A disequilibrium analysis of the labour market

Meulendijks, P.J.F.G.

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A DISEQUILIBRIUM ANALYSIS OF THE LABOUR MARKET: REVIEW AND COMMENTS*

BY

PIETER J. F. G. MEULENDIJKS**

1 REVIEW

One of the most important topics in economic analysis is the search for the determinants of demand for and supply of commodities and the way transactions take place.

During the Lustrum Congress held to celebrate the 50th anniversary of Tilburg Catholic University in April 1978, Dr. F. Haslinger from Regensburg University recognized that the present state of the art in this area of economic analysis could serve as a good example of a real revolutionary development in scientific thinking (Haslinger, 1978). Economic scholars can be divided into two groups: those economists who still operate within the equilibrium paradigm, and the advocates of the disequilibrium paradigm. Haslinger considers the latter approach as perhaps the only real revolutionary development in the field of economic analysis since Adam Smith formulated a 'unifying fundamental metaphysical blueprint that guided all economic theorizing for long and even the work of most economists today,' in the sense that they believe 'that the conflicts brought about by the scarcity of means of production and its resulting scarcity of commodities are solved by the working of the market forces to the best of all' (Haslinger 1978, p. 33).

Lenderink and Siebrand, in contrast with economists like Milton Friedman,[1] do not belong to these 'equilibrium economists'; they, following the Keynesian line, reject the idea that the existing economic system is, in any significant sense,

* This paper consists of a review of and comments upon *A Disequilibrium Analysis of the Labour Market* (Lenderink and Siebrand, 1976).

** University of Tilburg, the Netherlands.

1 See *e.g.* Friedman (1970), where he argues that the basic differences among economists concerning the determinants of and the way in which transactions on markets take place are of an empirical nature, rather than of a theoretical one. More recently he demonstrated in an article in the *University of Chicago Magazine* (1974) a similar interpretation of the functioning of the free market as a means of organizing resources. Lenderink and Siebrand show very clearly, in contrast with Friedman, that the basic differences among economists are indeed theoretical as well as empirical. In their study they note that 'there exists a theoretical and empirical gap between realisations and demand and supply theory' (1976, p. 2).

self-adjusting. Around 1936, Keynes caused a real revolutionary break with the equilibrium tradition: his 'metaphysical blueprint' set the basis of disequilibrium theory of which the theoretical core consists of the three assumptions of imperfect markets, limited knowledge, and bounded rationality of the economic agents. On the one hand it should be noted that the line of thought of the authors of the study before us is that 'which emerged from the well-known leading discussion of Keynes associated with the names Clower and Leijonhufvud searching ultimately for new equilibrium concepts in common.'[2] Furthermore Patinkin, Clower and Gregory are mentioned by Lenderink and Siebrand as the authors who have provided them with the norms of reference used in their present analysis. On the other hand it is true that the underlying study is not dealing explicitly with the theoretical question concerning the conditions under which the economy will achieve an equilibrium state in the sense that notional plans can also be realized and nobody would have an incentive, on the basis of his information, to change his behaviour. In the introduction of their study the authors start with the recognition of an inconsistency of handling simultaneously, without constraints, two essentially different norms of reference. It happens in current macroeconomics so far as there exists for instance 'a peculiar dichotomy in the use of the equilibrium assumption with regard to the labour market.' That is, in wage theory one usually assumes disequilibrium, but as a rule the analysis of employment and labour supply is implicitly based on equilibrium.[3] In their analysis of labour demand and labour supply they wish to integrate the results of the conventional analysis with the formulation of the implications of disequilibrium. In order to justify their line of thought and especially their empirical approach in their study of the Dutch labour market the authors consider again different theoretical reasons as well as sufficient empirical evidence for the relevance of disequilibrium of the real economic process (chapters 1 and 2). They suggest that such empirical evidence for the relevance of real disequilibrium of the labour market of various industrial countries over the past few decades is expressed by the number of registered unemployed, that is, people unable to find work. In these cases the registered labour supply exceeds registered labour demand:

$$\tilde{w}_n = \tilde{a}_s^f - \tilde{a}_d^f > 0.$$

It is argued that, in general, the evaluation of the consistent theoretical and

2 Haslinger considered them as the representatives of one of the three lines of research within the framework of the disequilibrium paradigm. The other two lines he mentioned are the Cambridge school (the post-Keynesian school), and the Keynesian essentialists (Haslinger, 1978, pp. 44–46).

3 Good demonstrations of circumstances under which the peculiar dichotomy in the use of the equilibrium concept can be used fruitfully in macro-economic analysis can be found in Schouten (1978) and Van den Goorbergh (1978).

empirical results of equilibrium and disequilibrium analysis can teach us that within the real economic process different levels have to be distinguished on which economic agents are actually acting and which can be verified in principle in an empirical way. At any level the economic activities are ultimately concerned with individual supply of and demand for and, aggregating these entities, with total supply of and demand for commodities and services brought together or confronted with each other on the market. In this sense total labour supply $\tilde{a}_s$ is confronted with total labour demand $\tilde{a}_d$ on the various levels of the labour market. Distinction of different activity levels and, as a consequence, distinction of different market levels with respect to a certain economic good (*e.g.* labour), in the sense of a specification of a number of intention levels of the economic agents with respect to some economic good, is useful to handle the situation of real economic life wherein supply and demand are only equal by coincidence. The latter circumstance seems true at least in the short run. Such a disequilibrium situation is possibly caused by the actual presence of a high degree of decentralization, of uncertainty, and of conflicting aims pursued by the economic agents with their decisions to undertake activities.

