

**A Study of Labour Force Flows  
1961-80**

**Jerry J. Sexton and Brendan M. Walsh**

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**P. BACON  
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S. SCOTT**





## A STUDY OF LABOUR FORCE FLOWS 1961-80

J. J. SEXTON (ESRI) and B. M. WALSH (UCD)

Changes in the labour force can usefully be discussed starting from the framework of the basic identity

$$\Delta \text{Population} \equiv \text{Natural Increase} \pm \text{Net Migration}$$

Interpreting "natural increase" in a labour force context to denote the growth that would occur in the population aged 15 and over in the absence of migration, this identity can be expanded to

$$\begin{aligned} \text{Natural increase} \pm \text{net migration} &\equiv \Delta \text{ number at work} \\ &+ \Delta \text{ number unemployed} + \Delta \text{ number not in labour force} \end{aligned}$$

or

$$NI \pm NM \equiv \Delta E + \Delta U + \Delta NLF \quad (1)$$

This identity provides the rationale for the equations estimated in Walsh, (1968; 1970-71; 1974) and Keenan (1978), where  $\Delta U$  is (arbitrarily) designated the "dependent" variable.

In this earlier work simple linear equations of the general form

$$\Delta U = a + b \Delta E + c NM \quad (2)$$

were estimated and the results used to explore the manner in which annual changes in employment and in net migration affected the level of unemployment.

The results obtained from the period 1951-71 reported in Walsh (1974, p.118) are very similar to those reported for the period 1951-66 in Walsh (1968). A representative\* equation is:

$$\begin{aligned} \Delta U_{na} = 10.88 - 0.51 \Delta E_{na} + 0.33 NM \quad R^2 = 0.58, DW = 1.31 \\ (5.1) \quad (5.0) \quad (4.8) \quad (3) \end{aligned}$$

(t-ratios in parenthesis), na = non-agricultural

These results suggest that (non-agricultural) unemployment tends to increase by about 11 thousand annually due to the growth of the labour force, but this potential increase is offset by 510 for every 1,000 net increase in (non-agricultural) employment and by 330 for every 1,000 rise in emigration. On the whole, this equation seemed to provide a coherent, if very much *ad hoc*, view of the interrelationships between the main labour force aggregates in Ireland during the 1950s and 1960s.

It is clear, however, that the specification used involves certain restrictive assumptions. In particular, the intercept of the estimated equation subsumes the combined effects of changes in the numbers not in the labour force and the

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\* In the actual analysis it is necessary to use figures for *total* annual net migration as an annual series based on flows for the population aged 15 years or over is not available.

\* Various definitions of E and U were tried.

“natural increase” of the working-age population, that is,  $NI + \Delta NLF$ . There is, however, no reason for this sum to remain stable, and if it varies over time the postulated relationship will fit the data less closely than one which allows for this possibility explicitly. There are two alternative approaches to this issue. One consists in obtaining more detailed information on the annual potential increase in the population aged 15 and over, and on the various components of  $\Delta NLF$ , so that it becomes possible to pinpoint more of the flows aggregated into this catch-all category. Another possibility is to subdivide the period into meaningful sub-periods and estimate the relationship separately for each of these, allowing for the intercept and other coefficients to differ between sub-periods.

The availability of a new, consistent labour force data set allows progress to be made in both these directions. The greater part of those data was given in Sexton (1981). In the present paper the data have been extended to provide a consistent series of annual labour force estimates for a longer period (1961-80) than that presented in the above-mentioned work which covered only the period 1971-79 as well as the individual Census years 1961 and 1966. Furthermore, an additional relevant variable has been estimated — the numbers aged 15 years or over in full-time education. The actual figures are given in the Appendix which also contains some methodological notes describing the methods of estimation used.

In the first place, data on the growth in the numbers in education ( $\Delta ED$ ) isolate one component of  $\Delta NLF$ . Secondly, the nineteen observations now available on a consistent basis facilitate tests for the stability of the relationship between sub-periods. The purpose of the present article is to report on the results from these extensions to the earlier research.

