What are the Short-Run Effects of Increasing Labor Market Flexibility?*

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Abstract: This paper evaluates the short-run effects of introducing labor market flexibility to an economy characterized by large firing taxes. Different reforms are considered: 1) eliminating all firing taxes, 2) introducing flexible new contracts while retaining the firing taxes on workers employed previous to the reform, and 3) introducing temporary contracts. The paper finds that eliminating all firing taxes increases the unemployment rate much more in the short run than in the long run, that introducing new flexible contracts has similar effects as eliminating all firing taxes, and that introducing temporary contracts of short durations can decrease the unemployment rate, but only in the short-run.

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1. Introduction

After years of imposing policies that penalize employers for firing workers, several countries have been questioning the desirability of these policies and have introduced, or are considering to introduce, reforms that will bring flexibility to their labor markets (examples are Argentina and Spain). While the long run effects of eliminating firing restrictions have been extensively analyzed in the literature (e.g. Bentolila and Bertola [4], Hopenhayn and Rogerson [5], Millard and Mortensen [7], Alvarez and Veracierto [1], [2], [3]) their short run consequences have not. An exception is Veracierto [9] who studied the short run effects of eliminating firing taxes in the Hopenhayn and Rogerson's framework. However, by considering a frictionless economy, that paper was unable to evaluate the effects on unemployment. Determining the short run effects on unemployment is a key policy issue because countries that typically adopt this type of reforms not only have high structural unemployment, but are in the middle of severe recessions (Argentina is a clear example). The goal of this paper is to determine these effects. Since there are different ways of introducing flexibility to the labor markets, the paper evaluates several of the main alternatives available.

The model used is a version of Alvarez and Veracierto [3], which in turn is based in the search model of McCall [8] and in the equilibrium unemployment model of Lucas and Prescott [6].[1] Production in the economy is done by a large number of sectors that use labor as the only input of production in a constant returns to scale technology. The sectors of production are subject to idiosyncratic productivity shocks that are identically and independently distributed across them and that follow a Markov process over time. At the beginning of each period workers are distributed in some given way across the sectors of production. After the productivity shocks are realized, workers must decide whether to leave the sectors where they are currently located, becoming non-employed, or to stay in those sectors and

[1]This paper extends Alvarez and Veracierto [3] by analyzing the short run effects of firing taxes and temporary contracts.

work. Agents that work start the following period in the same sectors where they are currently located. Non-employed agents have two alternatives: to search for a new job or to perform home production. If an agent searches for a new job, he randomly arrives to one of the production sectors at the begining of the following period. If an agent performs home production, he continues to be non-employed during the following period. Given that agents are risk-neutral, they seek to maximize the expected discounted value of their earnings. Labor markets are competitive: within each sector of production, both firms and workers take the wage rate as given.

Different labor market regimes are considered. The first regime is one of *laissez-faire*, where the government does not intervene in labor markets. The second regime is one where the government imposes a tax on employment destruction which is rebated to the families as a lump sum transfer. The third regime introduces a reform that moves the previous economy towards *laissez-faire*, but in a limited way. In particular, the separation taxes are eliminated only from the new contracts: the contracts that were signed previous to the reform continue to be subject to the taxes. The fourth regime introduces temporary contracts. Under these contracts, the taxes on employment destruction do not apply for workers that leave their sectors of production before a certain trial period is over.

The model is parametrized to reproduce important observations for the Argentinian economy. In particular, the model is calibrated under the large firing costs that characterize that economy. In turn, the technology and preference parameters are chosen to reproduce the interest rate, the unemployment rate, the labor force participation and the elasticity of labor supply observed in Argentina. Under such parametrization, the model is simulated to evaluate how Argentina would react under different the different labor reforms.

The paper is organized as follows. Section 2 describes the economy, Section 3 describes a competitive equilibrium without interventions, Section 4 describes an equilibrium with firing costs, Section 5 describes a regime that introduces flexibility in the new contracts,

Section 6 describes an equilibrium with temporary contracts, Section 7 calibrates the model to Argentinian observations, Section 8 simulates the model and reports the results, and Section 9 concludes the paper.

2. The model

The economy is populated by a continuum of agents with names in the interval $[0, 1]$. Their preferences are given by the following utility function:

$$E\left\{\sum_{t=0}^{\infty} \beta^t \left[c_t + h_t\right]\right\}$$

where $0 < \beta < 1$ is the discount factor, c_t is consumption of the market good and h_t is consumption of the home good.

In each period of time, an agent can be in the market sector or in the home sector, but not in both. Agents differ in how productive they are in the home sector. In particular, agents are distributed across home productivity levels according to a distribution function ϕ, where $\phi(h)$ is the fraction of agents that have a home productivity larger than h. Hereon, we will assume that home productivities take values in the set $[0, \bar{h}]$ and that the distribution function ϕ has the following functional form:

$$\phi(h) = 1 - Ah^{\xi}$$

where $\xi \geq 0$, and $A = \bar{h}^{-\xi}$. The advantage of this functional form is that it will give rise to a constant elasticity of labor force participation.

The market good is produced in a continuum of production sectors. Each sector has a linear production function given by

$$y_t = F(z_t, g_t) \equiv z_t g_t$$

where y_t is output, g_t is the labor input, and z_t is an idiosyncratic productivity shock to the sector. The idiosyncratic shock evolves according to the following AR(1) process

$$\ln z_{t+1} = a + \rho \ln z_t + \varepsilon_{t+1}$$

where $\varepsilon_{t+1} \sim N(0, \sigma^2)$, and $0 < \rho < 1$. We assume that the realizations of z_t are independent across the sectors. Throughout the paper we will denote as Q the transition function for z_t.

At the beginning of every period, the agents that participated in the labor market during the previous period are distributed in a certain way across the production sectors. An important characteristic of the economy is that it is difficult to reallocate agents across the production sectors. In particular, each sector is constrained not to employ more than the total of agents x_t present in the sector at the beginning of the period. If an agent stays in the sector where he is currently located, he produces market goods and starts the following period in the same sector. On the other hand, if the agent leaves the sector he becomes non-employed.

A non-employed agent has two alternatives. First, he can leave the labor force and produce home goods during the current period. The following period the agent will remain non-employed. The second alternative is to search for a new employment. If the agent chooses this alternative, he obtains cero home production during the current period, but is randomly assigned to one of the production sectors at the beginning of the following period. An important feature of the search technology is that agents have no control upon what sector they will arrive to (in this sense, search is "undirected"). In particular, we will assume that the agents that search for employment are assigned uniformly across all the sectors of the economy. Hereon we will refer to the agents that produce home goods as "being out of the labor force", to the agents working in the sectors of production as "employed" and to the agents that search as "unemployed".

We will now describe the resource feasibility conditions for this economy. Observe that each sector is indexed by its current productivity shock z and the total of agents x available in the beginning of the period. Feasibility requires that the employment of a sector of type (x, z) during period t, denominated $g_t(x, z)$, cannot exceed the number of agents available

to the sector, that is

$$g_t(x,z) \leq x.$$

The number of agents in the sector at the beginning of the following period x', is given by

$$x' = U_t + g_t(x,z)$$

where U_t is the total of unemployment in the economy during period t. Observe that this equation uses the fact that unemployed agents are uniformly assigned across all sectors of the economy.

Given the current distribution μ_t of sectors across duples (x,z), the employment decisions $g_t(x,z)$ and the number of agents that search U_t, the next period distribution μ_{t+1} satisfies

$$\mu_{t+1}(X',Z') = \int_{\{(x,z):\ g_t(x,z)\ +\ U_t\ \in\ X'\}} Q(z,Z')\,\mu_t(dx \times dz)$$

for every measurable set $X' \times Z'$. This equation says that the next period's measure of sectors with a number of agents in the set X' and a productivity shock in the set Z' is given by the number of sectors that transit from their current shocks to a shock in the set Z' and choose an employment level such that x' is in the set X'.

Aggregate employment N_t is then given by

$$N_t = \int g_t(x,z)\,\mu_t(dx \times dz)$$

and the production of market goods is given by

$$C_t = \int F(g_t(x,z),z)\,\mu_t(dx \times dz).$$

These two expressions are obtained by summing the corresponding magnitudes across all sectors in the economy.

Home production is given by

$$H_t = \int_{[\underline{h},\bar{h}]} h\phi(dh)$$

where $\underline{h}_t$ is the lowest home productivity of the agents that stay in the home sector.

Finally, feasibility in the labor market requires that

$$U_t + N_t + \phi\left(\underline{h}_t\right) = 1.$$

That is, that total unemployment, plus total employment, plus the total number of agents that stay in the home sector, equals the size of the population.

3. A laissez-faire equilibrium

Within each of the production sectors, it is assumed that there are competitive labor markets. As a consequence, the wage rate in a sector of type (x, z) is given by the marginal productivity of labor z. The agents' problem is to maximize the expected present value of wages plus home production. For simplicity, we start by describing a stationary equilibrium.

Given that the differences in home productivities are permanent, it is clear than in a stationary equilibrium there will be two groups of agents: those that will always participate in market activities, and those that will always do home production. Consider first the decision problem of an agent that always participates in market activities. Suppose that the agent starts the period in a sector of type (x, z) and must decide between staying or leaving. If the agent decides to stay, he earns the competitive wage rate z and starts the following period in the same sector (where the next period productivity is randomly determined according to the transition function Q). If the agent decides to leave the sector, he searches, obtaining an expected value equal to θ.[2] His problem is then described by the following Bellman equation:

$$v(z) = \max\left\{\theta, z + \beta \int v\left(z'\right) Q\left(z, dz'\right)\right\} \tag{3.1}$$

where $v(z)$ is the expected value of starting the period in a sector of type (x, z). Observe that this value is independent of the quantity of agents x in the sector.

[2]The value of θ is endogenous, determined at equilibrium.

The equilibrium employment level in the sector is then given by

$$g(x,z) = \left\{ \begin{array}{c} x, \text{ if } z + \beta \int v\left(z'\right) Q\left(z, dz'\right) > \theta \\ 0, \text{ otherwise} \end{array} \right\} \tag{3.2}$$

That is, all the agents in the sector stay if the present value in the sector is larger than the value of search, and all agents leave if the relation is the opposite (the case $z+\beta \int v\left(z'\right) Q\left(z, dz'\right) = \theta$ happens in a measure cero of sectors).

Let η be the invariant distribution of sectors across idiosyncratic productivity shocks. That is, η satisfies

$$\eta\left(Z'\right) = \int_{Z'} Q\left(z, Z'\right) \eta\left(dz\right)$$

for every measurable set Z'. The value of search is then given by

$$\theta = \beta \int v\left(z\right) \eta\left(dz\right) \tag{3.3}$$

given that agents have no control over what sectors they are going to find.

Substituting this expression in (3.1) gives the following functional equation for v:

$$v(z) = \max\left\{ \beta \int v\left(z\right) \eta\left(dz\right), z + \beta \int v\left(z'\right) Q\left(z, dz'\right) \right\}$$

Given the solution v to this functional equation, the value of search is obtained from (3.3) and the employment rule from (3.2).

Clearly, all agents with a home productivity larger than $\theta\left(1-\beta\right)$ will prefer to stay at home forever, and all agents with a home productivity lower than $\theta\left(1-\beta\right)$ will prefer to participate in market activities forever. For this reason, the number of agents out of the labor force is given by $\phi(\theta\left(1-\beta\right))$.

To complete the stationary equilibrium we must find the number of agents that search U. This quantity solves the condition that total employment, plus the total number of agents out of the labor force, plus total unemployment, equals the size of the population:

$$\int g\left(x,z\right) \mu\left(dx \times dz\right) + \phi(\theta\left(1-\beta\right)) + U = 1 \tag{3.4}$$

where μ is the invariant distribution that satisfies

$$\mu(X', Z') = \int_{\{(x,z):\ g(x,z)\ +\ U\ \in\ X'\}} Q(z, Z')\, \mu(dx \times dz).$$

Observe that μ also depends on U.

3.1. Transitionary dynamics

In general, the transitionary dynamics of this economy is quite complicated. However, there is a case in which it is very simple. This is the case where all agents that are located in the market sector at the beginning of period cero, have a home productivity lower than the reservation value $\theta(1-\beta)$ that satisfies equation (3.3). In this case we know that all agents that are initially in sectors of production want to remain in market activities: if they leave their sectors, it is only to search for new employment.

Starting from the initial distribution μ_0 of sectors across number of agents x and idiosyncratic shocks z, the dynamics of this economy is given by two equations. For every $t \geq 0$, the number of agents that search U_t is given by

$$U_t = 1 - \phi(\theta(1-\beta)) - \int g(x,z)\, \mu_t(dx \times dz)$$

and the distribution of sectors μ_{t+1} is given by

$$\mu_{t+1}(X', Z') = \int_{\{(x,z):\ g(x,z)\ +\ U_t\ \in\ X'\}} Q(z, Z')\, \mu_t(dx \times dz)$$

where θ satisfies (3.3) and $g(x,z)$ satisfies (3.2). Observe that labor force participation is constant along the transition.