Frictions between original intention levels, between adapted intention levels, and ultimately between realized intention levels of supplying and demanding agents in the market may appear in reality as frictions between original, adapted and realized and/or registered levels of supply of and demand for economic goods. Economic literature on disequilibrium considers these frictions as a consequence of imperfect market-clearing mechanisms (rigid or less flexible price and non-price conditions). Phenomena such as voluntary quantity adjustments and tendencies to involuntary quantity adjustments at the aggregated level are invoked by Lenderink and Siebrand. They accept the disequilibrium concept as a tool in their effort to build a consistent framework for theoretical and empirical analysis of the short-run phenomena on the Dutch labour market during the period between 1952 and 1970. For this purpose they develop a theoretical labour market model that satisfies conditions of (1) a good integration of the results of foregoing equilibrium as well as disequilibrium analysis and (2) tractability for estimation of coefficients and parameters of linear and non-linear relationships between the relevant variables for which the 'realized' values of some of them have to be approximated simultaneously.

The specification of their theoretical model therefore requires an operational concept of disequilibrium (see equations [1] to [6] below). Recognizing a possible division of the various intention levels into *ex ante* or potential, effective, and *ex post* or actual intention levels, the authors arrive at an operational concept of disequilibrium by distinguishing only actual or *ex post* variables on the one side and potential or *ex ante* variables on the other side. It is argued that

the economic agents on the labour market do have intentions and expectations with regard to developments of demand for and supply of labour. Aggregating the quantities arising from the intentions of the individual agents gives rise to the macroeconomic variables of *ex ante* demand for and *ex ante* supply of labour ($\tilde{a}_d^p$ and $\tilde{a}_s^p$ respectively). Equilibrium analysis, qualified by the authors as being conventional, may give enough information about the determinants of the *ex ante* or potential (notional) variables. Disequilibrium analysis, qualified as non-conventional, may give sufficient information about how and why from the theoretical as well as from the empirical point of view both potential variables are equal only by coincidence.

In the present case there exists labour market disequilibrium at the potential level, that is, $\tilde{a}_d^p \neq \tilde{a}_s^p$, which will not disappear by means of, for example, adaptive wages ($\tilde{p}_a$) because they are rigid in the short run.

In contrast with traditional involuntary quantity adjustment of the labour market, that is, $\tilde{a}_d^f = \min(\tilde{a}_s^p, \tilde{a}_d^p)$, Lenderink and Siebrand consider phenomena such as flexible non-wage conditions and voluntary quantity adjustment on both sides of the labour market. To a certain extent their approach takes care of realizations (and registrations) of actual labour supply and actual labour demand which both lie between the initial values of the two potential counterparts. So, the *ex post* or actual labour market situation will again be in equilibrium only by coincidence. However, it is postulated that the *ex post* situation always shows a smaller discrepancy between supply and demand than its corresponding initial *ex ante* disequilibrium situation, apart from frictional unemployment.

In order to evaluate and comment upon the subsequent part of their study it may be useful to reformulate their core model in a form which expresses our interpretation of their theoretical and application models, as follows:

Actual total labour supply:

$$ln\ \tilde{a}_s^f = u_s\ ln\ \tilde{a}_s^p + (1 - u_s)\ ln\ \tilde{a}_d^p + ln\ \theta. \qquad [1]$$

Actual labour demand (employment):

$$ln\ \tilde{a}_d^f = u_d\ ln\ \tilde{a}_s^p + (1 - u_d)\ ln\ \tilde{a}_d^p. \qquad [2]$$

Labour supply weights:

$$0 \leq u_s = \alpha_s \tanh(z_s) + \beta_s \leq 1. \qquad [3a]$$

Labour demand weights:

$$0 \leq u_d = \alpha_d \tanh(z_d) + \beta_d \leq 1. \qquad [3b]$$

Hyperbolic tangent with respect to labour supply weights:

$$\tanh(z_s) = \frac{e^{z_s} - e^{-z_s}}{e^{z_s} + e^{-z_s}};\ z_s = \gamma_s(x + ln\ \delta). \qquad [4a]$$

Hyperbolic tangent with respect to labour demand weights:

$$\tanh(z_d) = \frac{e^{z_d} - e^{-z_d}}{e^{z_d} + e^{-z_d}};\ z_d = \gamma_d(x + ln\ \delta). \qquad [4b]$$

Tension on the potential labour market:

$$x = ln\left(\frac{\tilde{a}_s^p}{\tilde{a}_d^p}\right) \text{ (theoretical models in man-year terms);} \qquad [5a]$$

$$x = ln\left(\frac{\tilde{a}_s^p}{\tilde{a}_d^p}(a)\right) = ln\ (1 + \tilde{w}^f + \varepsilon')$$

(application model estimation, round 1); [5b]

$$x = ln\left(\frac{\tilde{a}_s^p}{\tilde{a}_d^p}(a)\right) = ln\ (1 + \tilde{w}^p + \varepsilon)$$

(application model estimation, rounds 2–7). [5c]

Definitional relations and symbols:

Actual unemployment: $\tilde{w}^f \equiv (\tilde{a}_s^f - \tilde{a}_d^f)/\tilde{a}_s^f$.

Potential unemployment: $\tilde{w}_f^p \equiv (\tilde{a}_s^p - \tilde{a}_d^p)/\tilde{a}_s^p$. [6]

Potential unemployment in terms of a deviation of its sample-period mean value:

$$\tilde{w}^p \equiv \tilde{w}_f^p - \bar{\tilde{w}}_f^p \text{ and } \bar{\tilde{w}}_f^p \equiv \frac{1}{19}\sum_{t=1952}^{t=1970} \tilde{w}_f^p(t).$$

Corrected potential labour supply/demand ratio: $\frac{\tilde{a}_s^p}{\tilde{a}_d^p}(a)$,

where $\tilde{a}_s^f$; $\tilde{a}_d^f$; $\tilde{a}_s^p$ and $\tilde{a}_d^p$ are in man-year terms; $ln \equiv$ natural logarithms; $\theta \geq 1$: constant actual correction factor for actual total labour supply; $1 \geq (\theta - 1)/\theta \geq 0$: actual frictional unemployment; $\alpha_s, \alpha_d, \beta_s, \beta_d, \gamma_s, \gamma_d, \varepsilon'$ and ε are parameters to be varied along with varying assumptions about asymptotic and equilibrium properties of the labour supply and labour demand weights.

