A Flow Analysis of the Irish Live Register*

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Abstract: This paper makes use for the first time of data on the flows into and out of the Irish Live Register. It describes the construction of consistent quarterly flow series for the period 1967 to 1993. The analysis suggests that the build-up of the unemployment stock is mainly due to the inflows to the Live Register. The results also suggest that in the 1970s the inflows seem to have been largely determined by market and demographic adjustments in Ireland induced by developments in Britain. In the 1980s, by contrast, the inflows seem to have been driven substantially by demographic developments in Ireland.

I INTRODUCTION

E mpirical research into unemployment in Ireland has to date concentrated on the use of information on the stocks of unemployed due to the unavailability of other types of data. The present paper is a contribution to this research area which for the first time makes use of data on the flows into and out of the Irish Live Register. Focusing on the construction of consistent series of flow data, and on simple exploratory data description and analysis, we put forward a number of new facts and insights into the

behaviour of these flows. In particular, the analysis suggests that the build-up of the unemployment stock, and the numbers in the different duration categories, is mainly due to the inflows to the Live Register and that this build-up has been ameliorated by generally increasing outflows that seem to be strongly linked to migration to Great Britain.

If these findings are accepted, the clear implication is that in order to explain Irish unemployment, one has to understand and be able to explain the factors that determine the inflows to the Register. The results we present and discuss below suggest that the key determinant of the inflow in the 1970s is quite different from that which appears to operate in the 1980s. In the earlier period of the 1970s, the small Irish product and factor markets were closely integrated with those in Great Britain, whereas in the 1980s the links were much weaker. In the 1970s the inflows seem to have been largely determined by market and demographic adjustments in Ireland induced by developments in Britain. By contrast, in the 1980s, due to constancy of employment capacity and participation rates, the inflows seem to have been driven substantially by demographic factors. It is our strong contention that any theoretical explanation of Irish unemployment must account for the unusual features of the economy brought to light by this study. In particular, it must provide good reasons for the apparent lack of impact on the flows of changes in employment, changes which seem to be the main determinant of flows in other countries.

The paper is organised as follows. Section II describes the way the new data set was constructed. Section III focuses on the implications of the derived inflows for hazard rates, and on the factors affecting the outflows, while Section IV examines the key determinants of the inflows. Finally, Section V contains a few concluding remarks.

II CONSTRUCTION OF THE DATA

Information on the quarterly flows of individuals into and out of the Irish Live Register is not available from official data sources for all years over the recent past. Therefore we begin in this section by giving a brief description of how we constructed consistent series of such flow data using an approach similar to that of Lehmann (1993). We concentrate solely on the flows of males into and out of unemployment, though estimates of the flows of females could, of course, be derived in a similar manner. Fundamental to the methodology is the following identity which relates the stock of unemployed males at time t+1 (TU_{t+1}) to the stock of unemployed males at time t (TU_t) and the total number of newcomers to the Live Register (I) and the total number who left the Live Register (O) during the intervening period:

$$TU_{t+1} \equiv TU_t + I_{t \to t+1} - O_{t \to t+1} \tag{1}$$

where $t \to t+1$ denotes the three-month period between time points t and $t+1$.

The total number of unemployed males, TU_t, is available in a consistent quarterly series based on the definition of the Live Register introduced in January 1980. The precise time points used for this series are the end of March, June, September and December of each year. Clearly, given the over-all inflows of males into the Live Register during each of these quarters, $I_{t \to t+1}$, it follows from (1) that the corresponding overall quarterly outflows may be determined using the identity

$$O_{t \to t+1} \equiv I_{t \to t+1} - \Delta TU \tag{2}$$

where $\Delta TU \equiv TU_{t+1} - TU_t$ is the change in the stock of male unemployment over the quarter between time points t and $t+1$. Thus our attention focuses on the construction of a consistent series for $I_{t \to t+1}$, commencing with the first quarter of 1967 and ending with the fourth quarter of 1993.

