

Why labour hoarding may be rational: A model of firm behaviour during transition

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Editorial Note

Ceema Namazie is a Research Officer in the Economic and Social Research Council Centre for Analysis of Social Exclusions (CASE) at the London School of Economics. This paper forms part of her PhD. Thesis: Welfare and Labour Markets in Transition: The Case of the Kyrgyz Republic (2002), unpublished.

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Abstract

In the Former Soviet Union, the early 1990s were characterized by large falls in GDP and small changes to already low unemployment. The slow adjustment to unemployment was a result of employers using various means to maintain employment levels, including; extended periods of unpaid leave, reduced hours of work and non-payment of wages. A theoretical model presented here explains why it was rational for firms to adjust labour in this way. The nature of inherited features of the Soviet labour market and lack of institutions necessary for a competitive market economy meant it was in the firm's interest initially to maintain employment levels. Quantitative analysis using Kyrgyz data for 1993 and 1996 provides evidence of changing economic behaviour in agents over this period.

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1 Introduction

Despite similar programmes of reform being implemented in countries in Central and Eastern Europe (CEE) and those in the Former Soviet Union (FSU), recessions took hold across these countries with varying degrees of severity and duration. The FSU experienced almost twice the size of the falls in GDP as that in CEE. Unemployment increased rapidly in CEE while in the FSU moderate increases were only experienced in the late 1990s, see Table 5 in the Appendix. Official unemployment statistics¹ reported unemployment to be less than 1% of the labour force until the mid-90s, increasing to 5% between 1995-1996. This differs from the outcome in countries of CEE which experienced positive growth rates in GDP, albeit small, even in the early 1990s but much larger changes in unemployment. In fact, in the countries of the FSU the reform policies failed to create a competitive market-based environment but rather led to what has been called a “transformation crisis”, with protracted falls in output and high inflation (see Poser (1999)). Inflation was also much higher in FSU Republics compared to CEE, the former experiencing triple digit inflation while the latter was only around 10-20% in the early 1990s (see Table 6 in the Appendix). The variation in outcomes from the impact of the reform process can indeed be ascribed to the previous nature of the regimes in the respective countries and the degree with which reform was embraced and implemented. Indeed some countries had significant features of a market economy several years prior to reform such as Hungary and Poland, while others had been relatively more isolated from non-socialist countries and then introduced swift rapid restructuring programmes, such as Republics in Central Asia, see (Barr 1994) and (E.B.R.D. 1995).

This paper does not try to explain the differences in outcome between CEE and FSU, but instead aims to provide a rationale for the adjustment path that occurred in the FSU. More precisely, the paper is concerned with explaining the slow adjustment of the labour market to output falls in one of the smaller Republics

¹Includes only those registered unemployed.

of the FSU, the Kyrgyz Republic. The Kyrgyz Republic is a small land-locked mountainous country of approximately 4.6m people. The Republic is one of the poorest of the five Central Asian Republics with few natural resources. The affects of the breakup of the Soviet Union on the Kyrgyz Republic included the loss of an integrated trading market and cross-country subsidies, particularly from Moscow (transfers from Moscow accounted for as much as 10% of GDP till 1991, see The World Bank (1993)), and the collapse of a highly specialized integrated production system that spanned Republics within the Union (see Rumer (1989) and Rutkowski (1996)). Despite this the Kyrgyz Republic embarked on what was claimed a rapid programme of reform (E.B.R.D. (1995)). Although there are similarities between the transition with Russia, little is known of the experience of the smaller agrarian economies in the transition to a market economy.

The Kyrgyz Republic experienced falls in GDP of 20% with only positive rates of growth emerging in late 1995, far later than expected. The unemployment figures for the Kyrgyz Republic² are below Russia's, despite the well-known problem of surplus labour in Central Asia, and doubled from 3% in late 1994 to 6% in 1996, the first year of positive growth in GDP. This trend in unemployment is consistent with other measures of unemployment based on the ILO definition using nationally representative household survey data over a transitional period, though absolute levels of real unemployment is much higher than official statistics. Unemployment rates were found to have increased from 15% in 1993 to 28% in 1996, see Table 1 on page 22. Participation rates fell by 18% over the period, greater than the 15% decrease in employment rates. Although unemployment rates for men increased more than for women, participation rates for women decreased by 23% over the period, far greater than for men.

This paper provides a theoretical framework for the enterprise's adjustment process illustrating why slow changes in unemployment, despite large persistent falls in

²Official statistics, which include only those registered unemployed.

output, formed part of a rational outcome. It will be shown that given the institutional features of the labour market which were part of the Soviet system it was in the enterprise's interest to maintain its work force in the early period of the transition process and adjust other factors, such as intensity of worker and current wage costs. Firms were in receipt of subsidies for the provision of social benefits through the enterprise and had access to additional finances allowing them to continue non-profit maximizing behaviour. By varying worker intensity (reducing hours) and delaying costs (wage arrears) employers were initially able to maintain their present employment levels. As the transition to a market economy evolved, State subsidies to the enterprises fell and firms eventually had to cut employment levels. A model of the employer's adjustment strategy explains why these occurrences form a rational response to the changing environment. An empirical analysis is applied based on a tobit model of hours of work in the primary workplace to indicate changing behaviour in the work place.

The explanation of the adjustment process incorporates features of firms adjusting worker intensity rather than quantity, similar to that in Brechling (1965). In Brechling (1965), in the presence of hiring and training costs, firms are shown to pay existing workers a higher, bonus, wage to work additional hours rather than hire additional workers in the light of an increase in demand. Similarly here employers react to a fall in demand by reducing worker hours and delaying wage payments. Firms delay outlays to other firms and, in particular, wages as a means of delaying costs. The ability to delay wage payments to workers can also be seen as the firms ability to substitute away from cash balances as in Brechling and Lipsey (1963). The authors show that trade credit³ can frustrate a tightening of monetary policy in one instance if there is the opportunity to substitute away from cash balances and the firm has the ability to issue transferable trade credit in the form of IOUs. This can be seen as similar to the enterprise's inability to pay workers their wages

³Defined as the sum of outstanding bills and accounts which arise out of transactions among firms or between firms and households, see pg 620, Brechling and Lipsey (1963).

in the event of a fall in demand of its output as well as the fall in transfers from the State. Firms are able to delay workers wages, with a promise to pay later or are able to pay in-kind in the form of the firm's production.

The paper is structured as follows: a background to the Soviet labour market is presented in section 2. Section 3 examines firm level behaviour and presents a theoretical model of firms' adjustment decisions. Section 4 describes the data used in the empirical analysis presented in Section 5. Section 6 concludes the paper.

2 Under the Soviet System

Centralized planning which was prevalent in the FSU resulted in a mismatch between labour supply and demand across different regions and this was exacerbated by the lack of available housing and the need for a valid residential permit, called a '*propiskia*'. Workers were expected to have jobs for life in the enterprise, and work their way up through the highly graded system. In reality labour was relatively mobile and workers were free to change jobs and employers were free to hire whom they wanted, with the majority of hires arranged directly between workers and potential employers, see Marnie (1990), Standing (1991), Barr (1994) and Clarke (1999). Clarke (1999) reports that by the mid-1960s overall rates of labour mobility, approximated by turnover rates in the Soviet Union, were around 20% per annum falling to approximately 15% by the mid-1980s.

In the FSU wage rates were set centrally and strictly regulated. Wage levels were largely determined by a tariff system of around 20 coefficients, based on qualifications and occupation. Workers worked their way up the tariff system according to their rank with the first grade for each profession being determined by an obligatory minimum wage to maintain a certain standard of living, see Shcherbakov (1991) and Oxenstierna (1990). However non-monetary fringe benefits were often used by employers as a method of rewarding more valued workers, and these would include better housing, the use of a dacha, licences to purchase rationed goods amongst

other things; so the more highly educated or privileged elite would in fact be better off despite relative equalities in money wage income.

Places of employment at enterprises were not only sources of wage income but also institutions through which other facilities and benefits were provided to all family members, working and non-working. These services included health and education facilities, child care, subsidized canteens and often also housing. To a greater extent than in Eastern and Central Europe, firms in the FSU provided a wider range of services usually provided by municipalities or other branches of government in market economies. According to McAuley (1997), the provision of such services and benefits through price controls and subsidies, to ensure affordability to the majority of individuals, led to severe budgetary problems in the 1980s and contributed to the collapse of communism. Recently implemented policy has been designed to cut firm benefits, including decrees that have forced firms to divest themselves of their social assets. Freed from an exogenous requirement to provide benefits, firms were expected to limit provision of benefits that are costly or risky for the firm, resulting in negative implications for employee welfare. In particular the *de novo* (newly created private) firms and recently privatized enterprises would cut back their provision of such benefits since they would be motivated more by profitability. However this has not been the case with even enterprises facing financial difficulties still providing such benefits, and even privatized enterprises providing benefits of some sort (Fajth and Lakatos (1997) and Commander and Jackman (1997)). There has however been a reduction in the array of facilities. In addition the current policy structure of compensation from the State to firms, in terms of tax advantages and subsidies, is positively related to the amount of resources the firm has and creates a disincentive for enterprises to reducing the amount of labour they employ. Data on Russia show that expenditure on social benefits and services by firms was found to amount to about 4.1% of GDP in 1992 and 3.3% in 1993, or approximately 30% of total labour costs, with firms estimated to have contributed at least one-quarter of total expenditure to housing, health, education and cultural services in 1993, see Commander,

Lieberman, and Yemstov (1993). The authors purport this to be equivalent to about 14% of the enterprises total wage bill in 1993 for all firms, while for industrial firms the figure was found to be as high as 20% of the total wage bill. In contrast, they find Polish expenditure on social housing funds as a percentage of the wage bill was no more than 10% for industry in 1989. This meant that in general enterprises of the FSU entered transition with a higher level of commitment to benefit provision.

