NESC REPORT NO. 5

POPULATION AND EMPLOYMENT

PROJECTIONS:1971-86

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POPULATION AND EMPLOYMENT PROJECTIONS, 1971–86

Prepared by
BRENDAN M. WALSH

PART I

THE COUNCIL'S COMMENTS ON 'POPULATION AND EMPLOYMENT PROJECTIONS: 1971-86'

Introduction*

1. The Report on Full Employment of the National Industrial Economic Council was published in March 1967. That report stated the problems, assessed their dimensions, suggested some of the main elements of a broad strategy by which full employment might be pursued, examined some of the main obstacles which then lay in the way of its achievement, and generally posed the choices which the community, if it wanted full employment, would have to face and make. The Third Programme for Economic and Social Development 1969–1972 was drawn up against the background of the NIEC Report on Full Employment and was presented as a step on the road to that goal.

2. Since the NIEC Report was published, the achievement in providing new industrial and service employment has been significant. Despite this, much is still required if the goal of full employment is to be reached. The National Economic and Social Council, therefore, decided that the whole question of the achievement of full employment should be re-examined.

3. The first step is to identify the magnitude of the problem—that is, the increase in total employment that would have on average to be achieved each year in order to reach full employment at some specified future date. We have taken 1986 as the target date. This choice is clearly arbitrary. It envisages the achievement of full employment over a similar period to that taken by the NIEC. We asked Professor Brendan Walsh to make population projections for the period 1971–86, and to calculate the net increase in total employment that would have to be achieved if full employment were to be reached by 1986, on certain assumptions about the possible behaviour of emigration, fertility, marriage and participation rates. The results of Professor Walsh's study are published

*A draft of these comments was prepared by the Economic Policy Committee and discussed and amended by the Council at its meetings on 3 October 1974 and 24 October 1974. The comments were drafted by Tom Ferris of the Council's Secretariat.

in Part II of this report. Any set of population projections must rest on assumptions about how relevant variables will behave in the future. The projections must, therefore, be seen as providing a broad indication of the magnitude of the problem of achieving full employment, on the assumptions underlying the study.

4. It cannot be emphasised too strongly that Professor Walsh's projections are not forecasts of what will happen. They show what could happen between now and 1986 to the numbers who might be seeking work and to the numbers of dependants who must be supported, on certain explicit assumptions. We accept that these assumptions are reasonable in the light of the best information now available. Whether or not they turn out to be true depends on the actions of individuals and organised groups, and on the effectiveness of the economic and social policies that are applied, over the next fifteen years or so. If, for example, economic growth flags, many more might emigrate than Professor Walsh assumed. This could alter many of his other assumptions and the position by 1986 could, therefore, be radically different. Nevertheless, the projections as they stand give a broad indication of the magnitude of the problem that economic and social policies must face. If policies fail to resolve these problems, other and more serious economic and social problems will be created.

5. The Economic Policy Committee of the Council is currently engaged in assessing the possibility of achieving the growth in output, productivity and investment which would be required if employment were to be provided in Ireland for the projected growth in the labour force. It is hoped that the results of the work of the Economic Policy Committee in this field will be published in the near future. Professor Walsh's projections are also being examined by the Regional and Social Policy Committees of the Council. Prior to any conclusions being reached by the Committees, the Council decided to recommend that Professor Walsh's study should be published because of its important social and economic implications.

Summary of Professor Walsh's Study

6. The assumptions on which Professor Walsh's projections are based are set out in Part II of this report, where his study is published in full. The main results of his work are summarised in Table A. The range of

TABLE A
Summary of Projections

	1971 (Actual in Millions)	1986 (Projected) "Low" Estimates* Projection in Millions	"Low" Estimates* Annual Average % Growth	"High" Estimates* Projection in Millions	"High" Estimates* Annual Average % Growth
Total population	2·98	3·51	1·1%	3·78	1·6%
Age Structure of Population					
0–14 years	0·93	1·08	1·0%	1·28	2·1%
15–19 years	0·27	0·31	0·9%	0·31	1·1%
20–24 years	0·22	0·29	1·9%	0·32	2·6%
25–44 years	0·63	0·92	2·6%	0·94	2·8%
45–64 years	0·61	0·56	—0·6%	0·56	—0·5%
65 years and over	0·33	0·36	0·7%	0·36	0·6%
Numbers seeking Work					
Males	0·83	0·97	1·1%	1·00	1·2%
Females	0·29	0·33	1·0%	0·35	1·3%
Total	1·12	1·30	1·1%	1·35	1·3%
Occupational Distribution					
Family Farm (both sexes)	0·23	0·14	—3·5%	0·15	—3·2%
Non-Family Farm (both sexes)	0·88	1·16	1·9%	1·20	2·1%
Total (both sexes)	1·12	1·30	1·1%	1·35	1·3%
Non-Family Farm Employment†					
Total Employment (both sexes)	0·82	1·12	2·1%	1·16	2·4%
Total Unemployment (both sexes)	0·06	0·05	—2·5%	0·05	—2·2%
Total Non-Family Farm Labour Force	0·88	1·16	1·9%	1·20	2·1%

*The "high" and "low" estimates are the upper and lower bounds of the possible range of change based on the assumptions used in the projections by Professor Walsh.

†Non-Family Farm employment relates to the level of employment (and hence unemployment) required to reach Full Employment on Professor Walsh's assumptions by 1986.

figures shown for 1986 mainly reflects variations in the assumptions made about emigration (for example, zero or 5000 p.a. in 1986), female participation rates, and participation rates for both males and females in the age group 15–19 years.

7. Professor Walsh's projections indicate that the total population in 1986 could be between 18% and 27% higher than in 1971. The growth could be very different for different age-groups—the numbers aged 15 to 44 years could grow very much more rapidly than the number aged 65 years and over. If full employment policies were successfully applied, Irish people could be attracted back to meet shortages of particular skills and the age-structure of the population would be altered. Membership of the EEC could also have effects (which it is impossible at this stage to predict) on emigration and immigration. We did not ask Professor Walsh to make any attempt to develop projections for migration by specific age-groups. In his assumptions relating to emigration, he took zero net emigration in all age-groups for his lower figure, and for the higher net emigration figure (of 5000 p.a.) he projected forward the average age/sex distribution that existed during 1966–71.

8. However, one thing is clear. The age-structure in 1986 could be very different than it was in 1971. The age-structure at the date of the last census of population was "abnormal"—it reflected the results of the heavy emigration of those aged 25 years and over during the 1950's and the early 1960's.

9. The projections indicate the possibility of a doubling in the numbers of young married couples over the years to 1986. The numbers in the age-group 0–14 years—all of whom will be born in the years after 1971—depend on the assumption that is made about fertility rates. As a proportion of population the numbers in these age-groups could grow significantly.

10. The projected growth in the numbers that could be available for work depends not only on the numbers in the working age-groups (15–64 years), but also on the proportion of these that might seek work.

As far as the latter is concerned, the participation rates vary according to age-group, sex and marital status. The participation rate for the age-group 15–19 years will depend on the proportion of young people remaining in full-time education. It is assumed in the projections that the participation rate for these young people will not rise above its level in 1971. It is also assumed in the projections that the participation rates for males will remain at their 1971 levels, for the age-group 25–64 years.

11. Perhaps the most difficult area in which to identify a realistic assumption is that of the proportion of women of working age who will seek work. The female participation rate in Ireland has been relatively low as compared with other countries at a similar stage of development. It might reasonably be expected that a larger proportion of women would seek work as development continues. But the projected rise in the marriage rate would tend to reduce the participation rate for women of working age, because married women have historically had a lower participation rate than single women or widows. However, if married women were to complete their families at an earlier age, they could return to work, and with rising educational levels they would be more likely to succeed in finding work either on a part-time or full-time basis.

12. Professor Walsh prepared two projections of what could happen to the numbers of females in the non-family farm labour force. The first applied projected female labour participation rates to the projected labour force, and suggested the possibility of a decline in the proportion of women in non-family farm employment from 29·6% in 1971 to 27·6% in 1986. The second allowed for the possibility of the female share remaining constant at its 1971 level. This suggested a more rapid expansion of female employment and a higher female participation rate.

13. On the basis of his assumptions, Professor Walsh projects an increase of 200,000 from 1·1 million to 1·3 million in the number of men and women seeking work over the period from 1971 to 1986—an annual average increase of 13,000 to 15,000. Professor Walsh estimated the possible loss in employment in family farming. He projected a continued downward trend in the family farm labour force, with the

share of the total labour force declining from 21% in 1971 to under 11% in 1986. As a result of the assumptions relating to emigration, participation rates and the decline in numbers engaged in agriculture, he projected that the numbers seeking employment outside agriculture would grow by 300,000 from 0·9 million to 1·2 million. When allowance is made for the reduction in unemployment from 7·3% in 1971 to 4% in 1986, the number of additional new jobs required during 1971 to 1986 could be in the range 300,000 to 340,000. This would require an annual average growth in total non-family farm employment of between 2·1% and 2·4%, depending on the precise assumptions that are made. However, even this under-estimates the numbers for which new jobs will have to be provided, because some existing employment will be lost through technical progress or changes in market conditions. At present, redundancies are occurring at a rate of about 5% of industrial employment. If it were assumed that the average redundancy rate between now and 1986 were only half this figure, the gross number of new jobs required could be of the order of 375,000 to 420,000—or over 25,000 a year.

14. In projecting the number of additional new jobs required, Professor Walsh assumes that the rate of unemployment will decline to 4% by 1986. This is higher than the rate assumed in the NIEC Report on Full Employment, where an unemployment rate of 2% was taken as being consistent with full employment. Professor Walsh argues that there are convincing reasons for accepting a higher rate as equivalent to full employment, because of the low population density, narrow job-market outside Dublin, and the relationship between the Irish and British labour markets. Moreover, in an expanding economy, even with full employment, a significant number of people could be registered as unemployed at any particular time. These would be those in the process of moving from one job to another and the average period during which they were without work would be short. Professor Walsh, therefore, took the unemployment rate consistent with full employment as 4%. His target implies lowering the aggregate unemployment rate below the rate experienced in 1966 by a group widely believed to have been close to full employment at that time, namely male "skilled manual" employees, who are estimated to have had an unemployment rate of 5·6% in that

year*. However, an assumption of 2%—or even 1%—unemployment would make relatively little difference to the size of the numbers for whom new jobs would have to be found on average each year.

Effects of Projections

15. We would again emphasise that the projections contained in Professor Walsh's report show only what *could* happen between now and 1986 to the numbers who might be seeking work and to the number of dependants, on the basis of specified assumptions. If the projections could be realised then there would be significant social, regional and economic implications for the community.

16. If the population and employment projections were achieved, there would be important regional implications. The present projections present a picture of change at an overall national level. The changes in individual regions could vary significantly from the national pattern projected by Professor Walsh. An attempt to break down the projections at a regional level cannot be made until the overall economic implications have been spelt out.

17. If the projections were realised, there would be important social implications. For example, the increase in the number of children could place particular strain on educational facilities, on top of demands arising from the increase in the school-leaving age and the effects of the numbers of adults engaged in training and re-training programmes. Changes in employment structure, from family farm to non-family farm employment, could result in increased urbanisation of the population. Investment in social infrastructure—houses, schools and public utilities, could have to accord with new patterns of population location.

18. If the projections were realised the total dependency ratio† would remain at a high level in the years up to 1986. The future size of the dependency ratio could, however, be influenced by what happens to the

*cf. R. C. Geary and J. G. Hughes "Certain Aspects of Non-Agricultural Unemployment in Ireland" ESRI Paper No. 52 (1970), Table 9.

†i.e. the number of young and old persons per 100 persons in the "active" age groups 15–64 years.

birth rate. Professor Walsh points out in his report that only a substantial fall in the birth rate could offer any prospect of a significant reduction in the dependency ratio over the next two decades. With a continuing high dependency ratio, social expenditure on education, health and other social services would have to be maintained at a high level.

19. However, these social and other implications will arise only if and as progress is made towards achieving full employment. The Council believes that the aim should be to achieve full employment as soon as possible. Full employment does not mean the provision of work for its own sake. The jobs created must be regarded as satisfactory by those who need them and the rewards must be regarded as adequate. If the new employment is to be sustainable, the products and services produced must be competitive. If the progress towards full employment is not to be hindered by external constraints or internal conflicts, the balance of payments position must be sustainable—and the fruits of the economic expansion must be equitably distributed amongst individuals, social groups and the different regions.

20. Professor Walsh stated:

> "Projections should be treated as one input in policy formation, rather than taken as providing "the" answer to questions about the future course of certain variables".

The problem is not the desirability of the objective. It is rather the possibility of attaining it by the application of effective policies in the context of the constraints that may be imposed by the rest of the world or by the actions and attitudes of the Irish community. The rate of progress towards full employment will depend on the rate of growth in real incomes that the community finds acceptable. The faster the rise in living standards that is demanded, the longer it will take to attain full employment.

PART II

POPULATION AND EMPLOYMENT PROJECTIONS, 1971–86

Prepared by

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for

The National Economic and Social Council

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I wish to acknowledge the assistance provided by George Ryan in the preparation of this study. I am grateful to all those who provided comments on an earlier draft. Responsibility for the views and contents of the study remains solely mine.

B.M.W.

CHAPTER I

INTRODUCTION

Population and employment projections are a useful way of summarising the implications of different assumptions about key demographic and economic variables. The numbers obtained from these projections are not forecasts, but they give policymakers a clearer picture of the range within which the population or the labour force is likely to lie over the medium to long run. By comparing the results of different projections, the implications of variations in, for example, the migration or birth rate may be gauged. Projections should be treated as one input in policy formation, rather than taken as providing "the" answer to questions about the future course of certain variables.

