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Post-War Migration between Ireland and the U.K.:
Models and Estimates

Patrick Geary*
and
Cormac Ó Grada

Working Paper No. 49

May 1987

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Migration has long been more important to Ireland than to any of the other economies discussed at this conference. For over a century a falling population, due largely to an emigration rate that averaged one percent of the population annually, gave Ireland a unique status in the demographic literature. Not surprisingly, such familiar features of Irish social and economic history as poor economic performance, the rise in living standards after the Great Famine, and the low propensity to marry, have been attributed to emigration (Fitzpatrick, 1985).

The outward flow has fluctuated substantially over time. The emigration rate peaked in the later 1840s and early 1850s, but was also high in the later 1860s and during the 1880s. In the 1930s and 1940s it fell back to relatively low levels, but the late 1960s and 1970s provide the only extended period since the Famine in which there was a net inflow. By contrast the rate achieved in the 1950s rivalled that of most earlier decades. The years which provide the data-base for our analysis (1953-1983) saw the emigration rate range from -0.5 percent of the population of working age in 1974 to almost 3.5 percent in 1957. Post-war Irish emigration differs from earlier flows in that it is mainly short-distance (i.e. almost all to the United Kingdom), and more temporary. In terms of the age and sex characteristics of the emigrants, it follows a pattern set in the middle of the last century.

The causes and consequences of Irish emigration have long been debated. Arguments about the causes typically focus on the relative strength of 'push' and 'pull' forces, while those about the costs and benefits draw upon themes well-worn elsewhere (for surveys, see Meenan, 1971 : 337-351; Mokyr and Ó Gráda, 1982). More formal modelling of emigration is a relatively recent phenomenon, however. Its main focus has been on the determinants of emigration, with the net outflow specified as a function of real income
and unemployment differences between sending and receiving countries. Examples are O’Herlihy (1966), Walsh (1974), Geary and McCarthy (1976), and Keenan (1978), all of which analyze the post-war migration from Ireland to the U.K. All use variants of the following specification:

$$M = a_0 + a_1 YD + a_2 UD + a_3 M(-1) \tag{1}$$

where $M$ is the number of net migrants, $YD$ the difference in real income between receiving and sending countries, $UD$ the corresponding unemployment rate difference, and $M(-1)$ is the lagged dependent variable. Irish emigration in this period, as already noted, was always overwhelmingly to the U.K. This may account for the implicit assumption common to all earlier studies that wage movements and labour market conditions in other potential receiving countries did not matter. In other words, there is effectively a single receiving country.

A feature of most of the papers cited is that they employ ordinary least squares estimation. But as J.G. Williamson has pointed out in the context of nineteenth-century Atlantic migration (Williamson, 1974), this implicitly assumes that "the migrations themselves have no effect on the employment and wage conditions in the sending and receiving countries". In the case at hand, this assumption seems dubious: Irish migration contributed significantly to changes in the U.K. labour force, and its impact on the Irish economy was greater still. Ordinary least squares estimation is thus inappropriate. We therefore first estimated versions of (1) using instrumental variables methods. In our analysis emigration is defined as the 15-64 year-old net migration series produced by the Irish Central Statistics Office. Net outflows are entered as positive numbers. Unemployment data are labour force minus total employed. The wage series refer to industrial average weekly earnings. Data on the instruments used – they are listed in the notes to Table 1 – are also taken from official sources.

The result of estimating equation (1) by instrumental variables is:
\[ M = -125.83 - 0.891 \text{ YD} + 0.313 \text{ UD} + 0.233 \text{ M(-1)} \]

\[ (-2.91) \quad (3.03) \quad (2.03) \quad (0.95) \]

RSQ = .807 ; SER = 9.02 ; DW = 2.13
(t-statistics in parantheses)
Mean of the dependent variable : 14.7 (thousands)

The outcome is hardly satisfactory. Though the effect of wage differences is as predicted, the effect of unemployment differences is not. The result is not improved by using income and unemployment ratios instead of differences or by using other measures of labour market pressure. Nor does using all migrants rather than those of working age only affect the results. Interestingly, a specification along these lines was employed successfully by Pissarides and McMaster (1984) to model regional migration within the mainland U.K. However, instrumental variables estimation of the traditional migration function fails to yield meaningful results in the case of post-war Irish migration to the U.K.

This finding prompts a re-examination of the specification of the migration equation. Recent empirical research on labour markets, for example, Layard and Nickell (1985), has emphasized the importance of such factors as the tax wedge between the gross wage and take-home pay, and the provisions of the social welfare system in influencing labour flows. This suggests that the wage or income terms should be reformed to allow for the effects of changes in the Irish and U.K tax and social welfare regimes. Incomes in sending and receiving countries obviously depend on whether or not an individual is employed. This indicates that the appropriate specification of income is in terms of expected income, where the unemployment rate is interpreted as the probability of failing to obtain work. Expected income in each country can then be calculated as the weighted average of after tax income in and out of employment. More specifically, let :
\[\text{RET}_1 = \text{UR}_1 \cdot \text{RR}_1 + (1 - \text{UR}_1)(1 - t_{21})(1 - t_{11}) \quad (2)\]

Here \(\text{UR}\) refers to the unemployment rate, \(\text{RR}\) to the replacement ratio (i.e., the ratio of unemployment benefit to the average industrial wage), \(t_2\) to the employee social insurance contribution rate, and \(t_1\) to the income tax rate. \(\text{RET}\) is the expected proportion of a pound of gross income retained by the individual, and is referred to as the 'retention ratio'. Expected income in country 1, \(Y_1\), would be the retention ratio times average earnings. The migration equation is then specified as:

\[M = b_0 + b_1 \text{RELY} + b_2 M(-1) \quad (3)\]