3 Explaining the Behaviour of the Firm

Exploring the interaction between workers and employers within the context of the inherited Soviet institutional features provides a greater understanding of the adjustment process that occurred.

In this paper it is argued that labour managed models of the firm, rather than insider models of the firm (see Blanchard, Commander, and Coricelli (1995)) are appropriate for analyzing firm behaviour. In the latter models, wages are set as high as possible to maintain enough employment for the insiders. However, Blanchard, Commander, and Coricelli (1995) state there are three qualifying factors to the insider model, which provide some explanation for the differences in outcomes across the FSU and CEE countries. The first qualification refers to the relative role of the workers versus managers, the second to the time horizons of both workers and managers, which in turn depend on the process of privatization (the slower the privatization process the longer the horizon and the opportunity for managers and workers to work together through restructuring), and the third to the external environment in which the firm operated, in terms of hard or soft budget constraints. These are taken in turn.

The greater role of workers in decision-making was found to be related to trade union membership. Although membership of trade unions was widespread, the degree of militancy varied and was found to be relatively low in CSFR and Hungary, compared to Poland, see Blanchard, Commander, and Coricelli (1995). It was also

expected that as a result of the privatization process changes in the ownership, and ultimately the governance structure, would accelerate the elimination of any employment bias by varying the relative bargaining power of managers and workers, see Commander, Fan, and Shaffer (1996). Changes in the governance structure through outsider stakeholders were expected to have a greater impact in restructuring within the enterprise. However this did not happen and the privatization programme resulted in insiders holding a dominant ownership. In Russia, and in the FSU in general, privatization resulted in insider control, with managers often getting a disproportionate share of control, and claimed to reflect the explicit *de facto* importance of workers in decision-making, see Blanchard, Commander, and Coricelli (1995).

Even when managers were in decision-making positions worker influence was in no way marginal, and managers rarely made decisions at odds with the perceived interests of their workers. This is likely to be a combination of both adjustment costs as well as expectations with respect to future output, constituting some form of labour smoothing, as well as benevolence, which would explain the continuing high hiring rates. The privatization of enterprises also meant that there was now limited opportunity for managers to shift between positions previously appointed directly by the State.

One reason workers were willing to cooperate with managers over working conditions was for the provision of social benefits through enterprises, which can be seen as a social safety net. State enterprises were often large employers, particularly in the FSU and were also places where social benefits were provided though the cost was often borne by the State through a transfer or subsidy. The amount of transfers was dependent on the resources, namely labour, the enterprise utilized. The economies of scale of large scale benefit provision meant that it was relatively cheaper for a large scale firm to provide such benefits to a large number of workers. Workers who maintain attachment to enterprises are thus able to gain access to facilities, such as kindergartens, subsidized canteens, health care, where no alterna-

tive (affordable) provision is available outside the enterprise, see Standing (1993). However, with the collapse in output and the loss of transfers from Moscow, state enterprises did experience financial difficulties as enterprise subsidies gradually decreased, energy prices and the prices of inputs increased while the market for many of these unsaleable goods disappeared. This led to the worsening of the financial position of many enterprises.

Welfare considerations are likely to help explain why workers remained attached to enterprises even when wages are paid with delay, and may also help explain why wage arrears were endured by the work force. This is also reinforced given that wage arrears were relatively widespread and workers were unlikely to be paid in other places of employment, should firms be hiring. Shorter working hours were also introduced. By allowing flexibility in hours, workers are able to divert effort to other activities, formal or informal, where they were likely to be paid. However this paternalistic role of employers is likely to change over the coming years as responsibility for non-monetary benefits diminishes. See Standing (1993) on the changing role of the state.

The uncertainty regarding future expectations can be understood given the unique situation of the collapse of the Soviet Union. The demise of the CMEA Council and the liberalization of input prices resulted in sharp falls in demand for products which are unlikely to be able to compete in other competitive markets. The persistence in the down turn in demand and the need to find new markets for products caused uncertainty in production decisions. In response, managers maintained a supply of labour in lieu of the increase in demand.

The uncertainty of the change in demand also led to employers being reluctant to get rid of skilled labour which they would need if demand were to pick up. The reluctance to adjust the quantity of labour is reinforced if employers encounter costs of hiring and training new workers and thus the loss of workers would be a loss of investment. These non-wage costs and specific worker skills result in labour being costly to adjust in the short term, hence labour can be seen as a quasi-

fixed factor in the short term, see Oi (1980). Rather than varying employment levels, employers varied hours of input and accepted flexibility in workers' effort levels. This is similar to the adjustment described in Brechling (1965) using the example of British manufacturers, where for an unexpected change in demand it is optimal for the firm to pay its existing workers a higher wage for additional hours rather than hire additional workers which would involve hiring and training costs. Adjustment is in terms of the hours of utilization of the work-force rather than quantity of work force. In the Kyrgyz Republic, and in the FSU in general, instead of actually laying off workers, those employed were subjected to reduced hours, extended leave, particularly maternity leave for women (although positions previously kept available for women on maternity leave were later withdrawn) and wage arrears, while the enterprise went through bad times. These mechanisms had the result of decreasing the firms' wage bill, often costlessly in terms of unpaid leave or wage arrears particularly in times of high inflation, while still maintaining a supply of skilled labour should demand pick up. Even when paid, workers were often paid in-kind in the output of the firm that the firm could not sell and workers would find their own outlets to sell or barter the goods. The incidence of wage arrears has been particularly severe, with little difference in whether the enterprise is state or private, see Evans-Klock and Samorodov (1998) and Windell, Anker, and Sziraczki (1995).

At the enterprise level, the legacy of the Soviet period created incentives which led to distortions in economic behaviour, focusing on short-term gains. Informational problems of the central planning agency and the distortions of price and lack of private property are attributed with causing x-inefficiency or 'organizational slack' in the allocation of resources (Poser 1999). Output maximization seemed to be a central issue, with senior managers awarded generous bonuses for meeting prescribed targets (Chapter 5, Bergson (1964)). However targets were set not only for output levels, but also for per unit costs. If output targets were met, there was some flexibility over employment and wage bill targets and hence it was in the employer's

interest to consider both input and output targets, though it was not unusual for firms to run budget deficits (see Portes (1969)). The transition period was expected to be a period over which the firm's objectives moved towards profit maximization under competitive behaviour. Since a loss making firm was not expected to become a profit making firm instantaneously, in the interim period the firm was often able to gain some additional financing from State banks or other financial institutions to cover some of these deficits. The firm was thus able to operate under what was referred to as a soft budget constraint. The absence of formal bankruptcy laws and the ability to gain additional finances and postpone outlays in the FSU, and in particular in the Kyrgyz Republic, have enabled unprofitable firms to continue production and is important in understanding the slow adjustment in the labour market despite the falls in output demand.

The availability of additional financing permitted the continuation of old practices in State enterprises and this was perpetuated by the privatization process which led to a majority of the enterprises being sold to their managers, or employees, and enterprises became largely insider dominated. The result in many countries, as in the Kyrgyz Republic, was merely a change in ownership without the supporting institutions, financial, legal framework, bankruptcy laws, defined property rights etc. to make change in ownership effective, see Thornton (1997).

Another reason for inducing more cooperative work relations is due to the asymmetrical information about the nature of the work and the effort and skill required, which only employees truly know, see Williamson (1975) and Birdsall (2000). The effects of morale on productivity, particularly in large organizations, where workers feel they are merely raw inputs in the production process rather than part of the organization, has been documented as far back as Florence (1953) and more recently in King (1990).

Taking together all these qualifications to the insider model, it is argued that a labour managed or bargaining models are more appropriate than insider models for understanding firm behaviour in the initial years of the reform process. In fact

outcomes of insider models can also be explained by managers' decisions rather like a bargaining model. Rather than workers and managers colluding in the interests of the incumbent, managers decide to adjust their labour flows similar to insider models but where managers have a bigger role.

The ability to do this resulted in delayed restructuring of the firm and slowed the move to competitive profit maximizing behaviour. These approaches provide an understanding of the gains of cooperation between workers and employers which have existed over the years.

The result of the persistence in labour hoarding from not adjusting employment levels is declining average productivity in the short run. This is well known even in market economies (Brechling 1965). This phenomenon is embodied in Okun's work, (Okun 1981), which states that output fluctuates more than employment in the course of the trade cycle and the average productivity of labour is pro-cyclical. Again according to Okun's work the average productivity of labour rises with employment and output, and falls when they decline. This is consistent with previous Soviet ideology that the way to maximize output is to include all surplus labour. The consequences of the divergence between actual average productivity increases with employment and the usual assumptions about diminishing returns to employment explain the differences in outcome of employment from falls in output. This relationship can be seen in Figure 1 below, which illustrates the consequence of an output fall, such as that in the Kyrgyz Republic and similar transitional economies.

3.1 A Graphical Illustration

In Figure 1 the production function labelled 'apparent' production function has the property that the average productivity of labour increases with employment and output, while the 'true' production function embodies the usual assumptions of the

law of diminishing returns⁴.