Fortunately, this simple case is the one that will hold in our analysis of labor market policies. The reason is that all policies to be considered will increase labor force participation.

4. Firing costs

In this section we describe a competitive equilibrium with firing costs. The firing costs are a tax τ that the government imposes every time that a worker separates from his employment.

The government rebates the tax revenues to households, as a lump sum transfer. Alvarez and Veracierto [3] show in an economy similar to this, that the equilibrium is the same independently of who pays the separation costs (if it is the firms or the workers). The only variables affected are the equilibrium wages. Given this equivalence, and given that the equilibrium where workers pay the separation costs is simpler to describe, this is the case that we will consider here. Even though the separation costs are payed by the workers, we will call them "firing costs" hereon. We start by describing a stationary equilibrium.

Observe that in each sector of production we must distinguish between two types of agents. Those that worked in the sector during the previous period, and those that have just arrived. The problem of an agent that worked the previous period in a sector that now is of type (x, z), is the following:

$$v_p(z) = \max\left\{z + \beta \int v_p(z')\, Q(z, dz'), \theta - \tau\right\} \tag{4.1}$$

where θ is the value of search and τ is the separation tax.

The problem of an agent that has just arrived to the sector is the following:

$$v_n(z) = \max\left\{z + \beta \int v_p(z')\, Q(z, dz'), \theta\right\}. \tag{4.2}$$

Observe that a newly arrived agent does not have to pay the tax if he leaves the sector during the current period, but if he stays, he becomes subject to the separation tax in the following period.

The value of search satisfies

$$\theta = \beta \int v_n(z)\, \eta(dz) \tag{4.3}$$

Substituting this expression in [4.1] and [4.2], we can solve for the value functions v_p and v_n.

The state of a sector is the total of agents x at the beginning of the period, the total of newly arrived agents U, and the current productivity shock z. The equilibrium employment rule is given by

$$g(U,x,z)=\left\{\begin{array}{c} x,\text{ if } z+\beta\int v_p(z')\,Q(z,dz')>\theta \\ x-U,\text{if } \theta>z+\beta\int v_p(z')\,Q(z,dz')>\theta-\tau \\ 0,\text{ if } \theta-\tau>z+\beta\int v_p(z')\,Q(z,dz') \end{array}\right\}. \tag{4.4}$$

The first case is when the value of being employed in the sector is so large that even the newly arrived agents want to stay. The last case is when the value of employment is so low that even the agents that were employed in the sector during the previous period, prefer to pay the tax and leave the sector. When the value of employment is between $\theta-\tau$ and θ, the newly arrived agents leave the sector and the previously employed agents stay.

Feasibility in the labor market requires that

$$\phi(\theta(1-\beta))+\int g(U,x,z)\,\mu(dx\times dz)+U=1 \tag{4.5}$$

where μ is the invariant distribution that satisfies

$$\mu(X',Z')=\int_{\{(x,z):\ g(U,x,z)+U\in X'\}} Q(z,Z')\,\mu(dx\times dz).$$

The description of the transitionary dynamics is analogous to that in Section 3.1, as long as all agents that are in the market sector at the beginning of period cero have a home productivity lower than $\theta(1-\beta)$. The initial state of the economy in period cero is the initial distribution μ_0 of sectors across duples (x,z) and the number of new arrivals U_{-1}. Thereon, for every $t\geq 0$ the quantity of agents that search U_t is given by the equation

$$U_t=1-\phi(\theta(1-\beta))-\int g(U_{t-1},x,z)\,\mu_t(dx\times dz)$$

and the distribution of sectors μ_{t+1} is given by

$$\mu_{t+1}(X',Z')=\int_{\{(x,z):\ g(U_{t-1},x,z)+U_t\in X'\}} Q(z,Z')\,\mu_t(dx\times dz)$$

where θ satisfies (4.3) and $g(U_{t-1},x,z)$ satisfies (4.4).

5. New flexible contracts

In each sector, workers are subject to two types of contracts: old and new. The old contracts impose firing costs. The new don't. After leaving the sectors where they have been employed under old contracts, workers find employment under the new contracts. The new contracts never become old. As a consequence, the number of workers subject to the old contracts decreases over time.

The state of a sector is given by (n, p, z) where n is the number of agents subject to the new contracts (including the new arrivals to the sector) and p is the number of agents subject to the old contracts.

The problem of an agent under an old contract is the following:

$$v_p(z) = \max\left\{z + \beta \int v_p(z')\, Q(z, dz'), \theta - \tau\right\}$$

where θ is the value of search and τ is the separation tax

The problem of an agent under a new contract is the following:

$$v_n(z) = \max\left\{z + \beta \int v_n(z')\, Q(z, dz'), \theta\right\}.$$

The value of search satisfies

$$\theta = \beta \int v_n(z)\, \eta(dz) \tag{5.1}$$

given that the new arrivals become employed under the new contracts.

Substituting this expression for θ in the expressions above, we can solve for the value functions v_p and v_n.

The equilibrium employment rules are given by

$$g_p(p, z) = \left\{ \begin{array}{l} p, \text{ if } z + \beta \int v_p(z')\, Q(z, dz') > \theta - \tau \\ 0, \text{ if } \theta - \tau > z + \beta \int v_p(z')\, Q(z, dz') \end{array} \right\} \tag{5.2}$$

$$g_n(n,z) = \left\{ \begin{array}{l} n, \text{ if } z+\beta\int v_n(z')\,Q(z,dz') > \theta \\ 0, \text{ if } \theta > z+\beta\int v_n(z')\,Q(z,dz') \end{array} \right\}. \tag{5.3}$$

This rules simply state that in each sector of production and for each type of contracts, the total number of agents stay or leave the sector depending on whether the value of staying is larger than the value of leaving.

Feasibility in the labor market requires that

$$\phi(\theta(1-\beta)) + \int g_n(n,z)\,\mu_n(dn\times dz) + \int g_p(p,z)\,\mu_p(dp\times dz) + U = 1 \tag{5.4}$$

where μ_n is the invariant distribution that satisfies

$$\mu_n(N',Z') = \int_{\{(n,z):\ g_n(n,z)\,+\,U\,\in\,N'\}} Q(z,Z')\,\mu_n(dn\times dz)$$

and μ_p is the invariant distribution that satisfies

$$\mu_p(P',Z') = \int_{\{(p,z):\ g_p(p,z)\,\in\,P'\}} Q(z,Z')\,\mu_p(dp\times dz).$$

Observe that under the transition function Q, we have that $\mu_p(P,Z) = 0$ if $0 \notin P$, and $\mu_p(P,Z) = \eta(Z)$ if $0 \in P$. That is, all workers under old contracts end up leaving their initial sectors of production (in the long run, no sector keeps workers employed under old contracts).

The description of the transitionary dynamics is analogous to that in Section 3.1, as long as all agents in the market sector at the beginning of period cero, have home productivities lower than $\theta(1-\beta)$. The initial state of the economy in period cero is the initial distribution $\mu_{n,0}$ of sectors across duples (n,z) and the initial distribution $\mu_{p,0}$ of sectors across pairs (p,z). Thereon, for every $t \geq 0$ the number of agents that search U_t is given by

$$U_t = 1 - \phi(\theta(1-\beta)) - \int g_n(n,z)\,\mu_{n,t}(dn\times dz) - \int g_p(p,z)\,\mu_{p,t}(dp\times dz)$$

and the distributions $\mu_{n,t+1}$ and $\mu_{p,t+1}$ are given by

$$\begin{aligned} \mu_{n,t+1}(N',Z') &= \int_{\{(n,z):\ g_n(n,z)\,+\,U_t\,\in\,N'\}} Q(z,Z')\,\mu_{n,t}(dn\times dz) \\ \mu_{p,t+1}(P',Z') &= \int_{\{(p,z):\ g_p(p,z)\,\in\,P'\}} Q(z,Z')\,\mu_{p,t}(dp\times dz). \end{aligned}$$

Of special interest is the case where the initial state of the economy corresponds to the stationary equilibrium under firing costs of the previous section.[3] Let μ^* be the invariant distribution over pairs (x, z), and U^* the number of agents that search in that type of equilibrium. The initial state of the economy that we will want to consider is given as follows. The initial distribution $\mu_{n,0}$ satisfies

$$\mu_{n,0}(N, Z) = \left\{ \begin{array}{c} \eta(Z), \text{ if } U^* \in N \\ 0, \text{ otherwise} \end{array} \right\}$$

i.e. all sectors initially have U^* workers subject to new contracts. On the other hand, the initial distribution $\mu_{p,0}$ satisfies

$$\mu_{p,0}([0, x - U^*], Z) = \mu^*([0, x], Z), \text{ for every } x \geq U^*$$

i.e. a sector that was of type (x, z) in the equilibrium of the previous section, will initially have $x - U^*$ workers under old contracts (the total number of agents at the beginning of the period, less the new arrivals to the sector).

6. Temporary Contracts

Under the temporary contracts regime, the government imposes the firing cost τ only over the agents that have been employed in the same sector for J or more periods. Agents with tenure lower than J are exempt from the firing cost. Hereon, we will refer to $J - 1$ as the trial period of the temporary contracts.

We will denote $v(j, z)$ to be the value of an agent with tenure j in a sector with productivity shock z. This function satisfies

$$v(J, z) = \max \left\{ z + \beta \int v(J, z') Q(z, dz'), \theta - \tau \right\}$$

[3] In Section 8 we will want to evaluate the effects of different labor market reforms in an economy that has always been subject to firing costs.

$$v(j,z) = \max\left\{ z + \beta \int v(j+1, z') Q(z, dz'), \theta \right\}, \text{ for } j = 0, \ldots, J-1$$

Observe that agents with tenure lower than J don't have to pay the firing cost τ.

The value of search satisfies

$$\theta = \beta \int v(0, z) \eta(dz) \tag{6.1}$$

given that agents arrive to the sectors with a tenure equal to cero.[4]

Substituting this expression for θ in the above expressions, we can solve for the value functions $v(j,z)$ for $j = 0, 1, \ldots, J$.

The state of a sector is a vector $T = (T_0, T_1, \ldots, T_{J-1}, T_J)$ describing the number of agents of each tenure in the sector, and the current productivity shock z.

Defining $x = \sum_{i=0}^{J} T_i$ to be the total number of agents in the sector, we can write the employment rule as follows:

$$g(T,z) = \left\{ \begin{array}{c} x, \text{ if } z + \beta \int v(J, z') Q(z, dz') > \theta \\ x - T_{J-1}, \text{if } z + \beta \int v(J-1, z') Q(z, dz') > \theta > z + \beta \int v(J, z') Q(z, dz') \\ x - T_{J-1} - T_{J-2}, \text{if } z + \beta \int v(J-2, z') Q(z, dz') > \theta > z + \beta \int v(J-1, z') Q(z, dz') \\ \cdot \\ \cdot \\ \cdot \\ T_J + T_0, \text{ if } z + \beta \int v(1, z') Q(z, dz') > \theta > z + \beta \int v(2, z') Q(z, dz') \\ T_J, \text{if } z + \beta \int v(J, z') Q(z, dz') > \theta - \tau \text{ and if } \theta > z + \beta \int v(1, z') Q(z, dz') \\ 0, \text{ if } \theta - \tau > z + \beta \int v(J, z') Q(z, dz') \end{array} \right\}$$

In the first case, the value of staying in the sector is so high that even the agents that are about to become permanent prefer to stay. In the second case the value of staying is not sufficiently high for agents with tenure $J-1$, but it is for agents with tenure lower than $J-1$. Observe that the first agents to leave are those with tenure $J-1$, then those with

[4] When $J = 1$, the equilibrium is the same as in Section 4.

tenure $J-2$, and so on up to those with tenure cero. Only once all temporary workers have left the sector is that the permanent workers will consider to leave (see the last case).

The number of agents U that search in the stationary equilibrium must satisfy

$$\phi(\theta(1-\beta)) + \int g(T,z)\,\mu(dT \times dz) + U = 1 \tag{6.2}$$

where μ is the invariant distribution given by

$$\mu(S,Z') = \int_{\{(T,z):\ \widetilde{g}(U,T,z)\ \in\ S\}} Q(z,Z')\,\mu(dT \times dz).$$

where $\widetilde{g}(U,T,z)$ is a vector related to g and U in the following way

$$\widetilde{g}(U,T,z) = \left\{ \begin{array}{c} (U, T_0, T_1, \ldots, T_{J-3}, T_{J-2}, T_J + T_{J-1}),\ \text{if } x = g(T,z) \\ (U, T_0, T_1, \ldots, T_{\widetilde{J}}, 0, 0, \ldots, 0, T_J),\ \text{if } T_J < g(T,z) = T_J + \sum_{i=0}^{\widetilde{J}} T_i \\ (U, 0, 0, \ldots, 0, 0, 0, \ldots, 0, T_J),\ \text{if } T_J = g(T,z) \\ (U, 0, 0, \ldots, 0, 0, 0, \ldots, 0, 0),\ \text{if } 0 = g(T,z) \end{array} \right\} \tag{6.3}$$

The first case is when all agents stay in the sector. The second case is when all agents with tenure larger than $\widetilde{J}$ leave the sector and all agents with tenure less than or equal to $\widetilde{J}$ stay together with the permanent workers. The third case is when all temporary workers leave the sector and all permanent workers stay. The fourth case is when all agents leave the sector.

