What Hinders Structural Reforms?*

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Abstract

This paper studies the effect of political costs on implementing structural reforms in a macroeconomic political economy model with heterogeneous agents. I consider product market deregulation as a reform measure. In the model, deregulation creates potential winners and losers, and the potential losers endogenously decide to participate in political actions to impose political costs for the government. This political cost forces the government to implement an inefficiently high regulation level. A higher proportion of liquidity-constrained workers and a higher use of fixed-term labour contracts raise market regulation levels. In addition, high initial regulation levels are associated with a larger decrease in regulation levels in subsequent periods, consistent with the empirical literature. Compensation schemes, labour market reform, and strong government leadership in negotiation also help deregulation. Finally, I use the model to discuss why product markets are more deregulated in some European countries than in others.

JEL Classification: D72, E02, E60, P11

Keywords: structural reforms, product market deregulation, political economy, heterogeneous-agent model

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1 Introduction

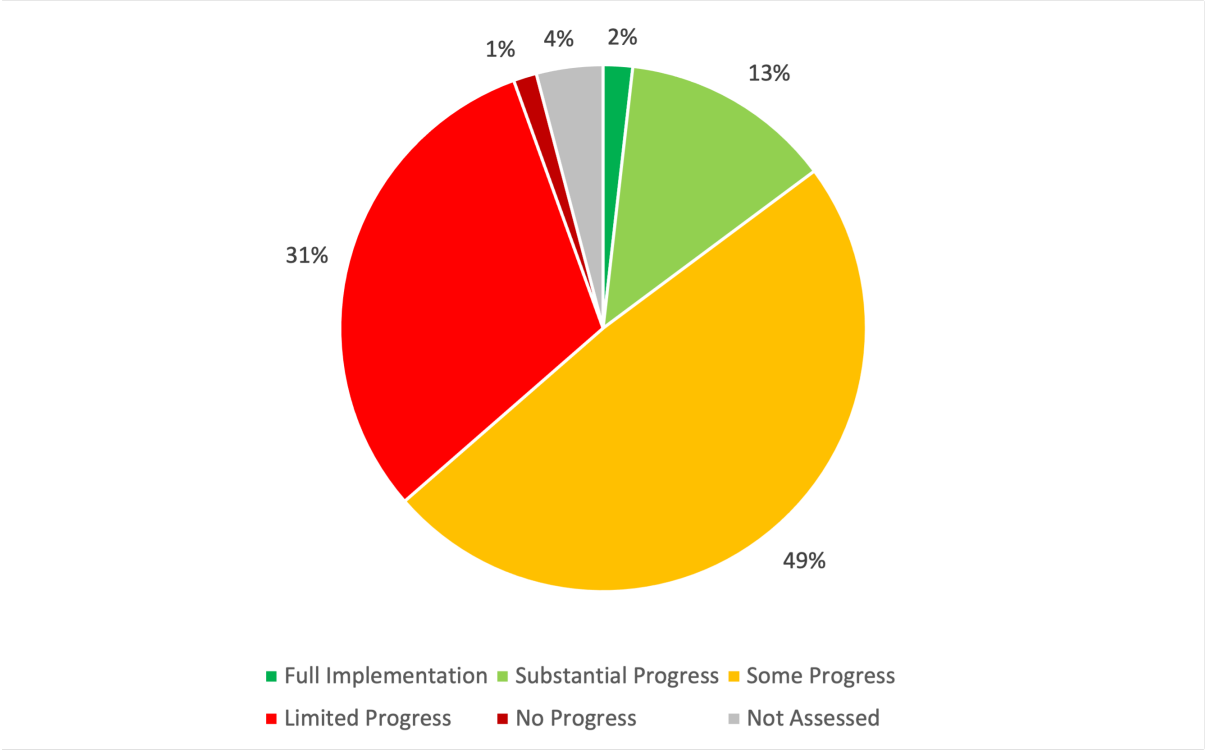
Structural reforms that deregulate product and labour markets frequently feature in policy recommendations by the European Central Bank (ECB), the World Bank, and the OECD as a promising mid- to long-term policy tool to promote growth and attain debt sustainability. Most recently, the former president of the ECB, Mario Draghi, has emphasised the importance of structural reforms for southern European countries hit by the debt crisis of 2010 (Draghi, 2017). The similar idea of deregulating market entry and promoting competition was also a central pillar of the Washington Consensus, which guided the policy recommendation for many Latin American countries since the end of the 1980s to restore macroeconomic stability and maintain fiscal discipline (Williamson, 2018).

Despite being widely endorsed, the implementation of structural reforms often makes little progress. Figure 1a shows the progress of reform recommendations in the European Commission's annual country reports for European Union countries throughout 2011-2020. Only 15% of reform measures recommended by the Commission made substantial progress (in light green) or were fully implemented (in dark green) over the decade. The rest are assessed as having made, at best, 'some progress' (in orange) by the Commission. By the definition of the Commission, this means that the measure is implemented on very limited scales. Figure 1b shows that progress in deregulating markets and encouraging competition is typically slow among these reform measures. No reform recommendation in this category is fully implemented, and only 8% of them are making substantial progress.

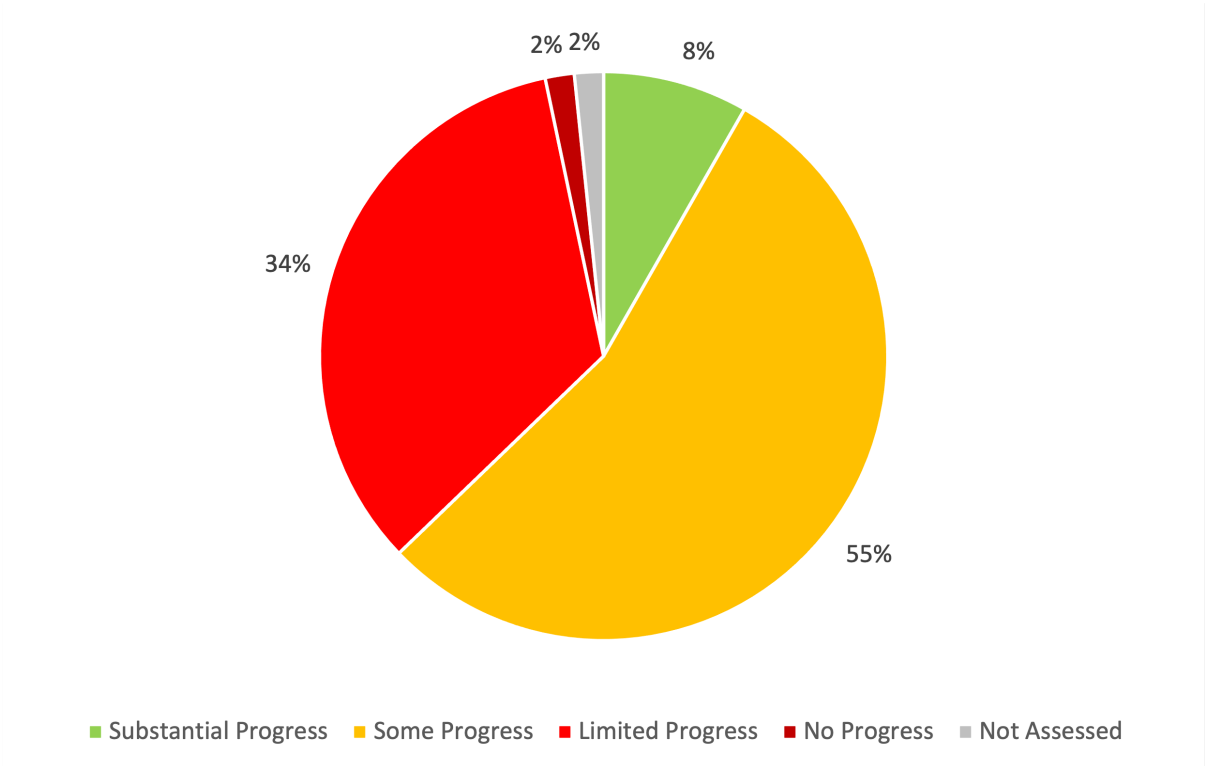
What explains this discrepancy between policy recommendation and implementation? This paper builds a macroeconomic political economy model with heterogeneous agents to study how political costs for the government associated with reforms hinder reform implementation. My paper makes two crucial contributions. First, different to the existing literature's focus on whether political costs hinder reform implementation, I provide a model for assessing to what extent political costs affect reform implementation. To my knowledge, my model is also the first to embed a political economy mechanism other than the voting mechanism in a standard macroeconomic heterogeneous-agent model. Second, I use the model to evaluate how different factors and policies affect the reform progress in counterfactual analyses. In particular, I investigate how workers' risk-sharing capability and usage of fixed-term labour contracts influence political resistance to product market reform, which is missing in the literature.

For this purpose, the model features two key components. First, the political cost that the government incurs to reform is endogenous and differs from a voting mechanism. This political cost originates from political actions such as demonstrations, riots, lobbying, and negative media coverage that are participated by workers who perceive themselves as losers from the reform. I assume that how much political cost that the government incurs

Figure 1: Country-specific Reform Recommendation Implementation in European Union 2011-2020



(a) All Policy Areas



(b) Competition Policy

Note: The progress is assessed by the European Commission. Source: European Commission (2022) and the author's calculation.

depends upon the participation rates of these political actions. The participation rates, in turn, endogenously hinges on how much the losers expect to lose from the reform. Second, I embed this political mechanism into a macroeconomic model with heterogeneous agents. In my model, reform's effect endogenously determines who perceives themselves as losers from the reform and how much they expect to lose.

I focus on deregulating the product markets by reducing the cost of entering a market.[1] This policy increases real incomes and creates more job opportunities on the aggregate level by making the market more competitive and reducing price mark-ups. However, on the individual level, the policy creates potential losers and winners among workers. The potential losers influence the government's decision on the regulation level to be implemented in their favour by participating in political actions. I parameterise the model using the empirical evidence from Spain and show that the product market regulation level is inefficiently high in equilibrium due to the political pressure imposed by the potential losers.

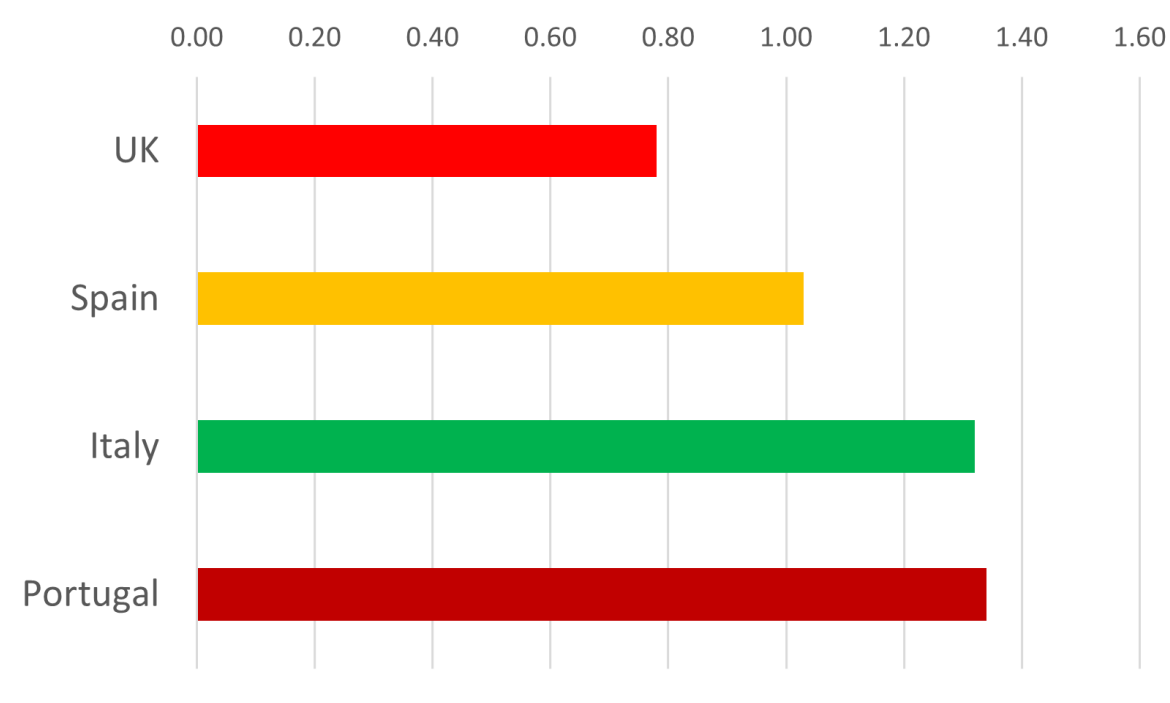
In my counterfactual analyses, I demonstrate that high initial regulation levels, better risk-sharing among workers, and less prevalent use of fixed-term contracts can effectively reduce resistance to deregulation, such that the implemented regulation level is lower. Moreover, by matching a few key parameters to countries in Figure 2, the model can replicate a ranking of the regulation level consistent with the ranking of these countries' actual product market regulation indicators.

I first illustrate the main mechanism in a two-period version of the model. In this model, workers are heterogeneous only on the dimension of their current employment status. Some are currently employed ("insiders") by the incumbent firms in the market, and the rest are unemployed ("outsiders"). For the "outsider" workers, the lower price mark-up following the deregulation raises their real income, and the new entrant firms will offer them better employment opportunities. Thus, they expect themselves to gain from deregulation. Meanwhile, after deregulation, the more competitive market forces some incumbent firms to downsize or close. Thus, deregulation increases the probability of losing jobs for the "insider" workers. A dismissed "insider" is subject to a significant income loss. Therefore, the "insiders" expect themselves to lose out from deregulation potentially.

The governments in period 1 choose the regulation level to be implemented in period 2. This policy decision balances between maximising aggregate workers' welfare and minimising the political costs of this regulation level. If the government attempts to deregulate further from the chosen regulation level, aggregate workers' welfare may increase, but the "insiders" expect to lose more. The policy thus increases their participation in political actions, which induces higher costs for the government. The higher

[1]This may come from, for example, cutting administrative red-tapes and professional license fees associated with setting up new firms.

Figure 2: Product Market Regulation Indicators of Selected European countries in 2018



Source: OECD (2018).

political cost will hinder the government from deregulating further.

Next, I extend the model to an infinite-horizon heterogeneous-agent full model. In this version of the model, workers have infinite horizons, and a majority of them can save via a risk-free asset to hedge against their idiosyncratic risk of losing jobs. Thus, workers are heterogeneous on two dimensions: their current employment status and risk-sharing capability. I demonstrate that both dimensions affect whether workers perceive themselves as winners or losers from deregulation. The workers with assets expect higher real income following the deregulation. Meanwhile, they no longer worry about higher job insecurity, which is hedged against by saving. Therefore, they support full market deregulation regardless of their current employment status and asset-holding levels.

By contrast, the liquidity-constrained "insiders" still advocate higher regulation levels as they did in the two-period version of the model. Interestingly, the liquidity-constrained "outsiders" also oppose full deregulation. This is because, with infinite horizons, they realise that although they are more likely to find a job immediately after the deregulation, they will be more likely to be dismissed in periods thereafter as an "insider". Hence, all liquidity-constrained workers resist full deregulation in this version of the model. This finding is consistent with the observation made by Haggard and Kaufman (1989) that illiquid asset holders are more likely to oppose economic adjustments because they cannot circumvent the adverse consequences. Even if they constitute only a small fraction of the population in the parameterised model, their opposition is strong enough to force the

government to keep an inefficiently high regulation level.

In the counterfactual analyses, I demonstrate that an economy with a higher initial regulation level can make more progress in deregulation. By contrast, a highly deregulated market may expect little further deregulation or even some reform reversals. This result resonates with the empirical finding in literature such as Da Silva et al. (2017) and Helbling et al. (2004) that adverse initial conditions are positively correlated with higher reform intensities, especially for the product market.

In addition, two novel insights emerge. First, better risk-sharing among workers, which corresponds to a lower share of liquidity-constrained workers, contributes to a lower implemented regulation level. This is because a lower share of the liquidity-constrained workers endogenously weakens the political resistance against deregulation.

Second, the market is more regulated if the fixed-term contract is more prevalent in the labour market. The empirical work by Aparicio-Fenoll (2015) shows that temporary workers employed with this type of contract are subject to significant job insecurity, and the risk of them being displaced from their current jobs is strongly and positively correlated with the market competition level. I extend the model so that a fraction of workers are employed with this type of contract. The model shows that the liquidity-constrained workers with this contract are mobilised to insist on a highly regulated market. Hence, the resistance to deregulation is stronger, which leads to a higher implemented regulation level.

In terms of policy, I show that several measures can be potentially helpful in weakening the opposition to deregulation. These include compensating those who lose out from the deregulation, labour market reform that reduces the use of fixed-term contracts, and strong government leadership in negotiation with the resisting group.

Finally, I use the insights from the model to provide a potential explanation of why product markets in some European countries are more deregulated than in others. Key parameters such as the share of liquidity-constrained agents, the use of fixed-term contracts, job insecurity, and the relative political influences of unions prove useful in understanding the heterogeneity in product market regulation levels of the selected European countries.

Related Literature This paper is related to three strands of literature. First, the way I model the effects of the product market deregulation is inspired by Blanchard and Giavazzi (2003) and Bilbiie et al. (2012). Recent papers such as Thomas and Zanetti (2009), Zanetti (2011), Eggertsson et al. (2014), and Cacciatore et al. (2016) model macroeconomic effects of different types of structural reforms in more detail. However, they abstract from the heterogeneous effects of reforms on different types of workers, as well as how these effects affect the political economy aspects of the reform, which is the focus of my paper.

