THE WAGE CURVE AND LOCAL LABOUR MARKETS IN NEW ZEALAND*

Philip S. Morrison and Jacques Poot

Institute of Geography and
School of Economics and Finance,
Victoria University of Wellington

"Every country seems to have a 'wage curve'."
(Blanchflower and Oswald 1994: 12)

Abstract

Blanchflower and Oswald argue in their 1994 book that there is a stable downward-sloping convex curve linking the level of pay to the local unemployment rate. They derived this so-called wage curve from measurements on individuals within regions (local labour markets) for several countries and periods. Other investigators have confirmed the robustness of this finding. In this paper we seek evidence for the wage curve in New Zealand drawing on data at the regional level by means of the 1996 census of population and dwellings. New Zealand research is hampered by the inaccessibility of unit record data and the paper reports results based on publicly available grouped data. The results show that a cross-sectional wage curve does exist in New Zealand. The elasticity is in the range of –0.07 to -0.12, which is similar to results obtained for other countries. However, research to date has not been able to choose between competing explanations for this phenomenon. We argue that a better understanding of the dynamics of local labour markets is an essential requirement for further study of the wage curve.

Keywords: *earnings functions, unemployment, local labour markets, bargaining*

Descriptive studies of regional labour markets in New Zealand, such as Morrison (1997), show a remarkable diversity in labour market outcomes across New Zealand regions. This is not a new phenomenon. Already in 1989, the Population Monitoring Group of the New Zealand Planning Council discovered growing differences between regions in terms of demographic and labour market characteristics. A wide-ranging reform process that led to extensive liberalisation of the New Zealand economy since 1984 has been an important cause of growing regional diversity.[1]

It is likely that the Employment Contracts Act (ECA) 1991 has also made a significant contribution to growing regional diversity in levels of pay through the replacement of national awards with individual employment contracts and firm-specific (and therefore often location-specific) collective contracts. Yet the regional dimension is remarkably absent from analyses of the impact of the ECA at the macro-level (Gorter and Poot, 1999; Maloney and Savage, 1996) or at the meso/micro level (Harbridge et al. 1997).

At least three important factors have contributed to the lack of research and policy interest in regional economic outcomes. The first is that New Zealand's structure of governance is strongly top-down oriented, with local government having limited instruments for economic policy while the mandate for regional government in this area has been removed entirely, except for issues related to the Resource Management Act. The small size of New Zealand's population is one possible justification for the centralised top-down approach.

Secondly, regional variations in average wages and prices were historically small and the current approach to regional issues may still be a reflection of this past. Thirdly, the convergence paradigm of orthodox neoclassical economics is currently the dominant doctrine for the formulation of sub-national policies in New Zealand. This paradigm suggests that diffusion of technologies, factor mobility and trade will operate as equilibrating forces in an open regional system, thus leading to a convergence in regional incomes.

There is some international evidence of such convergence among relatively homogeneous open regional systems. However, there is equally strong evidence that locational externalities (such as agglomeration advantages), spatial variations in population sizes and densities, accessibility differences, and path dependencies can all lead to diverging growth patterns.[2]

The idea of diverging regional development has not yet gained much support among New Zealand policy makers, but there has been a shift of regional policies from a focus on regional output (e.g. promotion of regional exports, public consumption and transfers etc.) to a focus on regional inputs (education and training of the labour force, business development grants, entrepreneurial knowhow, infrastructure, R&D, etc.). In response to the greater emphasis on market forces, a devolution and privatisation of responsibilities for regional development can now of course also be observed in many other countries (e.g. Nijkamp 1991). In New Zealand, a non-spatial business development policy has fully superseded regional development policy and it is now up to local authorities to develop their own initiatives in this new environment. Such initiatives could include the encouragement of new investment and inward migration, but at present such programs are very limited in scope (see Bevin, 1997). At the same time, there is substantial evidence in the USA and elsewhere that territorial competition can be wasteful if there is no interregional co-ordination (Poot 1999). It is in this contemporary context that we turn our attention in this paper to the relationship between wages and unemployment at the regional level.

Blanchflower and Oswald (1994) argue that there is a stable downward-sloping convex curve linking the level of pay to the local unemployment rate. In earlier research that provided the foundations for their 1994 book, they called this relationship the wage curve (see Blanchflower and Oswald 1990). Blanchflower and Oswald derive wage curves from measurements on individuals within regions (local labour markets) for several countries and periods.[3] Other investigators using similar data - such as Blackaby and Hunt (1992), Winter-Ebmer (1996), Bratsberg and Turunen (1996), Kennedy and Borland (1997) and Janssens and Konings (1998) - have confirmed the robustness of this finding. However, Partridge and Rickman (1997) find evidence for a positive relationship between individual wages and local unemployment rates. Several time-series studies also suggest a long-run inverse relationship between the wage level and unemployment, see for example Johansen (1997) and Chiarini and Piselli (1997). Card (1995) provides a survey of the literature up to the mid 1990's.

In this paper we seek evidence for the wage curve in New Zealand drawing on data at the regional level provided by the 1996 census of population and dwellings. The paper has five sections. The next section provides a very brief review of theoretical arguments and predictions regarding the relationship between regional wages and unemployment. Sections three and four reports on the overseas and the New Zealand evidence to date. New Zealand research is hampered by the relative inaccessibility of unit record data, due to the high cost of using this information and stringent restrictions on the processing and analysing of the data.[4] Consequently, the paper reports results based on publicly available grouped data. Hence, this initial investigation is quite exploratory but does raise a number of questions as to how local labour markets function in relation to the economy as a whole. The present analysis is a prelude to a full investigation of local labour market outcomes with unit record data. Section five sums up and considers ideas for the next phase of the project.

