in Ireland. It is likely that the increase in capacity utilisation in Ireland is now likely to level off and, in fact, the utilisation rate has declined as a result of greater investment since 1995. This suggests that capacity constraints could have become a factor if the investment trend of the early 1990s had continued, but that higher investment since 1995 has removed this threat.

The change in capacity utilisation in Ireland over the recent period may not seem substantial in relation to the much more rapid rates of growth of output and employment. However, simple relationships are seldom the norm in dealing with these variables. In fact, it is not unusual for capacity utilisation not to respond substantially to perceived changes in overall growth rates. For example, Summers (1990, p.238) notes that although European unemployment has been rising, capacity utilisation showed no trend over the 1980s. The only consistent relationship appears to be that identified by Dreze and Bean (1990, p.8) who conclude that investment should be positively related to the degree of capacity utilisation.

These trends are reflected in the figures for capital sufficiency in Table 3.5. Sufficiency is expressed as the percentage point difference between the number of managers who replied positively and those who replied negatively regarding their confidence in current capacity to meet future demand. The impact of the recession in the early 1990s is evident in both Ireland and the EU, but the figures in recent years for Ireland suggest that managers perceived the possibility of constraints on output as a result of under-capacity. For example, the figure for 1995 indicates that, among those who expressed a definite perception, 49 per cent believed capacity was insufficient to meet future demand. The figure for Ireland is below the average for the EU as a whole and substantially less than that in many countries. This is obviously a reflection of the strong growth performance in Ireland, and the expectation that this performance will be maintained,

but also suggests that capacity constraints could emerge, especially given the likely future constraints on the ability to increase output through greater utilisation.

TABLE 3.5
Capacity Utilisation and Perceived Sufficiency in Ireland and EU (1988-97)

	Capacity Utilisation (%)		Sufficiency (%)	
	Ireland	EU	Ireland	EU
1988	74.0	84.0	13	12
1989	74.4	85.6	7	6
1990	76.7	85.0	8	9
1991	75.5	82.1	19	22
1992	77.1	85.8	11	27
1993	73.6	77.6	22	38
1994	74.9	79.7	15	26
1995	79.9	82.9	2	14
1996	77.6	81.2	7	25
1997	77.9	81.1	7	23
Average 1988-96	76.2	82.5	11	20

Source: *European Economy, Supplement B*, various issues.

(ii) Structural Changes

The proposition that the decline in the rate of investment is a long run correction from the unsustainable levels of investment in the late 1970s and early 1980s appears to contain some validity. The earlier period was one of over-investment, with the cost of capital being low, not only historically, but also in relation to competitor countries. Changing demand expectations during the 1980s also contributed to the extent of the correction required. The improvements in capacity utilisation would also mean increased productivity, while improved procedures in relation to the evaluation of investment and the undertaking of programmes of investment may have contributed to improvements in the quality of fixed capital formation, particularly in the public sector. This would be further aided by improvements in the intrinsic productivity of investment goods as a result of technological progress and reductions in costs in some of the

most important growth sectors of the economy. Improvements in infrastructure have also increased the productivity of private capital.

Sectoral changes in the economy, which have resulted in a much increased importance of services and the high-tech manufacturing sector in total output, mean that the economy is now dominated by sectors capable of high capital productivity. In other words, the same output growth can occur with less investment. Although the previous chapter indicated that a positive association exists at sub-sectoral level between the rate of investment and the rate of growth in employment creation, changes in the structure of the economy mean that the association between the rate of investment and the rate of growth at the aggregate level could change substantially. Technological improvements, even in the absence of structural change, can have a similar effect.

This explanation is undoubtedly important when discussing the overall investment ratio in the economy, given the structural change which has occurred. However, the traditional sector in Ireland has shown a similar but more marked pattern of falling investment. This is not explained by improved capital productivity, which in many traditional industries has shown only moderate growth in recent decades. It is unlikely therefore that higher capital productivity is a general and full explanation for falling investment. Higher productivity implies a greater return to capital and, thus, any rise in capital productivity should imply a greater inducement to invest, indicating an acceleration in the investment rate, rather than the sharp decline witnessed.

Recent research has pointed to the importance of the development of human capital as a determinant of the growth which has been occurring in Ireland over recent years. Improvements in productivity from the investment in education which has occurred over recent decades appears to be somewhat later in Ireland than in many European countries. In addition, the influx of foreign high-tech firms has had an effect on managerial and organisational procedures in Ireland which has resulted in a modernisation of the economy and productivity gains beyond the foreign-owned sector. All of these factors would contribute to increased output from a fixed capital stock and thus a reduced requirement for new investment. However, these factors do not explain the underperformance of the indigenous manufacturing sector where low and declining rates of investment have been accompanied, in most industries, by historically low growth in output and employment.

An alternative explanation relates to the possibility of measurement biases. The investment goods deflator used in Ireland may fail to take proper account of the enhanced quality of capital inputs and thus create a downward bias to the quality adjusted volume of investment. This is

particularly important given the high structural change which has occurred in the Irish economy and is probably further exaggerated by the incidence of transfer pricing which overstates value added in the high-tech sector causing the investment output ratio to be biased downwards. However, if transfer pricing is an increasingly important determinant of the rate of growth then this raises even greater questions regarding the sustainability of growth. The use of fixed weights to aggregate the different components of the index may have affected the accuracy of the investment deflator also, since this fails to reflect the fact that investment became more orientated towards plant and equipment in the 1980s, and that productivity growth in equipment is generally higher than in construction.

5. RISK AND REWARD

Most economic research has tended to concentrate on identifying the factors which impact on a firm's decision to invest rather than the wide range of factors outlined above which affect the rate of investment required for growth. In effect therefore, the conditions are taken as given, and firms invest up to a point where the benefits from doing so are at least as great as the costs incurred. The two most important variables in such models relate to the relative cost of capital and labour and the impact of demand conditions. This approach is used in Chapter 4. It is also possible to modify these models to take account of the risk environment.

At its simplest, greater uncertainty in respect of future profits requires a higher minimum rate of return to induce investment. This will be so irrespective of whether the uncertainty results from price or output. Volatility, structural change and macroeconomic instability are particularly important issues in the assessment of the risk environment. Risk arising from uncertainty is likely to be greatest just at the very point when a high rate of investment is most needed. Where a new product or process is developed, structural change in the economy is induced. However, in order to gain a share of the market, a firm must invest at this very point to get in ahead of its competition. Similarly, when structural change is rapid an economy must increase its investment rate in order to remain competitive. However, structural change increases uncertainty and, thus, has a depressing effect on investment.

Research carried out for the UK by the Bank of England and the Confederation of British Industry in 1994 on the rate of return required on investment found that the average nominal required rate of return for new investment was around 17 to 20 per cent. This implies that companies estimate their real cost of capital at around 15 per cent. For companies that

formulated their investment rules in terms of a payback period, two-thirds required such projects to pay for themselves within 2-3 years. Such rules seem to imply a very high degree of risk aversion. Systematic over-estimation of the cost of capital will of course lead to inappropriately low levels of investment, particularly on projects whose return is realised over a long period.

The role of uncertainty is central in the analytical work of Dixit and Pindyck (1994) on the investment decision at the microeconomic level. When a firm identifies an opportunity to invest, traditional investment theory says a net present value (NPV) analysis will enable it to decide on whether or not the investment is worthwhile. According to Dixit and Pindyck this view of the investment decision is inaccurate. The source of the error is the failure of the NPV model to properly account for all costs, especially those associated with risk, which a manager will include before reaching a decision. In their model, the firm has the opportunity to delay the investment. Should the firm invest today it gives up the option to invest. This option has value and thus the opportunity cost of giving it up must be included. When this is done, the decision-maker may reject projects an orthodox NPV analysis previously accepted. Thus, uncertainty over the future has a crucial role to play. They estimate that inclusion of this opportunity cost may treble costs. This would help explain why firms have been observed not to invest until the return on capital is many times the cost of capital and explains the low responsiveness of investment to changes in cost of capital.

In relation to the issue of risk and reward, Forfás (1996) has concluded that:

Ultimately, the availability of finance for business is a function of the potential profitability of enterprises and their investment plans, relative to alternative possibilities available to investors. The fundamental issue to be resolved if savings are to be put to work in building Irish economic performance is to achieve a rate of return from productive investment which is as good as can be obtained elsewhere, for a given level of risk. (*Shaping Our Future*, p.207).