Second, the political economy component of my model is adapted from the recent contribution by Passarelli and Tabellini (2017). Their paper discusses the political economy motives for public debt accumulation, whereas I use a similar framework to study the implementation issues for structural reforms. The idea that political economy concerns block reforms dates back to Olson (1965). More recent discussions include, for example, Alesina and Drazen (1991), Fernandez and Rodrik (1991), Jain and Mukand (2003), Aghion and Schankerman (2004), Beetsma and Poplawski-Ribeiro (2008), Saint-Paul et al. (2016). My paper differs to this literature in three ways. First, the political economy components in previous models assume voting or lobbying mechanisms, implying that the political influences are exogenous. By contrast, my model enables the political pressure on the governments to vary endogenously with the economy's structure and how much different types of agents expect to win or lose from the deregulation. Second, previous models assume exogenous winners and losers from a given reform measure. In my paper, those who perceive themselves as winners and losers endogenously emerge from the effects of deregulation in a macroeconomic model with heterogeneous agents. This enriches the interaction between deregulation's effects and workers' political reactions. Third, I provide novel insights on how workers' risk-sharing capability and usage of fixed-term labour contracts affect the resistance to deregulation.

Lastly, my full model extends the heterogeneous-agent models such as Bewley (1977), Huggett (1993), and Aiyagari (1994) by embedding a political economy mechanism. Another difference between my model and the standard heterogeneous-agent model is that the Markov transition probabilities of income status are endogenous to the policy in my model, which is the regulation level.

The rest of the paper is organised as follows. Section 2 illustrates the main mechanism in a simple two-period version of the model. Section 3 extends the model to an infinite-horizon heterogeneous-agent full model. Section 4 considers the implication of the alternative measure for job insecurity associated with the fixed-term contracts for deregulation and the policy measures for promoting deregulation. Section 5 discusses how the insights from the model help us understand the heterogeneity in regulation levels in the selected European countries. Section 6 concludes.

2 Two-Period Model

I begin by illustrating the main mechanism in a simple 2-period model, which consists of firms that employ workers to produce goods, workers that supply labour to firms and consume goods, and a government that sets the regulation level in period 2 subject to the political pressure from the workers. For simplicity, inter-temporal savings are abstracted

from this version of the model so that all workers are hand-to-mouth.[2] With a numerical example, my model demonstrates how product market deregulation generates diverging views among workers on the optimal level of regulation, as well as how these views translate into political forces that shape the regulation that the governments eventually implement. Lastly, I discuss the impacts of initial conditions and ex-ante uncertainty on the implemented regulation level.

2.1 Producers

The setup of the production sector builds upon Blanchard and Giavazzi (2003) and Bilbiie et al. (2012). There are m_t incumbent producers in the economy,[3] each producing a different brand of goods Y_t^i according to the technology

$$Y_t^i = N_t^i.$$

The aggregate output Y_t is a composite of different brands of goods:

$$Y_t = [(m_t)^{-\frac{1}{\theta_t}} \sum_{i=1}^{m_t} (Y_t^i)^{\frac{\theta_t - 1}{\theta_t}}]^{\frac{\theta_t}{\theta_t - 1}},$$

where $\theta_t = g(m_t)$ is the elasticity of substitution between different brands of goods. I assume that $g'(\cdot) > 0$ so that θ_t increases with the number of brands in the economy. The higher the number of brands in the market, the more competitive the market is. As a result, the elasticity of substitution θ_t is higher. The above equation implies that the demand for each brand is

$$Y_t^i = \frac{1}{m_t}(\frac{P_t^i}{P_t})^{-\theta_t} Y_t,$$

where P_t^i is the price that the producer i charges for her goods. The corresponding aggregate price index P_t is

$$P_t = [\frac{1}{m_t} \sum_{i=1}^{m_t} (P_t^i)^{1-\theta_t}]^{\frac{1}{1-\theta_t}}.$$

Each period, the firm chooses the price and the amount of employment to maximise the real profit

$$(\frac{P_t^i}{P_t} - w_t^i) N_t^i,$$

subject to the firm's demand and production technology. w_t^i is the real wage paid to workers employed by firm i in period t. The optimal price charged by the typical individual

[2] Section 3 examines the implications of infinite horizon and inter-temporal savings.

[3] For simplicity, I assume that these firms are owned by entrepreneurs who constitute an infinitely small proportion of the population and exert no political influence. Including these entrepreneurs in the analysis should not change the qualitative findings below. I leave the quantitative implication for including these entrepreneurs for future research.

producer i is:

$$\frac{P_t^i}{P_t} = \frac{\theta_t}{\theta_t - 1} w_t^i = [1 + \mu_t(m_t)] w_t^i,$$

where $\mu(m_t)$ is the price mark-up that the firm charges over the marginal cost of production w_t^i. Note that the mark-up is the same across all firms as it depends negatively only on the total number of firms in the economy. The higher the number of firms m_t, the more competitive the market is. More competition leads to higher elasticity of substitution between different brands θ_t. From the equation above, this means a lower price mark-up μ_t.

At the start of period 2, new firms can enter the market by paying an entry cost ς. I use this cost to capture the level of regulation in the product market. It is thus the policy variable of my interest. Deregulation corresponds to a cut in the entry cost ς, leading to more new firms' entry. In other words, the number of firms m_t decreases with the entry cost such that $m_t'(\varsigma) < 0$. This means that the deregulation drives down profit per firm. For simplicity and without loss of generality, the entry cost ς is assumed to be proportional to the output. The entry of the market occurs until the expected profit is equal to the entry cost for individual firms:

$$(\frac{P_2^i}{P_2} - w_2^i) Y_2^i = \varsigma Y_2^i. \tag{1}$$

In an equilibrium where all firms are symmetric and make the same pricing decision, the relative price $\frac{P_t^i}{P_t} = 1$. Then the above equation (1) can be rewritten as

$$w_2 = 1 - \varsigma,$$

which implies that the real wage in period 2 is equalised across all firms and decreases with the entry cost. The intuition is that a product market deregulation that cuts the entry cost ς increases market competition by encouraging new firm entry. This reduces the market-wide mark-up μ_t through an increase in the elasticity of substitution θ_t. As a result, the real wage paid to incumbent workers increases. This equation thus captures the positive effects on real income from deregulating the product markets.[4]

[4]I treat equilibrium in each period as long-run equilibrium. This is because, similar to Blanchard and Giavazzi (2003), this type of deregulation has no short-run effect in this simple setup. Richer DSGE models, such as Cacciatore et al. (2016), discuss potential short-run macroeconomic effects by cutting entry costs. I focus on how long-run effects on their own can generate sufficient political opposition to obstruct such deregulation measures.

2.2 Workers

There are workers with a total mass of 1 in the economy, and all workers live for two periods. A proportion n_t^{in} of them are insider employees of the incumbent firms. The rest $1 - n_t^{in}$ of workers are outsiders of the market who are unemployed.

In order to capture the impact of deregulation on individual worker's job market prospects, I assume Markov transition probabilities for the workers' idiosyncratic employment status in each period. If a worker is an inside worker in period 1, the probability that she remains an insider in period 2 is

$$Pr(insider, t = 2|insider, t = 1) = q_i(\varsigma),$$

where I assume $\frac{\partial q_i(\varsigma)}{\partial \varsigma} > 0$. This assumption captures the effect that deregulation in the product market increases job insecurity for insider workers. The reason is that deregulation that cuts the entry cost ς increases market competition. More competition typically pushes some incumbent firms out of the market. Meanwhile, surviving firms may have to downsize due to a smaller market share or adopting more efficient operation procedures. These factors contribute to a higher risk of job displacement for insider workers. This intuition corroborates with the discussion in Blanchard and Giavazzi (2003). Aparicio-Fenoll (2015) and Anderton and Lupidio (2019) support this argument with empirical evidence using data from European countries. The probability of the insider workers experiencing a job displacement and becoming an outsider is thus $Pr(outsider, t = 2|insider, t = 1) = 1 - q_i(\varsigma)$.

Alternatively, if the worker is an outsider in period 1, the probability of her remaining to be an outsider in period 2 is

$$Pr(outsider, t = 2|outsider, t = 1) = q_o(\varsigma),$$

where I assume $\frac{\partial q_o(\varsigma)}{\partial \varsigma} > 0$. Accordingly, the probability of the outsider workers being employed in the industry is $Pr(insider, t = 2|outsider, t = 1) = 1 - q_o(\varsigma)$. These assumptions imply that the worker is more likely to be employed in the industry following market deregulation. This is consistent with the empirical finding that product market deregulation increases the overall employment rate and job finding rate (Bertrand and Kramarz, 2002; Nicoletti and Scarpetta, 2005). Therefore, the transition matrix of workers' employment status can be summarised as:

	insider in $t+1$	outsider in $t+1$
insider in t	$q_i(\varsigma)$	$1 - q_i(\varsigma)$
outsider in t	$1 - q_o(\varsigma)$	$q_o(\varsigma)$

In period 1, a particular worker j maximises her expected lifetime CRRA utility

$$V_1^j = \frac{(C_1^j/(C_1)^h)^{1-\gamma}}{1-\gamma} + \beta \mathbb{E}_t \frac{(C_2^j/(C_2)^h)^{1-\gamma}}{1-\gamma},$$

where C_1^j and C_2^j are the consumption of the worker in period 1 and 2 respectively, and C_1 and C_2 are the average consumption of the economy in the two periods respectively. β is the discounting factor. γ measures the degree of risk-aversion.

h is the habit formation parameter in the "keeping up with the Joneses" fashion. It measures the extent to which the worker cares about the position of her consumption relative to the average level in the economy. This positional concern captures the non-pecuniary costs associated with product market deregulation. Following deregulation, the average consumption of the economy will be higher. This decreases the utility of both types of workers' with different intuitions.

For the unemployed outsiders, their mental well-being is strongly positively correlated with the unemployment rate of the entire economy as a reference, as reported by Clark (2003). This is because workers want to deviate less from the social norm. The unemployment rate is lower in a more competitive market after deregulation. Then, the status of being unemployed hurts more when there is less of it around.

For insider workers, the non-pecuniary costs can come from various sources. For example, Colantone et al. (2019) demonstrates that a more competitive import sector is associated with higher levels of distress experienced by the workers in the sector. Guadalupe (2007) shows that wage inequality is higher with higher product market competition. Griffith (2001) documents that a more competitive market induces higher managerial efforts. All these factors can contribute to disutility from deregulation for workers.

In period 2, the worker maximises her period 2 utility $V_2^j = \frac{(C_2^j/(C_2)^h)^{1-\gamma}}{1-\gamma}$ only. The maximisation of utility in both periods is subject to the constraint

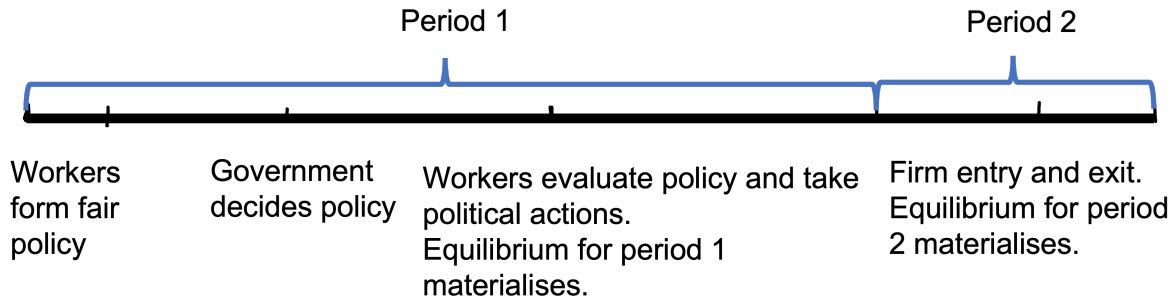
$$C_t^j = \begin{cases} w_t & \text{if insider} \\ 0 & \text{if just displaced} \\ b_t & \text{otherwise} \end{cases}$$

where w_t is the real wage firms pay in period t. $b_t = \nu w_t$ is the unemployment benefit. $\nu \in (0,1)$ is the unemployment benefit replacement ratio. Each period, each insider worker only provides 1 unit of labour and earns the wage rate. Those who are just dismissed in the current period to become an outsider lose all their income. This income loss associated with job displacement captures the significant pecuniary loss in Burdett et al. (2020), and the wage equivalent of large non-pecuniary loss in Rätzel (2012). Otherwise, if the worker has been an outsider since at least the previous period, she receives the unemployment benefit.

2.3 Fair Policy, Aggrievements, and Political Actions

In period 1, the government decides the entry cost for the market ς, which comes into effect in period 2.[5] The policy decision on ς is shaped by a procedure of 3 stages, adapted from the political mechanism in Passarelli and Tabellini (2017). Figure 3 illustrates this sequence of interactions between the governments and the workers.

Figure 3: The Sequence of Interactions between the Governments and the Workers



In stage 1, each worker forms a subjective view of the regulation level that she considers 'fair' to be implemented in the entire economy in the next period before the governments choose the policy. The worker thus expects a certain level of entitled welfare achieved by this subjectively 'fair' policy as her reservation welfare. In stage 2, the government decides the actual regulation level to be implemented in the next period and announces the policy to the public. In stage 3, after observing the government policy announcement, workers will compare the expected welfare under the actual policy to her reservation welfare. If her welfare realised by the government's policy is lower than the welfare she feels entitled to, the worker will feel aggrieved. The aggrieved workers will decide whether or not to take political actions that impose political costs on the government. The more her actual welfare deviates from her reservation welfare, the more likely she is to participate in political actions. These potential individual political reactions are aggregated and internalised by the government when it decides the regulation level in stage 2.

In the following, I describe how workers form their subjective 'fair' policy in stage 1 and how they react to the actual policy in stage 3. The following subsection describes how the governments internalise workers' potential reactions when they make the policy decision in stage 2.

Since the 'fair policy' for each member of the same employment status is the same, I consider the subjective views made by each group $k \in \{in, out, disp\}$ for simpler notation, which corresponds to insider, outsider, and just displaced workers respectively. The 'fair'

[5] In this two-period model, any change to the entry cost in period 2 will not have any effect unless there is a period 3. Thus, I do not consider the government's policy decision in period 2.

policy $\hat{\varsigma}^k$ is derived from maximising a modified aggregate social welfare

$$W_1^k = \sum_i \pi_{ik} V_1^i, i \in \{in, out, disp\} \tag{2}$$

in stage 1, where the weight that the particular group k attaches to its own welfare, $\pi_{kk} = \delta + (1-\delta)n_1^k$, whilst the other groups $i \neq k$ receive weights $\pi_{ik} = (1-\delta)n_1^i$. $\delta \in (0,1)$ captures the self-serving bias of the group. In other words, the members of each group think their welfare is more representative of the entire economy than those of others'. Hence, the weight attached to the welfare of their own group is larger than the share of the population of the group. This bias generates divergent subjective views among different groups of workers towards the regulation level to be implemented in the next period.

The optimisation yields a subjective reservation utility for the particular group $R_1^k = V(\hat{\varsigma}^k)$ achieved by the group's subjective views. Note that this utility is not necessarily politically feasible, as workers disregard political pressure from other groups that the government faces.

In stage 3, after the government announces the actual entry cost to be implemented, workers feel aggrieved if and only if their welfare achieved by the actual policy falls short of the reservation utility R_1^k:

$$A_1^k(\varsigma) = \frac{\omega^k}{2} max[0, R_1^k - V_1^k(\varsigma)]^2,$$

where $\omega^k > 0$. A_1^k measures the degree of the worker group k's aggrievement, increasing with the positive gap between the reservation and actual utility.

If the policy aggrieves the worker, the worker decides whether or not to participate in political actions by weighing the benefits against the costs of doing so. Here, political actions incorporate a wide range of activities, from street demonstrations, riots, and unrest that cause social harm to lobbying party members and negative media coverage that put pressure on policymakers. Realised political actions impose costs on the governments.

The benefit from participating in political actions is an emotional gain that increases with aggrievements, $A_t^k(\varsigma)$. Moreover, the benefit increases with the number of people from the same group that participate in the action, $\mathcal{P}_1^k n_1^k$, where $\mathcal{P}_t^k$ is the participation probability for the worker type k. With increasing participation, workers feel their objection to the policy is widely shared and anticipate higher chances of changing the policy in their favour.[6]

[6]In equilibrium, the announced policy will not change after the workers' political actions despite the protesting workers hoping it will. The reason is that the governments already minimised the impacts of these political actions in stage 2, as detailed in the next subsection. An equivalent formulation of the process is that there is a fourth stage in period 1 when the government does reconsider the policy. However, the reconsideration always yields the same decision as in stage 2 in equilibrium because the

The cost of participating in political actions comprises two components. There is a cost common to all workers, μ^c. This cost can be the potential legal punishment and repression following a street protest from workers or monetary spending for lobbying and media coverage. The second component is an idiosyncratic cost, $\epsilon^k_{i,t}$, for each particular worker i. $\epsilon^k_{i,t}$ is assumed to be uniformly distributed with mean zero and density $\frac{1}{2\sigma^k}$. The standard deviation of this cost σ^k measures how organised a particular group is in initiating political actions. The lower σ^k is, the more organised the worker type k.