From equations [1] to [6] we are able to derive now the next five implications.

First it is easy to verify for γ_s, γ_d, $\delta > 0$ and ε', $\varepsilon < 0$ that, in contrast with the authors' formulation on page 16 in their study the *boundaries of the u-weights* imply:

$$0 \leq \alpha + \beta \leq u \leq -\alpha + \beta \leq 1 \qquad [7]$$

Besides, it is true that for Min (u) in the extreme case of *ex ante* excess labour supply:

$$\{x \to \infty\} \to \{u \to \alpha + \beta = 0\}; \qquad [8]$$

and Max (u) in the extreme case of *ex ante* excess labour demand:

$$\{x \to -\infty\} \to \{u \to -\alpha + \beta = 1\} \qquad [9]$$

From [7], [8] and [9] the most extreme boundaries of the u-weights imply:

$$\{0 = \alpha + \beta \leq u \leq -\alpha + \beta = 1\} \to \{\alpha = -\beta = -0.5\} \qquad [9a]$$

Subtracting [2] from [1], because actual labour demand is defined as actual labour quantity traded the next *consistency conditions* are relevant:

$$ln\ \tilde{a}_s^f - ln\ \theta - ln\ \tilde{a}_d^f = (u_s - u_d)(ln\ \tilde{a}_s^p - ln\ \tilde{a}_d^p) \qquad [10]$$

Because the left-side member of this relation should be positive or equal to zero it follows:

$$(u_s - u_d) \geq 0 \text{ if } (ln\ \tilde{a}_s^p - ln\ \tilde{a}_d^p) > 0$$

$$(u_s - u_d) \leq 0 \text{ if } (ln\ \tilde{a}_s^p - ln\ \tilde{a}_d^p) < 0$$

This formulation of the core model and its implications in absolute, logarithmic and/or man-year terms can help to show how the authors have integrated the relevant results of equilibrium and disequilibrium analysis. It starts with the theoretical synthesis of the potential variables and actual variables as they appear in the core model. They achieve operationally the assumed 'real-world' adjustment processes by means of the weights and hyperbolic tangent functions of the tension on the potential labour market at a certain moment of time (year). Differentiation of the variables with respect to time yields the operational core model in terms of relative first differences. It plays the role of a bridge between the variables of the 21-equation system of the integral operational labour market model of chapter 6.

In addition to the equations of the dynamic core model and some other definitional equations with respect to the actual variables, the integral operational model merely consists of equations providing a theoretical explanation of the potential variables. Before they can be adapted for operational purposes, the

equations explaining the potential variables are established and developed in chapters 4 and 5. Here we find the mathematical formulation in terms of relative differences of the many processes of making decisions. These processes are based on the possibility of direct available information about the future for the economic agents or on the items of adaptive, rational or semi-rational expectations.[4]

In chapter 4 the authors' attention is devoted simply to the determinants of potential employment in industry. Government employment, 'frontier workers' and the group of employers, persons working on their own account, and unpaid family workers are considered exogenous. It allows them to equate the 'realized' values of the latter variables at the potential level to the registered ones at the actual level. Potential labour demand in industry has been based on the Harrod-technical progress-vintage production model idea of the clay-clay type. Well-known technical and economic scrapping conditions and spillover effects of disequilibria on the product and financial markets as important potential labour demand determinants are simultaneously introduced.

Chapter 5 deals with the main determinants of potential labour supply. Demographic, economic and psychological factors such as the rate of growth and the age composition of the population, real wages, working time and the degree of labour force participation play the dominant role. The core model, linking the main potential and actual labour market variables, only states in a global and implicit way what the market adjustment processes are. It expresses in an explicit way the presence of two distinct flexible reaction patterns of the two different groups of economic agents to discrepancies between their aggregated potential labour demand and labour supply.

In contrast with the number of equations of the integral labour market model, the two equations with respect to actual supply and actual demand [1, 2] demonstrate the very global way of covering the available theoretical information about adjustment processes in economic analysis. The main reason was that Lenderink and Siebrand saw problems on the empirical side of their labour market analysis.

Estimation of the coefficients and parameters of the integral labour market model requires retrospective empirical information about the potential and actual variables. The usual statistical problems concerning the empirical information required with respect to the actual variables are easily solved. However, the need for such information with respect to the potential labour demand and potential labour supply leads, because of a lack of reliable data, to more serious statistical problems. Obtaining direct information about the values of the poten-

4 A good recent survey of the literature on expectations in macroeconomic theory can be found in Sijben (1979).

tial variables by means of interview techniques gives rise to many difficulties, certainly in the underlying retrospective situation. It may be the main reason why disequilibrium analysis is much more developed in theoretical than in empirical studies. It may also be the reason why empirical analysis usually shows very sophisticated constructs in terms of macroeconometric models which at best secure a rather weak power of explanation of the real functioning of the labour market process. Especially, the testing of tension variables in the conventional Phillips curve analysis shows how unsatisfactory, both from theoretical and from empirical points of view, such approaches must be. For these reasons, the authors take the indirect approach, which consists of gathering the necessary information about the retrospective values of the potential variables. It means that their operational labour market model should allow simultaneously for the estimation of the coefficients and parameters of the integral model and for the approximation of the relevant unknown values of the potential labour demand and labour supply variables. The first-mentioned estimation has to be based on the latter data, taking into account the available retrospective (registered) values of the actual variables. This led to several successive estimation and determination (approximation) rounds by means of a convergent iteration procedure. As a determination model for the approximation round of the potential values the combination of the relevant equations of the integral model with regard to the potential variables can be used only if the coefficients and parameters of this model are already estimated. Therefore, in the first round they are set at corrected actual values. In the second part of chapter 6 the authors show that the estimation procedure in every round can be achieved by means of a linear regression model as the original non-linearity of the integral labour market model reduces to the linear case provided some parameters and basic values are predetermined. From the integral model, by means of substitution a two-equation system analogous to the dynamic version of [1] and [2] of the core model is derived for estimation purposes.

