

Endogenous Labor Market Rigidities and Family Ties

Alessandra Fogli*

New York University and Federal Reserve Bank of Minneapolis

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Abstract

Much has been written about institutional differences between European and North American labor markets, and about their role in determining the large and persistent differences between the unemployment rates in Europe and US over the last fifteen-twenty years. The objective of this paper is to answer the question: why have these differences in labor market flexibility emerged and why do they persist?

First, evidence is presented showing that, in countries with high employment protection policies, credit market imperfections are more severe and young people live longer in the family. Then a general equilibrium, overlapping generations model is developed to explicitly capture the relationship between degree of employment protection, family structure and credit market imperfections. In this context, the endogenous response of the family structure to credit market imperfections, gives rise to conditions in which differences in labor market rigidities emerge as the outcome of a dynamic and repeated bargaining process between generations.

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1. Introduction

Much has been written about institutional differences between European and North American labor markets, and about their role in determining the large and persistent differences between the unemployment rates in Europe and US over the last twenty years. In this paper we want to move our understanding of the European unemployment dilemma one step further and answer the question: why have these differences in labor market institutions emerged and why do they persist?

In this paper we focus on the political economy of employment protection legislation and explore the relationship between degree of employment protection, family structure and credit market imperfections.

A cross-country comparison for industrialized economies shows the existence of a strong positive correlation between degree of employment protection and degree of credit market imperfection. Moreover, in countries where the policy is stricter, young people live longer with their families, the employment rate for head of households is higher while that for youth is lower.

In this work we argue that differences in employment protection arise endogenously in the presence of differences in credit market imperfections. There are two elements that are key for this result. First, by redistributing employment from the young to the old generation, employment protection policies induce a steeper income profile over the lifetime. Second, since within the family the old generation consumption has a public good component, efficiency requires consumption profiles that are steeper over the lifetime than in a standard competitive equilibrium.¹

Our key insight is that in this context credit market imperfections have two effects: on one hand they lead to an endogenous modification of the family structure that makes the public good

¹Nelson (1988) and Lazear and Michael (1980) provide empirical estimations of the economies of scale in household consumption for a variety of different goods.

problem more severe, and on the other hand they make employment protection effective in reducing the associated inefficiency.

In an economy where young agents face borrowing constraints they realize most of their consumption smoothing through coresidence with their parents. This increases the family size, and makes the public good problem more severe. It follows that in an economy with credit market imperfections there are more gains from an intergenerational redistribution of consumption. In the presence of borrowing constraints however, the steeper income profile induced by the policy translates into a steeper consumption profile. This implies that employment protection can be welfare improving because it forces an increase in the equilibrium provision of the public good. In a complete markets economy on the other hand, not only the public good problem is less severe since young agents, having access to credit markets, do not need to cohabit with their parents in order to smooth consumption, but the intertemporal income redistribution implied by the policy has no effect on the pattern of consumption of the agents since it is completely offset by their ability to borrow on the market.

In the first part of the paper we present the empirical evidence that motivates this work and then we develop a general equilibrium, two period lived overlapping generation model to address it. The living arrangements of young people are endogenized and agents choose which fraction of their youth to spend living in the family and which fraction to spend on the labor market. When living with their parents, they enjoy the same consumption level of the old generation, so that parent's consumption is treated as a public good which can be consumed by the child at zero cost. The policy is introduced as a constraint on the firing decision of the firm: it requires the firm to keep the old workers that were hired in the previous period when they were young, regardless their productivity. The policy also specifies that these workers have to be retained for a fraction of the

period that is proportional to the time they have worked when young. The higher this fraction, the higher the degree of protection.

The steady state consequences of a given degree of protection are then analyzed for two economies identical in every respect but for the presence of borrowing constraints. We show that in the economy where young people face borrowing constraints they choose to live longer with their parents and their employment is lower than in the complete markets economy. Moreover, we show that the introduction of the policy is welfare improving for the economy with borrowing constraints while has no effect on welfare when agents can freely borrow.

Finally, the degree of employment protection is endogenized and it emerges as the outcome of a dynamic repeated bargaining process between the two generations. For a large range of parameter values, in the economy with borrowing constraints a positive degree of protection arises as an equilibrium outcome, while in the economy with perfect credit markets no protection is ever introduced. These differences in employment protection between the two economies persist over time, while the differences in living arrangements and youth employment rates increase. These equilibrium patterns are consistent with the cross-country and time series evidence.

2. Empirical Evidence

In this section I describe the available evidence on cross-country differences in employment protection policies (EPP) and document the following three empirical regularities: in the most protected countries credit market imperfections are more severe, young people tend to live longer with their parents and employment is redistributed from the young to the old generation.

2.1. Cross-country differences in EPP

There is significant international variation in employment protection, both with respect to the overall level of EPP strictness and with respect to the relative emphasis placed on the different components of regulation.

Table 1 sheds some light on the degree of EPP strictness for 15 OECD countries in the last two decades: the first two columns report an indicator that refers to the strictness of dismissal regulation for regular or permanent workers in the late 1980s and in the late 1990s. This indicator takes into account the requirements regarding severance payments and notice period, and measures of procedural inconveniences and difficulty of dismissal. The next two columns show an indicator based on the strictness of the regulation governing temporary work for the same two periods. The last columns report an overall indicator that has been constructed by the OECD as an average of the first two indicators.²

The data show that the legislation governing employment protection greatly differs across countries: the United States, the United Kingdom and Canada stand as the least regulated countries, while the strictest employment protection is offered by countries of southern Europe. Moreover, these differences tend to be highly persistent as suggested by the little change in the EPP indicator

²For details on the construction of the indicators see OECD, *Employment Outlook 1999*.

between the late 1980s and the late 1990s.

2.2. EPP, Credit Market Imperfections and Living Arrangements of Young People

The most protected countries are those with the higher degree of credit market imperfections and also those where young people live longer with their parents.

The volume of credit available to households and their access to credit markets differ substantially between countries, even within the group of OECD countries. Table 2 reports the data of Jappelli and Pagano (1994) on the maximum loan to value ratio (LTV) for the purchase of a house for 15 OECD countries in the period 1961-87. The maximum LTV is an indicator of the credit availability to households and is highly correlated with measures of household credit as the ratio of consumer credit to national income. However, it is a better measure of credit markets imperfections, since it is not affected by differences in the demand for loans.

Figure 1 plots the average maximum LTV ratio over the entire period for 15 countries against the overall indicator of employment protection strictness averaged over the period 1980-97. There is a strong negative correlation between degree of employment protection and degree of credit market imperfections: the countries where agents face tighter borrowing constraints are also those where the employment protection legislation is stricter.

The data also show that in the countries where credit markets imperfections are more severe, young people tend to live longer with their parents. Figure 2 plots a scatter diagram of the maximum LTV ratio averaged over the period 1961-87 against data on the living arrangements of young people for the same 15 countries. The data on the living arrangements come from a survey conducted in 1987 by the Commission of the European Communities in 10 European countries together with data collected in the early 1990s by the United Nations in their Fertility and Family

Survey. The data show the percentage of people between the ages of 15-24 living with their parents. The correlation between credit availability and percentage of young people living with their parents is -0.84.

This empirical evidence supports the idea that in countries where borrowing constraints are tight, young people tend to postpone their exit from the parental house and employment protection legislation is stricter.

2.3. EPP and Labor Market Performance

While a large number of studies have focused on the possible links between EPP and overall employment and unemployment, the evidence suggests that such links are not robust. Lazear (1990) finds that employment and labour force levels are lower when EPP are strict. On the other hand, Nickell (1997) and Nickell and Layard (1998) argue that these results might be biased, since there is a "spurious" correlation between low female participation and strict EPP, both of which are typical in southern European countries. Consistent with this interpretation, the effect disappears when the comparison is confined to adult male employment rates. Concerning unemployment levels, the theoretical analysis is inconclusive. The higher firing costs resulting from EPP reduce hirings during upswings (since employers become more hesitant about taking on additional workers, as they are aware of the costs of dismissal), but also reduce firings during downswings, so that the net impact on the unemployment stock is indeterminate. In practice, most of the empirical studies find no effect.