Therefore, the worker will choose to take action if the benefits of doing so are higher than the costs:

$$\mathcal{P}^k_1 n^k_1 A^k_1(\varsigma) - \mu^c - \epsilon^k_{i,t} \geq 0.$$

This implies that the participation rate

$$\mathcal{P}^k_1 = Pr(\epsilon^k_{i,1} \leq \mathcal{P}^k_1 n^k_1 A^k_1(\varsigma) - \mu^c) = \frac{1}{2} + \frac{\mathcal{P}^k_1 n^k_1 A^k_1(\varsigma) - \mu^c}{2\sigma^k}.$$

Solving for $\mathcal{P}^k_1$ we get

$$\mathcal{P}^k_1 = \frac{\sigma^k - \mu^c}{2\sigma^k - n^k_1 A^k_1(\varsigma)} \equiv \mathcal{P}^k_1(\varsigma), \tag{3}$$

where I assume $\sigma^k > max\{n^k_1 A^k_1(\varsigma) - \mu^c, \mu^c\}$, so that $0 < \mathcal{P}^k_1 < 1$.

It is easy to show that $\mathcal{P}^k_{A,1} = \frac{\partial \mathcal{P}^k_1}{\partial A^k_1(\varsigma)} > 0$, $\mathcal{P}^k_{n,1} = \frac{\partial \mathcal{P}^k_1}{\partial n^k_1} > 0$, $\mathcal{P}^k_{\sigma,1} = \frac{\partial \mathcal{P}^k_1}{\partial \sigma^k} < 0$, so that the probability of participation is increasing if the aggrievement of the group, $A^k_1(\varsigma)$, or the size of the group, n^k_1, is higher, and if the group is more organised (i.e. lower σ^k).

Moreover, $\frac{\partial \mathcal{P}^k_{A,1}}{\partial A^k_1(\varsigma)} > 0$, $\frac{\partial \mathcal{P}^k_{A,1}}{\partial n^k_t} > 0$, $\frac{\partial \mathcal{P}^k_{A,1}}{\partial \sigma^k} < 0$, so that the reactions of workers are more sensitive to aggrievement when the aggrievement is already higher and when the group is larger and more organised.

2.4 Government

In stage 2 of period 1, the government trades off the social benefit of the policy against the political costs imposed by workers' political actions in response to the policy. Specifically, the government chooses the actual regulation level to be implemented in period 2 to maximise

$$W_1 = \sum_j (V^j_1 - \kappa_j \mathcal{P}^j_1), \tag{4}$$

where $\kappa_j \geq 0$ captures the cost for the government inflicted by the political actions of a particular worker j. Given that the only heterogeneity in this version of the model is workers' employment status, this government objective can be conveniently rewritten as

$$W_1 = \sum_k (V^k_1 - \kappa_k \mathcal{P}^k_1) n^k_1, k \in \{in, out, disp\},$$

trade-offs remain the same for the government.

where $\mathcal{P}_1^k n_1^k$ measures the magnitude of political actions from the worker type k. Thus, the second component in the objective sums up the aggregate political costs for the government from all workers.

2.5 Equilibrium

In equilibrium, the goods and labour markets clear:

$$Y_t = C_t = \int_0^1 C_t^j dj$$
$$n_t^{in} = \sum_{i=1}^{m_t} N_t^i.$$

An equilibrium consists of consumption, prices, labour, wages, the subjective views $\{\hat{\varsigma}^k\}$, the government policy $\{\varsigma^a\}$, and the political participation rates $\{\mathcal{P}_t^k\}$, such that

1. the individual utilities and firm profits are maximised;
2. the subjective views maximise the modified aggregate social welfare functions for each group (2);
3. the government policy maximises the objective function (4);
4. workers choose whether or not to participate in political actions given the government policy, their subjective views, and the participation of other group members.

2.6 Parameterisation

I illustrate the model's implications on product market deregulation with a numerical example. The values of parameters are specified in Table 1. The discount factor β is chosen as 0.96 for an annual interest rate of 4%. The risk aversion parameter γ is set to 0.9. The value of θ_1 implies an initial mark-up of 20%. All these parameter values are standard in the literature. The unemployment benefit replacement ratio ν is set to 0.4, a reasonable value for European countries as in Thomas and Zanetti (2009).

In terms of the transition probability $q_i(\varsigma)$, Aparicio-Fenoll (2015) estimated a linear probability model for the relationship between the probability of becoming unemployed and the product market competition using the Spanish labour market flow data. Market competition in this paper is measured by the profit margin $\frac{P-MC}{P}$, where P is the price and MC is the marginal cost. The higher the profit margin, the less competitive the market is. From equation (1), it is straightforward to show that the entry cost ς in the model measures exactly the profit margin. Therefore, I define $q_i(\varsigma)$ likewise as an

increasing linear function with respect to ς:

$$q_i(\varsigma) = \beta_0^i + \beta_1^i \varsigma.$$

and use the corresponding slop estimates in Aparicio-Fenoll (2015) to set $\beta_1^i = 0.136$. β_0^i is chosen such that $q_i(\varsigma = 0.2) = 0.92$. In other words, with an average profit margin of 0.2, the probability of remaining employed for the insiders is 0.92. These are within the range of Spain's average mark-up and job transition probability estimates.[7]

I calculate $q_o(\varsigma)$ by using the labour market flow equations in steady state:

$$q_o(\varsigma) = 1 - \frac{(1 - q_i(\varsigma))(1 - u_2(\varsigma))}{u_2(\varsigma)},$$

where $u_2(\varsigma)$ is the unemployment rate in period 2 that satisfies

$$u_2(\varsigma) = 0.14 + 0.06 \times (\mu_2(\varsigma) - 0.2)$$

by the choice of $m_t(\varsigma)$. This implies that the period 2 equilibrium unemployment rate falls by 0.06 percentage points following a 1 percentage point reduction in the price mark-up, which is consistent with the finding by Bertinelli et al. (2013) from the simulation of a DSGE model calibrated to the European labour markets. In addition, the equation implies that with an aggregate profit margin of 0.2, the unemployment rate is 0.14, consistent with Spain's average unemployment rate over the period 2004-2012 (International Labour Organization, 2022). Appendix A.1 presents the derivation of $q_o(\varsigma)$ and plots the transition probabilities against the profit margin.

The empirical estimate for the positional concern, h, can vary widely in literature across age and different goods types (Carlsson, Johansson-Stenman, and Martinsson, 2007; Akay and Martinsson, 2012). It governs the strength of the non-pecuniary costs of deregulation. I set it to 0.3 in the baseline, which is within the range estimated in literature, and show the robustness of the results to h later in section 2.8.

δ measures the self-serving bias of workers when they form their subjective views on policy. I set this parameter to 0.7, which aligns with the estimates of altruism from experiments data in Andreoni and Miller (2002) and Fisman et al. (2007).

There is less guidance from the empirical side on how to parameterise the political participation parameters. I set ω, μ^c, and σ symmetrically for the insiders and the outsiders. The choice of these parameters must first satisfy the condition stated underneath equation (3) to ensure that the participation probabilities are between 0 and 1. In addi-

[7] From Soares (2020)'s estimates using data from 2004 to 2012, the aggregate profit margin in Spain is around 0.2. From Ward-Warmedinger and Macchiarelli (2013)'s estimates using data from 1998 to 2008, the probability of transiting from employment to either unemployment or out of the labour force in Spain is 0.08.

Table 1: Parameter Values of the Two-period Model

Parameter	Value	Interpretation
β	0.96	discount factor
γ	0.9	risk aversion
θ_1	5	elasticity of substitution in period 1
ν	0.4	unemployment benefit replacement ratio
β_0^i	0.893	parameter for probability q_i
β_1^i	0.136	parameter for probability q_i
h	0.3	positional concern
δ	0.7	self-serving bias
κ	1000	political influence
μ^c	19.2	constant cost of political actions
σ	20	standard deviation of idiosyncratic costs
ω	100	parameter for aggrievement

tion, the baseline values imply that political participation rates of different worker types are within the range $[0.02, 0.03]$. This replicates the range of fractions of countries with social unrest within a year in Europe during the period 2010-2020 estimated by Barrett et al. (2022), which approximately measures the frequency of social unrest in Europe. The values of κ are such that the weight attached to the loss from political actions in the government's objective function (4) is around 2.25 times of the weight attached to the aggregate welfare of all workers in the economy, which is a standard choice for government venality in lobbying models such as in Bridgman et al. (2007) and Adamopoulos (2008).

2.7 Results: What Determines the Market Regulation

Table 2 presents the results of the numerical simulation of the model with the parameter values discussed in the previous subsection. The first three rows report the regulation levels that the insider, displaced, and outsider workers in period 1 consider fair to be implemented in period 2 respectively. The fourth row is the efficient regulation level that a benevolent social planner would set to maximise the aggregate welfare of all workers in the economy. The last row is the actual regulation level implemented by the government that maximises the objective with political considerations (4). For a more intuitive interpretation, I convert the regulation levels measured by entry costs to their corresponding price mark-ups.

From the table, the insiders advocate a high regulation level corresponding to a high price mark-up. By contrast, the outsiders advocate full deregulation, corresponding to 1% of price mark-up in my model, regardless of whether the worker is just dismissed. This result suggests that the insiders prefer much more regulated markets than the displaced workers and the outsiders.

Table 2: Preferred, Efficient, and Actual Regulation Level, Two-period Model

$\hat{\mu}^{in}$	96	mark-up preferred by the insiders
$\hat{\mu}^{disp}$	1	mark-up preferred by the displaced
$\hat{\mu}^{out}$	1	mark-up preferred by the outsiders
μ^{i}	66	efficient mark-up
μ^{a}	56	actual mark-up

Note: The table reports mark-ups (%) implied by corresponding entry costs ς from the numerical simulation of the two-period model.

This divergence in subjective views between different workers is because the insiders expect themselves to be losers, while the outsiders expect themselves to be winners at low regulation levels. Consider a reform proposal that decreases product market entry cost ς from the level the insiders advocate. This policy attracts more producers to enter the market, making the incumbent product market more competitive.

For insiders employed in the incumbent industry, the more competitive market reduces the price mark-up, which in turn increases their real wages if they remain insiders in the next period. However, this expected pecuniary gain is compromised by two costs. First, the deregulation reduces the insiders' probability of remaining employed in the current job q_i. They lose all current income once they are dismissed from their current job. Second, deregulation increases the non-pecuniary cost to their utility. By contrast, a higher regulation level increases the prospect of them keeping their jobs and reduces the non-pecuniary costs from the higher competition. These effects dominate over the lower real income without deregulation. Hence, the insiders advocate more regulated markets when forming their subjective view as they attach a higher weight to their own welfare (2).

For the unemployed outsiders, the deregulation increases the unemployment benefits as a pecuniary gain. Meanwhile, they are more likely to be employed by the incumbent firms, as reflected by the decrease in the probability of remaining an outsider q_o. Once they are employed in the incumbent industry, they can earn even higher income. These expected gains outweigh the expected higher welfare cost from potentially remaining an outsider when there is lower unemployment in the economy after the deregulation. Thus, they advocate full deregulation.

In this simple model, though the total output is maximised in a fully deregulated market with the lowest entry cost, this is not pursued by the government that makes the policy decisions like a benevolent social planner without the political constraints (i.e. by setting $\kappa_{in} = \kappa_{out} = \kappa_{disp} = 0$). This result implies that the reason for impeded product market deregulation might be that further deregulation does not make the market more efficient. This explanation resonates with the 'second-best' argument in Rodrik (2004) that fixing a subset of inefficiencies in an economy may reduce welfare. In my model, the

government faces the trade-off between reducing price mark-up and increasing involuntary unemployment of the insiders by deregulation. In this version of the model, the insiders who expect to lose out from deregulation constitute the majority of the population. In this case, full deregulation does not maximise the aggregate social welfare function as it excessively hurts the majority of the population.

If the governments care about the political costs, the actual implemented regulation level differs from the efficient level, even if the political participation parameters are the same for all groups in my baseline case. This result is different to standard lobbying models, where the actual policy will not deviate from the socially optimal policy if the political participation technology of rival groups is the same. The reason is that a group's political pressure on the government depends not just on the exogenous political participation parameters. It also depends upon how each group endogenously reacts to the policy, which is captured by the political participation probabilities $\mathcal{P}_1^k$. As discussed, these probabilities are endogenously determined by the size of the group and how aggrieved different worker groups are towards a particular level of regulation. Under my baseline parameterisation, the efficient regulation level that implies 66% of mark-up disappoints the outsiders excessively because it is too far away from what they think is desirable (1% of mark-up). Therefore, the government sets a lower actual mark-up (56%) to prevent exorbitant political costs inflicted by the political actions of outsiders. Meanwhile, the government will not further deregulate the market to gratify the outsiders, as this provokes the insiders to impose political costs that outweigh the gain in outsiders' support.

The political participation parameters can still influence the implemented regulation level. Table 3 shows four alternative scenarios where the insider workers possess better participation technology. In these circumstances, the actual implemented regulation level is higher than the efficient one. Imagine that the incumbent workers belong to a union that can mobilise workers or has links to lobbying groups. They may incur lower costs in organising protests (lower μ_{in}), that they are more organised (lower σ_{in}), that they are more able to incite workers to take political actions (higher ω_{in}), or that they exert higher political influence or social cost by their actions (higher κ_{in}). In these cases, implementing the efficient regulation level that implies 66% of price mark-up will lead to disproportionate political backlash from the insiders. As a result, the government implements inefficiently high regulation levels. This result conforms to the observation by Haggard and Webb (1993) that, in practice, opposition to reforms often comes from sectors more incorporated into the political systems, smaller businesses, and organised labour force.

In summary, this numerical example shows that deregulating product markets can be hindered for two reasons. First, further deregulation may not be efficient because it reduces the aggregate social welfare. Second, deregulation may inflict too much political

Table 3: Actual Regulation Level and Political Influence, Two-period Model

scenario	actual mark-up
baseline	56
lower participation cost for insiders ($\mu_{in} = 0.9\mu_{out}$)	84
more organised insiders ($\sigma_{in} = 0.5\sigma_{out}$)	80
more sensitive insiders ($\omega_{in} = 1.5\omega_{out}$)	70
more influential insiders ($\kappa_{in} = 2\kappa_{out}$)	73

Note: The table reports mark-ups (%) implied by corresponding entry costs ς from the numerical simulation of the two-period model.

backlash from the market insiders. The opposition to deregulation from the insiders will be stronger if they are more politically integrated.

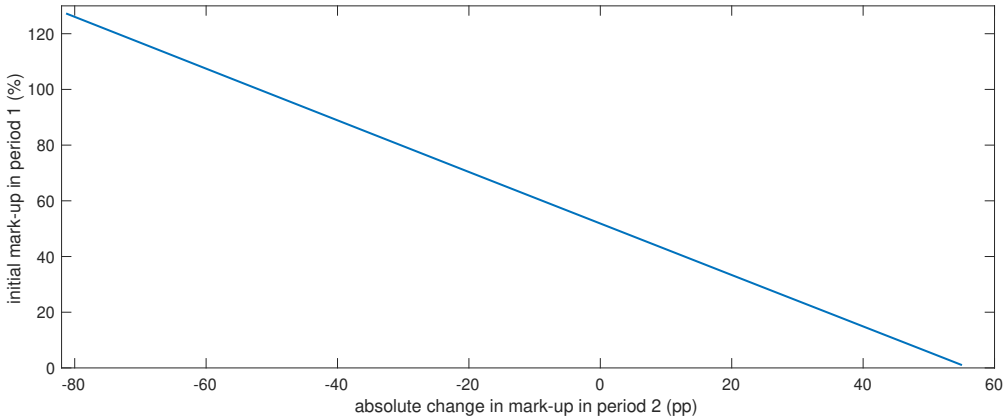
2.8 Initial Conditions and Ex-ante Uncertainty

In addition to the factors discussed in the previous section, one of the most discussed aspects in the literature that potentially influences the deregulation progress is the initial condition of the economy. For example, Helbling et al. (2004) and Da Silva et al. (2017) demonstrate that weak initial conditions significantly promote reform efforts. The potential explanation is that the opposition is weaker in the economy, where the condition is further away from the best practice. Based upon a similar rationale, deep crises can foster more reform, supported empirically by Alesina et al. (2006) and Høj et al. (2006).

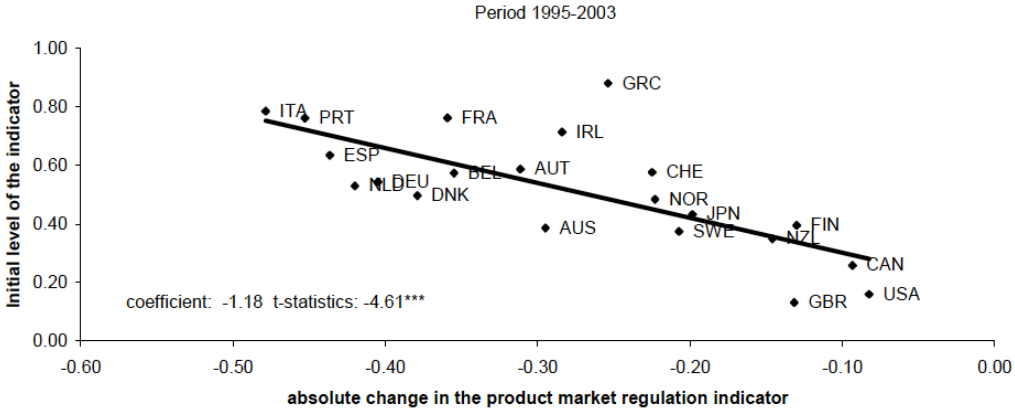
My model generates results that underpin this hypothesis. Figure 4a plots the initial mark-up of the economy in period 1 against the change that the government in the model makes in the actual level of mark-up in period 2 relative to the initial mark-up in the economy. The higher initial mark-up in period 1 represents a weaker initial condition. The figure shows that if the initial condition is weaker, more deregulation will be implemented in period 2. For example, with around 120% of initial mark-up in period 1, the government will be able to reduce the mark-up by around 76 percentage points in period 2. By contrast, if the economy starts with a low mark-up level such as 20%, there will be a reform reversal in period 2 that increases the mark-up by around 38 percentage points. This negative relationship qualitatively replicates the experience of the OECD countries in Figure 4b.