Chapter 7 is devoted to the performance and the final statistical results of the iteration procedure based on predetermined and registered figures of the Dutch labour market in the period 1952–1970. The 'best' solutions for the values of the potential variables and those for the coefficients and parameters are obtained in the seventh round in the sense that they had converged to a satisfactory level and that the values of the statistical parameters Var U, R^2 and D.W. were acceptable.

At the end of the same chapter the authors quote a remarkable agreement of their findings about the main determinants of the potential employment with those of authors like Den Hartog and Tjan (1974), in their Central Planning Bureau medium-term analysis of the postwar Dutch unemployment problem.[5]

5 A revised version of this paper has been published (Den Hartog and Tjan, 1976).

The most important conclusion for the Dutch postwar potential labour market level is perhaps that the change in potential employment in terms of man-hours virtually came to a standstill in the sixties. The relevant change in potential employment in terms of man-years was merely due to decreasing contractual working time (hours) per man-year. According to the authors this fact must be considered as the factor responsible for about fifty percent of the average change in actual employment (demand for labour in man-years). Over the whole sample period 1952–1970 the most important determinant on the potential labour supply side was a negative trend factor caused by both external migration and domestic factors which are further left unexplained. The latter determinant has had a mitigating influence on the rate of change of potential labour supply of about forty percent. Ultimately, it must be considered as the dominant mitigating factor for actual unemployment.

The evaluation and suggestions for further research made by the authors at the end of chapter 7 and in chapter 8 emphasize the consistency of their estimation results with their *a priori* expectations concerning the labour market situation in the Netherlands after the Second World War. For instance, their findings would be in accordance with the *a priori* feeling that during the sixties the Dutch potential unemployment was smaller than actual unemployment ($w_f^p < w^f$) while the reverse held for the earlier years. Furthermore, Lenderink and Siebrand suggest testing Phillips curve relations by means of their potential unemployment figures. These data can be considered to be more reliable concerning the real tensions on the labour market, which are not yet adapted by adjustment processes. The 'adapted' figures are the only ones being registered and investigated, until now, by the conventional analysis. The authors further suggest that this framework could be generalized to overall macroeconometric model building. It allows for consistent covering of disequilibrium situations and adjustment processes on the other markets analogous to those proposed for the labour market.[6]

In general, we agree that this approach can be used as an instrumental framework within which a consistent integration of demand and supply theory of equilibrium analysis with theoretical and empirical results of disequilibrium macro-research can take place. Besides, it allows for a simultaneous integration in overall macroeconomic building of the underlying ideas of conventional demand-oriented as well as supply-oriented macroeconomic models. By this, flexibility arises with regard to the analysis of the consequences of demand or supply dominancy at the various markets depending on the particular situations at hand.

6 An attempt to do this can be found in Hasselman (1977). Moreover, at the present moment we are working on a so-called *conjunctural-structural* model in which the same ideas are integrated in combination with the results of Schouten's (1978) paper.

2 DISCUSSION

The general analytical approach of Lenderink and Siebrand is certainly very promising. This is especially true of their innovative approach to disequilibrium analysis offering a new starting point for consistent empirical analysis of the labour market as well as of the interdependence of more markets within the economic system. However, we feel that some critical remarks are in order.

This was the main reason for reformulating the core model in the first section. We also produce some new data in what follows to be compared with the authors' original table 4 on page 92 and the appendix-E table on page 106. Summarizing them in our tables, they provide the basis for the following considerations:

1. In spite of the precise method, suggested by the authors when specifying their core model, the explicit integration of reaction processes of the two groups of economic agents at the potential and actual level only means a highly aggregative formulation of the implicit adjustment processes. The consequence must be that its theoretical explaining power is diminished enormously and can hardly tell us more than that the adjustment processes are mitigating factors on

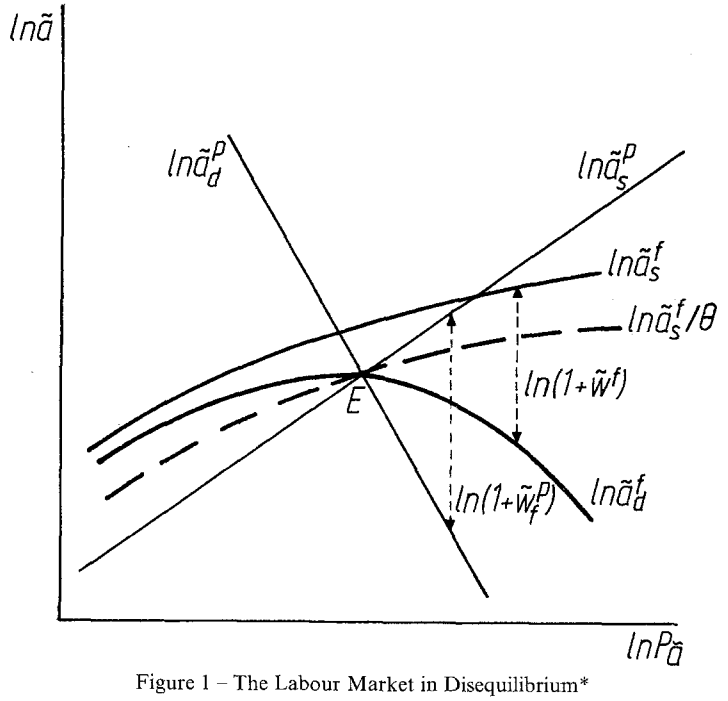

Figure 1 – The Labour Market in Disequilibrium*

* For the symbols, see section 1.

