



A HUMAN RESOURCES STUDY OF THE HOME BUILDING AND RENOVATION SECTOR FOR NEWFOUNDLAND AND LABRADOR PHASE III

The Economics of Labour Shortages

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Prepared by:



53 Leary's Cove Road
East Dover NS B3Z 3W7
902.852.2151 fax.852.3193
www.ahbrsc.com

and

PRAXIS Research &
Consulting Inc.





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1.0 Basic Economic Theory

Economic theory looks at the issue of labour shortages and surpluses in terms of the demand for and supply of labour. It predicts that wages will be rising in individual labour markets characterized by excess demand and falling in markets with excess supply. The rate at which wages adjust in individual labour markets is assumed to be related to excess demand as a proportion of the size of the labour market.

The aggregate demand for and supply of labour in the economy, as well as the aggregate rate of wage changes, are the weighted sums of individual labour markets. The relationship between aggregate wage changes and aggregate excess demand and supply is characterized as follows in Benjamin, Gunderson, Riddell, (2002)¹:

$$\dot{w} = f\{(D-S)/S\}$$

where:

\dot{w} – is the aggregate rate of wage changes

D – is the aggregate demand for labour, and

S – is the aggregate supply of labour

The relationship between aggregate wage changes and aggregate excess demand may be complex. For example, economists have found that wages are often downwardly rigid:

“ ... because wage rates fall less rapidly in response to excess supply than they rise in response to excess demand.”

(Labour Market Economics, Fifth Edition, Dwayne Benjamin, Morley Gunderson, W. Craig Riddell, 2002, p. 579)

Downwardly rigid wages imply that the downward pressure on wages in individual labour markets facing excess supply will be less than the upward pressure on wages in labour markets facing excess demand.

¹ The presentation of the economics of labour shortages/surpluses in this section is based directly on “Labour Market Economics”, Fifth Edition, Dwayne Benjamin, Morley Gunderson, W. Craig Riddell, 2002, pp. 578 – 611.



“In these circumstances, because wages fall less rapidly in response to excess supply than they rise in response to excess demand, the aggregate amount of excess supply must exceed the amount of excess demand in order for the aggregate rate of wage change to equal zero.”

(Benjamin, Gunderson and Riddell, 2002, p. 579)

Job Vacancies and Unemployment Levels

2.0 Job Vacancies and Unemployment Levels

In the words of Benjamin, Gunderson, Riddell (2002), the job vacancy rate and the unemployment rate are the “*observable counterparts*” to aggregate excess demand and supply. Job vacancies are an indicator of the demand for labour by employers and the persistence of unfilled vacancies may reflect an excess demand for labour. Unemployment occurs when workers cannot find jobs and persistent levels of unemployment may signal an excess supply of labour.

Benjamin, Gunderson, Riddell (2002) present the following simple linear equation relating the rate of aggregate excess demand, vacancy rates and unemployment rates:

$$(D-S)/S = V-U$$

where:

V is the job vacancy rate and

U is the unemployment rate

The above equation states that the rate of aggregate excess demand $(D-S)/S$ equals the vacancy rate minus the unemployment rate. It implies that if demand (D) is greater than supply (S), then the number of job vacancies (V) will be greater than the number of unemployed workers (U) and vice versa. In common sense terms, this equation says that, if there is excess demand for labour, job vacancies will outstrip the number of unemployed people whereas, if there is excess supply, there will be fewer job vacancies than unemployed people.

The relationship between aggregate excess demand, vacancy rates and unemployment rates implies that the aggregate rate of wage changes is a function of the excess of job vacancy rates over unemployment rates. This may be written as follows:

$$\dot{w} = f\{V - U\}$$

This equation implies that there are values for job vacancy rates and unemployment rates where both aggregate excess demand and the rate of changes in wages is zero. The labour market is in equilibrium at this point. The unemployment rate at this point is called the “natural rate of unemployment”.

It is interesting to note that both job vacancy rates (V) and unemployment (U) rates may be positive but offsetting at the equilibrium point. Furthermore, as demonstrated above, the unemployment rate



(representing excess supply) may be higher than the vacancy rate (representing excess demand) at this equilibrium point if wages are downwardly rigid.

