

The Relationship between Alternative Population and Migration Series: A Comment

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In their recent paper on the derivation of annual population estimates Whelan and Keogh (1980) implicitly assume that the number on the Electoral Register refers to April 15 — the date on which the Register comes into effect each year. However, since the qualifying date for inclusion on the Register is September 15, the Electoral Register figures should be adjusted to reflect the number expected on the Register on April 1 each year. This can be done by linear interpolation of the September figures and the resulting estimates can be used to derive annual population estimates using Whelan and Keogh's ratio formula. The original and adjusted Electoral Register figures and the population and net migration estimates which are derived from the adjusted figures are shown in Table 1 together with the difference between the CSO's post-censal population estimates, the adjusted population estimates, Whelan and Keogh's ratio estimates of the population and the CSO's pre-censal population estimates.

The Root Mean Square Errors¹ for the three population estimates for the period 1962-70 and 1972-78 are as follows:

	<i>Adjusted estimate</i>	<i>Whelan and Keogh's ratio estimate</i>	<i>CSO's pre-censal estimate</i>
1962-70	14.96	20.42	10.33
1972-78	15.54	19.94	56.34

It will be seen from the Root Mean Square Errors that the adjusted population estimates are in closer agreement with the CSO's post-censal estimates than Whelan and Keogh's unadjusted estimates. If closeness to the CSO's

*I have benefited in writing this comment from discussions with Gary Keogh and from a referee's report on an earlier draft.

¹ These errors refer to the difference between the CSO's post-censal estimates and the series in question.

Table 1: *Original and adjusted electoral register data, population and net migration estimates, and differences in various population estimates*

Year	000's						
	No. on electoral register on:		Estimated population on April 1	Differences in population estimates			
	Sept. 15	April 1		Net migration	Adjusted population estimate	Whelan and Keogh's ratio estimate	CSO's pre-censal estimate
1960	1,691,082	—	—	—	—	—	—
1961	1,690,229	1,690,622	2,818.3 ^c	-30.5	—	—	—
1962	1,686,877	1,688,420	2,814.7	-22.1	15.3	13.0	6.0
1963	1,696,539	1,692,092	2,820.8	- 7.6	29.2	39.0	9.0
1964	1,713,889	1,705,903	2,843.8	- 7.1	20.2	37.0	15.0
1965	1,726,221	1,720,545	2,868.2	-14.2	7.8	20.0	21.0
1966	1,731,648	1,729,150	2,882.6	-19.4	1.4	7.1	—
1967	1,736,612	1,734,327	2,892.6	-25.8	7.4	7.0	1.0
1968	1,735,605	1,736,069	2,895.5	- 0.9	17.5	12.0	3.0
1969	1,766,569	1,752,317	2,922.6	+ 7.1	3.4	-7.0	5.0
1970	1,780,796	1,774,248	2,959.2	+ 2.0	-9.2	-1.0	6.0
1971	1,806,713	1,794,784	2,993.5	-13.9	-15.3	3.0	—
1972	1,825,566	1,816,889	3,014.9	+ 7.4	9.1	2.0	10.0
1973	1,857,077	1,842,573	3,057.5	+ 9.5	14.5	19.0	21.0
1974	1,879,499	1,869,179	3,101.7	+10.3	21.3	17.0	34.0
1975	1,909,710	1,895,805	3,145.9	+39.7	30.1	33.0	49.0
1976	1,966,932	1,940,594	3,220.2	+15.3	5.8	32.0	64.0
1977	1,973,123	1,970,273	3,269.5	+ 3.9	-0.5	-4.0	77.0
1978	2,011,812	1,994,004	3,308.8	—	2.2	0.3	90.0

c = census figures.

post-censal estimates of population is accepted as a valid criterion for assessing the accuracy of various population estimates then the adjusted Electoral Register figures should be used in preference to the unadjusted figures.

