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## Labor and Product Market Deregulation: Partial, Sequential, or Simultaneous Reform?

*Helge Berger and Stephan Danninger*



**IMF Working Paper**

European Department

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Prepared by Helge Berger and Stephan Danninger<sup>1</sup>

Authorized for distribution by Bob Traa

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**Abstract**

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This study explores the effects of labor and product market deregulation on employment growth. Our empirical results, based on an OECD country panel from 1990-2004, suggest that lower levels of product and labor market regulation foster employment growth, including through sizable interaction effects. Based on these findings, the paper develops a theoretical framework for evaluating deregulation strategies in the presence of reform costs. Optimal deregulation takes various forms depending on the deregulation costs, the strength of reform interactions, and the perspective of the policymaker. Unless deregulation costs are very asymmetric across markets, optimal deregulation requires some form of coordination.

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Author(s) E-Mail Address: [sdanninger@imf.org](mailto:sdanninger@imf.org); [hberger@wiwiss.fu-berlin.de](mailto:hberger@wiwiss.fu-berlin.de)

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## I. INTRODUCTION

Deregulation, despite its ample potential benefits, is not an easy feat. Policymakers often face formidable headwinds in implementing reform. In part, this resistance reflects the economic and political costs of deregulation. Structural change in product and labor markets—while increasing output and employment growth (e.g., OECD 2001 and 2005; Blanchard 2004)—invariably involves up-front costs, including frictional unemployment, and costs associated with scrapping or mobilizing fixed capital. Reforms often also entail some redistribution of income, generating political costs a social planner would ignore. As a result, policymakers tend to curtail or slow reforms thereby foregoing economic gains.

Part of the difficulty in implementing structural reforms is that reforms are most effective if executed in a coordinated fashion. One recent example of a partial approach is Germany's labor market reform (a.k.a. "Hartz IV"), which occurred against the backdrop of a highly regulated service sector—the largest economic sector in terms of employment. The reform has been criticized for its high implementation costs and lack of an apparent early success.<sup>2</sup> But the benefits from partly liberalizing labor markets might have been (and might continue to be) small because high product market regulation constrains labor demand and, thus, dampens the positive employment effects policy makers had hoped for. Ignoring these interactions biases policymakers' anticipated reform benefits downward, leading—in the worst case—to reform abstinence.

Spillovers between labor and product market reform have shown to be important in many countries. For instance, using Italian micro data, Kugler and Pica (2004) show that the effects from changes in employment protection differ between industries depending on the competitive conditions in product markets. In particular, higher dismissal costs after legal changes in 1990 decreased the turnover rate for women, but the effect was smaller in sectors with higher barriers to entry on the product market side. Estevão (2005) shows in a dynamic panel framework for OECD member countries that the impact of lower labor costs on real GDP growth is larger with lower levels of product market regulation.

So how general is the evidence on reform interactions and what deregulation strategy should be pursued in the presence of these interactions? Traditionally, economists endorse an unconditional elimination of regulatory barriers, as they act as a direct brake on economic activity no matter where they occur.<sup>3</sup> However, this view tends to ignore reform spillovers on the benefit side. An implication of the model by Blanchard and Giavazzi (2003) is that sequential deregulation might have advantages. They show that greater competition in product markets reduces the rents available for redistribution in a union-firm bargaining process. Thus, by reforming the product market first, opposition to

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<sup>2</sup> See, for instance, Fertig and Kluge (2004) and Boss and Elender (2005) for an analysis of the economic impact of recent German reforms, including Hartz IV. IMF (2005) notes that the fiscal costs associated with Hartz IV have been higher than expected and that implementation needs to be improved.

<sup>3</sup> There are, of course, a number of exceptions to the rule. See, for instance, the discussion in Kauppi and others (2004), who analyze the effects of simultaneous labor and product market imperfections on equilibrium unemployment under exogenous as well as endogenous capital intensity.

(and the political costs of) labor market reforms would decline and prepare the ground for further reforms. The more general question then becomes whether multiple reform strategies can be optimal, and if so, under what circumstances.

The present paper adds to this discussion along two dimensions: first, by providing additional empirical evidence on the interaction of labor and product market reform with an emphasis on employment growth; and, second, by exploring the theoretical implications of deregulation spillovers for optimal policy design in the presence of reform costs.

Empirical work on the employment effects of regulation is relatively scarce. Most studies focus on the impact of regulation on other areas of economic activity such as productivity and investment, mostly confirming a detrimental effect (Alesina and others, 2005, Conway, Janod, and Nicoletti, 2005; Nicoletti and Scarpetta, 2003). But these findings do not automatically generalize to employment growth.<sup>4</sup> Our empirical results, based on an annual OECD panel during the period 1990-2004, suggest that reducing product and labor market regulation indeed foster employment growth, including through sizable interaction effects.

The most promising reform strategy is one of comprehensive deregulation with coordinated reform in the labor and product market. A country moving from median levels of regulation to par with the lowest decile of OECD countries stands to gain about 1 percentage point in annual employment growth. On average, the growth contribution from coordinating reforms (across markets) is 17 percent of the total growth boost, but doubles with a larger reform effort (from 75th percentile of regulation to the lowest decile). While subject to some data caveats, mostly because of the lack of broad-based regulatory measures with sufficient time variation, the econometric results are surprisingly robust across estimators, specifications, and types of regulatory indicators.

On the basis of these findings, we provide a framework for evaluating deregulation strategies in the presence of reform costs. The analysis suggests that optimal deregulation takes a number of forms depending on the deregulation costs, the strength of the interaction of labor and product market reform on the benefit side, and the perspective of the policymaker. As a rule, however, deregulation will take the form of a comprehensive reform package. If deregulation costs are broadly symmetric across markets and not prohibitively high, the optimal reform will involve both the labor and the product market, either in a sequenced approach or some form of simultaneous effort.

The remainder of the paper is structured as follows. Section II develops the intuition for the relevance of spillovers between labor and product market regulation based on the labor demand of a price-setting firm. Section III presents our empirical findings. Section

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<sup>4</sup> Ebell and Haefke (2004) caution that, if there is sufficient excess employment prior to the reform—for instance, in the public sector—product market deregulation might lead to higher production without any measurable change in employment, rendering the employment effects of reforms largely an empirical question. Analyzing the interaction of labor and product market reform might also help understand the puzzling simultaneity of a dismal job-creation record and a declining wage share in output characterizing (with some exceptions) continental Europe in recent years.

IV discusses policy implications by deriving a taxonomy of optimal deregulation policies with reform costs. Section V concludes.

## II. THE THEORETICAL ARGUMENT

The notion that broad-based or coordinated structural reforms create growth “synergies” has drawn attention in the literature lately. Blanchard and Giavazzi (2003) argue that deregulation in product markets paves the way for competitive wage setting in the labor market, by reducing rents in the goods markets. As the scope for distribution between firms and workers shrinks, the wage bargaining process becomes less contentious and moderate wage setting encourages output and employment growth. Others highlight the loss of effectiveness of reforms focused on only one market. Krueger and Pischke (1997) stress that product market regulation such as start-up restrictions might reduce employment by limiting the labor demand reaction to labor costs. Kugler and Pica (2004) formalize a related idea using a matching model illustrating how entry barriers in the product market mitigate the impact of labor market deregulation. The OECD (2005) provides a recent survey of potential reasons why the effects of labor and product market reforms might be correlated.

The intuition behind the interaction effect is that the employment impact of, say, labor market deregulation that boosts labor supply will be larger with lower product market regulation—which generates a more elastic response of labor demand and thus employment. The same is true for the impact of product market reform at different levels of labor market regulation.

The rationale can be illustrated within a simple static framework.<sup>5</sup> Assume that firms operate without excess labor capacity and under monopolistic competition in product markets, with the degree of competition decreasing in the level of product market regulation. In this case, it is straightforward to show that firms’ labor demand becomes steeper and less elastic as the level of product market regulation increases (see Appendix for an illustration). The intuition is that higher product market regulation reduces the elasticity of demand firms face on the product market, which in turn reduces the impact of the real wage on optimal output and factor demand. As a consequence, if product market reforms increase competition, we would observe the derived demand for labor shift right and become flatter in the relevant range of real wages.