An output fall from X_1 to X_2 should result in a fall of employment from N_1 to N_2 at point B , the long-run cost minimizing level. Instead employment falls only to N_3 at C , along the apparent production function. The costs associated with production are embodied in the cost function, C_f , in the bottom half of the figure. Instead of the costs falling from $C_1(X_1, N_1)$ to $C_2(X_2, N_2)$, the cost of production along the true production function with output OX_2 at point B , the cost of production falls only to $C_2(X_2, N_3)$ at point E , corresponding to point C on the actual production function. However, in addition, costs in the short run are further reduced when firms reduce their outlay by delaying payments to other firms and or to workers in the form of wage arrears. This reduces firms costs to the cost function \hat{C}_f . So in fact in the short run firm experiences lower costs, $C'_2(X_2, N_3)$, point F .

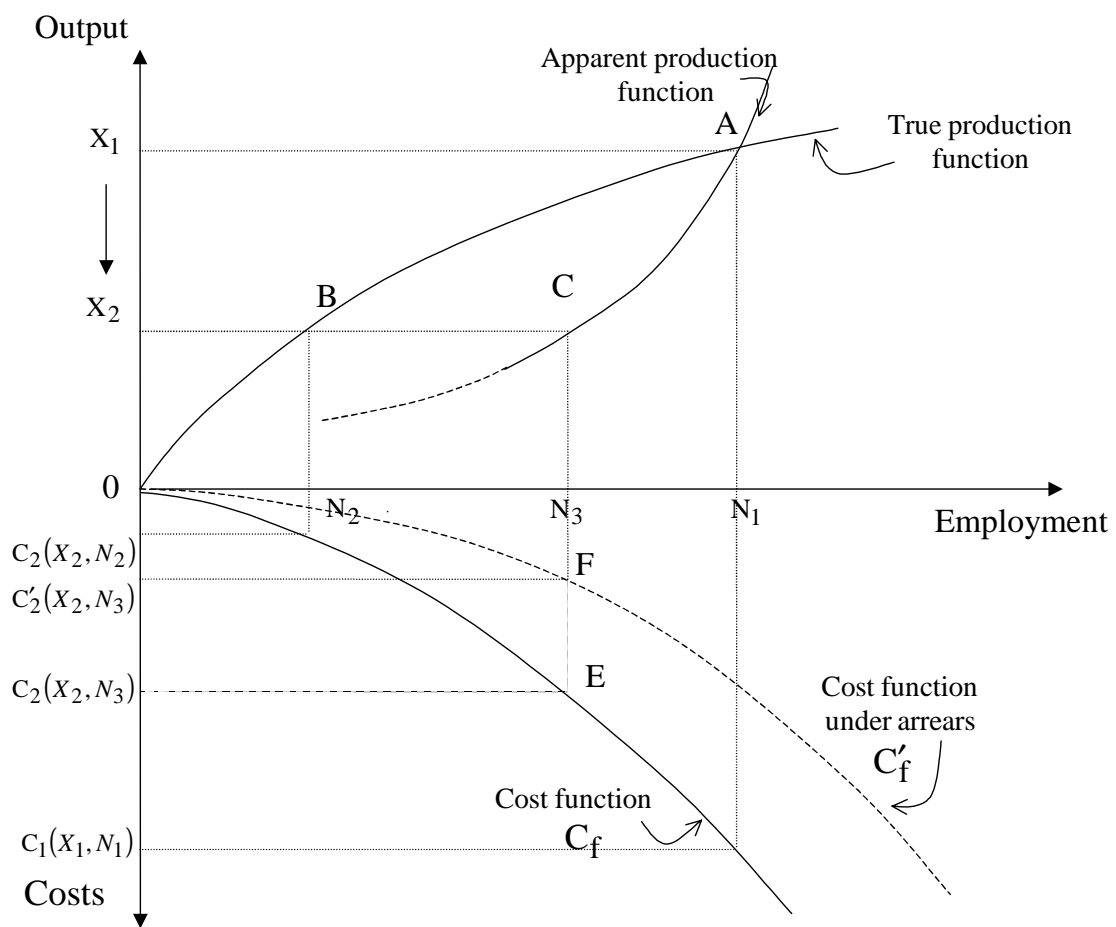
The disparity between these two production functions, the actual and the true, explains why in the short run employment did not appear to adjust fully to output falls. The lowering of costs by delaying payments explains why these small shifts in employment persisted.

3.2 The model

Here we formalize the adjustment process, illustrated in Figure 1, based on stylized facts of soviet institutional features in a model of employers production decisions. It is necessary to understand the environment in which firms operate to appreciate the adjustment path that firms took. Firms operating under the soviet ideology differ from firms operating under competitive markets for several reasons. Firstly, enterprises provide social benefits to the worker through the enterprise. The costs of these benefits are covered by a transfer from the State which is dependent on the

⁴Although it should be noted that at some point the apparant production function will eventually exhibit diminishing returns to scale.

Figure 1: Output, Employment and Costs under Labour Hoarding



amount of labour resources the firm utilizes. Secondly, firms have neither equity nor debt and thirdly, the compulsion to make profit is weak. The objective under central planning was not profit maximization and hence it was not unusual for the firm to operate at a financial loss. In the transitional period to a market economy the firm is able to renegotiate additional finances to cover the deficits from State Banks and institutions, though there is a limit to the amount of finances the firm can continuously renegotiate. This is income over and above the revenue received from selling the output and allows the firm to operate within a soft budget constraint. The enterprise knows that it can only renegotiate a limited, but positive, amount of finances during the transition period. Thus it is assumed that rather than maximizing profits, which is the conventional approach for firms operating under competitive markets, enterprises aim to minimize the deficit. The deficit is the difference between the revenue employers gain from both the output produced and the subsidy from the State, and the costs of production and costs of provision of social benefits. This differs from the firm's objective of profit maximization and cost minimization since there is the added dimension of subsidies and costs to the firm which are dependent on the quantity of labour, which alters the firm's objectives. This is also consistent with the objective of maximizing output whilst minimizing unit costs, as described in Bergson (1964) and Desai and Estrin (1992). Despite these differences, the firm's behaviour can be analyzed using the standard tools as long as we adapt it for the particular institutional circumstances. Here it is necessary to distinguish between the subsidies received for providing employee benefits and also the costs to the firm of doing so in the production function. The inputs used in production are defined as the amount of labour, capital, and all other inputs, as well as the hours worked as an indicator of the intensity in which labour is used. This allows employers to adjust hours of work as well as the amount of labour (and capital and all other inputs), see (Brechling 1965). For this reason hours of labour input enters the firms production function.

The objective function of the enterprise is to minimize the deficit, D ,

$$\min_{h,w,N} D \equiv \{C_1 + C_2\} - \{R + S\}$$

subject to the revenue and cost function constraints,

$$C_1 = whN_i + ru(k_i) + p_I I \quad (1)$$

$$C_2 = N_i C_2(N_i) \quad (2)$$

$$R = F_i(hN_i, u(k_i), I)p \quad (3)$$

$$S = N_i \Phi(N_i) \quad (4)$$

C_1 is the cost of production and C_2 is the cost of providing the social benefit to workers. R is revenue from the production of output, represented by the production function $F_i(hN_i, u(k_i), I)$ times the price of p . For employer i , the production function includes N_i workers, hired h hours, physical capital k and all other inputs I . S is the subsidy from the State to the enterprise for the provision of social benefits. S and C_2 are the new elements relative to the standard model. Here subsidies and costs are specified as so much per worker $\Phi(N_i)$ and $C_2(N_i)$ respectively, but alternative formulations can be provided e.g. $\Phi(N_i)$ as a lump sum, independent of the number of workers. It is assumed there are economies of scale of benefit provision.

The first order condition for minimizing the deficit D is;

$$dD \equiv dC_1 + dC_2 - dR - dS = 0 \quad (5)$$

and the first order derivatives for each component are given as;

$$dC_1 = whdN_i + wN_i dh + hN_i dw + ru'_k(k)dk + u(k)dr + p_I dI + I dp_I$$

$$dC_2 = C_2(N_i)dN_i + N_i C'_2(N_i)dN_i$$

$$dR = p dF + F dp$$

$$dF = F_h N_i dh + F_N h dN_i + F_k u'_k(k)dk + F_I dI$$

$$dS = \Phi(N_i)dN_i + N_i\Phi'(N_i)dN_i$$

The whole expression can be written as;

$$\begin{aligned} dD &= \{whdN_i + wN_i dh + hN_i dw + ru'_k(k)dk + u(k)dr + p_I dI + I dp_I\} \\ &\quad + \{C_2(N_i) + N_i C'_2(N_i)\} dN_i \\ &\quad - \{pF_h N_i dh + pF_N h dN_i + pF_k u'_k(k)dk + pF_I dI + F dp\} \\ &\quad - \{\Phi(N_i) + N_i \Phi'(N_i)\} dN_i \end{aligned} \quad (6)$$

A more intuitive way of writing Equation 6 is;

$$\begin{aligned} dD &= \underbrace{\{wN_i dh + hN_i dw\}}_{\text{(wage bill)}} + \underbrace{\{(r - pF_k)u'_k(k)dk\}}_{\text{(capital costs)}} + u(k)dr \\ &\quad + \{(p_I - pF_I)dI + I dp_I - F dp - pF_h N dh\} + \{wh - pF_N h\}dN_i \\ &\quad \text{(Non-labour costs - Revenue)} + \text{(wage - marginal product of labour)} \\ &\quad + \{C_2(N_i) + N_i C'_2(N_i) - \Phi(N_i) - N_i \Phi'(N_i)\}dN_i \\ &\quad \text{(net cost of benefit provision)} \end{aligned} \quad (7)$$

where $dF > 0$, $p > p_I$ and $F_h < 0$, $F_k < 0$, $F_N < 0$ consistent with diminishing returns.

