THE MALTESE LABOUR MARKET AND FRICIONAL UNEMPLOYMENT§

Mirko Mallia*

Abstract. This paper discusses the extent to which unemployment in Malta was caused by frictional factors rather than by the persistence of disequilibrium conditions, using data pertaining to the period 1990 to 2004. The paper briefly surveys the literature of theoretical and empirical unemployment models and reviews the theory of the relationship between unemployment and wage movements. It examines the causes of unemployment from a theoretical standpoint, and provides a general description of main labour market trends in the Maltese economy. It presents estimation results of a model capturing the speed of adjustment towards equilibrium in this market, concluding that unemployment in Malta was to a large extent caused by market frictions, notably skill mismatches, and that therefore active market policies should be given major attention in Malta.

Introduction

The labour market is essentially the interaction between labour demand by firms and labour supply by households. If the wage rate is sufficiently flexible, it would adjust to clear the market. This would be an equilibrium situation, where excess demand and excess supply of labour is eliminated.

If for example, wage rates decrease in the presence of excess labour supply, involuntary unemployment would be eliminated as firms increase their demand for labour and, possibly, households decrease their supply.

This paper discusses the possibility that unemployment in Malta was caused by frictional factors rather than by the persistence of disequilibrium conditions.

§ The views contained in this article are Mr Mallia’s personal views, and are not expressed on behalf of the Central Bank of Malta.

* Mirko Mallia is currently employed as an Economics Officer in the Financial Stability Office at the Central Bank of Malta. He possesses an MA(Economics) degree from the University of Malta.
between 1990 and 2004. Following this introduction, the paper briefly surveys the literature of theoretical and empirical unemployment models. Section 3 reviews the theory of the relationship between unemployment and wage movements while Section 4 examines the causes of unemployment from a theoretical standpoint. Sections 5 and 6 provide a general description of main labour market trends in the economy and reviews the estimation results of a model capturing the speed of adjustment towards equilibrium in this market. Section 7 concludes the paper with some implications arising from the results.

**Brief Literature Survey**

Some authors assume that the labour market tends to move towards equilibrium fairly rapidly at all times and that the existing unemployment is either temporary in which case it would be quickly eliminated or voluntary and should not, therefore, form part of labour supply. A well known study assuming labour market equilibrium is Lucas and Rapping (1969).

Other authors allow for the possibility of disequilibrium, assuming that the wage rate does not necessarily adjust to clear the market due to various institutional factors, including government intervention and union activity. Such models were proposed by Briguglio (1984), Rudebusch (1986) and Bhaskara (1990).

Briguglio (1984) discusses two versions of an aggregate labour market model, namely the equilibrium model and the disequilibrium model. The advantages that the author attributes to the latter model is that it is more general than the equilibrium models, given that it encompasses both the disequilibrium and equilibrium possibilities, and allows the researcher to test whether or not the equilibrium assumption is valid.

Briguglio concludes that models that *a priori* impose labour market equilibrium may not represent reality. Instead, the presence of wage rigidity and the existence of non-competitive market forces indicate that the labour market may not always be characterised by equilibrium. Furthermore by introducing a wage adjustment equation, disequilibrium models include an interesting feature of the labour market.
Similarly Rudebusch (1986) tested and rejected the hypothesis of labour market equilibrium. In addition, Rudebusch stresses that assumptions regarding labour market clearing determine whether a macroeconomic model produces classical or Keynesian results. Bhaskara (1990) conducted a similar study and applied it to the US Labour market utilising data between 1930 and 1965.

Bhaskara, utilises disequilibrium labour market models in order to evaluate the equilibrium model which was developed by Lucas and Rapping (1969). The author concluded that neither the wage rate nor the level of employment adjust instantaneously. In addition, a satisfactory explanation of the unemployment rate could be inferred using excess supply of labour generated from a disequilibrium labour market model.

**Wage Setting and Disequilibrium**

The basic difference between equilibrium and disequilibrium labour market models of the type described above is that the latter include a wage setting equation of the form:

\[ W - W_{-1} = c (L^d - L^s) \]

where \( W \) is the current wage rate, \( W_{-1} \) is the previous period wage rate, \( L^d \) is labour demand and \( L^s \) is labour supply; \( c \) is some functional relationship, taking a positive value. In this equation, an increase in wage rates (\( W > W_{-1} \)) signifies that there is excess demand (\( L^d > L^s \)).

In an equilibrium model this equation will not be useful, given that labour demand equals labour supply (\( L^d = L^s \)).