The main limitation of work in the projection area is the general assumption that past trends will be maintained. The absence of a behavioural basis for most projection models implies that the user must specify any reversal of trend that he considers likely—it cannot be predicted by the model. This problem is very relevant in the Irish case: work on population projection prior to 1971 was not conducted in anticipation of zero net emigration over the period 1971-76*, and hence results incorporating this assumption have not been published (although of course the methods used were quite general and could incorporate any set of migration assumptions). Thus, the specification of the assumptions used in the projections is far more crucial than the refinement of the projection method†. Policymakers must, therefore, be

*Cf. National Industrial Economic Council, *Report on Full Employment*, (Dublin 1967) and J. F. Knaggs and T. Keane, "Population Projections", paper to the Statistical and Social Inquiry Society of Ireland, 10 December 1971.

†The methodology of projections is by now fairly well-established: cf. H. S. Shryock and J. S. Siegel, *The Methods and Materials of Demography*, Washington, D.C., US Department of Commerce, Bureau of the Census, 1971, Vol. 2, Chapter 24.

prepared to examine critically the assumptions used, and the projections should be regularly updated as further information becomes available.

In order to reduce the complexity of the projections presented here, the number of alternative assumptions reported on has been kept to a minimum. The main findings that emerge from our calculations will be seen to be quite insensitive to most reasonable alternative values of the inputs.

CHAPTER II

THE METHODOLOGY OF THE PRESENT STUDY

The aim of the present study is to prepare projections, under a small number of alternative assumptions, of the growth in employment required to cater for the natural growth of the labour force and achieve some reduction in unemployment by 1986. Projections of the population, the total labour force, and the non-family farm labour force, by age and sex, form the main output from the study. Some information is also required on the likely course of (*a*) the dependency ratio, (*b*) the proportion of women married, and (*c*) the labour force participation rate among married women: this material is presented in Appendices to the main study.

The variables about which assumptions must be made to obtain the required output are listed below, with a brief discussion of the alternative assumptions actually used in the present study.

1. Population Projections

1.a. Mortality

All population projections have been prepared using the 1971 data for 15 five-year age groups and the group "75 and over", separately for males and females. Forward projections were made in the usual way, on the basis of five-year survivorship ratios derived from Life Table mortality data. Only one assumption has been used regarding the future level of mortality. For males aged 15 and over, mortality rates have been assumed constant at 1965–67 levels. For males aged under 15, and females of all ages up to 75, the rate of decline in mortality over the period 1960–62 to 1965–67 has been projected forward for each of the three inter-censal periods after 1971. The final projections of the labour force would not be significantly different under any other reasonable assumptions about mortality.

1.b. Net Migration

For the period 1971–76, zero net migration has been assumed in all the projections prepared. On the basis of data now available (mid-1974), it seems that there may even be a net inflow over this intercensal period. After 1976, the outlook is very difficult to predict, depending as it does both on the rate of employment growth in Ireland, economic conditions in Britain, and the significance of any migration to new destinations within the EEC. Two assumptions have been used for the level of migration between 1976 and 1986: (*a*) zero net migration, and (*b*) 5,000 net emigration a year. Both projections therefore incorporate net emigration assumptions that are very low by historical standards, but which seem realistic in the light of the current situation. Moreover, any resumption of large-scale net emigration would be incompatible with the target of "full-employment".

We assume that the age and sex distribution of net migration will be the same as that actually recorded in 1966–71. Where zero net migration is assumed, we set net migration in all age groups equal to zero, although it is possible or even probable that a zero balance would be arrived at by a set of cancelling in and out-flows at different ages. Any attempt to predict the changing age-structure of emigration would have entailed arbitrary assumptions.

1.c. The Birth Rate

Our primary concern is with the labour force in 1986. The population aged 15 and over in 1986 can be projected on the basis of the 1971 population (all ages) without making any assumptions regarding the birth rate. However, we are also interested in such matters as the dependency ratio and the marital status structure of the population, and consequently some calculations have been done on the variables that underlie the birth rate. These are described more fully in Appendix A but may be summarised here. First, the proportion of women married in each age group has been projected for 1976, 1981 and 1986. Secondly, the fertility rate among these married women has been projected. From these assumptions, the number of children born in each intercensal period has been calculated. It is difficult to select the most realistic assumption about the future course of fertility and nuptiality, and hence a number of estimates have been prepared.

2. Labour Force Projections

2.a. Labour Force Participation Rates

The projected population aged 15 and over can be used to project the total (employed plus unemployed) labour force if assumptions are made about labour force participation rates. These rates are known to vary in Ireland in response to *(a)* the unemployment rate, *(b)* the proportion of the labour force in agriculture (reflecting the role of definitional considerations, especially in deciding whether older workers will be classified in or out of the labour force), and *(c)* the proportion of young people staying on in full-time education*. The following assumptions have been used about the future course of labour force participation rates:

males and females aged	25–64: Stable at 1971 level
,, ,, ,,	20–24: declining at 1966–71 rate
,, ,, ,,	65 and over: declining at 1966–71 rate
,, ,, ,,	15–19: (A) Stable at 1971 level
	(B) Declining at some fraction of the 1966–71 rate.

The greatest uncertainty attaches to the rates for teenagers. The growth in school participation rates experienced over the 1966–71 period is unlikely to continue (see Appendix B). Assumption (A) explores the implications of a levelling off at the 1971 level. Assumption (B) reflects a moderate rate of increase in school participation. It should be stressed that Assumption (A) is more likely to be realised if employment opportunities in Ireland are relatively abundant. Staying on in full-time education is, for some young people, an alternative to unemployment or emigration. This aspect of our projections must be kept under review as more data become available.

2.b. Family Farm Labour Force

A projection of the numbers in family farming (i.e. farmers and relatives assisting on farms) has been prepared. This part of the pro-

*Cf. B. M. Walsh, "Aspects of the demand and supply of labour, with special reference to the employment of women in Ireland", paper read to Statistical and Social Inquiry Society of Ireland, May 1971.

jection has been treated as a self-contained sub-sector, used as an input to, but uninfluenced by, the rest of the model. This implies that the rate of decline of the numbers in family farming is independent of the rate of job-creation outside agriculture—and we have some evidence that, for young adults at least, this is not wholly true (see Appendix C). If the rate of non-family farm job-creation required for the targets used in this report were realised, we feel the rate of decline in family farming would be higher than envisaged here (which in turn would mean an upward revision of the non-family farm job targets—but this revision would be of the second order of magnitude in relation to the totals involved).

Starting from the numbers gainfully occupied in family farming in 1971, the number of expected survivors has been calculated (following the method described in 1.a. above) for 1976, 1981, 1986. These expected survivors were then multiplied by a "survival in farming" rate, which was calculated simply as the ratio of the actual number in a given age group in farming in 1971 to the expected survivors from the farm labour force aged five years younger in 1966*. This ratio allows for retirement and migration out of farming. For the youngest age groups (15–19 and 20–24) the very substantial fall in the labour force between 1966 and 1971 could not be assumed to continue, being in part no doubt due to a once-and-for-all rise in rural post-primary school participation rates. Hence a high and a low projection of the numbers in these ages has been prepared, based (A) on the assumption of a levelling off in the numbers at the 1971 level, and (B) a continuing decline, but at a slower rate than between 1966–71. More detail on these assumptions is given in Appendix C.

2.c. Non-Family Farm Labour Force†

The non-family farm labour force (employed plus unemployed) has been calculated by subtracting the projected family farm labour force from the projected total labour force.

*In fact these "survivorship in farming ratios" have remained fairly stable, except in the youngest age groups. since 1961. Cf. Appendix C.

†Members of the family farm labour force are not classifiable as unemployed in the census. Hence, all the unemployed are in the non-family farm labour force.

Since there are two projections of the total population, two of the total labour force, and two of the family farm labour force, the end result is eight projections of the non-family farm labour force. For the age groups 35 and over, only two different projections are obtained because the alternative assumptions about the labour force relate only to the 15–34 age interval.

This approach to the projection of the labour force uses projected population and projected labour force participation rates to project the labour force. An alternative approach has been explored with respect to the female labour force: taking the projected male labour force (as obtained by the original approach), the female labour force was projected on the assumption that the female/male ratio in non-family farm employment will remain stable. This alternative to the projection of the female labour force results in a projection of female participation rates as an output, rather than as an input.

3. Projections of Employment Growth Required to Reach "Full-Employment" by 1986.

"Full-employment" has been defined in previous studies as a combination of low emigration and low unemployment rates*. The first part of this definition has been built into *all* the projections in the present study. Compared with either the NIEC or the Knaggs and Keane study, the levels of emigration discussed in 1.b. above are very low indeed†. Turning to the distribution of the projected non-family farm labour force between those "at work" and "out of work", we now incorporate the target of a low rate of unemployment by 1986. "Low" in this context could be taken to mean 2% (as was used in the NIEC Report), but there are convincing reasons for accepting a higher rate as

*Labour force participation rates are also part of the "full-employment" concept, due to their responsiveness to labour market conditions. Our projections of recent trends in participation rates may not allow adequately for the possibility that the rates will rise in response to the tight labour market implied by "full-employment".

†The NIEC Report, for example, assumed a minimum of 9,500 a year net emigration between 1971–76, compared with zero net emigration for this period in all our projections. The lowest net emigration assumption published by Knaggs and Keane for this period was 12,000 per annum.

equivalent to full employment in Ireland: among these are the low population density and narrow job-market outside Dublin, the international dimension of the Irish labour market (with an elastic labour supply due to the potential return of emigrants as full-employment is approached), the high level of income maintenance payments in relation to average earnings—all factors that lead to a high rate of frictional unemployment*.

The unemployment rates revealed in the 1971 Census are (data refer to those aged 15 and over):†

	Males	Females	Both Sexes
(1) "Out of Work"	55,157	9,535	64,692
(2) Employees (incl. "out of work")	551,315	245,050	796,365
(3) Total Non-Family Farm Labour Force (incl. "out of work")	619,458	260,572	880,030
(1) as % of (2)	10·0	3·9	8·1
(1) as % of (3)	8·9	3·7	7·4

The present projections supply figures for the non-family farm labour force, but not for employees, hence it is expedient to define our target unemployment rate as a percentage of the non-family farm labour force. This rate stood at 7·4% in 1971. An aggregate unemployment rate of 4% has been taken as consistent with "full-employment" in the present study. Had this rate prevailed in 1971, 35,000 persons would have been unemployed (compared with the actual figure of 65,000). This corresponds to 4·4% of the employee labour force.

In 1966, the unemployment rate among "skilled manual" employees (males) was 5·6%‡. Hence, our target implies lowering the aggregate

*These topics are discussed in B. M. Walsh, *The Structure of Unemployment in Ireland, 1954–72*, ESRI paper No. 77 (1974).

†In order to derive these data on the labour force aged 15 and over, the 1971 Census returns classified by individual year of age 14–19 were used and the 14 year-olds subtracted from the 14–19 totals. We assumed that all 14 year-olds who were gainfully occupied were employees and that none of them was "out of work" (in fact, some of them are probably in family farming).

‡Cf. R. C. Geary and J. G. Hughes, *Certain Aspects of Non-Agricultural Unemployment in Ireland*, ESRI paper No. 52 (1970), Table 9.

unemployment rate below the rate experienced in 1966 by a group widely believed to have been close to full-employment at that time. This may be taken by some as an excessively ambitious target, whilst others may feel that any rate over 2% is too high. Our preference would be to define "full-employment" with reference not merely to unemployment but also to vacancies and the balance between the two sides of the labour market. This is not feasible, however, in the absence of meaningful data on vacancies, and hence we have settled for an aggregate unemployment rate of 4·0% as a working definition of full employment.

There is, moreover, a danger in defining one goal of economic policy in isolation from all others. "Full-employment" must be considered in relation to its implication for the rate of inflation and the balance of payments for example. However, the present study is not designed to assess the implications of our definition of "full-employment" for the other goals of economic policy.

It is not accurate enough for our purposes to define the target unemployment rate for the total non-family farm labour force. The unemployment rates experienced by various age groups differ considerably. In 1971, for example, the following are the *ratios* of age-and sex-specific rates among the non-family farm labour force to the aggregate rate:

Age Group	Males	Females
15–44	·95	·48
45–64	1·63	·58
65+	2·23	·45

It may be desirable to try to alter these ratios in future, especially to reduce the very high rate experienced by older men compared with the rest of the labour force. However, these ratios have been accepted for our projections.

The age-sex-specific rates implied by our target can be calculated *on the assumption of a constant distribution of the non-family farm labour force by age and sex* (if this distribution alters, as it will in actual fact, then when the target rates are defined separately for each population sub-group, the aggregate rate will emerge from the calculations).* The following are the age-specific target rates:

		1971	1976	1981	1986
Males	15–44	6·9	6·6	5·2	3·8
	45–64	11·9	11·4	9·0	6·5
	65+	16·3	15·6	12·3	8·9
Females	15–44	3·5	3·4	2·6	1·9
	45–64	4·2	4·1	3·2	2·3
	65+	3·3	3·2	2·5	1·8
Total	All Ages	7·3	7·0†	5·5†	4·0†

It may be seen that we have concentrated the bulk of the fall in unemployment in the years 1976-86.