In analysing the relationship between their net migration series,² EM, and the CSO's implicit net migration series, CM, Whelan and Keogh appear to have intended correlating their series with the CSO series lagged from one to four years. However, they inadvertently lagged the wrong series and correlated the CSO's series with their series lagged from one to four years. When the correct series is lagged (i.e., CM) the strongest correlations are still obtained when it is lagged by two years but there is, as one would expect, a significant improvement on the best results presented in Table 6 of Whelan and Keogh's paper. The correlation coefficient increases from .646 to .729 when EMR is correlated with CM₂ and from .658 to .716 when EMG is correlated with CM₂. When the correlations are done with the adjusted net migration series shown in Table 1 above the strongest correlation coefficient which occurs, .786, is obtained when the CSO series is lagged by one year. A lag of this length in the relationship between the migration series derived from the Electoral Register and the CSO's implicit migration series conforms with *a priori* expectations about the time which it should take for annual gross migration flows to affect the Electoral Register. Whelan and Keogh (1980, p. 312) note that the two year lag which they got "appears greater than one would have expected on *a priori* grounds." It is clear that the reason why their expectations about the lag were not fulfilled is that they assumed the number on the Electoral Register refers to the date on which it becomes effective rather than to the qualifying date for inclusion on the Register.

The size of the correlation coefficient obtained when the adjusted net migration series is correlated with the CSO's migration series lagged one year compared with the best correlation coefficient shown in Table 6 of Whelan and Keogh's paper (i.e., .786 v. .658) indicates that the relationship between the migration series derived from the Electoral Register data and the net passenger movement and Census data is stronger than appears from Whelan and Keogh's paper. Both the Electoral Register and CSO migration estimates reflect a similar pattern of annual net migration. Hence, the net passenger movement data which the CSO uses to distribute the known total of intercensal net migration over each of the years in the intercensal period appears to be a reasonably reliable guide to the trend of annual net migration even though it is quite inadequate as an indicator of the level of annual net migration in years for which a forecast of annual net migration is required (see Hughes (1980)). The significance of this point is that those who wish to study annual population or migration trends in the years before 1961,

2. Two new migration series are presented in Whelan and Keogh's paper. The first is derived from their ratio estimate of the annual population and is designated EMR while the second is derived from their regression estimate of the population and is designated EMG.

for which Electoral Register estimates are not available due to data limitations, can use the CSO's estimates with the assurance that they are a reasonably reliable guide to population and migration trends.

The existence of alternative net migration series poses a problem for those who may wish to estimate an econometric model of Irish migration for any period from 1961 onwards. Should Whelan and Keogh's adjusted net migration series or the implicit CSO net migration series be used in estimating the model? Keenan (1980) encounters this problem in his comparison of alternative econometric models of Irish migration and he argues that Whelan and Keogh's net migration series is preferable to the CSO's because of the superiority of their population forecasts. While Whelan and Keogh did not consider the question in their paper they drew attention to some aspects of their migration series which might make them unsuitable for use in time series studies of net migration, e.g., the periodicity in the series which appears to be due to the occurrence of general elections. Keenan (1980) found in his assessment of different migration models that "the forecasts based on the alternative migration series are at least no better than those derived using the official series." However, the Root Mean Square Error for the migration forecasts given by the best model (i.e., Bradley, Fitzgerald and McCarthy's (1978)) is 1.135 when the CSO series is used and 1.963 when Whelan and Keogh's series is used. If the criterion for selecting the best migration series to use in econometric work is to be which one can be most accurately predicted it seems that the CSO series is preferable.

REFERENCES

- BRADLEY, J., J. FITZGERALD AND C. McCARTHY 1978. "Specification Changes to the Mini and Maxi Econometric Models", Central Bank of Ireland, Technical Paper 5/RT/78.
- HUGHES, J. G., 1980. "What Went Wrong With Ireland's Recent Postcensal Population Estimates?", *The Economic and Social Review*, Vol. 11, No. 2.
- KEENAN, J. G., 1980. "Irish Migration, All or Nothing Resolved?", Economics Department, University College, Cork, mimeo; (forthcoming in *The Economic and Social Review*).
- WHELAN, B. J., and G. KEOGH, 1980. "The Use of the Irish Electoral Register for Population Estimation", *The Economic and Social Review*, Vol. 11, No. 4.