Here \(\text{RELY}\) is the ratio of U.K. to Irish expected income. Such an equation was estimated by Geary and Murphy (1986). Alternatively, the expected income terms can be included as separate regressors. Table 1, columns 1 and 2, presents the results of estimating both specifications. The results contrast sharply with those discussed above. In column 1, the new relative income term is highly significant and has the predicted positive sign. Further, there is no evidence of first or higher order autocorrelation in the residuals and both the Chow and the out-of-sample forecast tests for parameter stability are easily passed. The hypothesis of predeterminedness of the instruments is not rejected (the critical level of the test is 0.10). When the expected income terms are included separately (column 2) the expected signs are again obtained, negative for expected income in the sending country and positive for expected income in the receiving country. The magnitude of the coefficient of sending country income is the larger of the two. The separate inclusion of the expected income terms strengthen the role of the lagged migration term, but it remains relatively weak. However, the Chow and out-of-sample forecast tests, especially the latter, provide significant evidence of parameter instability.

Decomposing relative income into relative earnings and retention ratios allows the importance of the these components to be examined. The result of doing so appears in
column 3. While both variables have the predicted sign, the coefficient of the relative retention ratio is by far the better determined. The difference between this and the traditional model should be noted: the unemployment rates in sending and receiving countries are included only in combination with tax and social welfare variables, in contrast to equation 1.

Returning to the results in column 1, it is worth considering what the magnitude of the relative income term implies for the responsiveness of migration flows. The elasticity, calculated at the means of the variables, is approximately seven. This may seem very large, even allowing for the ease of movement between Irish and British labour markets. However, what it implies is that a one point increase in the relative income ratio is associated with an increase in net emigration of roughly one thousand.

II

In this paper, we have reestimated traditional migration equations for Irish migration to the U.K., using instrumental variables methods. Where unadjusted relative wage terms were used the results were generally poor, and alternative measures of labour market pressure added little to the overall quality of the results. However, when a relative expected income term adjusted to allow for provisions of the tax and social welfare systems was employed, a strong, well-behaved, stable relationship was obtained, showing that migration between Ireland and the U.K. in the post-war period can be accounted for in terms of changes in relative incomes, appropriately defined. The separate inclusion of expected income terms gives rise to parameter instability, however. Evidence is also presented that the retention ratio component of expected relative incomes is the dominant one.

The main conclusion emerging from these results is in modelling of migration flows full account be taken not only of incomes and the probability of finding employment, but also of the effects of tax and welfare regimes. The problem of defining a relative
income term appropriate to the study of recent Irish migration is greatly mitigated by
the fact that the bulk of post-war Irish emigration has been to the U.K. The analysis
along these lines of migration from other European sending countries, whose migrants
chose between different destinations, would be somewhat more difficult, but still tracta-
bile. It would be interesting to know whether the type of results reported here would
apply.
TABLE 1: IV ESTIMATES OF MIGRATION EQUATIONS

<table>
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<tr>
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<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
</tr>
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<tr>
<td>C</td>
<td>-67.88</td>
<td>23.97</td>
<td>-383.65</td>
</tr>
<tr>
<td></td>
<td>(-3.97)</td>
<td>(1.18)</td>
<td>(-5.19)</td>
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<tr>
<td>YIR</td>
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<tr>
<td>YUK</td>
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<tr>
<td>RELY</td>
<td></td>
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<td>RELW</td>
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<tr>
<td>RELSW</td>
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<td></td>
</tr>
<tr>
<td>M(-1)</td>
<td>0.195</td>
<td>0.315</td>
<td>0.267</td>
</tr>
<tr>
<td></td>
<td>(1.11)</td>
<td>(1.50)</td>
<td>(1.41)</td>
</tr>
<tr>
<td>RSQ</td>
<td>.852</td>
<td>.818</td>
<td>.878</td>
</tr>
<tr>
<td>CHOW(4)</td>
<td>1.54</td>
<td>5.08</td>
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<tr>
<td>FRCST(4)</td>
<td>6.04</td>
<td>87.88</td>
<td>1.71</td>
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<tr>
<td>DW</td>
<td>2.09</td>
<td>1.84</td>
<td>1.89</td>
</tr>
<tr>
<td>LM(4)</td>
<td>0.43</td>
<td>2.61</td>
<td>2.16</td>
</tr>
<tr>
<td>IV(K)</td>
<td>19.20</td>
<td>18.87</td>
<td>12.75</td>
</tr>
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(t-statistics in brackets)

All income and relative are indexed at 1980 = 100
NOTES TO TABLE 1

(1) INSTRUMENT LIST

A common list of instruments was used in estimating all the equations. It included real wages (2 lags), unemployment (1 lag), output (1 lag), and prices (1 lag), for both Ireland and the U.K.; a trend, trend squared, and migration (2 lags).

(2) DIAGNOSTICS

SER : Standard Error of the Estimate

DW : Durbin-Watson Statistic

LM(4) : Lagrange Multiplier Test for higher (fourth) order autocorrelation

CHOW(4) : Chow-test statistic

FCST(4) : Out-of-sample forecast test

IV(k) : Predeterminedness of instruments test

All test statistics are Chi-square.

k is the number of instruments.

CHOW and FCST are based on estimates for the period to 1978.
REFERENCES