What emerges from a closer look to the data however, is that the EPP have a strong redistributive effect of the employment opportunities across agents of different age. I calculate the employment to population ratio for young people as a fraction of the employment to population

ratio for old people, where young is defined as the male population that is 16-24 years old, and old is the male population between the age of 24 and 55. The data are averaged over the period 1983-97. Figure 3 plots this ratio against the overall indicator of EPP strictness averaged over the period 1980-90s. The graph shows a high negative correlation: in particular, highly protected countries like Italy, France and Belgium display an employment to population ratio for young people that is less than 40% the one for old people, while in United States, United Kingdom and Denmark this percentage is more than 70%.

The empirical evidence suggests that an important effect of employment protection on labor market performance is on the composition of total employment: when employment protection is strict, employment is redistributed from the young to the old generation.

2.4. Summary

This section establishes the existence of three empirical regularities that may help explain the emergence of cross-country differences in employment protection legislation. In particular it shows that in the most protected countries:

- credit markets imperfection are more severe.
- a higher fraction of young people live with their parents.
- employment is redistributed from the young to the old generation.

In the next section I develop a simple theoretical framework that explicitly addresses these facts and in which cross-country differences in EPP arise endogenously as the optimal choice of fully rational agents.

3. The Economy

The economy is populated by a sequence of two-period-lived overlapping generations. Each generation consists of a continuum of ex ante identical agents who are born attached to an old agent. During their first period of life, young agents choose their living arrangements: they decide how to divide their total endowment of time (normalized to 1) between living with their parent and staying on their own. In addition they have access to credit markets and choose how much to save and to borrow at the constant and exogenously given world interest rate r . When old, agents supply labor inelastically and repay their debts. Since young agents value independence, their utility is an increasing function of the fraction of time they spend living by themselves. Preferences of an individual are given by:

$$\log(c_y) + A \log(1 - s') + \beta \log(c'_o) \tag{1}$$

where c_y is consumption when young, s' is the fraction of time spent with the family over the first period of life and c'_o is consumption when old. Consumption is restricted to be nonnegative in every period, and s' to be between 0 and 1. Let c_p and c_a be respectively, young agent's consumption when living with his parent and when staying on his own. The consumption over the entire first period of life is given by:

$$c_y = s'c_p + (1 - s')c_a$$

When living with their parent young agents do not work and their consumption is an increasing function of their parent's consumption and the amount they borrow on the market. For simplicity we assume that, inside the household, the consumption of the parent is public good and is enjoyed by his child at no cost. This implies:

$$c_p = c_o + b'$$

where c_o is the parent's consumption in the current period and b' is the amount borrowed on the market.

The decision of young agents to move out the parental house and live on their own coincides with the decision to supply labor on the market, so that the consumption of a young agent living by himself, is financed with labor income and by borrowing on the market:

$$c_a = w_y + b'$$

where w_y is young workers' market wage.

The consumption good is produced by a large number of firms that hire young and old workers. Each agent in the economy may be productive or unproductive and the fraction of productive agents in each generation is equal to p . The productivity of an agent is revealed when the agent is old.

The constant returns to scale technology available to the firms is summarized by:

$$F(n'_y, n_p, n_u) = pn'_y + zn_p$$

where n'_y denotes the labor input provided by young workers, n_p and n_u denote, respectively, the labor input provided by productive and unproductive old agents employed in a given period and $z > 1$ is a constant that captures differences in productivity between young and old productive workers³. Unproductive workers do not contribute to production. Since firms cannot identify productive young workers, only a fraction p of their total labor input is transformed into output.

³This assumption implies that agents face a steep lifetime consumption profile.

The policy we consider is one that protects the employment of old unproductive workers. In particular, the employment protection policy of degree θ , where $\theta \in [0, 1]$ imposes the following constraint on the firing decision of the firms: if an old worker has worked for a firm for a fraction n_y of the previous period, then the firm has to retain that worker and pay him the market wage for a fraction θn_y of the current period, regardless of his productivity. Apart from the presence of the policy, labor markets are competitive.

In the following section we analyze the steady state consequences of a constant and exogenously given degree of employment protection for two different economies: one in which young agents cannot borrow and one in which they can intertemporally transfer any amount of resources at the world interest rate r .

Since this work focuses on the intergenerational effects of employment protection and abstracts from intragenerational considerations, we assume that young agents have access to competitive markets where they can sign contracts to insure against the risk of turning out unproductive in the second period of their lives.

3.1. Firm's problem

The presence of the policy makes the problem of the firm dynamic: the firm in every period decides the labor demand of young and old workers subject to the constraint imposed by the policy. We denote the state variable for the firm by n_y , namely the time worked by young workers in the previous period. The protection policy of level θ implies the following constraint on a firm that hired young workers for a fraction n_y of the previous period:

$$n_u \geq (1 - p)\theta n_y. \tag{2}$$

To understand (2) note that a fraction $(1 - p)$ of the young workers hired in the previous period turn out to be unproductive. The firm has to keep these old unproductive workers for at least a fraction of time θn_y . This implies that the total labor input from unproductive old workers has to be at least as large as their fraction in the population $(1 - p)$ times the fraction of time they work θn_y .

Given factor prices w_y , w_o and w'_o , the world interest rate r and an exogenously given constant policy θ , the firm's maximization problem can be written as:

$$\begin{aligned}
 & W(n_y; \theta) & (3) \\
 = & \max_{n'_y, n_u, n_p} \left[F(n'_y, n_p, n_u) - w_y n'_y - w_o (n_p + n_u) \right] + \frac{1}{1+r} W(n'_y; \theta)
 \end{aligned}$$

subject to (2).

Since firms will never willingly hire unproductive workers, constraint (2) binds and we can substitute for n_u in (3). Assuming an interior solution, the first order and envelope conditions imply:

$$w_y = p - \frac{1}{1+r} (1-p) \theta w'_o \quad (4)$$

$$w_o = z \quad (5)$$

Equation (4) shows that the employment protection policy θ reduces the equilibrium wage of young workers below their current marginal product by an amount equal to the expected loss from the worker next period. This loss is equal to the present value of the difference between total cost of the worker in the future and the corresponding output. At this wage the firm hires any number of young workers.

3.2. Consumer's problem

In the second period of life old agents supply labor inelastically and repay their debts. Also, agents' productivity is revealed. This implies that a fraction p of them are productive, work the entire period, and earn a wage w_o while a fraction $(1-p)$ are unproductive and thus work and earn a wage only for a fraction $\theta(1-s)$ of the period, where $(1-s)$ is the fraction of time the agents worked when young. Since young agents have access to markets where they can insure against the risk of turning out unproductive, optimal insurance and zero profit condition for the insurance company imply that old agents labor income net of the insurance payments is equalized across productive and unproductive workers and is equal to:

$$w_o [p + (1-p)\theta(1-s)] \tag{6}$$

Young agents choose the fraction of time they live with their parent and the amount to borrow on the market. Each young agent faces a borrowing limit of \bar{b} . The individual states of a young agent are s and b , namely the labor supply and the level of debt of his parent in the previous period. Given prices w_y , w_o and w'_o , the world interest rate r and the level of protection policy θ , optimal decision rules for the current young are functions for living arrangement $s'(s, b; \theta)$ and borrowing $b'(s, b; \theta)$ that solve:

$$V(s, b; \theta) = \max_{s', b'} \log(c_y) + A \log(1 - s') + \beta \log(c'_o)$$

$$s.t. \quad c_o = w_o [p + (1-p)\theta(1-s)] - (1+r)b \tag{7}$$

$$c_y = s'c_o + (1-s')w_y + b' \tag{8}$$

$$c_y \geq s'c_o \tag{9}$$

$$s' \geq 0 \quad b' \leq \bar{b}$$

Young agents enjoy the consumption of their parent at no cost when living with him. Constraint (7) gives the level of consumption of an old agent who worked for a fraction of time s and borrowed b during his youth. This is equal to his labor income net of the insurance payments (equation (6)) minus the cost of his debt. When living on their own young agents supply labor on the market at the wage w_y . In addition agents have access to credit markets where they can borrow up to a limit \bar{b} at the interest rate r . Constraint (8) gives total consumption during the first period of life while constraint (9) prevents young agents from carrying their parent's consumption into the future. Since young agents face a steep income profile ($z > 1$) this constraint will never be binding in equilibrium. The consumption of a young agent next period, c'_o is obtained by updating 7.