The description of the transitionary dynamics is similar to Section 3.1, as long as all agents that are in the production sector at the beginning of period cero have a home productivity less than $\theta(1-\beta)$.

The state of the economy in period cero is the initial distribution μ_0 of sectors across (T,z). Thereon, for every $t \geq 0$ the number of agents that search is given by equation

$$U_t = 1 - \phi(\theta(1-\beta)) - \int g(T,z)\,\mu_t(dT \times dz)$$

and the distribution μ_{t+1} is given by

$$\mu_{t+1}(S,Z') = \int_{\{(T,z):\ \widetilde{g}(U_t,T,z)\ \in\ S\}} Q(z,Z')\,\mu_t(dT \times dz).$$

Again, of particular interest is the case in which the initial state of the economy corresponds to the stationary equilibrium with firing taxes of Section 4. Let μ^* be the invariant distribution across pairs (x, z), and U^* the number of agents that search in that type of equilibrium. The initial state of the economy that we want to consider μ_0 satisfies

$$\mu_0\left(\{U^*\} \times \{0\} \times \{0\} \times \cdots \times \{0\} \times [0, x - U^*] \times Z\right) = \mu^*\left([0, x] \times Z\right)$$

for every $x \geq U^*$, and every measurable set Z. That is, all sectors that had a total of x workers in the stationary equilibrium of Section 4, now initially have $x - U^*$ permanent workers (of tenure J) and U^* workers of tenure cero.

7. Model parametrization

This section describes our choice of parameter values. There are six parameters to be determined β, ρ, σ^2, ξ, $\overline{h}$, and τ. There values are selected such that the steady state of the model reproduces important observations for Argentina.

Observe that the discount factor β determines the real interest rate of the model. Given that Argentina is a small open economy, it seems reasonable to choose β to determine the international interest rate. For this reason, β is selected to generate an annual interest rate of 4%, which is approximately the interest rate for the United States.

Both the persistence of the productivity shock ρ and the variance of its innovations σ^2, are key determinants of the search decisions. For this reason, they are selected to generate an unemployment rate of 15% and an average duration of unemployment equal to 6 months. An unemployment rate equal to 15% seems to be the normal level for Argentina since the mid-nineties. An average duration of unemployment equal to 6 months is larger than what is observed. However, in Argentina, the presence of informal employment substantially increases the turnover of workers. Given that that form of employment has not been model in our economy, the emphasis is put more in generating a realistic unemployment rate than

in generating a realistic duration of unemployment. An average duration of unemployment equal to 6 months is the lowest that allows the model to reproduce an unemployment rate of 15%.

The maximum home productivity $\overline{h}$ and the curvature parameter ξ for the distribution of home productivities are important parameters for labor force participation decisions. For that reason, the maximum home productivity $\overline{h}$ is chosen to generate a labor force participation equal to 72%, the level for Argentina during the late nineties. In turn, the parameter ξ determines the elasticity of labor force participation with respect to changes in wages. For this reason, ξ is chosen equal to 0.7, which is consistent with estimates the Argentinian economy.

Finally, the policy regime is selected to reproduce important features of the Argentinian system. Possibly, the most important characteristic of the Argentinian labor market regime is the presence of high firing costs. In practice, the system of firing penalties is far more complicated than in the model. While the Argentinian regime imposes severance payments equal to one month of wages per year worked, in the model the firing cost is a fixed amount independent of the worker's tenure. As a compromise between both systems, and given that the average duration of employment in the model is approximately equal to three years, the firing cost τ is chosen to be equal to three months of wages in the model economy

Table 1 shows values for the parameters of the model. The unit of time chosen is half a quarter.

8. Results

This section evaluates different ways of introducing labor market flexibility to the economy with high firing costs calibrated in the previous section. The labor market reforms that we will analyze are the following: 1) elimination of all firing costs, 2) elimination of the firing costs from the new contracts, and 3) introduction of temporary contracts.

8.1. Elimination of all firing costs

Starting from an initial equilibrium given by the stationary equilibrium with high firing costs (calibrated in the previous section), the government announces that there will be no more firing costs in the future. The reform applies not only to the new hires, but to the workers that have been employed previous to the reform. Thus, the reform puts the economy in the equilibrium without interventions described in Section 3.

The first two columns of Table 2 describe the long run effects of eliminating all firing costs. The first column describes the initial stationary equilibrium under high firing costs (calibrated in the previous section), while the second column describes the stationary equilibrium without interventions. The table shows that eliminating all firing costs increases the unemployment rate from 15.1% to 17.2%, in the long run. To understand this increase, it is important to note that the unemployment rate is determined by the rates at which agents flow between employment and unemployment. The elimination of the firing costs increases the rate of flow from employment to unemployment because workers now face no penalties for leaving their jobs. Thus, the average duration of employment decreases from 23.5 to 13.4 periods. In turn, the elimination of the firing costs leads agents to accept employment more easily because now they face no penalties if they want to become unemployed after a short period of time. For this reason, the average duration of unemployment decreases from 4.2 to 2.8 periods. Observe that the unemployment rate is determined by the ratio between the average durations of unemployment and employment. Given that the fall in the average duration of employment is larger than the fall in the average duration of unemployment, the unemployment rate increases. The intuition for why the job termination rate is affected more than the job acceptance rate is clear. When workers are making the decision to terminate their employment, they face the firing costs right away. But when workers are making the decision to accept employment, they face firing costs in the distant future. Given that agents discount the future, the elimination of the firing costs have lower effects in the job

acceptance decisions than in the job termination decisions.

The firing costs have a large effect in the productivity of the economy. The firing costs impose penalties to the reallocation of workers across sectors of production, inducing sectors with high productivity to operate with too little employment, and sectors with low productivity to operate with too many workers. This affects labor productivity quite substantially. In fact, when the firing costs are eliminated, we see that average labor productivity increases by 4.6 percent. Given this large increase in productivity and given the elimination of the penalties to employment separation, the return to market activities increases quite substantially. Labor force participation thus increases from 72.0% to 77.4%. This increase in labor force participation is so large that employment increases from 61.1% to 64.1% of the population, despite the large increase in the unemployment rate. With this higher employment level and the increase in labor productivity, output in the market sector increases about 9.7%. The large increase in labor force participation gives rise to a fall in home production of 15.8%, but this fall is more than compensated by the increase in market production: the increase in total production is about 1.7%.

Figures 1, 2 and 3 show the short run effects of eliminating the firing costs. With the elimination of the firing costs, the value of search increases to a level that is independent of the state of the economy.[5] This makes the labor force participation jump to a higher level and remain constant along the transition. Figure 1 shows that in the short run there is a strong increase in the unemployment level. This is due to two reasons. First, to the fact that new entrants to the labor force must go through unemployment and, as we have seen, the labor force participation increases quite substantially. Second, to the fact that the elimination of the firing costs leads to an important destruction of positions of low productivity. This employment destruction is compensated by the fact that the agents that searched during the period previous to the reform are now more inclined to accept job offers (since they are

[5] See equations (3.1) and (3.3).

not afraid of facing firing costs in the future). However, the effects on job destruction is larger than on job creation, and we see that the level of employment decreases 6.1% in the first period of the reform. With the increase in unemployment and this fall in the level of employment, Figure 2 shows that the unemployment rate jumps to 26% in the first period of the reform. After the first period, as the agents that search start to become employed, we see that total unemployment decreases over time and the total employment increases. This makes the unemployment rate to decrease quite rapidly, reaching 19% in the sixth period of the reform.

Figure 3 shows that the immediate destruction of positions of low productivity leads to an increase in labor productivity of about 3%. This increase in productivity compensates the decrease in employment during the first period, and leads to a fall in market output of only 3.1%. After the first period, output starts to increase at a strong pace due mainly to the increase in employment: labor productivity continues to increase, but a slow pace. The reason for the continued growth in labor productivity lies in the way that the distribution of workers across productivity levels evolves over time. In the first period of the reform, the productivity threshold below which workers decide to leave their jobs, increases quite substantially. This not only leads to a sharp destruction of employment, but makes the new productivity threshold fall in a range where many workers are initially located. Over time, good part of these workers transit to productivity levels lower than this threshold and leave the distribution, making average productivity to increase over time.

Given that market output starts decreasing and requires 16 periods (two years) to converge to its new stationary level, and given that home production is permanently lower, the welfare benefit of the reform is much lower than what is suggested from comparing total production levels across the two stationary equilibria. When the flow of total production in the equilibrium without interventions (discounted at the preference discount factor β) is compared with the total production obtained in the initial equilibrium (under high firing

costs), we see that the benefits of eliminating the firing costs are only about 1.0%. That is, agents are indifferent between eliminating the firing costs and staying in the equilibrium with high firing costs, if they receive a permanent increase in consumption of 1%.

8.2. Introducing flexible new contracts

This section considers a labor reform that brings flexibility only to the new contracts. The workers that were hired previous to the reform continue to be subject to the firing costs. However, once they leave their old positions and pay the firing costs, these workers can become employed under the new contracts (which are not subject to the firing costs). The purpose of this reform is to avoid a large immediate destruction of pre-existing positions, and thus dampen the initial increase in the unemployment rate.

It is important to note that this type of reform can only alleviate the unemployment rate adjustment in the short run. The long run effects must be identical to those of eliminating all the firing costs at once. The reason is that in the long run, the workers that were initially employed under the old contracts, will have already left their initial jobs. In the long run, this economy is identical to the economy without interventions.

Figures 4, 5 and 6 describe the short run effects of this type of reform. Figure 4 shows that the effects on labor force participation are identical to those seen in Figure 1. The reason is clear: labor force participation is determined by the value of search and this is the same under both reforms (given that in both cases, the new hires are not subject to firing costs). Figure 4 shows that the decrease in employment in the first period of the reform is lower when flexibility is brought only on the new contracts: employment falls to 95.2 instead of 93.9. This is exactly what was expected from this type of reform. By leaving the firing costs on the old contracts, the reform makes workers less willing to leave their old positions, reducing the immediate destruction of employment. However, the difference is small. The reason why workers leave their old positions almost as much as when all firing costs are

eliminated, is the low time discount rate. For the workers that start the reform employed under the old contracts, the costs of leaving their current positions represent a sunk cost. It is true that they can postpone the payment by postponing the decision to leave their jobs, but with $\beta = 0.9951$ the agents discount the future so little that it is almost the same for them to pay the cost now or in the future. Since the new positions are not subject to firing costs, almost all the workers that left their jobs when all the firing costs were eliminated, continue to leave their jobs under this reform.

The lower job destruction makes unemployment to increase by a smaller amount than in Figure 1. But since the difference is small, the evolution of the unemployment rate in Figures 2 and 5 are virtually the same.

Figure 6 shows a lower initial increase in labor productivity than in Figure 3. This is due to the fact that a lower number of low productivity positions are initially destroyed. However, for the previously discussed reasons, the difference is small. Observe that the initial drop in output is lower than in Figure 3. This is a consequence of the smaller fall in employment.

In conclusion, the qualitative differences with the reform of Section 8.1 were those expected. But the magnitude of the differences are small. Both reforms produce virtually the same short run effects, and generate identical long run effects.

8.3. Temporary contracts

Finally, this sub-section analyzes the effects of introducing temporary contracts. What the temporary contracts do is allow a trial period during which the workers are exempt from the firing taxes. If a worker continues to be employed once the trial period ends, he becomes subject to the firing taxes. Each time a worker becomes employed in a new sector, his trial period starts from cero. In what follows, we will consider trial periods equal to 3 months, 6 months and one year.

8.3.1. Temporary contracts of 3 months duration

The third column of Table 2 shows the long run effects of introducing temporary contracts of 3 months duration. Given that the temporary contracts bring flexibility to the economy, it is not surprising that they bring the economy towards the equilibrium without interventions (second column). However, we see that the magnitude of the effects are rather small. The reason is that in a trial period of 3 months bring some flexibility to the economy, but the idiosyncratic shocks are too persistent for this duration of the trial period to undo the restrictions introduced by the firing costs. Thus, we see that the unemployment rate increases only from 15.1% to 15.6% and the employment level increases from 61.1% to 61.5%. The only large effects are on the average durations of employment and unemployment, which become close to the average durations in the equilibrium without interventions. In particular, we see that the average duration of unemployment decreases from 4.2 to 3.0 periods, and that the average duration of employment falls from 23.5 to 16.1 periods. The reason for the fall in the average duration of unemployment is that, since they face no firing costs during the trial period, workers are willing to accept employment more easily. However, to avoid being subject to the firing taxes, workers tend to leave their jobs right before they become permanent, decreasing the average duration of employment. Thus, the temporary contracts substantially increase the turnover of workers.