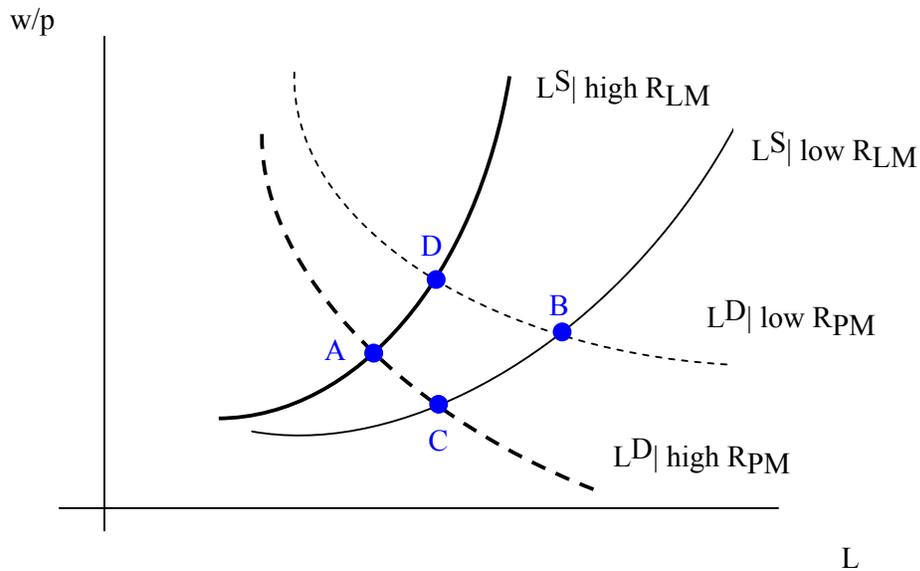
To complete the argument, assume that labor supply, too, depends not only on the real wage, but also on the level of labor market regulation. It is probably safe to assume that, at a given real wage, less restrictive labor market regulation will increase the supply of labor. For instance, because a reduction in employment protection makes employers more willing to hire workers while it weakens the position of unions in a right-to-manage bargaining framework (Estevão 2005). Also, a more flexible contractual framework leads

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<sup>5</sup> The model provides an interpretation for the aggregate interaction effects estimated below, but is otherwise only illustrative since shifts or rotations of labor demand and supply curves cannot be identified with available data.

to increases in the workforce.<sup>6</sup> Quite plausibly less labor market reform will also contribute to a more wage elastic labor supply, which will influence the employment impact of shifts in the labor demand curve.

Figure 1. Regulatory Reform and Employment



We are now ready to illustrate the interaction of regulatory reform on the labor and product markets (Figure 1). The employment impact of a reduction in labor market regulation depends on the degree of product market regulation. Assume that the initial equilibrium is at point A, and that the reform shifts the labor supply curve downward to the right as depicted in the graph. While the employment effect is always positive (from A to C), it is higher when the level of product market regulation is low (starting at D to point B). The simple reason is that the elasticity of labor demand is increasing as product market regulation declines. In other words, high product market regulation dampens the employment effects of labor market deregulation. Formally, this means that the first derivative of the equilibrium employment level  $L^*$  with respect to product market regulation  $R_{LM}$  is negative:  $L_{R_{LM}}^* < 0$ . The presence of a magnifying interaction effect of regulation across markets means then that the negative employment effect becomes smaller at higher levels of product market regulation  $R_{PM}$ , that is,  $L_{R_{LM}, R_{PM}}^* > 0$ .<sup>7</sup>

<sup>6</sup> Under the wage bargaining interpretation, regulation would influence the position of the so-called wage curve rather than the traditional labor supply. The analysis is otherwise comparable.

<sup>7</sup> Note that, in a dynamic setting, the described changes in equilibrium employment levels are likely to take some time if employment is persistent, leading to higher employment growth rates during the (possibly long) transition to the new steady state. Whether changes in the level of product and/or labor market regulation influence steady-state employment growth rates themselves is another question.

A similar mechanism could be at work for product market regulation. In the model a decrease in product market regulation always boosts employment. But, if the elasticity of labor supply depends negatively on the level of labor market regulation, a given decrease in product market deregulation will have smaller employment effects at higher levels of labor market regulation than at lower levels. In Figure 1, starting from point A with high labor and product market regulation, the upward-right shift of labor demand triggered by lower product market regulation will move us to point D. However, starting at point C, with low labor market regulation, product market regulation reform leads us to point B as a new equilibrium, a shift associated with larger employment gains. Clearly, high labor market regulation can reduce the employment effects of product market reform, that is  $L_{R_{PM}, R_{LM}}^* > 0$ .

### III. EMPIRICAL EVIDENCE: EMPLOYMENT EFFECTS OF REGULATION

A host of new data on regulatory activity allows us to test the economic significance of market regulation by comparing regulatory activity across sectors, countries, and over time. The general tenor of the empirical research so far is that excessive product market regulation has a measurable negative effect on economic activity and is at least partly responsible for divergences in economic performance among industrial countries. In particular, high regulation is associated with lower investment and multifactor productivity growth (Alesina and others, 2005, Nicoletti and Scarpetta, 2003; OECD, 2005). There is also some evidence that wages are higher and hiring decisions are adversely affected by excessive regulation (Jean and Nicoletti, 2004). The evidence regarding the impact of labor market regulation is somewhat more mixed—but a number of studies suggest a negative impact on real activity (OECD, 2004a; Nickell and others, 2005; Young, 2003).

The presence of interaction effects between product and labor markets regulation has been the focus of a number of studies: Kugler and Pica (2004) find that labor market liberalization has larger positive employment effects in less regulated product markets. In other words, competitive barriers in product markets dampen the deregulation effects in labor markets. Estevão (2005) shows that wage moderation—measured by the productivity and unemployment level adjusted wage change—is more effective in stimulating growth if it occurs in countries with more deregulated product markets. Again the implication is that insufficient competition limits the benefits of labor market reforms. Annett and Debrun (2004) explore indirect evidence for the advantages of sequencing of reforms à la Blanchard and Giavazzi. They find that within the euro area, product market reforms Granger-cause labor market reforms suggesting sequential effects and one-directional spillovers.<sup>8</sup>

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<sup>8</sup> Burda (2000) discusses some of the earlier literature. See Daveri and Tabellini (2000) for an instructive discussion of the impact of taxation (in particular labor taxes) on unemployment and real growth in Europe.

This study examines the role of interaction effects on employment growth. Assuming monopolistic markets, deregulation should foster employment growth in line with the induced output growth. This claim is supported by evidence in Messina (2004) who finds the share of service sector employment in OECD countries is lower in more regulated product markets. However, as already noted, the theoretical implication is ambiguous. The presence of wage bargaining in a monopolistic market environment can also lead to excessive hiring of workers (e.g., Ebell and Haefke 2004). An increase in competition through deregulation and the elimination of profitable margins of distribution would then reverse the overhiring, but need not increase employment. It is therefore an empirical question whether deregulation has positive employment effects.

Our empirical strategy is to evaluate the impact of regulation in labor and product markets on aggregate employment growth. To this end we develop a panel data set of OECD countries by matching aggregate employment growth data with data on regulation indices. The following subsections describe the compilation of the data set, baseline results and robustness checks, and conclude with a discussion of the size of the estimated effects.

### A. Data

The analysis covers the years 1980-2004, with most regressions starting in 1990 in line with the availability of the regulation data.<sup>9</sup> The database covers the following OECD member countries: Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Italy, Iceland, Ireland, Japan, Korea, Mexico, Netherlands, New Zealand, Poland, Portugal, Spain, Sweden, Switzerland, Turkey, United Kingdom, and United States. Employment is measured by the number of persons employed during a given year in the business sector.<sup>10</sup>

A limitation shared with all studies in the field is the lack of time variation in broad-based regulation indicators. The OECD country measures described below, while preferable in terms of their depth and coverage, are only available for a selected few years. An alternative set of indicators is the one developed by Nicoletti and others (2000) which contains annual regulatory indicators of overall regulation, barriers to entry, and public ownership in OECD member countries but is limited in its coverage to just a number of non-manufacturing industries. Moreover, those data end in 1998, while the latest broad-based data include 2003.

In light of these constraints, we opted for a dual approach. In the main part of the empirical exercise we work with the broad-based OECD data, relying on indicators for the years 1988, 1998, and 2003 for the labor market and 1998 and 2003 for product markets. Available data points are mapped forward annually until a new regulation data point was available. In addition, product market regulation during the years 1990-98 is

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<sup>9</sup> The data source is the OECD (STAN) database. The full panel is used to support the use of lagged variables.

<sup>10</sup> A preferable measure would have been total hours worked per year to capture movements between full and part-time employment, but this level of detail was not available for a sufficiently large number of countries.

assumed to be at the 1998 level. As a robustness check, we also present results based on the annual data by Nicoletti and others (2000). We find the results to be consistent.

To exploit the existing (if limited) time variation of our broad-based regulatory indicators while safeguarding against spurious results, we make use of standard time-series panel techniques employing fixed or random effect estimators. An alternative approach would be to collapse the data set into a cross-country pool framework, treating missing observations on the regulatory indicators as unavailable. As a rule, this type of cross-country analysis produces comparable results.<sup>11</sup> But since there is little reason not to make use of the information contained in the within-country changes in regulatory activity, we report the panel results using fixed and random effects to prevent the slow-moving regulatory indicators from picking up country effects.