Table 1 sets out the results of re-estimating the basic model with  $\Delta ED$  included for (a) the entire period 1961-80 and (b) two sub-periods, 1961-71 and 1971-80. The first equation in the table is strikingly similar to that reported in the earlier research. Neither the inclusion of the new data for the period 1961-71, nor of the additional observations for 1971-80, nor the introduction of the educational variable  $\Delta ED$  caused any material change in the results compared with those reported in the earlier research. When the period is split into two sub-periods, however, it is immediately apparent that the relationship is not stable over the entire twenty years. Specifically, comparing the equations for the two sub-periods it may be seen that while the coefficient and significance of  $\Delta E$  do not differ appreciably between periods, there is a major difference between the two intercepts and in the coefficients and significance levels of the migration variable. In fact, the net migration variable does not attain significance at all in the later period and its coefficient is near to zero. The educational flow variable has a larger and more significant coefficient in the earlier sub-period probably reflecting the impact the Free Secondary Education scheme introduced in September 1967. Overall, these differences are highly significant statistically as between periods and the hypothesis that the relationship is stable over the entire period 1961-80 is rejected at the 0.025 significance level (based on the usual F-test).

More detailed investigation is possible using estimates of the labour market and migration data classified by sex. Table 1 also contains the results of estimating the basic relationship for each of the three periods for males and

**TABLE 1: Regression Analyses representing the effect on unemployment of net annual changes in employment, net external migration and numbers in education (aged 15 +) for the period 1961-'80.**

Period	Intercept	Net changes in Employment ( $\Delta E$ )	Net changes in Nos. in Education ( $\Delta ED$ )	Net Annual Migration (NM)	
(1)	(2)	(3)	(4)	(5)	
			<i>Total</i>		
1961-'80	10.21	-0.66 (9.02)	-0.49 (1.38)	+0.38 (7.21)	(R <sup>2</sup> = 0.891) DW = 2.04
1961-'71	10.97	-0.93 (7.22)	-1.09 (3.42)	+0.20 (2.47)	(R <sup>2</sup> = 0.922) DW = 1.99
1971-'80	16.84	-0.77 (9.32)	-0.55 (1.30)	+0.04 (0.33)	(R <sup>2</sup> = 0.960) DW = 1.86
			<i>Males</i>		
1961-'80	5.39	-0.74 (8.34)	-0.37 (0.68)	+0.40 (4.95)	(R <sup>2</sup> = 0.886) DW = 1.45
1961-'71	4.99	-0.93 (6.73)	-0.99 (1.56)	0.08 (0.41)	(R <sup>2</sup> = 0.897) DW = 2.11
1971-'80	8.20	-0.78 (6.02)	-0.03 (0.04)	-0.04 (0.13)	(R <sup>2</sup> = 0.897) DW = 1.02
			<i>Females</i>		
1961-'80	2.44	-0.31 (4.01)	-0.26 (1.24)	+0.20 (4.59)	(R <sup>2</sup> = 0.624) DW = 2.41
1961-'71	2.86	-0.50 (1.85)	-0.40 (1.21)	0.20 (2.21)	(R <sup>2</sup> = 0.542) DW = 2.44
1971-'80	4.29	-0.36 (2.81)	-0.56 (1.02)	0.11 (0.85)	(R <sup>2</sup> = 0.658) DW = 2.36

The figures in parenthesis in columns (3), (4) and (5) are the t-values.

females separately. The general conclusions that are supported by these results are similar to those inferred from the data for the totals but some additional points should be noted. The coefficient of  $\Delta E$  is consistently lower in the female than in the male equations and the closeness of fit of the equations is higher for males. This indicates a large element of randomness in the female unemployment series and also reflects the fact that a fairly substantial proportion of the variation in female unemployment is attributable to influences other than those covered by the specified explanatory variables. For example, factors such as changes in the level of participation significantly affect the female labour market situation. More interestingly, the net migration variable does not attain statistical significance for males in either of the two sub-periods, although it is highly significant in the equation for the entire period.

The most important finding from this extension of the earlier research concerns the relationship between net migration and changes in unemployment. The original results suggested that if emigration rose by 100, the stock of unemployed persons remaining in Ireland would fall by between 30 and 40 persons. The results presented in the present paper suggest that this result does not hold over the years 1971-80, when no association between net migration and changes in unemployment is discernible, and that even for the

years 1961-71 the relationship is weaker than the earlier results suggested, mainly as a result of the absence of an association in the case of males. For both sexes combined, it seems that 100 emigrants reduced unemployment by only 20 even in the years 1961-71 and, even more surprisingly, this effect is entirely attributable to the relationship between female migration and female unemployment.