The first order and envelope conditions imply:

$$\frac{[c_o - w_y]}{c_y} \leq \frac{A}{(1 - s')} + \beta \frac{w'_o(1 - p)\theta}{c'_o} = \text{if } s' > 0 \tag{10}$$

$$\frac{1}{c_y} \geq \beta \frac{(1 + r)}{c'_o} = \text{if } b' < \bar{b} \tag{11}$$

Equation (10) shows the trade off young agents face when deciding their living arrangements: by living with their parent young agents increase their current consumption but lose in terms of both independence and future consumption since the policy guarantees a level of future employment that is proportional to current labor supply.

4. Equilibria for a given policy

DEFINITION 1: An equilibrium, for a given degree of protection θ , consists of consumer policy functions $s'(s, b; \theta)$, $b'(s, b; \theta)$ and value function $V(s, b; \theta)$, firms policy functions $n'_y(n_y; \theta)$, $n_p(n_y; \theta)$, and value function $W(n_y; \theta)$, wages w_y , w_o , w'_o , interest rate r that satisfy: i) the consumers' problem, ii) the firms' problem, iii) labor markets clearing

$$n'_y(n_y; \theta) = 1 - s'(s, b; \theta) \quad (12)$$

$$n_p(n_y; \theta) = p, \quad (13)$$

iv) resource constraint:

$$c_o + (c_y - sc_o) = F(n'_y, n_y, n_u) + b' - b$$

Note that in equilibrium all young agents (measure 1) supply labor for a fraction $1 - s$ of the period, while a measure p of old productive workers supply labor full time.

Given the linearity of the technology, it follows that every equilibrium associated to a positive level of employment is characterized by prices that are constant over time and equal to:

$$w_o = z \quad (14)$$

$$w_y = p - \frac{1}{1+r}(1-p)\theta z \quad (15)$$

For simplicity, in the analysis that follows we set $\beta = 1/(1+r) = 1$.

4.1. The economy with no borrowing

In this section we consider the economy with no borrowing, so that $\bar{b} = 0$. We first show that there is a unique steady state for this economy and then we analyze the effects of a once and for all policy change on steady state allocation and welfare. In particular we show that the fraction of time young agents spend living with their parents is an increasing function of the degree of employment protection and we derive conditions under which a steady state associated to a positive degree of protection yields higher welfare than the steady state with no protection.

4.1.1. Steady state

A *steady state* for this economy is an equilibrium together with a value for s such that $s'(s) = s$.

Assumption (1): $z > A + 1$.

This assumption is sufficient to guarantee that for every $\theta \in [0, 1]$ the steady state solution for s' is interior. Intuitively it guarantees that the young will spend some time at home by making the relative gain of staying at home (z) larger than the relative cost (A).

PROPOSITION 1: *There exists a unique steady state for this economy.*

Proof. The equilibrium wages are given by equations (14) and (15) where $r = 0$. At these wages firms hire any number of young workers. Moreover, all productive old workers are employed full time while the unproductive ones work for a fraction of time θs . The consumption of an old agent who has worked s in the previous period is then given by:

$$c_o = z [p + (1 - p)\theta(1 - s)] \tag{16}$$

Combining assumption (1) and equation (10) we can rewrite the first order condition for the con-

sumer's problem as:

$$\frac{[c_o - w_y]}{c_y} = \frac{A}{(1-s)} + \frac{w_o(1-p)\theta}{c_o} \quad (17)$$

If we substitute equations (14), (15) and (16) in equation (17) then a solution to this equation is a steady state.

Assumption (1) guarantees that if $s = 0$ the left hand side of this equation is greater than the right hand side. It is also easy to show that there exists an s sufficiently close to 1 such that the right hand side is greater than the left hand side. Existence follows from continuity. Uniqueness follows from the fact that the right hand side is strictly increasing in s while the left hand side is strictly decreasing in s .

QED.

4.1.2. Comparative Statics

I now examine how changing the amount of employment protection affects both the living arrangements of the young generation and welfare.

PROPOSITION 2: *The fraction of time young agents spend at home living with their parent is an increasing function of the degree of employment protection; i.e., $\partial s / \partial \theta$ is positive.*

Proof. We rewrite equation (17) as

$$\frac{[c_o - w_y]}{c_y} - \frac{w_o(1-p)\theta}{c_o} = \frac{A}{(1-s)} \quad (18)$$

the right hand side of this equation is increasing in s and does not depend on θ . Taking the derivative of the left hand side of (18) with respect to θ we obtain that, up to a positive constant,

the derivative is equal to:

$$\frac{zp + (1-s)p}{c_y^2} - \frac{zp}{c_o^2} \quad (19)$$

since this expression is always positive, it follows that an increase in θ induces an increase in the steady state value of s .

QED.

Intuitively, an increase in degree of employment protection has two effects on the trade off faced by young agents. The first term of (19) shows that an increase in θ decreases the labor supply of young agents, by making living with the parents more attractive since the introduction of the policy decreases the wages of the young from (15) and increases the consumption of the old from (16). On the other hand, the second term shows that agents may want to increase their labor supply since they realize that the more they supply labor when young the more they are protected when old. Given that agents face a steep lifetime consumption profile, they value an increase of their consumption when young more than an increase in consumption in the second period. It follows that the first effect dominates and the optimal fraction of time spent living with the family increases.

We consider next the change in welfare when employment protection is introduced.

PROPOSITION 3: *If A and z satisfy the condition: $A < \frac{z-1}{z}$ then locally increasing protection from 0 increases steady state welfare. That is, the steady state level of utility $U(\theta)$ is increasing in θ starting from $\theta = 0$.*

Proof. Under the condition $A < \frac{z-1}{z}$ assumption (1) is satisfied, so s is positive. The change in total utility can be written as the sum of the change in utility when young and the change in

utility when old:

$$\frac{\partial U}{\partial \theta} = \frac{1}{c^y} \frac{\partial c^y}{\partial \theta} + \frac{1}{c^o} \frac{\partial c^o}{\partial \theta}. \quad (20)$$

Clearly, from (16) in a neighborhood of $\theta = 0$ the consumption of the old is locally increasing in θ with:

$$\frac{\partial c^o}{\partial \theta} = z(1-p)(1-s). \quad (21)$$

and so the utility of the old is increasing. From the consumer's budget constraint:

$$\frac{\partial c^y}{\partial \theta} = \left[s \frac{\partial c^o}{\partial \theta} + (1-s) \frac{\partial w^y}{\partial \theta} \right]. \quad (22)$$

The policy has two opposing effects on the consumption of the young. On the one hand it has a positive effect since it increases the consumption of the parent that, because of its public good nature, increases the consumption of the young agent for the fraction of time he spends living with him. On the other hand the policy depresses the wage of the young since:

$$\frac{\partial w^y}{\partial \theta} = -z(1-p). \quad (23)$$

and thus decreases consumption proportionately to the fraction of time the young agent lives on his own.