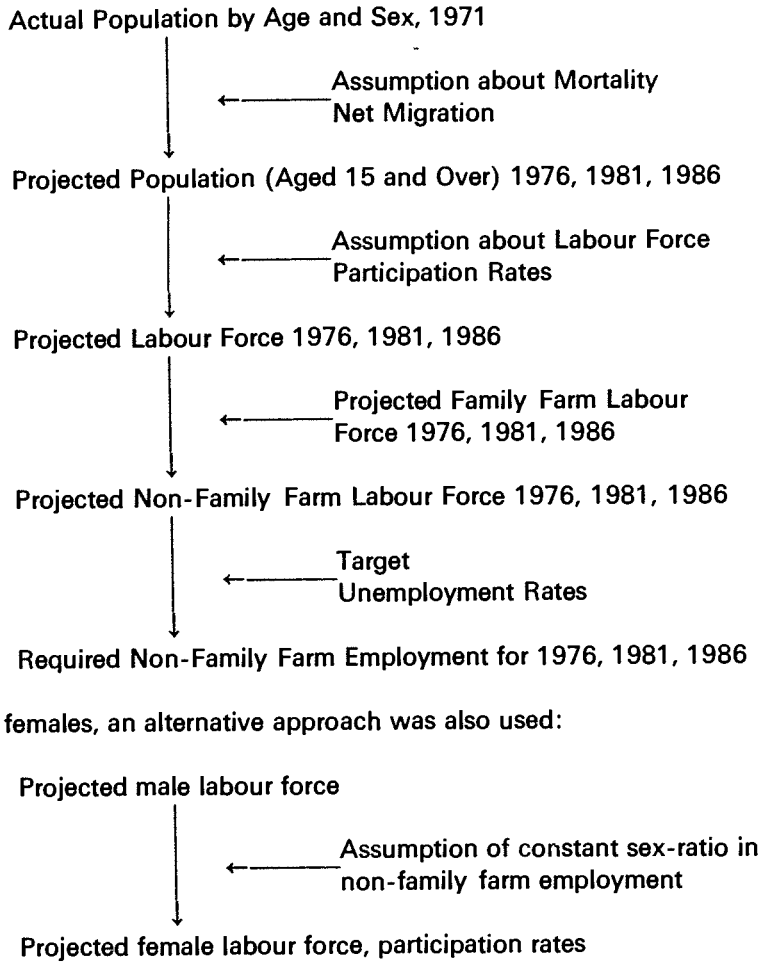
Subtracting these unemployment rates from 100% and multiplying by the projected non family-farm labour force, we obtain the level of employment required if our notion of full-employment is to be reached by 1986. Looking at the increase in employment over the 1971 figure implied by this target gives us a figure for the *net* job-creation required in the non family-farm sector (net, that is, of any redundancies from existing non family-farm employment).

*Technically, a given aggregate rate implies unique rates for each sub-group only if the weights of the sub-groups in the total are known. Our procedure is to use base-year weights, analogous to those involved in a Laspeyres price index number.

†1971 non-family farm-labour force structure.

Summary

The methodology of the present study may be depicted as follows:



For females, an alternative approach was also used:

The projection of the proportion of females ever-married, the birth rate, the dependency ratio, and labour force participation rates, is dealt with in the Appendices.

CHAPTER III

RESULTS AND COMMENTARY

Population aged 15 and over

Our two population projections of the numbers aged 15 and over are summarised in Table 1. The alternative assumptions about migration make little difference to the outcome—the most marked contrast being in the 15–44 age group, which is 4% higher in 1986 under assumption 2 than under 1.

It is immediately clear from Table 1 that the growth in population over the next 15 years is going to be very unevenly distributed by age group, the younger ages experiencing very rapid growth, the older ages experiencing a contraction. This arises from the abnormal age structure of the 1971 population, in particular the depletion of the age groups 25 and over by the heavy emigration of the 1950's and early 1960's. In Chart 1 we have reproduced the 1971 age pyramid to illustrate this point. Much of what we have to say on the basis of our projections is a reflection of this overwhelmingly important feature of the initial situation.

In Chart 2 and Table 2 the more detailed results for Projection 1 are presented. It is clear that the progression of the group aged 15–29 in 1971 through the age groups will cause very rapid but uneven population growth up to 1986.

TABLE 1

Projected Population Aged 15 and over, 1976-86
(Thousands)

Projection No. 1

Assumptions: Net Emigration Zero 1971-76
Net Emigration 5,000 p.a. 1976-86
Mortality: see text.

Age	Population aged 15 and over (both sexes)				Annual Average Growth Rate (%)	
	Year					
	Actual 1971	1976	1981	1986	1971-86	1966-71 (Actual)
15–44	1,109·2	1,249·3	1,381·7	1,510·2	2·1	0·9
45–64	608·1	600·1	576·2	558·6	—0·6	0·2
65 +	329·8	337·3	353·1	363·9	0·7	0·4
Total 15 +	2,047·1	2,186·6	2,311·1	2,432·7	1·2	0·6

Projection No. 2

Assumptions: Net Emigration Zero 1971-86.
Mortality: see text.

Age	Population aged 15 and over (both sexes)				Annual Average Growth Rate (%)	
	Year					
	Actual 1971	1976	1981	1986	1971-86	1966-71 (Actual)
15–44	1,109·2	1,249·3	1,412·5	1,571·6	2·4	0·9
45–64	608·1	600·1	579·4	564·1	—0·5	0·2
65 +	329·8	337·3	349·7	358·3	0·6	0·4
Total 15 +	2,047·1	2,186·6	2,341·6	2,494·0	1·3	0·6

TABLE 2

Annual Average Percentage Growth Rates In Projected Population (Males and Females) by age group
(Zero net emigration 1971-76; 5,000 per annum thereafter)

Age	Population 1971	Population 1976 (thousands)	Average Annual Growth Rate 1971-76	Population 1981 (thousands)	Average Annual Growth Rate 1976-81	Population 1986 (thousands)	Average Annual Growth Rate 1981-86
15–19	267,727	297·9	+2·2	307·8	+0·7	305·8	−0·1
20–24	215,251	266·9	+4·4	276·9	+0·7	286·8	+0·7
25–29	172,993	214·4	+4·4	260·5	+4·0	270·5	+0·8
30–34	151,351	172·2	+2·6	214·7	+4·5	260·7	+4·0
35–39	149,107	150·4	+0·2	172·8	+2·8	215·2	+4·5
40–44	152,729	147·4	−0·7	149·0	+0·2	171·2	+2·8
45–49	160,124	150·1	−1·3	144·9	−0·7	146·3	+0·2
50–54	159,082	155·4	−0·5	144·7	−1·4	139·7	−0·7
55–59	154,847	151·8	−0·4	147·4	−0·6	137·3	−1·4
60–64	134,066	142·7	+1·3	139·3	−0·5	135·3	−0·6
65–69	111,751	118·2	+1·1	127·6	+1·5	125·0	−0·4
70–74	98,986	90·9	−1·7	99·4	+1·8	107·4	+1·6
75 +	119,082	128·2	+1·5	126·1	−0·3	131·5	+0·8
15 +	2,047,096	2,186·6	+1·3	2,311·1	+1·1	2,432·7	+1·0

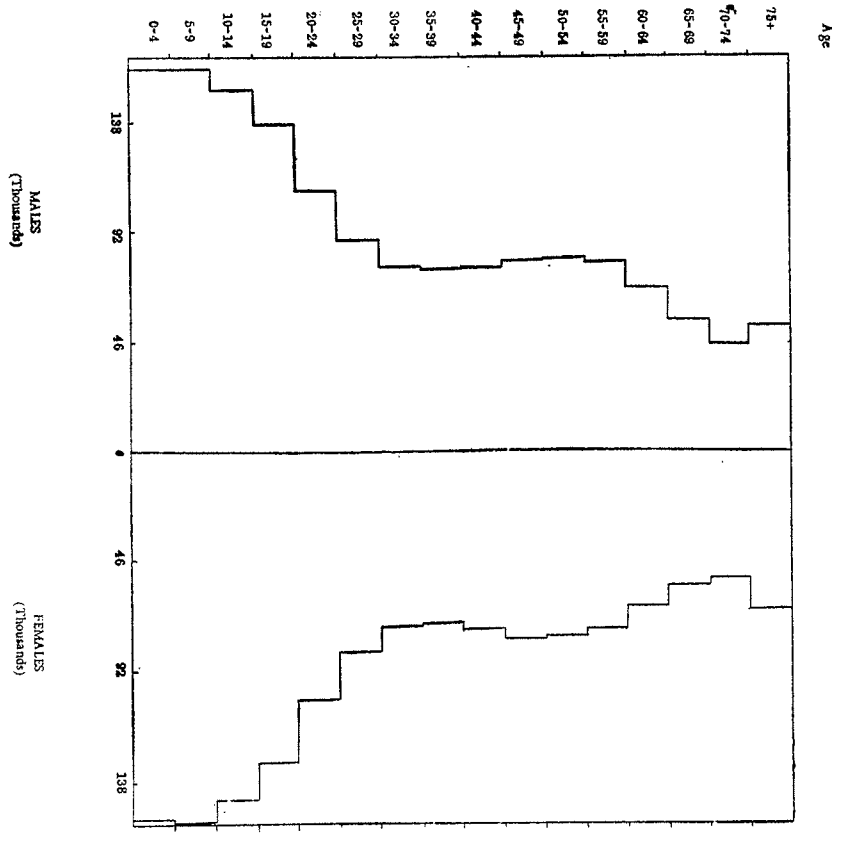
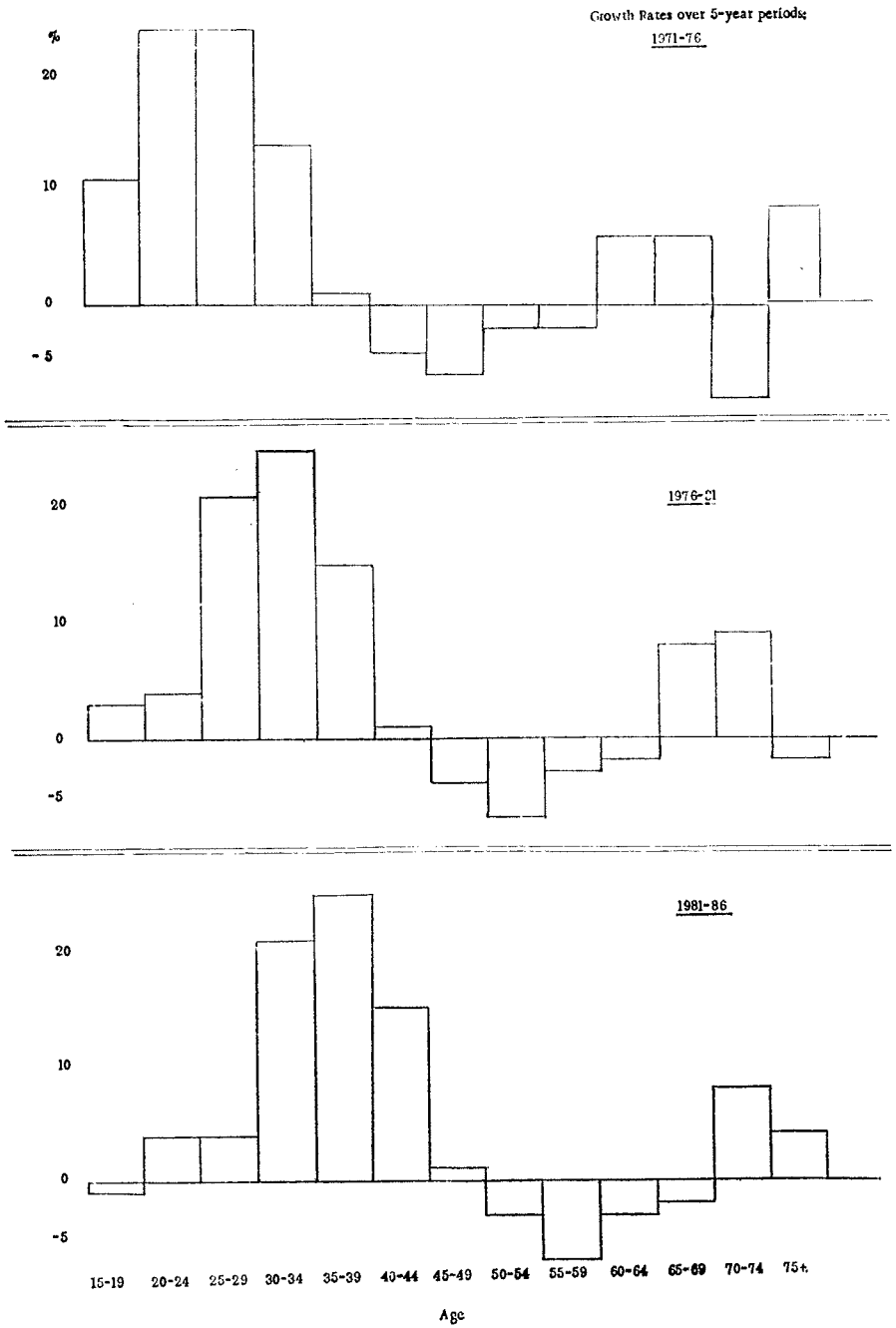


CHART 1

Actual Population Distribution by Age, 1971

CHART 2
% Growth Rate in Projected Population (Males and Females) by age group (Zero Net Emigration 1971-76; 5,000 per annum thereafter)



The implications of these projections (which are not very sensitive to alternative assumptions about migration or mortality) need not be spelled out here, except in so far as they affect our projections of the labour force.

Total Labour Force

By "total labour force" we mean the numbers that will be in the (employed plus unemployed) labour force, given our projected population and certain assumptions about labour force participation rates (see Appendix A). In subsequent sections, we discuss the distribution of this total between farm and non-farm employment, and between the employed and unemployed.

As explained in Chapter II, two assumptions have been made concerning future labour force participation rates among those aged 15–19. Combining these assumptions with the two population projections yields four alternative projections of the total labour force. In Table 3 we set out the average of the two labour force projections for each of the population projections separately.

For all cases, the male and female labour force aged over 44 declines between 1971 and 1986, but there is very rapid expansion in the younger labour force, amounting to over 2% annually for males. The total labour force (both sexes) is projected as rising at over 1% a year or by at least 17% between 1971–86.

This projection of the growth in the labour force may be compared with the figure of 22% growth projected by the UN Economic Commission for Europe for the years 1966–81.* Perhaps more relevant is a

*United Nations, Economic Commission for Europe, *Economic Survey of Europe in 1968,* (New York, 1969), Table 25. Developments since 1968, especially the continuing fall in the birth rate throughout the EEC (excluding Ireland) imply that the growth rates after 1980 will be even lower than those shown in the table.