The sizeable rise in the intercept for the later sub-period shown in all these results is capable of the interpretation that unemployment has tended to increase more rapidly in recent years due to autonomous factors such as the higher natural growth of the working age population. The results in Table 1 suggest that in the absence of net changes in employment, or in the numbers in education and with no migration, unemployment tended to rise by almost 17,000 a year over the period 1971-80, compared with 11,000 over the earlier period. The rather surprising result for males requires further comment. The results for the two sub-periods suggest that the overall effect of net migration is a significantly weaker influence than is indicated by the single regression equation covering the entire nineteen year period. Since the intercept in the equation for the latter sub-period is considerably higher it is possible that part of the variation which is subsumed into this constant term (when the data for the full nineteen-year period are used) may have been picked up by the net migration variable. There is the likelihood of an association here as there are similarities in the patterns of change. The rate of autonomous growth in the working age population escalated in the later interval and net migration changed from being a sizeable outflow to being an inflow (also of considerable extent) between the two periods involved. It will also be noted that the Durbin-Watson statistic is considerably lower for the equation for males in the second period which indicates the existence of other non-random influences.

In view of the labour market flow identity which forms the point of departure for these equations, the weak association between migration and the change in unemployment in the years after 1971 is surprising. One possible explanation is that the migration flows in these years were (a) relatively smaller and (b) contained a preponderance of non-active persons. We have no direct evidence on the second point, but it is supported by the greatly changed age structure of the more recent migration flow. During the period 1971-79, the overall net inflow of 109,000 of all ages involved a net inflow of 49,000 children aged under 15 years old and an influx of women aged 30 years or more (over 32,000). More detailed examination of the migrant flows in each five-year age group reveals that the labour force change associated with the more recent immigration is considerably smaller than that in earlier periods when the net outflows were more heavily concentrated among young adults. This would be expected to reduce the coefficient of the migration variable in the equations under discussion, but to the extent that children and other non-active persons tend to migrate as part of households in which there is at least one economically active person, a correlation between migration and the labour force variables should persist. The showing of the migration variable in the equations in Table 1 indicates that this is not the case during the years 1971-80. This may be confirmed by regressing net migration on changes in unemployment and in employment:

$$NM = 8.83 + 0.40\Delta U + 0.12\Delta E, \quad R^2 = 0.133 \dots \quad (4)$$

(0.32)      (0.13)

Using the series for changes in the numbers aged over 15 not in the labour force ( $\Delta NLF$ ) derived from Table B of the Appendix the correlation between  $NM$  and  $\Delta NLF$  is 0.73, which is considerably higher than that between  $NM$  and  $\Delta E$  ( $-0.34$ ) or  $NM$  and  $\Delta U$  ( $0.36$ ). This suggests that in recent years fluctuations in migration have been associated with (or have given rise to) fluctuations in labour force participation rates. The manner in which this has happened is worthy of further investigation, which would require more detail on the composition of the flows into the non-active, adult population.

A further consideration that should be taken into account in the interpretation of these data, and any statistical analysis based on them, is the necessarily tentative nature of the annual estimates of the variables involved. The annual migration estimates, in particular, are obtained as a residual from the (known) natural increase of population and the estimated pattern of annual population changes in intercensal periods (see Hughes, 1980). These residuals are extremely small when compared with the gross totals from which they are derived and the associated errors of estimation for the *annual* figures can clearly be very large in relative terms, even though the aggregate net migration for each intercensal period is accurate. The longer intercensal period from 1971 to 1979 would tend to add to the difficulties of deriving reliable annual estimates.