Figures 7, 8, and 9 show the short run effects of introducing a trial period equal to 3 months. With the introduction of the temporary contracts the value of search increases because, at least during the trial period, workers are not subject to the firing costs. However, since the trial period is short, this value does not increase substantially. As a consequence, we see that the labor force participation increases in Figure 7, but by a small amount.

Since the value of search increases only slightly, in the initial period of the reform there is very little destruction of pre-existing jobs. Given the low destruction of pre-existing jobs and the small increase in labor force participation, the increase in the flow of workers to

unemployment is small. On the other hand, the agents that searched during the period previous to the reform, now arrive to sectors where they can become employed without having to pay firing costs during the trial period. This makes the job acceptance rate to increase, leading more workers to become employed and fewer workers to want to continue to search for a job. As a counterpart, we see that the employment level increases and unemployment decreases in the initial period of the reform. Thus, Figure 8 shows an initial fall in the unemployment rate.

In the second period of the reform, there are no further flows of workers from out of the labor force into unemployment: given that the value of search is constant in time, all the increase in labor force participation took place in the initial period of the reform. There is no substantial amount of job destruction either because most of the destruction of pre-existing positions took place in the initial period of the reform, and the workers that were hired under temporary contracts have not yet finished their trial periods. On the other hand, the larger flow of workers from unemployment to employment continues due to the higher job acceptance rate induced by the temporary contracts. With the continued flow from unemployment to employment, the low job destruction rate and the constant labor force participation, employment continues to increase and unemployment continues to decrease during the second period of the reform. Thus, we see in Figure 8 that the unemployment rate continues to fall during the second period of the reform.

In the third period of the reform, the labor force participation remains constant and the larger flow of workers from unemployment to employment continues (given the higher job acceptance rate induced by the temporary contracts). However, now there is a large destruction of employment: the workers that were hired in the first period of the reform have finished their trial period, inducing many of them to abandon their jobs before becoming subject to the firing taxes. Thus, Figure 7 shows an important fall in employment and a strong increase in unemployment in the third period of the reform. Figure 8 shows that the

unemployment rate in the third period of the reform goes back to its level previous to the reform.

After the third period, job destruction continues to exceed job creation, but the difference decreases over time as the distribution of workers across productivity levels moves away from the productivity threshold below which permanent positions are destroyed.

Figure 9 shows that labor productivity starts decreasing during the first periods of the reform. This is due to the fact that the low destruction of initial jobs does not increase the productivity of pre-existing positions, and to the fact that the workers that arrive to the sectors of production are induced to accept, during the trial period, jobs with relatively low productivity. After that, labor productivity starts to increase because the flexibility brought by the temporary contracts induces workers to reallocate more efficiently across the sectors of production. Observe that market output starts increasing due to the initial increase in employment, then starts to decrease given the subsequent fall in employment, but is quickly compensated by the increase in labor productivity and moves back to a positive grow path.

8.3.2. Temporary contracts of 6 months duration

The long run effects of temporary contracts of 6 months duration in Table 2 are qualitatively similar to the effects of temporary contracts of 3 months duration, so we will not discuss them in detail again. But, of course, the quantitative effects are much larger.

Given that the increase in the value of search is larger than under the temporary contracts of 3 months duration, we see that the increase in labor force participation in Figure 10 is larger than in Figure 7. Also because of the larger increase in the value of search, the instantaneous destruction of pre-existing positions and the job acceptance rate increase more than when the duration of the temporary contracts was 3 months. In fact, Figure 10 shows that the effect on the job acceptance rate dominates the effect on the instantaneous destruction of positions, and we see that employment increases in the first period of the reform.

However, the increase in labor force participation is so large that unemployment increases. In fact, unemployment increases more than employment, and Figure 11 thus shows that the unemployment rate increases slightly in the first period of the reform.

After the first period of the reform, labor force participation is constant. As a consequence, the larger job acceptance rate starts to dominate the situation of the labor market, reducing unemployment and increasing employment. Thus, Figure 11 shows that the unemployment rate starts to fall after the first period of the reform. When the fifth period of the reform gets closer, which is when the workers that were hired in the first period of the reform finish their trial period, the job destruction starts to dominate, increasing unemployment and lowering employment. Thus, Figure 11 shows that the unemployment rate starts to increase after the fourth period of the reform, overtaking in the fifth period the level previous to the reform. In Figure 12 we see that the effects on labor productivity are qualitatively similar to those in Figure 9: labor productivity starts falling as workers accept jobs of low productivity, but then starts to increase as the allocation of workers across sectors of production becomes more efficient, given the flexibility introduced by the temporary contracts. The effects over market output are initially dominated by the employment dynamics, but afterwards by labor productivity.

8.3.3. Temporary contracts of one year duration

The long run effects of temporary contracts of one year duration are qualitatively similar to the temporary contracts considered before. In terms of their quantitative effects, Table 2 shows that the flows of workers between employment and unemployment are substantially affected. In fact, we see that the unemployment rate under temporary contracts of one year duration is the same as in the economy without interventions. The average durations of employment and unemployment are also very similar in both economies. However, the effects on labor force participation, market output and home output, although large, are

only half of the effects of eliminating all the firing restrictions.

Figures 13, 14 and 15 show the short run effects. In Figure 13 we see that the increase in labor force participation is much larger than in Figures 7 and 10. This is due to the fact that the value of search increases much more given the longer trial period. Given this big increase in the value of search, there is a large instantaneous destruction of pre-existing jobs. Actually, the amount of job destruction is so large that it compensates the larger job acceptance rate, and employment remains unchanged during the first period of the reform. Given the constant level of employment and the large increase in labor force participation, unemployment increases quite substantially. Figure 14 shows that this translates into a jump in the unemployment rate from 15.1% to 17.9% in the first period of the reform. After the first period, since labor force participation is constant, employment increases and unemployment decreases as unemployed agents continue to accept their employment opportunities. However, as the end of the trial period gets closer (which happens in period 9), the job destruction rate starts to increase, lowering the employment rate and increasing the unemployment rate. In any case, Figure 14 shows that the unemployment rate is always higher than in the initial equilibrium.

Contrary to the previous case we see in Figure 15 that average labor productivity does not decrease initially. This is due to the large initial destruction of positions of low productivity, which more than compensates the higher (temporary) acceptance of jobs of low productivity. Similarly to the previous cases, average labor productivity grows as workers are assigned more efficiently across the sectors of production (due to the flexibility introduced by the temporary contracts). Figure 15 also shows that in the first period of the reform, market output increases with labor productivity. After the first period, market output follows the evolution of employment until employment stabilizes and output starts to follow the evolution of labor productivity thereon.

9. Conclusions

This paper has analyzed the effects of different reforms that introduce flexibility in the labor markets : 1) elimination of all firing costs, 2) introduction of flexible new contracts, and 3) introduction of temporary contracts. Similarly to Alvarez and Veracierto [3] this paper found that introducing flexibility leads in the long run to a higher unemployment rate. However, they have the positive effect of increasing labor force participation, wages, market output and total output.

The unemployment rate increases with the elimination of all firing costs because the job-destruction rate increases more than the job-creation rate. The reason why the firing costs affect more the job-destruction margin than the job-creation margin, is that in the job acceptance decisions the firing costs appear as something distant in the future, while in the job-separation decisions the firing costs appear as something immediate. In the short-run, eliminating all firing costs leads to a strong increase in unemployment and a significative fall in employment. This makes the unemployment rate to jump to 25.9% in the first period of the reform. This is mainly explained by a large destruction of low productivity jobs and a large increase in labor force participation.

Introducing flexibility in the new contracts gives rise to almost identical effects than eliminating all firing costs. The reform achieves is a lower instantaneous destruction of jobs, given that the jobs created previous to the reform continue to be subject to the firing costs. But the difference is small: the unemployment rate increases to 24.9% in the first period of the reform, only 1% lower than when all firing costs are eliminated.

Introducing temporary contracts gives rise to smaller long-run effects than eliminating all the firing costs, because they introduce labor market flexibility in a partial way. In turn, the short-run effects of introducing temporary contracts vary substantially according to the length of the trial periods. Temporary contracts of 3 months or 6 months duration can reduce the unemployment rate during the first months of the reform. However, in the long-run they

lead to a larger unemployment rate. Temporary contracts of one year duration cannot reduce the unemployment rate, even in the short run. After the reform, the unemployment rate always exceeds the level previous to the reform.

As a tool to fight unemployment, we see that introducing flexibility in the labor markets is far from adequate. Only temporary contracts of short duration can reduce the unemployment rate, and only for a few months. Eventually, the additional flexibility leads to higher unemployment rates. However, as a tool to increase the productivity of the economy, introducing flexibilty in the labor markets is quite beneficial. Market production increases far more than the decrease in home production, increasing the welfare level of agents. In fact, in terms of welfare, the optimal policy is to eliminate all firing costs, even though that implies a large increase in the unemployment rate. The reason is that the equilibrium without interventions is Pareto optimal. The firing costs introduce such frictions to the employment reallocation process, that too few agents end up searching for employment.[6]

[6] In the economy considered, agents are risk neutral. However, introducing risk aversion and borrowing constraints would not affect the welfare implications in a significant way. The reason is that the average duration of unemployment is relatively short. Risk averse workers would self-insure with their own savings almost as well as if there were perfect insurance markets (see Alvarez and Veracierto [2]).

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Table 1
Parameter values

β	0.9951
ρ	0.95
σ	0.03
h	2.4938
ξ	0.7
τ	4.0

Table 2
Long-run effects

	Firing costs	Laissez-Faire	Temp. C. 3 months	Temp. C. 6 months	Temp. C. 1 year
Employment	61.1%	64.1%	61.5%	61.9%	61.8%
Unemployment	10.9%	13.3%	11.4%	11.7%	12.8%
Labor participation	72.0%	77.4%	72.9%	73.6%	74.6%
Unemployment rate	15.1%	17.2%	15.6%	15.9%	17.2%
Unemploym. duration	4.2	2.8	3.0	2.9	2.7
Duration employment	23.5	13.4	16.1	15.1	13.2
Productivity	100.0	104.6	100.9	101.4	103.7
Market output	100.0	109.7	101.5	102.7	104.7
Home output	100.0	84.2	97.46	95.6	92.7
Total output	100.0	101.7	100.3	100.5	101.0

Note: productivity, market output, home output and total output, were normalized to 100 in the benchmark equilibrium with high firing costs.

Figure 1: Transition without interventions
Employment, Unemployment and Labor Force Participation