TABLE 3

Projected Total Labour Force, 1976-86

(Thousands)

Based on average of two assumptions about labour force participation in age groups 15–19

(See Appendices B and D)

Age	Year				Average Annual Growth Rate	
	1971 (Actual)	1976	1981	1986	1971/86 %	1966/71 (Actual) %
	Based on Population Projection 1					
	Males					
15–44	475·5	534·9	595·5	656·6	+2·2	+0·4
45–64	287·4	279·5	267·3	259·7	−0·7	+0·1
65 +	66·2	62·0	59·9	55·2	−1·2	−1·8
15 +	829·1	876·4	922·7	971·5	+1·1	+0·1
	Females					
15–44	201·4	230·9	246·8	257·8	+1·7	+0·1
45–64	63·4	63·5	61·3	59·2	−0·5	+0·4
65 +	20·3	17·9	16·7	15·1	−1·9	−2·4
15 +	285·1	312·4	324·8	332·1	+1·0	0·0
	Both Sexes					
15 +	1,114·2	1,188·8	1,247·5	1,303·6	+1·1	+0·1

TABLE 3—*continued*

Age	Year				Average Annual Growth Rate	
	1971 (Actual)	1976	1981	1986	1971/86 %	1966/71 (Actual) %
	Based on Population Projection 2					
	Males					
15–44	475·5	534·9	607·2	682·9	+2·4	+0·4
45–64	287·4	279·5	268·2	260·8	−0·6	+0·1
65 +	66·2	62·0	59·0	54·1	−1·3	−1·8
15 +	829·1	876·4	934·4	997·8	+1·2	+0·1
	Females					
15–44	201·4	230·9	255·2	272·1	+2·0	+0·1
45–64	63·4	63·5	61·7	60·1	−0·4	+0·4
65 +	20·3	17·9	16·5	15·0	−2·0	−2·4
15 +	285·1	312·4	333·4	347·2	+1·3	0·0
	Both Sexes					
15 +	1,114·2	1,188·8	1,267·8	1,345·0	+1·3	+0·1

comparison with the UN's projections for the other EEC countries 1965–80 (ignoring net migration):

Percentage Growth in the Active Population of all ages, 1965-80

Belgium	6·6%
Denmark	2·8%
France	8·4%
Western Germany	0·6%
Italy	11·3%
Netherlands	16·1%
United Kingdom	3·2%
Ireland (1971-86)	17·0%

This makes it clear that Ireland's labour force growth potential significantly exceeds that of most EEC member states. Moreover, the growth potential of our non-agricultural labour force is even more exceptional, due to the fact that the declining agricultural sector forms a larger proportion of the total labour force in Ireland than in any other EEC country.

Non-Family Farm Labour Force

The method by which the decline in the numbers in family farming has been projected is discussed in Appendix C. Two alternative assumptions were made about the rate of contraction among the youngest age groups. To obtain the projected numbers in the non-family farm labour force, we subtracted the projected family farm labour force* from the projected total labour force. Given that we have four assumptions about the total labour force, we now obtain eight projections of the non-family farm labour force. However, apart from the 15–44 age group, these projections can be reduced to two (corresponding to the two different population projections). Moreover, the four different labour force projections based on the same population projections do not differ by more than 3% for the 15–44 age group even in 1986. In other words, the extra refinement obtained by the use of various assumptions about

*Recall at this stage that the farm labour force never contains unemployed persons, according to Census definitions. Hence, all the unemployed remain in the non-family farm labour force.

the labour force participation rates of the youngest age groups is not very crucial to the final projections obtained. We have, therefore, in the interests of simplicity, presented the *average* of all four projections in Table 4. The detailed figures for the 15–44 age groups are given in Appendix D.

On the basis of the first population projection, we arrive at a total non-family farm labour force of 1·2 million by the year 1986, a growth of 32% over the 1971 level or 1·9% annually. Once again, however, there is a stark contrast in the projected growth rates for the younger and older age groups: the number of males aged 15–44 is projected as growing by 54% over the 15 year period—or at an annual average rate of 2·9%. If population projection 2 is used, these rates are all slightly higher and the projected non-family farm labour force grows by 37% over the 15 year period (or by 2·1% annually). It is evident that if our assumptions about emigration are not totally falsified by events, the Irish non-family farm labour force will grow at a rapid pace over the immediate future, due especially to the expansion in the numbers of younger adults available for employment.

The changing age structure of the non-family farm labour force may be judged from Chart 3. It may be seen that by 1986 a somewhat more normal pyramid is emerging, although the effects of the heavy emigration of the 1950's will continue to be felt until the end of the century.

If the data for males and females in Table 4 are compared, it will be seen that the female share of the projected non-family farm labour force declines from 29·6% in 1971 to 27·6% in 1986 (population projection 1). In the period 1981–86, the female non-family farm labour force is projected as growing by only 10·7 thousand (or 3·5%), whereas the male non-family farm labour force is projected as increasing by 72·2 thousand (or 9·4%). This disparity between the male and female growth rates after 1976 is due to the fact that by then the large bulge in the population pyramid will have moved into the age groups 25–34 (cf. Table 2), and at this age there is a sharp drop in the female labour force participation rate.

CHART 3

Distribution of the Non-Family Farm Labour Force by ages (Projection I; Assumption AA

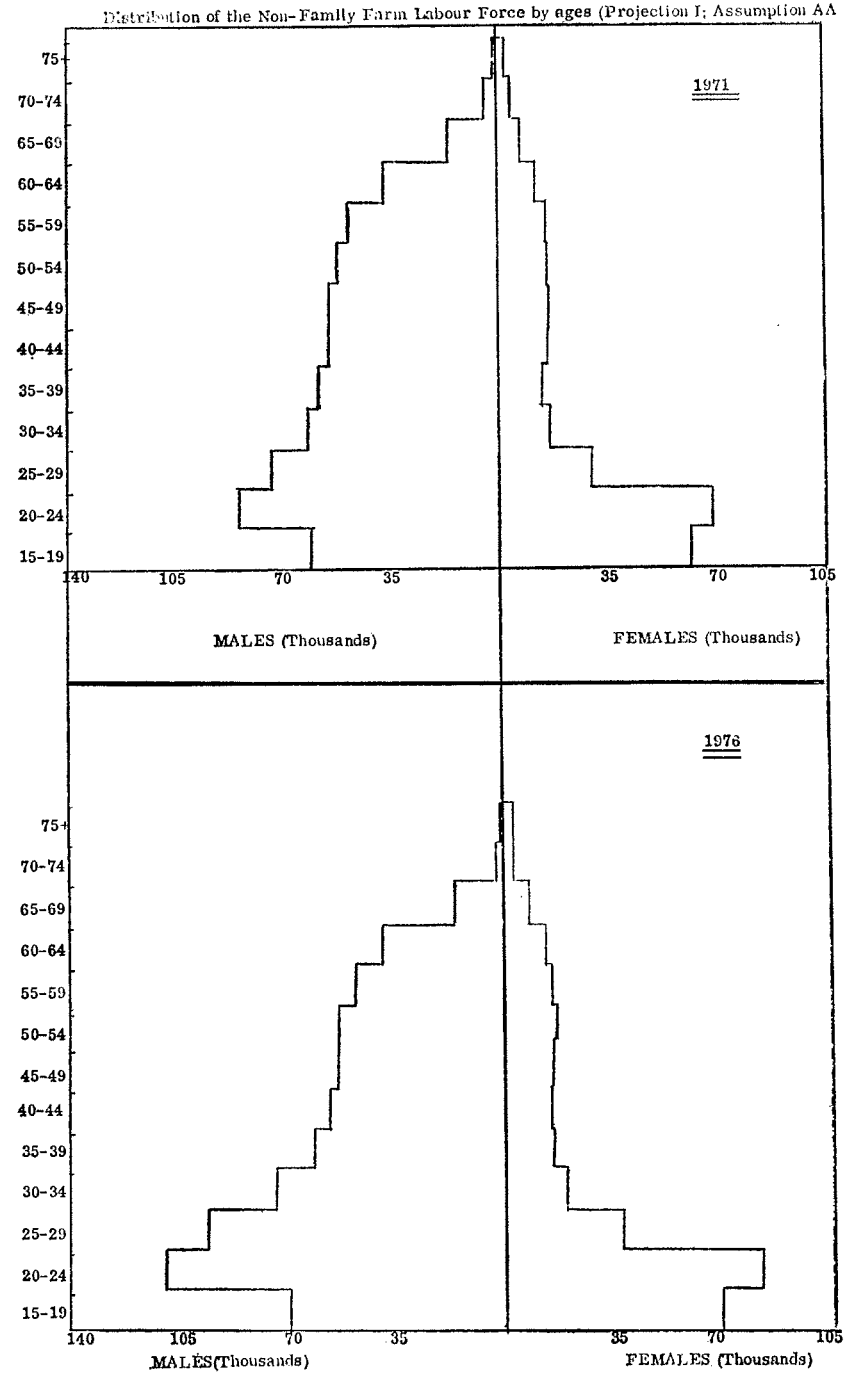


CHART 3 (Contd.)

Distribution of the Non-Family Farm Labour Force by ages (Projection I; Assumption AA)

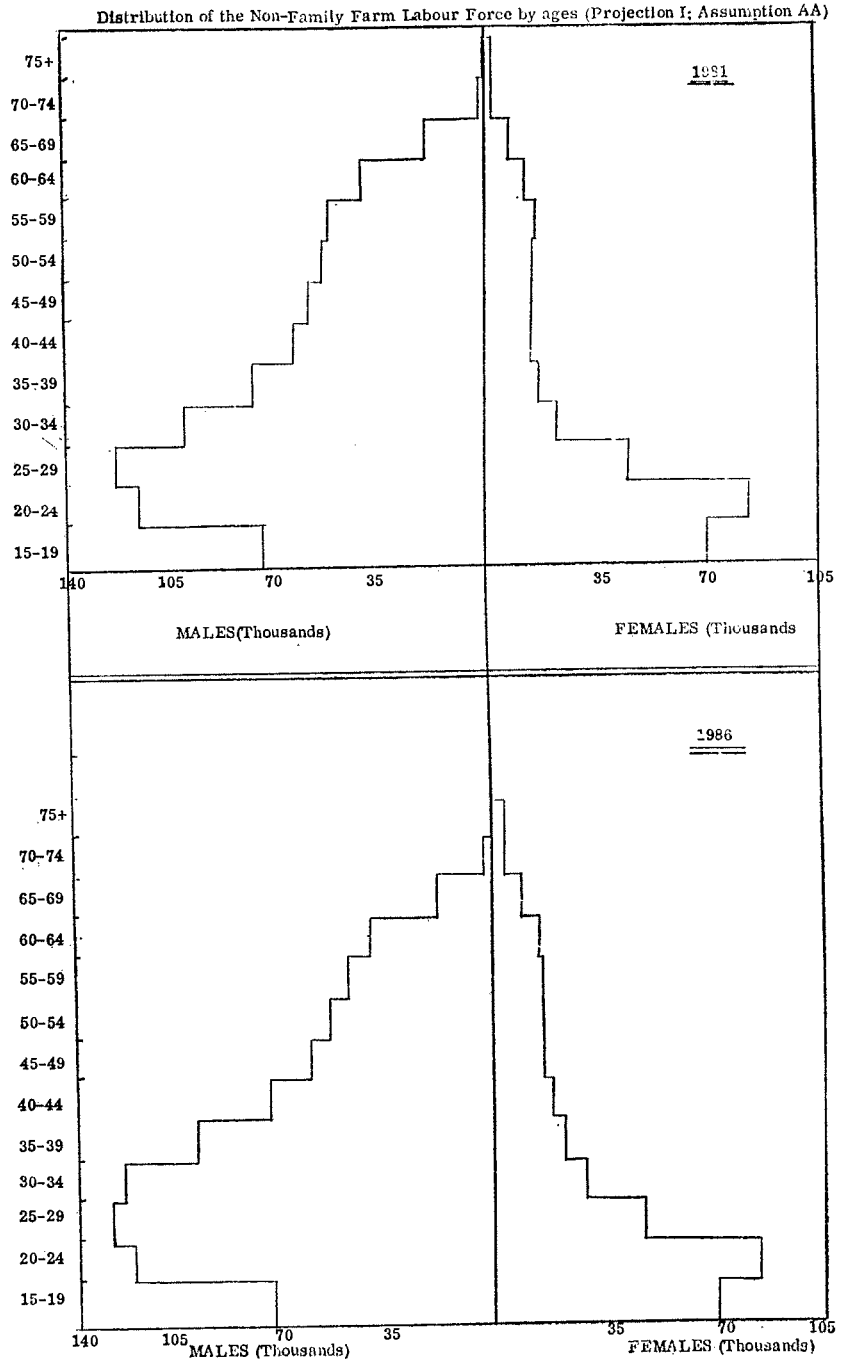


TABLE 4

Projected Non-Family-Farm Labour Force (Employed and Unemployed), 1976-1986

(Thousands)

Based on average of projected numbers under the four assumptions regarding labour force participation among those aged 15–44

(See Appendices B and D)

Age	Year				Annual Average Growth Rate	
	1971 (Actual)	1976	1981	1986	1971/86 %	1966/71 (Actual) %
	Based on Population Projection 1					
	Males					
15–44	396·8	472·3	543·8	612·3	+2·9	+1·8
45–64	196·4	201·0	203·2	208·9	+0·4	+1·0
65 +	26·2	24·2	23·2	21·2	−1·4	+0·7
15 +	619·5	697·4	770·2	842·4	+2·1	+1·5
	Females					
15–44	195·5	227·1	244·0	255·7	+1·8	+0·4
45–64	53·1	55·1	54·8	54·5	+0·2	+1·3
65 +	11·9	11·3	11·1	10·5	−0·8	+0·0
15 +	260·6	293·4	309·9	320·6	+1·4	+0·6
	Both Sexes					
15 +	880·0	990·9	1,080·1	1,163·0	+1·9	+1·2

TABLE 4—*continued*

Age	Year				Annual Average Growth Rate	
	1971 (Actual)	1976	1981	1986	1971/86 %	1966-71 (Actual) %
	Based on Population Projection 2					
	Males					
15–44	396·8	472·3	555·5	638·6	+3·2	+1·8
45–64	196·4	201·0	204·1	210·0	+0·4	+1·0
65 +	26·2	24·2	22·3	20·2	−1·7	+0·7
15 +	619·5	697·4	781·9	868·7	+2·3	+1·5
	Females					
15–44	195·5	227·1	252·4	270·0	+2·2	+0·4
45–64	53·1	55·1	55·3	55·4	+0·3	+1·3
65 +	11·9	11·3	11·0	10·3	−1·0	+0·0
15 +	260·6	293·4	318·7	335·7	+1·7	+0 6
	Both Sexes					
15 +	880·0	990·9	1,100·5	1,204·4	+2·1	+1·2

Economic growth has generally been accompanied by a rising proportion of females in the total labour force, due especially to an expansion of the commercial and service sectors. This has been the case in Ireland, although it is disguised somewhat in the aggregate figures due to the declining importance of "private domestic service".* In order to allow for the possibility that these trends would continue, we have prepared alternative projections of the female labour force based on an assumed stable female/male ratio (at each age) in the non-family farm labour force.† Table 5 summarises the results of this projection. By comparison with Table 4 it may be seen that the projected growth in the female non-family farm labour force rises from 1·4% to 1·9% a year, with the result that the growth of the male and female total rises from 1·9% to 2·0% annually. Almost all of the increase occurs in the 15–44 age group for females.