Briguglio (1984) added a term representing non-market forces as follows:

\[ W - W_{-1} = c_1 (L^d - L^s) + c_2 N \]

where \( N \) represents non-market forces, which Briguglio measured by employee union density, assumed to capture union pushfulness.
Intuitively, the direction of wage rate changes should give a clue as to whether the labour market is characterised by excess demand or excess supply, given that excess demand should result in positive wage rate changes and excess supply in negative ones. With the inclusion of nonmarket forces, this rule would be modified, as shown in Figure 1. The solid line assumes that wage rate changes are influenced by market forces only whereas the dashed line assumes that non-market forces affect wages.

Thus point A assumes that market clearance occurs when the market is in equilibrium ($\Delta W = 0$, and $L^d = L^s$) and point B assumes that there is an exogenous push on wages, exerted by Unions, for example, which makes it possible for wages to increase even if labour demand equals labour supply. The non-linearity of the curves refers to the possibility of wage stickiness in the
downward direction.\textsuperscript{1} The distance AC represents frictional unemployment, so that with the inclusion of market frictions, the wage adjustment curve resembles the Philips curve. A seminal paper in this regard is that by Lipsey (1960).

\section*{Unemployment}

Unemployment in a given country can be divided into two categories, namely that which is caused by excess supply of labour and that which is caused as a result of market frictions, such as supply/demand mismatches.

\subsection*{Excess Supply Unemployment}

In disequilibrium models, such as that proposed by Briguglio (1984), it is possible for excess supply unemployment to exist and persist due to factors that prevent the wage rate from adjusting to its equilibrium level.

When the wage rate is above its equilibrium level, the transacted quantity of labour (roughly equivalent to observed employment) is assumed to be equal to labour demand. Conversely when the wage rate is below its equilibrium level, the transacted quantity of labour is assumed to be equal to labour supply. Thus the transacted quantity of labour is assumed to be equal to the quantity demanded or the quantity supplied, depending on which of the two is lower.

This can be expressed as follows:

\[ L = \text{minimum of } L^d \text{ or } L^s \]

where L is the observed level of employment.

This equation is illustrated in Figure 2.

Only at the equilibrium wage rate (\( W^* \)) are labour demand and labour supply equal. In Figure 2, at a wage rate higher than \( W^* \), say at \( W_2 \) the transacted quantity of labour \( L_2 \) is determined by the amount that firms are willing to hire (labour demand) at this relatively high wage rate.

\textsuperscript{1} In this case the wage setting equation would be suitably modified to represent a nonlinear relationship.
In this case, excess labour supply, or alternatively deficient demand unemployment, would be AB.

At a wage rate lower than $W^*$, say at $W_1$, the transacted quantity of labour $L_1$, is determined by the amount that households are willing to offer (labour supply) at this relatively low wage rate. Therefore, labour transacted is represented by the solid segments of the labour demand and labour supply curves. This is known as the short side of the labour market.

The presence of excess supply (involuntary) unemployment should exert a downward push on wages. However, in disequilibrium models it is assumed that the labour market is characterised by factors which may prevent the wage rate from fully adjusting to its equilibrium level. These factors include government minimum wage legislation, trade union activity\(^2\) and long-term

---

\(^2\) Union activity could therefore have two distinct impacts on the labour market, namely (a) it could prevent wages from falling, leading to wage rigidity in the downward direction and (b) exogenous wage rate increases, possibly leading to an increase in wage rates, even in the presence of excess labour supply.
wage contracts. This line of thought may be referred to as the institutional model of unemployment and refers to conditions where non-market forces inhibit downward wage adjustment.

*Frictional Unemployment*

Unemployment could also occur as a result of market frictions. In the case of Malta, such frictions occur mostly as a result of skill mismatches, typically associated with changes in the structure of the economy, resulting in increased demand for certain skills and a decrease in demand for others.

Another source of labour market frictions relates to immobility of labour which arises from factors such as family ties or costs of finding alternative lodgings, hindering unemployed persons from moving into areas where jobs are available.

A third source of frictions is associated with lack of knowledge on the part of job seekers with regard to vacancies and on the part of firms wishing to fill vacancies, regarding the availability of possible candidates for the job.

It is therefore possible to have full employment (meaning that labour demand equals labour supply) with some job vacancies remaining unfilled, as those seeking employment do not have the right skills to fill the existing vacancies. It is even possible to have excess demand for labour and unemployment at the same time.