the labour market under all circumstances. However, in the present study even the latter weak conclusions cannot be drawn without restrictions, which are easy to verify from their graphical illustration that we reproduce (Figure 1), although this illustration is not a correct representation of the core model. Whereas the latter model deals with the potential and *actual activity* levels on the labour market, the model underlying Figure 1 deals with the potential activity and *effective intention* levels on the labour market. At least this is true for the left-sided domain of point E in the figure. It means that in Figure 1 potential excess demand can be mitigated by means of adaptive processes boiling down ultimately to a smaller effective excess demand, apart from the frictional unemployed effective labour supply. Using their definition of actual demand for labour as actual labour quantity traded or actual employment, an *ex post* situation of actual excess demand can never arise whether or not one disregards frictional unemployment. This fact implies the relevance of an *ex post* minimum rule on the actual labour market level, easily verified by means of conditions [10] formulated in the first section. It shows that if the applied model is dealing with potential excess demand, that is, $ln\ \tilde{a}_s^p - ln\ \tilde{a}_d^p < 0$ the difference between the weights should be negative or equal to zero, that is, $u_s - u_d \leq 0$ in order to deal with $ln\ (\tilde{a}_s^f/\theta) - ln\ \tilde{a}_d^f \geq 0$.

2. If we consider the empirical results, stated in the second part of their study, the authors refer to the contents of our Table 1, from which it should be clear that the seventh estimation round could be qualified as the best model-solving (estimation) result. The special predetermination problem about the choice of the parameters α, β, γ, δ, ε' and ε, essential for the computation of the weights u_s, u_d and their dynamic counterparts u_s^* and u_d^*, seems to be resolved by means of their actual choice *viz.*:

$$\alpha_s = -0.05;\ \alpha_d = -0.25;\ \beta_s = 0.80;\ \beta_d = 0.36;\ \gamma_s = 20.00;\ \gamma_d = 25.00;$$
$$\delta = 1.00;\ \varepsilon = -0.002 \text{ and } \varepsilon' = -0.0165$$

However, from equations [3a] to [5] and [7] to [9a], it is easy to verify that the chosen parameter values theoretically cover:

A. the possibility that in the most extreme case of *ex ante* excess labour supply the actual labour supply as well as the actual labour demand are still partially determined by the *ex ante* labour supply level, that is $u_s = 0.75$ and $u_d = 0.11$ – both values exceed the minimum value Min $(u) = 0$ in relation [8];

B. the possibility that in the most extreme case of *ex ante* excess labour demand the actual labour supply as well as the actual labour demand are still partially determined by the *ex ante* labour demand level, that is, $(1 - u_s) = 0.15$ and $(1 - u_d) = 0.39$. Both u values fall short of the maximum value Max $(u) = 1$ in relation [9].

TABLE 1 – DEMAND AND SUPPLY WEIGHTS

	Demand Analysis				Supply Analysis			
	Round 1	Round 2	Round 7		Round 1	Round 2	Round 7	
	u_d^*	u_d^*	u_d^*	u_d	u_s^*	u_s^*	u_s^*	u_s
1951	0.252	0.200	0.228	0.292	0.643	0.774	0.778	0.789
1952	0.024	0.068	0.070	0.179	0.592	0.746	0.746	0.769
1953	0.172	0.127	0.134	0.236	0.625	0.760	0.761	0.780
1954	0.370	0.283	0.289	0.324	0.671	0.788	0.789	0.794
1955	0.533	0.381	0.385	0.372	0.710	0.803	0.804	0.802
1956	0.619	0.457	0.462	0.412	0.730	0.816	0.816	0.808
1957	0.547	0.398	0.405	0.383	0.713	0.806	0.807	0.804
1958	0.252	0.184	0.183	0.267	0.643	0.771	0.771	0.785
1959	0.391	0.268	0.274	0.316	0.676	0.785	0.786	0.793
1960	0.570	0.400	0.414	0.387	0.718	0.806	0.809	0.804
1961	0.654	0.459	0.459	0.410	0.738	0.816	0.816	0.808
1962	0.666	0.542	0.535	0.452	0.741	0.830	0.829	0.815
1963	0.671	0.566	0.553	0.462	0.742	0.835	0.832	0.817
1964	0.690	0.600	0.591	0.487	0.746	0.841	0.839	0.821
1965	0.671	0.564	0.552	0.462	0.742	0.834	0.832	0.817
1966	0.619	0.533	0.526	0.447	0.730	0.829	0.827	0.814
1967	0.367	0.358	0.352	0.336	0.670	0.800	0.799	0.799
1968	0.404	0.359	0.360	0.360	0.679	0.800	0.800	0.800
1969	0.512	0.405	0.412	0.386	0.705	0.807	0.808	0.804
1970	0.573	0.476	0.477	0.419	0.719	0.819	0.819	0.810
α	−0.45	−0.25	−0.25		−0.10	−0.05	−0.05	
β	0.45	0.36	0.36		0.69	0.80	0.80	
γ	30.00	25.00	25.00		32.00	20.00	20.00	
δ	1.00	1.00	1.00		1.00	1.00	1.00	
$\varepsilon', \varepsilon$	−0.0165	−0.002	−0.002		−0.0165	−0.002	−0.002	

Source: Lenderink and Siebrand (1976, appendix E).