It is important to remember, however, that while the overall labour market might be in equilibrium, an individual company might experience shortages or surpluses. As stated in Benjamin, Gunderson and Riddell:

“... because of imperfect information, the process of matching workers and jobs takes time. Thus unfilled job vacancies and unemployed workers will coexist at any point in time. This disequilibrium at the micro level is nonetheless consistent with aggregate labour market equilibrium in that excess demand (unfilled job vacancies) in some markets is offset by an equal amount of excess supply (unemployed job seekers) in other markets. The aggregate rate of wage changes equals zero because markets in which wages are rising due to excess demand are offset by markets in which wages are declining.”

(Benjamin, Gunderson, and Riddell, 2002, p. 578)

One implication of this discussion is that studies showing high levels of job vacancies should not conclude that there is excess demand (shortages) unless they also examine data on unemployment rates. Another implication is that unemployment rates in excess of job vacancy rates do not necessarily imply that labour surpluses exist.

Economic analysis indicates that the “equilibrium” levels of both job vacancies and unemployment may be relatively high in some circumstances. For example, Benjamin, Gunderson and Riddell (pp. 597-599) show that persistent unemployment may lead to a deterioration of physical and human capital and a subsequent decline in labour market skills and job search intensity. This reduces demand for these unemployed workers as well as the probability that they will find employment. As a result, the equilibrium or natural rate of unemployment increases.

A phenomenon termed “insider-outsider wage-setting” by Benjamin, Gunderson and Riddell (p. 599) may further increase the level and persistence of unemployment in some circumstances and regions.

“... many long-term unemployed may suffer a decline in their job-related skills, the intensity of their search effort, or they may become accustomed to public assistance in the



form of unemployment insurance or social assistance. In these circumstances, the long-term unemployed may become 'outsiders', a group with little labour market attachment and one which exerts little restraining influence on wage settlements. The reduced impact on wage bargaining (for a given level of the unemployment rate) implies an increase in the equilibrium (natural) level of unemployment."

(Labour Market Economics, Fifth Edition, Dwayne Benjamin, Morley Gunderson, W. Craig Riddell, 2002, p. 578)

Benjamin, Gunderson and Riddell (pp. 598-599) point to evidence from other authors that Canada's employment insurance system may contribute to the persistence of unemployment. These authors also found evidence that there was a positive relationship between the generosity and duration of employment insurance benefits and the duration of unemployment in the labour force.

This discussion indicates that a high rate of job vacancies may not signal a shortage of labour. Conversely, significant levels of unemployment do not necessarily imply a surplus. It is the relative level of these two variables that is an indicator of excess demand rather than the absolute level of either of them

Examining job vacancy rates compared to unemployed rates is critical in order to document the existence of excess demand for labour (shortages).

The concept of a natural rate of unemployment plays an important role in the estimation of labour shortages. Benjamin, Gunderson and Riddell show that in many circumstances the actual unemployment rate in a specific labour market is not the correct measure of the excess demand for or supply of labour. The appropriate measure is the difference between actual unemployment rate in a specific labour market and the natural rate of unemployment.

"The natural unemployment rate depends on numerous factors ... such as the magnitude and frequency of seasonal, cyclical and other economic disturbances, the job search behaviour of employers and workers and the efficiency of the matching process, the use of layoffs to respond to changes in demand, the amount of labour force turnover, the age-sex composition of the labour force, and labour market policies such as minimum wages and unemployment insurance. In these circumstances, the appropriate measure of aggregate excess demand for labour is the difference between the observed and natural unemployment



rates. That is, when the equilibrium unemployment rate itself may be changing, the unemployment rate is not a reliable measure of aggregate excess demand . . .”