*Observed Unemployment*

Observed unemployment (denoted by \( U^o \)) therefore consists of excess supply of labour plus frictional unemployment, as shown in the following equation:

\[
U^o = U^s + U^f
\]

where \( U^s \) represents excess supply unemployment and \( U^f \) frictional unemployment. As already explained, frictional unemployment will result in the existence of job vacancies which remain unfilled.
Figure 2 can therefore be modified to include frictional unemployment, as shown in Figure 3, where frictional unemployment is assumed to increase as the labour market becomes tighter. In other words, as labour demand increases, there will be more unfilled vacancies.

This is in line with the well known negative relationship between unemployment and vacancies.

As a result the short side of the market is depicted by the curve N, where the difference between N and L^d represents unfilled vacancies. Thus, in Figure 3, at wage rate W_2 unemployment is measured by CB of which CA represents frictional unemployment and AB excess supply unemployment.

At the equilibrium wage rate W^*, there is no excess supply unemployment, but only frictional unemployment equal to DE. DE may be viewed as that unemployment compatible with wage stability.
The unemployment present when the wage rate is at its equilibrium level is often labelled as the natural rate of unemployment. It is that level compatible with wage stability, which is not therefore the result of a wage rate higher than its equilibrium level.

**Policy Implications**

This analysis yields a number of policy implications. If unemployment is the result of excess labour supply, stimulating labour demand may be appropriate, given that the objective of policy is to close the gap between labour demand and labour supply. One solution could be to increase labour demand through aggregate demand expansion.

If on the other hand, unemployment is frictional, stimulating labour demand would not solve the problem – on the contrary it may exacerbate it. In this regard, active labour market policies which attempt to reduce or eliminate inefficiencies in the labour market would be more appropriate to reduce unemployment.

---

**Figure 4**

Unemployment Rate (%) in Malta

*Source: National Statistics Office (NSO)*
Unemployment in Malta. Between 1990 and 2004, the unemployment rate has remained relatively stable and averaged at around 5% as shown in Figure 4. It would be interesting to ask whether this unemployment rate is attributable to excess labour supply or to market frictions, or to both.

Undoubtedly there were factors that influenced labour demand and labour supply during the period under consideration. Wage rate changes may have affected decisions by firms to employ labour and decisions by households to supply labour. Changes in output of firms, which ultimately reflect themselves in GDP changes, most probably also affected labour demand. Attitudinal changes towards female employment and better female employment opportunities have probably resulted in an increase in female employment, which affected labour supply.

Figure 5
Malta’s Real Gross Domestic Product (1990-2004)

Source: National Statistics Office (NSO)
**GDP and Labour Demand.** Between 1990 and 2004, Malta’s real GDP increased significantly, recording a growth of 3.6% per annum in real terms. This is shown in Figure 5. However a great proportion of this increase was recorded during the 1990s, where GDP growth averaged at 4.8% per annum, while between 2000 and 2004 GDP growth was negligible.

**Female Participation Rates.** In Malta, the participation rate of females (measured as the proportion of the population of females in the working age population that is in the labour force) has tended to increase, although it is still one of the lowest in Europe. Figure 6 plots male and female participation rates in Malta between 1990 and 2004.

The male participation rate has tended to decrease somewhat during this period. On the other hand, female participation rates increased substantially during the same period. In 2004, 33% of the female working age population participated in the labour market.
The Disequilibrium Labour Market Model

A disequilibrium labour market model could be specified on the following four equations, as formulated by Briguglio (1984:543-548).

\[
\begin{align*}
L^d &= a_1 W + a_2 Y \quad (1) \\
L^s &= b_1 W + b_2 Z \quad (2) \\
W - W_{-1} &= c (L^d - L^s) \quad (3) \\
L &= \min (L^d - L^s) \quad (4)
\end{align*}
\]

Equations (1) and (2) represent standard labour demand and labour supply equations\(^3\) where \(L^d\) and \(L^s\) refer to the quantity of labour services demanded and supplied, \(W\) refers to the prevailing wage rate and \(Y\) and \(Z\) refer to different exogenous variables influencing labour demand and labour supply respectively.\(^4\) Equations (3) and (4) have already been explained above.

This formulation can be used to test for the existence of market disequilibrium.

If the market is in equilibrium we will conclude that \(L^d = L^s\) and that therefore equation (1) is equal to equation (2) as follows:

\[
a_1 W^* + a_2 Y = b_1 W^* + b_2 Z \quad (5)
\]

where \(W^*\) is the equilibrium wage rate, from which we can derive an equilibrium reduced form equation for wage rates as follows:

\[
W^* = \alpha_1 Y - \alpha_2 Z \quad (6)
\]

where: \(\alpha_1 = a_2 / (a_1 - b_1)\) and \(\alpha_2 = b_2 / (a_1 - b_1)\)

If the market is not in equilibrium, we can derive a disequilibrium reduced

---

\(^3\) For a discussion on these equations see Briguglio (1984).