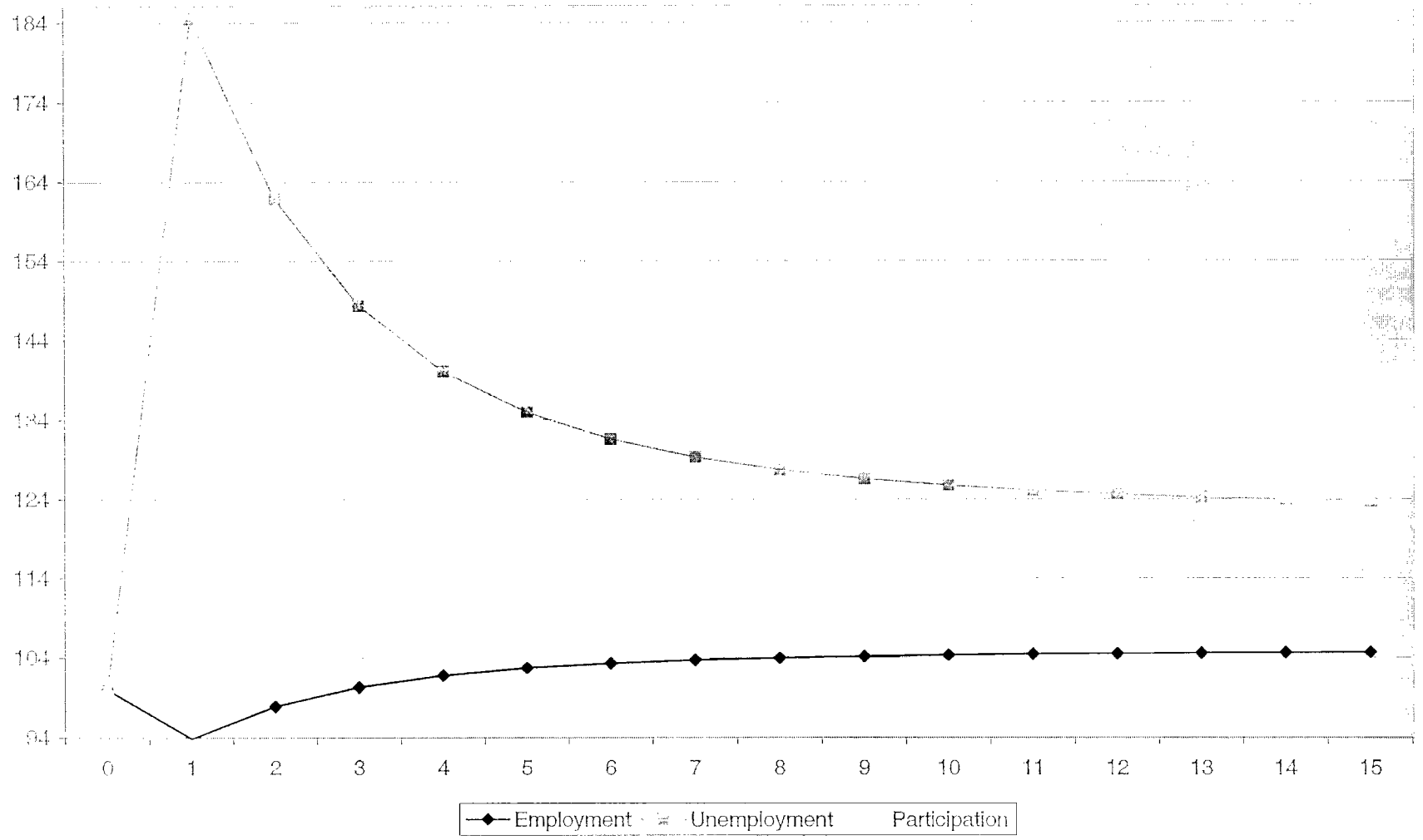

Figure 2: Transition without interventions
Unemployment Rate

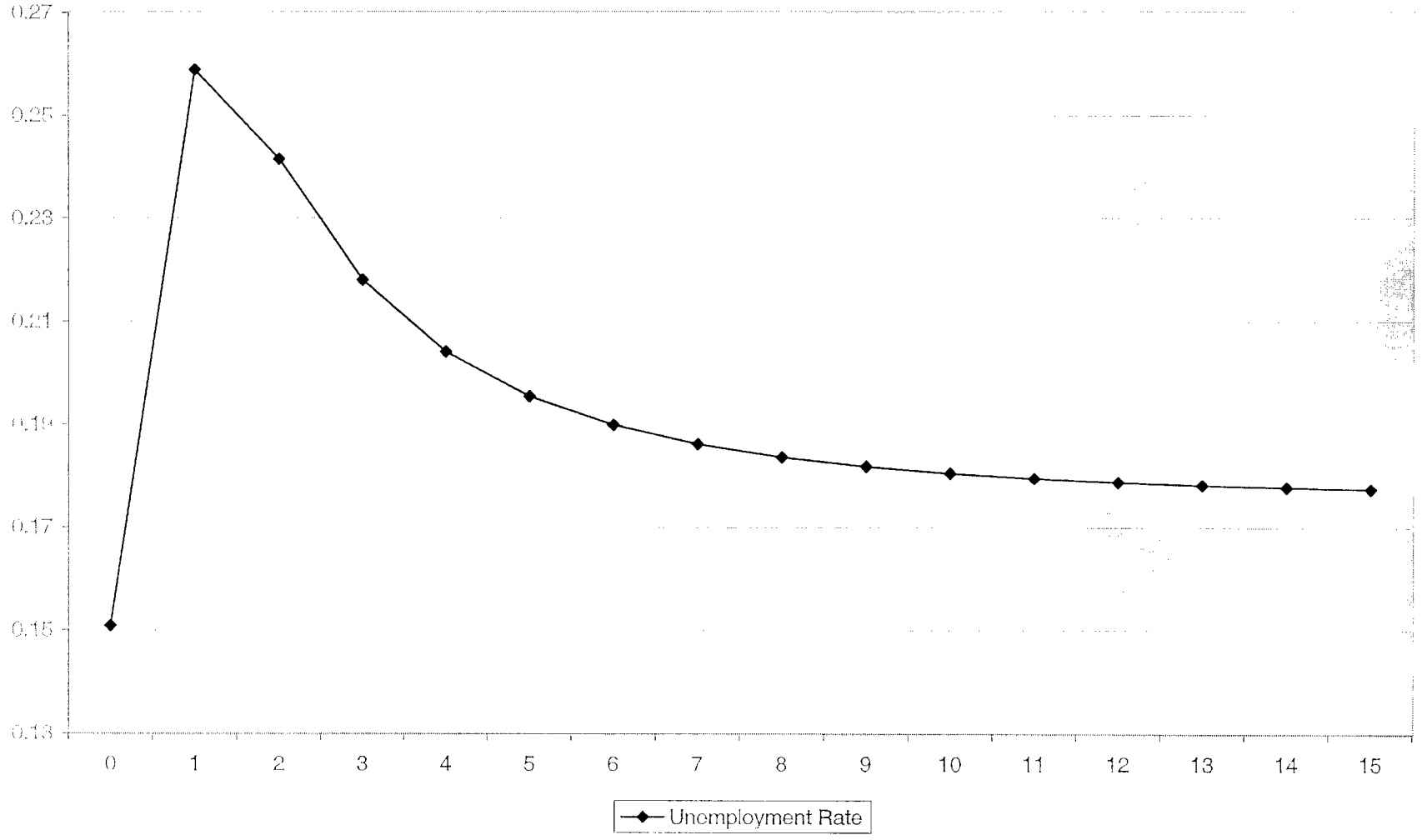

Figure 3: Transition without interventions
Market Output and Labor Productivity

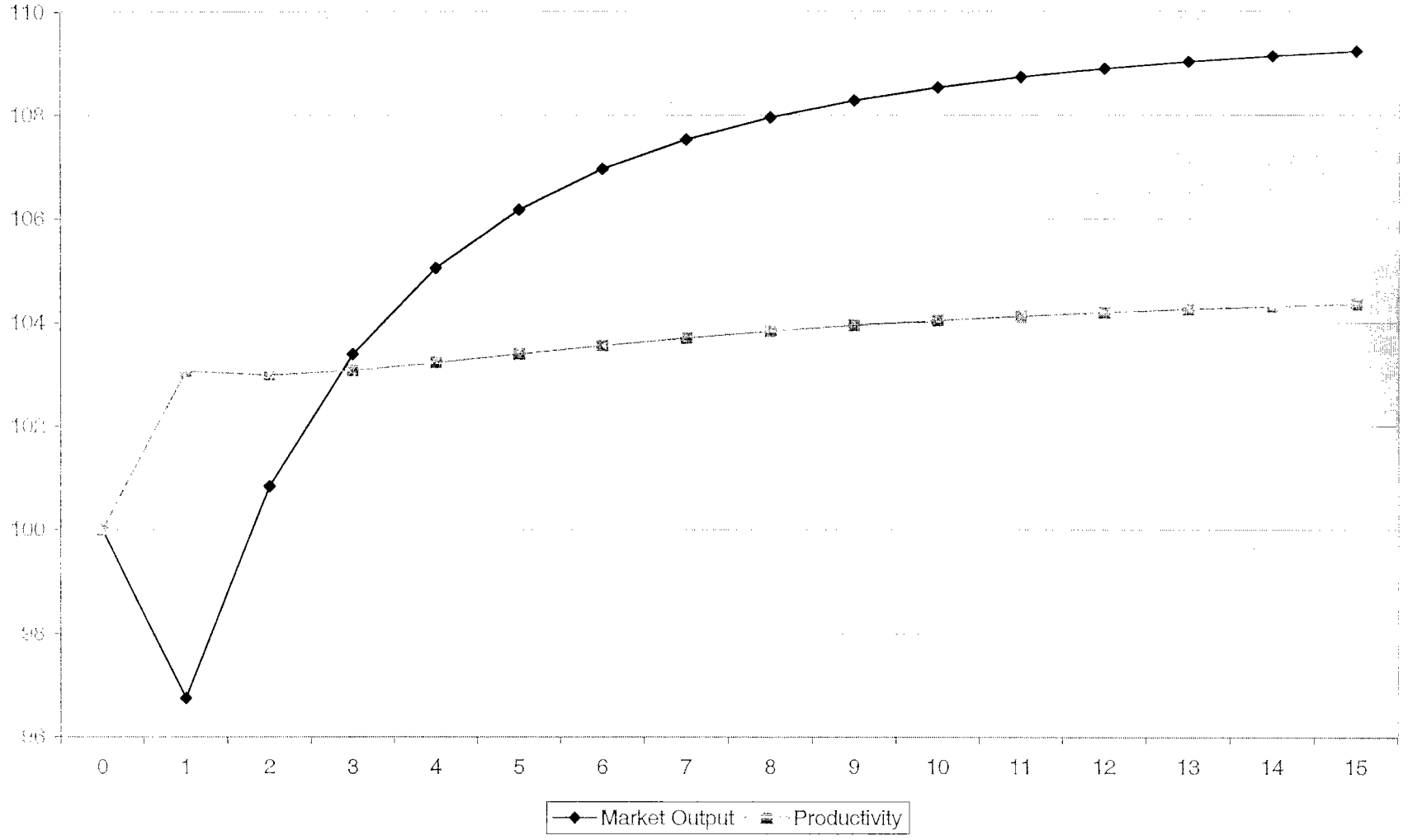

Figure 4: Transition with Flexible New Contracts
Employment, Unemployment and Labor Force Participation