For the period from the first quarter of 1983 to the last quarter of 1993, i.e., 1983-1 to 1993-4, the inflows of unemployed males have in fact been published by the Central Statistics Office on a monthly basis. The counts for this series were undertaken on the second Friday of each month. Within the period the count is intended to cover, some newly unemployed individuals have up to the full month to leave the Register and others just one day. Nevertheless, we feel that the trend in the overall monthly inflows is well-captured by the CSO figures for the 1983-1 to 1993-4 period. To construct a quarterly series for the inflows of males to the Live Register which corresponds with the end-of-month time-points used for the stock of unemployment data, we assume that the monthly inflows accumulate at a uniform weekly rate, then aggregate the CSO monthly figures and make the appropriate adjustments for the weeks at the beginning and end of each quarter.

Construction of the required inflows for the earlier part of our sample is more problematical as no CSO monthly inflow data were available. Indeed, due to insuperable constraints relating to raw data availability, our method of construction had to be modified for two earlier sub-periods, namely, the periods 1967-1 to 1979-4 and 1980-1 to 1982-4.

For the period 1967-1 to 1979-4, we made use of the CSO's quarterly unemployment age-by-duration analysis for males, excluding those aged 65 years and over. This analysis is based on data collected on the last Friday in February, May, August and November in each of the relevant years. Prior to finalising construction of a quarterly inflow series from these data, we

investigated some of their characteristics by deriving from them annual inflow series in three different ways. First, treating all males in the under three months duration category at the end of each quarter as a proxy for the inflow in that quarter, we aggregated over quarters to obtain annual inflow estimates. Second, using all males in the under six months duration category at the end of each half-year as a proxy for the inflow in that period, we summed semi-annual figures to derive a second annual inflow series. Finally, we constructed an annual inflow series using the total number of males in the under twelve months duration category directly. The first proxy allows individuals up to three months to leave the Live Register, while the second allows up to six months and the third up to a year. However, although these alternative annual measures had different levels, they had exactly the same trends, reflecting, we feel, an important feature of labour market flows which we will return to in Section III below, namely, that the hazard rates for the different duration categories were virtually constant during the 1970s.[1] The common trend in turn almost certainly reflects the trend of the actual inflows in this initial period, which would count every new unemployment registration. Assuming that February, May, August and November are representative months for the required quarters, the quarterly inflows were constructed as 3.25 times the number of males in the under five weeks unemployment duration category in each of the representative months. This procedure provides us with results which are consistent with the estimates for the 1983-1 to the 1993-4 period.

For the remaining sub-period in the sample, namely, the bridging period 1980-1 to 1982-4, only semi-annual duration analysis is available from CSO sources. For this case, construction of proxies for the required quarterly inflows was based on the fact that, inflow cohorts generally seem to be staying on for long durations throughout this period. Thus the quarterly inflow during the period to the end of March in each year was estimated by the number of unemployed in the under 12 weeks duration category at the start of April of the same year. The inflow for the quarter to the end of June was estimated by all those in the 13 to 26 weeks category in October of the same year. Similarly, the quarterly inflow to the end of September was proxied by the number in the under 12 weeks category in October of the same year, while the inflow in the quarter to the end of December was measured by total unemployment in the 13 to 26 weeks duration category in April of the immediately following year. In the case of the second and fourth quarters in each year a small upward adjustment was made giving the quarters the same relative levels as in the corresponding quarters in 1983. This was carried out

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1. The alternative annual inflow measures are recorded in McNally (1994).

in order to allow for the fact that in these quarters there is up to six months for individuals to leave the Live Register, rather than three months as in the first and last quarters in any year. We feel confident that the method of construction for the bridging period both picks up the trend in the overall inflows to the Live Register, and also produces results which are reasonably consistent with the estimates of the overall inflows for the earlier 1970s period and the data derived for the 1980s and early 1990s.