\(^4\) Strictly these should be represented by \(\cdot a_i Y_i\) and \(\cdot b_i Z_i\), where \(i = 1, 2, \ldots, n\) and \(n\) is the number of exogenous variables.
form equation for labour, combining equations (1), (2) and (3) as shown in equation (7).

\[ W - W_{-1} = c [(a_1 W + a_2 Y) - (b_1 W + b_2 Z)] \]  

which when rearranged yields the following equation:

\[ W = \beta_1 W_{-1} + \beta_2 Y - \beta_3 Z \]  

where:

\[ \beta_1 = 1/[1- c(a_1- b_1)] \]
\[ \beta_2 = a_2/[1- c(a_1- b_1)] \]
\[ \beta_3 = b_2/[1- c(a_1- b_1)] \]

By estimating equation (8) we can assess whether the market was generally characterised by equilibrium. Briefly the exercise involves testing whether \( \beta_1 \) takes a value of zero or otherwise. If \( \beta_1 \) is found to be zero or not statistically different from zero, we can conclude that there was no evidence that the market in disequilibrium, since the term \( W_{-1} \) will disappear, and equation (8) becomes identical to the equilibrium reduced form equation (6). This situation would imply that the speed of adjustment parameter \( c \) in equation (3) would be infinite, implying an instantaneous adjustment towards equilibrium.\(^5\) Mallia (2005) tested this model for the period 1990-2004, using the least squares method of regression with Maltese data for the period 1990-2004, and found that the value of \( \beta_1 \) was not different from zero.\(^6\) The results therefore indicate

---

\(^5\) A similar approach, which would be more consistent with the theory of rational expectations, would involve altering equation (3) such that the movements in the wage rate would depend on the lagged, rather than the current level of labour market disequilibrium. Thus:

\[ \Delta W = c(L_{d-1} - L_{s-1}) \]

where \( L_d \) and \( L_s \) have been defined in equations (1) and (2).

The solution of this differential equation gives the time path for the wage rate:

\[ W_t = (W^*-W_0) e^{c(a_1- b_1)t} + W^* \]

where \( W^* \) is the equilibrium wage and \( W_0 \) is the initial (disequilibrium) level of wages. If \( c = 0 \), then the wage rate would be fixed at \( W_0 \) and there would be no adjustment towards equilibrium. The difference between the initial wage and the equilibrium wage would be cleared faster at higher values of \( c \).

\(^6\) Mallia (2005) also estimated the labour supply and demand equation, using the two Stage Least Squares (2SLS) method of regression.
that the wage rate tended to adjust to clear the market during the period under consideration.

This would seem to contradict the assumption of persistent disequilibrium in the labour Maltese market during the period under consideration.

If this is true the unemployment rate figures in Malta should, to a large extent, be attributed to market frictions, such as skill mismatches, and not to excess supply. In these circumstances, active labour market policies which attempt to reduce or eliminate inefficiencies in the labour market would be more appropriate to reduce unemployment than policies to stimulate labour demand, as argued above.

It should be recalled that unemployment rates during the period analysed averaged around 5%, and the results of the estimation suggest that this corresponded approximately to the natural rate of unemployment.

**Conclusion**

This paper has described the estimation results of a labour market model, using Maltese data. The estimation results suggest that during the 1990-2004 period, unemployment existed in the labour market, but this was mostly due to market frictions, meaning that the main reason was not deficient demand (or conversely excess supply) but factors such as skill mismatches.

It should be kept in mind that the exercise looks at general tendencies and the results should be interpreted with caution.

For example, it is useful to note that the exercise pertains to the aggregate labour market. The Maltese labour market is made up of different segments and could have been characterised by excess supply in certain segments e.g. low skilled jobs and excess demand in other areas e.g. highly skilled and technical jobs.

In addition, there could have been spill-over effects from one segment to another. In the case of Malta the wage rate settlements in the public sector could have had an effect on private sector wage rates.
The results have important policy implications. Currently, policy makers in Malta are utilising a mixture of active market policies to reduce market frictions, notably skill mismatches, and policies to stimulate labour demand, notably by trying to expand GDP. The results of this study suggest that active market policies should be given major attention.

References