At $\theta = 0$ we have:

$$\begin{aligned} c^o &= zp \\ s &= \frac{z-1-A}{(1+A)(z-1)} \end{aligned}$$

Substituting these expressions in (8) gives $c^y = zp/(1 + A)$. Substituting (21)-(23) and these expressions into (20) gives

$$\frac{\partial U}{\partial \theta} = \frac{(1-p)(1-s)}{p} \left[1 - \frac{Az}{(z-1)} \right]$$

which is positive as long as $(z-1)/z > A$.

QED.

The basic idea is that in this economy an increase in the level of protection has two opposing effects. Since parent's consumption is a public good which can be consumed by the child at zero cost, in equilibrium it is underprovided. In steady state, employment restrictions reduce wages of young workers and increase those of old workers. With borrowing constraints, a steeper wage profile induces a steeper consumption profile. This has two opposing effects on welfare: a positive effect, due to the increase of the consumption of the old, and a negative effect coming from the reduction in consumption smoothing. The positive effect is captured by the first term in (22) and is proportional to the time the child lives with his parent while the negative effect is captured by the second term in (22) and is proportional to the time the young agent spends on his own. This implies that the higher the fraction of time the young agent lives at home at $\theta = 0$, the more he gains from the protection of his parent's job and the less he loses from the reduction of his wage.

For given A , that is for a given disutility from staying at home, the fraction of time the young chooses to live with his parent is an increasing function of z , that is the differential productivity of the old. Thus, if z is sufficiently high, the young lives with his parent most of the time and, at worst, loses relatively little from the policy. Notice that endogenous living arrangement decisions reinforces the positive effect of the policy. When agents face a steeper wage profile they decide to live with their parents longer in order to smooth consumption and this in turn increases the gains

from a higher consumption of old agents.

We fix $p = 0.9$ ⁴. Figure (4) plots the total utility of a representative generation as a function of the degree of employment protection for the case in which $\frac{z-1}{z} \geq A$. Figure (5) shows that welfare is decreasing for $\frac{z-1}{z} < A$. In this case young agents spend relatively little time at home and thus the negative effect of the policy dominates.

4.2. The economy with nonbinding borrowing constraints

Consider next an economy in which the borrowing constraint $b' < \bar{b}$ never binds. I first show that there exists a unique steady state. I then show that increasing protection leads young people to borrow more but does not change their decision of living arrangements and their welfare.

4.2.1. Steady state

A *steady state* for this economy is an equilibrium together with a value for (s, b) such that $s'(s, b) = s$ and $b'(s, b) = b$.

Since the borrowing constraint does not bind the young agent's problem can be written:

$$\begin{aligned} & \max_{c_y, c'_o} \log(c_y) + A \log(1 - s') + \log(c'_o) \\ & \text{s.t.} \\ & c_y + c'_o = s'c_o + (1 - s')w_y + z(p + (1 - p)\theta(1 - s')) \\ & c_y \geq s'c_o \end{aligned}$$

⁴This implies an equilibrium unemployment rate for old workers equal to 10% in the case with no policy.

the solution to this problem yields the following optimal decision rules for s' , c_y and c'_o

$$s = \begin{cases} \frac{z-1-A-Az}{z-1-A} & \text{if } A < \frac{z-1}{z+1} \\ 0 & \text{otherwise} \end{cases} \quad (24)$$

$$c_y = c_o = \begin{cases} \frac{zp}{1+A} & \text{if } A < \frac{z-1}{z+1} \\ \frac{p(z+1)}{2} & \text{otherwise} \end{cases} \quad (25)$$

The amount of borrowing is found by subtracting consumption of the old agents from their income and it is given by:

$$b = z(p + (1-p)\theta(1-s)) - c_o.$$

4.2.2. Comparative Statics

I now examine how changing the amount of employment protection affects both the decision rules of the young and welfare.

PROPOSITION 4: *The fraction of time young agents spend at home living with their parent is independent from the degree of employment protection, while the amount they borrow is an increasing function of the policy, so that $\partial s/\partial\theta$ is zero and $\partial b/\partial\theta$ is positive for all parameter values.*

From equations (24) and (25) it is immediate that consumption, living arrangements and welfare do not depend on the level of policy θ , while the amount of borrowing depends positively on the policy and

$$\frac{\partial b}{\partial\theta} = z(1-p)(1-s)$$

Intuitively an increase in θ induces a steeper wage profile without affecting the total amount of resources and therefore its effect on consumption and living arrangements are completely undone by an increase in borrowing.

PROPOSITION 5: $\forall A$ such that $A < \frac{z-1}{z}$ the introduction of a positive degree of protection is not welfare increasing in the unconstrained economy.

This result follows directly from propositions (3) and (4) and is illustrated in Figure (6).

4.3. Comparing the two economies

An important difference between the two economies is the employment level of young agents. Since in the non borrowing economy the only available way of smoothing consumption is to live at home, young agents optimally choose to work less than what they would work in the borrowing economy for all parameters values. This result is summarized in the following proposition.

PROPOSITION 6: *More young people are employed in the economy with borrowing, that is:*

$$1 - s_b > 1 - s \quad \forall \theta \in [0, 1]$$

where $1 - s_b$ is the fraction of young people that are employed in the unconstrained economy and $1 - s$ is the same fraction in the constrained economy.

Proof.

We have established that s is increasing in θ while s_b does not depend on θ . It is thus sufficient to show that $s_b < s$ when $\theta = 0$. We divide the space of parameters in two regions, $z - 1 > A > \frac{z-1}{z+1}$ and $0 \leq A < \frac{z-1}{z+1}$. In the first region for $\theta = 0$ $s_b = 0$ while $s > 0$. In the second region in $\theta = 0$ we

have that

$$s_b = \frac{z - 1 - A - Az}{z - 1 - A} < \frac{z - 1 - A}{z - 1 - A + Az} = s$$

QED.

A consequence of the previous result is that in the economy with borrowing constraints young agents live longer with their parents and thus welfare gains from introducing the policy are larger.

5. Political Equilibrium

In this section the employment protection policy is endogenized and emerges as the outcome of a political process. Every period, young and old agents bargain over the degree of employment protection that is to be introduced. In particular, the political process is described by Nash bargaining among the two generations and if the agents do not reach an agreement, no policy is introduced.

This choice stems from the limitations that a voting mechanism has in the environment just described. A majority voting scheme would imply that, in a conflict between young and old, the most numerous class would have all the power in the government, leading to extreme outcomes. On the other hand bargaining is well suited to analyze the conflict between two large groups that fully realize the costs of concessions to the other party.

Let us denote with $\Theta(N_y, B)$ the function that assigns a level of protection policy given the aggregate states N_y (aggregate employment of the young in the previous period) and B (aggregate debt of old agents). We assume that agents and firms use the function Θ , together with the law of motion for the aggregate states, to formulate expectations on future policies. Let's first consider the problem of the young agents

$$V^y(N_y, n_y, B, b; \theta) = \max_{s', b'} \log(c_y) + A \log(1 - s') + \beta \log(c'_o) \quad (26)$$

$$\begin{aligned}
s.t. \quad c_y &= s'c_o + (1 - s')w_y(\theta') + b' - T/2 \\
c_o &= w^o [p + (1 - p)\theta n_y] - b - T/2 \\
N'_y &= N'_y(N_y, B) \\
\theta' &= \Theta(N_y, B) \\
T &= F(N'_y, N_p, N_u) - w_y N'_y - w^o (N_p + N_u) \\
s &\geq 0 \quad b \leq \bar{b}
\end{aligned}$$

The utility of old agents is given by

$$\begin{aligned}
V^o(N_y, n_y, B, b, \theta) &= \log(c_o) \\
c_o &= w^o [p + (1 - p)\theta n_y] - b - T/2 \\
T &= F(N'_y, N_p, N_u) - w_y N'_y - w^o (N_p + N_u)
\end{aligned}$$