Wages and unemployment: the arguments and evidence

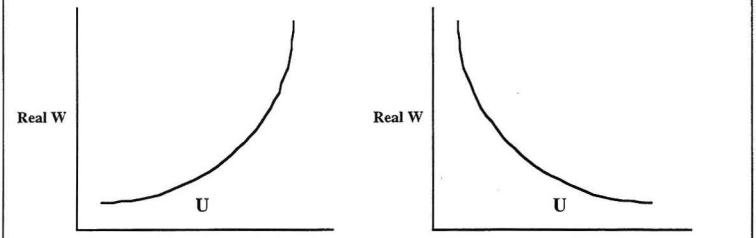
Internationally there are two quite different theoretical conjectures concerning the empirical relationship between wages and unemployment. The first argues that regions with high unemployment would also be ones with high wages (Hall 1970, 1972; Harris and Todaro 1970, Reza 1978). This perspective is depicted in Figure 1a. The second argues the reverse, namely that regions with high unemployment will be the ones with low wages. This is the relationship that is referred to as the wage curve, and has been depicted in Figure 1b.

The central idea of the Harris-Todaro model is a version of Adam Smith's compensating differentials. Regions with high unemployment are less desirable places to live, other things being constant, because it is relatively difficult to find a job there. To keep workers in such areas wages have to be higher, i.e. the differential in net income due to job search costs and possible spells of unemployment must be compensated in spatial equilibrium.[5] This is formulated in the Harris-Todaro model through the concept of expected income which is assumed to equal the wage multiplied by one minus the unemployment rate, that is, the wage times the chance of a job: $E=W^*(1-U)$.[6] In the New Zealand context this implies that in regions like Northland or Gisborne where unemployment rates are high relative to the New Zealand average, real wages will have to be higher to compensate for the greater risk of unemployment.[7] Similarly, lower unemployment in the metropolitan regions of Auckland and Wellington would correspond with lower real wages.

Both Hall (1972) and Harris and Todaro (1970) assume that, unless the expected return at a location is equal to the income available elsewhere, the worker will move. Since in long-run equilibrium each city must offer the same expected real income, pay and unemployment will be positively correlated in a cross-section of cities (and e.g. Hall provides some evidence using USA data from the 1960s).[8]

The arguments behind the wage curve are more complex and invoke elements from several existing theories of wage setting behaviour, including efficiency wages (and notions of fairness in wage setting), insider-outsider effects in bargaining and efficient labour contracting (Blanchflower and Oswald 1995, Card, 1995).

Figure 1. The relationship between wages and unemployment - alternative perspectives



a. Compensating differentials model **b.** The wage curve

The most intuitive idea behind the wage curve is that both pay and the tightness/slackness of the labour market (measured here by the rate of unemployment) affect the workers motivation and, hence, productivity. In this efficiency wage interpretation of the wage setting process, a marginal rise in unemployment leads to a corresponding marginal fall in wages, because firms can reduce pay slightly while maintaining a motivated work force (given that layoff would now be more costly for the worker). Conversely, "In a booming labour market, firms may have to pay well to ensure that individual workers, who know that there are many other jobs open to them, exert enough effort to work" (Blanchflower and Oswald, 1994: 38). High wages also introduce greater urgency into the job search because of the higher opportunity cost of remaining unemployed.

A similar phenomenon emerges when trade unions bargain on the workers' behalf. When rising unemployment leads to a larger proportion of union members facing a threat of layoffs, the union will moderate its wage demands and tilt its preferences towards a greater concern for jobs. There is ample evidence of such union behaviour in countries such as The Netherlands where union still have (indirectly) a large impact on wage setting (e.g. Gorter and Poot 1999).

In the efficient labour contracting model, which in its original form dates back to Leontief (1946) and McDonald and Solow (1981), employers and workers are concerned about both wages and employment. They bargain until an agreement is reached from which neither party wants to deviate. The outcome is not unique (and depends on the relative bargaining strength of the parties), but can be shown to lie on an upward sloping curve in wage-employment space. Consequently, even when prices and technologies are the same across regions but bargaining situations vary, we may find that wage levels and employment levels are cross-sectionally positively related. If higher employment translates into lower unemployment, the wage curve again emerges.

Even when we accept the basic idea of an inverse relationship between wages and unemployment, there is a question of whether unemployment determines the wage *level* (as suggested by Blanchflower and Oswald) or the *rate of change* of wages, as suggested much earlier by the New Zealander (Bill) Phillips (1958). The theoretical justification for the Phillips curve was first formulated by Lipsey (1960). These two competing ideas can be tested by nesting both models in a general specification in which the change in wages is a function of present and past unemployment rates (see Card 1995; Card and Hyslop 1996; Blanchard and Katz 1997), but this requires observations at more than one point in time. Because our New Zealand application provides only a regional cross-section at one point in time (1996), we do not pursue this idea further in the present paper.