Although we believe that possibilities A and B as well as, in general, their implicit interpretations of the most extreme boundaries of the u-weights are highly questionable, the worst possibility allowed for by Lenderink and Siebrand was

C. the possibility $u_s - u_d = 0.24 > 0$ in the less or more extreme case of potential excess labour demand, that is, $ln\ \tilde{a}_s^p - ln\ \tilde{a}_d^p < 0$.

The latter possibility means a contradiction in terms with respect to conditions [10] that we derived in the first section. Considering furthermore that u_s and u_d

TABLE 2

	$\tilde{w}^p \equiv \tilde{w}_f^p - \bar{\tilde{w}}_f^p$	$\tilde{w}_f^p$	$\frac{\tilde{a}_s^p}{\tilde{a}_d^p}(a) =$ $= 1 + \tilde{w}^p + \varepsilon$	$\frac{\tilde{a}_s^p}{\tilde{a}_d^p} \equiv$ $\equiv \frac{1}{1 - \tilde{w}_f^p}$	$\tilde{w}^f$	$\frac{\tilde{a}_s^f}{\tilde{a}_d^f}(a) \equiv \frac{\tilde{a}_s^p}{\tilde{a}_d^p}(a) =$ $= 1 + \tilde{w}^f + \varepsilon'$
1951	0.0131	0.0111	1.0111	1.0112	0.0241	1.0076
1952	0.0393	0.0373	1.0373	1.0387	0.0361	1.0196
1953	0.0240	0.0220	1.0220	1.0224	0.0276	1.0111
1954	0.0078	0.0058	1.0058	1.0058	0.0195	1.0030
1955	0.0000	−0.0020	0.9980	0.9980	0.0134	0.9969
1956	−0.0063	−0.0083	0.9917	0.9917	0.0101	0.9936
1957	−0.0016	−0.0036	0.9964	0.9964	0.0129	0.9964
1958	0.0177	0.0157	1.0157	1.0159	0.0241	1.0076
1959	0.0091	0.0071	1.0071	1.0071	0.0187	1.0022
1960	−0.0023	−0.0043	0.9957	0.9957	0.0120	0.9955
1961	−0.0061	−0.0081	0.9919	0.9919	0.0087	0.9922
1962	−0.0133	−0.0153	0.9847	0.9849	0.0082	0.9917
1963	−0.0152	−0.0172	0.9828	0.9830	0.0080	0.9915
1964	−0.0202	−0.0222	0.9878	0.9782	0.0072	0.9907
1965	−0.0152	−0.0172	0.9828	0.9830	0.0080	0.9915
1966	−0.0123	−0.0143	0.9857	0.9859	0.0101	0.9936
1967	0.0026	0.0006	1.0006	1.0006	0.0196	1.0031
1968	*0.0020*	*0.0000*	*1.0000*	*1.0000*	*0.0182*	*1.0017*
1969	−0.0022	−0.0042	0.9958	0.9958	0.0142	0.9977
1970	−0.0077	−0.0097	0.9903	0.9903	0.0119	0.9954

Source: Lenderink and Siebrand (1976, table 4), plus some additional data.

are related directly to their dynamic counterparts u_s^* and u_d^* it becomes clear that the contradiction is still maintained if in the application model the dynamic weights are actually used. This remains true in spite of the possibility that the procedure of approximation to the ratios of the weights in the first-round estimation could actually imply by accident the absence of possibility C. Moreover, Table 1 shows $u_s - u_d > 0$ for the whole sample period. Therefore, we must conclude, in contrast with the authors' contention that there exists a large range of possibilities of variation for the determination functions of the static and dynamic weights, that the properties of the hyperbolic tangents [4a] and [4b] of the core model, combined with the aforestated parameter values, are such that:

A. Only if there is no tension on the potential labour market or if there exists potential excess supply, apart from ε' and ε, are the chosen parameter values consistent from the numerical point of view, but they remain at least questionable from the economic-theoretical point of view (see point 4).

TABLE 2 CONTINUED

$\frac{\tilde{a}_s^f}{\tilde{a}_d^f} \equiv$	$ln\left(\frac{\tilde{a}_s^p}{\tilde{a}_d^p}\right) \equiv$	$ln\left(\frac{\tilde{a}_s^f}{\tilde{a}_d^f}\right) \equiv$	$(\theta-1)/\theta = 0.0182$	$\tilde{w}_e^f = 0.0165$	$\bar{\tilde{w}}^f = 0.0152$
$\equiv \frac{1}{1-\tilde{w}^f}$	$\equiv ln\left(\frac{1}{1-\tilde{w}_f^p}\right)$	$\equiv ln\left(\frac{1}{1-\tilde{w}^f}\right)$	$\tilde{w}^f - 0.0182$	$\tilde{w}^f - 0.0165$	$\tilde{w}^f - 0.0152$
1.0246	0.0111	0.0243	0.0059	0.0076	0.0089
1.0374	0.0379	0.0367	0.0179	0.0196	0.0209
1.0283	0.0221	0.0279	0.0094	0.0111	0.0124
1.0198	0.0057	0.0196	0.0013	0.0030	0.0043
1.0135	−0.0020	0.0134	−0.0048	−0.0031	−0.0018
1.0102	−0.0083	0.0101	−0.0081	−0.0064	−0.0051
1.0130	−0.0036	0.0129	−0.0053	−0.0036	−0.0023
1.0246	0.0157	0.0243	0.0059	0.0076	0.0089
1.0190	0.0070	0.0188	0.0005	0.0022	0.0035
1.0121	−0.0043	0.0120	−0.0062	−0.0045	−0.0032
1.0087	−0.0081	0.0086	−0.0095	−0.0078	−0.0065
1.0082	−0.0152	0.0081	−0.0100	−0.0083	−0.0070
1.0080	−0.0171	0.0079	−0.0102	−0.0085	−0.0072
1.0072	−0.0220	0.0071	−0.0110	−0.0093	−0.0080
1.0080	−0.0171	0.0079	−0.0102	−0.0085	−0.0072
1.0102	−0.0142	0.0101	−0.0081	−0.0064	−0.0051
1.0199	0.0005	0.0197	0.0014	0.0031	0.0044
1.0185	*0.0000*	*0.0183*	*0.0000*	*0.0017*	*0.0030*
1.0144	−0.0042	0.0142	−0.0040	−0.0023	−0.0010
1.0120	−0.0097	0.0119	−0.0063	−0.0046	−0.0033

B. Not only for the extreme case but for the whole range of theoretical possibilities of potential excess demand are the chosen parameter values inconsistent with respect to conditions [10].