We assume that the optimal θ is the outcome of a negotiation between young and old agents and that the threat point of the negotiators is given by the no policy outcome. This implies that θ is the solution of

$$\begin{aligned}
\max_{\theta} [V^y(N_y, N_y, B, B; \theta) - V^y(N_y, N_y, B, B; 0)] & \quad (27) \\
[V^o(N_y, N_y, B, B, \theta) - V^o(N_y, N_y, B, B, 0)]
\end{aligned}$$

DEFINITION 2: A political equilibrium is a collection of value functions, decision rules, wage functions and law of motions for the aggregate states together with a function $\Theta(N_y, B)$ that satisfy:

- the consumers' problem in (26)
- the consistency of individual and aggregate decisions, that is, the conditions

$$b'_y(N_y, N_y, B, B; \hat{\theta}) = B'_y(N_y, B; \hat{\theta}) \quad \text{and} \quad 1 - s(N_y, N_y, B, B; \hat{\theta}) = N'_y(N_y, B; \hat{\theta}).$$

- the firms' maximization problem in (3)
- the bargaining problem in (27).

In figure 7 we report the time series for the equilibrium level of protection policy, living arrangements, youth and old employment for the economy with and without borrowing constraints while figure 8 shows the equilibrium path for total employment. The economy with borrowing constraints displays higher level of employment protection, lower level of youth employment, higher fraction of young people living at home and higher employment of old workers than the complete markets economy, as suggested by the cross-country evidence.

Moreover differences in employment protection are persistent while differences in living arrangements and youth employment increase over time. This result is consistent with the time series evidence and is due to the feed back of the policy on the family structure. Borrowing constraints induce a larger family size that makes the public good problem severe and the policy welfare improving. As a result a positive degree of employment protection is introduced. The introduction of the policy reduces the equilibrium wage of young agents and increases the income of the old generation, so that living with the parents becomes relatively more attractive for young agents. This effect induce young people to live even longer with their parents and generates further potential gains from protection. This reinforcing mechanism implies that full protection is again chosen when the bargaining game is repeated.

6. Conclusions

This paper provides an explanation of the large cross-country differences in labor market institutions that is based on the interaction between credit market imperfections and family structure. We document that countries characterized by high level of protection also display severe credit market imperfections and a high fraction of young people living at home. The framework we propose takes credit market imperfections as primitive and predicts that, in an economy with credit constraints, young agents, being unable to borrow, choose to live with their parents longer in order to smooth consumption. Since consumption inside the household has a public good component, a policy that increases the income of the old generation can be welfare improving and these potential gains are larger in countries characterized by a larger family size. Protection policies induce a transfer of resources from the young to the old generation that, in the presence of credit market imperfections, implies a steeper consumption profile over the lifetime. It follows that in countries where credit market imperfections are more severe young people live with their parents longer and employment protection is welfare improving, while has no effect on consumption in a complete markets economy. Moreover, once the policy is introduced, young agents, facing a steeper income profile, choose to live even longer with their parents in order to smooth consumption, thereby further increasing the welfare gains from protection. A specific model, in which the employment protection policy endogenously emerges as the outcome of a repeated dynamic bargaining game between young and old generations, predicts patterns for protection policies, living arrangements and employment of young and old agents that are qualitatively consistent with the cross country and time series evidence.

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Tables and Figures

Table 1: Indicators of EPP "strictness"

| | Regular Empl. ^a | | Temp. Empl. ^b | | Overall | | Overall |
|----------------|----------------------------|-------|--------------------------|-------|---------|-------|---------|
| | 1980s | 1990s | 1980s | 1990s | 1980s | 1990s | average |
| Belgium | 1.5 | 1.5 | 4.6 | 2.8 | 3.1 | 2.1 | 2.60 |
| France | 2.3 | 2.3 | 3.1 | 3.6 | 2.7 | 3.0 | 2.85 |
| Germany | 2.7 | 2.8 | 3.8 | 2.3 | 3.2 | 2.5 | 2.85 |
| Netherlands | 3.1 | 3.1 | 2.4 | 1.2 | 2.7 | 2.1 | 2.40 |
| United Kingdom | 0.8 | 0.8 | 0.3 | 0.3 | 0.5 | 0.5 | 0.50 |
| Greece | 2.5 | 2.4 | 4.8 | 4.8 | 3.6 | 3.6 | 3.60 |
| Italy | 2.8 | 2.8 | 5.4 | 3.8 | 4.1 | 3.3 | 3.70 |
| Portugal | 4.8 | 4.3 | 3.4 | 3.0 | 4.1 | 3.7 | 3.90 |
| Spain | 3.9 | 2.6 | 3.5 | 3.5 | 3.7 | 3.1 | 3.40 |
| Denmark | 1.6 | 1.6 | 2.6 | 0.9 | 2.1 | 1.2 | 1.65 |
| Finland | 2.7 | 2.1 | 1.9 | 1.9 | 2.3 | 2.0 | 2.15 |
| Norway | 2.4 | 2.4 | 3.5 | 2.8 | 3.0 | 2.6 | 2.80 |
| Sweden | 2.8 | 2.8 | 4.1 | 1.6 | 3.5 | 2.2 | 2.85 |
| Canada | 0.9 | 0.9 | 0.3 | 0.3 | 0.6 | 0.6 | 0.60 |
| United States | 0.2 | 0.2 | 0.3 | 0.3 | 0.2 | 0.2 | 0.20 |

a) It includes measures of procedural inconveniences, notice and severance pay and difficulty of dismissal.

b) It includes measure of strictness for the regulation of fixed-term contracts and temporary work agencies.

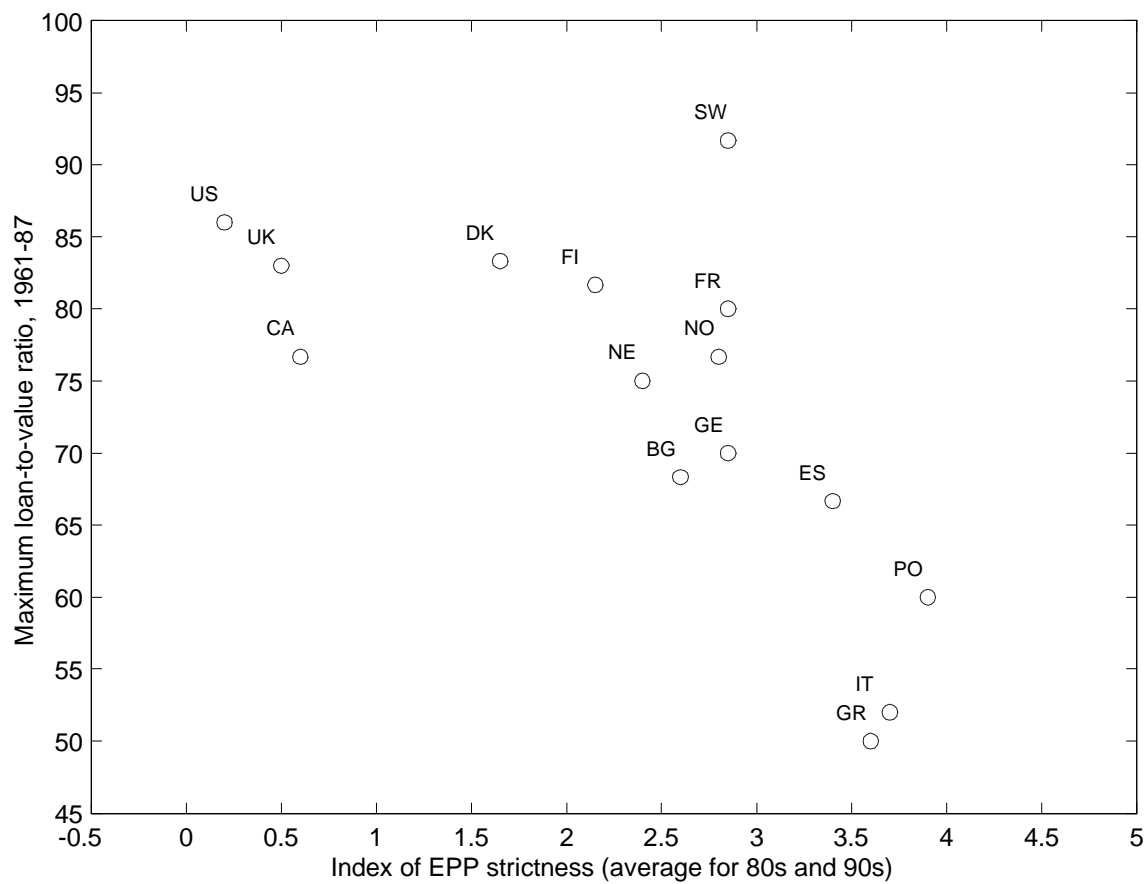
Source: Tables 2.2, 2.3 and 2.5, OECD Employment Outlook, 1999.