The finding of a negative influence on investment from risk could also be a large part of the explanation of why countries that invest more grow faster. This would follow if the risky investments that individual firms are unwilling to take tend to have beneficial effects on the whole economy. In such a context, market failures prevent private investment being pushed to the point where marginal social return equals the investment cost. Economies which invested more would, in this framework, grow faster.

6. CONCLUSION

This chapter has examined various possible explanations for the trends in investment observed in Chapter 2. Most of the explanations put forward imply that the trend does not have negative implications for the sustainability of growth rates.² Savings are more than adequate for the financing of investment and, although some concerns have been raised on the issue, international outflows, by whatever means, should be viewed as a optimal response to the need to pursue profit opportunities and risk diversification. This accepted, it should also be recognised that certain firms may be having problems accessing the available funds and weaknesses in the Irish financial system could mean that some of the outflows are sub-optimal.

Regarding the demand for investment, changes in capacity utilisation, the quality of investment undertaken and structural changes in the economy mean that output can be increased and growth rates sustained on lower rates of investment and a lower capital stock. In this situation, the emphasis should be placed on the development of human capital and managerial competence.

A key determinant of investment in any country is the balance between risk and reward. It has been observed that improved rewards to investing in Ireland are desirable. An alternative approach is to examine the risk associated with investment in Ireland. This risk can be described as either a general aggregate risk arising out of the overall economic environment in Ireland or a more firm specific risk arising from the perceptions and situations of individual firms. Examination of the importance of risk under both these headings is undertaken in the Chapters 4 and 5 respectively.

2. This is consistent with the conclusion of Chapter 2 that the fall in the rate of investment should be seen, to an extent, as a correction from the previously wasteful and unsustainable levels of investment of the early 1980s.

CHAPTER 4¹

ECONOMETRIC ANALYSIS OF INVESTMENT AND RISK

1. INTRODUCTION

In the five years up to 1994, the share of investment in Ireland fell more than any OECD country outside the Scandinavian Bloc. This should be seen in a context where the investment ratios of all major OECD countries have been in decline, falling about 3 percentage points since the 1960s. A number of general explanations for this trend were outlined in Chapter 3. This chapter undertakes a more formal empirical analysis of these issues. It also analyses the impact of generalised risk in the Irish economy on investment decisions.

In Section 2 the main results of an econometric estimation of a set of investment equations for Ireland are presented. Investment performance is analysed at the level of total manufacturing and for the food, traditional and high-tech sectors. This analysis identifies a stable investment relationship for Irish manufacturing over the sample period and identifies which variables explain movements in the rate of investment.

Section 3 is concerned with the measurement of risk and volatility in the Irish economy. Volatility is likely to be greater in a small open economy with specialised exports. In addition, Ireland is still in a phase of transition or catch up. The pace of structural change in Ireland is identified as an important factor underlying volatility and uncertainty. In turn, uncertainty tends to depress capital spending and other commitments such as R&D. As a result capital spending may be curtailed just when it is most needed to offset the downside of structural adjustment by fuelling new growth. Variables to represent risk and volatility are calculated and included in the model to determine their impact on the explanatory power of this model. The final section contains a brief summary of the main conclusions of this analysis.

1. This chapter, and Chapter 5, are summaries of some of the findings of work undertaken by Dr. Ciaran Driver for the Council. However, there is some difference in emphasis and some of the conclusions diverge from these identified by Dr. Driver. Dr. Driver's report is available on request from the NES Secretariat.

2. ECONOMETRIC ANALYSIS OF INVESTMENT IN MANUFACTURING

(i) Basic Equations

Constructing a Model of Investment

Capital investment is one of the most difficult economic variables to model and forecast. This is clear from surveys on investment theory (Chirinko 1993); from comparative tests of investment theories (Clark 1979; Berndt 1990); and from cross-country studies of OECD investment behaviour (Catinat et al 1987; Ford and Poret 1991).

A theoretical expression for the demand for capital may be obtained by solving the first order conditions for profit maximisation subject to a production function: this gives a standard expression for the desired capital stock (Berndt 1990). An alternative approach is to model firms as demand-constrained with exogenous demand: in this case the desired capital is obtained by cost minimisation subject to the production constraint (Catinat et al 1987, Berndt 1990). Indicators of profitability may also be included, possibly modifying the speed of adjustment, where firms are assumed to be finance constrained. An investment equation may be obtained by including lag structures for gestation and expectations. Where adjustment of the ratio of capital to labour used in production is relevant only to new investment, that is, where there is a degree of irreversibility associated with the capital stock or where the composition of output is not perfectly variable, it is more appropriate to use a putty-clay adjustment process.

Catinat *et al* (1987) estimated aggregate investment functions for a range of European countries, not including Ireland. They specify equations for three separate approaches, namely, the optimal behaviour/relative price approach, the accelerator approach and the cash-flow approach. In the first, the firm is assumed to operate in such a way as to maximise profits depending on the relative cost of inputs and subject to technological constraints. The second assumes that firms will invest to ensure the capacity to meet future demand. The third approach places strong emphasis on the role of financial variables, such as cash-flow and retained profits. These three approaches are then synthesised in a model which allows that each of these factors may influence the investment decision of certain firms at certain times. The advantage of this accelerator-relative costs-profit model is, for example, that it recognises and covers cases in which some firms are constrained by a lack of demand while others face financing constraints. Their general conclusion was that the influence of demand is especially important in the short-term, while

profits and relative input costs would seem to be important in the longer run. This implies that a putty-clay flexible accelerator is an appropriate model.

It is possible to replicate the Catinat framework for Ireland, both for aggregate manufacturing and for three broad sectors: food, traditional manufacturing and high-tech. However, Irish data are only available in annual form, whereas the original Catinat studies had been carried out for the major European countries on quarterly data. This somewhat limits the comparisons that can be made. Nevertheless, the results from the European and Irish studies are broadly similar. Variables representing demand and the real cost of capital "explained" over 95 per cent of the variation in investment, a somewhat higher percentage than for most of the EC country equations estimated in the Catinat study. There was no significant profitability effect either at total or disaggregated levels. This is not altogether surprising given the divergence between the declining investment ratios and the rising indicators of profitability in Ireland in the period after the mid 1980s. This divergence is most likely explained by liberalisation of international capital flows. However, the lack of a significant finding for profits does not necessarily rule out the possibility of liquidity problems for small independent firms. The econometric analysis could not pick up this effect as the analysis is not carried out by size group.

Results

The estimation was recast in an error correction framework which tracks investment movements about a long-run or "co-integrating" relationship. Where investment and demand are cointegrated, the long-run relationship is one where capacity utilisation attains some normal level. The basic variables are real gross investment, real demand growth and the relative factor price terms which are entered separately and by sector.

There is a long-run relationship for total manufacturing involving all these variables. All variables are significant at the 1 per cent level. The long-run relationship for the traditional sector is similar to that for the total with the same variables: demand growth and the real cost of capital. The long-run relationship for the food sector is with demand growth only. The cost of capital appears to have little discernible long-run influence here. It is known that this sector suffers from over capacity and is subject to non-economic influences. For the hi-tech sector there is again no long-run relationship between investment and the real domestic cost of capital.

Previous work has discussed whether foreign direct investment in Ireland reflected competitiveness, for example, against Europe, or whether it was

exogenous with no strong relationship to competitiveness (Bradley et al 1991 p.35; Barry 1991,p.108). This study tested the proposition that hi-tech foreign investment in Ireland was related to exchange rates via the perceived differences in asset prices between the home country (typically the US) and Ireland. There does appear to be a long-run association which implies that investment in Ireland occurs when the US dollar is strong against the Irish pound.

Market Services

Some attention was also given to modelling investment in the Market Services sector. There are data problems, particularly with price indices, which make analysis of this sector difficult. The only long-run relationship here appeared to be between investment and output and the analysis did not establish a significant effect for the cost of capital, although it was correctly signed. Manufacturing has higher measured productivity than most consumer services and so any initial boost to growth gets amplified over time. But organisational change and innovation are occurring also in many service industries, with attendant - often unmeasured - productivity gains.