A further complication could arise due to changing patterns of employment and the increasingly uncertain distinction between part-time or casual employment and the "not in labour force" status. The complexities of assigning the population to alternative labour force categories are discussed in some detail in the text of The Results of the 1979 Labour Force Survey. The dividing line between "employed" and "not in the labour force" is shown, for example, by the data in Table E for the 1979 Labour Force Survey, where the population aged 15 and over "with a job last week" is cross-classified by Principal Economic Status (PES). The relevant data are summarised in Table 2. Between 1977 and 1979, the numbers "with a job last week" rose by 50 thousand, but the numbers "at work" according to PES rose by 67 thousand. (The latter is the measure that corresponds more closely to  $\Delta E$  in our equations). Thus, 17,000, or over a quarter of the total increase in employment in these years as measured in the revised labour force series, represents a net transfer of people with a casual or temporary job to more permanent employment. Corresponding to this part of the rise in the numbers employed is, of course, a fall in the numbers outside the labour force according to PES but, nonetheless, "with a job last week". The Labour Force Surveys show the following totals in this category.

	<u>1975</u>	<u>1977</u>	<u>1979</u>
(thousands)	32.1	38.5	22.3

Source: *Labour Force Survey 1979 Results*, Table E.

It appears, however, that the recorded employment increase arising from this transfer does relate to individuals who increased their average level of gainful activity (i.e., paid work). The figures for average hours worked for person

“with a job”, whether relating to persons inside or outside the labour force, were virtually the same in the 1977 and 1979 Surveys (44 hours and 20 hours respectively). If there has been a tendency to include persons in the labour force (defined according to PES) without an associated increase in working hours than one would expect the second average to be significantly smaller in 1979. Much of the fall between 1977 and 1979 is, in fact, accounted for by the decline of 14 thousand in the number of women with a job “last week” whose PES was “engaged in home duties”.

**TABLE 2: Increase in Employment According to Alternative Definitions — 1975-79 (000)**

Increase in numbers employed according to:	1975-77			1977-79		
	Males	Females	Total	Males	Females	Total
(i) Principal Economic Status	11.1	1.3	12.4	43.3	23.7	67.0
(ii) “Job last week”	12.6	5.7	18.3	40.7	9.1	49.8

Source: *Labour Force Survey 1979 Results*, Table E.

This type of growth in employment is helpful in explaining our finding of a relatively weak link between changes in employment and in unemployment, especially for females during the period 1971-80 (Table 1). Growth in employment that takes the form of increasing the number of hours worked by those who were previously in occasional or part-time employment affects participation rates as measured in the labour force data we have used, rather than confirming the link between changes in employment and employment posited in the equation estimated in Table 1.

With regard to the comments made earlier relating to the apparently weaker association between variations in unemployment and in net migration as indicated by the data used, it must be borne in mind that what we are examining here are net *annual* changes which do not reflect the cumulative change over a period of time. The total population in 1971 was some 54,000 lower than it would otherwise have been due to the effect of net emigration over the previous five years and, obviously, this must have eased the domestic labour market situation. Conversely, the cumulative net inflow of 109,000 persons between 1971 and 1979 must have accentuated the unemployment problem even though, as indicated previously, the impact may have been somewhat less on account of the considerably higher proportion of economically inactive persons among the returning migrants. In fact, an inspection of the age profiles of the intercensal net migration flows for 1966/71 and 1971/79, when considered in association with the pattern of participation rates, suggests that the labour force was some 45,000 lower at the end of the earlier period, and some 25,000 higher at the end of the second (longer) interval due to the effect of net migration. Another relevant feature of the 1971/79 period is that many of the returning migrants were skilled operatives who took up positions that would not necessarily have been filled from among the ranks of the unemployed. This kind of occupational mismatch problem became manifestly clear during the buoyant 1978/79 period when severe skill shortages occurred (particularly in technology oriented areas) even though the overall level of unemployment remained very high.



Another consideration which has to be borne in mind is that the unemployment figures used do not include persons seeking work for the first time as it is not possible to compile a reliable annual series of such estimates. While the inclusion of this additional component would probably not affect the derived relationship between unemployment and changes in the employment level, or with the net migration variable, the educational variable ( $\Delta ED$ ) would probably attain a considerably higher level of significance if unemployment were measured in this more comprehensive way.

In summary, this note has updated and extended earlier empirical analysis of the relationships between the main labour market flow variables. Some important contrasts between the 1961-71 and 1971-80 periods, and between the results for males and females are documented and possible interpretations of these findings are suggested.