The intuition is that with a higher initial mark-up, the proportion of insiders in the economy is smaller as the unemployment rate is higher. This weakens the opposition to deregulation in three channels. First, workers' subjective views are more conducive to low regulation levels. This is because all workers attach smaller weight to the welfare of insiders when forming their subjective view by maximising their own modified social welfare functions (2), as long as their self-serving bias $\delta < 1$. Consequently, the insider workers will be more sympathetic to the opinion of the outsiders and more tolerant if

Figure 4: Initial Conditions and Deregulation, Two-period Model



(a) Model



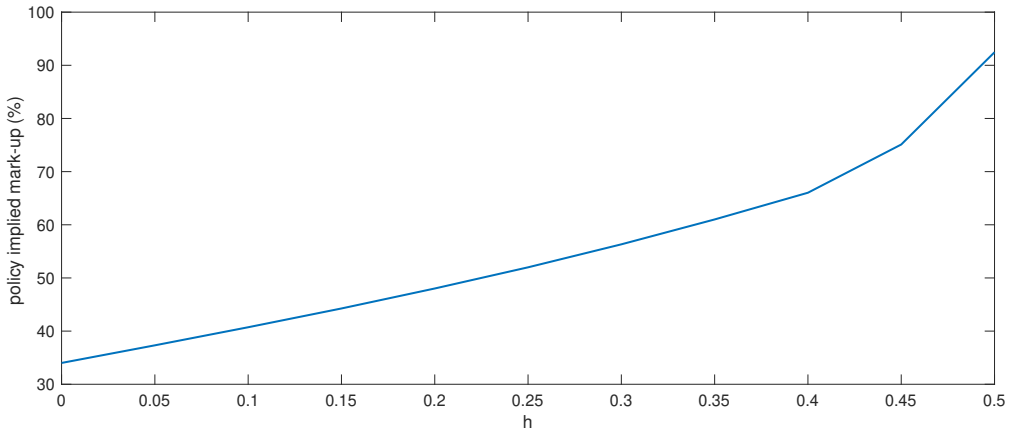
(b) Data from Høj et al. (2006), OECD countries, 1995-2003

the government sets a lower regulation level. By contrast, the outsiders will be more insistent on full deregulation. Second, the government will attach smaller weight to the welfare and political influence of the insiders. The latter is because the insiders' political participation will be smaller given their overall smaller size, as implied by equation (3). Third, the opportunity cost of losing jobs, which is the wage rate, is smaller in a more regulated market. Therefore, the insiders are more willing to trade off more job security for potentially higher wage rates. Consequently, they will be less aggrieved if the government deregulates more. These three effects encourage the government to move the policy more to the outsiders' favour.

One of the reasons all insider workers oppose low regulation levels in the model is that they are uncertain in period 1 about whether they will remain insiders or not in period 2. If they remain insiders, they benefit from higher wages in a more deregulated market. Otherwise, they lose out if dismissed and incur significant displacement costs. This means their expected income will not necessarily increase with deregulation, which motivates their opposition. Fernandez and Rodrik (1991) argue that this ex-ante uncertainty creates

a status-quo bias that hinders efficiency-enhancing reforms. Meanwhile, the other source of the insiders' unanimous opposition in my model comes from the direct non-pecuniary costs from deregulation, captured by the positional concerns. To what extent do these factors drive the results? Figure 5 shows that the actual implemented mark-up increases if the workers are more sensitive to the non-pecuniary costs (i.e. with higher h). However, even if $h = 0$ so that there is no non-pecuniary cost, the ex-ante uncertainty insiders face still mobilises strong enough opposition to block full deregulation.

Figure 5: Non-pecuniary Costs and Deregulation, Two-period Model



3 Full Model

This section extends my two-period model to an infinite-horizon heterogeneous-agent political economy model. In this version of the model, the majority of the workers can save via a risk-free asset. The motivation for these extensions is twofold. First, the deregulation impacts the workers' welfare beyond 2 periods so that the effects of higher job insecurity, which only the insiders care about in the 2-period model, become relevant also for the outsider workers. Even if the current outsiders are more likely to find new jobs following deregulation, it is also more likely that they will be dismissed in a more competitive market once they become insiders. This concern weakens their support for full deregulation. Similarly, the higher chances of being re-employed become relevant in the insiders' trade-off, weakening their opposition to deregulation. Second, the workers who are able to save can allocate their income inter-temporally and hedge against their idiosyncratic job insecurity. As we will see, this eliminates the opposition to deregulation from the asset-holding workers regardless of their current employment status.

3.1 Model Set-up

The set-up of the full model is based upon the Bewley-Huggett-Aiyagari framework and preserves the features of the 2-period model in section 2 in many aspects. In a small open economy, there are workers of a total mass of 1. Each of them maximises her expected lifetime CRRA utility

$$V_t^j(a^j, \ell^j, \ell^{dj}) = \frac{(C_t^j/(C_t)^h)^{1-\gamma}}{1-\gamma} + \beta \mathbb{E}_t[V_{t+1}^j(a^j, \ell^j, \ell^{dj})].$$

A proportion $1-\eta$ of them can save via a risk-free asset. For these workers, the utility maximisation is subject to the following constraints:

$$\begin{aligned} &C_t^j + a_{t+1}^j = w_t \ell_t^j (1-\ell_t^{dj}) + b_t(1-\ell_t^j)(1-\ell_t^{dj}) + (1+r)a_t^j \\ &a_{t+1}^j \geq -\bar{a}. \end{aligned}$$

The first constraint is the budget constraint, where a_t^j is the holding of the risk-free asset by the j-th worker in period t. r is the net world real interest rate paid on the savings. ℓ_t^j is an indicator variable which takes the value of 1 if the worker is an insider, and 0 otherwise. ℓ_t^{dj} is an indicator variable which takes the value of 1 if the worker is dismissed from the incumbent firms in period t and 0 otherwise. The second constraint is a borrowing constraint, where $\bar{a} \geq 0$ is the upper bound that a worker can borrow.

The remaining η of workers are hand-to-mouth. Given that they cannot allocate consumption inter-temporally, their maximisation problem is identical to those faced by the workers in the two-period model in section 2.2. The Markov transition matrix for idiosyncratic employment statuses for all workers is also identical to that specified for the 2-period model in section 2.2.

The specification of producers is identical to those in section 2.1, except that the market entry condition becomes

$$\sum_{\tau=t}^{\infty} \beta^{\tau-t}(\frac{P_\tau^i}{P_t} - w_\tau^i) = \varsigma,$$

so that the entry of the market occurs until the expected profit of all future periods equals the entry cost for the new entrant firm.

Assume that in period t, the government is hit by a shock that enables it to re-evaluate and decide the regulation level that it will credibly commit to implementing from the next period onward. Then, the policy plan is announced to the public. Moreover, all agents in the model are agnostic in period t about the next occurrence and the distribution of such a shock. This assumption implies that workers and firms believe that the announced policy in the current period will be implemented immediately from the next period onward

because it is never optimal for the government to renege on implementing the announced policy.[8]

Under the assumptions above, the political process in period t is identical to the process described in section 2.3. Thus, before the government decides and announces the actual regulation level, workers form their subjective view of the regulation level to be implemented from the next period onward by maximising the modified aggregate social welfare

$$W_t^k(\varsigma, a^k, \ell^k, \ell^{dk}) = \sum_{i \in S} \pi_{ik,t} V_t^i(\varsigma, a^i, \ell^i, \ell^{di}), \tag{5}$$

where $i, k \in S$, and S is the set of all possible combination of states $\{a, \ell, \ell^d\}$. The weight $\pi_{kk,t} = \delta + (1-\delta)n_t^k$, whilst $\pi_{ik,t} = (1-\delta)n_t^i$ for $i \neq k$. The maximisation yields the the desired entry cost $\hat{\varsigma}_t^k(a^k, \ell^k, \ell^{dk})$ and the corresponding subjective reservation utility $R_t^k(a^k, \ell^k, \ell^{dk}) = V_t^k(\hat{\varsigma}_t^k(a^k, \ell^k, \ell^{dk}))$ for workers under every state $k \in S$.

After the government announces the actual regulation level to be implemented ς, workers' aggrievements are also state-dependent:

$$A_t^k(\varsigma, a^k, \ell^k, \ell^{dk}) = \frac{\omega(a^k, \ell^k, \ell^{dk})}{2} max[0, R_t^k(a^k, \ell^k, \ell^{dk}) - V_t^k(\varsigma, a^k, \ell^k, \ell^{dk})]^2, k \in S.$$

Then, workers participate in political actions if the benefits of doing so outweigh the costs:

$$\mathcal{P}_t^k(\varsigma, a^k, \ell^k, \ell^{dk}) n_t^k(a^k, \ell^k, \ell^{dk}) A_t^k(\varsigma, a^k, \ell^k, \ell^{dk}) - \mu^c(a^k, \ell^k, \ell^{dk}) - \epsilon_{k,t}(a^k, \ell^k, \ell^{dk}) \geq 0.$$

This implies a participation rate of political actions for workers in any particular state k

$$\mathcal{P}_t^k(\varsigma, a^k, \ell^k, \ell^{dk}) = \frac{\sigma(a^k, \ell^k, \ell^d) - \mu^c(a^k, \ell^k, \ell^{dk})}{2\sigma(a^k, \ell^k, \ell^{dk}) - n_t^k(a^k, \ell^k, \ell^{dk}) A_t^k(\varsigma, a^k, \ell^k, \ell^{dk})}.$$

Lastly, the government decides the actual regulation level to implement in the next period ς to maximise

$$W_t(\varsigma) = \sum_{k \in S} [V_t^k(\varsigma, a^k, \ell^k, \ell^{dk}) - \kappa_k(a^k, \ell^k, \ell^{dk}) \mathcal{P}_t^k(\varsigma, a^k, \ell^k, \ell^{dk})]. \tag{6}$$

3.2 Stationary Equilibrium and Solution Algorithm

A stationary equilibrium consists of value functions $V : S \to R$, individual choices of consumption and asset holdings, prices, labour, wages, a measure Φ, the subjective views $\{\hat{\varsigma}^k\}$, the government policy $\{\varsigma^a\}$, and the political participation rates $\{\mathcal{P}_t^k\}$, such that

[8] This means that the economy immediately transits into another stationary equilibrium in the next period, so there is no transitional effect. Looking at the transition along a gradual path of implementation is an interesting avenue for future research.

1. V satisfies the workers' Bellman equations, and a_{t+1}^j and C_t^j are the associated policy functions, given r, w_t;

2. the choices of P_t^i and N_t^i maximise the producers' profits;

3. markets for consumption goods and labour clear:

$$Y_t = C_t = \int_0^1 C_t^j d\Phi$$
$$n_t = \sum_{i=1}^{m_t} N_t^i$$

4. let Q be the transition function, for all $s \in S$,

$$\Phi(S) = \int Q(s, S) d\Phi;$$

5. subjective views maximise the modified aggregate social welfare functions for workers in each state (5);

6. the government policy maximises the objective (6);

7. the workers choose whether or not to participate in political actions given the government policy, their subjective views, and the participation of other group members.

The model is solved numerically. Using the value function iteration method, I first solve for the stationary equilibrium under each discretised grid of the entry cost ς. This step gives the value functions and the stationary distribution of workers in all possible states conditional on any value of ς. Then, I aggregate these measures to obtain the individual modified social welfare for workers in each state. These welfare functions are then maximised to yield distributions of workers' subjective views on all possible values of the policy variable ς. I calculate the aggrievements and political participation rates based upon these views, which are, in turn, used to construct the government's objective function. Lastly, I obtain the actual implemented policy by maximising this government objective. The details of this solution algorithm are described in Appendix B.

3.3 Market Regulation in the Full Model

All parameters in the full model are kept the same except for the political participation parameters. They are adjusted to match the same targets for the two-period model so that the political participation rates are within the $[0.02, 0.03]$ range. Moreover, the

weight attached to the political costs in the government's loss function is around 2.25 times the weight attached to the aggregate welfare of all workers in the economy. In addition, the world interest rate r is set to 3.95%, which is in line with the range of the EU government bond yields at the onset of the Greek debt crisis in 2010. The borrowing constraint $\bar{a}$ is fixed at 0. The proportion of hand-to-mouth workers η is 0.18, consistent with the estimate for Spain in Bracco et al. (2021). The parameter values are reported in Table 4.

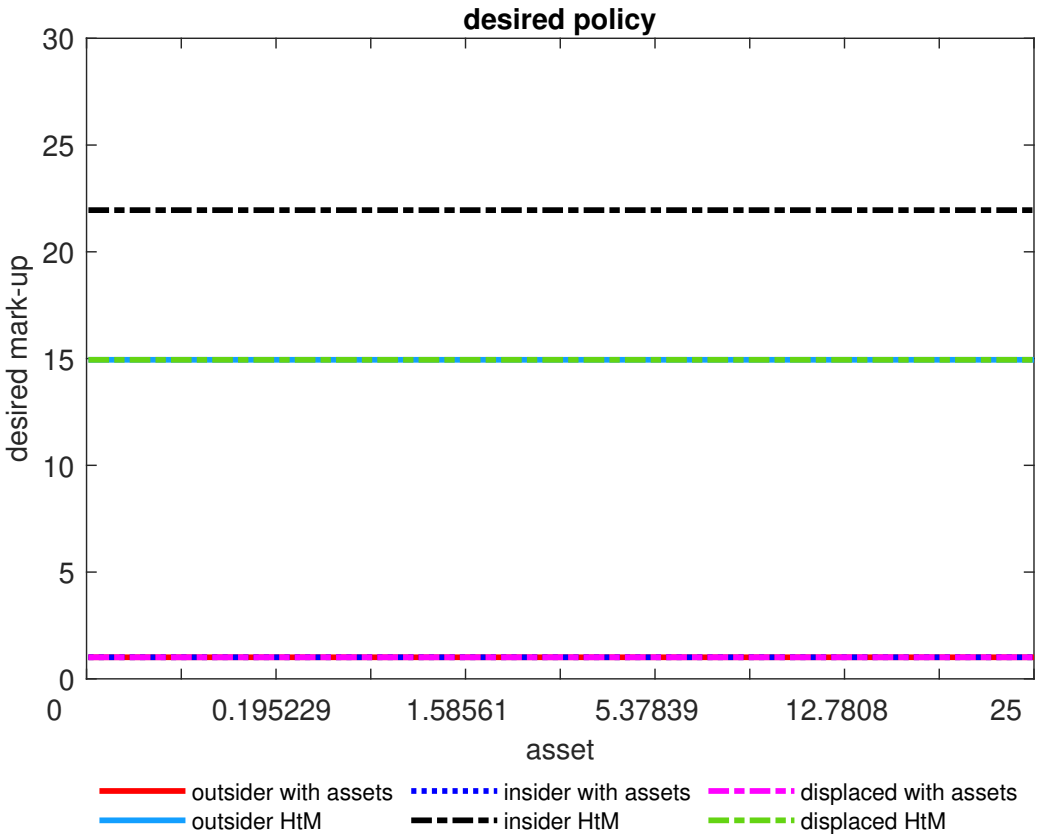
Table 4: Parameter Values of the Full Model

Parameter	Value	Interpretation
β	0.96	discount factor
γ	0.9	risk aversion
ν	0.4	unemployment benefit replacement ratio
β_0^i	0.893	parameter for probability q_i
β_1^i	0.136	parameter for probability q_i
h	0.3	positional concern
δ	0.7	self-serving bias
κ	27000	political influence
μ^c	19.2	constant cost of political actions
σ	20	standard deviation of idiosyncratic costs
ω	5	parameter for aggrievement
r	0.0395	world interest rate
$\bar{a}$	0	borrowing constraint
η	0.18	proportion of hand-to-mouth workers

Figure 6 plots the mark-ups implied by the corresponding regulation levels that each type of worker considers fair to implement in the next period. The overlapped lines at the bottom indicate that the workers who can save advocate full deregulation (i.e. mark-up of 1%) regardless of their current employment status and asset levels. This is because these workers can hedge against their idiosyncratic future employment status changes, such that the concerns over higher job insecurity after deregulation are mitigated. Overall, the income effect from full deregulation quantitatively dominates the job insecurity concerns and the non-pecuniary costs over all worker types.

By contrast, the dashed black line shows that the hand-to-mouth liquidity-constrained insiders advocate a regulation level that implies around 22% of price mark-up in the product market. This is because they are still preoccupied with the higher risk of losing jobs following the deregulation, but they cannot save to hedge against such risks. This concern motivates them to advocate high regulation levels as in the two-period model. Nevertheless, with a horizon beyond just two periods, they realise that even if dismissed in a more competitive market, it will be easier for them to find another job as an outsider after the next period. Therefore, these insiders advocate a lower regulation level than those in the two-period model.