The constructed overall quarterly inflows and derived outflows of males are tabulated in the annex to the paper. The flows, smoothed using a five-point moving average, are plotted in Figure 1. The build-up of unemployment is depicted by the accumulating area between the plotted inflows and outflows over time. An interesting feature of the flows is that over the business cycle they are positively correlated with each other; one might have expected them to be negatively related. Job creation and destruction, and changes in workers participation levels in response to domestic and international business cycles, would generally be expected to be the major influences on the flows. Employment movements appear to play a minor role in determining the behaviour of the flows in most years in the sample period. It will be suggested in Sections III and IV that demographic forces, and particularly migratory movements, are likely to be the real key to explaining the behaviour of the flows and the positive relationship observed in Figure 1.
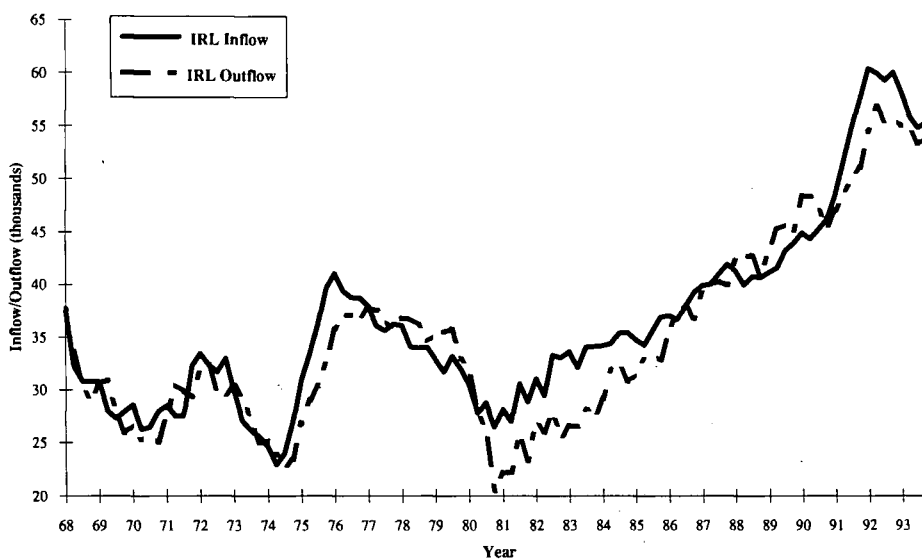

Figure 1: *Quarterly Male Inflows Into and Out of the Irish Live Register*

III HAZARD RATES AND THE OVERALL OUTFLOW

In this section we infer from the overall inflow and the stock of long-term unemployment how hazard rates for the different duration categories have changed over time. Due to the lack of detail in our duration analysis, hazard rates cannot be constructed for all duration categories.[2] Breen and Honohan (1991), using different approaches, gave indirect evidence that the semi-annual hazard rates for the short-term, medium-term and long-term unemployed in Ireland have been constant over the 1970s and the 1980s. This has the important implication that the build-up of unemployed resources overall, and in the different duration categories, can be solely attributed to the increased inflow of newcomers to the Live Register.

The first part of this section uses our information on the overall inflow and the stock of long-term unemployment to re-check the Breen-Honohan finding of constant hazard rates. From the overall inflow and the stock of long-term unemployment we can extract information concerning the movements of hazard rates for the combined duration categories.[3] We work with annual data on long-term unemployed males at the end of the first quarter of each year and sum the quarterly inflows from the second quarter of one year to the first quarter of the next, inclusive. We work with the following modification of identity (1) which states that the stock of long-term unemployment at time t+1 is identical to the stock of long-term unemployment at time t plus the total number of newcomers to long-term unemployment (I^*) over the year t to t+1 minus those who outflowed from long-term unemployment (O^*) during the same period.

$$L_{t+1} \equiv L_t + I^*_{t \to t+1} - O^*_{t \to t+1} \qquad (3)$$

To verify Breen and Honohan's (1991) findings we begin by assuming that the hazard rates for the different duration categories remain constant over time. This assumption implies that there would be the following proportional relationship between the inflow of newcomers into long-term unemployment

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2. The duration analysis only allows one to split the data into under 6 months, between 6 months and a year and over a year. As a result a semi-annual hazard rate can only be constructed for the short-term unemployed.