Alternatively Equation 6 can be expressed as,

$$dD = A + B = 0 \quad (8)$$

where A is the standard (neoclassical) term for a change in profit or loss and B is the institutionally specific terms due to subsidies, or costs of reducing workers.

In equilibrium we assume that the rate of interest, capital accumulation and all other inputs are fixed i.e. \bar{r} , \bar{k} and \bar{I} hence $dr = 0$, $dk = 0$ and $dI = 0$. Enterprises cannot influence p and p_I directly hence also $dp = 0$ and $dp_I = 0$.

So in equilibrium A and B can be defined as,

$$A = whdN_i + wN_idh + hN_idw - pF_hN_idh - pF_NhdN_i \quad (9)$$

$$B = \{C_2(N_i) + N_iC_2'(N_i) - \Phi(N_i) - N_i\Phi'(N_i)\}dN_i \quad (10)$$

In a neoclassical firm in equilibrium it would be expected that $A = 0$ (i.e. no change in profits or loss), but here since in equilibrium the change in the deficit must equal zero, $dD = 0$, it is possibly that in fact $A > 0$, and $B < 0$, i.e. firms can experience a loss while in receipt of subsidies.

Thus re-arranging Equation 9, A can be rewritten as;

$$\begin{aligned} A &= (w - pF_h)N_idh + (w - pF_N)hdN_i + hN_idw > 0 \quad (11) \\ &= (\quad \alpha dh \quad) + (\quad \beta dN_i \quad) + (\quad \gamma dw \quad) \end{aligned}$$

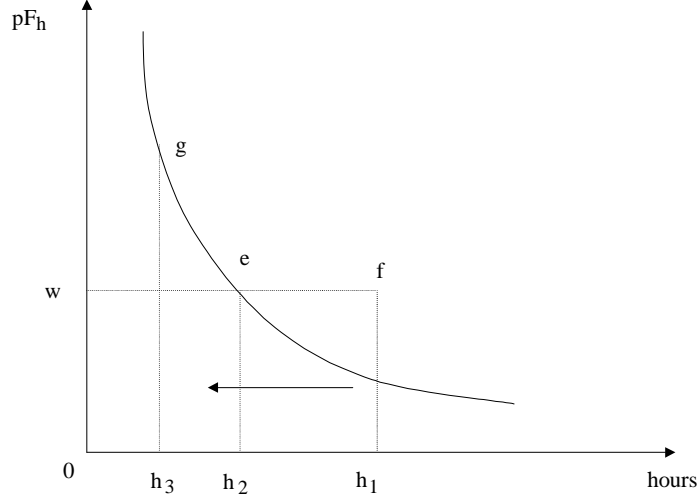
while B remains the same.

Before transition each of the two terms α and β above could be taken as positive, or at best zero, since workers are paid a premium above productivity. This is illustrated in Figure 2. Prior to reform, workers are employed for h_1 hours and are paid a wage, w , which is higher than their marginal product, at point f . As the enterprise reduces the hours of work from h_1 to h_2 the wage equals the marginal product at point e and with h_2 hours. In this case it is in the firm's interest to reduce worker hours. Then the firm may travel along the curve to reduce hours to h_3 and this will raise marginal product to g .

If *hours* are cut (i.e. $dh > 0$, $dN_i = 0$, $dw = 0$) then the marginal product of hours of labour, F_h , would increase ($F_{hh} < 0$). Thus $(w - pF_h)N_idh$ would be decreasing i.e. getting less positive if hours are cut.

Alternatively, rather than changing hours, employers could change employment (i.e. $dN_i > 0$, $dh = 0$, $dw = 0$). If *employment* is adjusted the effect would be

Figure 2: Changes in marginal product as hours changes



$$\beta dN_i + B \quad (12)$$

OR

$$\{(w - pF_N)h + C_2(N_i) + N_i C_2'(N_i) - \Phi(N_i) - N_i \Phi'(N_i)\} dN_i \quad (13)$$

From Equation 13 the affect of adjusting the numbers employed will depend largely on the net cost of benefit provision, since this term is dependent on the number of workers. If this term is negative, i.e. $C_2(N) < \Phi(N)$, then adding an additional worker will decrease the firm's deficit by increasing the revenue of the firm and firms will hire more workers (since the subsidy the employer receives for hiring an additional worker is higher than the cost of providing social benefits). If the net cost of provision of social benefits is positive, i.e. $C_2(N) > \Phi(N)$, then employers will increase revenue if they decrease employment. The first case, with costs per worker of benefit provision less than the per worker State transfer, is likely to be the situation at the start of the reform process. This is not unreasonable since there are likely to be economies of scale in providing benefits through the enterprise and hence for large scale employers, the transfer for an additional worker is assumed

to cover the additional cost of benefit provision. Hence not only is the amount of transfer from the State important, but also the level of employment at the enterprise since the size of the enterprise's work force affects which benefits the firm can afford to provide.

So firms can alter hours or quantity of workers, dh or dN_i . However, if employers encounter large hiring costs when they employ an additional worker, employers could incur huge losses by firing workers. So in the short run at least, the quantity of employees will be fixed. Employers will then vary the intensity of the use of labour if they cannot change the number of workers. In the long run however both factors, the intensity and quantity of workers, will be variable. If there were no hiring costs associated with employing workers then both hours of work and number of workers employed would be variable in the short run and the effects to revenue would be the same as described in the long run above and will depend upon differences in $\Phi(N)$ and $C_2(N)$.

In both cases it has been assumed that wages were not adjusted, $dw = 0$. From Equations 11 and 13 it can be seen that cutting wages, $dw > 0$, would have a negative impact on A and would reduce overall losses in the short term (dw only appears in Equation 11). Hence by delaying wages and cutting hours firms would re-enforce the effect on losses.

As enterprises move towards more competitive behaviour, firms will no longer be responsible for providing benefits and hence subsidies to the firm will also cease i.e. the terms $S()$ and $C_2()$ drop out from employer's objective function. So rather than minimizing the deficit, the firm's objective will be to maximize profits. Firms will have to reduce costs of productions and this will initially be a reduction in the provision of benefits (reducing $C_2(N)$).

We now turn to an empirical analysis of household data to test if implications of the model can indeed be supported by the data. Here we examine for evidence of changing behaviour in the workplace by examining the determinants of hours of work as an indication of work intensity. Before presenting the results, the following

section provides a description of the data.

4 Data description

The empirical analysis is based on nationally representative data from the Kyrgyz Multipurpose Poverty Survey (KMPS) for the Fall of 1993 and 1996. These surveys are World Bank sponsored household surveys, based on the World Bank's well-established Living Standard Measurement Survey. The 1993 survey was designed for the purpose of identifying the poor, while the 1996 Survey was more in line with the standard LSMS format.

A stratified multi-stage sampling procedure was followed so that, in principle, every household had a non-zero random chance of falling into the sample. This paper draws largely from the Adult Questionnaire, and in particular the section related to time use or employment for those respondents aged 16 years and older. In both years roughly 2,000 households and 10,000 individuals were interviewed. Definitions pertaining to the labour market used in the analysis have been taken from ILO guidelines as far as the survey allows, see Blyton (1989) and Hughes (1989).

In 1993 the private sector was still relatively small and so from the 1993 data the number of observations classified as "worker and not entrepreneur nor independent worker", referred to as "worker", was 2,796 out of a total of 2,949 observations for the employed, or 94.8% of those employed. In the 1996 data, of the total number of observations of the employed, 2,167 observations, 1,682 were classified as "worker", or 77.6%. These numbers represent the initial sample sizes before any data cleaning was undertaken for the analysis.

A problem encountered with the 1993 data was the large number of responses of those who classified themselves as working for an enterprise but did not report hours of work and reported not to be on involuntary or administrative leave. Out of the 922 individuals of working age who claimed to be working, 245 were women on maternity leave while 677 remain unaccounted for. The corresponding figures for

those individuals classified as workers and not entrepreneurs, independent workers or self-employed, are 822 not reporting hours, of which again 245 are women on maternity leave. The rest belong to a variety of other occupations. The majority belong to less skilled occupations, over 60% are from State enterprises, around 50% are men and just over three-quarters are owed wage payments. Those individuals who have reported being at work, i.e. not on maternity leave, or on holiday or official administrative leave, have been assigned a value of 0 hours worked. This problem did not occur in the 1996 data and hence corresponding adjustments were very minor for the 1996 data set.

5 Empirical Analysis

In this section empirical evidence is provided indicating that employers initially adjusted worker intensity early in the reform process, in 1993, before significant adjustments in the quantity of labour were made later on, in 1996. The reduction in employee's work-load is seen as a tool by which managers are able to reduce labour costs whilst maintaining employment levels at the enterprise. In the absence of employer or enterprise data, the empirical approach applied here is to look for changes in hours worked in the primary place of employment.