In summary we have two sets of arguments. The first set is driven by the fact that workers have migration alternatives, but says little about employer behaviour, and the second set has local unemployment conditions determining relative wage bargaining strengths but pays scant attention to migration and, hence, to the presence of other local labour markets.[9]

The overseas evidence

Blanchflower and Oswald assemble a compelling raft of evidence for different countries in support of the wage curve and other researchers such as those referred to in the introduction provided additional evidence. In many cases, the elasticity found in the wage-unemployment relationship has been quite similar, namely about –0.1. Thus, a 10 percent rise in the unemployment rate would lead firms to pay 1 percent less, *ceteris paribus*.

Recently, Campbell and Orszag (1998) provided a theoretical explanation for the apparent robustness of this result. Like many others, they see the wage curve as the result of local monopsony power of firms: when unemployment is high, firms do not need to pay as high a wage to retain their workers. Campbell and Orszag formalise this idea by formulating a variant on the dynamic efficiency wage model of Phelps (1994). Their key assumption is that

the workers' quit rate is positively related to the employment rate (1 – U) with a constant elasticity h. In this case, different regions may be on different steady-state paths (and these paths are assumed unrelated!), but the elasticity of the wage with respect to the employment rate turns out to be a function of only one parameter, namely h. The same is therefore true for the wage curve. It turns out mathematically that even policy variables such as taxes and wage subsidies do not affect the elasticity of the wage curve.

Yet the precise nature of the wage curve and its interpretation are by no means undisputed. For example, Partridge and Rickman (1997) suggest, after finding a positive rather than the expected negative relationship between wages and the unemployment rate on alternative US data, that it might be, "premature to expunge the Harris-Todaro compensating differentials model from regional economic analysis" (p. 281) and that, "more research should be conducted on the robustness of the wage curve" (ibid).

New Zealand did not figure in Blanchflower and Oswald's set of international examples (although Australia does). Morrison (1997) did find a weak positive correlation between the aggregate employment rate and average annual income of wage and salary earners across New Zealand's 14 regions, which is consistent with the existence of a wage curve.[10]

The New Zealand case is of considerable interest for although this small country has marked regional variations in its labour market conditions, it also has relative few impediments to mobility so that sensitivity to compensating differentials can be expected to play a role in migration and regional labour market outcomes, (for example see Poot, 1986). On the other hand the post 1991 reforms, particularly those that encourage decentralised, individualised wage bargaining should work in favour of the local bargaining model that underlies the wage curve. How these arguments play themselves out in this highly open economy raises a number of intriguing questions about the international generality of the wage curve on one hand and its internal usefulness as an indicator of labour market behaviour within New Zealand on the other.

The New Zealand evidence

In this paper we seek evidence for the relationship between wages and unemployment using regional data available from the 1996 New Zealand census of population and dwellings. The analysis is conducted not on the basis of observations on individuals but for groups of individuals who have location and some other characteristics in common. Specifically we provide estimates of the wage curve at the level of the urban area controlling for different composition effects. The results will not be directly comparable to those of Blanchflower and Oswald who use individuals and pool cross sections from several points in time, as do most authors who test these propositions. However, Partridge and Rickman (1997) uses data on groups and Kennedy and Borland (1997) analyse both individual records and grouped data.

When data on individuals in pooled cross-sections are available, the wage curve relationship can be formally expressed as follows:

(1)
$$lnW_{irt} = \alpha + \beta lnU_{rt} + \psi' X_{irt} + \sum_{s=2}^{R} \varphi_s L_{sr} + \sum_{u=2}^{T} \lambda_u P_{ut} + \varepsilon_{irt}$$

where, in very general terms, lnW_{irt} is the natural log of the average hourly wage of individual i (= 1,2,..,N) living in region r (= 1,2,…,R) at time t (= 1,2,..,T), lnU_{rt} is the natural log of the unemployment rate in region r at time t and X_{irt} is a vector of attributes pertaining to the i^{th} individual living in region r at time t. In addition, the dummy variables L_{sr} (= 1 when s = r and 0 otherwise) and P_{ut} (= 1 when u = t and 0 otherwise) refer to region and time dummy variables respectively (ie. fixed effect deviations from the general level term α). The coefficients α and β are single parameters to be estimated; ψ' is a vector of parameters of which the length depends on the number of attributes included; φ_s and λ_u are the fixed effects for regions and time periods respectively and ε_{irt} is the error term (autocorrelation, heteroscedasticity and the possible simultaneity of wage and unemployment determination can be taken into account).

Note that it is assumed that the unemployment rate U_{rt} is the relevant measure of the slackness of the labour market for all invidivals for whom the model is estimated. If different groups of workers face different likelihoods of spells of unemployment, U_{rt} can be replaced by U_{ir}, ie. the unemployment rate pertaining to individual i.

It is also possible to test whether the parameters of the model vary between groups of individuals. For example, Kennedy and Borland (1997) find that the wage curve relation appears stronger for female than male employees in Australia, but Janssens and Konings (1998) find the opposite in Belgium.