The OECD indicators of product market regulation capture different aspects of regulation that have the potential to limit competition.<sup>12</sup> This information comes from detailed questionnaires sent to OECD member governments. The study uses six of these measures: aggregate regulation, administrative regulation, economic regulation, barriers to entrepreneurship, degree of state control, and barriers to trade and investment. The regulation indicators take a value of zero when entry is free and a value of six when competition is severely restricted. Intermediate values represent partial liberalization of entry.

Regulation of labor markets is captured by the OECD employment protection index (EPL) for the years 1988, 1998, and 2003 (OECD 2004a). EPL measures the strictness of legal protection of regular employment, temporary employment, and collective dismissals and are based on a similar scale of zero to six, with six indicating the highest degree of legal protection.<sup>13</sup> The empirical findings rely mainly on the aggregate EPL index. In past research this indicator has successfully explained developments in different labor market segments, even though the evidence on overall unemployment effects is mixed (Young 2003, OECD 2004). Other data used in the study come from the OECD, the IMF World Economic Outlook, and the International Financial Statistics database. The data are merged into an annual panel.

## B. Empirical Results

The baseline results are derived from an unrestricted dynamic model of employment growth. Special attention was given to interaction effects between product and labor market regulation:

$$\Delta E_{it} = \alpha + \alpha_1 \Delta E_{i,t-p} + \alpha_2 R_{PMt} + \alpha_3 R_{LMt} + \gamma R_{PMt} \times R_{LMt} + \delta X_{it} + \varepsilon_{it}$$

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<sup>11</sup> Available on request.

<sup>12</sup> The OECD indicators were developed to illustrate broad differences in product market policies and are described in detail in Conway, Janod, and Nicoletti (2005).

<sup>13</sup> While both the OECD's EPL and product market measure work with a zero-six scale, this does not mean that the intensity of regulation at a given level, say four, is directly comparable. We will return to this issue in the empirical application.

where  $\Delta$  is a general growth rate operator,  $p$  indicates the lag length chosen, and  $X_{it}$  refers to other control variables.

The main findings are reported in Table 1 and differentiate between two definitions of the dependent variable: the models in the first two columns and column five measure employment growth as the average annual growth rate over a five year span to remove business cycle variations. The models in columns three, four, and six refer to the annual employment growth rate. Only the estimates for the regulation variables are shown. All models have a dynamic specification and also include other controls as discussed in Table 1.<sup>14</sup> Models one and three are estimated with fixed effects and models two and four use random effects. Model five presents the results using lagged GDP growth as an instrument for the lagged dependent variable. The final model applies the GMM estimator proposed by Arellano-Bond.

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<sup>14</sup> The left-hand-side variables exhibit significant autocorrelation. Alternative specifications that more directly test for cyclical effects found a positive association with lagged and current GDP growth. However, since GDP growth becomes insignificant in the presence of lagged dependent variables, and in order to avoid multicollinearity and endogeneity problems, GDP growth was dropped subsequently from the baseline specification.

Table 1. Employment Growth and Regulation: Annualized Five-year Growth, 1990-2003 1/

|   | Employment Growth                  |                                    |                                  |                                    |                                    |                               |
|---|------------------------------------|------------------------------------|----------------------------------|------------------------------------|------------------------------------|-------------------------------|
|   | (1)<br>$\Delta^5 E_t$              | (2)<br>$\Delta^5 E_t$              | (3)<br>$\Delta E_t$              | (4)<br>$\Delta E_t$                | (5)<br>$\Delta^5 E_t$              | (6)<br>$\Delta E_t$           |
| $R_{PM}$  | -0.005<br>(1.52)                   | -0.006<br>(2.36)*                  | -0.000<br>(0.07)                 | -0.005<br>(2.35)*                  | -0.003<br>(1.06)                   | -0.0002<br>(0.06)             |
| $R_{LM}$  | -0.007<br>(3.37)***                | -0.007<br>(4.92)***                | -0.008<br>(2.45)**               | -0.003<br>(2.11)**                 | -0.008<br>(3.72)***                | -0.005<br>(1.29)              |
| $R_{PM} \times R_{LM}$ 2/   | 0.013<br>(3.95)**                  | 0.015<br>(5.40)***                 | 0.010<br>(1.85)*                 | 0.007<br>(2.58)***                 | 0.014<br>(4.16)***                 | 0.005<br>(1.03)               |
| Estimation 3/<br>Observations<br>Countries<br>R-squared<br>Wald-Test 4/ | FE<br>330<br>27<br>0.01<br>10.5*** | RE<br>330<br>27<br>0.14<br>54.5*** | FE<br>347<br>28<br>0.29<br>2.8** | RE<br>347<br>28<br>38.7<br>13.5*** | IV<br>330<br>28<br>50.6<br>11.3*** | AB<br>422<br>28<br>...<br>... |

Source: OECD and author's estimates

Notes: absolute value of t statistics in parentheses; \* significant at the 10 percent, \*\* at the 5 percent, and \*\*\* significant at the 1 percent level.

1/ The dependent variable in models (1), (2), and (5) is the annualized employment growth rate (persons) averaged over 5 years, in models (3), (4), and (6) it is the annual growth rate. Other control variables not shown in models (1), (2), and (5) are the five-year lag of the average growth. Models (3) and (5) include the first to the fifth lag of the annual employment growth rate. Model (5) is an instrumental variable estimation using the annualized real GDP growth rate averaged over 5 years lagged five year as an instrument on the lagged dependent variable. The specification includes country dummies equivalent to a FE specification. Model (6) presents Arellano-Bond estimates based on a four lag structure and covers the period 1985-2004. All models include population size as a control for country size and a constant. Lagged dependent variables in all models are significant.

2/ Dummy interaction effect. 1 if both labor and product market regulation are at or above the average level of the sample of OECD countries, and 0 otherwise.

3/ FE=fixed effects, RE=random effects, IV= instrumental variables, AB= Arellano-Bond.

4/ Test of joint significance of regulation variables.

The first aspect worth noticing in Table 1 is the consistent sign pattern of the estimated coefficients across models. The direct effect of market regulation is negative while the interaction term has an offsetting positive effect in all specifications. Although product market regulation is not always statistically significant,<sup>15</sup> Wald-tests indicate joint significance of all three regulation variables. The interaction term is a dummy variable and set to be equal to one if a country has above average product and labor market regulation and zero otherwise. This specification avoids potential compatibility problems with the metric of the two indicators and provides a better fit than a multiplicative term.<sup>16</sup> We show results for both random and fixed effects estimators.<sup>17</sup>

The empirical results provide evidence of cross-market synergies from deregulation in both markets. This can be demonstrated by analyzing the employment effect of partial deregulation. The full impact of partial changes is the sum of the direct impact and the offsetting effects from the interaction term. The model parameters imply that the (marginal) employment effect from deregulating one market increases as the level of regulation decreases in the other market, thus reflecting positive synergies from joint deregulation.

In general, the estimated net effect of partial deregulation is positive, that is, enhances employment growth—but for a few countries, however, the marginal reform effect becomes negative due to a large offsetting interaction term. This somewhat counterintuitive result highlights the importance of the cross-market spillover: a partial deregulation effort in one market at very high levels of regulation in the other is not guaranteed to be successful. But the result is reversed as the level of regulation in the other market falls and does not appear in most deregulation scenarios (see Table 5 below).

In order to understand better which regulation channels affect employment growth, we also explore the relative importance of different subcomponents of the regulation indices. The results are reported in Tables 2 and 3. To assess the effects of labor market regulation, we estimate the effects of three subindices measuring the degree of employment protection of regular employment, temporary employment, and large-scale dismissals. Columns (1) to (4) in Table 2 compare the estimates for the overall index with its subcomponents. The largest negative employment effects stem from employment protection of full-time employment and large-scale dismissals. Regulations affecting temporary employment seem to play a smaller role. These results suggest that employment protection interferes with job growth primarily by raising the cost of regular full-time employment contracts.

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<sup>15</sup> A plausible explanation is inflated standard errors due to the positive correlation of the regulation variables. Product market regulation is statistically significant in models which exclude labor market regulation and the interaction term (see below).

<sup>16</sup> The multiplicative interaction terms consistently come out with a positive sign, but is not always statistically significant at conventional levels.

<sup>17</sup> Although the Hausman specification tests rejects the hypothesis of consistency of random effects in favor of the fixed effect model, there is a potential conflict between using fixed effects and the less time variation of the regulatory indicators.

Analysis of product market subindices hint at increased costs for creating new jobs (Table 3). Columns (1) to (6) present the overall index compared to five subcomponents. Employment growth is mostly hampered by a high administrative burden and barriers to entrepreneurship, trade, and investment. Comparatively less important are economic regulations—for instance, through price ceilings or quotas—or excessive state control via public ownership. Although still based on fairly general indicators, the findings suggest that regulation especially hampers job creation in startups or small firms as they are most sensitive to administrative burdens and barriers to entry of entrepreneurship and investment. This interpretation is consistent with large competitive barriers in the service sector in several European countries, where most small enterprises are concentrated (Berger and Danninger, 2005).