Growth Required to Attain "Full Employment"

In Chapter II, Section 3, we discussed our understanding of the full-employment target. Our procedure is to apply the target unemployment rates in each age group to the projected non-family farm labour force and thereby to obtain a projection of the number of non-family farm jobs required to meet the full-employment goal. Note that this number refers to *net* job creation, over and above any redundancies from existing employment.

*Cf. Walsh, SSISI, May 1971, *op. cit.*, Table 3.

†The use of each age-group's female/male ratio does not preserve stability in the overall ratio, due to the shifting weights of each age group in the total.

TABLE 5

Projected Non-Family Farm Labour Force (Employed and Unemployed) 1976-1986, under the assumption of constant male/female ratio

(Thousands)

(Figures for 15–44 age groups are averages of the four assumptions regarding labour force)

Age	Year				Annual Average Growth Rate	
	1971 (Actual)	1976	1981	1986	1971/86 (Projected) %	1966/71 (Actual) %
	Based on Population Projection 1					
	Males					
15–44	396·8	472·3	543·8	612·3	+2·9	+1·8
45–64	196·4	201·0	203·2	208·9	+0·4	+1·0
65 +	26·2	24·2	23·2	21·2	−1·4	+0·7
15 +	619·5	697·4	770·2	842·4	+2·1	+1·5
	Females					
15–44	195·5	236·9	260·6	278·7	+2·4	+0·4
45–64	53·1	54·4	55·0	56·5	+0·4	+1·3
65 +	11·9	11·0	10·5	9·6	−1·4	+0·0
15 +	260·6	302·3	326·1	344·8	+1·9	+0·6
	Both Sexes					
15 +	880·0	999·7	1,096·2	1,187·1	+2·0	+1·2

The basic results are summarised in Table 6. The growth rates shown in the last column of this table are one and a half to two times the corresponding entries in Table 3, reflecting the additional growth required (*a*) to absorb the reduction in the farm labour force and (*b*) to absorb some of those currently classified as unemployed. Comparison of Tables 4 and 6 shows that (*b*)—the absorption of the unemployed into the employed labour force—contributes relatively little to the required growth in non-family farm employment. The main source of growth in our projection of required employment is not the fall in the numbers unemployed, but the high growth potential of the labour force. In fact, the total level of non-family farm unemployment in 1971 amounts to the equivalent of only three years' natural growth in the non-family farm labour force. This point deserves emphasis: the rapid rate of growth implied by our targets is not mainly due to the reduction in unemployment rates we have built into these targets. The non-family farm labour force (employed and unemployed) is projected as growing at 2·1% and 1·9% annually between 1971 and 1986, whereas the required growth in employment is in the range 2·4% to 2·1%—less than a 15% increase in the growth rate attributable to the targeted reduction in unemployment. It is clear from these figures that the reduction in employment growth that would be caused by redefining our targets to reflect higher unemployment rates would amount to barely over one year's natural growth in the non-family farm labour force.

TABLE 6

Level of Non-Family Farm Employment required to reach Full-Employment by 1986

(Thousands)

Based on Non-Family-Farm Labour Force Data in Table 4 and target unemployment rates described in text

Age	Year				Annual Average Growth Rate	
	1971 (Actual)	1976	1981	1986	1971-86 %	1966-71 (Actual) %
			Based on Population Projection 1			
			Males			
15–44	369·4	441·1	515·5	589·0	+3·2	+1·7
45–64	173·1	178·1	184·9	195·3	+0·8	+0·6
65 +	21·9	20·4	20·3	19·3	−0·8	−0·6
15 +	564·4	639·6	720·7	803·6	+2·4	+1·2
			Females			
15–44	188·7	219·4	237·7	250·9	+1·9	+0·4
45–64	50·9	52·8	53·0	53·2	+0·3	+1·1
65 +	11·5	10·9	10·9	10·3	−0·8	−0·3
15 +	251·1	283·1	301·6	314·3	+1·5	+0·5
			Both Sexes			
15 +	815·5	922·7	1,022·3	1,118·0	+2·1	+1·0

TABLE 6—*continued*

Age	Year				Annual Average Growth Rate	
	1971 (Actual)	1976	1981	1986	1971–86 %	1966–71 (Actual) %
			Based on Population Projection 2			
			Males			
15–44	369·4	441·1	526·7	614·3	+3·5	+1·7
45–64	173·1	178·1	185·7	196·3	+0·8	+0·6
65 +	21·9	20·4	19·5	18·4	−1·2	−0·6
15 +	564·4	639·6	731·9	829·0	+2·6	+1·2
			Females			
15–44	188·7	219·4	245·9	264·9	+2·3	+0·4
45–64	50·9	52·8	53·5	54·1	+0·4	+1·1
65 +	11·5	10·9	10·7	10·1	−0·9	−0·3
15 +	251·1	283·1	310·1	329·1	+1·8	+0·5
			Both Sexes			
15 +	815·5	922·7	1,041·9	1,158·1	+2·4	+1·0

As was noted above, our target rate of unemployment was 4% in 1986, defined on the labour force age structure that existed in 1971. The actual unemployment rates are somewhat lower, namely:

1976	1981		1986	
	1	2	1	2
6·9	5·4	5·3	3·9	3·8

More detail on our projections is provided in Table 7. The net number of new non-family farm jobs required is in the region of 20,000 a year throughout the period 1971–86 under population projection 1. Interestingly, this net job-creation target is at its maximum in the first period, so that by now (mid-1974) we should have created 60,000 additional non-family farm jobs since the last Census.* In percentage terms, the rate of new job creation required declines slightly from 1976 onwards.

When the higher population projection is used—allowing no net migration over the entire period—the annual employment growth is higher, rising to 24,000 between 1976 and 1981. But even under this assumption both the rate of growth, and the absolute increase required, level off after 1981. Under this assumption, the required level of non-farm employment grows by a total of 41% between 1971 and 1986.

The growing female/male imbalance evident in Table 4 is even more pronounced in Tables 6 and 7, where 87% of the required employment growth, 1981–86, is male. This implausible outcome lends importance to the alternative approach to the projection of the female labour force, which results in the full-employment projections summarised in Table 8. This approach substantially increases the required growth rate of female employment (from 1·5% to 2·0%), but the growth of total employment rises only from 2·1% to 2·3%.

*In fact the growth of non-agricultural employment between 1972 and 1973 was estimated at only 12,000.

TABLE 7

Annual Average Growth Rate in Non-Family-Farm Employment, and Net Number of New Non-Family-Farm Jobs Required to Attain "Full Employment" by 1986

(Same assumptions as Table 5)

Age	Period					
	1971–76		1976–81		1981–86	
	Net New Jobs Required per year (Thousands)	Annual Average Growth Rate %	Net New Jobs Required per year (Thousands)	Annual Average Growth Rate %	Net New Jobs Required per year (Thousands)	Annual Average Growth Rate %
	Based on Population Projection 1					
	Males					
15–44	14·3	3·6	14·9	3·2	14·7	2·7
45–64	1·0	0·6	1·4	0·8	2·1	1·1
65 +	−0·3	−1·5	0·0	−0·1	−0·2	−1·0
15 +	15·0	2·5	16·2	2·4	16·6	2·2
	Females					
15–44	6·1	3·1	3·7	1·7	2·6	1·1
45–64	0·4	0·7	0·0	0·1	0·0	0·1
65 +	−0·1	−1·1	0·0	−0·1	−0·1	−1·1
15 +	6·4	2·4	3·7	1·3	2·6	0·8
	Both Sexes					
15 +	21·4	2·5	19·9	2·1	19·1	1·8

TABLE 7—*continued*

Age	Period					
	1971–76		1976–81		1981–86	
	Net New Jobs Required per year (Thousands)	Annual Average Growth Rate %	Net New Jobs Required per year (Thousands)	Annual Average Growth Rate %	Net New Jobs Required per year (Thousands)	Annual Average Growth Rate %
	Based on Population Projection 2					
	Males					
15–44	14·3	3·6	17·1	3·6	17·5	3·2
45–64	1·0	0·6	1·5	0·8	2·1	1·1
65 +	−0·3	−1·5	−0·2	−0·9	−0·2	−1·2
15 +	15·0	2·5	18·5	2·7	19·4	2·5
	Females					
15–44	6·1	3·1	5·3	2·3	3·8	1·5
45–64	0·4	0·7	0·1	0·3	0·1	0·2
65 +	−0·1	−1·1	0·0	−0·4	−0·1	−1·1
15 +	6·4	2·4	5·4	1·8	3·8	1·2
	Both Sexes					
15 +	21·4	2·5	23·8	2·5	23·2	2·2

Consistency Checks*

One check on the internal consistency of the assumptions about migration and unemployment used in this study can be obtained from the results of an econometric study of Irish migration.† One of the simplest equations in that study showed the following results for the period 1951–71:

$$N_t = 7{\cdot}05 - 9{\cdot}56\,(W_I/W_B)_t + 0{\cdot}33\,(U_I/U_B)_t$$

where N = net migration rate
W_I/W_B = ratio of earnings of Irish to British industrial workers,
U_I/U_B = ratio of Irish to British unemployment rates.

Our projections assume N at or near zero. We have set $U_I = 4\%$. If we explore a range of British unemployment rates from 2% to 1%, the value of U_I/U_B would be

U_I =	4%	4%	4%
U_B =	2%	1·5%	1%
$U/_IU_B$ =	2	2·67	4

Using the above equation ,it is possible to obtain the values of W_I/W_B implied by $N = 0$ and these values of U_I/U_B :

$\frac{W_I}{W_B}$ | $N = 0$ =	·81	·83	·88

This implies that our assumptions concerning the unemployment and net migration rates are mutually compatible provided the ratio of Irish to UK earnings lies in the range 81% to 88%. Earnings data for various categories of workers in Ireland and Britain reveal that this ratio currently

*This section derives from discussions with P. T. Geary and Colm McCarthy.

†Brendan M. Walsh, "Expectations, Information, and Human Migration: Specifying an Econometric Model of Irish Migration to Britain", *Journal of Regional Science*, Vol. 14, No. 1, 1974, pp. 107–120.

TABLE 8

Level of Non-Family Farm Employment Required to Reach Full-Employment by 1986 (under the assumption of constant male/female ratio in non-farm labour force)

(Thousands)

Based on non-family-farm labour force data in Table 5 and target unemployment rates described in text

Age	Year				Annual Average Growth Rate	
	1971 (Actual)	1976	1981	1986	1971/86 %	1966/71 (Actual) %
	Based on Population Projection 1					
	Males					
15–44	369·4	441·1	515·5	589·0	+3·2	+1·7
45–64	173·1	178·1	184·9	195·0	+0·8	+0·6
65 +	21·9	20·4	20·3	19·3	−0·8	−0·6
15 +	564·4	639·6	720·7	803·6	+2·4	+1·2
	Females					
15–44	188·7	228·9	253·8	273·4	+2·5	+0·4
45–64	50·9	52·2	53·2	55·2	+0·5	+1·1
65 +	11·5	10·6	10·3	9·5	−1·3	−0·3
15 +	251·1	291·7	317·3	338·0	+2·0	+0·5
	Both Sexes					
15 +	815·5	931·2	1,038·0	1,141·6	+2·3	+1·0

TABLE 9
Annual Average Growth Rate in Non-Family Farm Employment and Net Number of New Non-Family Farm Jobs Required to attain "Full Employment" by 1986
(Same assumptions as Table 8)

Age	Period					
	1971–76		1976–81		1981–86	
	Net New Jobs Required per year (thousands)	Annual Average Growth Rate %	Net New Jobs Required per year (thousands)	Annual Average Growth Rate %	Net New Jobs Required per year (thousands)	Annual Average Growth Rate %
			Based on Population Projection 1			
			Males			
15–44	14·3	3·6	14·9	3·2	14·7	2·7
45–64	1·0	0·6	1·4	0·8	2·1	1·1
65 +	–0·3	–1·5	0·0	–0·1	–0·2	–1·0
15 +	15·0	2·5	16·2	2·4	16·6	2·2
			Females			
15–44	8·0	3·9	5·0	2·1	3·9	1·5
45–64	0·3	0·5	0·2	0·4	0·4	0·7
65 +	–0·2	–1·6	–0·1	–0·6	–0·2	–1·6
15 +	8·1	3·0	5·1	1·7	4·1	1·3
			Both Sexes			
15 +	23·1	2·7	21·4	2·2	20·7	1·9

lies between 80% and 85%. In other words, our results suggest that, on the basis of the Irish experience 1951–71, the "full-employment" target as defined in this study is compatible with the existing ratio of Irish to British earnings.