3. Denoting the short-term unemployed (all males in the under six months duration category) as S_t, the medium-term unemployed (all males in the six to twelve months category) as M_t, and the long-term unemployed (all males in the over twelve months category) as L_t, Breen and Honohan (1991) define the *semi-annual* hazard rates for the short-, medium- and long-term unemployed as $a_{t \to t+1} = 1 - M_{t+1}/S_t$, $b_{t \to t+1} = 1 - (L_{t+1} - (1 - c_{t \to t+1})L_t)/M_t$ and $c_{t \to t+1} = b_{t \to t+1} - \gamma(a_{t \to t+1} - b_{t \to t+1})$, respectively. Their definition of the semi-annual hazard rate for the long-term unemployed as a linear combination of the other two hazard rates clearly constrains both the calculation of $b_{t \to t+1}$ and $c_{t \to t+1}$.

during a given year and the newcomers to the Live Register during the previous year.

$$I^*_{t \to t+1} = (1-a)(1-b)I_{t-1 \to t} \tag{4}$$

where a is the constant proportion of newcomers to the Live Register that would flow out during the first six months of a year, and b is the constant proportion of those newcomers remaining beyond six months that flow out during the second half of the year. The outflow from long-term unemployment during a year can be written alternatively as

$$O^*_{t \to t+1} = c^*L_t + c(1-a)(1-b)I_{t-1 \to t} \tag{5}$$

where c^* is the proportion of the long-term unemployment at time t that flow out during the period t to t+1, and c is the proportion of newcomers to long-term unemployment that flow out during the same period. Using (4) and (5) we can re-write (3) as

$$L_{t=1} \equiv (1-c^*)L_t + (1-a)(1-b)(1-c)I_{t-1 \to t} \tag{6}$$

As c^* may be expected to be very close to zero, it follows that (6) may be re-written as

$$\Delta L \approx \lambda I_{t-1 \to t} \tag{7}$$

where $\Delta L = L_{t+1} - L_t$ and $\lambda = (1-a)(1-b)(1-c)$. Thus, if hazard rates are constant, there should be an approximate proportional relationship between the change in the stock of long-term unemployment and the overall inflow of newcomers to the Live Register during the previous year. These two series are plotted in Figure 2. It is clear from the graph that the kind of proportionality suggested by (7) held during the 1970s and the early 1990s. We therefore conclude that there is strong empirical support for the assumption of constant hazard rates during these two periods.

The period 1979 to 1990 shows very different trends for the two series. Between 1979 and 1984 the combined hazard rates for the different duration categories seem to have declined as the rate of change in long-term unemployment increased more rapidly than that of the overall inflows during the previous year. Between 1984 and 1990 a reversal of this phenomenon appears to have taken place. Except for the period 1979 to 1984, these results reinforce Breen and Honohan's view that the build-up of unemployed resources overall, and in the different duration categories, can be attributed solely to
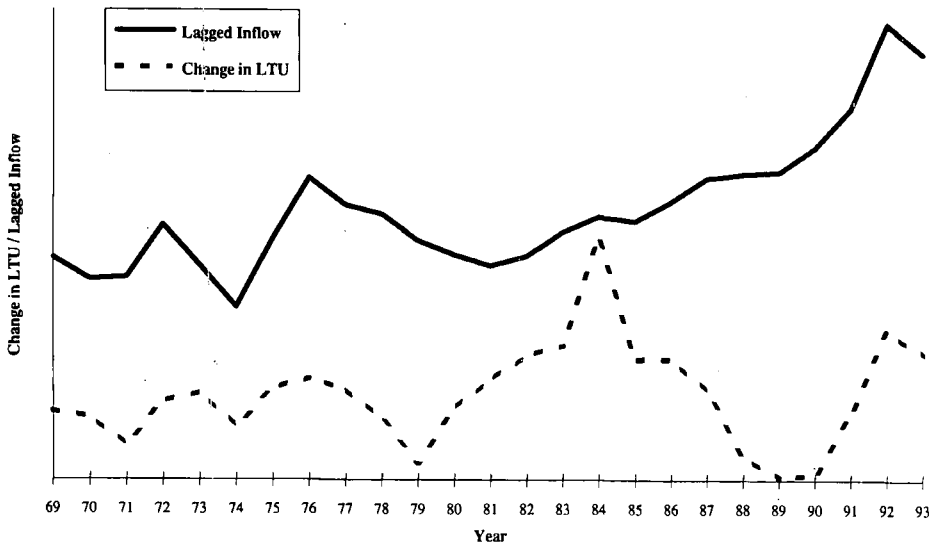
Figure 2: *The Annual Change in Long-Term Unemployment and the Inflow of Newcomers to the Live Register during the Previous Year*