Table 2. Employment Growth and Regulation: EPL Subindices, 1990-2004 1/

|                         | Change in Employment  |                       |                       |                       |
|-------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
|                         | (1)<br>$\Delta^5 E_t$ | (2)<br>$\Delta^5 E_t$ | (3)<br>$\Delta^5 E_t$ | (4)<br>$\Delta^5 E_t$ |
| $R_{LM}$                | -0.007<br>(3.62)***   |                       |                       |                       |
| Regular Employment      |                       | -0.016<br>(5.06)***   |                       |                       |
| Temp. Employment        |                       |                       | -0.003<br>(2.49)**    |                       |
| Collective Dismissal    |                       |                       |                       | -0.015<br>(3.08)***   |
| Observations            | 330                   | 330                   | 330                   | 170                   |
| Countries               | 27                    | 27                    | 27                    | 27                    |
| Estimation 2/           | FE                    | FE                    | FE                    | FE                    |
| R <sup>2</sup> (within) | 0.25                  | 0.28                  | 0.24                  | 0.55                  |

Notes: absolute value of t statistics in parentheses; \* significant at the 10 percent, \*\* at the 5 percent, and \*\*\* significant at the 1 percent level.

1/ Dependent variable is annualized employment growth rate average over five years. Regulation subindices measure regulation of regular employment contracts, regulation of temporary employment contracts, and regulation of collective dismissals. Estimation technique is fixed effects. Models include 5-year lagged dependent variable, population size, fixed effects, and a constant. Lagged dependent variables are significant.

2/ FE=fixed effects

Table 3. Employment Growth and Regulation: Product Market Regulation Subindices 1990-2004 1/

|                                  | Change in Employment  |                       |                     |                     |                       |                       |
|----------------------------------|-----------------------|-----------------------|---------------------|---------------------|-----------------------|-----------------------|
|                                  | (1)<br>$\Delta^5 E_t$ | (2)<br>$\Delta^5 E_t$ | (3)<br>$\Delta E_t$ | (4)<br>$\Delta E_t$ | (5)<br>$\Delta^5 E_t$ | (6)<br>$\Delta^5 E_t$ |
| $R_{LM}$                         | -0.008<br>(2.83)***   |                       |                     |                     |                       |                       |
| Administrative Regulation        |                       | -0.009<br>(3.78)***   |                     |                     |                       |                       |
| Economic Regulation              |                       |                       | -0.003<br>(1.34)    |                     |                       |                       |
| Barriers to Trade and Investment |                       |                       |                     | -0.009<br>(2.66)*** |                       |                       |
| Extent of State Control          |                       |                       |                     |                     | -0.004<br>(1.98)**    |                       |
| Barriers to Entrepreneurship     |                       |                       |                     |                     |                       | -0.009<br>(3.32)***   |
| Observations                     | 330                   | 330                   | 330                 | 330                 | 330                   | 330                   |
| Countries                        | 27                    | 27                    | 27                  | 27                  | 27                    | 27                    |
| R <sup>2</sup> (within)          | 0.24                  | 0.26                  | 0.23                | 0.24                | 0.23                  | 0.25                  |

Source: OECD and author's estimates.

Notes: absolute value of t statistics in parentheses; \* significant at the 10 percent, \*\* at the 5 percent, and \*\*\* significant at the 1 percent level.

1/ The dependent variable is annualized employment growth rate average over five years. Regulation subindices measures the level of administrative regulation, level of economic regulation, barriers to trade and investment, extent of state control, and barriers to entrepreneurship. Models include five-year lagged dependent variable, population size, fixed effects, and a constant. Lagged dependent variables are significant.

### C. Robustness Checks

Several different modifications to the baseline model were examined to assess the robustness of the baseline results. In a first step different control variables were added to examine the scope of an omitted variable bias. One potential factor suggested in the literature is the tax wedge on labor which increases the cost of labor and thereby could reduce employment growth. Adding either the level or the growth rate of the tax wedge—both are highly significant—does not alter the sign or joint significance of the regulation effects. Similarly, controlling for union density or the coverage of collective bargaining—both variables are insignificant—has no effect on the baseline results.<sup>18</sup> We also test for heterogeneity across regional country groupings but do not detect a country cluster effect (e.g., transition economies).

To control for the potential endogeneity of the lagged dependent variable an instrumental variable (IV) model is estimated with lagged GDP growth as an instrument. The IV model produces the same sign pattern and significance patterns as in the baseline model.<sup>19</sup> To deal with potential estimation problems arising from the dynamic panel specification, the annual model was reestimated using the procedure proposed by Arellano-Bond. Again the sign-pattern of the regulation effects remained intact although the coefficients were no longer statistically significant.<sup>20</sup> These results are reported in columns (5) and (6) of Table 1.

Next, we see whether the qualitative results from the cross-country panel hold up in a industry-level data set. The main benefit of the alternative panel is higher frequency data on product and labor market regulation, but with the drawback of covering an earlier time period (1980-98), includes fewer countries (six), and restricts the analysis to just four non manufacturing sectors.<sup>21</sup> Annual product markets regulation data come from Nicoletti and others (2000) and have been used in explaining relative economic performance (e.g., Alesina and others, 2005). Data on employment protection legislation are taken from Table 12 in Nickell (2003) to obtain an elongated time-series. All other industry data come from the OECD STAN database.

Results from baseline regressions on this panel confirm the presence of negative regulation effects with cross-market interactions. Table 4 presents the sectoral regulation effects for two model specifications using five year and annual employment growth rates. The model specifications are the same as in Table 1, but also include industry dummies.

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<sup>18</sup> Data sources for the tax wedge are OECD “Taxing Wages” (various issues). Union density and collective bargaining coverage are taken from Nickell (2003), tables 8 and 9. Results are available from the authors upon request.

<sup>19</sup> All three regulation variables were jointly significant at the 1 percent level. All were individually significant with the exception of product market regulation.

<sup>20</sup> Given the fact that this procedure was developed for large micro-data panels, and due to the limited time variation of the current sample, the applicability of the dynamic panel estimator is doubtful.

<sup>21</sup> Electricity production, telecommunications, transportation, and postal services.

The Hausman specification test suggests random effects to be the preferable model. In both the five-year average and the annual specification, the same regulation pattern emerges. The sign pattern is the same as in the cross-country panel and at least in the case of the five-year growth rates, the estimated effects are statistically significant.

Table 4. Employment Growth and Regulation:  
Industry Level Data 1980-98 1/

| Degree of Regulation   | (1)<br>$\Delta^5 E_t$ | (2)<br>$\Delta E_t$ |
|------------------------|-----------------------|---------------------|
| $R_{PM}$               | -0.006<br>(2.69)**    | -0.527<br>(1.47)    |
| $R_{LM}$               | -0.023<br>(3.48)**    | -1.715<br>(1.81)    |
| $R_{PM} \times R_{LM}$ | 0.005<br>(3.13)**     | 0.367<br>(1.44)     |
| Estimation 2/          | RE                    | RE                  |
| Observations           | 103                   | 183                 |
| Countries              | 6                     | 6                   |
| Sectors                | 4                     | 4                   |
| R-squared              | 0.62                  | 0.32                |
| Wald-Test 3/           | 7.1**                 | 4.7                 |

Source: OECD and author's estimates

Absolute value of z statistics in parentheses; \* significant at 10 percent \*\* at 5 percent \*\*\* significant at 1 percent.

1/ Sectoral employment growth (persons) in four non-manufacturing industries (electricity production, telecommunications, transportation, and postal services) covering the years 1980-88 sourced from the OECD STAN database. Market regulation indicators are taken from Nicoletti and others (2000) and Nickell (2003) Table 12. Baseline regressions include sectoral dummy variables and in model one a five-year lag of the dependent variable and in models two the first to the fifth lag. Lagged dependent variables are significant. Interaction term is the product of the market regulation indicators.

2/ RE=random effects.

3/ Test of joint significance of regulation variables.

#### D. The Economic Impact of Deregulation

To simulate the employment growth effects from deregulation, Table 5 presents the findings for a number of reform scenarios based on the econometric results in Table 1 above. These results are based on two different reform strategies (comprehensive and partial) and two levels of the deregulation effort (small and large). A comprehensive reform is defined as coordinated deregulation in both the product and labor markets (i.e., a decline of the regulation index in both markets). A partial reform is a unilateral decrease of the regulation index in only one market. A large deregulation effort represents

movement from the 75th to the 10th percentile in the OECD distribution of the respective regulation index, a small reform effort is defined as a decline in the regulation level from the median to the 10th percentile. When conducting a partial reform experiment, we assume that the level of regulation in the non reforming market remains at the pre-reform level of the reforming market.