Figure 6: Desired level of Mark-ups (%) for All Agents, Baseline Full Model

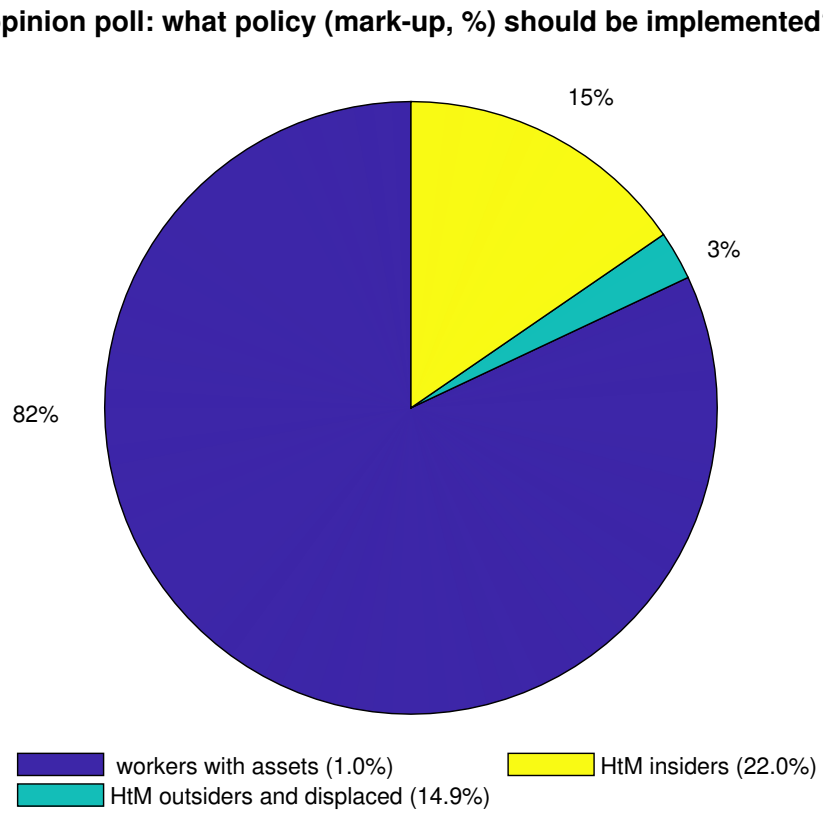


Note: The current market has a mark-up of 20%. Lines for HtM outsiders and displaced overlap in the middle, and lines for workers with assets overlap at the bottom.

By the same intuition, the hand-to-mouth outsiders and displaced workers will not advocate full deregulation as they do in the two-period model. Although full deregulation benefits them in the next period, they now worry about the higher risk of losing their jobs in periods thereafter in a highly competitive market once they are employed as insiders. Since they cannot hedge against this risk, they prefer some regulation being kept in the market rather than full deregulation.

Imagine that the economy starts from a market regulation level corresponding to around 20% price mark-up. Figure 7 reports the results of an opinion poll which asks each worker in the model the regulation level they consider fair to implement. This figure thus reflects the distribution of the workers' subjective views of the fair policy in the initial stationary equilibrium. 82% of the workers advocate full deregulation (in dark blue). Consistent with the results in Figure 6, these are workers who can save. The remaining workers are liquidity-constrained, and they advocate higher mark-ups. In this case, the efficient policy that a benevolent social planner would implement is full deregulation. However, the political pressure from the liquidity-constrained workers will force the gov-

Figure 7: Opinion Poll of the Desired Mark-ups (%), Baseline Full Model



Efficient mark-up: 1%. Actual implemented mark-up: 5%.

Note: The current market has a mark-up of 20%.

ernment to implement an inefficiently high regulation level that implies a mark-up of 5% instead. Unlike the two-period model, where the majority of the population as insiders advocate high regulation levels, the anti-deregulation coalition here is formed by the minority of the population. This result corroborates the vested interest argument that dates back to Olson (1965). The cost of the policy concentrates on a small proportion of the economy, whereas the benefit spreads among a large population. The group that incurs the loss, small yet organised, will act to impede further reform. Moreover, the fact that the liquidity-constrained workers form the anti-reform coalition resonates with the observation made by Haggard and Kaufman (1989) that illiquid asset holders are more likely to oppose economic adjustments because they are unable to circumvent the adverse consequences.

Similar to the two-period model, if the insider workers can organise political actions more easily, as captured by the more advantageous political participation parameters, the resistance to deregulation from the liquidity-constrained insiders is strengthened. The stronger resistance imposes higher political pressure on the government to increase

market regulation. Consequently, the implemented mark-up is higher, as shown in Table E.1 in Appendix E.

3.4 What Affects the Regulation Level

The results above suggest that a worker's support for and opposition to deregulation crucially depends upon whether the worker can save to hedge against employment risks. Therefore, in this subsection, I first consider how the degree of risk-sharing among workers, measured by the proportion of liquidity-constrained workers, influences the implemented regulation level in my full model. Then, I explore the impacts of initial conditions and non-pecuniary costs on the implemented regulation level as in the two-period model.

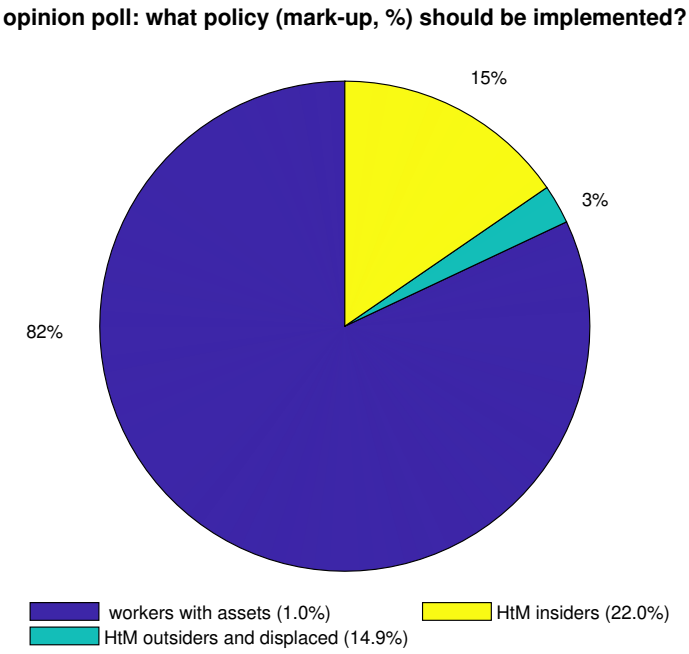
Figure 8 compares the distribution of opinions on the regulation level to be implemented when the proportion of liquidity-constrained workers $\eta = 0.18$ and $\eta = 0.4$ respectively. The second case of high η corresponds to countries like Greece and Portugal as estimated by Bracco et al. (2021). When the proportion of liquidity-constrained workers is higher, the actual implemented mark-up increases from 5% in the baseline to 19%.

In this case, the political opposition to low regulation levels is strengthened by the first two channels discussed in section 2.8. First, all types of workers attach higher weights to the welfare of the liquidity-constrained workers in forming their subjective view on the regulation level to be implemented. Thus, workers with assets become more sympathetic to the liquidity-constrained workers. Although this effect is not strong enough to persuade these workers to withdraw their support for full deregulation, they will be more tolerant if the implemented regulation level is higher. Meanwhile, the liquidity-constrained workers become more resistant to low regulation levels, advocating even higher regulation levels than the baseline.

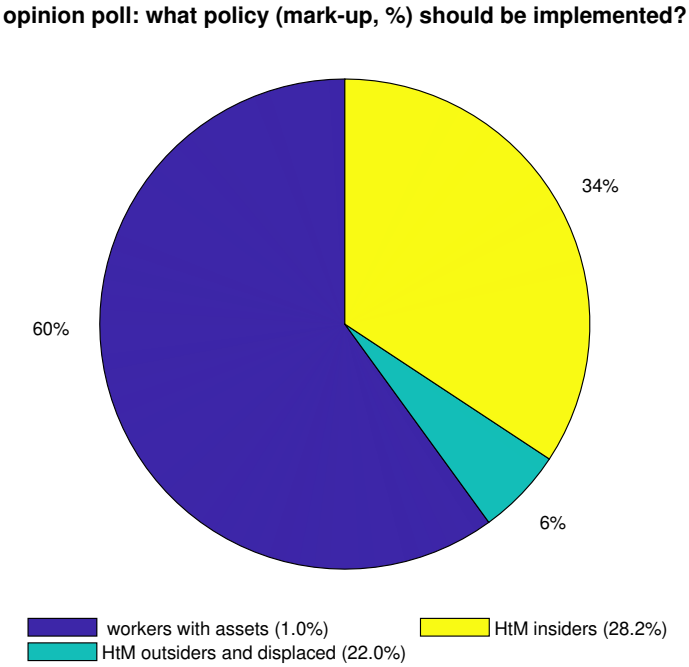
Second, the government realises that liquidity-constrained workers become more influential in affecting aggregate social welfare and inciting political actions with more extensive participation. Both channels work together to increase the costs for the government to maintain a low regulation level. Thus, the government set a higher regulation level to avoid potentially significant political backlashes from the liquidity-constrained workers.

Meanwhile, a more adverse initial condition, captured by a higher initial mark-up corresponding to a higher initial regulation level in the economy, foreshadows larger progress in deregulation in the subsequent period. Figure 9a plots the initial mark-up of the economy on the vertical axis against the absolute change in the implemented mark-up relative to the initial mark-up in the economy on the horizontal axis. Similar to the result of the two-period model in section 2.8, we observe a negative correlation between the two, consistent with the data. The higher initial regulation level leads to a less competitive

Figure 8: Proportion of Liquidity-constrained workers and Regulation Level (%), Baseline Full Model



Efficient mark-up: 1%. Actual implemented mark-up: 5%.
(a) $\eta = 0.18$ (baseline)

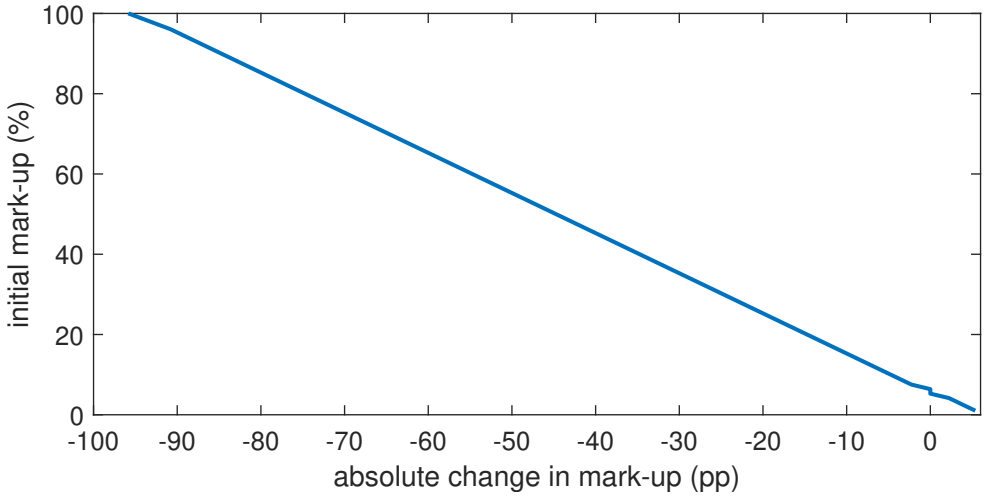


Efficient mark-up: 1%. Actual implemented mark-up: 19%.
(b) $\eta = 0.4$

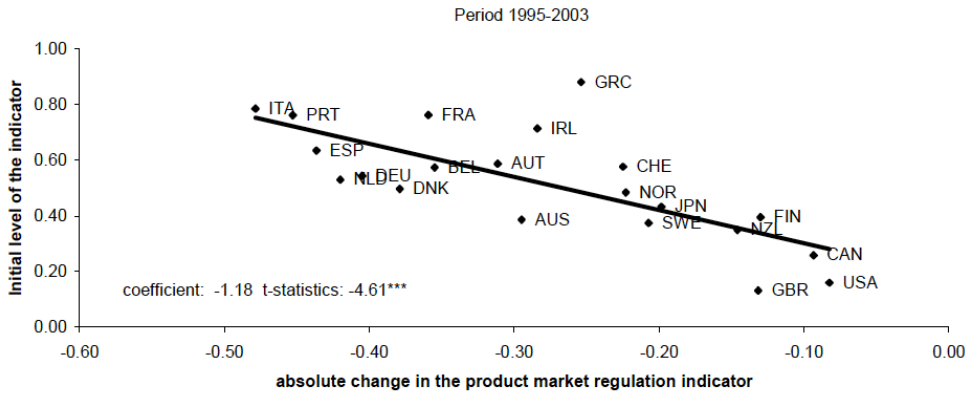
Note: The current market has a mark-up of 20%.

market and a smaller share of the liquidity-constrained insiders among the workers. This scenario weakens the opposition to deregulation in the same way as in the two-period model through the three channels discussed in section 2.8.

Figure 9: Initial Conditions and Deregulation, Baseline Full Model



(a) Model



(b) Data from Høj et al. (2006), OECD countries, 1995-2003

By contrast, higher non-pecuniary costs from deregulation should prompt higher implemented regulation levels. Figure 10 compares the opinion polls and the actual regulation levels when $h = 0$, $h = 0.3$, and $h = 0.5$. As expected, a higher h induces the liquidity-constrained workers to advocate higher regulation levels, strengthening opposition to deregulation. When $h = 0.5$, the implemented regulation implies a mark-up of 27%, higher than the baseline. By contrast, if there is no non-pecuniary cost (i.e. $h = 0$), all workers advocate full deregulation, and this efficient policy is implemented. Note that workers achieve this unanimous view only when they are not entirely self-biased in forming their subjective views. In this case, the liquidity-constrained workers acknowledge that full deregulation is socially desirable and should be implemented, even though the policy does not maximise their own welfare. As demonstrated by Figure D.1 in Ap-

pendix D, the liquidity-constrained workers will still oppose full deregulation when they are purely self-biased (i.e. with $\delta = 1$). Unlike the results of the two-period model in section 2.8, the increased risk of losing jobs after deregulation alone is not costly enough for workers to resist full deregulation in the full model based upon the current parameter values.

4 Alternative Measure of Job Insecurity

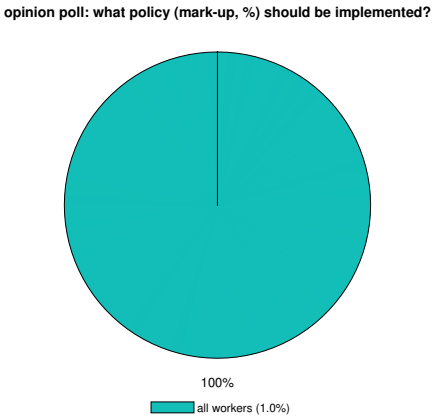
In many European countries, many newly hired workers are temporarily employed under fixed-term contracts that last at most $3-5$ years. Aparicio-Fenoll (2015) finds that workers under the fixed-term contract are subject to a significant risk of failing to obtain an open-ended contract, and this risk is strongly and positively correlated with the market competition level. At the end of this contract, even if many of those who fail to secure an open-ended contract find another job immediately, the job transition process that involves job search and relocation can still be costly. This fact potentially explains the finding by Booth et al. (2002) that the lower job security offered by fixed-term contracts decreases workers' satisfaction. Therefore, interpreting the transition probability $q_i(\varsigma)$ as the probability of losing jobs may not be able to fully capture the job insecurity experienced by temporary workers under the fixed-term contract. In this section, I show how incorporating the higher job insecurity induced by the fixed-term contract in my model strengthens the opposition to deregulation. Then, I discuss the policy options for the government to promote deregulation in this case.

4.1 Model Set-up

Suppose that a proportion η_F of workers in the model are temporary workers who will be offered a fixed-term contract whenever they get employed. At the end of each period, firms give one-period notices to some of their temporary employees to terminate their contracts. Assume that $1-q_i^f(\varsigma)$ is the probability that an insider worker will be informed at the end of period t that her contract will terminate by the end of $t+1$. Otherwise, with probability $q_i^f(\varsigma)$, she will be kept by the current employer in period $t+1$ without receiving any notice.

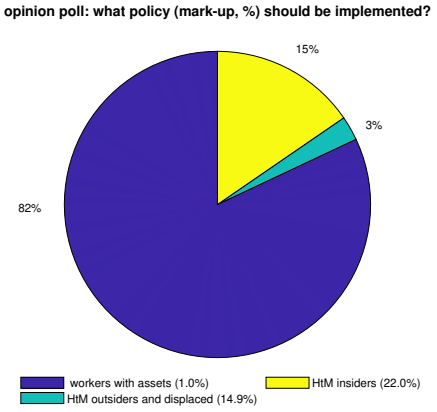
For an insider who has received the termination notice at the end of the previous period, she pays a transition cost that is equal to her wage and starts a job search while still on her current job in the current period. With probability $q_m(\varsigma)$, she fails to find another position immediately, so she becomes an unemployed outsider in period $t+1$. Otherwise, with probability $1-q_m(\varsigma)$, she finds another position that offers her a new fixed-term contract. For an outsider, with probability $q_o(\varsigma)$, he remains to be an outsider. Otherwise, with probability $1-q_o(\varsigma)$, he is offered an insider job. Thus, the transition

Figure 10: Strength of Non-pecuniary Costs and Regulation Levels, Baseline Full Model



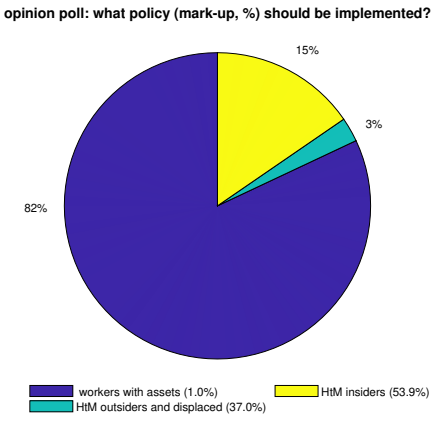
Efficient mark-up: 1%. Actual implemented mark-up: 1%.