Table 2: Indicator of Credit Market Imperfections

| | Maximum loan-to-value ratio | | | |
|----------------|-----------------------------|---------|---------|---------|
| | 1961-70 | 1971-80 | 1981-87 | Average |
| Belgium | 65 | 65 | 75 | 68.33 |
| France | 80 | 80 | 80 | 80.00 |
| Germany | 65 | 65 | 80 | 70.00 |
| Netherlands | 75 | 75 | 75 | 75.00 |
| United Kingdom | - | 81 | 87 | 83.00 |
| Greece | - | - | 50 | 50.00 |
| Italy | 50 | 50 | 56 | 52.00 |
| Portugal | 60 | 60 | 60 | 60.00 |
| Spain | 60 | 60 | 80 | 66.67 |
| Denmark | 70 | 85 | 95 | 83.33 |
| Finland | 80 | 80 | 85 | 81.67 |
| Norway | 75 | 75 | 80 | 76.67 |
| Sweden | 90 | 90 | 95 | 91.67 |
| Canada | 75 | 75 | 80 | 76.67 |
| United States | 80 | 80 | 89 | 83.00 |

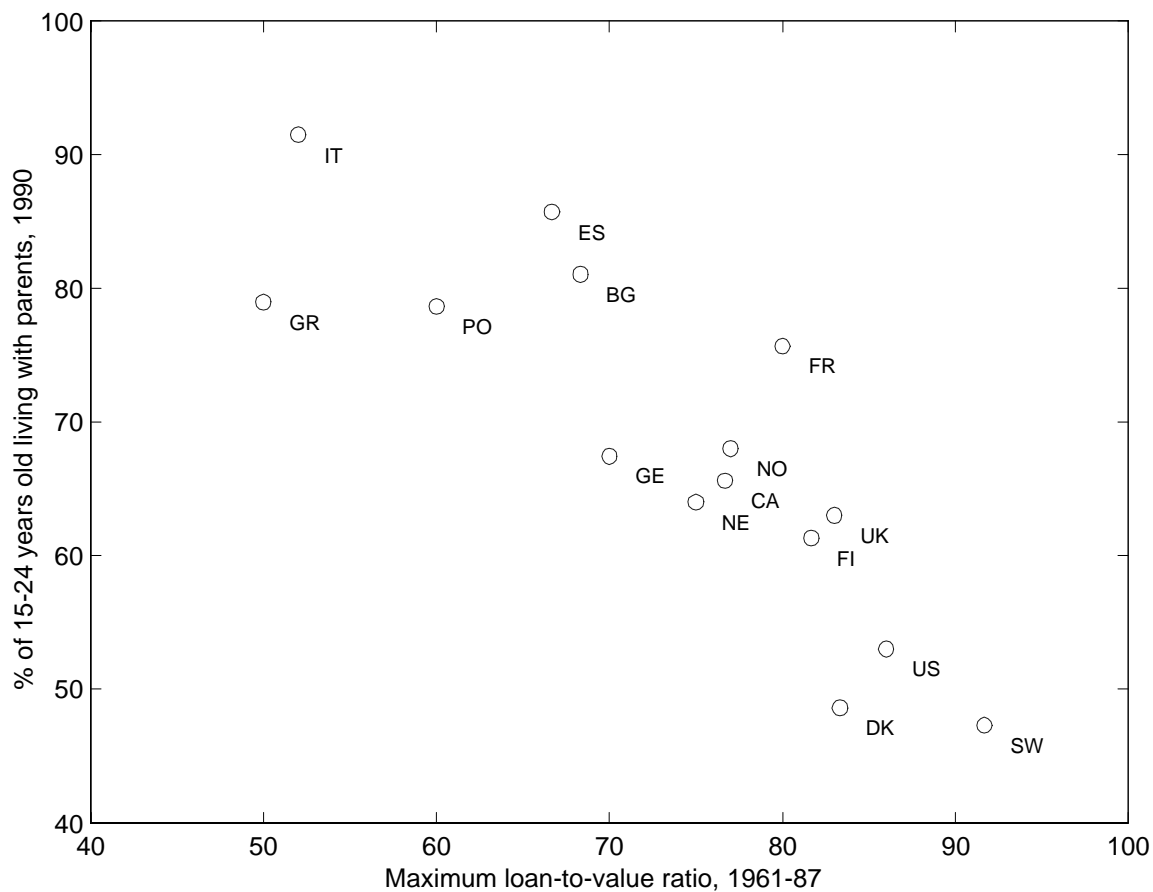
Source: Jappelli and Pagano, QJE, 1994.

Figure 1: EPP and Credit Market Imperfections



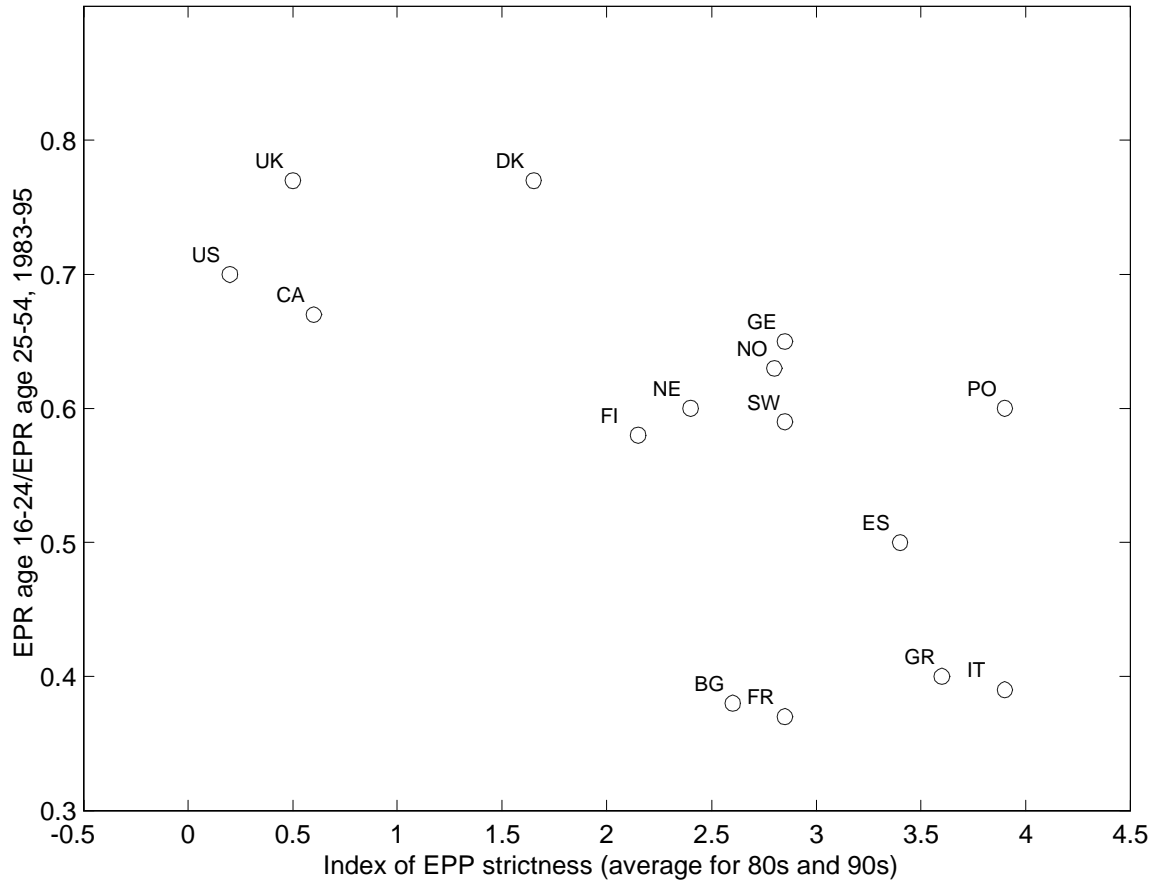
Source: Jappelli and Pagano, QJE, 1994 and OECD Employment Outlook 1999, Table 2.5