The economic effects appear to be large in all reform scenarios, irrespective of which empirical model is applied. The first five columns in Table 5 report the annual employment growth effect based on different empirical models (see Table 1). The average effect across models is reported in the last column. Partial reforms lead on average to additional employment growth of between 0.5 or 0.6 percent across all models. The size of the effort does not change the result much. Comprehensive reform trivially doubles the impact to between 1.0 and 1.2 percent simply because it involves a double effort in both markets.

However, in addition, policy coordination also generates a positive synergy effect due to the interaction term identified in the empirical exercise. This effect can be measured by the difference between the sum of partial product and labor market deregulation and a comprehensive reform. On average, coordinating reform efforts across markets increases the estimated employment effects by about 17 percent in the small effort scenario (i.e., the shift from median to 10th percentile) and by 38 percent in the large effort scenario (75th to 10th percentile). And while the size of the estimated effects varies substantially across models, the coordination effects generally significantly boosts the overall effect.

Table 5. Employment Effect from Partial and Comprehensive Deregulation 1/

| Model 3/<br>Technique 4/       | A<br>FE | A<br>RE | B<br>FE | B<br>RE | A<br>IV | B<br>AB | Mean |
|--------------------------------|---------|---------|---------|---------|---------|---------|------|
| Partial Reform 2/              |         |         |         |         |         |         |      |
| 75pct → 10 pct                 |         |         |         |         |         |         |      |
| Average growth effect          | 1.3     | 0.2     | 0.7     | 0.1     | 0.8     | 0.4     | 0.6  |
| Median → 10 pct                |         |         |         |         |         |         |      |
| Average growth effect          | 0.9     | 0.4     | 0.5     | 0.2     | 0.6     | 0.3     | 0.5  |
| Comprehensive reform 2/        |         |         |         |         |         |         |      |
| 75pct → 10 pct                 |         |         |         |         |         |         |      |
| Overall effect                 | 3.0     | 1.5     | 1.5     | 0.9     | 2.1     | 0.8     | 1.6  |
| o/w coordination               | 0.4     | 1.0     | 0.2     | 0.6     | 0.4     | 0.1     | 0.5  |
| % increase over partial reform | 15.6    | 210.3   | 15.4    | 213.2   | 27.0    | 6.6     | 38.4 |
| Median → 10 pct                |         |         |         |         |         |         |      |
| Overall effect                 | 1.9     | 1.2     | 1.0     | 0.7     | 1.4     | 0.5     | 1.1  |
| o/w coordination               | 0.1     | 0.4     | 0.1     | 0.2     | 0.2     | 0.0     | 0.2  |
| % increase over partial reform | 7.9     | 44.1    | 7.5     | 45.6    | 12.6    | 3.5     | 16.6 |

Source: Author's calculations.

1/ Reported estimates measure annual employment growth impact.

2/ Partial policy simulations refers to a move from 50<sup>th</sup> to the 10th percentile on the regulation index in one market. Comprehensive reform refers to a simultaneous move to the 10th percentile in both markets.

3/ Model A based on five-year averages, model B on annual data. See Table 1 for details.

4/ FE=fixed effects, RE=random effects, IV= instrumental variable, AB= Arellano-Bond.

#### IV. IMPLICATIONS FOR THE POLITICAL ECONOMY OF DEREGULATION

One implication of the empirical results is that optimal deregulation policies need to take into account interaction effects across markets. A benevolent social planner will take a holistic view of the economy, reducing excessive regulation in both the labor and product market simultaneously to maximize overall welfare. Of course, in actual decisions policymakers often take a market-by-market perspective. As we will show below, however, such a partial perspective will, as a rule, lead to inefficient policy results in the presence of sizable interaction effects.

In addition to the economic benefits of deregulation, decision makers will also consider its economic costs. For the social planner, such costs may include transaction costs—for instance, frictional unemployment or the cost of moving or scrapping physical capital—that occur when resources are being reallocated to more efficient uses.<sup>22</sup> The planner will weigh the benefits of a particular reform scenario on both the labor and product markets with costs and proceed only if there is a net benefit.

In addition, actual decision-making may be influenced by political costs.<sup>23</sup> For instance, interest groups will try to influence the distributional effects of a reform or politicians might take into account the potential loss of votes from the displaced workers and their dependents. Because the social planner would ignore political costs, however, taking them into account (just like taking a partial perspective on benefits) will lead to suboptimal policy results.

We will first assume that reform costs are only economic in nature, but show further below how the model can be extended to include political reform costs, leaving all main results unchanged. In the remainder of the section, we derive a taxonomy of optimal deregulation policies based on a simple decision model that describes the net benefit from reforms of the labor and/or product markets. The model illustrates the rationale for policy-coordination across sectors and thus explains when a social or when a partial planner would reform. Differences arise for cost constellations where the net-benefits from deregulation depend on cross-market effects.

##### A. A Model of Costly Deregulation

Deregulation policies will be implemented when their marginal benefit exceeds the marginal cost.<sup>24</sup> The stylized facts from the empirical section suggest that employment growth or, more generally, benefits ( $B$ ) have the general form

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<sup>22</sup> The report of the Australian Competition Commission (2004) provides a comprehensive accounts of such costs.

<sup>23</sup> In practice differentiating between economic and political costs may be difficult. Modern interest group theory (e.g., Potters and van Winden 1996) stresses the potentially beneficial role that lobbies play in guiding government decisions in environments with private information. Broadly speaking, interest groups might provide helpful information on the costs of deregulation, but their role in the policy process might give them an opportunity to blur the line between economic and private costs.

<sup>24</sup> This is true no matter the specific nature of these costs. To the extent that marginal costs reflect economic (or transaction) costs, the rule ensures first-best efficiency. Policy failure arises, if marginal political costs

(continued...)

$$B = \bar{\alpha} - \alpha_{LM} R_{LM} - \alpha_{PM} R_{PM} + \gamma R_{LM} R_{PM},$$

where the  $\alpha$  terms as well as  $\gamma$  are constants and the  $R_i$ , with  $i=LM, PM$ , are the measures of the level of regulatory activity in the labor and product market introduced earlier.

Furthermore, assume that the economic cost of a discrete change in the level of regulation ( $\Delta R_i$ ) in either market takes the linear form

$$K_i = C_i |\Delta R_i|.$$

Then the first order condition (FOC) describing the optimal discrete *reduction* in the level of regulation in either market ( $\Delta R_i < 0$ ) will equate marginal benefits and marginal costs:

$$\Delta B_i = C_i \Leftrightarrow \alpha_i - \gamma R_{\neq i} + \frac{\Delta R_{\neq i}}{\Delta R_i} (\alpha_{\neq i} - \gamma R_i) = C_i + \frac{\Delta R_{\neq i}}{\Delta R_i} C_{\neq i},$$

where the term  $\Delta R_{\neq i} / \Delta R_i$  describes the implications of deregulation in market  $i$  on deregulation in market  $\neq i$  in the optimum. Note that  $\Delta R_{\neq i} / \Delta R_i$  appears on the benefits and the cost side of the FOC.

Understanding the link between regulatory activity in both markets is crucial for the question of policy coordination. As already noted,  $\Delta R_{\neq i} / \Delta R_i$  can only take on values other than zero if policymakers do indeed take an overall rather than a market-by-market perspective. If they do not—that is, under a market-by-market perspective—the FOC reduces to  $\Delta B_i = C_i \Leftrightarrow \alpha_i - \gamma R_{\neq i} = C_i$ . If decisions are made from an overall market perspective, however, we will have  $\Delta R_{\neq i} / \Delta R_i > 0$  if (and only if) deregulation in market  $i$  actually “triggers” deregulation in market  $\neq i$ .<sup>25</sup>

This implies the following policy rule

$$\Delta R_i \begin{cases} < 0 & \text{if } \alpha_i - \gamma R_{\neq i} + \frac{\Delta R_{\neq i}}{\Delta R_i} (\alpha_{\neq i} \Delta R_{\neq i} - \gamma R_i) \geq C_i + \frac{\Delta R_{\neq i}}{\Delta R_i} C_{\neq i} . \\ = 0 & \text{otherwise} \end{cases}$$

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are the decisive factor in upholding regulation in any market, while a comparison of benefits and economic costs alone would suggest otherwise. Given informational constraints, the rule might still yield a second-best result, however.

<sup>25</sup> Given the symmetry of the setup, the conditions under which this is indeed the case should become clear from the discussion below.