For this study, those working less than 41 hours a week are considered to be working less than full-time, or working reduced hours. An examination of the 1993 data found the majority of workers clustered around a 41 hour week while for the 1996 Survey workers were asked about their working schedules corresponding to a 41 hour week. This is different from a widely used classification of part-time work which is usually based on 15 hours or less a week since during the Soviet period part-time work was, and is, relatively scarce, see Oxenstierna (1990) and hence it is important to examine how widespread the occurrence was of workers working less than full-time. Official part-time workers made up as little as 4% of the work force in 1996, which translates to 12% of those on reduced hours. Though there

are no comparative figures for 1993, evidence suggests it is unlikely to have been higher than the 1996 rate, a relatively low figure given the high fertility rate and employment rate for women. Oxenstierna (1990) also notes that part-time work was even rare amongst women. Although however officially working full-time, women who had to manage responsibilities both at home and at work did in fact have low productivity at work. Also, despite the official retirement age of 55 years for women, and 60 years for men, people are able to work and claim their pension, which they often do given the low level of pension payments. For this reason data disaggregated by age for older workers have differing cut-off values for men and women.

Here we look at those workers working less than full-time hours including those placed on official reduced schedules. We do not differentiate between workers voluntarily working less than 41 hours from those on official reduced schedules in the summary statistics but do account for this difference in the regression analysis.

Firstly we examine the over picture of the labour market and the incidence of workers working less than full-time.

5.1 Summary Statistics

Table 1 illustrates how the overall labour market changed between 1993 and 1996. It can be seen that over this period there was a contraction in the labour force, shown in a fall in the participation rate from 66% to 54% of the working age population. In particular the percentage of women that have withdrawn from the labour market by 1996 is as high as 23%. The rural areas have fared particularly badly, with unemployment more than doubling.

Table 2 illustrates the incidence of less than full-time working schedules for specified characteristics. In 1993 the incidence of workers working less than a full-time schedule was as high as 25%. However, including the number of workers who were working and did not report any hours which was 21%, the figure increases to 46% of workers. The incidence fell to 32% by 1996. The low standard errors suggest this

Table 1: Labour force rates, 16+ and working-age, 1993 and 1996

16+		Total	Male	Female	Urban	Rural
(s.e. in parentheses)						
<i>Participation Rates</i>	1993	0.66 (0.007)	0.76 (0.006)	0.56 (0.007)	0.63 (0.007)	0.67 (0.006)
	1996	0.54 (0.007)	0.66 (0.006)	0.43 (0.007)	0.53 (0.007)	0.55 (0.007)
<i>Employment Rate</i>	1993	0.85 (0.005)	0.85 (0.005)	0.86 (0.005)	0.84 (0.005)	0.86 (0.005)
	1996	0.72 (0.006)	0.71 (0.006)	0.74 (0.006)	0.84 (0.005)	0.66 (0.006)
<i>Unemployment Rate</i>	1993	0.15 (0.005)	0.15 (0.005)	0.14 (0.005)	0.16 (0.005)	0.14 (0.005)
	1996	0.28 (0.006)	0.29 (0.006)	0.26 (0.006)	0.16 (0.005)	0.34 (0.006)
16-54/59						
<i>Participation Rates</i>	1993	0.78 (0.006)	0.85 (0.005)	0.72 (0.007)	0.77 (0.006)	0.79 (0.006)
	1996	0.65 (0.007)	0.74 (0.007)	0.55 (0.007)	0.63 (0.007)	0.66 (0.007)
<i>Employment Rate</i>	1993	0.85 (0.005)	0.84 (0.005)	0.86 (0.006)	0.83 (0.006)	0.86 (0.005)
	1996	0.72 (0.007)	0.71 (0.007)	0.73 (0.007)	0.84 (0.005)	0.65 (0.007)
<i>Unemployment Rate</i>	1993	0.15 (0.005)	0.16 (0.005)	0.14 (0.005)	0.17 (0.006)	0.14 (0.005)
	1996	0.28 (0.007)	0.29 (0.007)	0.27 (0.007)	0.16 (0.005)	0.35 (0.007)

Source: Author's calculations based on KMPS 1993 and 1996

Table 2: Working less than full-time per week, 1993 and 1996

	1993		1996
Maternity Leave ²	8.8		
Reported hours missing ^{2,3}	20.8		
Reported +ve hrs less than f/t	25.2		
	(0.011)		
Total *including missing	46.0		32.0
	(0.011)		(0.012)
<i>Official part-time jobs</i>			4.0
Men	33.0		31.0
	(0.014)		(0.016)
Women	53.1		33.4
	(0.018)		(0.018)
Age group			
16-29	38.1		37.2
	(0.019)		(0.022)
30-49	41.9		30.2
	(0.015)		(0.015)
50-54/59	45.9		18.7
	(0.035)		(0.034)
55/60+	50.0		46.0
	(0.065)		(0.063)
Wage arrears/non-wage arrears			
Wage arrears	36.9		51.8
	(0.015)		(0.026)
No wage arrears	46.1		26.4
	(0.016)		(0.012)
Occupation		Sector	
Military	0.4	Agriculture	55.0
	(0.171)		(0.021)
Legislators	30.8	Mining	26.7
	(0.074)		(0.114)
Professionals	65.0	Manufacturing	17.7
	(0.030)		(0.028)
Technicians	56.5	Elec. gas, water	7.3
	(0.033)		(0.041)
Clerks	48.8	Construction	16.4
	(0.046)		(0.050)
Service Workers	28.0	Commerce	15.4
	(0.043)		(0.041)
Skilled Agri & Fishery wrks.	14.1	Transport	11.8
	(0.066)		(0.032)
Craft & related trade	50.2	Financial	3.1
	(0.030)		(0.031)
Plant & Machine operators	35.4	Services	23.9
	(0.026)		(0.019)
Elementary Occupations	27.1		
	(0.018)		
Enterprise ownership			
State	45.4	State	19.8
	(0.013)		(0.014)
Public Organization	35.1	Social Organization	38.1
	(0.079)		(0.106)
Work Collective	26.5	Cooperatives	30.8
	(0.022)		(0.037)
Private Individuals	44.8	Joint-stock/ventures	21.3
	(0.065)		(0.031)
		Private firms	13.0
			(0.038)
		Farming communities	43.7
			(0.053)
		Private farming	69.7
			(0.026)
Other	29.6	Other	44.4
	(0.088)		(0.096)
Oblast			
<i>North</i>			
Bishkek	59.5		12.6
	(0.030)		(0.016)
Chu	41.0		23.6
	(0.022)		(0.028)
Issy-kul	44.7		28.8
	(0.040)		(0.039)
Naryn	45.5		17.9
	(0.076)		(0.047)
Talass	54.7		12.1
	(0.059)		(0.057)
<i>South</i>			
Djalabad	39.5		44.2
	(0.028)		(0.030)
Osh	31.7		50.3
	(0.018)		(0.023)

¹ Less than full-time is taken as less than 41 hrs/week. ² Out of all workers.

³ Includes those on maternity leave. ⁴ Standard errors in parenthesis.

Source: Authors calculations based on KMPS 1993, 1996

fall is statistically significant. Female workers had a higher incidence of working less than full-time compared to men in 1993, while in 1996 the disparity reduced with the incidence falling to just over 30% for both men and women. While there is no particular age bias, in 1993 younger workers experienced a slightly lower incidence of less than full-time schedule and in 1996 older workers (50-54/59 years old) had a distinctly lower incidence at 19% compared to the other age groups which ranged between 30% and 46%.

The difference across workers experiencing delays in wage payments and those that do not is supportive of the hypothesis that workers adjusted intensity of hours. In 1993 the incidence of less than full-time work was high across both categories of workers while by 1996, those workers experiencing wage arrears had a higher incidence of working less than full-time compared to those workers receiving wages. This would suggest that employers adjusted worker intensity early in the transition process and by 1996, those employers likely to be experiencing bad times, would use both delays in payment and reduction in hours. The incidence was as high as 52% for workers experiencing wage arrears and 26% for those not experiencing wage arrears, see Namazie (2001), for the incidence of wage arrears which was as high as 58% in 1993 but had fallen to 24% in 1996.

There are some distinctions across occupations with higher skilled occupations, professionals and technicians, and the very lower skilled occupations, clerks and craft and related trade workers, experiencing significantly higher reduced working schedules than the other occupations. The incidence amongst these groups was as high as 50% and above. Interestingly workers in elementary occupations and skilled agricultural and fishery workers experienced the lowest incidence of less than full-time work, apart from those in the military. The category elementary workers includes largely farm workers, and these workers could well have continued to work on the land for their own purposes (though it is important to note that agricultural workers were subject to particularly high incidences of wage arrears, again refer to Namazie (2001)). In 1996 the agricultural and service sectors both had higher in-

cidences of less than full-time working schedules, 59% and 22% respectively, both sectors which are dominated by low skilled workers. The majority of enterprises had not been privatized in 1993 and hence State enterprises have a higher percentage of workers on reduced schedule, 84%, than other categories. Work collectives had as many as 10% on less than full-time working schedule. Work collectives were largely agricultural based enterprises and included the Kolkhozs and Sovkhozs (collective and state farms), with approximately 80% of workers from rural areas. Work collectives also includes workers of cooperatives, and the latter tended to operate in areas of catering and consumer goods and tended to be productively more efficient than many other forms of non-state ownership, and their workers often received higher than average wages, see Kuznetsova (1991).