The models we are able to estimate here differ from the individual unit record case primarily in how the dependent variable is specified and in the nature of the controls we can impose. Our data do not refer to individuals but to groups of individuals who are enumerated at the time of the census according to where they live. In this case, the estimated relationship becomes:

(2)
$$ln\overline{W}_{rt} = \alpha + \beta lnU_{rt} + \psi' \overline{X}_{rt} + \sum_{s=2}^{R} \varphi_s L_{sr} + \sum_{u=2}^{T} \lambda_u P_{ut} + \varepsilon_{rt}$$

Here, $\overline{W}_{rt}$ and $\overline{X}_{rt}$ refer to means calculated from groups of individuals. For example, $\overline{W}_{rt}$ measures the average annual income of all males in New Zealand (residing in region r) who worked full time in a job paying a wage or salary in the four weeks preceding the March 5th census date of 1996.[11] Fulltime refers to working thirty hours per week or more. Because we expect greater variation in hours worked among women than among men, even with the fulltime group as defined above, we restrict the analysis to males only.

The grouped data regressions have the econometric advantage of having observations at the same level of aggregation at both sides of the equation. A potential problem with estimating equation (1) is that the unemployment rate is a group rate that is related to the observed wage of individuals. Moulton (1986) has shown that this may lead to a t-statistic on the unemployment rate coefficient that is biased upwards. The "cell-mean" earnings regression model in equation (2) does not have this problem as long as the unemployment rate on the right hand side has been computed for the *same* individuals as the average wage on the left hand side. However, using grouped data drastically reduces the number of available observations.

The unemployment rate lnU_r is the natural log of the 1996 census unemployment rate of males in region r. The unemployed are defined as persons who were not working in a paid job, business, farm or profession at the census date, but had looked for either full-time or part-time work in the preceding four weeks, regardless of their availability and the job search methods used.[12]

Because the reported income in the census refers to all sources of income rather than just wages and salaries paid, it is necessary to constrain the analysis to those occupations in which wages and salaries make up a substantial component of reported income. As Table 1 shows, of the 23 occupations listed in the table, there are nine for which wage and salary earners represent more than 85 percent of the workers in that occupation (the others are primarily self-employed).

For the purpose of this exploratory analysis we have selected four occupations, for which more than 85 percent of the workers are salary and wage earners: Office Clerks, Stationary Machine Operators and Assemblers, Industrial Plant Operators and Labourers and Related Elementary Service workers.

Publicly available income information is reported in rather broad income classes. Average wage income for the four occupational groups was therefore calculated as follows. Mid points of the income categories of $10,000 and over were multiplied by the number of respondents in each category. The sum of the resulting products was then divided by the total number of respondents involved. The open ended income category was assumed to be of the same width as the last closed interval.

Relevant data were available for 39 urban areas in New Zealand. Ranging in size from a population of 78,957 (Central Auckland) to 2,382 (Greymouth), this set of major and minor urban areas is probably the closest standard statistical units in New Zealand come to what we understand by local labour markets. At the same time, there is considerable room for debating the separate identification of certain areas. One could argue for example that the four Auckland zones should be grouped into one large, metropolitan labour market, or that administratively separate urban areas such as Napier and Hastings function as one labour market, or that small urban areas such as Fielding might be better linked with its larger neighbour Palmerston North. Each of these arguments has merits but in the absence of a systematic grouping of labour catchments throughout the country any such grouping can be as arbitrary as leaving the existing set untouched. We suspect that most of the key issues to emerge from this analysis do so independently of competing spatial configurations and therefore we will simply treat the urban area set as they come to us from Statistics New Zealand.[13]

By pooling the urban area data for the four occupations described above, we are able to work with 39 x 4 = 156 observations. The model we estimate is a variation on (2) in which we drop the subscript T (we only use one time

Table 1. Occupations ranked by the proportion of wage and salary earners among full-time workers, New Zealand , 1996

Occupation	Proportion
Teaching Professionals	99.0
Legislators and Administrators	94.4
Customer Services Clerks	94.0
Office Clerks	93.8
Personal and Protective Services Workers	90.2
Stationary Machine Operators and Assemblers	90.0
Industrial Plant Operators	89.4
Physical Science and Engineering Associate Professionals	86.7
Labourers and Related Elementary Service Workers	86.0
Metal and Machinery Trades Workers	82.6
Precision Trades Workers	82.3
Salespersons, Demonstrators and Models	81.5
Physical, Mathematical and Engineering Science Professionals	81.4
Drivers and Mobile Machinery Operators	76.1
Life Science and Health Associate Professionals	72.4
Other Craft and Related Trades Workers	72.0
Building and Related Workers	70.1
Other Professionals	69.8
Other Associate Professionals	69.5
Life Science and Health Professionals	64.2
Corporate Managers	60.9
Building Trades Workers	54.3
Market Oriented Agricultural and Fishery Workers	42.7
Not Specified	46.6
Total fulltime male earners	**70.9**

Figure 2. Average annual income and the local unemployment rate for full time male wage and salary earners in selected occupations, 1996

Fig 2a Office Clerks.

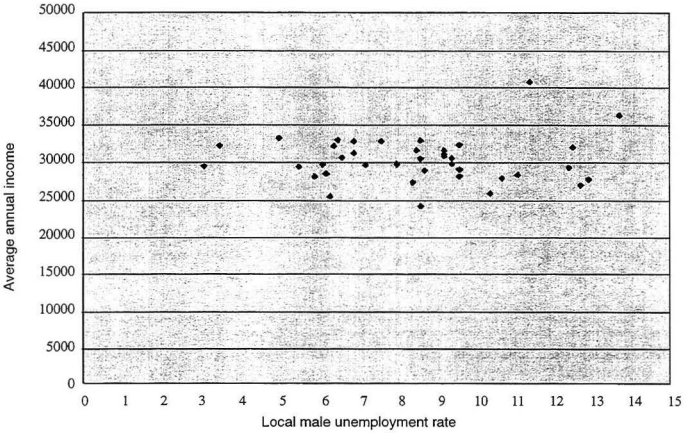


Fig 2b Stationary Machine Operators and Assemblers.