3. MODELLING RISK AND INVESTMENT

(i) Structural Change in the Irish Economy

Structural change, particularly when undertaken in a manner compatible with the exploitation of opportunities arising from globalisation and global changes in demand, is likely to lead to long term gains, but the short term effects can result in damaging levels of uncertainty and an increase in risk. There is no agreed measure of structural change and risk, but a number of different methods may be employed to gain a balanced picture of trends and of international comparisons. One method of measuring structural change is to compute indices of the changing proportional importance of different sectors for the economy in terms of employment or output. Two such indicators (Stoikov and Lilien) have frequently been used to record structural change. These indices were calculated for the manufacturing sector, 1974-1990 using CSO data on net output, at three-digit level. The proposition is that high structural change is likely to fuel uncertainty as to the future direction of demand.

Both indices indicate that structural change reached a peak around the time of the first oil shock at the start of the sample. Subsequently structural change has been erratic, but reached another peak in the late 1980s. This partly reflects the difficulties of the traditional sector of the

economy where there were closures and job losses. Other research has suggested that the extent of inter-industry structural change in the 1980s may reflect specialisation within the enlarged EC (Barry,1991). The short-run effect of this will be demand uncertainty for the sector and its suppliers.

(ii) Measures of Risk

Risk and Uncertainty

In their research on the UK, Driver and Moreton (1992) show that output uncertainty is a major determinant of low investment rates. This is true at both the micro and macroeconomic levels. They use an equation similar to that used Catinat et al (1987), but modified to include variables representing the level of uncertainty in the economy. This modification revealed that, in many cases, profitability affected the timing, rather than the level of investment. The influence previously attributed to profitability, is now attributed to uncertainty over future levels of output growth. This is not a contradiction of the earlier results, but refines the importance Catinat *et al* give to expectations of future demand.

Any approach which emphasises the role of uncertainty encounters the difficulty of quantifying uncertainty. In recent years, less attention has been paid to the distinction between risk (which obeys some known probability distribution) and uncertainty (which is unquantifiable). In Dixit and Pindyck's analysis it is assumed that the firm could construct a portfolio of financial assets with a similar risk to that of the investment in capital goods. By then deciding on the optimum financial portfolio we find a correct investment strategy. Dixit and Pindyck also argue that the failure to include risk in traditional cost of capital models explains their poor predictive ability. Their work also explains why high profits and high losses can persist in industries without inducing new entry or exit. These approaches make clear that uncertainty has a vital role to play in the analysis of investment.

It has been possible in the UK to assess risk by looking at variation in the year-ahead forecasts of GDP, taking this variance to indicate the difficulty or otherwise of anticipating future demand. There is no indication from forecast dispersion in the Irish economy that risk rose over the 1980s or early 1990s. This negative finding is not conclusive, however, especially given the small number of forecasts available. There was a large underestimation of GDP growth by all the forecasting teams in the 1980s, indicating a tendency to express consensus views rather than fully reflecting the range of probabilities. An alternative measure of risk is the volatility of key economic variables: real output, producer prices, real

interest rates, and nominal effective exchange rates. Volatility can thus be measured as the standard deviation of quarterly rates of change over three sub-periods: 1960-82, 1983-89, and 1990-94.

In the earliest period (1960-82) Ireland was not more volatile than most developed countries in respect of production or exchange rates - the latter partly reflecting the link with sterling. However, price volatility was higher than the rest. The period 1983-89 - which includes a period of poor investment performance for Ireland - was one of high comparative volatility on all measures. Other data show that revisions to investment intentions were far higher than in other countries during this period. (Ford and Poret 1991).

The data since 1990 reveal a mixed message. Volatility was lower than before on all counts except the exchange rate, reflecting the devaluation of 1993 and the exit of Sterling from the ERM. Although volatility has lessened overall, relative to other countries, exchange rates and prices have been more volatile than most. In the volatility comparisons, the UK figures are of particular interest from an Irish perspective, given the dependence of the traditional sector on this market. The data suggest that the UK market is also relatively volatile and this is confirmed by recent unpublished work done by the Bank of England.

(iii) Dynamic Models and Risk

Dynamic models are regression equations which explain the movement in the first difference of investment, in other words, changes in the rate of growth of investment. The regressions in each case contain a feedback term which exerts a control to bring investment in line with that predicted by the long-run relationship. The volatility measures discussed above suggest that risk has indeed been higher in the Irish economy in comparison with other European countries, at least for the 1980s. A variable representing risk was included in the equation and re-estimated to determine whether there has been an effect of volatility on investment.

Regressions for total manufacturing and each of the three sectors, using only demand and cost of capital in differenced form along with an error correction term, were estimated and compared with modified equations which contain additional regressors to represent volatility. These variables are a dummy variable for the volatile years 1980 to 1985 inclusive, and a variable representing volatility (in first difference form) measured by the square-deviation of GDP from its long-run trend. Both these variables are negative suggesting a dampening effect of (a) the instability of the years 1980-85 and (b) a more general negative influence of volatility.

The inclusion of these variables substantially improves the 'fit' of the estimates for the whole economy and for the food and traditional sectors. This improvement is summarised in Table 4.1 which shows the R-bar-squared for the relevant equations before and after modification to include the volatility variables.

TABLE 4.1
R-bar-squared for Basic and Modified Equations

	Before Inclusion	With Modification
Total	0.24	0.66
Traditional	0.33	0.44
Food	0.37	0.59
Hi-Tech	0.54	0.54

Thus, the inclusion of a variable to allow for alterations in the level of risk in the economy improves the explanatory power of the equations. This result was particularly obvious in the food and traditional sectors. This is in keeping with the observations in Chapter 2 that investment by indigenous firms appears closely correlated with overall economic performance. In the food sector, however, it appears that output price volatility encourages investment. Perhaps this paradoxical result is capturing the effect whereby firms most fear not being able to supply a profitable market. In the hi-tech sector there appears to be no role for domestic volatility measures in explaining investment variation. The modified equation here includes the change in the punt-sterling rate and the dummy variable used in the other regressions, but lagged once.

The long-run relationships appear stable at sectoral and aggregate level. The only exception is the period 1980-85. Thus, demand volatility appears to have at least a short-run influence on investment in the traditional sector and in total manufacturing. Firms in the food sector, by contrast, may be encouraged to invest by volatile output prices. There is no evidence of domestic measures of risk having any influence on the long-run or short-run behaviour of the hi-tech sector. However, in so far as the dummy variable for the early 1980s is capturing risk, there may have been a negative influence.

Some commentators have suggested that the level of government debt may have exerted an independent effect on investment by increasing uncertainty. This was tested for by entering the debt ratio (national debt to GDP) in the investment equations. There is no long-run relationship. The

dynamic equation for total manufacturing is improved by the inclusion of the debt variable but this is outperformed by the dummy variable for the period 1980-85; this suggests that the effect is confined to the early 1980s and that the uncertainty effect springs from broader concerns than the debt problem. The debt variable does not appear significant in the sectoral equations.

4. CONCLUSION

International evidence indicates that the level of generalised risk in an economy is an important determinant of investment performance. This chapter has analysed the extent to which risk is important in explaining Irish investment patterns since the early 1980s. Dispersion between economic forecasts has been used successfully in the UK to define risk variables. Due to the limited number of forecasts available at any point in time in Ireland, this approach is inappropriate. Instead, indices of structural change and of volatility in key economic variables were used to measure uncertainty.

The analysis shows that structural change in Irish manufacturing has continued at a high level and that economic volatility has been higher than in many European countries, particular in the 1980s. Demand growth in Ireland has an important long run influence on investment in all manufacturing sectors, except high-tech, while the real cost of capital has a significant and substantial long run effect on investment in the traditional sector and in total manufacturing. Modification of standard equations to include risk variables shows that risk, as measured by demand volatility, is important for the manufacturing sector as a whole and particularly so in the traditional sector. However, risk appears to be given an impetus to investment in the food sector and has no effect on hi-tech investment.

These findings suggest that variation in the cost of capital is an important inhibitor of investment and that investment responds positively to low effective borrowing rates, when combined with stable domestic demand. Generalised risk has had a dampening effect on investment but there appear to be differences in response depending on the sector analysed. These differences are examined further in Chapter 5.