the increased inflow of newcomers to the Live Register. Given the apparent significance of the inflow in determining the stock of unemployment, we raise in Section IV the important question of what in turn might be the essential determining factors of the inflow itself.

In the remainder of this section we restrict our attention to the outflows from the Live Register. Specifically, given that employment growth was generally sluggish (no vacancies) during our sample period, and that the numbers of newcomers to the working-age population burgeoned (more competition for existing vacancies), we address the questions as to why, as shown above, hazard rates were generally non-decreasing and why, as shown in Section II, gross outflows from the Register were generally increasing. The answer to these questions is hinted at, we feel, in the upsurge in outward migration over the 1980s.

Honohan (1992) and Harrison and Walsh (1994) focus on the importance of the link between Irish and British labour market developments. Harrison and Walsh (1994), using the quarterly flow data constructed in Section II, examine the link between the flows into and out of the Irish and British Live Registers. The flows of males into and out of the Live Register in Great Britain were constructed by Lehmann (1993) in a manner similar to our

method of construction of the Irish flows. In Figure 3 the trends in the outflows for Ireland and Great Britain are shown against each other. The same basic trend is apparent in the two series from 1967 into the late 1980s. In the absence of the relevant data, Harrison and Walsh (1994) make a key assumption concerning this phenomenon. They assume that the majority of persons who flowed out of the Irish Live Register did not flow into employment in Ireland. Some went into government schemes, others left the labour force, but the majority almost certainly emigrated. It was also felt most likely that the majority of the unemployed that migrated went to Great Britain. Labour and product market adjustments in Great Britain were likely to have pulled the flows out of the Irish Live Register. To obtain indirect evidence in support of this view they modelled male outflows from the Irish Live Register as depending on the outflow from the Live Register in Great Britain and a weighted GDP index designed to reflect the changing migration patterns away from Great Britain and towards North America and continental Europe. Great Britain has always been the most significant destination, however, and so got the largest weighting. The combined steady-state long-run elasticity of Irish outflows with respect to the above two variables was estimated to be unity. In the light of this recent research there seems little doubt about the importance of the impact of migration flows on hazard rates and the overall outflow.

Figure 3: *Scaled Trends in the Outflow of Irish and British Males*

IV THE OVERALL INFLOW AND DEMOGRAPHICS

The two key results that we carry from Section III are, first, that the build-up of unemployed resources in Ireland, and in the different duration categories, can be solely attributed to the increased inflow of newcomers to the Live Register. Second, there seems little doubt that migration flows were the prime determinant of the mainly non-decreasing duration-specific hazard rates and the generally increasing gross outflow of males from the Live Register. Thus, if we can explain what drives the overall inflow to the Live Register, then we can explain the build-up of Irish male unemployment.