Whilst this brief section does not aim at providing a full check on the consistency of the model, nor of its implications for the price level, the material presented here is reassuring evidence that no additional cost-push impetus to Irish inflation is necessarily implied in our concept of full-employment.

Concluding Remarks

Major uncertainties exist about the future of many of the variables used as inputs in these projections. No one can foresee with any confidence the future course of Irish migration. Our assumptions regarding labour force participation rates may prove conservative. The rate of decline in the farm labour force may not continue in line with past trends.

It is, however, clear that the main conclusions emerging from our study are very robust under realistic alternative assumptions regarding key variables. Our findings are dominated by the abnormal age-structure (of both the population and the labour force) from which we started in 1971. The age groups over 30 have been severely depleted by the heavy emigration of past decades. There is, consequently, a very rapid natural increase in the labour force, as the depleted age groups are replaced by generations of school-leavers who experienced very little net emigration. Absorbing these young adults into the employed labour force is one of the major challenges facing the economy.

The abundant supply of young workers that will characterise our economy for many years to come is likely to have particular implications for older workers who become redundant and face competition with a large number of young job-seekers. The labour force will become more and more dominated by those aged under 45, whose share of total male non-family farm employment will rise from 65% in 1971 to 73% in 1986 (according to projection 1).

Summary of Main Projections

The following is a summary of the main projections obtained in this study:

	Actual Growth 1966–71	Projected Growth 1971–86			
	Annual Average %		Annual Average %	Total Growth 1986 as % of 1971	Annual Average Increase (thousands)
Population aged 15 and over	0·6	High	1·3	122	29·8
		Low	1·2	119	25·7
Total labour force	0·1	High	1·3	121	15·4
		Low	1·1	117	12·6
Non-family farm labour force	1·2	High	2·1	137	21·6
		Low	1·9	132	18·9
Non-family farm employment required for "full employment"	1·0*	High	2·4	142	22·8
		Low	2·1	137	20·2

*Actual growth in numbers at work outside family farming.

APPENDIX A

PROJECTIONS OF PROPORTIONS MARRIED, THE BIRTH RATE, TOTAL POPULATION AND THE DEPENDENCY RATIO

Methodology

Our interest lies in the medium to long run. Trend will dominate cyclical factors when we take this type of time horizon. We therefore rely heavily on the assumption that post-war trends will be continued in our projections of marriage and fertility rates. Provided the long-term rate of growth in real income does not exhibit a discontinuity in or about 1971, our approach will yield the same results as would be obtained from an attempt to measure the association of real income with these demographic variables in the past and to use this as the basis for the projections.

Marital Status

Table A1 sets out the proportions of women ever-married by single year of age from the Population Census 1946, 1951, 1961, 1966 and 1971 and for France, 1969. In Chart A1, these proportions for 1946 and 1971 are presented, together with the French data. Unfortunately, these data refer to "cross-sections" of the population, containing as many birth cohorts as there are years of age in the table. (This accounts in the Irish data for the occurrence of a slight downturn in the curve at certain older ages—when the marriage rate is rising very rapidly it is possible for a higher proportion of younger than of older women to be ever-married.)

Table A2 sets out the limited data available on a cohort basis for the proportions ever-married. In this table, of course, the entries along a row must rise, since we are re-constructing the experience of a given cohort of women as they progress through the individual age groups.

TABLE A1

Ever-married as percentage of all women at each year of age in the Census of Population, 1946–71

Age Last Birthday	1946	1951	1961	1966	1971	France 1969
16	0·3	0·2	0·2	0·2	0·4	0·9
17	1·0	0·6	0·6	0·8	1·0	3·2
18	2·3	1·6	1·9	2·4	3·2	8·6
19	4·6	3·6	3·9	5·3	6·7	18·8
20	8·1	8·1	8·1	10·2	13·1	31·6
21	12·4	11·7	14·1	17·3	21·1	46·2
22	17·1	17·2	21·2	25·6	31·4	58·8
23	22·5	23·2	30·0	36·0	42·2	67·2
24	28·0	29·3	37·9	43·7	51·4	73·9
25	33·5	34·8	45·2	51·1	59·1	78·7
26	39·1	41·6	50·4	58·5	65·0	81·5
27	43·0	46·1	55·5	63·4	70·7	84·3
28	46·6	50·6	60·2	68·2	74·8	85·9
29	51·3	54·6	62·9	70·3	76·9	87·1
30	55·6	58·4	66·2	73·2	77·7	87·9
31	60·0	62·6	69·0	74·6	80·0	88·7
32	61·7	64·0	70·3	76·3	81·5	89·2
33	63·5	65·6	72·7	77·7	81·9	89·6
34	65·8	67·6	73·5	77·3	81·8	90·2
35	65·6	69·0	74·8	77·5	82·4	90·4
36	67·2	71·1	75·8	78·6	82·8	90·8
37	68·5	72·0	76·2	78·4	83·3	91·0
38	68·9	72·3	77·4	79·9	83·5	91·3
39	69·8	73·1	78·0	79·3	82·6	91·4
40	71·5	72·4	77·3	80·3	82·2	91·6
41	71·4	73·4	79·1	80·4	82·3	91·6
42	73·0	73·5	77·9	80·4	82·0	91·6
43	73·2	73·7	77·8	80·9	82·7	91·5
44	73·1	73·8	78·1	79·7	81·8	91·5

CHART A1

Proportion of Women Ever-Married at ages 15–45. Census (Cross-Section) Data

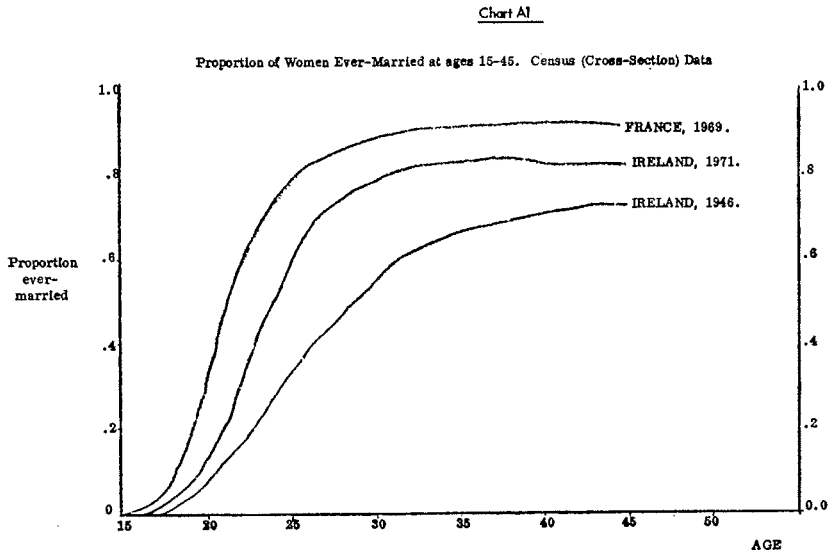


TABLE A2

Ever-married as percentage of all women by cohort (Based on Census data, referring to those surviving in Ireland)

Cohort Born in	Age: 15–19	20–24	25–29	30–34	35–39	40–44	45–49
1906–11	0·7	—	35·9	—	67·9	73·3	75·4
1911–16	—	13·6	—	61·2	71·5	76·4	77·9
1916–21	0·9	—	42·5	63·6	72·6	78·0	79·6
1921–26	—	17·5	45·6	67·0	76·5	80·5	81·8
1926–31	1·6	17·7	46·7	70·4	78·8	82·2	
1931–36	1·1	18·7	54·9	75·9	82·9		
1936–41	0·9	21·8	62·2	80·6			
1941–46	1·1	25·2	68·8				
1946–51	1·6	31·1					
1951–56	3·0						

— = Not available (No Census in 1921, 1931 or 1941).

The first approach to the projection of the marital status structure of the population taken in the present study has been to fit curves to the data of Tables A1, A2, and to attempt to project the parameters of these curves. The basic function used was the Gompertz curve, the curve of whose first derivative is a non-symmetrical distribution and which seems to fit the marriage data better than any of the usual alternatives (such as the logistic curve).*

On the whole, the results of this experimentation did not inspire confidence: the curves provided extremely close fits to the transformed variables ($\log_e Y$ or $\log_e (\frac{c}{y} - 1)$) but these do not always translate into close fits for the original variable, Y. Secondly, the high or low ranges of the curve are very unstable, and this problem is aggravated by the use of cross-section data, for which successive values of Y are not always increasing.

The projected values displayed in Table A3 owe something to the Gompertz curve, but they also embody some *ad hoc* manipulation, reflecting our "hunch" as to how this variable will change, assuming for the "high" projection that it will eventually approach the current French distribution. This part of our projection, and the results that derive from it must, therefore, be treated with particular caution. We feel, however, that the basic methodology is worthy of further research, and is preferable to any attempt to project marriage rates and to derive the proportion ever-married from these.† Having obtained a projection of the proportions ever-married, women were allocated between the widowed and the currently-married on the basis of the 1971 distribution of these components of the total.

*For a discussion of this approach to the analysis of marriage rates, cf. A. J. Coale, "Age Patterns of Marriage", *Population Studies*, Vol. 25, No. 2 (July 1971), pp. 193–214. For a discussion of the curve-fitting techniques involved, cf. F. E. Croxton, D. J. Cowden, and S. Klein, *Applied General Statistics*, Third edition, Prentice-Hall, Englewood Cliffs, N. J., 1967, Chapter 13.

†The use of first marriage rates would normally only involve assumptions about the first derivative of the curve for proportions ever-married, but in Ireland the relevant rates are difficult to measure due to (*a*) those who, when marrying in Ireland, give an "intended future residence 'outside the State' " and (*b*) the possibly important effect of marriages outside Ireland on the marital status of the flow of returning migrants and of the resident population.

TABLE A3

Projected Proportions of Female Population Ever-Married, 1971–86

Age	Ireland							France	England and Wales
	Actual 1971	1976		1981		1986		1968	1966
		High	Low	High	Low	High	Low		
15–19	2·1	3·5	2·5	4·0	2·8	4·5	3·0	3·2	8·0
20–24	31·1	36·1	33·6	41·1	36·1	46·1	38·6	43·9	58·7
25–29	68·8	72·8	70·8	76·8	72·8	80·8	78·8	81·9	86·6
30–34	80·6	83·3	82·0	86·0	83·4	88·7	84·8	89·5	91·1
35–39	82·9	85·1	84·0	87·3	85·1	89·3	86·2	90·9	91·6
40–44	82·2	84·4	83·3	86·6	84·4	88·5	85·5	91·0	91·7
45–49	81·8	84·0	82·9	86·2	84·0	88·0	85·1	91·3	91·3
50–54	80·5	82·6	81·6	84·8	82·7	86·6	83·8		

When the results were combined with assumptions about legitimate and illegitimate fertility, projections of the birth rate were then possible.

Birth Rate

Given the marital status structure of the female population, assumptions regarding the future course of fertility were needed to calculate the number of births each period. In this area, projection is an especially hazardous task. Family size is influenced by a complex set of factors—religious, cultural and economic—and the Irish situation in regard to fertility is at present very unusual by European standards.*

We start from the age-specific legitimate and illegitimate fertility rates for 1961, 1966 and 1971 (Table A4). Our projections are based on the (legitimate and illegitimate) period-fertility method, which is considerably less elaborate than alternatives such as the cohort-fertility or marriage-parity interval progression method.†

*For some international data, cf. B. M. Walsh, "Ireland's Demographic Transformation, 1958–70", *Economic and Social Review*, January, 1972.

†For a discussion of these techniques, cf. Shryock and Siegel, *op. cit.*, pp. 781 ff.

Table A4 also displays our projections of the fertility rate. These have been calculated by the simple method of using the ratio of 1971 to 1966 rates as the assumed rate of change. For legitimate fertility, a high and low projection have been prepared: the high projection assumes that the rate of decline will be at the same rate as between 1966-71, the low projection assumes that this rate of decline will double after 1971.* Of course, there is no behavioural relationship on the basis of which we can choose between these alternatives. However, it is interesting to note that even on the results of our low projection, Irish legitimate fertility would still be higher than current rates in France or Britain, as may be seen from Table A5: in positing this more rapid rate of decline in Irish fertility we are still envisaging a situation in which Irish fertility would be substantially above the western European average in 1986. Similarly, in allowing illegitimate fertility to rise at the 1966-71 rate, we are still projecting a lower rate for Ireland in 1986 than that currently prevailing in Britain or France.

The birth rate was obtained by applying these rates to the married and unmarried female population projected to survive to the end of each quinquennium, averaging the births for the first and last years of each quinquennium, and multiplying by five. This yields a total for the number of children born during the intercensal period. Survivorship ratios have then to be applied to obtain the number expected to survive to the next Census date.

*For the age group 15–19, we assumed that fertility would stabilise at its 1971 level. This age group has little effect on the overall birth rate.