(Labour Market Economics, Fifth Edition, Dwayne Benjamin, Morley Gunderson, W. Craig Riddell, 2002, p. 579)

3.0 Wage Changes

The discussion above shows that the rate of wage changes is directly related to the level of excess demand (shortages) or supply (surpluses). Gunderson (1991) described the role wages in explaining changes in labour supply and demand, and in resolving labour shortages, in the construction industry as follows:

“Since a shortage of labour occurs when the demand for labour exceeds the supply of labour at the going wage rate, the conventional economic solution to shortages is to raise wages. Higher wages can induce an increase in all dimensions of labour supply: increased employment, longer hours and even more work effort and intensity. In the long run, they can encourage more people to enter the trade, to move, to upgrade their skills and even postpone retirement or return from retirement. Higher wages can also induce a decrease in demand for the higher-priced skilled labour that is in short supply, by encouraging employers to substitute other inputs (substitution effect) by using, for example, other workers, prefabricated products or subcontracting to self-employed independent operators. Contractors may also reduce their output (output effect) because of the higher wage costs, thereby employing less of the skill labour in short supply and less of all other inputs. In the extreme some contractors may even go out of business because of the higher wage costs. These are, respectively, the substitution and scale effects that lead to a reduction in the demand for labour whose price has risen. Both the increased labour supply and the reduced labour demand induced by the wage increase should serve to alleviate the labour shortage. This is the market response, where wages are flexible and allowed to ‘clear’ markets. This can occur indirectly through piecework and self-employment, both of which have increased in residential construction.”

(Morley Gunderson, “SKILL SHORTAGES IN THE RESIDENTIAL CONSTRUCTION INDUSTRY”, Report to the Canada Mortgage and Housing Corporation, January, 2001, p. 20)

Reasons for Labour Market Imbalances

4.0 Reasons for Labour Market Imbalances

Given that wage rate changes are a built-in adjustment mechanism, it is fair to ask how shortages or surpluses can persist over the long term. Labour market imbalances may arise and persist for a number of reasons, including the following:

1. Wages May be Set Above Equilibrium Levels

Gunderson shows that wage rates may be fixed above market clearing levels. He explains the impact of fixed rates as follows:

“Surpluses can arise when wages are set above the market clearing level so that the supply of labour exceeds the demand at the going wage rate. Wages set above the competitive rate can occur for a myriad of reasons such as union wage premiums, public sector wage premiums, and wage fixing legislation (e.g., minimum wages, equal pay, “fair wage” requirements in government contracts, and wage extension by decree). In such circumstances, employers are constrained to accept those wages and even though they have an incentive to reduce them, they cannot do so.”

(Gunderson, January, 2001, p. 20)

Gunderson elaborates on the possible impact of union wage setting on labour market imbalances as follows:

“Collective agreements, for example, can specify rate schedules that lead to surpluses in some groups and shortages in others. The shortages are more likely to occur for the more skilled groups given the fact that unions tend to compress skill differentials.”

(Gunderson, January, 2001, p. 21)

The residential construction industry is not unionized whereas other sectors of the construction industry such as the Institutional, Commercial and Industrial (ICI) and the Engineering sectors are heavily unionized. This would indicate that shortages and surpluses in trades in the residential construction sector would be less of an issue than they would be in these other sectors. While this is true, it does not imply that union-induced wage rigidities in the non-residential sectors would not have an impact on shortages and surpluses in the residential sector of the construction industry. This is demonstrated as follows in Gunderson (2001).



“Even in non-union environments, spillover effects may occur from the unionised environment. For example, if shortages arise because of rigid wage structures in unionised non-residential construction, this can have spillover effects leading to shortages in non-unionised residential construction.

Union wage premiums in the unionised sector (e.g., non-residential construction) can also make it more difficult to recruit to fill labour shortages in the lower paying, less unionised sector (e.g., residential construction). This is compounded when the shortages prevail in both unionised and non-unionised labour markets.”

(Gunderson, January, 2001, p. 21)

2. The Impact of Wage Increases on Existing Employees

Gunderson (2001) points out that shortages can arise and persist if individual employers in the construction industry influence the level of wages² in their attempts to recruit workers. Under such conditions:

“Employers will constantly report vacancies or shortages (because demand exceeds supply at the going wage) but they will not raise wages to reduce those shortages because the higher wage (or at least some of it) paid to attract the new employees also has to be paid to the existing incumbent workforce as well.”