Figure 2: EPP and Living Arrangements of Young People



Source: Eurobarometer Survey, Fertility and Family Surveys and Jappelli and Pagano

Figure 3: EPP and Employment/Population Ratios



Source: OECD Labour Force Statistics 1998 and OECD Employment Outlook 1999, Table 2.5

Figure 4: Total welfare as a function of protection: $A > \frac{z-1}{z}$, $z = 2$

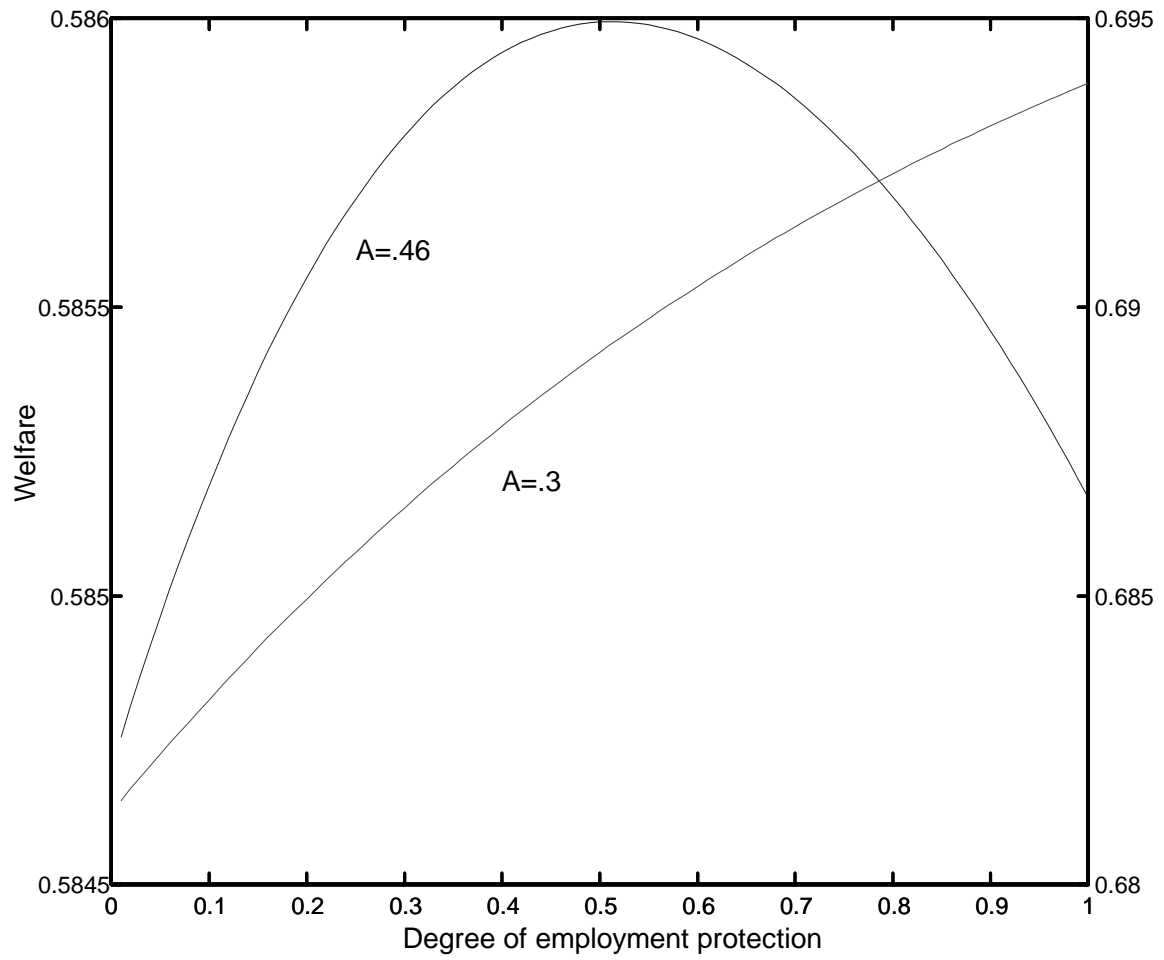


Figure 5: Total welfare as a function of protection: $A < \frac{z-1}{z}$, $z = 2$