## APPENDIX

### **Estimates of the Labour Force and Other Components of the Adult Population**

The annual estimates of employment and unemployment for the period 1961-80 used in this paper are compiled on the basis of the concepts adopted in Labour Force Surveys. Official annual estimates on this basis are now available for the period from 1975 to 1980 but it is necessary to adjust the Census based estimates for earlier years to coincide with the new concepts in order to obtain a consistent and comparable series over the whole period of the study. As indicated in the text, such a consistent series for 1971/80 was given in Sexton (1981) and the methodology employed in making these adjustments is described in Appendix II of that publication. The present paper includes, in addition, annual estimates of the labour force on the adjusted basis for the period from 1961 to 1970. The method of compilation is basically the same as in the earlier work. However, for the period 1966-71 particular account has also been taken of the influence of the introduction of Free Secondary Education in September 1967; this has affected not only the level, but also the trend, indicated by the new estimates in relation to the existing Census based estimates for this period. An inspection of the age classifications of the labour force given by the Censuses of 1961, 1966 and 1971 show clearly that labour force growth during this time arose exclusively from the 15 to 24 year age group (in fact the older age groups had a negative offsetting effect) and any major social initiative relating to this age group was bound to have a significant effect on the labour force as a whole. In fact, the size of the workforce in 1971 was only marginally up on 1966 (having increased by 15,000 in the previous five years) and it is plausible to assume that there must have been an actual fall in the years after 1967 when the full impact of the Free Secondary Scheme took effect. The labour force estimates for this period, given in Tables A and B following, have been calculated taking into account the increasing size of the adult population, the trend in labour force participation rates and the numbers aged 15 years or over in Education which were derived independently from data on school enrolments compiled by the Department of Education. Age classifications of persons in Education are not available for the first few years of the 1960s; however, the aggregates were available by grade and it was possible to compile age based estimates using the cross-sectional relationship between age and grade for the year 1964 contained in the Report "Investment in Education".

It was also necessary to adjust downwards by 5,000 each of the original annual totals for the numbers in Education for the years from 1975 on as the timing of the yearly count was altered at that time (it was brought forward from February to September.).

**TABLE A: Population Aged 15 Years or Over Distinguishing Persons at Work, Unemployed and Economically Inactive, 1961-80**