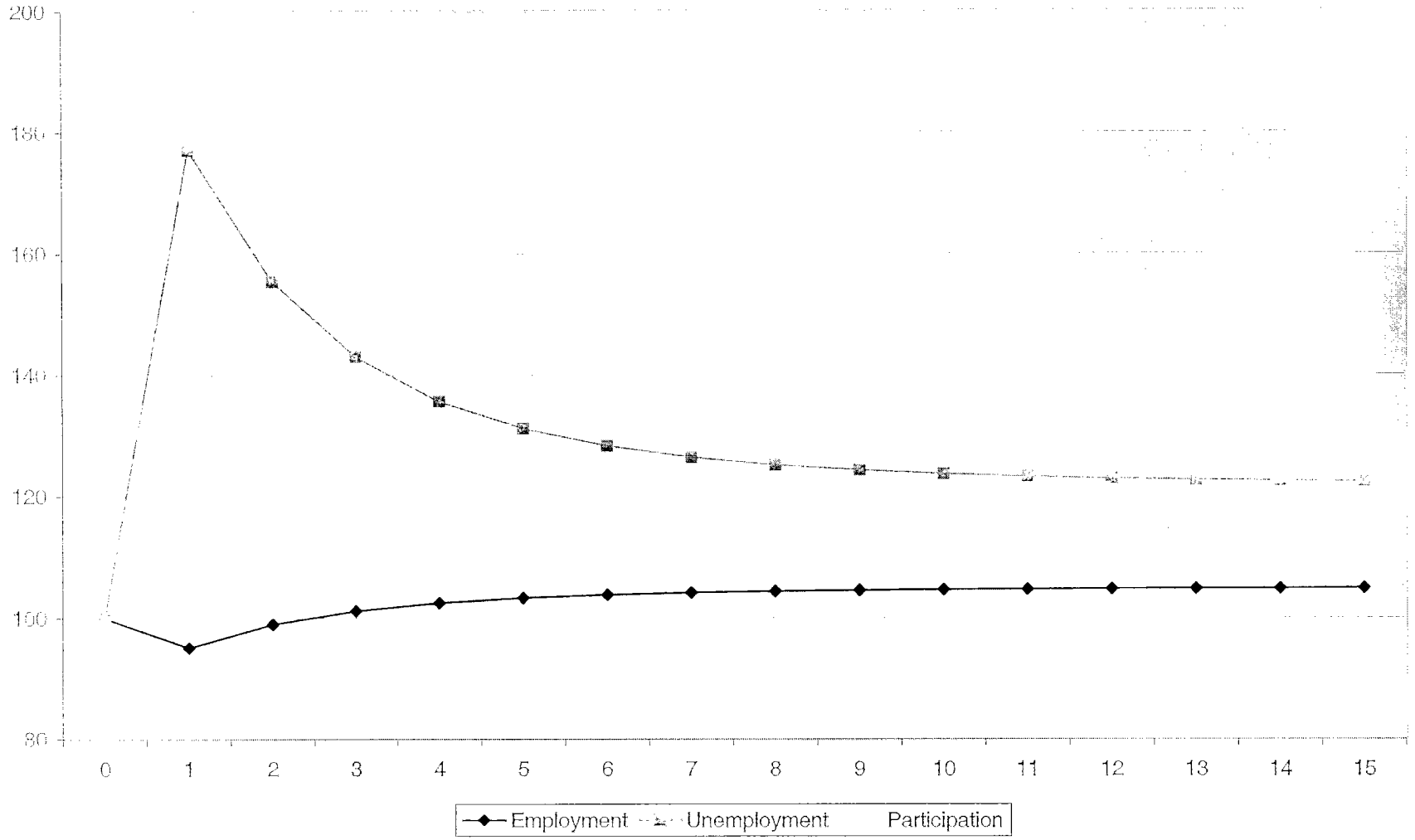

Figure 5: Transition with Flexible New Contracts
Unemployment Rate

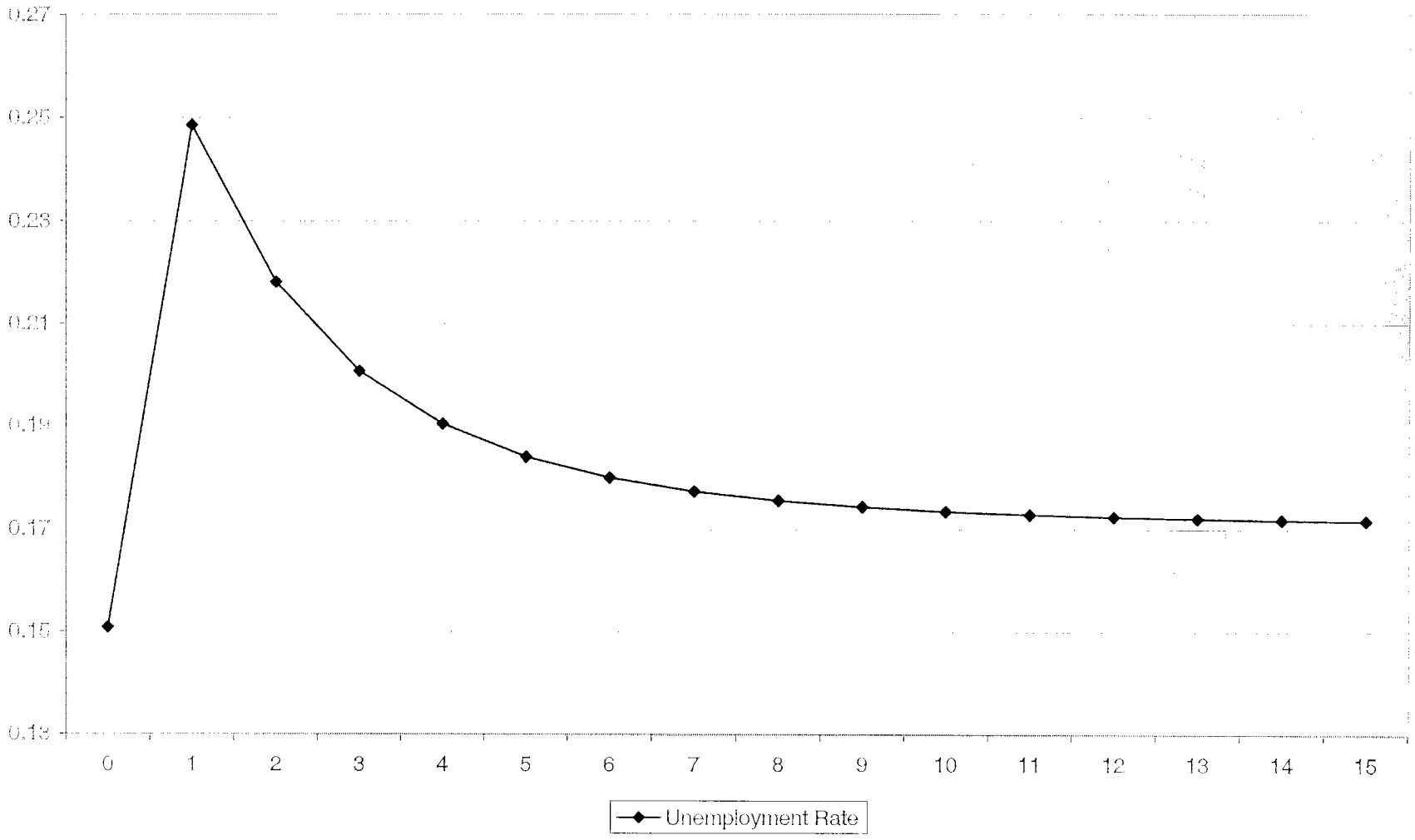

Figure 6: Transition with Flexible New Contracts
Market Output and Labor Productivity

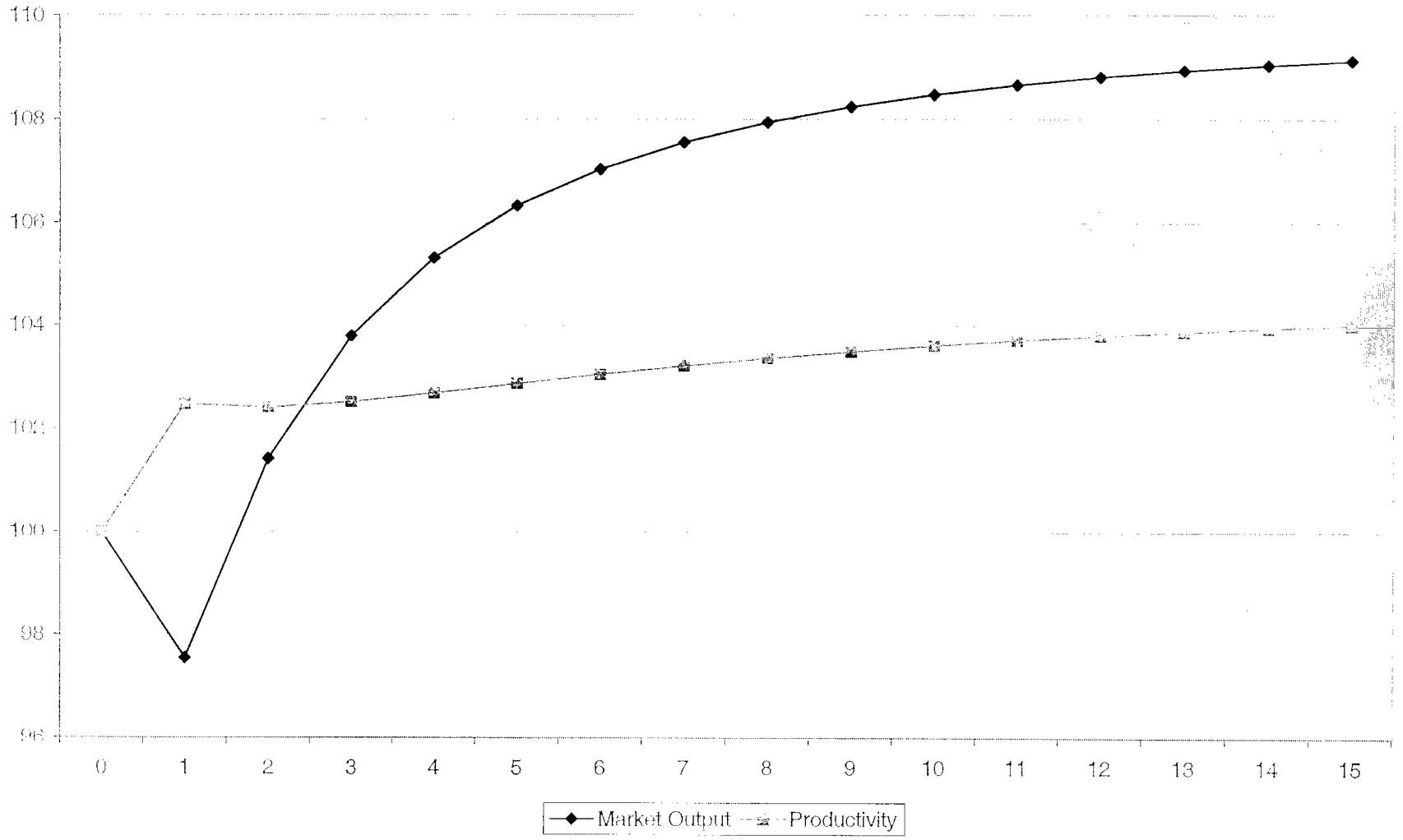

Figure 7: Temporary Contracts of 3 Months Duration (J = 3)
Employment, Unemployment and Labor Force Participation