To simplify the exposition, we make a number of assumptions. First, we allow for only two levels of regulation, a “high” and a “low” level, in both markets (in line with Figure 1). Second, we normalize the high level to unity and the low level to zero,  $R_i = 0,1$ , implying that any deregulation will take the form  $\Delta R_i = -1$ . Note that this implies that  $\Delta R_{\neq i} / \Delta R_i$  can only take the values 1 (when a reform in the other market is triggered) and 0 (when it is not). Third, we assume that the initial level of regulation is high in both markets when considering the incentives to reform.<sup>26</sup> This changes the appearance of the decision rule to

$$\Delta R_i \begin{cases} < 0 & \text{if } \alpha_i - \gamma + \frac{\Delta R_{\neq i}}{\Delta R_i} (\alpha_{\neq i} - \gamma) \geq C_i + \frac{\Delta R_{\neq i}}{\Delta R_i} C_{\neq i} . \\ = 0 & \text{otherwise} \end{cases}$$

## B. Taxonomy of Optimal Reforms

We are now able to summarize the policy decisions of a social planner and categorize them into a taxonomy of reform areas. In principle, there are three basic policy scenarios depending on the particular constellation of marginal reform benefits and costs. If costs are relatively small compared to benefits and symmetric, then *comprehensive reforms* ( $\Delta R_i < 0, \Delta R_{\neq i} < 0$ ) will be optimal. If costs are asymmetric and relatively high in one market, *partial reform* is optimal ( $\Delta R_i = 0, \Delta R_{\neq i} < 0$ ). And, finally, if costs are symmetric and high, the social planner will prefer *no reform* ( $\Delta R_i = 0, \Delta R_{\neq i} = 0$ ).

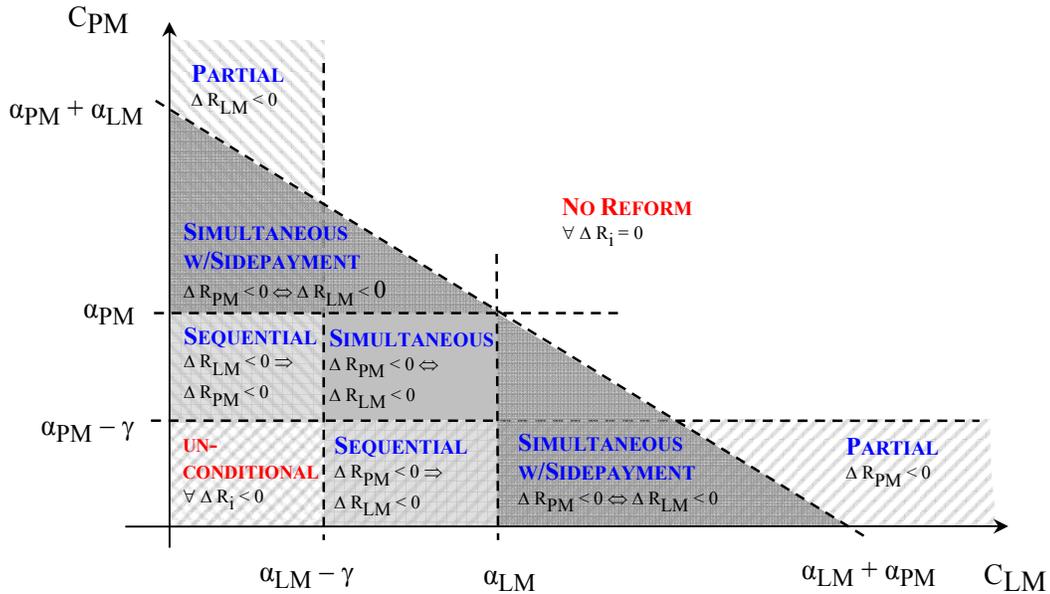
Comprehensive reforms can take various sub forms, demanding different degrees of policy coordination. In the *unconditional reform* scenario, deregulation in both markets occurs irrespective of the reform activity in the other sector. In the *sequential reform* scenario, the impact of deregulation in one of the markets has to be felt before the other market reforms. And for specific constellations of costs and benefits, reforms only occur if the decision-maker can secure *simultaneous reform* on both the labor and the product market, with side payments between sectors in some cases.

We now develop these cases in detail based on the graphical representation in Figure 2. The following section provides a detailed interpretation of the results.

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<sup>26</sup> The expositional assumptions still allow fairly general results. For instance, the implications of *given* levels of high or low regulation on the other market for the incentives to reform a particular market follow straightforwardly from the discussion below.

Figure 2. Policy Implications of Costly Deregulation



Case 1: NO REFORM

( $\alpha_i < C_i$  for  $i = LM, PM$ , with  $\Delta R_{\#i} / \Delta R_i \geq 0$ )

No reform will take place if reforms do not promise an increase in overall welfare. This is the case when the cost of deregulation is larger than the marginal benefits in either market even when interaction effects are taken into account. This is the area to the top right of Figure 2 marked NO REFORM.

Case 2: PARTIAL

( $C_i \leq \alpha_i - \gamma$  and  $C_i + C_{\#i} > \alpha_i + \alpha_{\#i}$  for  $i = LM, PM$ , with  $\Delta R_{\#i} / \Delta R_i \geq 0$ )

In principle, unilateral reform in one market will always be optimal if the marginal costs of deregulation are higher than the marginal benefits even at unchanged high levels of regulation in the other market. Formally, unilateral reform occurs when  $C_i \leq \alpha_i - \gamma < \alpha_i$ .

In Figure 2, for product market deregulation, this is the flat open rectangle with marginal reform costs  $C_{PM}$  up to  $\alpha_{PM} - \gamma$  at any level of  $C_{LM}$  marked by the upward diagonal pattern; for labor market deregulation this is the high open rectangle with costs  $C_{LM}$  up to  $\alpha_{LM} - \gamma$  at any level of  $C_{PM}$  marked by the downward diagonal pattern.<sup>27</sup> For reforms to be PARTIAL, unilateral reform must occur in one market, while it will never pay to

<sup>27</sup> As Figure 2 shows, unilateral reform in one market does not preclude deregulation elsewhere. Whether this is the case or not depends on the level of marginal deregulation costs in the other market. For instance, as we will explain below, for cost levels of labor market reform  $C_{LM}$  up to  $\alpha_{LM} + \alpha_{PM}$  the PARTIAL reform area for the product market overlaps with regions that also allow for labor market deregulation (SEQUENTIAL & SIMULTANEOUS W/SIDEPAYMENT). It is only when deregulation costs become very asymmetric, at more extreme levels of  $C_{LM}$ , that only the product market reform will occur.

reform the other market under any circumstance. In Figure 2, this is the case in the open areas to the top-left (for partial labor market reform) and the bottom-right (for partial product market reform) to the north-east of the diagonal line representing the  $\alpha_i + \alpha_{\neq i} \leq C_i + C_{\neq i}$ -constraint.

*Case 3: UNCONDITIONAL*

If unilateral reform is optimal in both markets at the same time, coordinated deregulation becomes self-supporting. This is the region around the origin with up- and downward patterns of Figure 2 dubbed UNCONDITIONAL.

*Case 4: SEQUENTIAL*

( $C_i \leq \alpha_i - \gamma$  and  $\alpha_{\neq i} - \gamma \leq C_{\neq i} < \alpha_{\neq i}$  for  $i = LM, PM$ , with  $\Delta R_{\neq i} / \Delta R_i \geq 0$ )

Coordinated reform also occurs when the marginal benefits of deregulation in a market exceed marginal costs if the level of regulation in the other market is low. In these situations both markets might reform—either simultaneously or sequentially. In the sequential case we have  $C_i \leq \alpha_i - \gamma$  in market  $i$ , but in market  $\neq i$  it holds that  $\alpha_{\neq i} - \gamma \leq C_{\neq i} < \alpha_{\neq i}$ . Thus, reforms in market  $i$  will (have to) pave the way for reforms in market  $\neq i$ . In Figure 2, the areas named SEQUENTIAL are found above and to the right of the UNCONDITIONAL area described under *Case 2*. Note, however, that sequencing will occur whether the decision maker has a market-by-market or an overall perspective (i.e.,  $\Delta R_{\neq i} / \Delta R_i \geq 0$ ). The reason is that the SEQUENTIAL region intersects with the region of market  $i$ , in which unilateral deregulation is optimal even when the decision maker ignores the implications of the decision on the  $\neq i$  market.

*Case 5: SIMULTANEOUS*

( $\alpha_i - \gamma \leq C_i < \alpha_i$  for  $i = LM, PM$ , with  $\Delta R_{\neq i} / \Delta R_i > 0$ )

A stronger form of coordination—namely, a simultaneous effort—is required if deregulation in either market produces positive net benefits only if there is a simultaneous reform effort in the other. This is the area north-east of the UNCONDITIONAL area in Figure 2 named SIMULTANEOUS. If  $\alpha_i - \gamma \leq C_i < \alpha_i$  for  $i = LM, PM$ , there will be no partial reform effort and policymakers need to be aware of the fact that  $\Delta R_{\neq i} / \Delta R_i > 0$  to have an incentive to deregulate. In other words, the SIMULTANEOUS region will not exist if policymakers take a market-by-market perspective. There are no “side payments” required between the two reform activities, however, because the contribution of either market reform to overall welfare remains non negative.