CHAPTER 5

PERCEPTIONS AND MANAGEMENT OF RISK IN IRISH FIRMS

1. INTRODUCTION¹

The analysis in Chapter 4 concludes that changes in the incidence of generalised risk were relevant in explaining overall investment performance. Honohan and O'Connell (1994) observed that generalised uncertainty "has inhibited investment decisions because it adds to perceptions of risk, and because it increases domestic interest rates". Such an observation is of course not unique to Ireland, but the volatility of demand during the early 1980s and the loss of confidence as a result of the debt crisis mean that the incidence of risk could be particularly important for Ireland. Echoes of this are to be seen in the currency instability which has continued to affect Ireland during the 1990s. The effect of volatility goes beyond increased perceptions of risk, since it will also impact on confidence through affecting expectations which can be so important for the investment decision. There will be an almost inevitable tendency for decision makers to react cautiously to sharp changes in public policy with the likely result of co-ordination failures and demand constraints on some sectors.

This chapter examines the perception of risk by firms in various sectors of the economy and the way in which decision-makers react to and manage risk. The data were obtained from a survey of Irish manufacturing firms. The survey was devised by Dr. Ciaran Driver who was also responsible for the analysis and results.

Attitudes to Risk

Firms may have a cautious attitude to risk in which case they will need a higher return to undertake a risky project. This is generally known as risk-aversion. Some firms are prepared to accept risky projects with no compensation for risk. These firms are only interested in the expected return on a project rather than the variance of the return. These firms are termed risk-neutral - they are always willing to accept a fair bet. A final possibility is that firms are risk-seeking in that they will choose a project with higher risk as a matter of choice, perhaps because they have

1. This chapter is a summary of some of the findings of work undertaken by Dr. Ciaran Driver for the Council. See note 1, Chapter 4.

expertise in such projects. While it is difficult to give a precise definition of the terms defining attitudes to risk, it is clear that firms who require a higher compensation for risky projects are more averse than those who do not.

Under risk the entrepreneur has to maximise the expected utility of profits subject to a production function, demand function and a set of input costs, all of which may be determined, at least in part, by previous experience and performance. The number of possible models is large, but some reasonably general conclusions have emerged. First, under risk aversion, capital input will generally be biased downwards if demand or output price is the source of risk. Second, under risk neutrality or risk-seeking behaviour, capital input may be biased upwards, depending on the specific features of the production process, such as substitutability between factors, returns to scale and the nature of the demand curve. One rationale for an upwards bias is that the firm may seek to insure itself against losing profitable sales by carrying sufficient capacity to be able to respond to a favourable demand shock or a favourable reduction in input costs. Third, the possibility of an upward bias is virtually eliminated if capacity and demand are allowed to diverge so that the firm runs a risk of carrying unused excess capacity. Typically the bias to capital input will now be downwards, assuming a sufficient degree of irreversibility of the capital input. This means assuming that over-expansion cannot easily be corrected either through growth or disposal of assets and that the context is one of sufficiently high capital intensity.

This chapter presents the main results of the survey of Irish manufacturing industry which was undertaken by Dr. Driver to establish which type of risk has the greatest impact on investment decisions in Ireland. Analysis of the results identify differences by sector and by size and ownership. The results of this survey regarding the performance of the indigenous sector are particularly important, since explanations which identify the high relative cost of labour as the prime determinant are unlikely to be complete, given that relative wage to capital costs peaked in the mid 1980s, but investment declined well into the mid 1990s.

Section 2 of this Chapter gives a brief description of the survey. The results are analysed in Section 2 to identify the type of risk perceived by firms in general, their attitude to risk and the effect of risk on investment decisions. The results are then disaggregated by sector, into high-tech, traditional and food sector firms. Further analysis is carried out according to firm size. The outflows from Ireland have already been identified. The survey collected data regarding the underlying reasons for foreign investment by Irish firms. Section 3 draws together some conclusions arriving out of the analysis of the information collected in the survey.

2. SURVEY ON INVESTMENT

(i) Brief Description

A questionnaire on investment was appended to the October 1995 IBEC/ESRI Investment Survey of manufacturing firms. Approximately 230 firms provided usable responses. The broad purpose of the survey was to discover whether firms in Ireland are constrained in their capital investment by risk and, if so, to specify the type of risk that is most constraining. The survey asked a number of supplementary questions to clarify the processes by which risk might inhibit the scale or timing of investment. Finally, the survey sought to establish the importance of a number of other constraints on investment and to understand the reasons why Irish firms invest abroad. The responses, which have been weighted by investment in 1995, are summarised in the Appendix to this chapter.

(ii) Results for the Total Sample

Types of Risk (Questions 6 and 8)

The survey establishes which types of risk are perceived to inhibit investment. The risk of variation in capital installation costs was not thought to be of prime importance, but it is included to provide a reference point to judge the importance of the other categories of risk. The responses show that capital investment is severely inhibited by demand/price risk, somewhat inhibited by other forms of risk and little inhibited overall by firm-level debt. These findings are, of course, for the total sample and disaggregated analysis will show more particular concerns.

The survey was also concerned to establish whether some types of investment were more risky than others. In particular it tested the hypothesis that expansionary investment is more risky than cost-cutting investment. The replies show that expansionary investment is more risky by a majority of two-to one. This is not surprising, given the concern expressed over demand risk.

Risk attitude (Question 10)

Capital investment is affected by risk in several ways. First, firms that are averse to various types of risk may invest less than others who are risk-loving or risk-neutral. Put differently, risk-averse firms need to be compensated for higher risks and may prefer a project with lower return if the risk is also lower. The survey would appear to indicate that Irish firms are generally quite risk-averse. The responses may be contrasted with the

responses to a similar survey question asked of Austrian firms (Aiginger 1987). The type of firm seems similar, with most of the Austrian firms having domestic market shares between 5 per cent and 50 per cent. For medium-size Austrian projects, costing half their annual investment programme, risk behaviour was spread fairly evenly between risk neutrals, risk lovers and risk averters. For projects many times the annual budget, just over 50 per cent were risk averse with 12 per cent risk-lovers. These figures show a pronounced contrast with firms operating in Ireland. The contrast is also marked for small firms with less than 100 employees; in Austria 14 per cent of these are risk-seekers as compared with just 4 per cent in Ireland. However, as noted in Chapter 3 above, research in the UK has also indicated a high degree of risk aversion across a broad range of firms.

Irreversibility of Capital Commitment (Question 4)

Risk aversion is not the only way in which risk inhibits firms from investing. Even firms who are risk-neutral may find it profitable to err on the side of caution since investment in fixed assets is usually irreversible. A cautious investment approach would be best for the firm if the loss in profits from excess capacity were to outweigh the loss in profits from deficient capacity. The survey found that only a quarter of firms thought the loss to be greatest from excess capacity. We interpret this to mean that irreversibility is only a major problem for these firms. Nevertheless, of this quarter of high irreversibility firms, 70 per cent were inhibited "a lot" by demand risk.

Effect of Risk on Investment Timing (Question 9)

Risk affects not only the scale of an investment project but also its timing. Although a significant proportion of investment is started promptly, approximately the same percentage is delayed because of risk. The damage from this delay was investigated by asking firms whether and how it would affect their prospects. Nearly half replied that delay would have a "substantial" effect with a further 15 per cent recording a "drastic" effect. Nearly a third felt they would suffer only little damage. Nevertheless, nearly a third of all firms who state that a year's delay would involve "substantial" damage still delay investing because of risk; a further third of those who saw delay as involving "substantial" damage have to delay due to technical factors.

(iii) Disaggregated Results by Sector

Risk Perceptions

There is considerable variation in risk-behaviour and attitude across the three broad industrial sectors, as shown in Table 5.1. Firms in the hi-tech sector are far more inhibited by demand/price risk than by input cost risk. This is also true for firms in the traditional sector, though to a lesser extent. Input cost risk ranks equally with demand/price in the case of food, but is of strikingly low concern in hi-tech. The figures for the risk of exposure to debt are shown in the table both for those responding "a lot" and for those responding "no" because they are both of interest. The hi-tech sector is unconcerned by debt, presumably because investment is largely financed by profit retention or equity and because debt may be a parent company concern for a lot of subsidiaries. In the traditional sector there is clearly some concern in that less than half of the firms did not dismiss the risk as irrelevant.