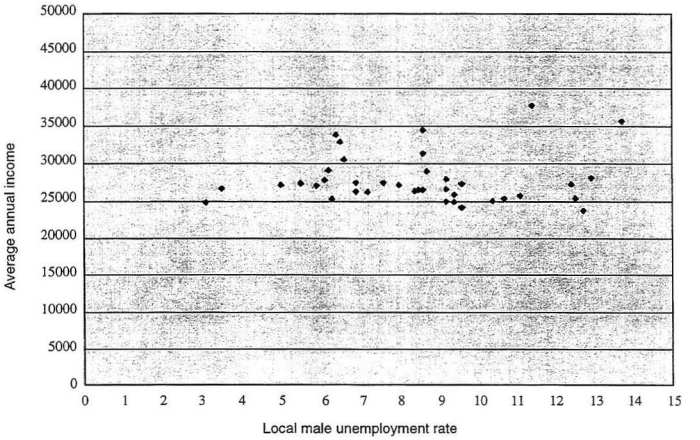


Figure 2 (cont.) Average annual income and the local unemployment rate for full time male wage and salary earners in selected occupations, 1996

Fig 2c Industrial Plant Operators.

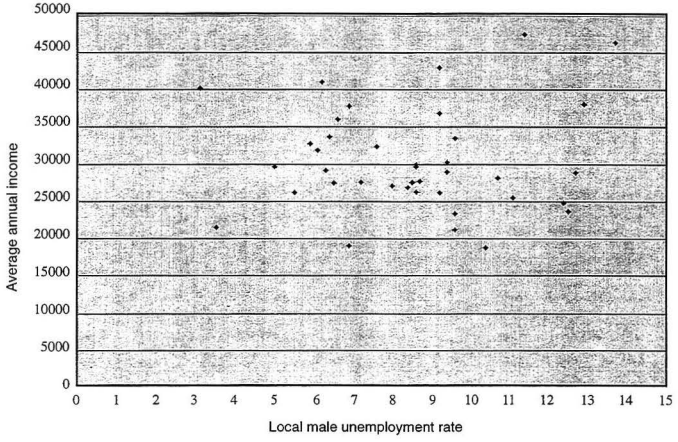


Fig 2d Labourers and Related Elementary Service Workers.

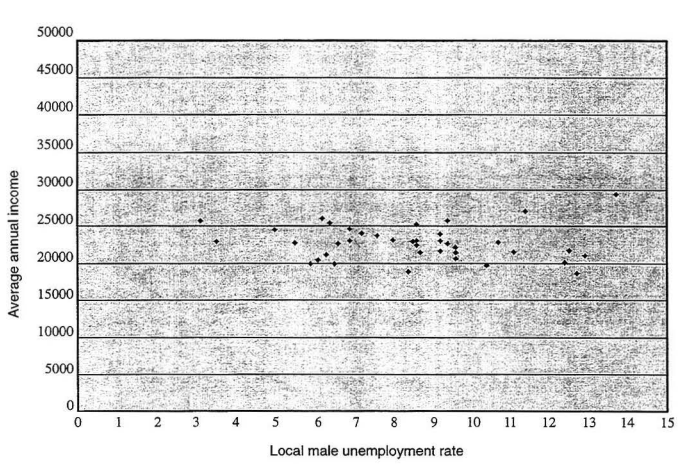


Table 2. Simple regression of annual income on the local unemployment rate for selected occupation, weighted least squares

Occupation	*N*	*β*	R^2	*F*	*P-value*
Office Clerks	39	0.-089	0.115	4805	0.035
Stationary Machine Operators and Assemblers	39	-0.040	0.020	0.769	0.368
Industrial Plant Operators	39	-0.026	0.002	0.067	0.797
Labourers and Related Elementary Service Workers	39	-0.115	0.168	7.460	0.010
Four occupations aggregated	**156**	**-0.067**	**0.013**	**2.028**	**0.156**

point, namely 1996) and in which the observations for the four occupational groups are pooled. Using this approach we turn to the New Zealand evidence.

The uncontrolled plots of the reported wage incomes of fulltime male workers against the male unemployment rate at the level of 39 major and minor urban areas in New Zealand is shown in Figure 2 for each of the four occupations separately.

The scatters do not provide any convincing evidence of an inverse bivariate relationship between regional wage levels and the corresponding unemployment rates. Yet when equation (2) is estimated by WLS in each of the four cases with no control variables imposed, there is a significant correlation for two occupations: office clerks and labourers and related elementary service workers. Moreover, the elasticity of the wage curve (b in equation 2) is in both cases close to –0.1 as suggested by Blanchflower and Oswald. This can be seen from Table 2.

Since the variables in the regression reflect group means rather than individual observations, the appropriate method of estimation is weighted least squares (e.g. Johnston 1984, pp. 293-296) and the weight used in this case was the number in the male labour force.

The variables used were those that were considered relevant and could be obtained from Statistics New Zealand by means of SUPERMAP (see Statistics New Zealand 1995): see Annex.[14] The results are reported in Table 3.