(Gunderson, January, 2001, p. 23)

3. Time Lags in the Adjustment Process.

It can take workers a significant length of time to acquire the training required to move into an occupation in shortage or to move to areas where shortages exist. In the case of apprenticeship, it takes years to acquire the certifications required in some construction occupations. Government policy decisions to reduce shortages through immigration also can take years.

Conditions in the job market may change dramatically by the time an extra supply of workers becomes available in response to wage increases resulting from a shortage situation. A downturn in demand in this interim period could result in a situation where there is a surplus of workers by the time labour

² This situation is termed monopsony in the economics literature.



supply increases. In this case, the increase in supply could exacerbate the surplus and drive down wages. This situation could cause on-going labour market instability with shortages and surpluses occurring over time.

The response of employers and workers to temporary imbalances in the labour market is critical to the speed with which a new equilibrium is reached in the labour market and to level of the natural rate of unemployment that will prevail at the new equilibrium. Policies that would reduce the time required by employers and workers to adjust to labour market imbalances could reduce the incidence and duration of labour shortages or surpluses. Shorter training programs are one obvious solution. The provision of more information to improve the ability of employers and workers to respond to temporary periods of excess demand or supply is another. Roy, Henson & Lavoie support this conclusion in a 1996 article focusing on the measurement of labour shortages and surpluses.

“Market participants would adjust faster to demand and supply shocks if they knew more about existing market conditions”

(Richard Roy, Harold Henson & Claude Lavoie, Applied Research Branch, Strategic Policy, Human Resources Development Canada, “A Primer on Skill Shortages In Canada”, R-96-8E, November, 1996, p.16)

4. Liquidity Constraints Faced by Workers

Workers who wish to enter an occupation in shortage by moving or acquiring the required training may not have the financial resources to support their plans. This constraint could inhibit the inflow of workers into occupations in shortage despite the attraction of high wages.

5. Firm Specific Human Capital

Employers may be reluctant to pay for the training required by workers to move into an occupation in shortage unless the training is “firm specific”. If the training received by workers can be used in other jobs, employers may not be able to recoup investments in training made on behalf of employees. As stated by Gunderson:

“The contractor cannot be guaranteed that the worker will stay, especially in a market where they are now better trained and where there are general labour shortages in their skills.”

(Gunderson, January, 2001, p. 19)

Empirical Estimation of Shortages

5.0 Empirical Estimation of Shortages

Data limitations on the availability and reliability of vacancy and unemployment rates at an occupational level make it difficult to conclusively diagnose a shortage or surplus of labour. However, the accumulation of evidence available from a variety of indicators may go a long way towards a conclusive determination. In particular, examining time series data on job vacancy and unemployment rate over time may provide the opportunity reach conclusions about the relative degree of labour shortages over time. Examining job vacancy and unemployment rate data across occupations may support conclusions about the relative degree of shortages or surpluses across occupations.

The rate of wage changes can be used to corroborate findings based on vacancy and unemployment data. A positive rate of wage changes should correspond to positive excess demand and could reinforce findings based on comparisons of vacancy and unemployment rates.

The article by Roy, Henson and Lavoie (1996) indicates that unemployment and vacancy rates are key indicators of shortages/surpluses. The article also shows how economists have used these indicators to measure shortages. One common method is to develop a ratio of the unemployment rate to the vacancy rate (Beveridge Curve). The Roy, Henson and Lavoie article also stresses the importance of examining changes in wages and benefits in making determinations about the existence of a shortage or surplus.

An important contribution of the Roy, Henson and Lavoie article is that it shows that a combination of indicators can be used to draw a more definite conclusion about shortages than the use of individual indicators.

“Using wage movements along with unemployment rate changes would provide more reliable information than using either of them separately.”