*Case 6: SIMULTANEOUS W/SIDEPAYMENTS*

( $\alpha_i < C_i$  and  $C_{\neq i} < \alpha_{\neq i}$  for  $i = LM, PM$ , with  $\Delta R_{\neq i} / \Delta R_i > 0$ )

In this scenario, deregulation in market  $i$  always creates a negative net contribution to social welfare even at low levels of regulation in market  $\neq i$  (i.e.,  $\alpha_i < C_i$ ). Nevertheless, it might be rational from the perspective of a decision maker taking an overall perspective to deregulate. This can be the case if the “investment” in market  $i$  yields benefits in market  $\neq i$  that guarantee a positive overall welfare gain from simultaneous reform. That

is, we must have that  $\alpha_i + \alpha_{\neq i} \leq C_i + C_{\neq i}$ .<sup>28</sup> A necessary condition for this constraint to hold is that deregulation in market  $\neq i$  produces a positive welfare gain on its own (i.e.,  $C_{\neq i} < \alpha_{\neq i}$ ). In Figure 2, the regions fulfilling both conditions are the dark grey triangles just below the diagonal line representing the  $\alpha_i + \alpha_{\neq i} \leq C_i + C_{\neq i}$ -constraint. Again, the SIMULTANEOUS W/SIDEPAYMENTS region will not exist if policymakers take a market-by-market perspective.

### C. Interpretation

A first message stemming from the analysis summarized in Figure 2 is that first-best deregulation can take a number of forms. The model illustrates that the basic reform scenarios discussed in the literature—namely unconditional and sequential reforms—are not mutually exclusive. Either one may be optimal depending on circumstances. More generally, the set of feasible outcomes includes different forms of coordinated or partial reform efforts, but leaving the status quo untouched and not deregulating can also be optimal.

Three forces drive this result.

- The first factor is deregulation costs. When deregulation is costly, reforming the labor and/or the product market might not lead to an increase in welfare even when the implied employment effects promise positive marginal benefits.
- The second factor is the interaction of labor and product market reform on the benefit side. Since reform in only one market influences marginal benefits in the other, there is room for welfare-enhancing coordinated reforms. In the absence of regulatory interaction (i.e., if the  $\gamma$  coefficient in the benefit equation is zero), the possible reform scenarios in Figure 2 are reduced to PARTIAL reform, UNCONDITIONAL reform, and NO REFORM.
- Of equal importance is the perspective of the policymaker—the third factor behind the results. Obviously, if policymakers take only a partial view of the welfare effects of deregulation (i.e., if  $\Delta R_{\neq i} / \Delta R_i \equiv 0$ ), there will be no coordinated reform efforts that require taking into account deregulation spillovers across markets.<sup>29</sup> The same applies to a situation in which policymakers restrict their coordination effort to the SIMULTANEOUS and the SEQUENTIAL cases because they are restricted in transferring welfare gains achieved in one market to the other.

Finally, an important qualitative policy implication coming from this framework is that deregulation will often take the form of a comprehensive reform package. Unless deregulation costs are (very) asymmetric across markets, optimal deregulation is likely to

<sup>28</sup> Note that here  $\Delta R_{\neq i} / \Delta R_i = 1$  and so the decision rule is

$\alpha_i - \gamma + (\Delta R_{\neq i} / \Delta R_i)(\alpha_{\neq i} - \gamma) \geq C_i + (\Delta R_{\neq i} / \Delta R_i)C_{\neq i}$ , which implies the inequality above.

<sup>29</sup> The possible reform scenarios would be reduced to PARTIAL, UNCONDITIONAL, and NO REFORM. Of course, foregoing the welfare gains from coordinated reform would not be optimal in the social sense.

involve both the labor and the product markets, requiring some form of coordination. This coordination can take various forms and might or might not require the consolidation of net-benefits between markets. But under plausible parameter constellations, if there is deregulation at all, it will not take the form of a partial effort.<sup>30</sup>

#### **D. Political Costs of Reform**

There can be little doubt that political costs also influence decision-making when it comes to regulatory reform. Or, as the OECD (2004b, p. 17) puts it matter-of-factly for the example of German reforms in recent years: “Organized interest groups take part in consensus-driven decision-making. Over time this has led to a situation in which many players at different levels of the system [...] can block or stall progress in taking a decision.” In the framework developed above, this kind of activity translates into reforms becoming more costly.<sup>31</sup> We find that the need for coordination prevails even when political economy considerations are added to the model.

To facilitate the analysis, we assume that political economy factors are *separable* from economic cost and benefit considerations and that decision-makers take them into account in *addition* to the economic arguments considered by the social planner. On the cost side, additional political costs of reform could entail, for instance, business interests fighting to keep up barriers to entry or organized union protest. On the benefit side, a relevant political economic consideration is the time preference of decision makers. While reform costs (as a rule) occur up front, benefits are often spread out over time (see, e.g., Australian Competition Commission, 2004). For instance, opening a market to competition will immediately be resisted by incumbents, while the implied benefit on the consumer side takes the form of a discounted flow of future rent increases. If decision makers have a time horizon shorter than the social planner’s, perhaps because of re-election constraints or other forms of myopia, they will underestimate benefits. Moreover, benefits tend to be less visible than costs—not least because the interest groups negatively affected by deregulation tend to be smaller in number, less dispersed, and better organized than the groups set to profit from these reforms.<sup>32</sup>

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<sup>30</sup> Our argument may also apply to reforms *within* the product or labor market. For a formal discussion of complementarities of between various labor market reforms see, for instance, Coe and Snower (1997).

<sup>31</sup> Among the more influential papers on the political economy behind (de)regulation are Stigler (1971), Becker (1983), and Peltzman (1976, 1989), who stress the role of powerful interest groups. In a voting framework, Fernandez and Rodrik (1991) argue that uncertainty about individual winners and losers can lead to a bias against reforms. Coate and Morris (1999) point out that adjustment to political action might inherently produce political pressures against (further) changes. Dewatripont and Roland (1995) show that, in a more complex political-economic setup, policy complementarities might be compatible with a gradual (or partial) reform approach, if this helps to build support for the overall policy program and “big bang” reforms are more costly to reverse.

<sup>32</sup> Winston (1993) argues that a lack of enthusiasm for certain deregulation might also reflect intra-household benefit dispersion, as not all consumers benefit equally from the effort.

Figure 3. Policy Implications of Political Costs

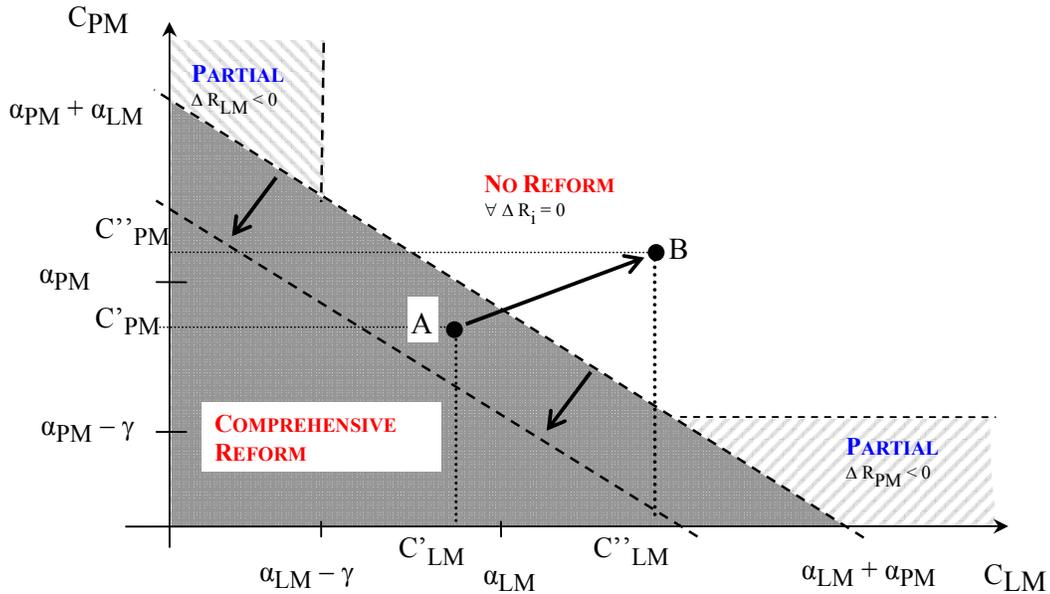


Figure 3 demonstrates how the presence of political costs could affect the reform decision. By adding political cost to the decision maker's menu, the location describing marginal benefits and costs might shift from point such as A ( $C'_{LM}$ ,  $C'_{PM}$ ) to a point further northeast such as B ( $C''_{LM}$ ,  $C''_{PM}$ ). If these additional costs are large enough, as shown in Figure 3, then the policymaker would find him- or herself in the NO REFORM area while a social planner, ignorant of the political costs and still focused on point A, would pursue reforms.