The first set of explanatory variables which were added to the simple linear regressions reported in Table 2 are those which follow from a tradition in estimating earnings functions that commenced with Mincer's classic (1974) study. Mincer related the logarithm of earnings to schooling and to age (the latter in a non-linear way). Consequently, model 1 shows the results of explaining male wage and salary earnings in terms of the male unemployment rate (LUNM), the age distribution (G40 and G60) and the proportion of workers with no post-compulsory education (NOPOSTED). The model explains very little of the variance in earnings across regions and occupations, but the coefficients do have the right sign. The negative coefficient of LUNM is consistent with the wage curve. The coefficient of G40 (the proportion of workers between 40 and 65) is positive and the coefficient of G60 (the proportion of workers aged between 60 and 65) is negative. Consequently, these variables provide some support for the usual concave age-earnings profiles in which earnings increase until, and peak at, middle ages and subsequently fall off in the years close to retirement. Earnings are also lower when workers have lower levels of schooling, as is reflected in lower values of earnings when the proportion with no post-compulsory education in the region is higher. The coefficient for LUNM is similar to that found in the final row of Table 2, namely around –0.07.

In the second model, we make a crude attempt to control for cost of living differences. There is no information on regional price levels collected in the census, but these price levels are expected to be correlated to rents paid by households renting dwellings. Information on rents paid is collected in the census. As part of the economic policy reforms in New Zealand, rents paid are generally market rents, even in public housing.[15] However, AVRENT does not appear to have any influence on wages paid. This can be seen from model 2, but the same remains true in the fuller specified models 3 to 5. The fact that AVRENT is an insignificant variable does not imply that regional cost of living differences do not matter in New Zealand. They may in fact be captured by the regional fixed effects that are included in models 4 and 5. These regional fixed effects are significant in a number of cases. Indeed, the lower wages paid in some South Island regions may well be due to lower price levels in those regions. The available data do not permit us to disentangle this effect from any other regional fixed effects.

Model 3 provides a dramatically improved "explanation" of earnings. The adjusted R^2 increases to 0.592. However, the improvement is entirely due to allowing for occupational fixed effects. The differences in wage levels between

occupations, ceteris paribus, may be due to compensating differentials for pleasantness of the work, occupational hazards, differences in the allocation of the occupations across industries (given that wages vary across industries for a range of reasons, see e.g. Borjas 1996: 427-429), occupational segregation, etc. The simple model reported here does not explain any of these effects, but makes it clear that their joint effect is important. Besides now that the wage curve elasticity has become significant at the 5 percent level, the age (G40, but not G60) and education effects also become significant. The occupational effects are all positive, as they are measuring wages relative to those of labourers and elementary service workers, who have the lowest wages of the occupations considered. The elasticity of the wage curve is about –0.07, as before.

The model which includes regional specific effects (model 4) is an improvement on model 3. The fit improves further and Akaike's Information Criterion (AIC) is also lower, although Schwarz's Bayesian Criterion (SBC) is higher.[16] The regional effects that are significant are located in the South Island (Nelson, Canterbury and Otago), except for

Table 3. New Zealand estimates of the wage curve, based on group data

N=156; Weighted Least Squares
Dependent variable: LWAGE
Weights used: MALELF

Model	1	2	3	4	5
LUNM	-0.068 (0.048)	-0.071 (0.049)	-0.071[b] (0.031)	-0.068[c] (0.039)	-0.115[c] (0.063)
G40	0.008[c] (0.005)	0.007 (0.006)	0.007[b] (0.004)	0.012[a] (0.004)	0.012[a] (0.004)
G60	-0.061 (0.063)	-0.057 (0.065)	-0.057 (0.041)	-0.131[a] (0.050)	-0.131[b] (0.051)
NOPOSTED	-0.003 (0.002)	-0.004 (0.002)	-0.004[b] (0.002)	-0.004[a] (0.002)	-0.004[a] (0.002)
AVRENT		-0.0001 (0.0005)	-0.0001 (0.0003)	-0.0004 (0.0005)	-0.0004 (0.0005)
OFFICEC			0.285[a] (0.021)	0.285[a] (0.019)	0.231 (0.172)
STATM			0.155[a] (0.021)	0.155[a] (0.019)	-0.003 (0.172)
INDPO			0.242[a] (0.021)	0.242[a] (0.019)	0.054 (0.172)
NORTH				0.019 (0.064)	0.019 (0.065)
WAIK				0.030 (0.035)	0.030 (0.035)
BAYOP				0.007 (0.038)	0.007 (0.038)
GISB				-0.040 (0.077)	-0.040 (0.078)
HAWKB				-0.036 (0.043)	-0.036 (0.043)
TARA				0.064 (0.060)	0.064 (0.060)
MANA				-0.074[c] (0.039)	-0.074[c] (0.040)
NELS				-0.096[c] (0.054)	-0.096[c] (0.054)
CANT				-0.055[c] (0.032)	-0.055[c] (0.033)
OTAGO				-0.145[a] (0.046)	-0.145[a] (0.047)
SOUTH				0.071 (0.065)	0.071 (0.065)
WEST				-0.037 (0.119)	-0.037 (0.119)
LUNMOC1					0.026 (0.081)
LUNMOC2					0.075 (0.081)
LUNMOC3					0.089 (0.081)
CONSTANT	10.353	10.409	10.238	10.340	10.440
Adj. R^2	0.011	0.004	0.592	0.644	0.641
AIC	0.021	0.021	0.009	0.008	0.009
SBC	0.023	0.024	0.011	0.013	0.014

Standard errors in parentheses
[a] Significant at the 1% level
[b] Significant at the 5% level

the Manawatu region. The results suggest that wages paid are generally lower in the South Island. One contributing factor may be that the South Island has a far lower population density than the North Island. The absence of agglomeration advantages and the presence of higher transportation costs may lead to lower labour productivity, all else being equal, which is ultimately reflected in lower wages.