TABLE 5.1
Risk Perceptions by Sector
Percentage with Characteristic within Each Sector

Characteristic	Hi-tech	Traditional	Food
demand/price risk - % inhibited a lot	71	53	23
input cost risk - % inhibited a lot	8	26	26
debt exposure - % inhibited a lot (not at all)	3(91)	1(45)	17(66)
% risk-seekers	27	2	1
% risk-averse	60	86	94
% expansionary more risky	61	33	82
% cost-cutting more risky	32	35	6

The table shows that risk seekers are virtually absent, except in the hi-tech sector, where they are concentrated in chemicals and office machines. Even within the hi-tech sector, however, a majority are risk-averse. Within the traditional and food sectors, 86 per cent and 94 per cent respectively are risk averse. Expansionary investment is regarded as most risky in the food and hi-tech sectors. This may be partly because the food sector has excess capacity and the hi-tech sector exports a high percentage of its output. The more balanced response of the traditional

sector reflects its focus on a limited range of markets, but it may also reflect the perceived risk of debt in financing any type of investment.

Irreversibility by Sector

All three sectors tend to regard too little capacity as more damaging than too much. The traditional sector is more even balanced between these two replies. This may be because investment constitutes a more irreversible commitment for the traditional sector. Growth is slower in this sector and it will take longer to reverse mistakes.

Investment Timing by Sector

The cyclical timing of investment can have important macroeconomic effects independent of the rate of capital formation. In particular, slow response times can cause supply constraints at a time when the potential for growth is greatest. The survey shows that delay due to risk is an important feature of firms in the hi-tech and traditional sectors. For the hi-tech sector, this delay is probably inevitable given that these firms are dealing with highly risky discrete projects. For the traditional sector, the percentage delaying on account of risk ranks close to the hi-tech response. This is disturbing because this sector is more risk averse than hi-tech and the projects concerned are likely to be of a lower level risk.

R&D and Corporate Taxation by Sector

The survey investigated two other specific constraints on investment: insufficient accumulated stock of R&D, and levels of corporate taxation. Insufficient R&D could play a part in limiting a firm's process or product development, thus affecting its capital expenditure. R&D is also a potential antidote to risk - recent academic studies have shown that a discriminating characteristic of innovating and non-innovating firms is that innovators are less sensitive to cyclical shocks (Geroski and Machin 1994). One fifth of the firms in hi-tech are inhibited "a lot" but the percentage "not inhibited" is in line with the whole sample. The other sectors respond fairly heavily that investment is inhibited "somewhat" by accumulated R&D. Put differently, while the hi-tech sector is intensively inhibited, firms in the other sectors are extensively inhibited.

Only a tiny percentage in any sector is inhibited "a lot" by the corporate tax system. The food sector has the highest proportion reporting itself as "somewhat" inhibited, but even in this case more than half of the sample indicates no concern on this score.

(iv) Impact of Firm Size

Four size groups are distinguished: small firms with less than 100 employees, medium size firms with between 100 and 500 workers and large firms with more than 500 workers. Among small and medium firms, about 7 per cent are inhibited a lot by exposure to debt. No large firm gives this response. It is, of course natural that the smaller firms are most vulnerable, partly because some small firms will be new and untested and partly because information costs will dissuade the banks from analysing the specific circumstances of small firms.

In regard to investment timing, small firms are four times more likely to delay investing because of risk than they are to start investing immediately. A higher proportion of these than in the full sample believe they would suffer drastic or substantial damage to profits from a year's delay. Clearly these results are a cause of some concern.

Only one third of the large firms has no concern in respect of corporate taxation. This compares with a figure of two-thirds for the full sample. This large-firm sector contains most of the risk-seeking firms in the economy, concentrated in the office machinery industry, so the issue is clearly important. The expressed concern may partially reflect the absence of provision for assuming shorter asset lives for depreciation purposes in industries such as office machines.

The relative riskiness of expansionary and cost-cutting is size-dependent. Cost-cutting projects rank almost equally with expansionary projects in terms of riskiness for the medium size firms and this is in marked contrast with firms in other size groups where expansionary projects are heavily cited as more risky. The contrast may partly reflect the nature of the end market with the export-oriented hi-tech firms, concerned about demand risk. The contrast may also reflect differences in managerial or technical competence to carry through efficiency investments.

(v) Risk, Diversification and Foreign Direct Investment

A third of the weighted sample has made decisions in relation to investment abroad. For the large and very large groups, the proportion was close to 70 per cent. Broken down by sector, exactly half the traditional sector had made foreign investment decisions as compared with just under a third of the other two sectors. When ownership is taken into account, nearly half the independents and nearly a third of the foreign sample had made foreign investment decisions. Large independent firms in the traditional sector are more likely to invest abroad than other types of firm.

TABLE 5.2
Reasons for Foreign Investment
Percentage within Each Column Responding:
Very Important (Important)

	Whole Sample	Hi-Tech	Traditional	Food
proximity to markets	40(59)	26(74)	60(40)	67(27)
firm has unique competitive advantage	25(71)	13(79)	4(96)	92(4)
production and labour costs abroad	60(35)	78(17)	36(61)	28(63)
geographical diversification to minimise risk	19(23)	13(5)	28(42)	25(65)
home market is saturated	11(12)	0(11)	5(16)	57(7)
other (trade barriers, grants, tax, etc.)	42(35)	66(24)	0(34)	10(78)

Note: Where the numbers in any cell add to 100, no respondent has answered "not important".

For the hi-tech sector, investment location seems to be largely cost-driven with production and labour costs as well as tax and grants (i.e. other factors, in the table above) scoring highest. The dominant concern for food is the use of its competitive advantage - presumably technological expertise - and the need to locate close to new markets, given the saturation of home demand. The traditional sector seeks to locate close to new markets, and is concerned with production and labour costs. Both the traditional and food sectors express a substantial concern for geographical diversification as a way of hedging against risk. This may be associated with the high level of exchange rate volatility in recent years. Since investment in both these sectors is largely financed from retained earnings, there is no matching liability when an asset is acquired. This may help explain why firms choose to invest abroad. It is less clear whether this action is what their shareholders would ideally wish.

3. SUMMARY OF RESULTS

This chapter presents the main results of a survey of Irish manufacturing industry to determine the types of risk which are perceived as important, the reaction of firms to risk and the extent to which these perceptions and

actions differ between sectors. The survey showed that the volatility of demand is the main source of the risk perceived by firms and there were indications that Irish owned firms may be particularly risk averse. Investment was further inhibited, particularly in the traditional sector, by the perception that over capacity would be very costly.

Small firms are most likely to delay because of risk although they perceive that they will also suffer most from this delay. This appears to be serious for small firms in general, but especially for those in the traditional sector. Fear of over exposure to debt is also a strong constraint on Irish owned firms, particularly those in the food industry. Among other factors inhibiting investment, lack of R&D is important in some Irish owned sectors, but corporate taxation is not a major issue with the exception of large firms in the high-tech sector. Large independent firms in the traditional sector have a high propensity to invest abroad, mainly so as to be close to their markets. Diversity to avoid risk appears to be a relatively minor issue in the decision to invest abroad.

The risk associated with demand volatility is particularly important in the Irish owned and traditional sector and among small firms. The irreversibility of capital investment, combined with a fear of over expansion, leads to a high degree of risk aversion. While this chapter has focused on borrower risk, in other words the extent to which risk may impact on the demand for capital and thus investment, this finding does suggest that certain constraints, for example constraints in the availability of finance - either regarding its volume or conditions attached - may be inhibiting risk taking. Other findings, particularly those relating to small and medium sized firms, further suggest that constraints operating in relation to access to finance may exaggerate perceptions of borrower risk, and thus inhibit investment. In addition, access to R&D indicates the importance of initiatives to improve the flow of information in the economy in providing a stimulus to investment. The findings of this survey would also, on balance, lend support to the previous stated position of the Council that policy should not inhibit foreign investment by Irish firms since most of this investment appears to be driven by factors which are likely to improve the competitive position of Irish firms.

SUMMARY OF FINDINGS AND CONCLUSION

1. MAIN FINDINGS

The aims of this study were to identify the trend in the rate of investment in Ireland, to discover the factors underlying it and to determine whether or not there are implications for the sustainability of growth arising from the level of investment in fixed capital.