Myopia or short political tenure affects the reform decision in a similar manner. A high discount rate of anticipated benefits may lead to an inward shift of the boundary between the reform and no-reform areas—at a reduced level of perceived benefits of deregulation, lower reform costs are required to make deregulation worthwhile. Again, if the shift is large enough relative to the actual level of reform costs in both markets, it may cause policymakers to forgo reforms even though deregulation would be socially optimal. In Figure 3, this would be the case for the combination of reform costs depicted by point A.

### E. Extensions and Caveats

The model could be extended along a number of dimensions. First, the setup allows for decentralized decision-making, with labor and product market reforms (or perhaps their implementation) in the hands of independent regulatory agencies. In most countries, the implementation of product market and labor market reforms is in the hand of separate agencies, which would make the implementation of comprehensive reform packages difficult. The outcome is likely to depend, among other things, on the sequential structure of the game between these agencies and potential differences in their commitment abilities and time horizons.

A second area possible extension concerns the modeling of reform costs. For instance, as pointed out by Saint Paul (1997) and Koeniger and Vindigni (2003), product market reforms may reduce the incentive for labor to protect insiders by means of restrictive labor market policies. Similarly, firms in competitive markets may find it more difficult to bear the cost of restrictive labor market regulation.<sup>33</sup> This suggests that at least the political costs of deregulation could be endogenous with regard to the reform effort.

At the same time, it is worthwhile pointing to caveats to deriving policy implications from a simple setup like the one discussed here. While, armed with an estimate of the marginal benefits of deregulation and a precise enough idea of the costs of deregulation, deriving the precise optimal reform scenario is a straightforward exercise, there is substantial empirical uncertainty. First, as the empirical section showed, estimates of the benefits function tend to vary across specifications, and the implied coefficient range will make it difficult to determine exactly which reform package to apply. A second, perhaps more severe problem is estimating deregulation costs. Putting precise numbers to the economic costs of deregulation (and detangling them from purely political costs) is difficult, to say the least.

## V. CONCLUDING REMARKS

In this paper we provide new evidence on the economic benefits of labor and product market reform. We show for a sample of OECD member countries that market deregulation is associated with a significant increase in aggregate employment growth. The effect relies in part on sizable interactions between labor and product market reforms linking the effectiveness of deregulation in one market to the level of regulation in the other market. Intuitively, liberalizing the labor market generates higher employment growth when the product market is more competitive, and vice versa. Comparable interaction effects have been reported in other studies, and their presence may help explain why the benefits of structural reforms have differed so much among industrial countries (e.g., Estevao, 2005; Kugler and Pica, 2004).

We find that the employment effects are the largest when deregulation includes both labor and product markets, and the estimated employment gains can be sizable. A country moving from median levels of regulation to the lowest decile stands to gain about 1 percentage point in annual employment growth, partially due to sizable spillover effects. A caveat is that these findings—while rather robust along many dimensions—are based on a panel with only limited time variation in regulatory indicators. However, key results can be replicated in an alternative data set using regulatory indicators with more time variation but smaller coverage of the economy.

The presence of synergies in labor and product market reform has important implications for the coordination of reforms. Based on a simple policy model, the paper shows that

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<sup>33</sup> Koeniger and Vindigni (2003) reason that this argument also helps explain why (the levels of) product and labor market regulations are highly correlated across OECD member countries. Note that this correlation might also be explained by decision makers taking into account the interaction of deregulation across markets along the lines of the model discussed here.

optimal deregulation policy can take a number of forms including unilateral, sequential, or comprehensive reforms, depending on the nature of reform costs, the size of the interaction effect, and the perspective of the policymaker. In general, the first-best reform strategy policy will be a comprehensive reform package involving both the labor and the product market. Isolated reforms which involve only one market are likely the exception to optimality and not the rule.

Why then would policymakers forgo broad-based reforms if they appear a first best-strategy? There are several reasons for welfare-inferior outcomes, and the paper highlights two. One is that policymakers may not fully appreciate positive interaction effects. This could be simply due to a lack of awareness of these effects, or the result of a partisan decision-making process. One example is that consensus-driven government systems could allow (partial) veto players to block broad-based reforms. The second reason is related to political costs. A shorter-time horizon of policymakers or the need to appease organized interest groups can reduce net benefits and lead to reform abstinence, despite available welfare gains.

The analysis hints at measures to limit reform resistance. First, understanding the underlying reasons for opposition to welfare-enhancing reform packages is crucial. If reforms are sidestepped because of a limited understanding of how benefits are distributed across labor and product markets, education of voters and policymakers can make a difference. For instance, unions might view labor market liberalization in a different light if they were undertaken simultaneously with competition-enhancing product market reforms and the beneficial interactions between both efforts were sufficiently communicated. Second, transferring reform responsibilities to technical experts or other non partisan groups may work well, if reforms fail due to a shortened political horizon or the lack of internalization of interaction effects. Benevolent policymakers may be willing to tie their hands early in their term knowing that as the political cycle moves forward they would be tempted to hold up reforms. On the other hand, this strategy may not work in a consensus-driven policy framework where veto players would be hard pressed to extend such a mandate to a non partisan group. For sure, there is no simple policy solution and improving our understanding of reform effects and policy environments should be a priority for further research.

### Appendix: Illustrating the Interaction Effect

The exercise shows that “synergies” between labor and product market reform depend on the influence of regulation on labor demand and supply elasticities. The model assumes that firms operate without excess labor capacity and monopolistic competition in product markets. A (representative) profit-maximizing firm with market power on the product market solves

$$\max_L \pi = p(x(L))x(L) - wL$$

where  $p$  is the price of output  $x$ ,  $L$  is labor, and  $w$  the nominal wage level. The production function follows standard assumptions, including  $x_L > 0$ ,  $x_{LL} < 0$ , and  $x_L \rightarrow 0$  as  $L \rightarrow \infty$ . The first order condition of this problem can be written

$$x_L \left( 1 + \frac{1}{\eta} \right) = \frac{w}{p},$$

where  $\eta \equiv x_p p / x < 0$  is the demand elasticity the firm is facing on the product market. In a monopolistic competition framework, the demand elasticity measures the firm’s price-setting abilities, with higher values of  $\eta$  (or lower *absolute* values  $|\eta|$ ) indicating higher market power.

A plausible assumption is that tighter product market regulation will augment the firm’s grip on the market, while lower product market regulation will weaken it. More formally,

$$\eta = \eta(R_{PM}); \eta_{R_{PM}} < 0,$$

where higher levels of  $R_{PM}$  indicate tighter product market regulation. The only further restriction required for the functional form of  $\eta(R_{PM})$  is that, since for any price-setting firm  $-\infty < \eta \leq -1$ , it must also hold that  $\eta \rightarrow -\infty$  as  $R_{PM} \rightarrow 0$  and  $\eta \rightarrow -1$  as  $R_{PM} \rightarrow \infty$ .

How do changes in product market regulation influence the firm’s labor demand? The concavity of the production function ensures that labor demand is falling in  $w/p$ . Under perfect competition on the product market,  $\eta$  becomes infinitely small and labor demand converges to the inverse of the marginal product of labor,  $x_L$ . As the firm acquires market power, labor demand at a given level of real wages will shift to the left, and the curve will become steeper. The shift is obvious from the first order condition,  $x_L \left( 1 + \frac{1}{\eta} \right) = \frac{w}{p}$ : as  $\eta$  increases, the bracket multiplying  $x_L$  becomes smaller than unity. At a given level of  $w/p$  this requires an *increase* in the marginal product of labor, which can only be achieved by *reducing* labor demand. Because larger shifts in labor demand are required at higher levels of production and labor input to achieve a given reduction in the marginal product of labor, the left-shift of labor demand is more pronounced at lower levels of  $w/p$  and higher levels of

$L$ . In other words, increasing product market regulation leads to lower and less elastic labor demand.

To complete the argument, assume that labor supply depends not only on the real wage, but also on labor market regulation ( $R_{LM}$ ). This would imply

$$L^S = L^S\left(\frac{w}{p}, R_{LM}\right); L_{w/p}^S > 0, L_{R_{LM}}^S < 0.$$

This formulation leaves open the form of the labor supply reaction to changes in labor market regulation. An increase in  $R_{LM}$  might simply right-shift the curve, leaving its slope unchanged ( $L_{w/p, R_{LM}}^S = 0$ ). However, it might quite plausibly also contribute to a less wage elastic labor supply ( $L_{w/p, R_{LM}}^S < 0$ ), which will influence the employment impact of shifts in the labor demand curve.

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