(a) $h = 0$



Efficient mark-up: 1%. Actual implemented mark-up: 5%.

(b) $h = 0.3$ (baseline)



Efficient mark-up: 1%. Actual implemented mark-up: 27%.

(c) $h = 0.5$

Note: The current market has a mark-up of 20%.

matrix for the temporary workers is the following:

	insider without notice	contract not renewed	outsider
insider without notice	$q_i^f(\varsigma)$	$1 - q_i^f(\varsigma)$	0
contract not renewed	$1 - q_m(\varsigma)$	0	$q_m(\varsigma)$
outsider	$1 - q_o(\varsigma)$	0	$q_o(\varsigma)$

Note: Each row denotes the status in period t. Each column denotes the status in period $t+1$.

These workers' utility maximisation problem resembles what is defined in section 3.1, except that ℓ_t^{dj} is 1 if the worker receives the contract termination notice and 0 otherwise.

The rest $1 - \eta_F$ of workers are offered open-ended contracts whenever they get employed. Their transition of employment status is identical to that for the workers in the baseline full model as described in the previous section.[9] The key difference between the permanent and the temporary workers captured by this extended version of the model is that the temporary workers are much less likely to remain employed by the same employer. For that reason, they are more likely to experience job displacements without necessarily becoming unemployed.

For simplicity, I assume that the permanent and temporary workers are equally likely to be liquidity-constrained. In other words, within workers of each contract type, η of them are hand-to-mouth. The rest of the model remains identical to the baseline full model in section 3.

The parameter values of this model is reported in Table 5. In terms of the transition probability $q_i^f(\varsigma)$, I assume a linear function that is similar to $q_i(\varsigma)$:

$$q_i^f(\varsigma) = \beta_0^f + \beta_1^f \varsigma,$$

and I choose β_1^f to match the estimates of Aparicio-Fenoll (2015) using the Spanish data. Meanwhile, the value of β_0^f implies that $q_i^f = 0.171$ when the price mark-up $\varsigma = 0.065$ is consistent with the mean of the corresponding measures of the sample used in the same paper. Given the probability of outsiders remaining unemployed, $q_o(\varsigma)$, and the unemployment rate $u(\varsigma)$, the probability of a displaced temporary worker failing to find a new job is

$$q_m(\varsigma) = \frac{(1 - q_o(\varsigma))(2 - q_i^f(\varsigma))}{(1/u(\varsigma) - 1)(1 - q_i^f(\varsigma))}.$$

Appendix A.2 shows the derivation details for q_m and plots the transition probabilities against the entry cost ς under the current parameter values.

[9] It is legitimate to consider a model without segregation of contract types. This setting allows the temporary workers to become permanent employees, which captures the 'stepping stone' effect from fixed-term contracts as documented in Booth et al. (2002). I abstract from considering this effect explicitly because there is no reliable empirical guidance to parameterise all transition probabilities involved in such a model.

The proportion of the temporary workers, η_F, is chosen to be 0.26 as reported by Eurostat (2022a) and OECD (2022) for Spain in 2018. The strength of non-pecuniary cost, h, is set to 0 to highlight the role of job insecurity in this case. The political participation parameters are adjusted to match the same targets as in the two-period model and the baseline full model. The rest of the parameters remain unchanged from the baseline full model in the previous section.

Table 5: Parameter Values in the Full Model with Fixed-term Contracts

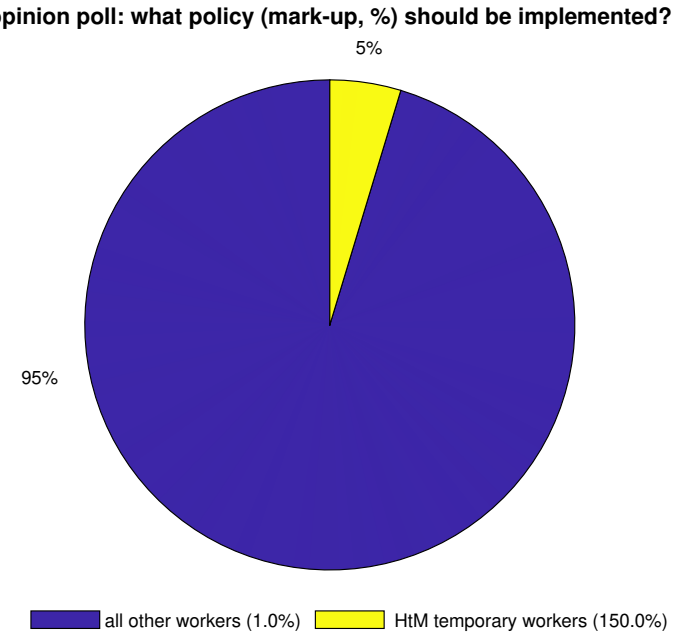
Parameter	Value	Interpretation
β	0.96	discount factor
γ	0.9	risk aversion
ν	0.4	unemployment benefit replacement ratio
β_0^i	0.893	parameter for probability q_i
β_1^i	0.136	parameter for probability q_i
β_0^f	0.831	parameter for probability q_i^f
β_1^f	1.352	parameter for probability q_i^f
h	0	positional concern
δ	0.7	self-serving bias
κ	25000	political influence
μ^c	38.4	constant cost of political actions
σ	40	standard deviation of idiosyncratic costs
ω	0.6	parameter for aggrievement
r	0.0395	world interest rate
$\bar{a}$	0	borrowing constraint
η	0.18	proportion of hand-to-mouth workers
η_F	0.26	proportion of fixed-term workers

4.2 Market Regulation with High Job Insecurity

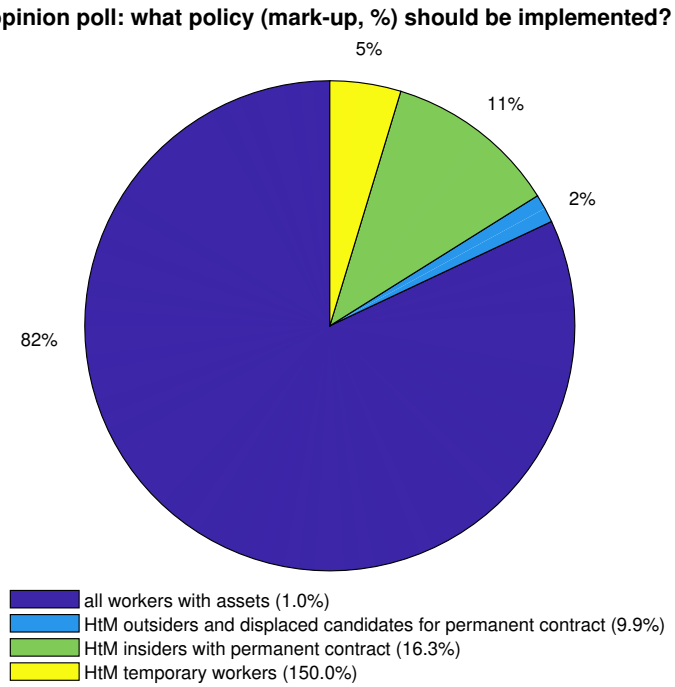
Figure 11a shows the opinion poll results in the extended full model with temporary workers on fixed-term contracts. In this case, the liquidity-constrained temporary workers advocate extremely high regulation levels regardless of their current employment status. The intuition is that the risk of experiencing a job displacement for the temporary insiders is susceptible to market regulation levels. Following deregulation, the temporary insiders are much less likely to stay in the same job. Meanwhile, this implies a higher job insecurity for the displaced and outsider temporary workers if they become insiders. Since these workers cannot save to hedge against this high job insecurity, they are all motivated to advocate much less competitive markets.

By contrast, workers with access to savings advocate full deregulation as in the baseline full model. In addition, the liquidity-constrained permanent workers, who do not support full deregulation in the baseline full model, also support full deregulation. This is because the workers are only partially self-biased when forming their subjective views

Figure 11: Opinion Poll of Desired Mark-ups (%), Full Model with Fixed-term Contracts



Efficient mark-up: 1%. Actual implemented mark-up: 41%.
(a) $\delta = 0.7$ (baseline)



Efficient mark-up: 1%. Actual implemented mark-up: 41%.
(b) $\delta = 1$

Note: The current market has a mark-up of 20%.

on the regulation level to be implemented. Figure 11b shows that if workers are purely self-biased (i.e. $\delta = 1$), liquidity-constrained permanent workers will not support full deregulation. When they are more considerate of others instead, they acknowledge that full deregulation is welfare improving for the society overall, so they are willing to lower their advocated regulation level.

In this case, full deregulation remains the efficient policy that a benevolent social planner would implement. However, the implemented mark-up is 41% despite only 5% of the population wanting a highly regulated market. This result shows that even if the non-pecuniary cost of deregulation is absent, if a small proportion of workers are heavily affected by the job insecurity associated with fixed-term contracts, they may form a powerful opposition to market deregulation.

Similar to the baseline full model, the actual implemented regulation level also depends upon the relative political power of worker groups in this extended version of the model with temporary workers. Table E.2 in Appendix E shows that the market is even more regulated if the insider workers can be more easily mobilised with better political participation parameters than other groups. This result is driven by the strong political pressure from the political actions initiated by the liquidity-constrained temporary insiders.

4.3 Policy to Promote Deregulation

The analyses above suggest that the resistance to deregulation in my model comes from the liquidity-constrained workers who cannot hedge against the job-losing risk and the associated income loss following a deregulation. Moreover, using fixed-term contracts increases job insecurity for workers and strengthens the opposition to deregulation. The intensified opposition eventually leads to high implemented regulation levels.

Therefore, the government's key to promoting product market deregulation is to weaken the opposition to deregulation. I consider three policy options below for the government to achieve this goal. The first option is to provide insurance that compensates the insiders who lose their jobs after the deregulation. I simulate the effect of this policy by a reduction in the proportion of the liquidity-constrained workers η. This measure weakens the opposition by reducing the proportion of potential losers from deregulation. In my model, a 1 percentage point reduction in η pushes the implemented mark-up to 32% from 41% in the baseline.[10]

Similarly, labour market reform that restricts the use of fixed-term contracts weakens the opposition by reducing the share of potential losers in the population. In my model, a 1 percentage point reduction in the proportion of temporary workers η_F lowers the implemented mark-up to 33%.

[10]Figure D.2 in Appendix D shows the corresponding poll.

Another popular strategy in practice is to conduct formal discussions between the governments and social partners to persuade the resisting groups to make concessions. I simulate the effect of this strategy as a reduction of the self-serving bias parameter δ in the model. This measure aligns the workers' views more with the benevolent social planner's objective. The implemented regulation level will thus be closer to full deregulation, which is the efficient policy. My simulation suggests that the baseline implemented mark-up of 41% only starts to decline when δ is less than 0.18.[11] This implies that the government needs to sufficiently persuade the workers to reduce their self-serving bias from the baseline value of 0.7 to below 0.18 to weaken the resistance effectively. A reduction of such magnitude potentially requires strong government leadership in terms of its readiness to act unilaterally or sanction non-cooperative parties. This is because this leadership plays a key role in the success of these negotiations, as observed by Tompson and Dang (2010).

5 Application: Understanding the Heterogeneity in Regulation in Europe

The analyses so far identify some key factors that affect the regulation level implemented in the model, such as the share of liquidity-constrained workers η, the proportion of temporary workers with fixed-term contracts η_F, the relative political influence of different worker groups, and the impact of deregulation on job insecurity. In this section, I compare these factors among 5 European countries and illustrate how my model can help to understand why some countries are more deregulated than others.

Table 6 reports the 4 factors mentioned above for Spain, the United Kingdom, Italy, Portugal, and Greece. The countries are ranked from top to bottom by their Product Market Regulation Index (PMR Index) in 2018, composed by the OECD (2018) from low to high. Among them, I include Spain as the benchmark country as in previous sections. The United Kingdom is a representative country with lower product market regulation than Spain. Italy, Portugal, and Greece are the three other Southern European countries with higher product market regulation levels. The proportion of liquidity-constrained agents η is estimated by Bracco et al. (2021). The proportion of temporary workers η_F comes from OECD (2022). The trade union density is reported by OECD (2020). This statistic measures the proportion of employees who are union members and is often used as an indicator of the strength of unions. Lastly, the probability of transiting to permanent contracts from fixed-term contracts is taken from Eurostat (2022b).

The upper panel of Figure 12 shows the product market regulation levels of 5 European countries in 2018. I normalise these indices by the highest index value among the 5

[11] See Figure D.3 in Appendix D for the poll of opinions when $\delta = 0.18$.

Table 6: Relevant Statistics in the Selected European Countries

	Share of HtM η	Share of temporary workers η_F
UK	0.19	0.04
Spain	0.18	0.26
Italy	0.29	0.16
Portugal	0.43	0.20
Greece	0.44	0.11
	Trade union density	Probability of transiting to permanent contract from fixed-contract
UK	0.23	0.13
Spain	0.13	0.08
Italy	0.33	0.07
Portugal	0.15	0.19
Greece	0.19	0.02

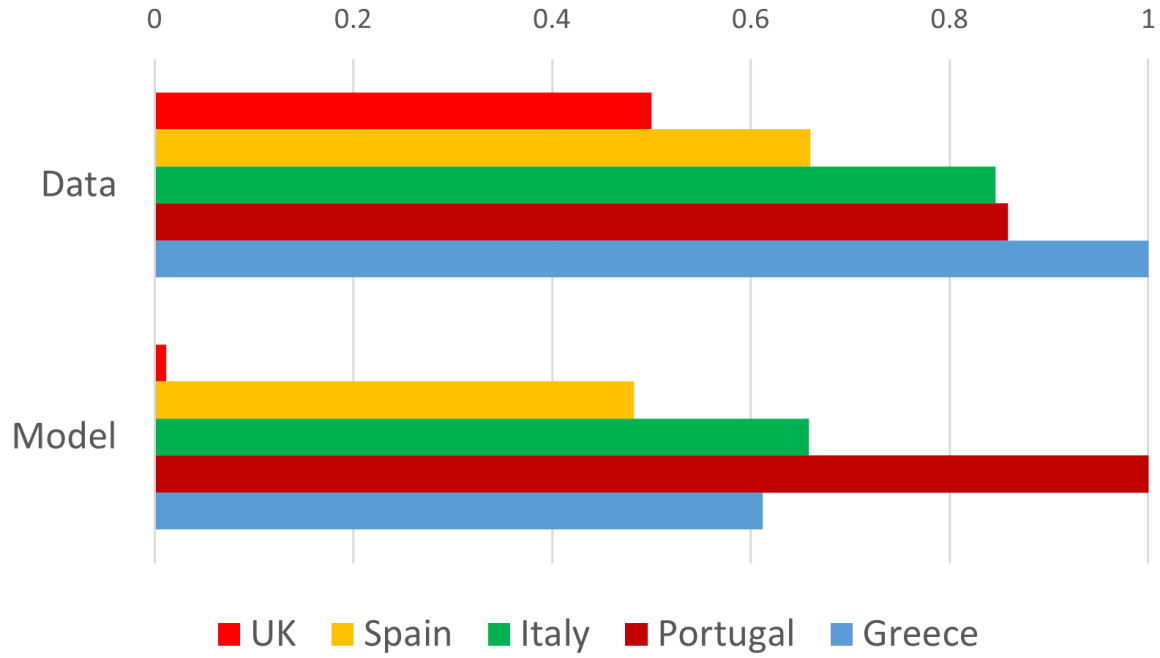
Source: Bracco et al. (2021) for η, OECD (2022) for η_F, OECD (2020) for trade union density, Eurostat (2022b) for the transition probability.

countries, which is that of Greece. The lower panel plots the regulation levels of these countries that my model predicts by matching the values of η, η_F, and trade union density in the model to those reported in Table 6 for each country while keeping other parameters unchanged. The model-predicted regulation levels are normalised by that of Portugal, which is the highest among the 5 countries. I account for the trade union density by setting the political influence parameter for the insiders in the model κ_{in} such that for any country i, the ratio $\kappa_{in}^{i}/\kappa_{in}^{Spain}$ is equal to the ratio of the union density of that country relative to the union density of Spain.

The figure demonstrates that the model can produce a ranking that is broadly consistent with the data. The UK is predicted to be the most deregulated market, followed by Spain, Italy, and Portugal. As reported in Table 6, Spain has the lowest share of liquidity-constrained workers and the highest share of temporary workers among the 5 countries. The UK has roughly the same proportion of liquidity-constrained agents as Spain but a significantly lower share of temporary workers. This explains why it has the lowest regulation level. Italy has a higher share of liquidity-constrained workers but a lower share of temporary workers than Spain. Meanwhile, the union power in Italy is the strongest among all countries, which implies potentially higher political influence from insider workers in Italy to move the policy in their favour. As a result, Italy maintains a higher regulation level compared to Spain. Portugal instead features a much higher share of liquidity-constrained agents than the 3 countries above. Meanwhile, the share of temporary workers in Portugal is only lower than in Spain. This explains its much higher regulation level compared to other countries.