The final model, model V, tests whether the elasticity of the wage curve varies between the four occupational groups considered. The coefficients of the interaction effects LUNMOC1, LUNMOC2 and LUNMOC3 are all insignificant. However, they are all positive and provide therefore some tentative evidence that the wage curve is more elastic for the rather unskilled labourers than for the other occupational groups. Kennedy and Borland (1997) found in their disaggregate analysis for Australia that the wage curve elasticity did not appear to vary in any systematic manner with educational attainment and that the wage curve relationship was only significant for a small subset of occupational groups.

Future research

We have found evidence that the wage curve relationship does hold in New Zealand and that the unemployment elasticity of pay is between about –0.07 and –0.12. In this respect, our brief New Zealand study appears to provide one more supporting piece of evidence for an empirical economic phenomenon for which there is a remarkable degree of consensus internationally. Indeed, Card's (1995) review of research on the wage curve suggests that the existence of such a curve is no longer disputed, but that the reason for the negative correlation between the wages of individuals and the local unemployment rates are not clear despite various conjectures that have been offered.

Therefore, an important objective for future New Zealand work is to contribute to the international research in this area by shedding light on the causes of the cross-sectional regularity. The key issue here is the dynamics of the local labour market, an issue ignored in most previous research on the wage curve. Specifically, in future papers we will investigate whether the wage curve is due to a sorting of workers across regions (by means of internal migration and labour supply responses) such that high wage workers are overrepresented in low unemployment regions. Formal econometric models of New Zealand internal migration have been estimated in the past (e.g. Poot 1986), but there has been no analysis of internal migration with micro-level data. Alternatively, the wage curve could result from changing bargaining outcomes over the regional business cycle: workers residing in particular regions finding their wage growth lower as the unemployment rate rises.

The two hypotheses will be tested in future work by means of unit record data from the 1991 and 1996 NZ Census of Population and Dwellings. This permits estimation of the cross-sectional wage curve at both points in time. Wage equations are based on conventional human capital theory and will include age, schooling and other personal characteristics. Industry and occupation effects will also be investigated. However, the dynamics of the relationship between wages and local unemployment rates are identified by cohort analysis. Since there are as yet no longitudinal labour market data in New Zealand, such data are synthetically generated by identifying homogeneous cohorts in the 1991 census and then by finding the matching observations in the 1996 census. This enables the computation of wage growth for the "stayers", which can be compared with the change in the regional unemployment rate. If the wage-unemployment relationship remains robust to this first differencing, it confirms bargaining models of local wage setting. If the wage curve breaks down in the dynamic context, it suggests that supply responses such as changing labour force participation and geographical mobility are responsible for observing the cross-sectional wage and employment outcomes.

Although positioned adversarily it may be counterproductive to continue to think in terms of two competing theoretical models; of Harris and Todaro arguing for a positive relationship between wages and unemployment and Blanchflower and Oswald for a negative relationship. As Blanchflower and Oswald themselves note, the Harris and Todaro model *can* sit comfortably alongside the wage curve - it is the *permanent* value of pay and joblessness that will be positively related across the regions in a long run equilibrium[17] whereas the *contemporaneous* pay and joblessness will be negatively related (permanent values can be positively related while movements around the mean are negatively related).[18] The difference between the behaviour or permanent and transitory components of both wages and unemployment has received little attention in the literature. Future work will attempt to disentangle these components, as well as focus on micro-level behaviour of firms and workers in regional labour markets.

Notes

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1 See Evans et al. (1996) for a survey of the New Zealand reform process, Maloney and Savage (1996) on the labour market impact, and Le Heron and Pawson (1996) on regional trends and issues.

2 See Nijkamp and Poot (1998) for a survey.

3 Specifically, they estimated wage curves with data from 12 countries: USA, Britain, Canada, South Korea, Austria, Italy, the Netherlands, Switzerland, Norway, Ireland, Australia and Germany.

4 Unit record data from official government surveys such as the Census of Population and Dwellings are in New Zealand only available through the so-called Statistics

Laboratory of Statistics New Zealand. The computer processing must be done on the premises of Statistics New Zealand. For confidentiality reasons, procedures are in place that prevent the reporting of information on individual records and all output from analyses is checked against the conditions stipulated in the Statistics Act.

5 In the growing regional economics literature on compensating differentials is it not just unemployment that matters, but cost of living and the value of (dis)amenities as well. See for example Roback (1982) who argues that regional wage differences can be explained largely by these local attributes. This is reflected in relating the real wage rather than the nominal wage to the unemployment rate in Figure 1.

6 However, as noted by e.g. Borjas (1996: 217), the compensating differential would vanish when workers are covered by taxpayer-financed unemployment insurance.