Honohan (1984) has shown that during the 1970s, when product and factor markets in the British Isles were highly integrated, the Irish unemployment rate had a long-run equilibrium tendency to converge to 5 percentage points above the corresponding UK rate. In a similar study for the 1980s, Honohan (1992) found that the previous relationship did not hold in the same way. Although the UK rate still appeared to have a strong short- and long-term influence on the Irish unemployment rate, the Irish rate in the 1980s can no longer be explained by the trends in the UK rate. Harrison and Walsh (1994), again using the quarterly inflow data from Section II, examine the link between the inflows of Ireland and Great Britain. The inflows are plotted against each other in Figure 4, and display similar trends except for the period from when Ireland joined the ERM in 1979 to when the UK joined in
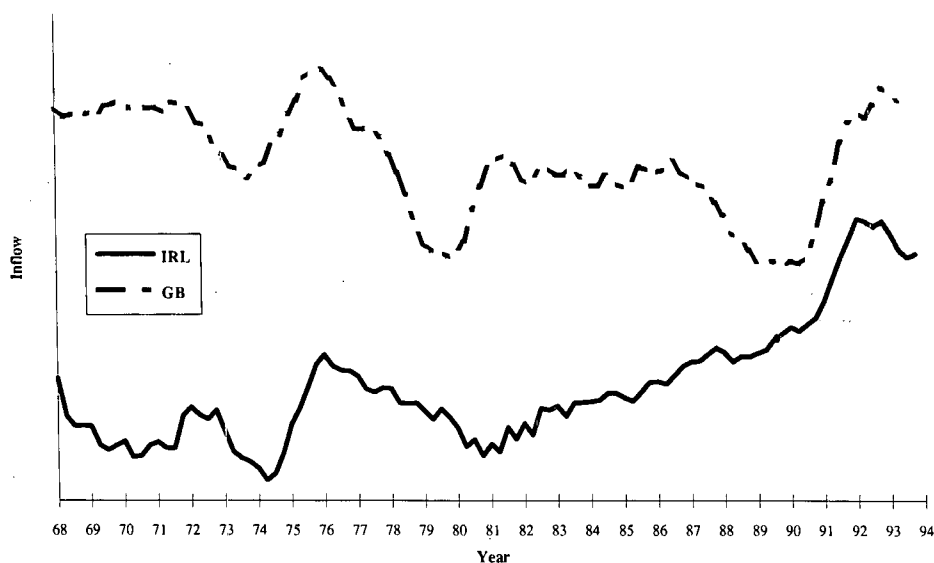

Figure 4: *Scaled Tends in the Inflow of Irish and British Males*

1989. Their results suggest that due to migration, capital and trade, flows between the small Irish economy and the mainland, inflows were pulled by the product and factor market adjustments in Great Britain over the 1970s. The steady-state long-run elasticity of the Irish inflow with respect to the British inflow suggests that convergence was important in the 1970s, was broken in the 1980s as product and capital markets became less integrated, but was re-established in a weaker form in the early 1990s. The relative importance of migration flows, capital and trade flows cannot be decomposed from the analysis. Convergence links with Great Britain explain movements in the gross inflow and unemployment in the 1970s but not since the early 1980s. We therefore turn to consider the main determinant of the inflow over the 1980s.

The inflow to the Live Register comes essentially from two sources: namely, employment destruction over both the domestic and international business cycles, and newcomers to the labour force produced by population growth and changing participation rates. Migration flows from these sources will, of course, offset the inflow to the Register. What, though, has been the relative importance of these factors since the early 1980s?

Since the early 1980s, working-age participation in the labour force has been remarkably constant at around 52 per cent. Similarly, the overall employment capacity of Ireland has remained fairly static, never deviating too much from 1.1 million since the same time. However, despite the stability in overall numbers, there have been changes in the composition and structure of employment. Given a constant participation rate the labour force, which currently stands at 1.34 million, reflected the trends in the working-age population, growing by 11 per cent over the 1970s and by 5 per cent during the 1980s. Table 1 gives more detail on the growth rates of the working-age population and the labour force for five-year intervals during the whole period.

A constant employment capacity implies that any growth in Ireland's participating working-age population must be absorbed by unemployment.