TABLE A4

Legitimate and Illegitimate Fertility Rates, 1961, 1966 and 1971, and Projected Values for 1976–86

H = High Projection L = Low Projection

Legitimate Births per 1,000 Married Women

Age	1961	1966	1971	1976		1981		1986	
				H	L	H	L	H	L
15–19	608·6	635·5	678·7	680	680	680	680	680	680
20–24	474·6	480·9	457·2	435	413	413	373	392	338
25–29	389·5	366·8	349·0	332	316	316	286	301	259
30–34	296·5	278·8	248·0	221	196	196	155	174	123
35–39	201·0	184·6	160·0	137	120	120	90	104	68
40–44	76·5	70·1	58·4	49	41	41	28	34	20
45–49	5·8	5·7	4·3	3	2	2	1	2	1

Illegitimate Births per 1,000 Single and Widowed Women

Age	1961	1966	1971	1976	1981	1986
15–19	2·7	3·4	4·7	6	9	12
20–24	5·3	8·3	11·1	15	19	26
25–29	5·1	8·5	10·1	12	14	17
30–35	4·0	6·0	6·2	6	7	7
35–39	2·0	2·9	3·5	4	5	6
40–44	0·6	0·9	0·9	1	1	1
45–49	0·1	0·1	0·2	0	0	0

TABLE A5

Comparison of Projected Irish Fertility in 1986 with levels in France and Britain about 1970

	Ireland, 1986		France 1968	England and Wales, 1970
	Legitimate Fertility Rate			
Age	High Projection	Low Projection		
15–19	680	680	454	443
20–24	392	338	311	242
25–29	301	259	195	171
30–34	174	123	110	84
35–39	104	68	53	36
40–44	34	20	16	9
45–49	2	1	1	1
	Illegitimate Fertility Rate			
Age				
15–19	12		6	14
20–24	26		21	28
25–29	17		31	44
30–34	7		29	38
35–39	6		19	21
40–44	1		7	6
45–49	0		1	0

Results

Table A6 shows the projected growth in the number of married women in the country under various assumptions. The rapid increase in the numbers in the young adult population, even when combined with the more conservative assumption about nuptiality, yields a very rapid rate of increase in the number of married women aged 15–34. It is notable, however, that we project a slower rate of growth in the number of married women aged 20–24 than that actually recorded between

1966 and 1971; the slowing-down occurs mostly after 1976, and reflects the sharp drop in the rate of population growth in that age group after 1976 (cf. Chart 2 of the main study). Taking all age groups up to 54 together, it is clear that the growth rate in the number of married couples over the fifteen year period is likely to be substantially higher than that recorded between 1966 and 1971.

Our assumptions about fertility and nuptiality yield the following projected annual average number of births (thousands):

Fertility/Nuptiality:	High		Low	
	1971-76			
High	73·1		71·4	
Low	70·3		68·7	
	1976-81			
	1*	2*	1*	2*
High	84·8	86·0	80·0	81·0
Low	76·0	77·1	71·6	72·6
	1981-86			
	1*	2*	1*	2*
High	94·6	98·8	87·8	91·6
Low	79·5	83·3	73·6	77·0

*Refers to population projections 1 and 2.

The range from the highest to the lowest of these projections has become very substantial by 1986—from 98·8 to 73·6 thousand births a year (implying a birth rate between 21 and 25 per 1,000). This is a measure of the difficulty of projecting the components of the birth rate. However, some of these projections look less plausible than others. Births registered between 1971:2 and 1974:1 averaged 68,100

a year, slightly *lower* than the lowest of our four projections for the intercensal period 1971–76. Thus, we are either over-projecting the rise in the young female population or the proportions ever-married, or alternatively fertility has declined even more rapidly than is allowed for in our low fertility assumption. If we exclude as implausible the combination of the high fertility and high nuptiality assumptions*, we narrow the range of the projections in 1981–86, to between 91·6 and 73·6 thousand births a year. The outcome may be even lower than our lowest projection.

A feature of these projections is their greater sensitivity to the fertility than to the nuptiality assumptions: the difference in the number of births projected between comparable high and low nuptiality assumptions is of the order of 8% for the years 1981–86, whereas that between the high and low fertility assumption is about 19%.

When we add our projection of births to the projected survivors from the existing population we obtain the projected total population. The results are set out below:

Projected Total Population, 1971–86
(Thousands)

Fertility	1971 (Actual)	1976	1981		1986		Annual Average Growth Rate 1971–86		1966–71 (Actual)
			1*	2*	1*	2*	1*	2*	
		High Nuptiality Assumption							
High	2,978·2	3,182·5	3,418·0	3,448·9	3,701·3	3,778·5	1·5	1·6	0·6
Low		3,168·6	3,360·3	3,390·9	3,568·6	3,643·1	1·2	1·4	
		Low Nuptiality Assumption							
High	2,978·2	3,174·1	3,385·5	3,415·8	3,635·0	3,709·8	1·3	1·5	0·6
Low		3,160·5	3,330·1	3,360·0	3,509·1	3,580·8	1·1	1·2	

*Refers to population projections 1 and 2.

Our projected totals for 1986 lie in the range 3,778·5–3,509·1 thousand. Much of the difference is due to the effect of the various fertility-

*There is some evidence that the rise in nuptiality tends to be more rapid when fertility is falling rapidly. Cf. Walsh, *op. cit., Economic and Social Review,* January 1972.

nuptiality assumptions on the birth rate. It is interesting to note that the range of projected total populations for 1986 published by Knaggs and Keane lay in the interval 3,514·9–3,302·0 thousand. These lower totals reflect the much higher net emigration assumptions used by them in all their published projections. Their published projections for 1976 (the highest figure is 3,091·6 thousand) are low in comparison with the estimated April 1973 total of 3,051·0 thousand.

In Table A7 we summarise the projected age structure of the population in terms of the dependency ratio. We show the number of young and old dependants per 100 "active" (i.e. aged 15–64). The results emphasise the well-known interrelations between the birth and migration rates and the population age structure. The two most important points emerging from the table are: *(a)* the higher the level of net emigration, the higher the level of both young and old dependency (compare the results for population projections 1 and 2), *(b)* the higher the birth rate (whether due to high fertility or nuptiality), the higher the level of young dependency. In the medium-run, up to 15 years, the second effect has no influence on the level of old dependency, but as the larger birth-cohorts begin to enter the "active" age groups, the level of old dependency will decline.

The range of total dependency projected for 1986 is 68–79. Almost all of this variation is due to the variation in young dependency, which has a range of 51–61. It is clear that the crucial question from the viewpoint of the future course of the dependency ratio is the level of the birth rate. Only a substantial fall in the birth rate offers any prospect of a significant reduction in dependency over the next two decades.

One aspect of the situation that is not adequately measured by the conventional dependency ratio is the important increase in the proportion of the population aged 15–44. This finding has been stressed in connection with Table 1 of the main study. It may be seen that the proportion of the "active" age group (15–64) that is aged 15–44 is projected as rising from 54% in 1971 to 62% (projection 1) or 63% (projection 2) in 1981.

Summary of Main Findings

1. The number of married couples in Ireland is likely to grow very rapidly, due to the rapid growth of the young adult population and to

the rising proportions married at each age. By 1986, there may be about twice as many married women aged 20–29 as were recorded in the 1971 Census.

2. The number of births will grow fairly rapidly if marriage rates continue to increase and fertility declines no faster than in the last intercensal period. The birth rate is likely to remain high, even if fertility declines, due to the increase in the proportion of the population in the young adult age groups.

3. The total dependency ratio is likely to remain high. Old dependency may decline slightly, but young dependency will remain stable or even rise unless the birth rate declines.

TABLE A6

Projected Numbers of Married Women, 1971–86 (Thousands)

Age	1971 Actual	1976	1981		1986		Annual Average Growth Rate (%)			
			1*	2*	1*	2*	1971–86		1966–71 (Actual)
							1*	2*	
High Nuptiality Assumption									
15–19	2·8	5·1	6·0	6·2	6·7	6·9	6·0	6·2	7·0
20–24	32·7	47·1	56·0	59·9	64·8	71·1	4·7	5·3	7·5
25–29	58·5	76·2	98·1	99·9	107·9	117·5	4·2	4·8	4·9
30–34	59·6	70·2	89·6	89·4	112·7	114·6	4·3	4·5	1·7
35–39	60·1	62·2	73·2	72·8	92·5	91·9	2·9	2·9	0·0
40–44	60·4	59·4	61·1	61·5	71·9	71·8	1·2	1·2	—1·1
45–49	61·3	58·7	57·5	57·7	59·0	59·5	—0·3	—0·2	0·2
50–54	55·4	56·6	53·7	54·3	52·3	53·2	—0·4	—0·3	0·0
15–54	390·8	435·5	495·2	501·7	567·8	586·5	2·5	2·7	1·3

*Refers to population projections 1 and 2.

TABLE A6—*continued*

Age	1971 Actual	1976	1981		1986		Annual Average Growth Rate (%) 1971–86		1966–71 (Actual)
			1*	2*	1*	2*	1*	2*	
Low Nuptiality Assumption									
15–19	2·8	3·7	4·2	4·3	4·5	4·6	3·2	3·4	7·0
20–24	32·7	43·8	49·2	52·6	54·3	59·5	3·4	4·1	7·5
25–29	58·5	74·1	93·0	94·7	105·2	114·6	4·0	4·6	4·9
30–34	59·6	69·1	86·9	86·7	107·7	109·5	4·0	4·1	1·7
35–39	60·1	61·4	71·4	71·0	89·3	88·7	2·7	2·6	0·0
40–44	60·4	58·6	59·6	59·9	69·4	69·4	0·9	0·9	−1·1
45–49	61·3	58·0	56·0	56·3	57·0	57·6	−0·5	−0·4	0·2
50–54	55·4	55·9	52·3	52·9	50·7	51·5	−0·6	−0·5	0·0
15–54	390·8	424·6	472·6	478·4	538·1	555·4	2·2	2·4	1·3

*Refers to population projections 1 and 2.

TABLE A7

Dependency Ratio of Projected Population

Numbers in Dependent Age Groups per 100 "Active"	1971 Actual	1976	1981		1986	
			1*	2*	1*	2*
		Fertility: High				
			Nuptiality: High			
Young	54	53	57	56	61	60
Old	19	18	18	18	18	17
Total	73	72	75	74	79	77
			Nuptiality: Low			
Young	54	53	55	54	58	57
Old	19	18	18	18	18	17
Total	73	71	73	72	76	74
		Fertility: Low				
			Nuptiality: High			
Young	54	53	54	53	55	54
Old	19	18	18	18	18	17
Total	73	71	72	71	73	71
			Nuptiality: Low			
Young	54	53	52	51	52	51
Old	19	18	18	18	18	17
Total	73	71	70	69	70	68

*Refers to population projections 1 and 2.

APPENDIX B

LABOUR FORCE PARTICIPATION RATES

In order to derive projections of the labour force from population projections, assumptions must be made about labour force participation rates (LFPR). Our procedure has been outlined in Chapter II this Appendix furnishes the details.

In Table B1 age-specific male and female LFPR for 1966 and 1971 are set out together with our projections for 1971–86. The stability in these rates for all ages between 25 and 64 between 1966 and 1971 is striking. In the case of males, it is unlikely that there will be any significant change in the future. For women, the overall stability is deceptive, because the proportions married at each age increased and hence the overall LFPR remained stable only because there was a substantial rise in the rate for single and married women.*

We have projected the male LFPR in the age intervals 15–24 and 65 and over as shown in Table B1. The declining rate among older men is due mainly to the fall in the proportions engaged in family farming.† We have assumed that the LFPR among those aged 20–24 will continue to decline at the rate recorded 1966–71. (Table B2 gives more detail on this age group in the 1966 and 1971 Censuses). Considerable uncertainty surrounds the LFPR among those aged 20–24. As may be seen from Table B2 the proportions of males and females in this age group who were at school rose very substantially between 1966 and 1971. It seems unlikely that this proportion can continue to grow at this rate, and hence we take as a high assumption for our LFPR projection the 1971 rate in the age group 15–19. Our low LFPR projection is based on the assumption that educational participation will continue to increase, but at a slower rate than over the last five years.

*Throughout this Appendix the problems of measuring female labour force participation should be kept in mind. The Census probably understates the number of married women in employment due to its emphasis on "principal occupation".

†Cf. B. Walsh, SSISI, May 1971, *op. cit.*, for an econometric study of the factors influencing Irish LFPR.

TABLE B1

Labour Force Participation Rates by Age and Sex, 1966–86
(Percentage of each group in the labour force)

Age	1966 Actual	1971 Actual	1976	1981	1986
			Males		
15–19	61·5	50·7	A 50·7 B 50·0	50·7 47·5	50·7 45·0
20–24	89·4	88·9	88·4	87·9	87·4
25–29	96·7	96·8	Assumed Stable at 1971 Level		
30–34	97·9	97·8			
35–39	97·9	97·8			
40–44	97·7	97·5			
45–49	97·2	97·1			
50–54	96·3	96·0			
55–59	93·6	94·0			
60–64	85·5	87·6			
65–69	65·6	63·9	62·2	60·6	59·0
70–74	46·1	40·0	34·7	30·1	26·1
75 +	32·4	26·2	21·2	17·1	13·8
			Females		
15–19	53·6	44·9	A 44·9 B 44·5	44·9 42·0	44·9 40·0
20–24	66·8	65·0	63·3	61·6	59·9
25–29	35·6	34·6	First Approach: Assumed Stable at 1971 Level		
30–34	22·2	21·6			
35–39	19·0	18·9			
40–44	17·9	19·3			
45–49	19·7	20·1			
50–54	20·8	21·5			
55–59	22·4	21·8			
60–64	21·2	20·7			
65–69	17·2	15·9	14·7	13·6	12·6
70–74	13·0	10·9	9·1	7·6	6·4
75 +	9·8	7·8	6·2	4·9	3·9

TABLE B2

Labour Force Status of Males and Females Aged 15-24 in the 1966 and 1971 Census

(Percentage Distribution)

	Males				Females			
Age:	15–19		20–24		15–19		20–24	
Census:	1966	1971	1966	1971	1966	1971	1966	1971
Labour Force Status								
Gainfully occupied	61·5	50·7	89·4	88·9	53·6	44·9	66·8	65·0
At school, students	32·6	43·3	8·7	8·3	35·9	47·2	3·9	4·4
Other	5·9	6·1	1·9	2·6	10·5	7·9	29·3	30·6
Total	100	100	100	100	100	100	100	100

We adopted two approaches to projecting the female labour force. The first approach was exactly the same as that used for males—applying the projected LFPR set out in Table B1 to the projected population to obtain the projected labour force. It was clear from the results obtained that this approach led to an increasingly male labour force (cf. Tables 4 and 6). In order to explore an approach that avoided this implausible outcome, we have prepared projections based on an assumed constancy in the sex-ratio of non-family farm employment at each age, starting from the 1971 ratio.* Thus, we projected the female labour force from the male labour force. The female LFPR was then obtained as an *output,* rather than used as an *input.* Since this approach implied a more rapid expansion of female employment, it yielded higher projections of the female LFPR.