7 In a slightly more formal statement of the argument: "in a multi-regional labour market, equilibrium is attained when expected utility is equalized across all regions and net migration between regions equals zero" (Partridge and Rickman, 1997: 277).

8 Support may also be found in Reza (1978), Marston (1985) and in Topel (1986).

9 There is another approach based on the idea that there may be differences between regional labour markets in the extent to which wages and employment will respond to disequilibrium, see for example McCormick and Sheppard (1992).

10 The correlation coefficient was 0.36.

11 It is possible for someone to live in one region and work in another. We simply assume here however that the usual place of residence appropriately approximates the boundaries of the relevant local labour market.

12 The definition of "looking for work" was contained in the guide notes and required at least one of the job search methods listed, during the four weeks preceding the census. If "looking at job advertisements in newspapers" was one of the methods cited, at least two methods are required. (Statistics New Zealand 1995).

13 Main urban areas are very large non-administrative centres which are urban in character and have a minimum population of 30,000. They may be part of a city or parts of cities and/or part of a district or parts of districts. Minor urban areas are small to medium-sized non-administrative centres which comprise part of a district, are regarded as urban in character and have populations ranging between 1,000 and 9,999 (Statistics New Zealand, 1995).

14 The data are available upon request from the authors.

15 Households with low incomes may be given a limited accommodation grant to supplement their income (see Morrison, 1995).

16 See e.g. Ramanathan 1989, p.166 for a description ofthese model selection criteria.

17 Because migration generates heavy short run costs; it is closer to an investment decision than to a consumption decision. Therefore migrants' choices are not likely to respond to transitory movements in economic conditions which may affect their wage determination *in situ* (Blanchflower and Oswald, 1994: 93).

18 See Blanchflower and Oswald, 1994, page 93, footnote 21.

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Authors

Philip Morrison is an Associate Professor in the Institute of Geography, and Jacques Poot is an Associate Professor in the School of Economics and Finance, Victoria University of Wellington, PO Box 600, Wellington.

E-mail: Philip.Morrison@vuw.ac.nz, Jacques.Poot@vuw.ac.nz

Annex: Definition of the variables used

Mnemonic	*Variable*	*Description*
LWAGE	Natural log of the average annual income of fulltime male wage and salary earners.	This refers to income from a variety of different sources, not just wages and salaries. Measuring income before tax of persons 15 years and over received from all sources for the financial year ending 31 March 1996. This includes income from: wages, salary, commissions, bonuses paid by employer, self-employment, or business(es) owned and worked in, interest, dividends, rent, other investments, ACC regular payments, New Zealand Superannuation, pensions, annuities, unemployment benefit, sickness benefit, invalids benefit, student allowance, other government benefit, government income support payments, or war pensions. Wages and salary earners are the largest of three categories of 'employment status' used in the census; the other two are self employed (with or without employees) and unpaid labour.
MALELF	The number of males in the labour force.	This is the number of male employed (E) plus the male unemployed (U). This is used to weight the grouped observations for each urban area.
LUNM	Natural log of the unemployment rate of males only.	Unemployment rate = U/(U+E) where U is the definition of unemployment as used in the census and E refers to all employed (wage and salary earners plus the self employed - with and without employees, together with unpaid workers).
G40	The proportion of all wage and salary earners who are aged between 40 and 65.	
G60	The proportion of all wage and salary earners who are aged between 60 and 65.	
NOPOSTED	The proportion of males in fulltime paid work with no post secondary school qualification	This variable proxies the average education level of the workers considered in the regression models.
AVRENT	The average rents of all rented dwelling units in 1996	This variable is used as a proxy for cost of living, a practice with a number of precedence in the literature, see for example Winter-Ebmer (1996: 428). See Blackaby et al (1991) for a strong argument for the incorporation of regional prices to make sure that real wages are adequately defined in cross-sectional studies.
OFFICEC	A dummy variable identifying Office Clerks	An occupational fixed effects. The coefficient measures the influence of the specific occupation on wages relative to Labourers and Related Elementary Service Workers.

Annex (cont.)

STATM	A dummy variable identifying Stationary Machine Operators and Assemblers	
INDPO	A dummy variable identifying Industrial Plant Operators	
NORTH	A dummy variable identifying the Northland region	A regional fixed effects. The coefficient measures the influence of the specific region on wages relative to the Auckland and Wellington metropolitan areas.
WAIKA	A dummy variable identifying the Waikato region	
BAYOP	A dummy variable identifying the Bay of Plenty region	
GISB	A dummy variable identifying the Gisborne region	
HAWKB	A dummy variable identifying the Hawke's Bay region	
TARA	A dummy variable identifying the Taranaki region	
MANA	A dummy variable identifying the Manawatu region	
NELS	A dummy variable identifying the Nelson region	
CANT	A dummy variable identifying the Canterbury region	
OTAGO	A dummy variable identifying the Otago region	
SOUTH	A dummy variable identifying the Southland region	
WEST	A dummy variable identifying the Westland region	
LUNMOC1	LUNM x OFFICEC	This variable measures whether the wage curve elasticity is different for Office Clerks as compared with Labourers and Elementary Service Workers
LUNMOC2	LUNM x STATM	A wage curve elasticity effect for Stationary Machine Operators and Assemblers
LUNMOC3	LUNM x INDPO	A wage curve elasticity effect for Industrial Plant Operators