The data in Chapter 2 show a declining rate of investment for most of the decade and a half up to 1993. Since 1994 there has been a consistent recovery. The 1979-1993 experience is in contrast to the period from 1960 to the early 1980s, when investment was generally buoyant and rising as a proportion of GDP. The rate of investment has been low and output growth has been buoyant for much of the 1990s and this has led to the proposition that Ireland is undergoing a period of investmentless growth.

The analysis in Chapter 2 shows however that this overall performance is not indicative of individual sectors of the economy and substantial differences are evident at sub-sector level. In fact, the data show that employment growth has been most rapid in the sub-sectors where investment per person employed was generally the highest. These are mostly sectors which are predominantly foreign-owned. The lowest rates of investment occurred in low growth sectors which are predominantly Irish-owned. However, the data showed a slightly different trend from 1994 when overall investment began to grow more rapidly. In 1994 and 1995 there was a much stronger performance of investment by indigenous industry. Further analysis in Chapter 2 also showed that although the rate of investment has been falling, the capital stock has continued to grow during the 1990s in excess of employment creation in manufacturing. Thus, the capital intensity of employment in manufacturing has continued to rise. It was also shown in Chapter 2 that the level of investment in services has been buoyant. The evidence indicates that the problem of a low rate of investment in the Irish economy existing simultaneously with a high rate of output growth is a statistical artefact, emerging from the historically poor performance of Irish owned manufacturing industry, and the rapid growth of the service sector where the capital labour ratio may be different than in manufacturing, rather than a general phenomenon for the economy as a whole.

The key question is whether or not these trends have implications for the sustainability of growth. A number of explanations were put forward in Chapter 3 which together suggest that output growth in the future requires a lower rate of investment than previously. For a start, the long decline in the rate of investment through the 1980s and early 1990s can, to an extent, be explained as a correction from an earlier period of over-investment driven by public sector deficits. Furthermore, there have been improvements in capital utilisation in Ireland. As a result, the return to capital in Ireland has grown. A number of structural changes, such as the move towards more high-tech, human capital intensive production and the growth of the service sector have also meant that the ratio of fixed capital to output has risen for the economy as a whole. However, many sectors remain relatively labour intensive and it is the poor growth of output and investment in these sectors before 1994 which would give cause for concern, should previous trends reassert themselves. These changes in the economy have not been reflected in modifications in the way in which investment data is compiled. Taken together, these factors mean that total output has been able to grow at a rate considerably in excess of growth of the capital stock.

There is no evidence that an overall funding constraint has impaired the rate of investment, although certain firms, particularly small firms, may have difficulties accessing sources of capital and may find capital costs expensive.

While the impact of some of these factors may be less in the future - for example, capacity utilisation is nearing the EU average - there is no reason to believe that productivity will not continue to grow as the structural change in the economy proceeds and new forms of technology are consistently introduced. To facilitate this process, investment in human capital, managerial competence and the organisational capabilities within and between firms would appear to be key factors. These are the vital areas for policy to ensure a desirable outcome. However, Chapter 3 did suggest that should capital outflows become continuous and long-term there are implications for investment. There is some evidence that policy interventions over the recent years have had an impact in terms of the accessibility of funding for firms previously constrained in this report. Opportunities to further develop these initiatives should be pursued.

Standard macroeconomic models of investment generally include the relative costs of capital and demand conditions as key determinants of the rate of investment. Profitability has also been found to be important in many studies. The model of investment summarised in Chapter 4 showed that capital costs and demand conditions are the key variables

determining investment in Ireland. However, when modified by the inclusion of variables to account for risk in the economy - derived from indices of volatility in macroeconomic indicators - the explanatory power of the model was improved. This is particularly the case for manufacturing in total and for the traditional sector. This internal measure of risk had no impact in the high-tech sector, where investment decisions are largely exogenous, although movements in exchange rates were important in determining the level of investment by US companies in any particular year. Thus, there is evidence that periods of macroeconomic instability have dampened investment in Ireland, leading to the conclusion that a reduced cost of capital and steady growth of demand provide the best conditions to stimulate investment. In addition, the survey provided some evidence that liquidity constraints may be important for SMEs.

Some difficulties were experienced in identifying and quantifying an appropriate variable for risk in the economy. In any case, generalised risk is of limited usefulness since it is the perception of risk, and the reaction to this perception by decision-makers, which affects investment. Data on these issues were collected from a survey of manufacturing firms in Ireland and are analysed in Chapter 5. The results show that Irish firms are predominantly risk averse with uncertainty over the level of demand being a key determining factor affecting investment decisions. Although they are aware that delay in investing can be costly, many Irish firms appear willing to alter the timing of investment in response to uncertainty, particularly expansionary investment. This problem appeared to be most serious for small firms and firms in traditional sectors. This finding is in keeping with those data which show indigenous Irish firms, which constitute the vast majority of firms in the traditional sector, had the weakest investment performance in the early 1980s and only began to invest at a higher rate in 1994 when strong economic growth was well under way.

Although risk was certainly perceived as important to investment decisions in general, the level of risk in Ireland, and risk diversification were not major influences on the decision of Irish firms to invest abroad. Rather, these firms invested abroad to be close to markets, to avail of cost competitive locations and to further exploit their own competitive advantages.

2. IMPLICATIONS OF THESE FINDINGS

The evidence from the past couple of years suggests that the previous period of low and declining investment has been reversed. The overall

rate of investment for the economy has improved considerably and there is some evidence that this is true also in the previously low investing sectors of the economy. Conditions for investing have improved due to the period of steady economic growth and lower interest rates. These factors are particularly important for the indigenous sector since they simultaneously improve the rewards to investing and reduce the risks from doing so. This underlines the importance of maintaining stability in aggregate economic indicators, particularly the growth of aggregate demand.

Given the positive relationship between investment, output growth and employment creation which is evident at the sub-sectoral level, the Council expresses some concern that the investment performance of the early 1990s, which was largely the result of the poor investment performance of indigenous industry, could undermine the productive and employment creation capacity of the indigenous sector should the trend reassert itself in the near future. This concern does not arise from observation of the trend in fixed capital formation in the economy in general. The dual structure of the economy, and the increasing importance of human capital intensive sectors, means that the historical trend in investment does not necessarily have implications for aggregate growth of output. Investment in human capital is a more pressing requirement for the future performance of the high-tech sectors. However, the findings of Council Report on *The Association between Economic Growth and Employment Growth in Ireland* (NESC, 1992), indicate that employment growth requires balanced output growth. This underlines the importance of maintaining the stronger investment performance of indigenous sectors seen in the last couple of years.

Substantial financial outflows since 1990 do not appear to have been a contributory factor to the low investment in some sectors. These flows are the result of conditions in the economy, many of which are desirable. These include high savings, a good current account outcome and the acquisition of optimal asset portfolios by financial institutions, in addition to foreign expansion by successful Irish firms. However, this does not preclude the possibility that institutional deficiencies in Ireland could have a role to play, which could make these outflows long-term and excessive. In addition, it is desirable that efforts continue to identify opportunities for investment in Ireland by financial institutions. Improvements in profitability and a better risk environment are not necessarily sufficient to achieve this.

The question of sustainability is central to the debate on investment in the economy. These findings indicate that, at an aggregate level, concerns regarding the sustainability of growth relative to increases in the

productive capacity in the economy are not justified. However, the possibility that congestion externalities, as a result of bottlenecks in particular sectors of the economy, may restrict medium-term growth cannot be ignored. These problems arise primarily in relation to investment in transport infrastructure and possible skill shortages. These issues are possibly most important in relation to short- to medium-term investment performance and policy in the economy. The possible emergence of these problems is likely to be lessened through infrastructural and educational investment; the recently announced Education Technology Investment Fund is an example of such an investment.

One final point is worth noting. The identification of investment trends and their implications is hampered somewhat by the nature and timing of much of the data available. Improvements in timeliness have taken place, particularly regarding the Census of Industrial Production, over the last couple of years. However, some reassessment of the methodology employed in the compilation of statistics on investment is appropriate to ensure that weightings are used to bring trends in investment more in line with what is happening to productive capacity.