In 1993 there was a higher incidence of less than full-time work in the less rural areas, though in general the frequency was 40% and over. In 1996 the incidence was much lower across all regions, though rural regions had a higher incidence of less than full-time work, particularly in the south which experienced higher incidences of 44% and 50% in Djala-abad and Osh, compared to 20% or less in the rest of the country.

These trends are consistent with the dire situation in 1993 which was particularly bad for agricultural workers who may have worked longer hours in agricultural activities as part of a subsistence-level coping strategy. In 1996, employers have adjusted quantity of employment to some extent, but still employers try to reduce work intensity and costs. Agricultural workers, who still tend to be the worse off in 1996, may have had to reduce hours in primary employment and substitute employment with off-farm activities and this would account for the reduction in hours.

The above results showed evidence that reduction in work intensity was higher in 1993 compared to later in 1996 when participation rates had fallen and unemployment increased. However summary statistics provide a picture of incidence of a reduced working schedule across different worker characteristics. In order to capture the interaction between different effects regression analysis is used.

5.2 Regression Analysis

For this analysis the tobit model or censored regression, is used since the distribution of the dependent variable (hours of work) being analyzed is a mixture of discrete and continuous outcomes i.e. workers with zero and positive hours of work. A brief definition of the variables included in the regressions can be found in the Appendix.

The regression model The regression is specified as follows;

$$\begin{aligned}y_i^* &= \beta' x_i + \varepsilon_i \\y_i &= 0 \text{ if } y_i^* \leq 0 \\y_i &= y_i^* \text{ if } y_i^* > 0\end{aligned}$$

where y_i^* is the natural log of weekly hours worked of workers in the primary place of employment. The vector x_i is a vector of both individual characteristics of workers, including worker type and enterprise characteristics.

As mentioned previously in the data section, there are slight differences between the 1993 and 1996 surveys. For this reason there are slight differences in the work-related variables included in the 1993 and 1996 regressions. For 1993 only information on the wage that workers received is included. In 1996 information on workers' salary as well as amount received was provided and so both variables are included. In both years a dummy variable for those who work in additional activities is included, as well as the average income from these activities for those workers. Workers who have been placed on a reduced working schedule by their employer are identified by a dummy variable called "Reduced hours". In 1993 information on occupation codes was collected, while in 1996 there is information on worker type and sector, as well as information on individuals' years in the firm and in the occupation.

The determinants of hours worked in the primary place of employment is likely to differ for men and women and hence number of children, both of the young (6-15)

and very young (0-5) are included. Location dummies account for differences in the economic conditions across regions. The oblast level rather than a lower geographical level is included since workers are unlikely to be limited to working within a narrow regional area. An array of household assets/durables is also included to provide some control for the economic status of the household. In both years the list of assets comprised of the following list; refrigerator, washing machine, black and white television, colour television, video cassette recorder and a car. For 1993 ownership of a motorbike is included in the regression but this information is not available in 1996. These items were selected to reflect those that were not necessarily biased by location, since all areas have access to electricity and hence there is no urban bias in the selection.

Ideally information on workers' salary, not just amount received, would have been useful. However this information was not collected in 1993, though given that wages were still following the highly centralized rewarding system, distinctions between workers in 1993 are likely to be captured in other work related variables. Despite the slight differences in the survey, comparable information has been incorporated and any loss of generality in the results is likely to be small.

5.3 Results

Due to the problems of accurate reporting of information on income and secondary employment we note which characteristics are significant rather than attaching importance to the value of the associated coefficient.

Table 3 presents the results of the tobit regression for workers in 1993. From these results it can be seen that wage arrears and an imposed reduced working schedule have a negative effect on hours worked, as does the amount of income workers earn from additional activities. The latter indicates workers may be working outside their enterprise and hence are cutting down hours of work in their primary employment. Plant operatives work less hours than elementary workers, and in-

terestingly only “other” defined enterprise workers work less than State enterprise workers, with workers in work collectives working longer (consistent with the finding of agricultural workers working longer on land for their own gain as found in the summary statistics). This is also consistent with urban workers working less hours than workers in rural areas. As expected, men work longer hours than women and having very young children has a negative impact on hours work.

Focusing on the separate male and female results, these results carry over with only a few notable exceptions. There are no significant differences across occupation groups for men, though female plant operators work less than female elementary workers and again urban and rural differences carry over for women workers. Income from secondary activities is only (negatively) significant for men.

Although not presented in the table, the array of durables, which is can be interpreted as a proxy for wealth, were found to be jointly significant but only the ownership of a refrigerator was (positively) significant across all three regressions.

In the 1996 results, in Table 4, again wage arrears, reduced working schedules and income from secondary activities have a negative impact on hours worked. The amount of wages the worker actually receives is negatively correlated with hours worked and this is consistent with workers on higher salaries working longer hours. Plant and machine operators is an indication of the relative size of blue collar workers in the manufacturing sector. (This group comprises of approximately 16% of workers in 1993, though many may also be found in the category for elementary workers). Owners and members of manufacturing cooperatives work longer hours compared to white collar workers, and workers in manufacturing work more hours than agricultural workers, again consistent with higher paid workers working longer hours.

The insignificance of educational differences in the overall model could be because worker type and sectorial differences capture all differences in qualifications. There is little indication that highly skilled workers left for privatized enterprises by 1996, with State and Public/Social Organizations still retaining a higher proportion of

individuals with higher education in their work force. This is not entirely unexpected given enterprises were largely sectorial based. Workers with specific skills would have not been choosing between State or non-State enterprises, but between sectors which could lie wholly in one or the other form of ownership. This has been a result of the sector-wide approach to privatization, with also certain industries (e.g. defence) being wholly excluded from the privatization process.

Despite the number of years a worker has worked in his or her present occupation or for his or her present firm which could be controlled for in the 1996 regression runs, neither of these variables were significant. Though in the male-only sample, workers with less than high school education work more hours than those with higher education (this was found in the summary statistics).

The distinctions across males and females are less notable, except that the result for higher salaries and inverse amount of wages received is significant for women not men, while again income from additional activities is only negatively significant for men. Also interestingly, having older children in the household has a negative impact on male workers rather than female workers. The lack of effect of children in the household on female workers may be due to changes in the provision of child care facilities (one facility that has been greatly reduced in many enterprises) which has meant that pregnant women or women who do have to look after young children have had to withdraw from the labour market altogether. Ownership of the household durables items were not found to be significant in the three regressions. Asset ownership may have been a more distinguishing feature amongst households in 1993, when households actually ran down their assets during the peak of the recession while by 1996 asset ownership across households was not significantly different.

Another interesting result is that less skilled workers in agricultural areas seem to work less hours in their primary employment. In 1993 the economic conditions were far worse and hence all workers (high skilled and less skilled) were affected by the situation, though again less skilled workers in agricultural activities did fare worse even then. The improvements of the fit of the model (the log likelihood estimate

falling from -4964.69 to -1892.50) provide some support for this too, implying that work related variables appear to better explain workers' patterns, more so than in 1993. The reduction in the number of censored observations which reflects the number of workers employed but not working at the enterprise over the period is also an indication of change in employers' behaviour. This is consistent with a reduction in labour hoarding, and a general fall in (rural) employment rates.

Table 3: Tobit regression of hours worked, 1993

ln hrs worked a week	All		Male		Female	
	<i>Coeff.</i>	<i>t</i>	<i>Coeff.</i>	<i>t</i>	<i>Coeff.</i>	<i>t</i>
constant	1.14	2.12 *	2.34	3.67 *	2.39	2.70 *
Age	0.04	1.53	0.01	0.32	-0.02	0.37
Age ²	-0.05	1.38	-0.02	0.38	0.04	0.62
<i>Gender (Female)</i>						
Male	1.12	9.98 *				
<i>Education level (Higher education)</i>						
Less than High School	0.01	0.08	-0.04	0.29	0.00	0.00
High School	-0.46	3.30 *	-0.36	2.14 *	-0.56	2.41 *
<i>Occupation Group (Elementary Workers)</i>						
Managers	0.26	0.67	-0.09	0.24	0.43	0.40
Professionals	-0.05	0.27	-0.02	0.07	0.06	0.20
Technicians	-0.26	1.43	0.19	0.66	-0.45	1.74
Clerical	0.27	1.20	0.59	1.56	0.04	0.11
Personal Services	-0.17	0.75	0.08	0.26	-0.54	1.45
Agri. Labour	-0.49	1.28	0.05	0.13	-1.93	1.61
Craft	-0.20	1.10	0.09	0.48	-0.57	1.25
Operatives	-0.38	2.38 *	0.01	0.08	-1.46	3.75 *
<i>Work Characteristics (Full-time)</i>						
Arrears	-0.87	6.55 *	-0.04	2.62 *	-1.24	5.60 *
Reduced Hours	-2.16	6.58 *	-2.29	6.75 *	-1.69	2.40 *
Ln mthly wages received	0.00	0.70	0.00	0.74	0.00	0.89
Hold second job	0.56	1.60	0.66	1.65	0.12	0.20
Ln Income other labour activ.	-0.001	2.26 *	-0.001	2.41 *	-0.001	1.12
<i>Enterprise (State)</i>						
Public Organization	0.51	1.37	0.58	1.20	0.24	0.42
Work collective	0.32	2.45 *	-0.03	0.24	0.89	3.93 *
Private Firms	0.24	0.77	0.19	0.57	0.84	1.47
Other	-0.74	1.91 *	-1.45	3.40 *	0.29	0.40
<i>Household attributes</i>						
No. of child. 0-5 years old	-0.24	4.84 *	0.04	0.68	-0.66	7.47 *
No. of child. 6-16 years old	0.00	0.05	-0.04	0.92	0.09	1.43
<i>Assets</i>						
<i>Type of Region (Rural)</i>						
Urban	-0.30	2.14 *	-0.17	1.00	-0.50	2.24 *
<i>Oblasts (Osh)</i>						
<i>Ethnicity (Kyrgyz)</i>						
Observations	2684		1419		1265	
Log likelihood	-4964.69		-2676.234		-2187.133	
Pseudo R ²	0.0422		0.0349		0.0622	
LR Chi (d.f)	437.14 (42)		193.84 (41)		290.03 (41)	
no. of censored obs.	861		348		513	