Table 1: *Percentage Growth Rates*

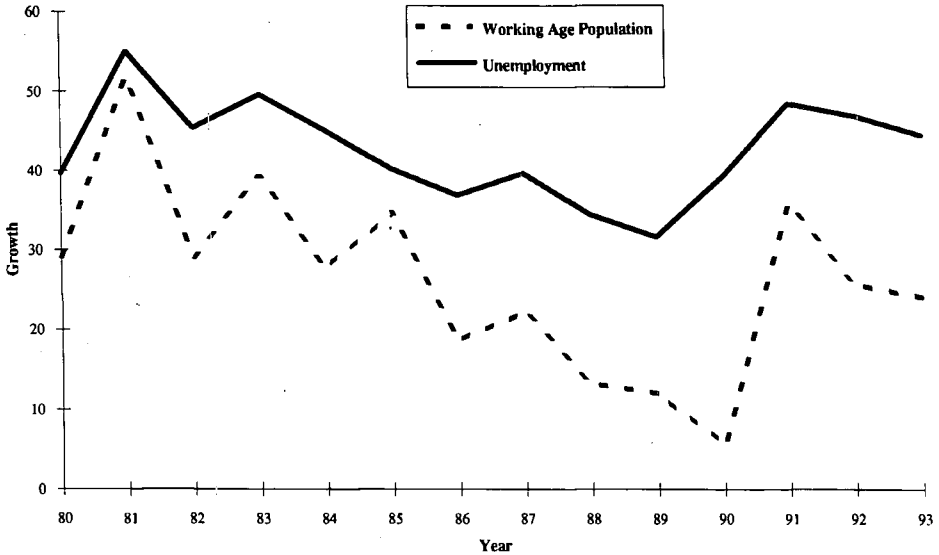| Period	Working-Age Population	Labour Force
1971 - 1975	4.0	4.1
1975 - 1980	7.9	7.2
1980 - 1985	4.3	4.4
1985 - 1990	1.8	0.4
1990 - 1993	3.6	4.7

Figure 5: *Trends in the Growth of Working Age Population and Unemployment*

Figure 5 illustrates this point. The growth in working age population, which has similar trends to the labour force, is plotted against the growth in unemployment. It is clear that over the 1980s the growth in unemployment is probably very significantly pushed by the growth in working-age population.

Having demonstrated in Section III that the build-up of unemployment was essentially due to increased inflows to the Live Register during our sample period, it would appear to follow that in the 1980s, because of the constant employment capacity and participation rates, the inflows can in turn be linked primarily to the growth in the working-age population. This is in stark contrast to the experience in the 1970s, when the inflows appeared to be driven more by market and demographic adjustments in Ireland stimulated by developments in British markets.

V CONCLUSION

The two key results arising from this study are, first, that the build-up of unemployed resources in Ireland, and in the different duration categories of the Live Register, can be solely attributed to the increased inflow of newcomers to the Register; and second, that migration flows were the main determinant of the essentially non-decreasing duration-specific hazard rates and the generally increasing gross outflow of males from the Live Register. In

the 1970s the inflows appear to have been driven mostly by market and demographic adjustments in Ireland stimulated by developments in British markets, whereas in the 1980s, because of the constant employment capacity and participation rates, it seems more likely that the inflows were linked primarily to the growth in the working-age population. These results suggest that the flows over the whole sample period are predominantly pushed and pulled by growth in the working-age population and migration flows, rather than flows created by employment flows.

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DATA ANNEX

Consistent Quarterly Irish Male Flows On and Off the Live Register in Thousands: 1967-1993

Period		Stock	Inflow	Derived Outflow	Period		Stock	Inflow	Derived Outflow
1967	Q1	46.400	52.757	NONE	1970	Q1	54.300	34.333	27.533
	Q2	35.400	32.523	43.523		Q2	51.400	24.625	27.525
	Q3	34.700	31.038	31.738		Q3	42.600	23.065	31.865
	Q4	46.200	36.374	24.874		Q4	50.800	29.039	20.839
1968	Q1	51.900	35.692	29.992	1971	Q1	51.700	31.271	30.371
	Q2	39.200	25.321	38.021		Q2	39.600	29.559	41.659
	Q3	37.500	25.402	27.102		Q3	39.600	24.577	24.577
	Q4	44.600	31.207	24.107		Q4	57.200	46.808	29.208
1969	Q1	46.500	36.049	34.149	1972	Q1	58.100	35.045	34.145
	Q2	37.500	22.055	31.055		Q2	51.500	25.769	32.369
	Q3	36.300	21.736	22.936		Q3	49.500	26.296	28.296
	Q4	47.500	28.577	17.377		Q4	56.700	30.989	23.789