Greece is the only outlier in this ranking comparison. Despite having the highest

Figure 12: Product Market Regulation, Data vs. Model



Note: The simulations match η, η_F and trade union density in the model to each country. Source: OECD (2018) and author's calculation.

share of liquidity-constrained workers among the 5 countries, Greece has a much lower share of temporary workers than Spain, Portugal, and Italy. Thus, the model predicts a regulation level in Greece that is higher than in the UK and Spain but lower than in Italy and Portugal. This inconsistency can potentially be resolved by factoring in the job insecurity faced by workers. The lower right panel of Table 6 shows that the probability of transiting from fixed-term contracts to permanent contracts is significantly lower in Greece than in other countries. Thus, the job displacement risk for temporary workers is potentially much higher in Greece. This higher risk should strengthen the opposition to reform in Greece and lead to a more highly regulated market compared to other countries.[12]

6 Conclusion

This paper identifies critical factors that hinder structural reforms in a macroeconomic political economy model. In my model, the higher job insecurity and the associated income and welfare loss for workers following product market deregulation contribute to the opposition to the policy. The workers who expect to lose out impose political costs on

[12]To the best of my knowledge, there is no empirical study that estimates how mark-ups affect the probability of transiting to permanent contract from fixed-term contract in countries other than Spain. Therefore, I leave the exercise of matching this dimension quantitatively in my model to future research.

the governments through their political actions to maintain inefficiently high regulation levels.

However, the resistance is weaker if the initial regulation level of the market is high, if more workers can save to hedge against future employment risks, and if there is a lower share of temporary workers employed with fixed-term contracts. The policy implication is that compensating the potential losers, labour market reform restricting the use of fixed-term contracts, and strong government leadership in negotiations can help the government promote deregulation. Lastly, the factors my model identified help understand Europe's heterogeneous product market regulation levels.

There are several avenues for future research. First, political consideration is an essential dimension in the debate after the Greek debt crisis about whether structural reforms and fiscal consolidation are complementary. The framework in this paper can be used to explore this question and discuss the optimal design of such programs. Second, I consider only stationary equilibria in my full model. Studying the transitions between stationary equilibria in this model is potentially interesting. For example, the credibility of fully implementing and maintaining the reform proposal can be discussed in this context. Lastly, future empirical work can formally test the predictions of my model. Current empirical literature focuses on the role of political influence and initial conditions in affecting the deregulation progress. However, it is interesting to see how job insecurity, risk-sharing capacities among households, and the use of fixed-term contracts affect product market regulations empirically.

References

Adamopoulos, T. (2008): "Land Inequality and the Transition to Modern Growth," *Review of Economic Dynamics*, 11(2), 257–282.

Aghion, P. and M. Schankerman (2004): "On the Welfare Effects and Political Economy of Competition-enhancing Policies," *Economic Journal*, 114(498), 800–824.

Aiyagari, S. R. (1994): "Uninsured Idiosyncratic Risk and Aggregate Saving," *The Quarterly Journal of Economics*, 109(3), 659–684.

Akay, A. and P. Martinsson (2012): "Positional Concerns through the Life Cycle: Evidence from Subjective Well-Being Data and Survey Experiments," IZA Discussion Papers 6342, Institute of Labor Economics (IZA).

Alesina, A., S. Ardagna, and F. Trebbi (2006): "Who Adjusts and When? The Political Economy of Reforms," *IMF Staff Papers*, 53, 1–29.

Alesina, A. F. and A. Drazen (1991): "Why Are Stabilizations Delayed?" *American Economic Reviews*, 81(5), 1170–1188.

Anderton, R. and B. D. Lupidio (2019): "Effects of Labour and Product Market Regulation on Worker Flows: Evidence for the Euro Area Using Micro Data," *Working Paper Series 2312, European Central Bank.*

Andreoni, J. and J. Miller (2002): "Giving According to GARP: An Experimental Test of the Consistency of Preferences for Altruism," *Econometrica*, 70(2), 737–753.

Aparicio-Fenoll, A. (2015): "The Effect of Product Market Competition on Job Security," *Labour Economics*, 145–159.

Barrett, P., M. Appendino, K. Nguyen, and J. de Leon Miranda (2022): "Measuring Social Unrest Using Media Reports," *Journal of Development Economics*, 158, 102924.

Beetsma, R. M. W. J. and M. Poplawski-Ribeiro (2008): "The Political Economy of Structural Reforms under A Deficit Restriction," *Journal of Macroeconomics*, 30(1), 179–198.

Bertinelli, L., O. Cardi, and P. Sen (2013): "Deregulation Shock in Product Market and Unemployment," *Journal of Economic Dynamics and Control*, 37(4), 711–734.

Bertrand, M. and F. Kramarz (2002): "Does Entry Regulation Hinder Job Creation? Evidence from the French Retail Industry," *The Quarterly Journal of Economics*, 117(4), 1369–1413.

Bewley, T. (1977): "The Permanent Income Hypothesis: A Theoretical Formulation," *Journal of Economic Theory*, 16(2), 252–292.

Bilbiie, F. O., F. Ghironi, and M. J. Melitz (2012): "Endogenous entry, product variety, and business cycles," *Journal of Political Economy*, 120, 304–345.

Blanchard, O. and F. Giavazzi (2003): "Macroeconomic Effects of Regulation and Deregulation in Goods and Labor Markets," *The Quarterly Journal of Economics*, 118(3), 879–907.

Booth, A. L., M. Francesconi, and J. Frank (2002): "Temporary Jobs: Stepping Stones or Dead Ends?" *Economic Journal*, 112(480), 189–213.

Bracco, J., L. Galeano, P. Juarros, D. Riera-Crichton, and G. Vuletin (2021): "Social Transfer Multipliers in Developed and Emerging Countries The Role of Hand-to-Mouth Consumers," *Policy Research Working Paper, the World Bank Group.*

Bridgman, B., I. D. Livshits, and J. C. MacGee (2007): "Vested Interests and Technology Adoption," *Journal of Monetary Economics*, 54(3), 649–666.

Burdett, K., C. Carrillo-Tudela, and M. Coles (2020): "The Cost of Job Loss," *Review of Economic Studies*, 87(4), 1757–1798.

Cacciatore, M., R. A. Duval, G. Fiori, and F. Ghironi (2016): "Short-term Pain for Long-term Gain: Market Deregulation and Monetary Policy in Small Open Economies," *Journal of International Money and Finance*, 68(C), 358–385.

Carlsson, F., O. Johansson-Stenman, and P. Martinsson (2007): "Do You Enjoy Having More Than Others? Survey Evidence of Positional Goods," *Economica*, 74(296), 586–598.

Clark, A. E. (2003): "Unemployment as A Social Norm: Psychological Evidence from Panel Data," *Journal of Labor Economics*, 21(2), 289–322.

Colantone, I., R. Crinò, and L. Ogliari (2019): "Globalization and Mental Distress," *Journal of International Economics*, 119(C), 181–207.

Da Silva, A. D., A. Givone, and D. Sondermann (2017): "When Do Countries Implement Structural Reforms?" European Central Bank Working Paper Series 2078, European Central Bank.

Draghi, M. (2017): Introductory Remarks by Mario Draghi, President of the ECB at the ECB Conference "Structural Reforms in the Euro Area", Frankfurt am Main, 18 October 2017.

Eggertsson, G. B., A. Ferrero, and A. Raffo (2014): "Can Structural Reforms Help Europe?" *Journal of Monetary Economics*, 61(C), 2–22.

European Commission (2022): "Country-specific Recommendations Database, 2021 Semester Cycle (March)," https://ec.europa.eu/economy_finance/country-specific-recommendations-database/, accessed: 2 August 2022.

Eurostat (2022a): "Employees with A Contract of Limited Duration (Annual Average) - Spain, 20-64 Years, as Percentage of Total Employment," Eurostat Database. Online data code: TPS00073. Data retrieved on July 25, 2022.

——— (2022b): "Transition from Fixed Term Contracts to Permanent Contracts - Annual Averages of Quarterly Transitions, Estimated Probabilities - 24-64 Years, Total," Eurostat Database. Online data code: LFSI_LONG_E09. Data retrieved on July 25, 2022.

Fernandez, R. and D. Rodrik (1991): "Resistance to Reform: Status Quo Bias in the Presence of Individual-Specific Uncertainty," *American Economic Reviews*, 81(5), 1146–1155.

Fisman, R., S. Kariv, and D. Markovits (2007): "Individual Preferences for Giving," *American Economic Review*, 97(5), 1858–1876.

Griffith, R. (2001): "Product Market Competition, Efficiency and Agency Costs: An Empirical Analysis," IFS Working Papers 01/12, Institute for Fiscal Studies.

Guadalupe, M. (2007): "Product Market Competition, Returns to Skill and Wage Inequality," *Journal of Labor Economics*, 25, 439–474.

Haggard, S. and R. Kaufman (1989): "The Politics of Stabilization and Structural Adjustment," in *Developing Country Debt and Economic Performance, Volume 1: The International Financial System*, University of Chicago Press, 209–254.

Haggard, S. and S. B. Webb (1993): "What Do We Know about the Political Economy of Economic Policy Reform?" *World Bank Research Observer*, 8(2), 143–168.

Helbling, T., D. Hakura, and X. Debrun (2004): "Fostering Structural Reforms in Industrial Countries," *World Economic Outlook*, 2004, 103–146.

Huggett, M. (1993): "The Risk-free Rate in Heterogeneous-agent Incomplete-insurance Economies," *Journal of Economic Dynamics and Control*, 17(5-6), 953–969.

Høj, J., V. Galasso, G. Nicoletti, and T.-T. Dang (2006): "The Political Economy of Structural Reform: Empirical Evidence from OECD Countries," OECD Economics Department Working Papers 501, OECD Publishing.

International Labour Organization (2022): "Unemployment, Total (% of Total Labor Force) (National Estimate) - Spain," ILOSTAT database. Data retrieved on February 8, 2022.

Jain, S. and S. W. Mukand (2003): "Redistributive Promises and the Adoption of Economic Reform," *American Economic Review*, 93(1), 256–264.

Nicoletti, G. and S. Scarpetta (2005): "Product Market Reforms and Employment in OECD Countries," OECD Economics Department Working Papers 472, OECD Publishing.

OECD (2018): "The Economy-wide PMR Indicators," Accessed on 27 July 2022.

——— (2020): "Trade Union Dataset," Accessed on 27 July 2022.

——— (2022): "Temporary Employment (Indicator)," DOI: 10.1787/75589b8a-en, accessed on 27 July 2022.

Olson, M. (1965): *The Logic of Collective Action*, Harvard University Press.

Passarelli, F. and G. Tabellini (2017): "Emotions and Political Unrest," *Journal of Political Economy*, 125(3), 903–946.

Rätzel, S. (2012): "Labour supply, life satisfaction, and the (dis) utility of work," *The Scandinavian Journal of Economics*, 114, 1160–1181.

Rodrik, D. (2004): "Rethinking Growth Policies in the Developing World," *Draft of the Luca d'Agliano Lecture in Development Economics delivered at the 8th October*.

Saint-Paul, G., D. Ticchi, and A. Vindigni (2016): "A Theory of Political Entrenchment," *Economic Journal*, 126(593), 1238–1263.

Soares, A. C. (2020): "Price-cost Margin and Bargaining Power in the European Union," *Empirical Economics*, 59(5), 2093–2123.

Thomas, C. and F. Zanetti (2009): "Labor Market Reform and Price Stability: An Application to the Euro Area," *Journal of Monetary Economics*, 56, 885–899.

Tompson, W. and T.-T. Dang (2010): "Advancing Structural Reforms in OECD Countries: Lessons from Twenty Case Studies," OECD Economics Department Working Papers 757, OECD Publishing.

Ward-Warmedinger, M. and C. Macchiarelli (2013): "Transitions in Labour Market Status in the European Union," IZA Discussion Papers 7814, Institute of Labor Economics (IZA).

Williamson, J. (2018): "What Washington Means by Policy Reform," in *Modern political economy and Latin America*, Routledge, 18–23.

Zanetti, F. (2011): "Labor Market Institutions and Aggregate Fluctuations in A Search and Matching Model," *European Economic Review*, 55, 644–658.

Appendices

A Derivation of Transition Probabilities

A.1 Probability q_o

In the model, the labour market flows in steady state satisfy the following condition:

$$(1 - q_i)n^{in} = (1 - q_o)n^{disp} + (1 - q_o)n^{out}, \tag{7}$$

where the left-hand side of the equation is the outflow from the incumbent industry, and the right-hand side is the inflow to the incumbent industry.

Meanwhile, the transition from being insiders to being the displaced implies that

$$n^{disp} = (1 - q_i)n^{in},$$

and on aggregate

$$n^{in} + n^{disp} + n^{out} = 1.$$

Using these two conditions, we can rewrite equation (7) as

$$(1 - q_i)n^{in} = (1 - q_o)(1 - q_i)n^{in} + (1 - q_o)(1 - n^{in} - (1 - q_i)n^{in}).$$

Simplify to get

$$(1 - q_i)n^{in} = (1 - q_o)(1 - n^{in}).$$

Recognise that the unemployment rate

$$u = n^{disp} + n^{out} = 1 - n^{in}.$$

Thus, the simplified equation can be further rewritten as

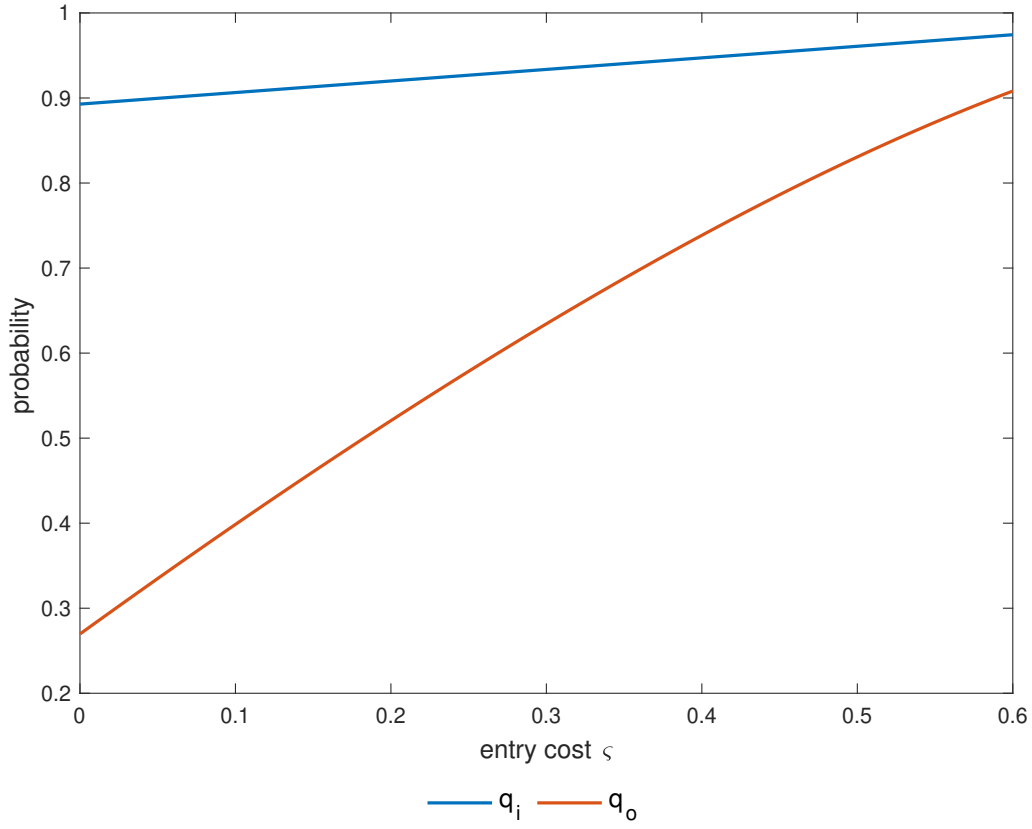
$$(1 - q_i)(1 - u) = (1 - q_o)u.$$

Therefore, we have

$$q_o = 1 - \frac{(1 - q_i)(1 - u)}{u}.$$

Figure A.1 plots the transition probabilities q_i and q_o against the entry cost ς, which measures the profit margin of the product market, with the parameterisation specified in subsection 2.6.