Omitted groups for dummy variables are in (*italics*)

* statistically significant at the 5% level

Source: Author's calculations based on KMPS 1993

Table 4: Tobit regression of hours worked, 1996

Ln hrs worked a week	Total		Male		Female	
	<i>Coeff.</i>	<i>t</i>	<i>Coeff.</i>	<i>t</i>	<i>Coeff.</i>	<i>t</i>
constant	3.17	10.75 *	3.68	10.22 *	2.66	5.19 *
Age	-0.00	0.84	-0.00	0.24	0.01	0.27
age ²	0.01	0.43	0.03	0.16	-0.03	0.10
<i>Gender (Female)</i>						
Male	0.20	4.40 *				
<i>Education level (Higher education)</i>						
Less than High School	0.15	1.72	0.23	2.19 *	0.07	0.48
High School	-0.03	0.47	-0.05	0.75	0.01	0.11
<i>Worker type (White collar)</i>						
Blue collar	-0.09	1.43	-0.14	1.82	-0.03	0.32
Owner	0.73	3.44 *	0.57	2.06 *	0.99	2.97*
Manu. Coop.	0.43	3.28 *	0.26	1.66	0.71	2.98*
Professional	0.03	0.10	0.12	0.67	0.02	0.06
Domestic services	-1.27	1.50	-1.76	2.26 *		
<i>Skills/Experience (Years in firm & Occupation)</i>						
<i>Work Characteristics</i>						
Arrears	-0.76	3.63 *	-0.22	2.21 *	-1.04	2.97 *
Reduced hours	-0.73	7.10 *	-0.07	3.99 *	-0.82	4.89 *
ln mthly Salary	0.12	3.94 *	0.00	1.01	0.21	3.40 *
ln mthly wages received	-0.09	2.48 *	-0.00	0.56	-0.12	2.03 *
Hold second job	0.33	1.30	0.10	0.34	0.06	0.90
ln Income other activities	-0.10	1.99 *	-0.002	3.42 *	-0.00	0.97
<i>Enterprise (State)</i>						
Social Organization	-0.24	1.32	-0.16	0.52	-0.18	0.72
Cooperative	-0.08	0.88	0.01	0.08	-0.23	1.37
Joint Company	-0.08	1.06	-0.10	1.11	-0.02	0.11
Private firms	0.12	1.18	0.13	1.01	0.11	0.67
Farming community	-0.11	0.93	-0.07	0.59	-0.26	0.92
Private farm	-0.40	4.30 *	-0.39	3.76*	-0.44	2.35*
Other						
<i>Sector (Agriculture)</i>						
Mining	-0.31	1.33	-0.17	0.76		
Manufacturing	0.23	2.25 *	0.27	2.36*	0.20	0.94
Utility	0.10	0.65	-0.01	0.04	0.35	1.09
Construction	0.14	1.05	0.19	1.42	-0.03	0.08
Commerce	0.06	0.49	0.10	0.62	-0.02	0.11
Transport	0.01	0.12	0.13	1.06	-0.20	0.75
Finance	0.10	0.60	0.07	0.29	0.04	0.13
Services	0.05	0.55	0.02	0.17	0.05	0.28
Other	0.53	0.57			0.45	0.50
<i>Household attributes</i>						
no. of child 0-5 years old	-0.04	1.57	-0.03	1.08	-0.05	1.09
no. of child. 6-15 years old	-0.05	2.67 *	-0.07	2.86 *	-0.03	0.92
<i>Assets</i>						
<i>Type of Region (Rural)</i>						
Urban	0.06	0.85	-0.09	1.03	0.18	1.60
<i>Oblasts (Osh)</i>						
<i>Ethnicity (Krygyz)</i>						
Observations	1539		857		682	
Log likelihood	-1892.50		-968.00		-892.01	
Pseudo R ²	0.0897		0.1112		0.0873	
LR Chi (d.f)	372.97 (53)		242.29 (51)		170.59 (50)	
no. of censored obs.	73		32		41	

Omitted groups for dummy variables are in (*italics*)

* statistically significant at the 5% level

Source: Author's calculations based on KMPS 1996

6 Conclusion

The purpose of this paper was to explain the slow adjustment in employment in the Kyrgyz Republic that took place so much later in the reform process despite initial large falls in output. Here we explained why this was a rational process of adjustment given the particular institutional features of the Soviet labour market that were similar throughout the FSU.

The main contribution of this paper was a model of employer's adjustment strategy, which illustrated that whilst employers were uncertain of the extent of the economic downturn, and enterprises provided enterprise benefits and were in receipt of State subsidies, it was in the firm's interest to vary worker intensity (hours of work) and delay costs (wage payments). As subsidies dried up, and it became too costly for firms to provide social benefits, employers reduced the quantity (number) of workers and hence employment fell and unemployment increased. This shift is a reflection of a change in behaviour towards more competitive behaviour in the labour market

Intensity of work and delaying of costs were modelled using hours of primary work and wage arrears, respectively. Empirical evidence found here supports the predications of the model, namely that while in receipt of subsidies for the provision of benefits firms varied hours of work but as these subsidies decreased employment levels changed. The incidence of both these aspects were high in 1993, while by 1996 both wage arrears and the proportion of workers working less than full-time had fallen significantly. The general bad economic conditions prevalent in 1993 is reflected in the prevalence across all worker characteristics in the 1993 data. In 1993 all occupations had a relatively high proportion of workers working less than full-time, and there was little difference across the enterprise ownership type. An important consideration in 1993 was the large number of workers, as many as 822, who reported being employed but had worked zero hours over the reference period, again an indication of employers maintaining workers on record but allowing for

flexibility in intensity of work. Many of these workers were low skilled or farm workers. In the 1996 data, summary statistics show that agricultural workers fared worse in terms of working less than full-time work, though the incidence was also high for the service and the industrial-based sectors. The results of 1996 suggest that working schedules were more in-line with what we would expect in a competitive labour market, with higher paid workers working longer hours and the negative effects of wage arrears and additional employment activities.

Delays in labour market adjustment that has lagged behind falls in output can be seen to form a rational adjustment process by employers in the light of the specific institutional features of the Kyrgyz (and other FSU) Republics, namely the provision of social sector benefits not provided outside the enterprise, enterprise subsidies based on resource holdings and in particular the availability of additional finances permitting the firm to operate against soft budget constraints. So although very slight, there does appear to be some evidence of change in the labour market between the two periods, with the labour market responding a little more to expected patterns by 1996. There is evidence to support the hypothesis of a gradual change in the labour market towards a more profit orientated environment, though there is a long way to go before a full adjustment can be said to have taken place.

7 Appendix: Labour Market Trends

Table 5: Growth in real GDP and Unemployment across the Former Soviet Union, 1992-1996

%	GDP					Unemployment				
	1992	1993	1994	1995	1996	1992	1993	1994	1995	1996
<i>Central and eastern Europe and the Baltic States</i>										
Bulgaria	-7.3	-1.5	1.8	2.1	-10.1	15.3	16.4	12.8	11.1	12.5
Czech Rep.	-3.3	0.6	3.2	5.9	4.8	2.6	3.5	3.2	2.9	3.5
Hungary	-3.1	-0.6	2.9	1.5	1.3	12.3	12.1	10.4	10.4	10.5
Latvia	-34.9	-14.9	0.6	-0.8	3.3	3.9	8.7	16.7	18.1	19.4
Poland	2.6	3.8	5.2	7.0	6.1	14.3	16.4	16.0	14.9	13.2
Slovak Rep.	-6.5	-3.7	4.9	6.9	6.6	8.3	14.4	14.8	13.1	12.8
<i>Commonwealth of Independent States</i>										
Armenia	-52.6	-14.8	5.4	6.9	5.9	3.5	6.3	5.8	8.4	10.1
Georgia	-44.8	-25.4	-11.4	2.4	10.5	5.4	9.1	3.6	3.1	2.8
Kazakhstan	-2.9	-9.2	-12.6	-8.2	0.5	0.4	0.6	7.5	11.0	13.0
Kyrgyz Rep.	-19.0	-16.0	-20.1	-5.4	7.1	0.1*	0.2*	3.1	4.4	6.0
Russia	-14.5	-8.7	-12.7	-4.1	-3.5	5.3	6.0	7.8	9.0	9.9
Tajikistan	-29.0	-11.0	-18.9	-12.5	-4.4	0.3	0.8	1.2	1.3	1.6
Ukraine	-13.7	-14.2	-23.0	-12.2	-10.0	0.2	0.3	0.3	0.5	1.3
Uzbekistan	-11.1	-2.3	-4.2	-0.9	1.6	0.1	0.3	0.3	0.3	0.3