3. Table 2 shows that the sample period 1952–1970 (nineteen years) actually contains twelve years with potential excess demand, *viz.* during the years 1955–1957; 1960–1966 and 1969–1970. For these years we can conclude that the corresponding results reproduced in Table 3 must be inconsistent from theoretical as well as from empirical points of view. Because the weight values (u_s, u_d) are equated to the parameter values β_s, β_d, Table 1 and the core model show that 1968 was the only year of equilibrium on the Dutch potential labour market. The latter result as well as the empirical results with respect to the suggested years of potential excess supply on the Dutch labour market *viz.* those of 1952–1954; 1958–1959 and 1967 have become too questionable, particularly from the empirical point of view because of the tautological interdependence incorporated in the iteration procedure (see *e.g.* equations [5] and [6] of the core model).

4. The inconsistency of the results of Table 3 must be easy to verify in another way. Doing it now will give us moreover the possibility to show that the predetermined values of the parameters ε' and ε in the tension variable functions [5b] and [5c] of the core model seem to suffer from inconsistency.

Starting from 1968, suggested as the equilibrium year by equating the weight values to the values of the parameters β, that is, $u_s\,(1968) = u_s^*\,(1968) = \beta_s = 0.80$ and $u_d\,(1968) = u_d^* = \beta_d = 0.36$, we can use the core model to compute for the same year 1968 values of the most important variables. Although the aforementioned ε'-value (see point 2) has been used only in the first estimation round, the authors' interpretation of it, combined with their interpretation of the ε-value, shows, by using the core model equations, that for 1968:

$$\tilde{w}^p = 0.0020;\ \tilde{w}_f^p = 0.00;\ \frac{\tilde{a}_s^p}{\tilde{a}_d^p}(a) = 1.000;\ \frac{\tilde{a}_s^p}{\tilde{a}_d^p} = 1.000;\ ln\left(\frac{\tilde{a}_s^p}{\tilde{a}_d^p}\right) = 0.000;$$

$$\tilde{w}^f = 0.0182;\ \frac{\tilde{a}_s^f}{\tilde{a}_d^f}(a) = 1.0017;\ \frac{\tilde{a}_s^f}{\tilde{a}_d^f} = 1.0185;\ ln\left(\frac{\tilde{a}_s^f}{\tilde{a}_d^f}\right) = 0.0183;$$

$$\tilde{w}^f - 0.0182 = 0.0;\ \tilde{w}^f - \tilde{w}_e^f = 0.0017;\ \tilde{w}^f - \bar{\tilde{w}}^f = 0.0030.$$

Acceptance of these 1968 values implies that the value of the actual constant correction factor for actual total labour supply θ, appearing in relations [1] and [10], equals 1.0185, or frictional unemployment, $(\theta - 1)/\theta$, equals 0.0182 or 1.82%. Under this circumstance the authors' choice for $\varepsilon' \equiv -0.0165 \equiv -\tilde{w}_e^f$ leads to the inconsistency that frictional unemployment exceeds equilibrium unemployment by 0.17% (see the last three columns of Table 2). The same situation holds for the actual unemployment rates during the years mentioned in point 3 dealing with potential excess labour demand, that is, $0.0182 - \tilde{w}^f > 0$. Moreover, the same is true for the sample-average actual unemployment rate, that is, $0.0182 - \bar{\tilde{w}}^f = 0.0182 - 0.0152 = 0.0030$. The authors' interpretation of $\varepsilon = -0.002$ as the value of the sample-average potential unemployment rate, *i.e.* there exists a sample-average potential excess demand, should inevitably lead to an inconsistent average result with respect to conditions [10]. For, we are dealing on the average during the sample period with possibility C and its implications considered in our comments (point 2).

The only remaining possibility is to accept the original (registered) values for actual unemployment during the sample period and to reject 1968 as an equilibrium year. Similarly, the estimated values of the weights as well as those of the potential variables of the core model must be rejected. In the same way rejection of the final estimates of the coefficients of the integral labour market model follows.

TABLE 3

	Change in potential unemployment ratio versus change in actual unemployment ratio			Potential unemployment ratio versus actual unemployment ratio		
	$\Delta\tilde{w}^p$	$\Delta\tilde{w}^f$	$\Delta\tilde{w}^p - \Delta\tilde{w}^f$	$\tilde{w}^p$	$\tilde{w}^f - \bar{\tilde{w}}^f$	$\tilde{w}^p - \tilde{w}^f + \bar{\tilde{w}}^f$
1952	2.62	1.20	1.42	3.93	2.09	1.84
1953	−1.54	−0.85	−0.69	2.40	1.24	1.16
1954	−1.61	−0.81	−0.80	0.78	0.43	0.35
1955	−0.78	−0.61	−0.17	0.00	−0.18	0.18
1956	−0.64	−0.33	−0.31	−0.63	−0.51	−0.12
1957	0.47	0.28	0.19	−0.16	−0.23	0.07
1958	1.93	1.12	0.81	1.77	0.89	0.88
1959	−0.86	−0.54	−0.32	0.91	0.35	0.56
1960	−1.14	−0.67	−0.47	−0.23	−0.32	0.09
1961	−0.38	−0.33	−0.05	−0.61	−0.65	0.04
1962	−0.72	−0.05	−0.67	−1.33	−0.70	−0.63
1963	−0.19	−0.02	−0.17	−1.52	−0.72	−0.80
1964	−0.49	−0.08	−0.41	−2.02	−0.80	−1.22
1965	0.50	0.08	0.42	−1.52	−0.72	−0.80
1966	0.28	0.21	0.07	−1.23	−0.51	−0.72
1967	1.50	0.95	0.55	0.26	0.44	−0.18
1968	−0.07	−0.14	0.07	0.20	0.30	−0.10
1969	−0.42	−0.40	−0.02	−0.22	−0.10	−0.12
1970	−0.55	−0.23	−0.32	−0.77	−0.33	−0.44
Mean value	−0.11	−0.06	−0.05	0.00	0.00	0.00
Variance	1.18	0.34	0.28	2.07	0.56	0.52