Period		Stock	Inflow	Derived Outflow	Period		Stock	Inflow	Derived Outflow
1973	Q1	54.400	31.190	33.490	1984	Q1	160.300	35.503	30.403
	Q2	46.800	20.774	28.374		Q2	156.000	31.099	35.399
	Q3	46.500	21.375	21.675		Q3	156.500	33.090	32.590
	Q4	52.500	23.576	17.576		Q4	167.600	37.705	26.605
1974	Q1	53.800	26.140	24.840	1985	Q1	172.100	36.567	32.067
	Q2	49.600	22.682	26.882		Q2	167.200	32.872	37.772
	Q3	53.300	25.903	22.203		Q3	168.200	37.834	36.834
	Q4	63.900	36.225	25.625		Q4	176.900	39.841	31.141
1975	Q1	73.200	43.989	34.689	1986	Q1	175.400	38.261	39.761
	Q2	75.500	38.084	35.784		Q2	167.600	34.736	42.536
	Q3	79.000	37.109	33.609		Q3	167.500	39.505	39.605
	Q4	88.300	42.874	33.574		Q4	180.700	44.289	31.089
1976	Q1	90.100	43.131	41.331	1987	Q1	179.800	42.945	43.844
	Q2	84.900	35.877	41.077		Q2	175.200	38.826	43.426
	Q3	83.900	34.808	35.808		Q3	171.300	39.639	43.539
	Q4	89.000	37.037	31.937		Q4	177.400	44.103	38.003
1977	Q1	89.000	38.987	38.987	1988	Q1	176.000	41.291	42.691
	Q2	82.900	33.777	39.877		Q2	166.000	36.070	46.070
	Q3	80.300	33.530	36.130		Q3	165.200	42.856	43.656
	Q4	85.700	37.814	32.414		Q4	170.300	39.158	34.058
1978	Q1	85.900	36.631	36.431	1989	Q1	168.000	46.722	49.022
	Q2	75.500	28.571	38.971		Q2	157.600	43.428	53.828
	Q3	71.800	33.290	36.990		Q3	154.000	44.371	47.971
	Q4	77.300	33.888	28.388		Q4	159.800	46.209	40.409
1979	Q1	74.400	32.162	35.062	1990	Q1	152.700	43.976	51.076
	Q2	67.100	30.739	38.039		Q2	147.900	43.818	48.618
	Q3	62.700	35.948	40.348		Q3	148.500	48.402	47.802
	Q4	67.200	27.430	22.930		Q4	158.100	48.729	39.129
1980	Q1	70.000	26.256	23.456	1991	Q1	167.300	58.175	48.975
	Q2	73.200	18.536	15.336		Q2	168.700	60.448	59.048
	Q3	80.300	35.830	28.730		Q3	172.100	59.024	55.624
	Q4	93.200	24.266	11.366		Q4	181.000	62.068	53.168
1981	Q1	97.200	35.860	31.860	1992	Q1	187.800	62.782	55.982
	Q2	94.200	20.507	23.507		Q2	183.100	56.240	60.940
	Q3	96.900	36.380	33.680		Q3	187.800	56.845	52.145
	Q4	108.200	27.186	15.886		Q4	194.700	62.845	55.945
1982	Q1	113.600	35.471	30.071	1993	Q1	196.700	52.704	50.704
	Q2	114.600	27.825	26.825		Q2	193.200	51.467	54.967
	Q3	125.300	39.755	33.055		Q3	190.600	50.835	53.435
	Q4	135.100	35.016	21.216		Q4	195.700	59.408	54.308
1983	Q1	143.400	30.106	21.806					
	Q2	141.700	27.926	29.626					
	Q3	144.400	37.667	34.967					
	Q4	155.200	39.862	29.062					

Notes: 1. The quarterly dates of stock for each year are 31 March (Q1), 30 June (Q2), 31 September (Q3) and 31 December (Q4).

2. The corresponding quarterly periods of inflow are from 1 January up to and including 31 March (Q1), 1 April up to and including 30 June (Q2), 1 July up to and including 31 September (Q3), and 1 October up to and including 31 December (Q4).

3. Outflow is derived as in Equation (2), Section II.