Source: Transition Report update 2000, EBRD based on National Statistical Data

*Transition Report 1998, EBRD based on National Statistical Data

Table 6: Consumer price inflation (annual averages), 1992-1996

	% changes				
	1992	1993	1994	1995	1996
<i>Central and eastern Europe and the Baltic States</i>					
Bulgaria	82.0	73.0	96.3	62.0	123.0
Czech Rep.	11.1	20.8	10.0	9.1	8.8
Hungary	23.0	22.5	18.8	28.2	23.6
Latvia	951.0	109.2	35.9	25.0	17.6
Poland	43.0	35.3	32.2	27.8	19.9
Slovak Rep.	10.1	23.2	13.4	9.9	5.8
<i>Commonwealth of Independent States</i>					
Armenia	1,346	3,732	5,273	176.7	18.8
Georgia	887.0	3,125	15,607	162.7	39.4
Kazakhstan	1,381	1,662	1,892	176.0	39.1
Kyrgyz Rep.	855.0	722.4	228.7	40.7	31.3
Russia	1,526	875.0	311.4	197.7	47.8
Tajikistan	1,157	2,195	350	609.0	418.0
Ukraine	1,210	4,735	891	377	80.0
Uzbekistan	645.0	534.0	1,568	304.6	54.0

Source: Transition Report update 2000, EBRD based on National Statistical Data

Variable and Definitions for Tobit Regression

Age: Age of respondent in 1993 or 1996

Education level: Less than High School: Those individuals who had no more than 9 years of primary and secondary schooling. This category also includes those with no formal education.

High school only: 10 or more years of primary and secondary schooling and did not study elsewhere.

Higher Education: Includes those who undertook 10 or more years of primary and secondary schooling and completed one (or more) of a vocational course or 10 or more years of primary and secondary schooling and completed one (or more) of university level.

Arrears: Those classified as employed and working over the reference period but who had not received a wage payment in the last month.

Reduced hours: Those officially placed on reduced working schedules, where less than full-time is taken as less than 41 hours a week. This variable tries to capture those workers who did not voluntarily decide their hours of work.

Ln mthly wage received: Natural log. of the amount of wages received for the month.

Ln mthly Salary received: Natural log. of monthly salary, in the 1996 data.

Hold Second job: If worker engaged in activities additional to primary employment in 1993, or held a second job in addition to primary employment in 1996.

Ln Income other labour activities: Natural logarithm of income from additional activities for 1993 data. Natural logarithm of income from secondary job for 1996 data.

Assets: Electric stove or central gas supply, refrigerator, washing machine, black and white television, colour television, video cassette recorder, car and motorbike in 1993, refrigerator, washing machine, black and white television, video cassette recorder, car in 1996. The assets included are those that are comparable between the surveys. Additional assets were chosen in 1993 to captures differences between

households given the worse conditions experienced in 1993 and hence the extended list better distinguishes between social groups in 1993.

Type of Region: Urban or Rural.

Oblasts: Naryn, Talass, Djalal-abad, Issuk, Osh, Chui (six oblasts), Bishkek (capital).

Ethnicity: Kyrgyz, Russian, Other Slavs, Uzbeks, Others.

References

- Barr, N. (1994). *Labour Markets and Social Policy in Central and Eastern Europe*. Oxford University Press.
- Bergson, A. (1964). *The Economics of Soviet Planning*. New Haven and London: Yale University Press.
- Birdsall, K. (2000). 'Everyday crime' at the workplace: Covert earning schemes in Russia's new commercial sector. In A. Ledeneva and M. Kurkchyan (Eds.), *Economic Crime in Russia*, Chapter 10. London: Kluwer Law International.
- Blanchard, O., S. Commander, and F. Coricelli (1995). Unemployment and Restructuring in Eastern Europe and Russia. In S. Commander and F. Coricelli (Eds.), *Unemployment, Restructuring and the Labor Market in Eastern Europe and Russia*, Chapter 7. Washington DC: The World Bank.
- Blyton, P. (1989). Working population and unemployment. In R. Bean (Ed.), *International Labour Statistics: A Handbook, Guide and Recent Trends*, Chapter 2. Routledge.
- Brechling, F. (1965). The Relationship between output and employment in British manufacturing industries. *Review of Economic Studies* 32(3), 187–216.
- Brechling, F. and R. Lipsey (1963). Trade Credit and Monetary Policy. *The Economic Journal* 73(292), 618–641.
- Clarke, S. (1999). Labour market behaviour and institutions in the transition to a market economy in Russia. Working paper, Centre for Comparative Labour Studies, Dept. of Sociology, University of Warwick.
- Commander, S., Q. Fan, and M. E. Shaffer (1996). *Enterprise Restructuring and Economic Policy in Russia*. EDI. The World Bank.
- Commander, S. and R. Jackman (1997). Firms and Government in the Provision of Benefits in Russia. In M. Rein, B. L. Friedman, and A. Worgotter

- (Eds.), *Enterprise and Social Benefits After Communism*, pp. 95–114. Cambridge University Press.
- Commander, S., L. Liberman, and R. Yemstov (1993). Unemployment and Labour Market Dynamics in Russia. Policy and Research Working Paper 1167, EDI, The World Bank.
- Desai, M. and S. Estrin (1992). Some Simple Dynamics of Transition: From Command to Market Economy. Discussion Paper 85, Centre for Economic Performance, L.S.E.
- E.B.R.D. (1995). Transition Report. Technical report, European Bank for Reconstruction and Development.
- Evans-Klock, C. and A. Samorodov (1998). The Employment Impact of Privatization and Enterprise Restructuring in Selected Transition Economies. Working Paper IPPRED 16, International Labour Organization.
- Fajth, G. and J. Lakatos (1997). Fringe benefits in transition in Hungary. In M. Rien, B. L. Friedman, and A. Worgotter (Eds.), *Enterprise and Social Benefits After Communism*, pp. 167–186. Cambridge University Press.
- Florence, P. S. (1953). *The Logic of British and American Industry*. Routledge and Kegan Paul Ltd.
- Hughes, J. J. (1989). Unemployment. In R. Bean (Ed.), *International Labour Statistics: A Handbook, Guide and Recent Trends*, Chapter 3. Routledge.
- King, J. (1990). *Labour Economics* (2nd ed.). MacMillan.
- Kuznetsova, T. (1991). The Growth of Cooperatives in the Soviet Union. In G. Standing (Ed.), *In Search of Flexibility: The New Soviet Labour Market*, pp. 277–84. Geneva: I.L.O.
- Marnie, S. (1990). Labour Market Reform in the U.S.S.R.: Fact or Fiction? EUI Working Paper in Economics ECO 90/24, European University Institute, Florence.

- McAuley, A. (1997). Social Policy and the Labour Market in Russia During Transition. In N. R. Council (Ed.), *Transforming Post-Communist Political Economies*, pp. 223–44. National Research Council, Washington, D.C.: National Academy Press.
- Namazie, C. Z. (2001). Who Bore the Burden of Wage Arrears in the Kyrgyz Republic? mimeo.
- Oi, W. Y. (1980). Labour as a quasi-fixed factor. In J. King (Ed.), *Readings in Labour Economics*, pp. 87–107. Oxford University Press.
- Okun, A. M. (1981). *Prices and Quantities: A Macroeconomic Analysis*. The Brookings Institute.
- Oxenstierna, S. (1990). *From Labour Shortage to Unemployment? The Soviet Labour Market in the 1980's*. Department of Economics, University of Stockholm: Swedish Institute for Social Research 12.
- Portes, R. (1969). The Enterprise under Central Planning. *The Review of Economic Studies* 36(2), 197–212.
- Poser, J. A. (1999). *Microeconomic Conditions and Macroeconomic Disruptions in Transition Economies: Managing the Transformation Crisis in the Former Soviet Union*. Ifo Studien Zur Entwicklungsforschung 34. Weltforum Verlag.
- Rumer, B. Z. (1989). *Soviet Central Asia: "A Tragic Experiment"*. Boston: Unwin.
- Rutkowski, M. (1996). The challenge for industrial development in the Central Asian Republics of the Former Soviet Union. *MOCT-MOST* 6(2), 111–137.
- Shcherbakov, V. (1991). The Labour Market in the U.S.S.R.: Problems and Perspectives. In G. Standing (Ed.), *In Search of Flexibility: The New Soviet Labour Market*, pp. 19–44. Geneva: I.L.O.
- Standing, G. (1991). *In Search of Flexibility: The New Soviet Labour Market*. Geneva: International Labour Organization.

- Standing, G. (1993). Restructuring for Distributive Justice in Eastern Europe. Central and Eastern Europe Team, Budapest Policy Papers 2, International Labour Office.
- The World Bank (1993). *Kyrgyzstan: The Transition to a Market Economy*. Washington, D.C.: The World Bank.
- Thornton, J. (1997). Restructuring production without market infrastructure. In N. R. Council (Ed.), *Transforming Post-Communist Political Economies*, pp. 133–55. Washington, D.C.: National Academy Press.
- Williamson, O. (1975). *Markets and Hierarchies: Analysis and Antitrust Implications*. New York: The Free Press.
- Windell, J., R. Anker, and G. Sziraczki (1995). Kyrgyzstan: Enterprise Restructuring and Labour Shedding in a Free-Fall Economy, 1991-1994. Labour Market Papers 5, International Labour Organization.