Year	Males						Females						Total						Year	
	At Work	Un-employed	Labour Force	In Education	Other Inactive	Total Population 15+	At Work	Un-employed	Labour Force	In Education	Other Inactive	Total Population 15+	At Work	Un-employed	Labour Force	In Education	Other Inactive	Total Population 15+		
1961	746.4	34.8	781.2	34.9	151.8	967.8	271.3	7.7	279.0	31.1	663.3	973.4	1017.7	42.5	1060.2	66.0	815.0	1941.2	1961	
1962	750.1	32.3	782.4	36.9	152.8	972.1	271.6	8.3	279.9	33.1	664.6	977.6	1021.7	40.6	1062.3	70.0	817.4	1949.7	1962	
1963	750.3	36.7	787.0	40.1	151.3	978.4	272.3	8.3	280.6	35.5	667.5	983.6	1022.6	45.0	1067.6	75.6	818.8	1962.0	1963	
1964	756.1	33.2	789.3	42.7	150.9	982.9	272.6	9.0	281.6	38.0	668.3	987.9	1028.7	42.2	1070.9	80.7	819.2	1970.8	1964	
1965	760.2	31.7	791.9	44.9	150.4	987.2	272.6	9.3	281.9	40.3	668.7	990.9	1032.8	41.0	1073.8	85.2	819.1	1978.1	1965	
1966	759.5	32.9	792.4	48.6	148.5	989.5	275.2	7.4	282.6	42.5	669.0	994.1	1034.7	40.3	1075.0	91.1	817.5	1983.6	1966	
1967	761.1	34.8	795.9	50.3	148.4	994.6	277.5	7.1	284.6	43.3	671.8	999.7	1038.6	41.9	1080.5	93.6	820.2	1994.3	1967	
1968	758.2	38.4	796.6	53.7	148.3	998.6	274.4	7.8	282.2	48.7	673.3	1004.2	1032.6	46.2	1078.8	102.4	826.5	2002.8	1968	
1969	759.3	36.5	795.8	58.4	148.3	1002.5	273.3	6.9	280.2	52.5	676.1	1008.8	1032.6	43.4	1076.0	110.9	829.3	2011.3	1969	
1970	751.1	44.9	796.0	61.5	153.0	1010.5	272.6	7.5	280.1	57.5	679.3	1016.9	1023.7	52.4	1076.1	119.0	835.8	2027.4	1970	
1971	756.1	41.1	797.2	64.4	158.4	1070.0	274.3	8.4	282.7	60.6	683.8	1027.1	1030.4	49.4	1079.9	125.0	842.2	2047.1	1971	
1972	759.6	47.1	806.7	67.0	163.2	1036.9	279.8	9.5	289.3	63.7	691.3	1044.3	1039.4	56.6	1096.0	130.7	854.5	2081.2	1972	
1973	772.0	43.7	815.7	69.0	170.5	1055.2	287.7	8.7	296.4	66.9	701.1	1062.4	1059.8	52.4	1112.2	135.9	869.5	2117.6	1973	
1974	782.3	43.7	826.0	70.2	177.9	1074.1	295.2	8.8	304.0	69.0	708.3	1081.3	1077.5	52.5	1130.0	139.2	886.2	2155.4	1974	
1975	775.9	59.6	835.5	72.7	185.7	1093.9	297.1	13.4	310.5	72.0	717.8	1100.3	1073.0	73.0	1146.0	144.7	903.5	2194.2	1975	
1976	767.4	74.7	842.1	79.5	191.3	1112.9	296.6	15.3	311.9	77.5	730.6	1120.0	1064.0	90.0	1154.0	157.0	921.9	2232.9	1976	
1977	784.5	72.4	856.9	82.6	190.1	1129.6	298.8	16.2	315.0	81.5	740.7	1137.2	1083.3	88.6	1171.9	164.1	930.8	2266.8	1977	
1978	800.8	69.0	869.8	84.5	191.7	1146.0	309.2	16.0	325.2	85.2	742.2	1152.6	1110.0	85.0	1195.0	169.7	938.9	2298.6	1978	
1979	824.0	58.4	882.4	85.5	198.4	1166.3	321.0	15.6	336.6	88.0	747.5	1172.1	1145.0	74.0	1219.0	173.5	945.8	2338.3	1979	
1980	838.2	57.2	895.5	86.2	199.6	1181.3	324.8	16.7	341.5	91.3	752.3	1185.1	1163.0	74.0	1237.0	177.5	951.9	2366.4	1980	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



**TABLE C: Estimates of Annual Net Migration Flows for the Period 1961-80**

Period	Males	Females	Total
	000		
1961/62	-7.0	-7.9	-14.9
1962/63	-3.9	-4.3	-8.2
1963/64	-7.8	-8.8	-16.6
1964/65	-9.2	-10.3	-19.5
1965/66	-9.7	-10.9	-20.6
1966/67	-6.2	-7.2	-13.4
1967/78	-7.3	-8.4	-15.7
1968/69	-7.3	-8.5	-15.8
1969/70	-2.7	-2.8	-5.5
1970/71	-2.0	-2.3	-4.3
1971/72	+6.0	+4.7	+10.7
1972/73	+7.2	+5.6	+12.8
1973/74	+9.2	+7.1	+16.3
1974/75	+11.2	+8.8	+20.0
1975/76	+9.2	+7.1	+16.3
1976/77	+5.6	+4.4	+10.0
1977/78	+3.7	+2.9	+6.6
1978/79	+9.0	+7.0	+16.0
1979/80	-2.3	-2.1	-4.0

It is also necessary to comment on the annual net migration estimates in Table C above. With regard to the total figures, the data for the period from 1961 to 1971 have been taken from Hughes (1977) while the figures for the annual periods after 1971 have been derived from the annual CSO population estimates in association with data on natural increase (in fact, Hughes' estimates for the earlier period were calculated in the same way). The estimates of net migration for males and females have been obtained by applying to the total figures, the male/female ratios of aggregate net migration for the various intercensal periods involved (i.e., 1961/66, 1966/71, 1971/79, 1979/81). It must be borne in mind that this adds one more element of estimation to these already tentative figures (see text) and this should be taken into account in interpreting the results based on them.

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