Figure A.1: Transition Probabilities of Employment Status



A.2 Probability q_m

In the extended full model with fixed-term contracts presented in section 4, the labour market flow in steady state for permanent workers is identical to what is described in the subsection above in this appendix. Thus, the probability of remaining an outsider, q_o, is the same as above

$$q_o = 1 - \frac{(1-q_i)(1-u)}{u}.$$

The labour market flow in steady state for the temporary workers satisfies the following instead

$$(1-q_i^f)n_{temp}^{in} = (1-q_m)n_{temp}^{disp} + (1-q_o)n_{temp}^{out}, \tag{8}$$

where n_{temp}^{disp} denotes the workers who receive the contract termination notice in the current period. In steady state, it thus also satisfies

$$n_{temp}^{disp} = (1-q_i^f)n_{temp}^{in}.$$

Therefore, equation (8) can be rewritten as

$$(1-q_i^f)n_{temp}^{in} = (1-q_m)(1-q_i^f)n_{temp}^{in} + (1-q_o)n_{temp}^{out}.$$

Recognise that $n_{temp}^{out} = \eta_F u$, the equation becomes

$$(1-q_i^f - (1-q_m)(1-q_i^f))n_{temp}^{in} = (1-q_o)\eta_F u.$$

Therefore,

$$\frac{n_{temp}^{in}}{u} = \frac{\eta_F(1-q_o)}{(1-q_i^f-(1-q_m)(1-q_i^f))} = \frac{\eta_F(1-q_o)}{q_m(1-q_i^f)}. \tag{9}$$

In addition, for temporary workers,

$$n_{temp}^{in} + n_{temp}^{disp} + n_{temp}^{out} = \eta_F,$$

which can be rewritten as

$$n_{temp}^{in} + (1-q_i^f)n_{temp}^{in} + \eta_F u = \eta_F.$$

Thus,

$$(2-q_i^f)\frac{n_{temp}^{in}}{u} = \eta_F(\frac{1}{u}-1),$$

which means

$$\frac{n_{temp}^{in}}{u} = \eta_F \frac{1/u - 1}{2-q_i^f}. \tag{10}$$

Then from equation (9) and (10), we can get

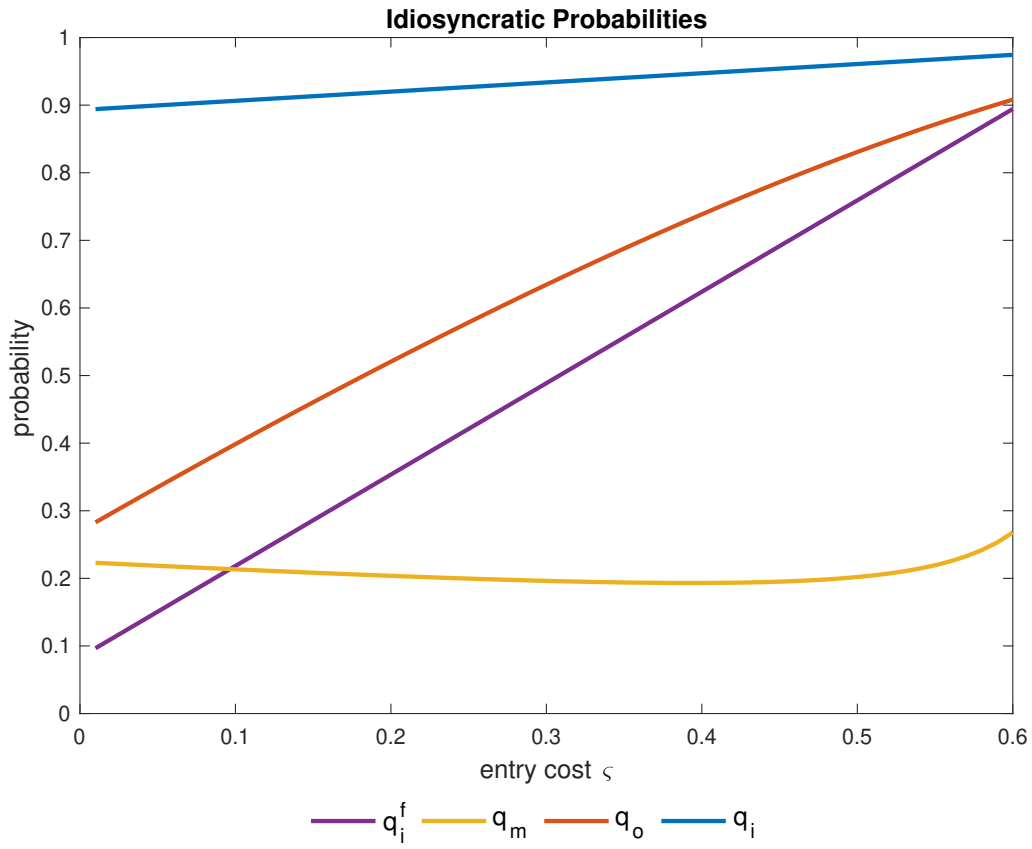
$$\frac{\eta_F(1-q_o)}{q_m(1-q_i^f)} = \eta_F \frac{1/u-1}{2-q_i^f}.$$

Solve this to get

$$q_m = \frac{(1-q_o)(2-q_i^f)}{(1/u-1)(1-q_i^f)}.$$

Figure A.2 plots the transition probabilities q_i for the permanent insiders, q_i^f for the temporary insiders, q_m for the displaced temporary insiders, and q_o for the outsiders against the entry cost ς, which measures the profit margin of the product market, with the parameterisation described in subsection 4.1.

Figure A.2: Transition Probabilities of Employment Status in the Full Model with Fixed-term Contracts



B Algorithm for Solving the Full Model

The algorithm follows the steps below:

1. Create grids for the assets a and the entry cost ς. Given each grid of ς, guess $\tilde{C}$ for the average consumption C.

2. Calculate elasticity θ, wage w, unemployment benefits b, and transition probabilities q_i and q_o.

3. Calculate the consumption and utility for each grid of the assets a_{t+1} held by the non-hand-to-mouth workers.

4. Solve for the policy functions of the non-hand-to-mouth workers $a_{t+1}(\varsigma, a_t, \ell_t, \ell_t^d)$ and $C_t(\varsigma, a_t, \ell_t, \ell_t^d)$ by the value function iteration method. Obtain the associated value functions $V_t(\varsigma, a_t, \ell_t, \ell_t^d)$.

5. Compute the stationary distribution using the policy functions and then calculate the aggregate consumption C.

6. Check whether the aggregate consumption C converges to the initial guess $\tilde{C}$. If so, move to the next step. If not, go back to Step 1 to update the guess $\tilde{C}$.

7. Calculate the value functions for the hand-to-mouth workers.[13]

8. For each grid of ς, calculate the subjective weights π_{ik} using the stationary distributions. Aggregate the value functions using those weights to get the modified aggregate social welfare for workers under each state (a_t, ℓ_t, ℓ_t^d). Maximise these welfare functions with respect to ς to get the subjectively 'fair' policy $\hat{\varsigma}(a_t, \ell_t, \ell_t^d)$ and the associated reservation utility $R(a_t, \ell_t, \ell_t^d)$ for workers in any state.

9. Compute the functions for the aggrievements $A(\varsigma, a_t, \ell_t, \ell_t^d)$ and the associated participation rates of political actions $\mathcal{P}(\varsigma, a_t, \ell_t, \ell_t^d)$.

10. Compute the government's objective function. Maximise this objective function with respect to ς to get the implemented policy ς^a.

[13] The details are in Appendix C.

C Value Functions for Hand-to-mouth Workers in the Full Model

For the hand-to-mouth workers in the baseline full model described in section 3, the value function for the insider, outsider, and displaced workers in steady state are respectively

$$\begin{aligned} V^{in} &= U^{in} + \beta[q_i V^{in} + (1-q_i)V^{disp}] \\ V^{out} &= U^{out} + \beta[q_o V^{out} + (1-q_o)V^{in}] \\ V^{disp} &= U^{disp} + \beta[q_o V^{out} + (1-q_o)V^{in}], \end{aligned}$$

where V^{in}, V^{out}, and V^{disp} are values for being the insider, outsider, and displaced workers, and U^{in}, U^{out}, and U^{disp} are their corresponding per-period utilities respectively.

Solve these 3 equations for the values will yield the value for being an insider as

$$V^{in} = \frac{1-\beta q_o}{1-\beta q_i - \beta q_o - \beta^2(1-q_i-q_o)}(U^{in} + \beta(1-q_i)U^{disp} + \frac{\beta^2(1-q_i)q_o}{1-\beta q_o}U^{out}]).$$

Then, the value of being an outsider can be calculated as

$$V^{out} = \frac{U^{out} + \beta(1-q_o)V^{in}}{1-\beta q_o}.$$

Finally, the value of being dismissed is

$$V^{disp} = U^{disp} + \beta[q_o V^{out} + (1-q_o)V^{in}].$$

In the extended full model with fixed-term contracts in section 4, the values of being hand-to-mouth workers on permanent contracts remain the same as above. For the hand-to-mouth temporary workers, the value functions are

$$\begin{aligned} V^{in}_{temp} &= U^{in}_{temp} + \beta[q^f_i V^{in}_{temp} + (1-q^f_i)V^{disp}_{temp}], \\ V^{out}_{temp} &= U^{out}_{temp} + \beta[q_o V^{out}_{temp} + (1-q_o)V^{in}_{temp}], \\ V^{disp}_{temp} &= U^{disp}_{temp} + \beta[q_m V^{out}_{temp} + (1-q_m)V^{in}_{temp}], \end{aligned}$$

where V^{disp}_{temp} and U^{disp}_{temp} correspond to the value and per-period utility of workers who receive the contract termination notice. Solve this system to get the value for being a temporary insider

$$V^{in}_{temp} = \frac{(1-\beta q_o)[U^{in}_{temp} + \beta(1-q^f_i)U^{disp}_{temp} + \frac{\beta^2(1-q^f_i)q_m}{1-\beta q_o}U^{out}_{temp}]}{1-\beta q^f_i - \beta q_o - \beta^2(1-q^f_i-q_m) + \beta^2(q_o-q_m)[q^f_i + \beta(1-q^f_i)]}.$$

It follows that

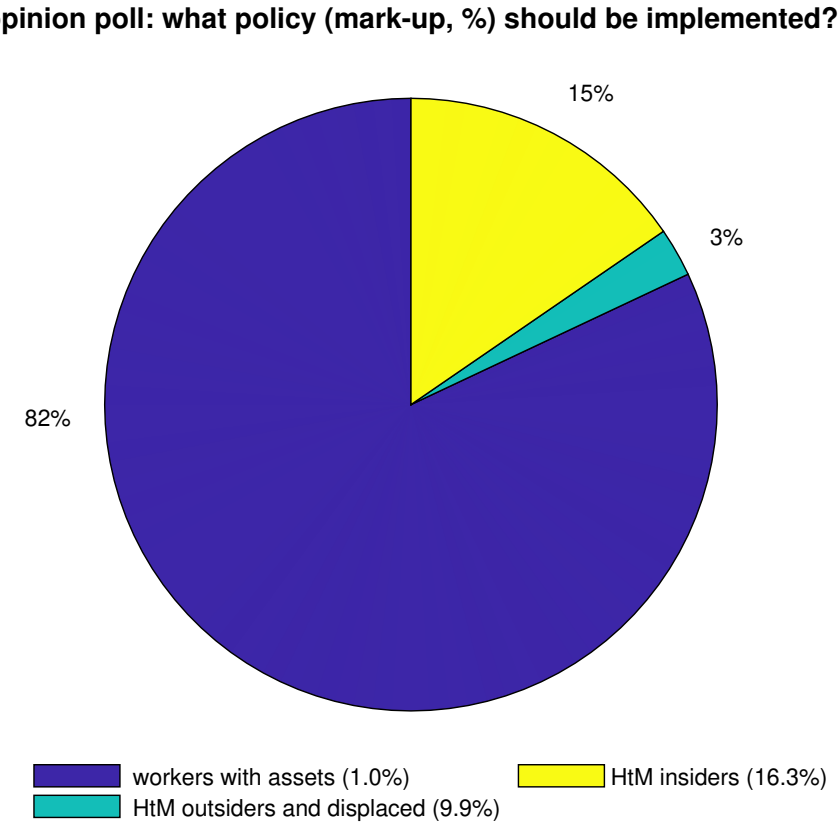
$$V_{temp}^{out} = \frac{U_{temp}^{out} + \beta(1 - q_o)V_{temp}^{in}}{1 - \beta q_o}$$

and

$$V_{temp}^{disp} = U_{temp}^{disp} + \beta[q_m V_{temp}^{out} + (1 - q_m)V_{temp}^{in}].$$

D Additional Figures

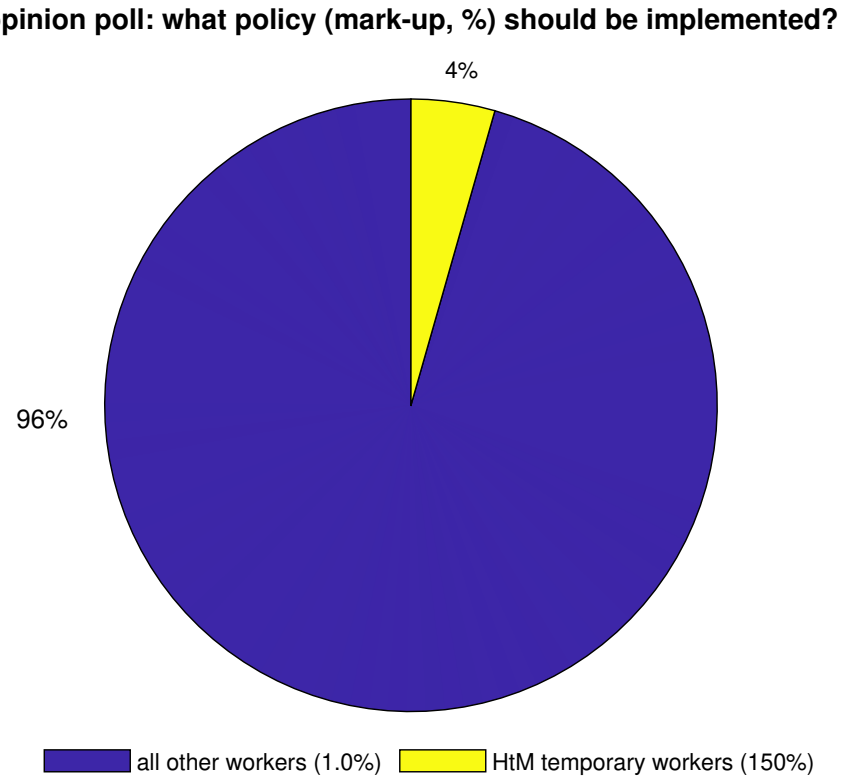
Figure D.1: Opinion Poll of Desired Mark-ups (%) with $h = 0$ and $\delta = 1$, Baseline Full Model



Efficient mark-up: 1%. Actual implemented mark-up: 1%.

Note: The current market has a mark-up of 20%. The full deregulation is implemented because the opposition from the liquidity-constrained workers is not strong enough to impose high political costs for the government.

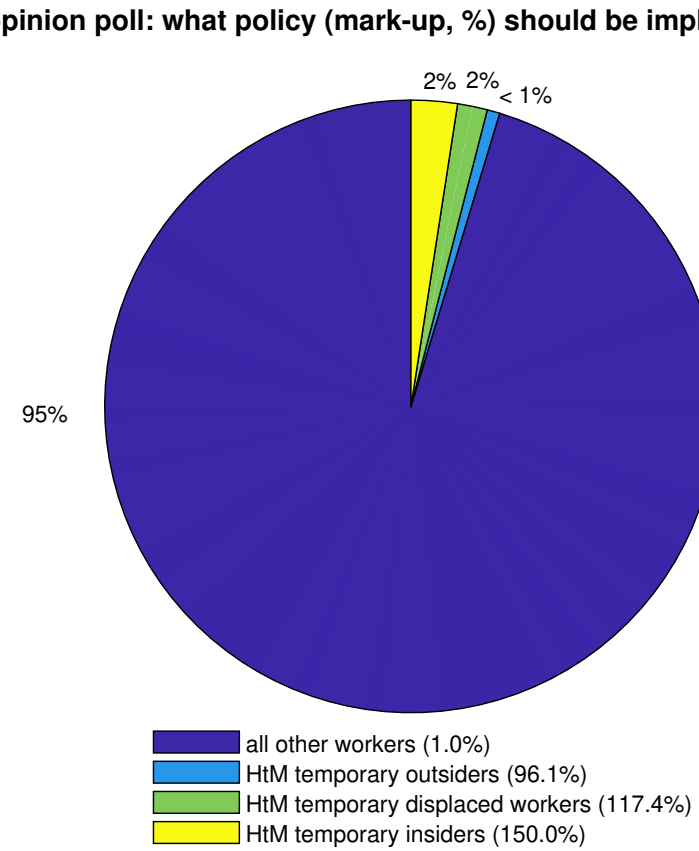
Figure D.2: Opinion Poll of Desired Mark-ups (%) with Government Compensation, Full Model with Fixed-term Contract



Efficient mark-up: 1%. Actual implemented mark-up: 33%.

Note: The government promises compensation for workers. The current market has a mark-up of 20%.

Figure D.3: Opinion Poll of Desired Mark-ups (%) with $\delta = 0.18$, Full Model with Fixed-term Contracts



Efficient mark-up: 1%. Actual implemented mark-up: 39%.

Note: The current market has a mark-up of 20%.

E Additional Tables

Table E.1: Actual Policy (in mark-up, %) and Political Influence, baseline Full Model

scenario	actual mark-up
baseline	5
lower participation cost for insiders ($\mu_{in} = 0.9\mu_{out}$)	10
more organised insiders ($\sigma_{in} = 0.5\sigma_{out}$)	9
more sensitive insiders ($\omega_{in} = 5\omega_{out}$)	11
more influential insiders ($\kappa_{in} = 2\kappa_{out}$)	9

Table E.2: Actual Policy (in mark-up, %) and Political Influence, Full Model with Fixed-term Contracts

scenario	actual mark-up
baseline	41
lower participation cost for insiders ($\mu_{in} = 0.9\mu_{out}$)	67
more organised insiders ($\sigma_{in} = 0.5\sigma_{out}$)	61
more sensitive insiders ($\omega_{in} = 1.1\omega_{out}$)	45
more influential insiders ($\kappa_{in} = 2\kappa_{out}$)	54