(Roy, Henson & Lavoie, November, 1996, p.29)

While stressing the important role of wages and wage changes in explaining labour shortages and surpluses, Roy, Henson & Lavoie advise caution in using wage changes as an indicator of shortages or surpluses:



“... there is also cross-country evidence that wages do not respond very strongly to existing market conditions. According to the OECD³ Jobs Study (1994) this general tendency for relative wages to be inflexible would be the main reason for the wide dispersion of unemployment rates across particular groups of workers. ... In any case ... if the wage structure is inflexible, especially over the medium-run, shocks will give rise to persistent occupational imbalances and these imbalances will tend to resolve themselves through inter-occupational mobility rather than through variations in relative wages.”

(Roy, Henson & Lavoie, November, 1996, p.30)

Roy, Henson & Lavoie point out that the structure of product and labour markets in a particular industry will influence wage rate changes in response to temporary imbalances. For this reason, it is important to document the structure of the product and labour markets in an industry in order to predict and explain wage levels and changes. For example, it would be expected that wage levels and changes in the residential construction sector, which is highly competitive and characterized by a large number of small firms and the absence of unions, would differ substantially from those in the institutional, commercial and industrial (ICI) or engineering sectors of the construction industry which are both characterized by a smaller number of larger firms with a unionized workforce.

Roy, Henson & Lavoie (p23) show that there are two types of labour market imbalances: (1) imbalances due to structural or compositional shifts in demand or supply (that leave aggregate demand or supply for labour unchanged) and (2) imbalances due to changes in aggregate demand (i.e. in economic activity). Widespread occupational imbalances would be expected in response to changes in general economic activity (Imbalance Type 2). The policy response to such imbalances would likely be to stabilize overall economic activity and facilitate the adjustment of all occupations to the economic change.

Imbalances in specific occupations, or groups of occupations, would be expected in response to specific structural or compositional shifts in demand or supply (Imbalance Type 1). The policy response to Type 1 imbalances would focus on specific industries and occupations and would be designed to address the structural or compositional causes of imbalances. The first crucial step in this process would, of

³ Organization for Economic Co-operation and Development



course, be to determine the structural or compositional causes of the imbalance. The Roy, Henson & Lavoie article notes that changes in balance of demand and supply of a particular occupation compared to that for other occupations in the economy may be a signal of Type 1 imbalances. They observe that:

“An occupation that is diagnosed as being in a shortage situation when most other occupations are in surplus due to weak economic activity is, priori, a more interesting case for policy action”

(Roy, Henson & Lavoie, November, 1996, p.23)

This discussion stresses the importance of obtaining indicators of the relative degree of shortage of occupations. Roy, Henson & Lavoie conclude that this strategy would be helpful in assisting policy makers to allocate human resource budgets targeted on improving the efficiency of the labour market.

Roy, Henson & Lavoie advise caution in using employer surveys to diagnose labour shortages. The authors state that employer surveys can contribute to such a diagnosis, as well as to the documentation of its impacts, but are subject to misinterpretation. One reason for this is that a positive number of vacancies occur even when the labour market is in equilibrium. As noted in Roy, Henson & Lavoie:

“...the co-existence of vacancies and unemployed workers is not necessarily evidence of skill imbalances in the labour market. It is not sufficient either.”

(Roy, Henson & Lavoie, November, 1996, p51, footnote 124)

The authors go on to point out that vacancy rates may overstate the true market requirements of employers because inter-occupational mobility will reduce the employers' need for new workers. In addition:

“...many so-called shortages may not be genuine market shortage, if, for example, they are reported by employers that are unwilling to pay the on-going wage for a particular skill.”

(Roy, Henson & Lavoie, November, 1996, p32)

The discussion above shows that it is to be expected that individual employers will experience shortages or surpluses even when the overall labour market is in equilibrium.



Roy, Henson & Lavoie summarize the findings of Laslett (1992) regarding problems with using employer surveys to document skill shortages.

“ In reviewing a series of employer-based surveys on shortages in engineering in the UK, Laslett (1992) indicated that, no matter how carefully the surveys were designed and conducted, the skill shortages identified were hardly there when the problem was pursued.”

(Roy, Henson & Lavoie, November 1996, p32)