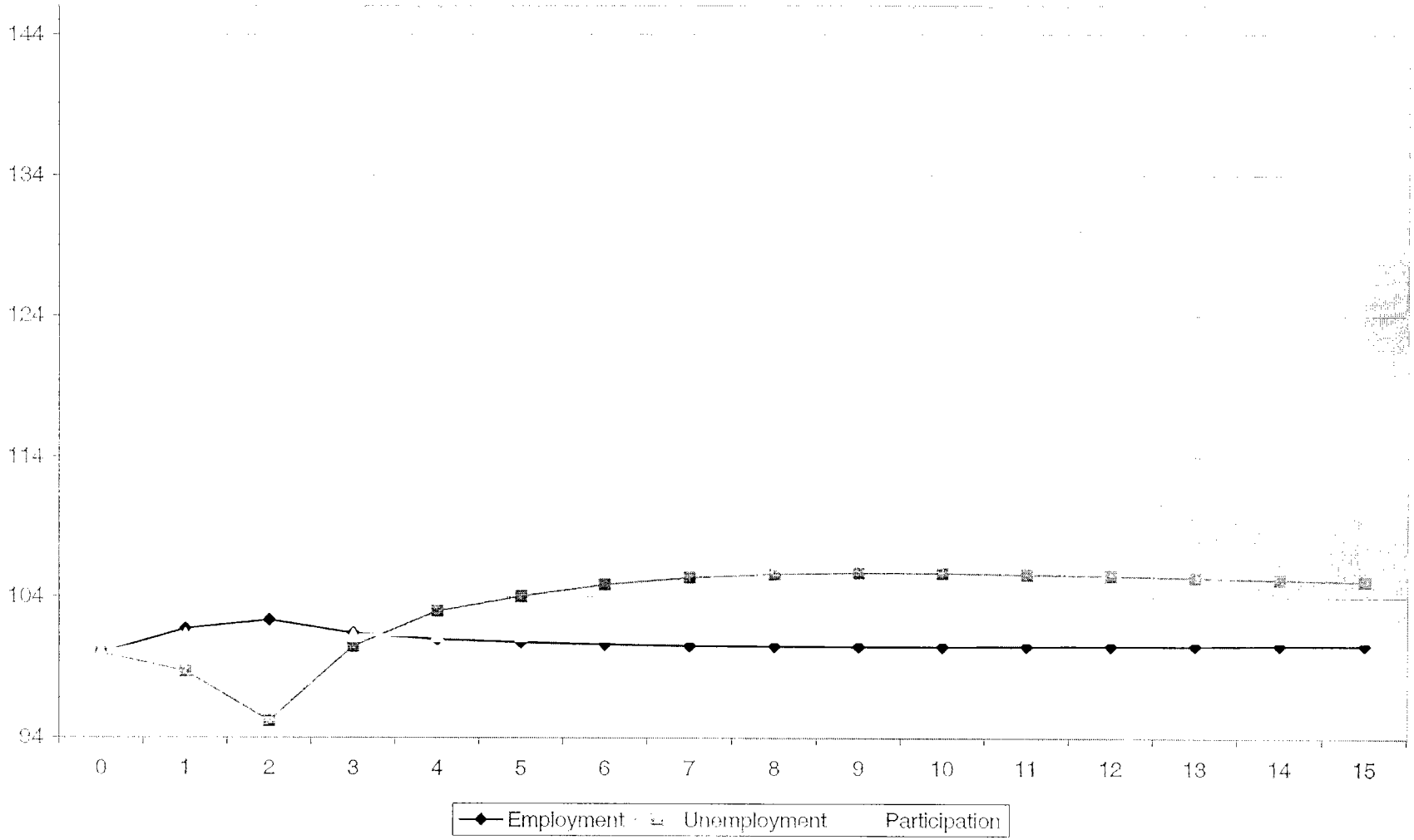

Figure 8: Temporary Contracts of 3 Months Duration (J = 3)
Unemployment Rate

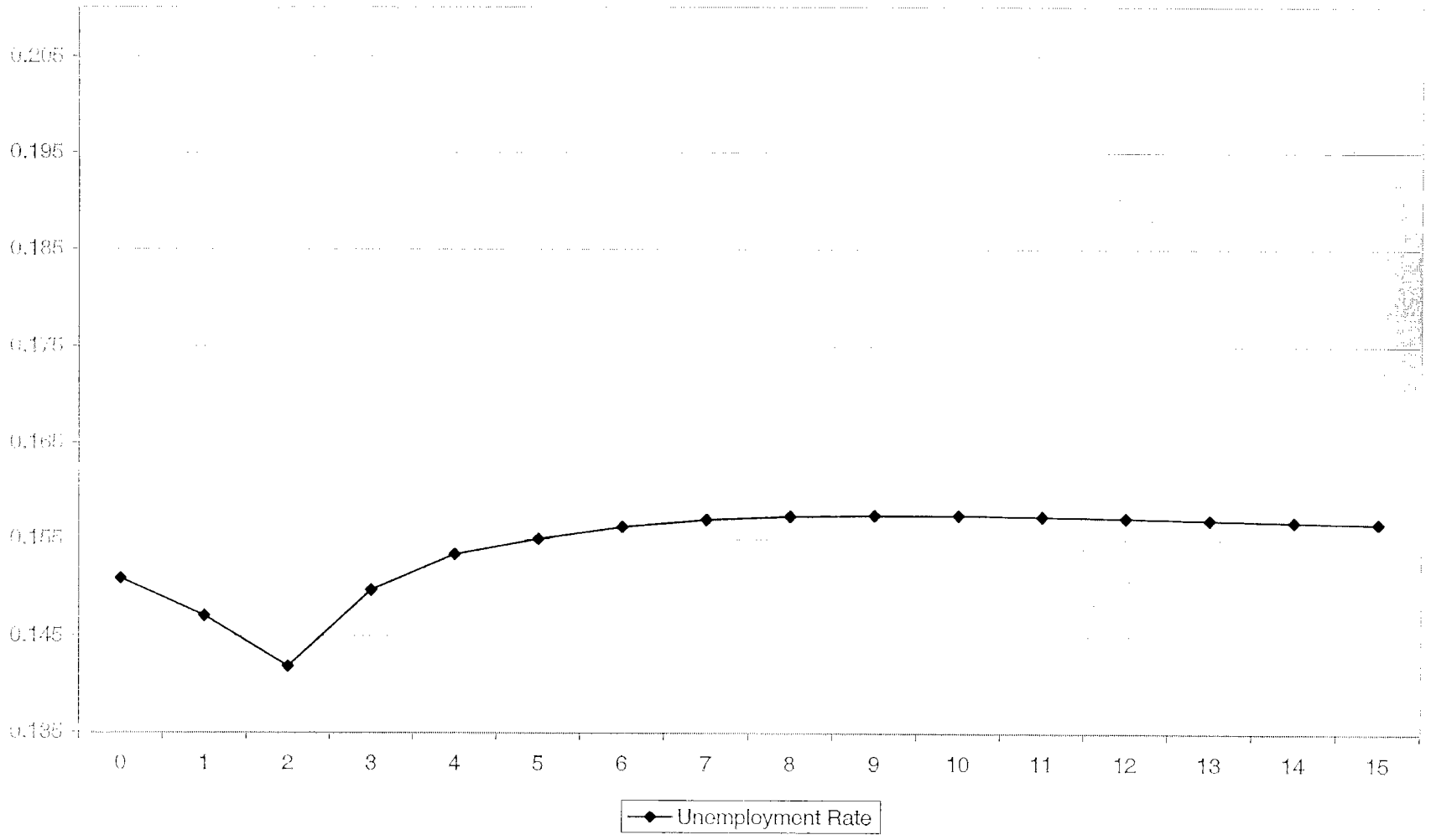

Figure 9: Temporary Contracts of 3 Months Durations (J = 3)
Market Output and Labor Productivity

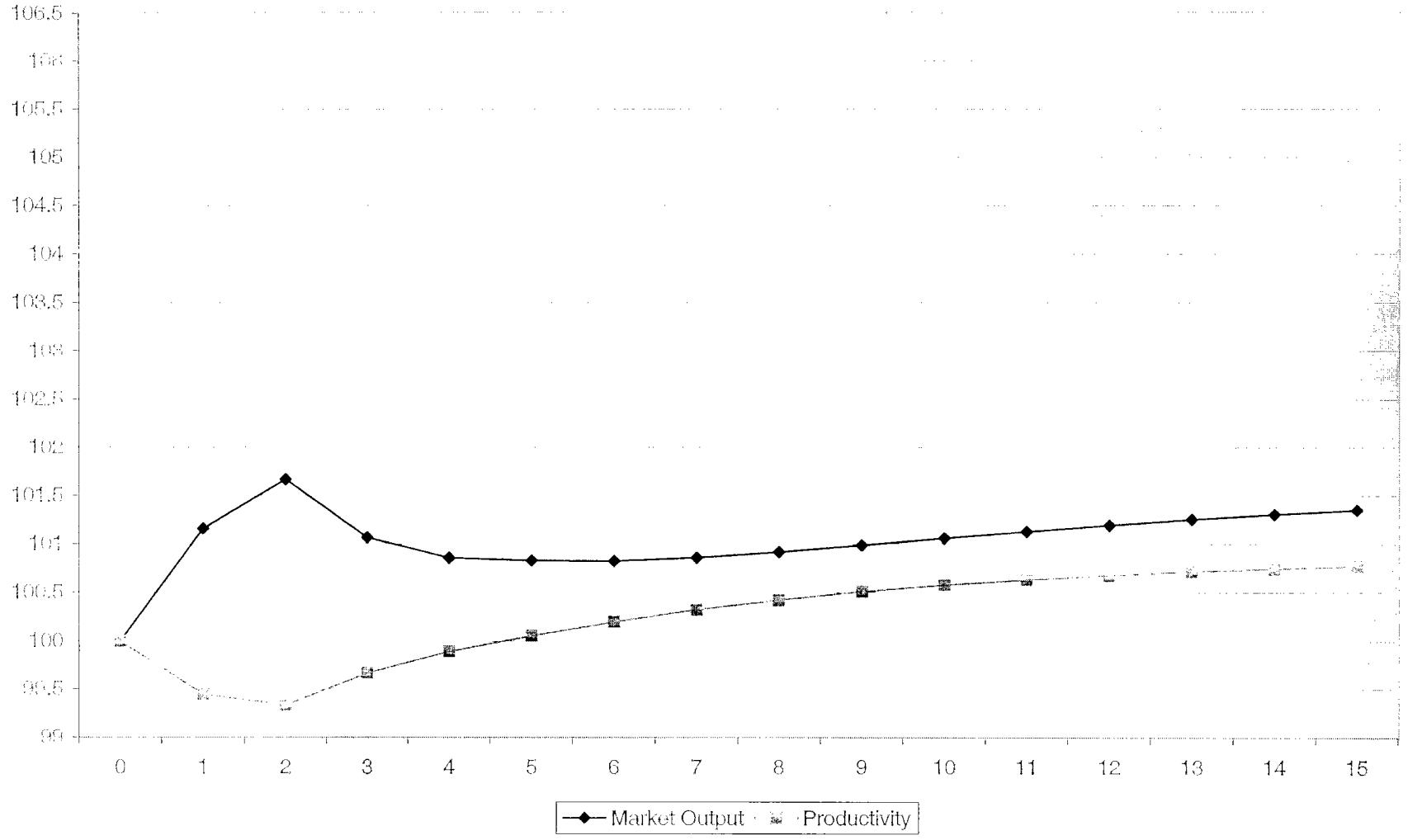

Figure 10: Temporary Contracts of 6 Months Duration (J = 5)
Employment, Unemployment and Labor Force Participation

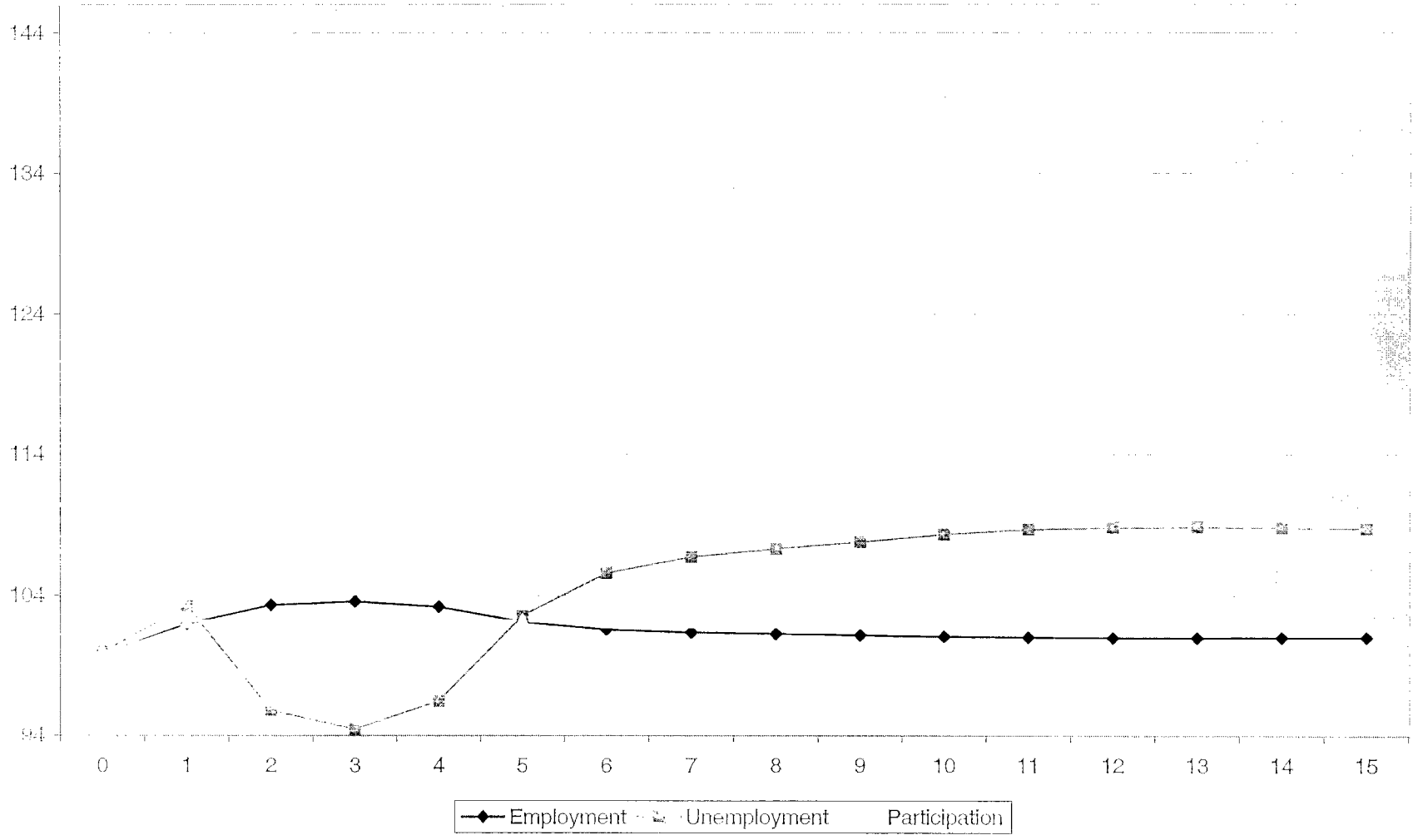

Figure 11: Temporary Contracts of 6 Months Duration (J = 5)
Unemployment Rate

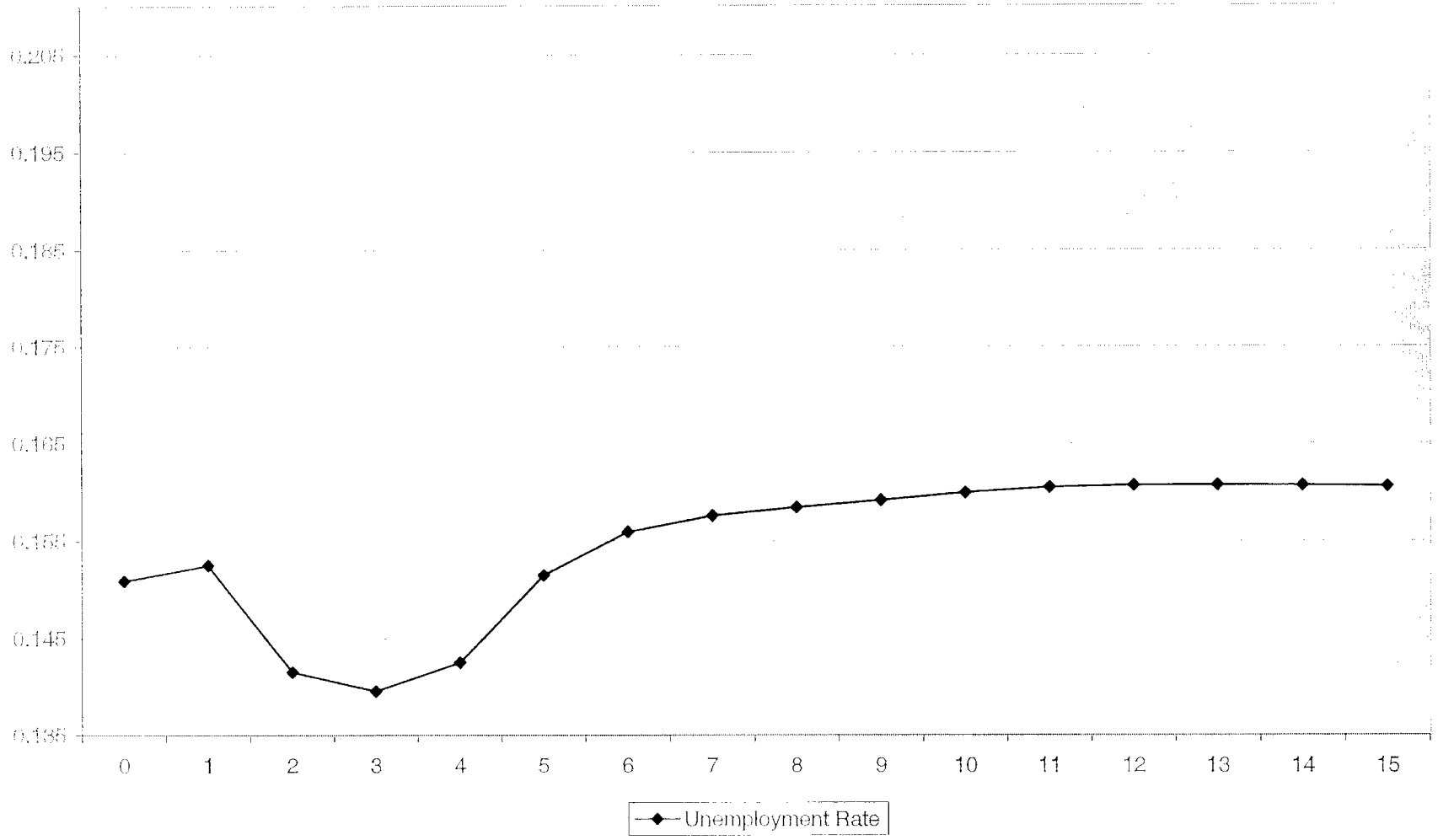

Figure 12: Temporary Contracts of 6 Months Duration (J = 5)
Market Output and Labor Productivity