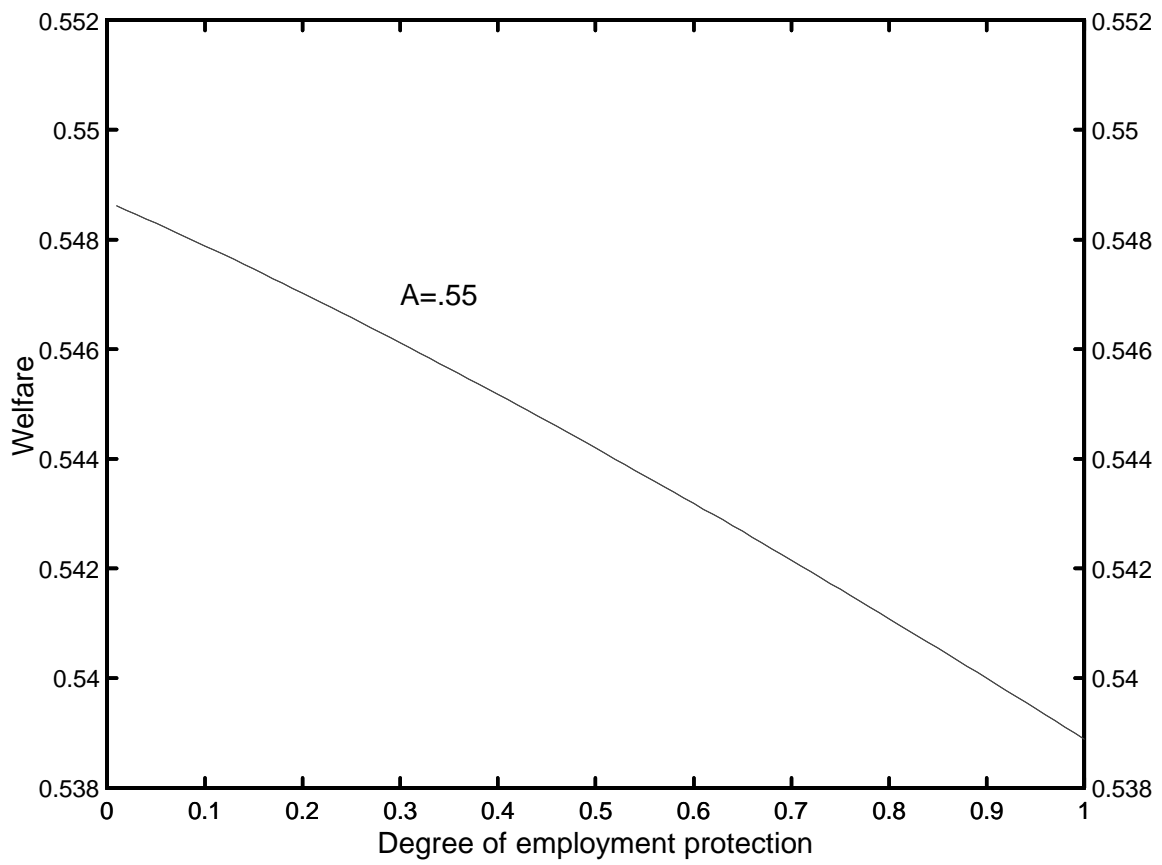


Figure 6: Welfare in complete markets and borrowing constrained economies

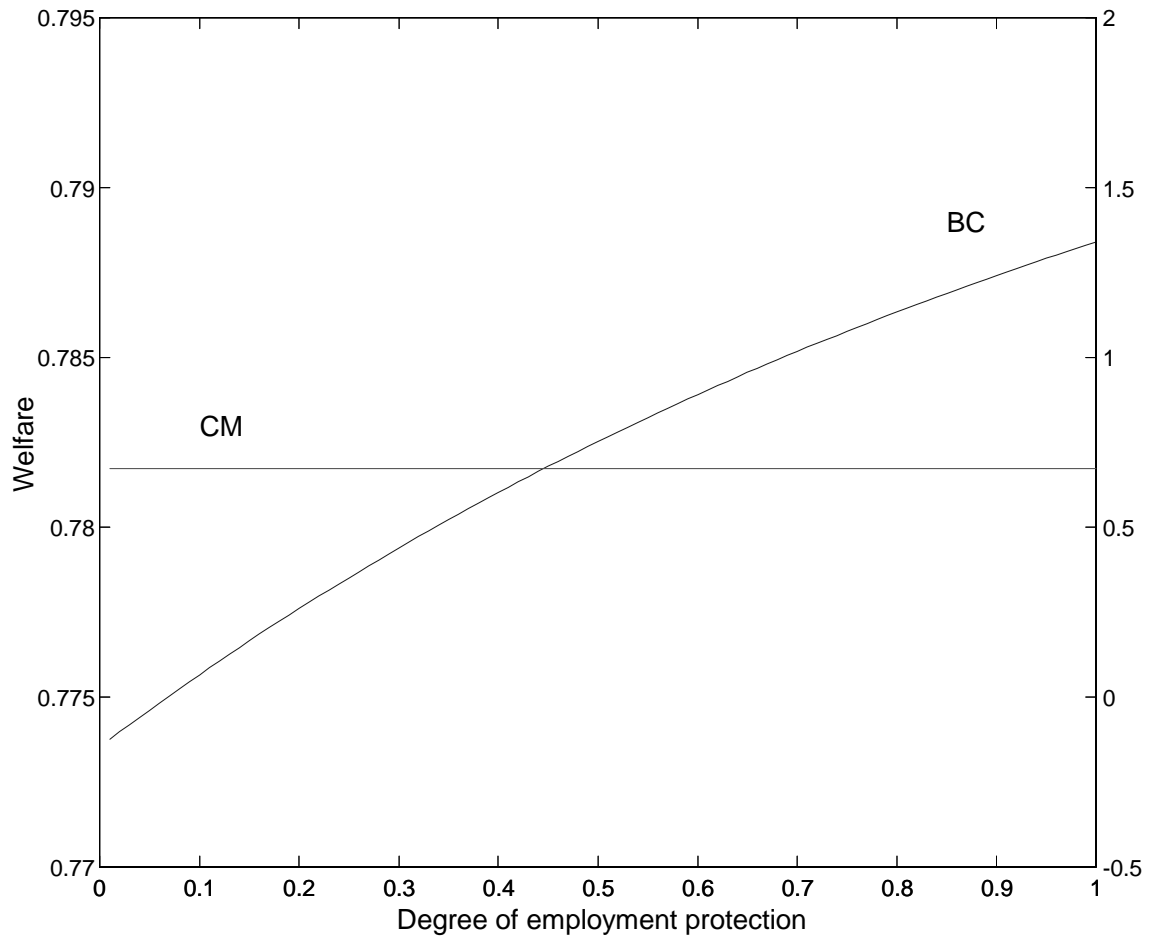


Figure 7: Outcomes of the Bargaining Game

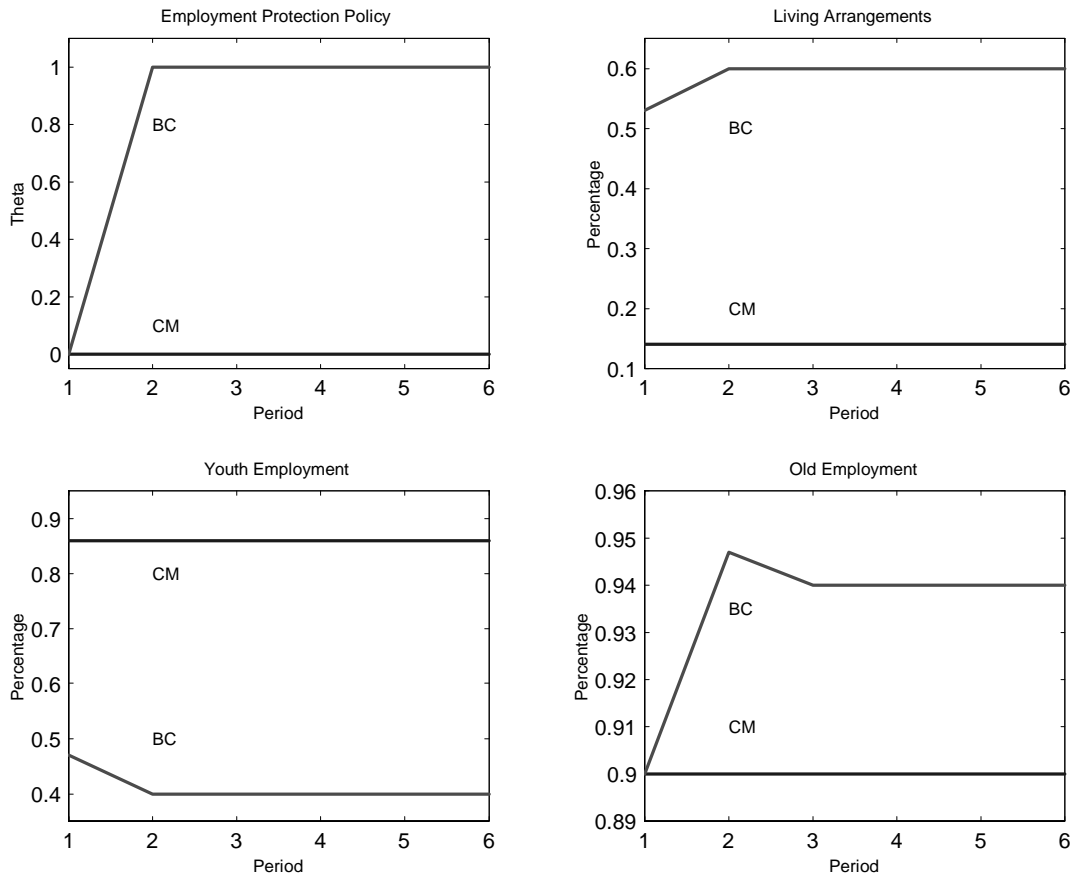


Figure 8: Total Employment