Source: Lenderink and Siebrand (1976. table 4). Variables are here expressed in percentage terms.

5. Given the previous remarks it remains to conclude that an evaluation of the empirical results produced in the study and their test by means of comparison with *a priori* notions, as the authors did, cannot be fruitful. Instead, suggestions for revisions of certain aspects of the theoretical and the empirical basis of the application model will be made. In accordance with the econometric approach of Lenderink and Siebrand, including the implicit determination method of the values of the potential variables in the core model, there is a need to determine the boundaries of the u-weights not only by condition [7] as the authors do, but also by the conditions [10]. Moreover one must reconsider the meaning of them as

well as of the corrective unemployment factor θ. In contrast with the authors' remark, alternative assumptions of the level of actual employment for a wage level consistent with potential labour market equilibrium, such as the ones made by Hansen (1957), really are relevant in the sense that they can affect the results of the analysis. In the present context it means that assumptions formulated in either absolute terms or in first differences always have to satisfy the condition $(\theta - 1)/\theta \leq \bar{\tilde{w}}^f$, $\tilde{w}^f$ and $\tilde{w}_e^f$. Which alternative assumption would be the best one merely depends on the *ex post* knowledge that is available about these actual variables. If there is less-uncertain information on $\tilde{w}^f$, $\bar{\tilde{w}}^f$ and $\tilde{w}_e^f$ in the present disequilibrium analysis of the Dutch labour market compared to the availability of information on $(\theta - 1)/\theta$, one may solve this problem in principle in two different ways. On the one hand, one could try to obtain more-certain information about the corrective actual unemployment rate according to direct and indirect approaches dealing with explicit or implicit information techniques. The implicit way of gaining the information could again be integrated in the application model, as has been done for the potential variables of the core model.[7] On the other hand, one could make, in a more or less arbitrary way, a choice based on the already-known (registered) numerical values of the unemployment rates, thereby taking into account the aforementioned minimum rule. In the present case it implies that the $(\theta - 1)/\theta$ value (s) could be less than or equal to the lowest unemployment rate in the sample period (equal to 0.72%), that is, less than or equal to the actual unemployment rate in 1964 (see Table 2).

Note, however, that these two ways of solving the consistency and certainty problems with respect to the corrective unemployment factor will not improve the theoretical power of the present version of the authors' application model. For the simultaneous integration of the implicit determination method in the application model with the explicit estimation method logically implies at best that the estimation can only tell us afterwards to what extent the *a priori* knowledge incorporated in the iterative application model satisfies at least conditions of statistical and theoretical consistency. It only proves the existence of a possibility to show which *a priori* known determinants of demand for and supply of labour could have been relevant on the Dutch labour market. Moreover, it only proves the existence of a possibility to show how *a priori* known global adjustment processes could have taken care of the transactions that have taken place in the Netherlands, boiling down ultimately to the registered labour market figures in the sample period 1952–1970. The possibility to overcome to a greater extent this problem of 'unreal' verification will consist of the introduction

7 We are certainly not objecting to the introduction in the model of the distinct corrective labour supply factors on the actual as well as on the potential level of the labour market. However, they should not be integrated as constants but as variables.

of the direct approach to the process of gaining information about the retrospective values of all the model variables, the potential ones included. On the latter data significant estimation of the integral model coefficients can, in principle, take place. In these circumstances testing the theoretical basis of the labour market process, and in general, of the whole economic process, can be conducted along lines similar to those of Lenderink and Siebrand. When such work is completed and consequently such models have been constructed, one can use in the future the same models for more objective (implicit) investigation on retrospective values of the potential variables than can be performed by means of direct information techniques.[8] Of course, the latter situation may hold if well-known conditions of stability are met by the 'real world' economic process. As we know, the same would be true as regards the possibility for prediction, *i.e.* determination, of prospective values, not only for actual, but also for potential variables.

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8 Application of such implicit determination methods can be found, *e.g.*, in Meulendijks (1972), and more recently in Fase and Huijser (1978).

Summary

DISEQUILIBRIUM ANALYSIS OF THE LABOUR MARKET: REVIEW AND COMMENTS

The article has been divided into two main parts. The first consists of a review and an evaluation of Lenderink and Siebrand's analytical and empirical approaches to the short-run phenomena on the Dutch labour market during the period 1952–1970. The main implications are explicitly stated and show how the authors have integrated the relevant results of equilibrium and disequilibrium analysis. It appears that the general analytical approach of Lenderink and Siebrand certainly is very promising. From the comments in the second part it becomes clear that the authors' main empirical results should be rejected. Some new data are produced to be compared with the originally presented data. They provide the basis for emphasizing that the original analysis does not satisfy some theoretical and empirical consistency conditions. Therefore, suggestions for revision of some aspects of Lenderink and Siebrand's study are recommended.