APPENDICES

APPENDIX TO CHAPTER 2
Definition of NACE Codes in Manufacturing

NACE	Description
15-16	Food products, Beverages and Tobacco
17-20	Textiles, Clothing, Leather, Wood and Wood products
21	Paper and Paper Products
221-222	Publishing and Printing
223	Recorded Media
24	Chemicals, Chemical products and Man-made Fibres
25-29	Rubber and Plastic products, Mineral and Metal products, Machinery and Equipment
30	Office Machinery and Computers
31-33	Electrical appliances, Automotive components and Medical Equipment
34-35	Transport Equipment
36-37	Other Manufacturing

APPENDIX TO CHAPTER 5

Survey Questionnaire and Results

(Figures are weighted percentages except Question 1)

1.	Which description best fits the sector in which your firm operates?:			
	Traditional			40
	High-Tech			40
	Food			20
2.	How do you usually respond if demand weakens after you have completed an investment?:			
	We try to maintain the price even if it means some loss of sales			17
	We try to lower price in some markets to try to maintain sales			42
	We have to accept the market price and adjust production			41
3.	What action, apart from normal overtime, do you take if you find you have too little capacity?:			
	lengthen order-books			32
	sub-contract or put in extra shifts			61
	raise price			1
4.	Which action would be most damaging for your firm's profits?:			
	over-investment resulting in 10% excess capacity			24
	under-investment resulting in 10% capacity shortage			46
	these are equally damaging			30
5.	When an upturn in demand is expected, you may need to decide when to add capacity. Do you usually?:			
	delay investing until you are sure the upturn will be sustained			28
	delay investing because capital investment can only be done in large bites			20
	start investing once forecasts predict rising demand			36
	operate with enough spare capacity always to meet peak demand			16
6.	Do the following types of uncertainty tend to seriously inhibit your investment commitments?:			
		Yes	Somewhat	No
	uncertainty about future demand or price	59	37	4
	uncertainty about future unit input cost	14	64	2
	uncertainty due to exposure to debt	5	16	80
	uncertainty over capital installation cost	8	39	53
7.	Does your investment tend to be inhibited by?:			
		A lot	Somewhat	Not at all
	a lack of accumulated R&D:	13	15	72
	the way investment is treated under the present corporate taxation rules	2	31	68

8.	In your firm's experience, which tends to be <i>more</i> risky: Investment for cost-saving or investment for expansion?:			
	cost-saving projects			27
	expansionary projects			60
	there is no difference			12
9.	In the market in which you operate, if your firm were to delay a large capital investment project by one year or more, how much would that affect the firm's future prospects?:			
	Drastically			15
	Substantially			48
	A little			31
	Not at all			7
10.	Suppose you compare two projects. The return for project A is reasonably certain. Project B has a higher payback but also considerable risks. Which is most true?:			
	We tend to prefer the project with the known but lower rate of return			71
	We tend to prefer the project with the higher return but also higher risks			18
	We calculate the statistical 'average' rate of return and choose on this basis			11
11.	(a) Has your firm ever made decisions relating to capital investment abroad?:			
	Yes	33		
	No	67		
	(b) If yes, how important were each of the following factors in making those decisions?:			
		Very Important	Important	Not Important
	proximity to markets	40	59	1
	firm has unique competitive advantage	25	71	4
	production and labour costs abroad	60	35	5
	geographic diversification to minimise risk	19	23	58
	home market is saturated	11	12	77
	other (trade barriers, grants, tax etc.)	42	35	23

BIBLIOGRAPHY

- Aiginger, K. (1987), *Production and Decision Theory under Uncertainty*. Oxford: Basil Blackwell
- Bacon, P. (1997), 'The Scope for Increasing Investment Opportunities in Ireland for Portfolio Investors'. *Irish Banking Review*, Autumn, pp.2-12.
- Barry, F. (1991), "Issues in the analysis of Irish unemployment" in J. Bradley, J. FitzGerald, and D. McCoy, *Medium-Term Review 1991-96*. Dublin: ESRI
- Berndt, E. (1990), *The Practice of Econometrics: Classic and Contemporary*. London: Addison Wesley.
- Bradley, J., FitzGerald, J. and D. McCoy (1991), *Medium-Term Review 1991-96*. Dublin: ESRI.
- Bradley, J., FitzGerald, J. and I. Kearney (1993), 'Modelling Supply in an Open Economy Using a Restricted Cost Function', *Journal of Policy Modelling*, January, pp.11-21
- Catinat, M., Cawley, R., Ilzkovitz, F., Italianer, A. and M. Mors (1987), 'The Determinants of Investment', *European Economy*, No. 31, pp.5-60. Luxembourg: European Commission.
- Chirinko, R. (1993), 'Business Fixed Investment Spending: A Critical Survey of Modelling Strategies, Empirical Results and Policy Implications' *Journal of Economic Literature*, Vol. XXXI, pp1875-1911.
- Clark, P. (1979), 'Investment in the 1970s: theory, performance and prediction', *Brookings Papers on Economic Activity*, Vol. 1, pp.73-113.
- Deloitte & Touche and Bacon & Associates (1996), *Increasing Investment Opportunities for Pension Funds in the Economy of Ireland*. Consultants' Report.
- Denny, K. and C. Guiomard (1997), *Road Infrastructure and Productivity in Irish Manufacturing 1951-1994*, Working Paper WP97/6, Department of Economics, UCD, Dublin.
- Dixit, A. and R. Pindyck (1994), *Investment Under Uncertainty*. London: Harvester Wheatsheaf.
- Dreze, J. and C. Bean (1990), *Europe's Unemployment Problem*. Cambridge, MA: MIT Press.
- Driver, C. and D. Moreton (1992), *Investment, Expectations and Uncertainty*. Oxford: Basil Blackwell.

- Duffy, D., Fitzgerald, J., Kearney, I. and F. Shortall (1997), *Medium-Term Review 1997-2003*. Dublin: ESRI.
- European Commission (1991), *Country Studies No. 6: Ireland: Luxembourg*: European Commission, Directorate General for Economic and Financial Affairs.
- European Economy (1996), *The Economic and Financial Situation in Ireland: Ireland in the Transition to EMU*, No. 1. Luxembourg: European Commission.
- Ford, R. and P. Poret (1991), 'Business Investment: Recent Performance and Some Implications for Policy', *OECD Economic Studies*, No. 16, Spring, pp.79-131. Paris: OECD.
- Forfás (1996), *Shaping our Future: A Strategy for Enterprise in Ireland in the 21st Century*. Dublin: Forfás.
- Geroski, P. and S. Machin (1994), 'Innovation, Profitability, and Growth Over the Business Cycle' in K. Aiginger and J. Finsinger (eds.), *Applied Industrial Organisation*. Dordrecht: Kluwer Academic Publishers.
- Henry, E. (1989), *The Capital Stock of Ireland 1950-84*, General Research Series Paper No. 145. Dublin: ESRI.
- Honohan, P. (1992), *Intersectoral Financial Flows in Ireland*, General Research Series Paper No. 158. Dublin: ESRI.
- Honohan P. and J. Kelly (1997), 'Financial Flows and the Balance of Payments' in D. Duffy, J. Fitzgerald, I. Kearney and F. Shortall (eds.), *Medium-Term Review 1997-2003*, pp.67-80. Dublin: ESRI.
- Honohan, P. and P. O'Connell (1994), *Ex-Ante Appraisal of the Irish National Development Plan, 1994-99*. Dublin: ESRI.
- Kenny, G. (1996), 'Economic Growth in Ireland: Sources, Potential and Inflation', *Quarterly Bulletin*, Autumn, Central Bank of Ireland, pp.43-53.
- Layard, R., Nickell, S. and R. Jackman (1991), *Unemployment: Macroeconomic Performance and the Labour Market*. Oxford: Oxford University Press.
- McCall, B. (1997), 'Filling the Gap', *Enterprise & Innovation*, Issue 11, vol. 3, November 1997.
- NESC (1992), *The Association Between Economic Growth and Employment Growth in Ireland*, Report No. 94. Dublin: NESC.
- O'Grada, C. and K. O'Rourke (1995), 'Economic Growth: performance and explanations' in J. O'Hagan (ed.), *The Economy of Ireland*. Dublin: Gill and Macmillan.
- OECD (1996), *Economic Outlook*, December. Paris: OECD.
- Reynolds, G. (1988), 'Capital Liberalisation and Strengthening the EMS - An Irish View', *Central Bank of Ireland Quarterly Bulletin*, Summer, pp.63-72.
- Rowthorn, R. (1995), 'Capital Formation and Unemployment', *Oxford Review of Economic Policy*, Vol. 11 (1), pp.26-39.
- Sabel C. (1994), 'Learning by Monitoring: the institutions of economic development' in N. Smelser and R. Swedberg (eds.), *Handbook of Economic Sociology*, pp.137-165. Princeton, NJ: Princeton-Sage.
- Summers, L. (1990), *Understanding Unemployment*. Cambridge, MA: MIT Press.
- Walsh, M. and J. Murray (1993), *Pension Fund Investment*. Consultants' Report.