In order to obtain projected female LFPR by marital status, we projected the single and widowed LFPR from the 1966–71 trend, applied these projected rates to the projected single and widowed female population. This gave an estimate of the number of single and widowed

*Between 1966 and 1971 this ratio in fact remained stable at 42 females per 100 males (aged 15 and over).

women in the labour force. Subtracting this estimate from the total projected female labour force gave us, as a residual, the projected number of married women that would be in the labour force, from which the married female LFPR was calculated.

We have used two projections of the LFPR among single and widowed women. The first merely projected the 1966–71 rate of decline or increase in the proportions *not* in the labour force over each subsequent five year period. These LFPR were used with our first approach to the projection of the female labour force (which had a declining sex ratio). Our second projection doubled the rate of decline* in the proportion of single and widowed women not in the labour force. These LFPR were used in conjunction with our second approach to the projection of female employment (which assumed a stable sex-ratio). The projected single and widowed female LFPR are set out in Table B3. The rates for single women under the second approach are very high, and probably represent an upper limit to the extent to which these rates are likely to increase in response to demand pressures.

Using these two sets of single and widowed LFPR to obtain projected married female LFPR is complicated by the fact that we have used a high and a low nuptiality assumption. Hence we get four alternative married female LFPR projections. These are set out in Table B4. The married female LFPR must be higher, the higher the nuptiality assumption used. And the higher the assumed sex ratio (F/M) of the labour force, the higher the female LFPR. The variety of assumptions used give rise to a range of projected married female LFPR, but in most age groups this range is surprisingly narrow. For the 20–24 age groups the range of projected rate is enormous—11·9% to 37·7% in 1986—indicating that we have really very little basis on which to make a prediction about the likely outcome. For the remaining age groups, however, all four projections show a relatively similar upward trend.

*In cases where this proportion increased, the rate of increase was assumed equal to the 1966–71 rate.

TABLE B3
Projected Single and Widowed Female Participation Rates, 1971/86
(Percentage in Labour Force)

	Single				Widowed			
	1971 Actual	1976	1981	1986	1971 Actual	1976	1981	1986
	Declining F/M Ratio in Non-Family Farm Labour Force							
Age								
20–24	87·4	88·3	89·2	90·0	43·8	49·1	53·9	58·2
25–29	87·6	90·5	92·7	94·4	47·3	48·8	50·3	51·8
30–34	80·1	83·6	86·4	88·8	43·0	42·0	41·0	40·0
35–39	75·2	79·4	82·9	85·8	46·5	43·3	39·9	36·3
40–44	69·9	73·7	77·0	79·9	46·7	44·1	41·4	38·6
45–54	64·1	67·6	70·8	73·7	41·8	39·6	37·3	34·9
55–64	50·8	52·3	53·8	55·3	30·9	29·2	27·5	25·8
65–69	31·9	31·0	30·1	29·2	18·0	14·2	10·2	6·0
70–74	20·3	18·5	16·7	14·9	11·4	7·6	3·6	—
75 +	15·5	13·8	12·1	10·4	6·4	3·9	1·3	—
	Stable F/M Ratio in Non-Family Farm Labour Force							
20–24	87·4	89·2	90·7	92·0	43·8	53·9	62·2	69·0
25–29	87·6	92·7	95·7	97·5	47·3	50·2	52·9	55·5
30–34	80·1	86·5	90·8	93·7	43·0	42·0	41·0	40·0
35–39	75·2	82·9	88·2	91·9	46·5	43·3	39·9	36·3
40–44	69·9	77·0	82·4	86·5	46·7	44·1	41·4	38·6
45–54	64·1	70·8	76·2	80·6	41·8	39·6	37·3	34·9

One feature of these results calls for comment: the rapid upward trend in married female LFPR for those aged 20–24, contrasted with a much less steep rate of increase in older age groups, suggests that some substitution of older for younger female workers is likely. The LFPR among those aged 20–24 in fact rose from 8·6% in 1966 to 15·2% in 1971, so our projections are not out of line with past trends. Nonetheless, our second approach to the projection of female LFPR assumed a constant F/M ratio *in each age group,* and this rather implausibly allows for no substitution of older for younger women workers. It is likely that older married women would be more readily available for work than their younger counterparts. This issue has not been pursued further in the present study.

TABLE B4

Married Female LFPR, under Alternative Assumptions

Age	Actual 1971	1976	1981	1986
Projection 1: Assumptions: Proportions ever married—High Sex ratio (F/M) of Labour Force—Declining*				
20–24	15·2	19·0	22·0	24·6
25–29	10·5	13·6	16·9	20·3
30–34	7·2	8·9	10·8	12·8
35–39	6·7	7·7	9·1	10·5
40–44	6·8	7·9	9·2	10·4
45–54	7·3	8·3	9·6	10·7
Projection 2: Assumptions: Proportions ever married—Low Sex ratio (F/M) of Labour Force—Declining*				
20–24	15·2	13·8	12·7	11·9
25–29	10·5	11·4	12·8	18·4
30–34	7·2	7·7	8·4	9·3
35–39	6·7	6·8	7·2	7·7
40–44	6·8	7·0	7·4	7·9
45–54	7·3	7·5	7·9	8·4
Projection 3: Assumptions: Proportions ever married—High Sex ratio (F/M) of Labour Force—Stable*				
20–24	15·2	29·1	32·2	37·7
25–29	10·5	14·9	19·0	22·0
30–34	7·2	9·1	12·1	14·7
35–39	6·7	8·2	10·2	12·7
40–44	6·8	8·5	10·9	12·8
45–54	7·3	8·0	10·2	12·5

Projection 4: Assumptions: Proportions ever married—Low Sex ratio (F/M) of Labour Force—Stable*

Age	Actual 1971	1976	1981	1986
20–24	15·2	24·7	24·1	27·1
25–29	10·5	12·7	14·8	20·1
30–34	7·2	7·8	9·7	11·0
35–39	6·7	7·2	8·1	9·8
40–44	6·8	7·6	9·0	10·2
45–54	7·3	7·1	8·3	10·1

*Excluding family farming.

APPENDIX C

PROJECTION OF NUMBERS IN FAMILY FARMING

Starting from the numbers of farmers and farmers' relatives recorded in the 1971 Census, projections have been based on the "continuation in family farming" rates of the 1966–71 intercensal period. Table C1 sets out these rates for 1961–66 and 1966–71:

TABLE C1

Actual Numbers Recorded in Family Farming as Ratio of the Expected Survivors from the Group aged 5 years younger in Previous Census

Age at Start of Period	1961–66		1966–71	
	Males	Females	Males	Females
15–19	·720	·724	·691	·753
20–24	·850	·795	·779	·515
25–29	·985	·706	·925	·475
30–34	1·012	·691	·965	·730
35–39	·994	·802	·954	1·036
40–44	1·012	·825	·956	1·207
45–49	·983	·902	·933	1·098
50–54			·945	1.074
55–59	·976	·807	·955	·974
60–64			·972	·829
65–69	·904	1·056	·827	·821
70 +	·787	1·254	·680	·657
15 +	·940	·901	·892	·842

It is clear that at most ages there has been an increased rate of out-movement from family farming in the later period. This is most marked in the first two age groups (where presumably movement to non-farm employment is accelerating as job opportunities increase), and among those aged over 64 (where retirement has apparently become more usual). Over the age interval 25–64 some slight fall in the male "continuation rate" and a rise in the female rate may be noted, but generally net movement is very slight.

In our projections we have used the 1966–71 continuation rates. This may be conservative, tending to overstate the future family farm labour force.* As far as the older age groups are concerned, this will have no significance for our projections of the non-farm labour: a quickening of the rate of retirement from farming presumably will not increase the supply of non-farm labour: if we had projected a continuing decline in the continuation rates among older farmers, we should also have used correspondingly lower labour force participation rates in calculating the total labour force at those ages.

Most serious issues arise in connection with the number of young entrants to family farming each period. The following are the numbers of males aged 15–24 gainfully occupied in family farming in 1966 and 1971:

	1966	1971
15–19	17,454	9,639
20–24	14,386	12,044

In addition to a net outflow of over five thousand young men from the 17·5 thousand aged 15–19 in 1966, there has been a dramatic fall in the intake of teenagers to family farming (i.e. farmers' sons entering the farm labour force). No doubt this is due in large part to an upsurge in post-primary school participation among farm children. Two uncertainties face anyone preparing projections on the basis of the 1971 data:

*It has been shown that the rate of outflow of young adults from the agricultural sector is somewhat responsive to the availability of non-farm-employment: Cf. B. M. Walsh, "Economic and Demographic Adjustment of the Irish Agricultural Labour Force, 1961/66", *Irish Journal of Agricultural Economics and Rural Sociology*, Vol. 3, No. 2 (1971), Table 9.

will the increase in educational participation continue? and will there be any flow from the post-primary school system into farming? In answer to the first question, it seems unlikely that the rate of increase will be sustained, and hence the 1966–71 rise may be regarded as a once-and-for-all change. The second question may be answered with qualified scepticism about the likelihood that significant proportions of males with post-primary schooling being willing to return to the status of "farmers' sons assisting on farms".

With these considerations in mind, we have prepared a high (A) and a low (B) projection of the numbers in family farming. Both assume that the numbers of 15–19 year-olds will continue to decline, but at much slower rate than between 1966–71:

Family Farm Labour Force, Aged 15-19

	1966	1971	1976	1981	1986
	Actual		Projected		
Males	17,454	9,639	9,000	8,500	8,000
Females	1,956	793	700	600	500

For projection (B) we have applied the 1966–71 "continuation in family farming" rate (·691 for males, cf. Table C1) to the projected survivors of these entrants to family farming. For projection (A) we have greatly raised the "continuation rate" for those aged 15–19 (who become those aged 20–24 in the next period), by assuming that 100% of the survivors from the entrants continue in farming. This is designed to allow for the possibility that the entry to farming of those with post-primary education will at least offset the outflow of the 15–19 year-olds already in farming.

The following is a summary of the projected numbers in family farming under the two assumptions:

	1966	1971	(Thousands) 1976	1981	1986	Annual Average Rate of Change 1971/86 %
			Males			
15–44	103·0	78·7	A 64·1	54·3	47·8	−3·3
			B 61·1	49·1	40·8	−4·3
45–64	99·3	91·0	78·5	64·1	50·8	−3·8
65 +	47·3	39·9	37·8	36·8	33·9	−1·1
Total 15 +	249·6	209·6	A 180·5	155·2	132·5	−3·0
			B 177·5	150·0	125·6	−3·4
			Females			
15–44	9·0	5·8	A 4·0	2·9	2·3	−6·0
			B 3·8	2·7	2·0	−6·9
45–64	12·4	10·3	8·5	6·5	4·8	−5·0
65 +	10·9	8·4	6·6	5·6	4·6	−3·9
			A 19·1	15·0	11·7	−4·8
Total 15 +	32·3	24·5	B 18·9	14·7	11·5	−5·0
Total Family Farm Labour Force, 15 and over:	281·9	234·2	A 199·5	170·1	144·3	−3·2
			B 196·3	164·7	137·0	−3·5

(The choice between assumption (A) and (B) does not greatly affect the final results for the totals although by 1986 projection (B) shows 15% fewer males in the 15-44 age group.) Projection (A) shows some slowing-down in the rate of decrease in the family farm labour force,

but the results for projection (B) show virtually the same rate of decline as that actually recorded between 1966–71, namely, a 17% fall in the family farm labour force between each census. The projected decline in the number of younger farmers and their relatives is, however, more rapid than in the past, whilst the number aged 65 and over is projected to decline by only 20% over the entire 1971–86 period. The figures for the 45–64 age group may be used fairly confidently, in view of the fact that the net movement into or out of family farming is not likely to be important at this age. It is striking that our projections show a markedly accelerated rate of decline in this age interval after 1971. Although our projections of the youngest group are hedged with a great deal of caution due to the uncertainty underlying the choice of a realistic assumption about the entry into family farming, the data illustrate that a continuation of the rapid rate of decline in the numbers in this age group is very likely.

When these projections of the family farm labour force are related to our projections of the increase in the non-family farm labour force required to reach full-employment, it may be seen that the contraction of the share of family farming in total employment is likely to be at a faster pace from now on:

Projected Share of Family Farm Labour Force in Total Labour Force (%)

1966	1971	1976	1981	1986
25·4	21·0	A* 16·7	13·5	10·9
		B* 16·4	13·1	10·4

*Based on population projection No. 1, labour force projection A. (The A and B alternatives here relate to the two assumptions about the future of the family farm labour force).

This outcome reflects the more rapid growth in non-family farming employment projected for the years 1971–86 than actually achieved between 1966–71.

Appendix D
Projected Non-Family Farm Labour Force Aged 15-44, 1976–86
(Employed and Unemployed)*
(Thousands)

Actual 1971		1976	1981 Projection 1	1981 Projection 2	1986 Projection 1	1986 Projection 2
			Males			
396·8	AA	471·3	543·7	555·6	613·3	639·6
	AB	474·3	548·9	560·7	620·3	646·6
	BA	470·3	538·7	550·4	604·3	630·5
	BB	473·3	543·8	555·5	611·3	637·5
			Females			
195·5	AA	227·3	246·1	254·5	259·2	273·6
	AB	227·5	246·3	254·8	259·5	273·9
	BA	226·7	241·7	250·0	251·9	266·1
	BB	226·9	242·0	250·3	252·2	266·4
			Total			
592·3	AA	698·6	789·8	810·1	872·5	913·3
	AB	701·8	795·2	815·5	879·8	920·5
	BA	696·9	780·4	800·4	856·3	896·6
	BB	700·2	785·8	805·8	863·5	903·9

*Assumptions

15–19
- AA: LFPR levels off at 1971 rates and no.'s in FFLF are constant at 1971 level.
- AB: LFPR levels off at 1971 rates and no.'s in FFLF are declining by 500 each intercensal period.
- BA: LFPR declines between 1971–86 and no.'s in FFLF are constant at 1971 level.
- BB: LFPR declines between 1971–86 and no.'s in FFLF are declining by each intercensal period.

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