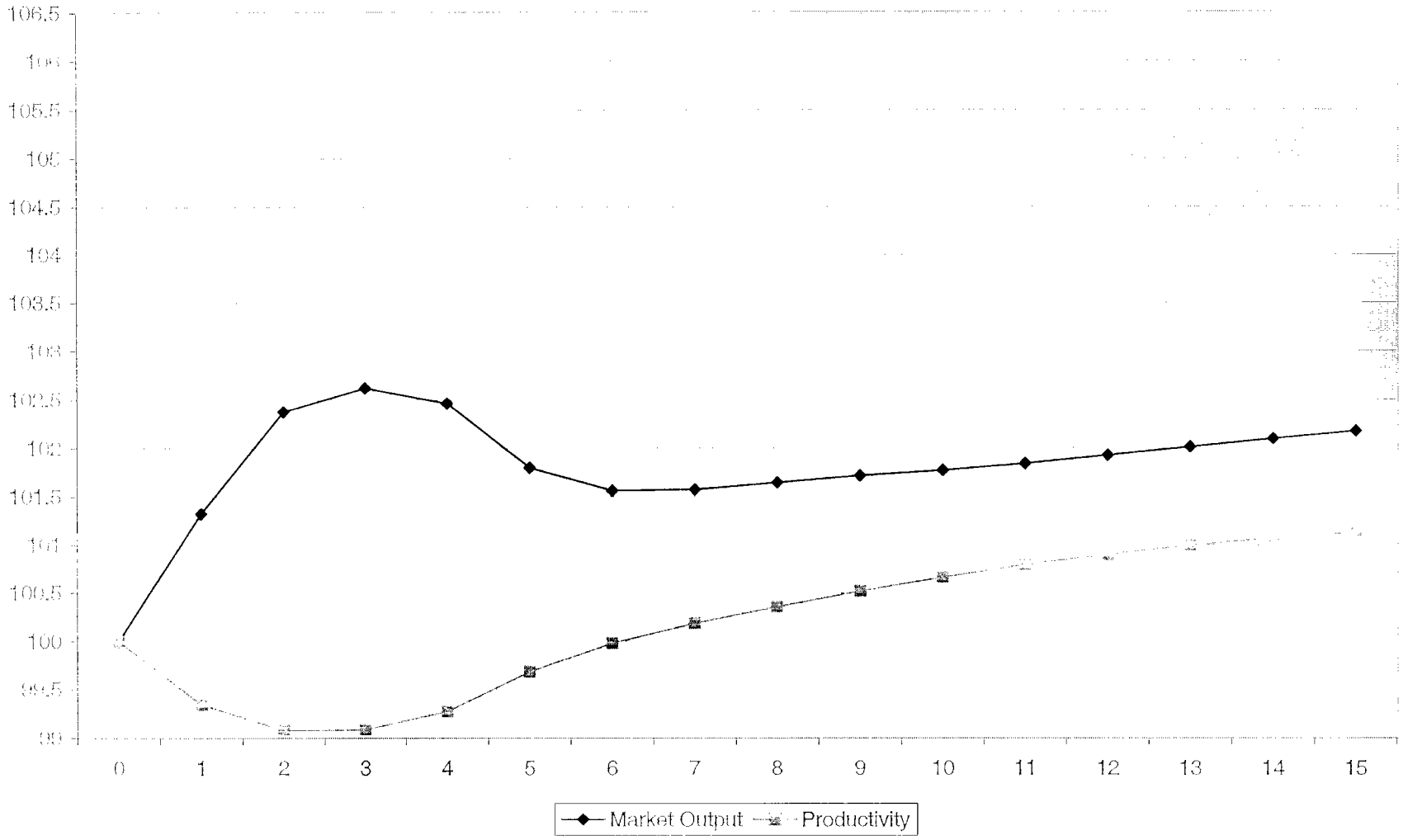

Figure 13: Temporary Contracts of 1 Year Duration (J = 9)
Employment, Unemployment and Labor Force Participation

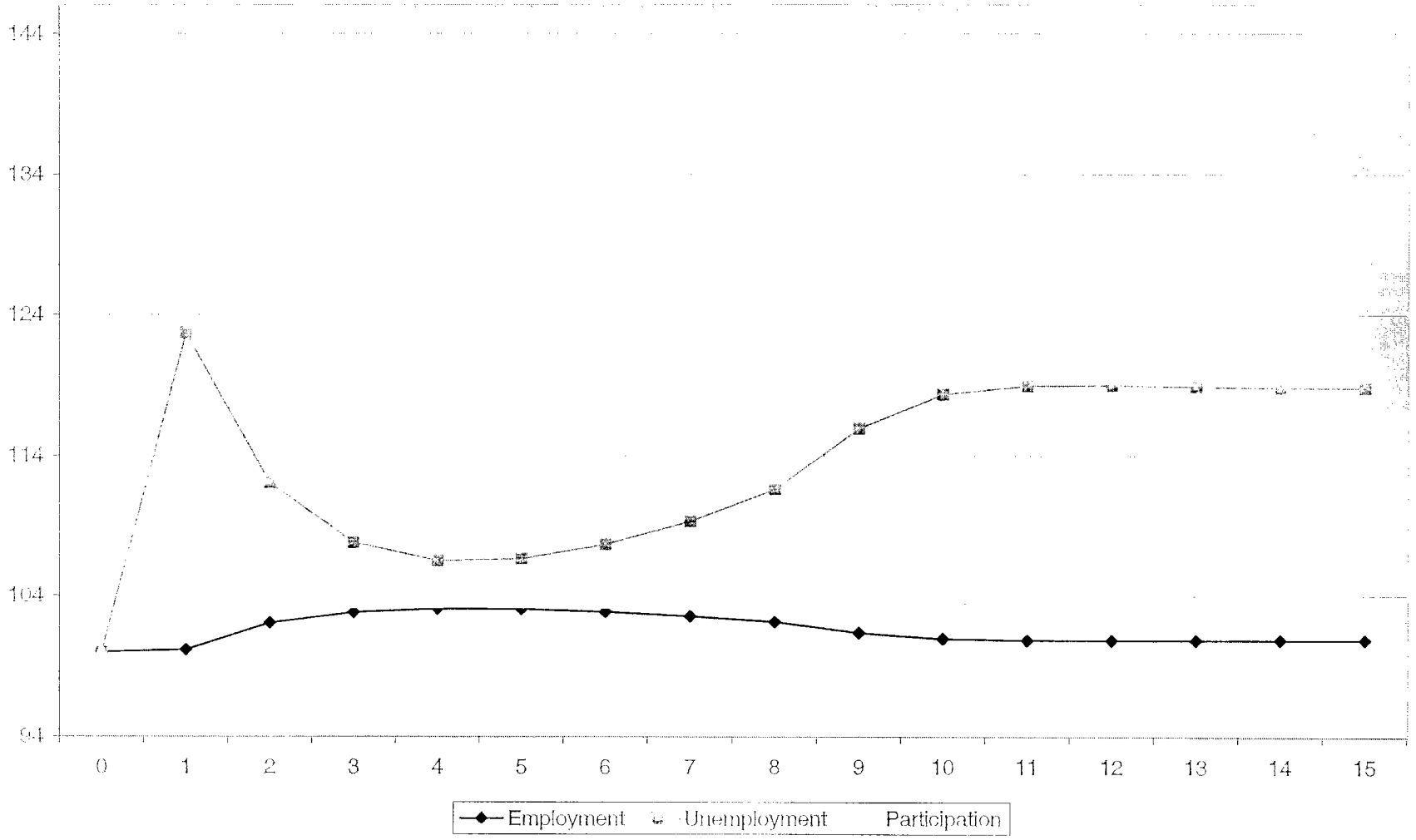

Figure 14: Temporary Contracts of 1 Year Duration (J = 9)
Unemployment Rate

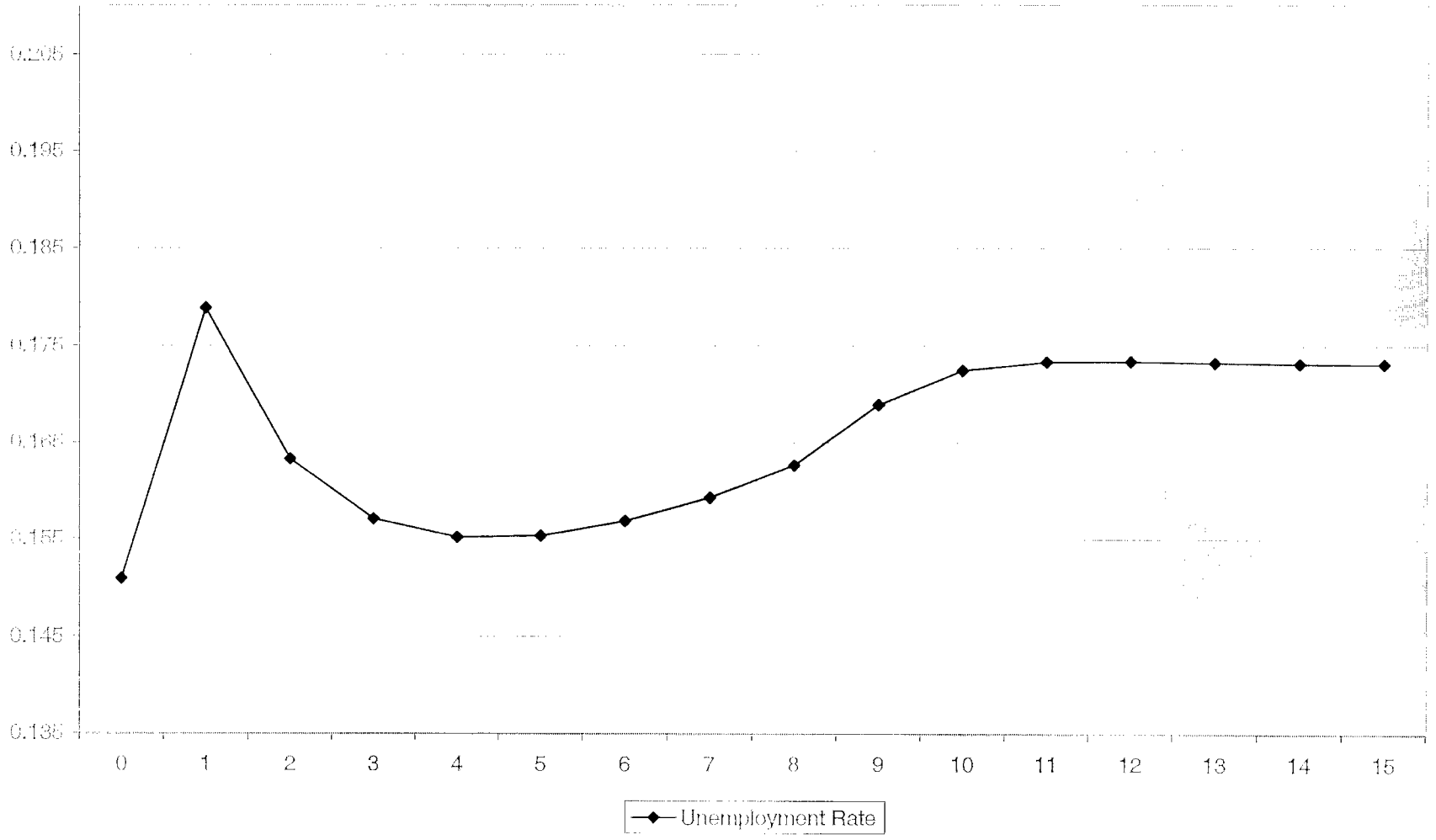

Figure 15: Temporary Contracts of 1 Year Duration (J = 9)
Market Output and Labor Productivity