NATIONAL ECONOMIC AND SOCIAL COUNCIL PUBLICATIONS

NOTE: The date on the front cover of the report refers to the date the report was submitted to the Government. The date listed here are the dates of publication.

<i>Title</i>	<i>Date</i>
1. Report on the Economy in 1973 and the Prospects for 1974.....	April 1974
2. Comments on Capital Taxation Proposals	July 1974
3. The Economy in 1974 and Outlook for 1975.....	Nov 1974
4. Regional Policy in Ireland A Review.....	Jan 1975
5. Population and Employment Projections: 1971-86	Feb 1975
6. Comments on the OECD Report on Manpower Policy in Ireland	July 1975
7. Jobs and Living Standards Projections and Implications	June 1975
8. An Approach to Social Policy	June 1975
9. Report on Inflation.....	June 1975
10. Causes and Effects of Inflation in Ireland.....	Oct 1975
11. Income Distribution: A Preliminary Report.....	Sept 1975
12. Education Expenditure in Ireland.....	Jan 1976
13. Economy in 1975 and Prospects for 1976	Oct 1975
14. Population Projections 1971-86: The Implications for Social Planning - Dwelling Needs	Feb 1976
15. The Taxation of Farming Profits	Feb 1976
16. Some Aspects of Finance for Owner-Occupied Housing.....	June 1976
17. Statistics for Social Policy.....	Sept 1976
18. Population Projections 1971-86: The Implications for Education.....	July 1976
19. Rural Areas: Social Planning Problems	July 1976
20. The Future of Public Expenditure in Ireland	July 1976
21. Report on Public Expenditure.....	July 1976
22. Institutional Arrangements for Regional Economic Development	July 1976
23. Report on Housing Subsidies	Feb 1977
24. A Comparative Study of Output, Value-Added and Growth in Irish and Dutch Agriculture.....	Dec 1976
25. Towards a Social Report.....	Mar 1977
26. Prelude to Planning	Oct 1976
27. New Farm Operators, 1971 to 1975.....	April 1977
28. Service-type Employment and Regional Development	July 1977
29. Some Major Issues in Health Policy.....	July 1977
30. Personal Incomes by County in 1973	July 1977
31. The Potential for Growth in Irish Tax Revenues	Sept 1977
32. The Work of the NESc: 1974-1976.....	Sept 1977
33. Comments on Economic and Social Development, 1976-1980	July 1977
34. Alternative Growth Rates in Irish Agriculture	Oct 1977
35. Population and Employment Projections 1986: A Reassessment.....	Oct 1977
36. Universality and Selectivity: Strategies in Social Policy	Jan 1978
37. Integrated Approaches to Personal Income Taxes and Transfers	Mar 1978
38. Universality and Selectivity: Social Services in Ireland	June 1978
39. The Work of the NESc: 1977	June 1978
40. Policies to Accelerate Agriculture Development.....	Sept 1978
41. Rural Areas: Change and Development.....	Sept 1978
42. Report on Policies for Agricultural and Rural Development.....	Sept 1978

43. Productivity and Management	Feb 1979
44. Comments on Development for Full Employment	Dec 1978
45. Urbanisation and Regional Development in Ireland	June 1979
46. Irish Forestry Policy	Sept 1979
47. Alternative Strategies for Family Income Support	April 1980
48. Transport Policy	Mar 1980
49. Enterprise in the Public Sector	May 1980
50. Major Issues in Planning Services for Mentally and Physically Handicapped Persons	Oct 1980
51. Personal Incomes by Region in 1977	July 1980
52. Tourism Policy	Dec 1980
53. Economic and Social Policy 1980-83: Aims and Recommendations	Nov 1980
54. The Future of the National Economic and Social Council	Feb 1981
55. Urbanisation: Problems of Growth and Decay in Dublin	Sept 1981
56. Industrial Policy and Development: A Survey of Literature from the Early 1960s to the Present	Feb 1981
57. Industrial Employment and the Regions 1960-82	May 1981
58. The Socio-Economic Position of Ireland within the European Economic Community	Sept 1981
59. The Importance of Infrastructure to Industrial Development in Ireland - Roads, Telecommunications and Water Supply	Sept 1981
60. Minerals Policy	Oct 1981
61. Irish Social Policies: Priorities for Future Development	Nov 1981
62. Economic and Social Policy 1981 - Aims and Recommendations	Oct 1981
63. Population and Labour Force Projections by County and Region, 1979-1991	Oct 1982
64. A Review of Industrial Policy (A Summary of this report is available separately)	Oct 1982
65. Farm Incomes	Nov 1982
66. Policies for Industrial Development: Conclusions and Recommendations	Oct 1982
67. An Analysis of Job Losses in Irish Manufacturing Industry	June 1983
68. Social Planning in Ireland: Its Purposes and Organisational Requirements	April 1983
69. Housing Requirements and Population change, 1981-1991	August 1983
70. Economic and Social Policy 1982: Aims and Recommendations	April 1983
71. Education: The Implications of Demographic Change	April 1984
72. Social Welfare: The Implications of Demographic Change	April 1984
73. Health Services: The Implications of Demographic Change	April 1984
74. Irish Energy Policy	April 1984
75. Economic and Social Policy 1983: Aims and Recommendations. A Review of the Implications of Recent Demographic changes for Education, Social Welfare and the Health Services (Background Paper)	April 1984
76. The Role of the Financial System in Financing the Traded Sectors	Oct 1984
77. The Criminal Justice System: Policy and Performance	Feb 1985
78. Information for Policy	July 1985
79. Economic and Social Policy Assessment	Jan 1985
80. The Financing of Local Authorities	May 1985
81. Designation of Areas for Industrial Policy	Nov 1985
82. Manpower Policy in Ireland	Jan 1986

83. A Strategy for Development 1986-1990 (A Summary of this report is available separately)	Nov 1986
84. Community Care Service: An Overview	Nov 1987
85. Redistribution Through State Social Expenditure in the Republic of Ireland: 1973-1980	Dec 1988
86. The Nature and Functioning of Labour Markets	Dec 1988
87. A Review of Housing Policy	Mar 1989
88. Ireland in the European Community: Performance, Prospects and Strategy	Sept 1989
89. A Strategy for the Nineties: Economic Stability and Structural Change	Oct 1990
90. The Economic and Social Implications of Emigration	May 1991
91. Women's Participation in the Irish Labour Market	Jan 1992
92. The Impact of Reform of the Common Agricultural Policy	May 1992
93. The Irish Economy in a Comparative Institutional Perspective	Jan 1993
94. The Association between Economic Growth and Employment Growth in Ireland	Feb 1993
95. Education and Training Policies for Economic and Social Development	Oct 1993
96. A Strategy for Competitiveness, Growth and Employment	Nov 1993
97. New Approaches to Rural Development	Feb 1995
98. Strategy into the 21st Century: Conclusions and Recommendations	Oct 1996
99. Strategy into the 21st Century	Nov 1996
100. Networking for Competitive Advantage	Nov 1996
101. European Union: Integration and Enlargement	Mar 1997
102. Population Distribution and Economic Development: Trends and Policy Implications	Dec 1997

NESC Research Series

RS

1. Clusters in Ireland
The Irish Dairy Processing Industry:
An Application of Porter's Cluster Analysis
2. Clusters in Ireland
The Irish Popular Music Industry:
An Application of Porter's Cluster Analysis
3. Clusters in Ireland
The Irish Indigenous Software Industry:
An Application of Porter's Cluster Analysis