

# **Horizontal Mergers, Involuntary Unemployment, and Welfare**

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## **Abstract**

Standard welfare analysis of horizontal mergers usually refers to two effects: the anticompetitive market power effect reduces welfare by enabling firms to charge prices above marginal costs, whereas the procompetitive efficiency effect increases welfare by reducing the costs of production (synergies). However, demand-side effects of synergies are usually neglected. We introduce them into a standard oligopoly model of horizontal merger by assuming an (empirically supported) decrease in labour demand due to merger-specific synergies and derive welfare effects. We find that efficiency benefits from horizontal mergers are substantially decreased, if involuntary unemployment exists. However, in full employment economies, demand-side effects remain negligible. Eventually, policy conclusions for merger control are discussed.

**Keywords:** horizontal mergers, involuntary unemployment, efficiency defense, oligopoly, competition

**JEL:** L13, L41, J01, L16



# 1. Introduction

The welfare analysis of mergers usually consists of two elements: the allocative effect and the efficiency effect. While the former refers to the welfare loss due to the narrowing of the market structure (dead weight loss), the latter analyses the effect of efficiency gains from mergers.<sup>1</sup> Such efficiency gains typically originate from synergy effects of the integration of two or more companies to a single entity, i.e. an (assumed) constant output can post-merger be produced with fewer inputs, for instance due to the amalgamation of overhead and administration departments like human resources, accounting, executive committee, etc. According to standard M&A business economics, the reduction of staff represents an important source of such kinds of synergy gains.

The usual way of modelling efficiency gains from mergers in industrial economics is to analyse the effects from a merger-fuelled decrease in marginal costs. However, in doing so, the analysis of the synergy effects remains limited to the supply side of the relevant markets (shifts of the supply curve). In contrast, possible effects on the demand side, for instance leading to a shift of the demand curve, are usually neglected. We contribute to filling this gap by introducing the demand effects from synergy-driven mergers to a standard welfare analysis of horizontal mergers in oligopolies. We find that efficiency benefits from horizontal mergers are substantially decreased, sometimes even completely eroded, if involuntary unemployment exists. In full employment economies, demand-side effects remain negligible.

## 2. Literature Overview

There is surprisingly few literature dealing with mergers/competition and unemployment. The larger branch is empirical and addresses the employment ef-

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1 This type of trade-off analysis was pioneered by *Williamson* (1968) and is immanent in most landmark contributions to the modern economic analysis of horizontal mergers (e.g. *Farrell & Shapiro* 1990, 2001).

fects of mergers. The most comprehensive studies are *Conyon et al. (2002)* and *Gugler & Yurtoglu (2004)*. *Conyon et al. (2002)* find for the UK that mergers and acquisitions lead to a significant decrease in labour demand by the merged entity (that also decreases joint output) compared to the pre-merger situation.<sup>2</sup> This result is generally supported by *Gugler & Yurtoglu (2004)* finding significant and considerable negative effects of merger activity in Europe (in average a 10 per cent decrease in labour demand). However, and in line with earlier studies (*Green & Cromley 1982; Upadhyaya & Mixon 2003*), they do not find negative effects of merger activity on the unemployment rate in the US. As an explanation, *Gugler & Yurtoglu (2004)* suggest that more rigid and more sclerotic labour markets in Europe compared to the U.S. drive the effect. This view is additionally supported by the case study from *Behar & Hodge (2007)*. *Margolis (2006)* finds evidence that mergers and acquisitions lead to a reduction in the employment particularly of (comparatively) ‘low-skilled’ workers, a finding that fits into this line of reason as sclerotic labour markets usually exert an over-proportionally adverse effect on low-skilled labour. Altogether, this empirically strengthens the reasoning that countries with persistent involuntary unemployment and sclerotic labour markets experience negative employment effects from increasing merger activity because the employees that lose their job in the course of post-merger rationalisation cannot find a new job. Thus, those economies suffer (consumer) income-wise from mergers & acquisitions.

Most analyses in the theoretical literature in this context focus on the influence of the intensity of competition on unemployment and/or the determination of wages. One line of reasoning concerns imperfections on labour markets: then, promotional effects of intensified product market competition on employment are not a matter of course (*Koskela & Stenbacka 2005*). In another respect, the landmark work of *d'Aspremont et al. (1984, 1989a, 1989b, 1990)* focuses on the explanation of involuntary unemployment based on an extended Cournot oli-

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2 This study somewhat generalises an earlier sector-specific study by *Haynes & Thompson (1999)* that also finds negative employment effects, however, only after an initial temporary increase in labour demand.

gopoly model, thereby taking into account the interdependencies between labour and product markets.<sup>3</sup> Producers are assumed to behave according to their ‘true’ demand curve, i.e. taking into account the total income effect of their decisions on altering the level of employment. Involuntary unemployment then results from market imperfections in the product markets – even at a zero wage – due to bounded labour demand. Unemployment does not rest on the assumption of an imperfectly competitive labour market and is more likely the lower is the degree of competition in product markets. Even though their focus is totally different because we do not try to explain the existence of involuntary unemployment, the possible dependence of producers’ decisions on total income – mentioned by *d’Aspremont et al.* – plays a crucial role in our following analysis, in which we regard aspects of mergers and total welfare in a given involuntary unemployment environment.

Though total welfare effects of mergers are not discussed, *Schniewind* (2000) analyses the effect of mergers on unemployment in a partial equilibrium Cournot competition model. Contrary to our model, a rise in total factor productivity due to a merger leads to a positive effect on employment. This positive effect is counteracted by a mark-up effect due to lower competition. As a result, lower growth in total factor productivity, a smaller number of firms and a larger sector size confirm a negative net impact of mergers on unemployment.

Furthermore, *Gersbach* (2000) derives that intensifying product market competition leads to more employment in most cases (in particular if it is done via reducing mark-ups or inducing a more rapid expansion of the product mix). Only if productivity increases are combined with rigid labour markets (for instance, workers are immobile), mixed or negative results might occur. The idea that a lessening of competition promotes involuntary unemployment is compatible with our reasoning as soon as horizontal mergers actually lead to a lessening of competition. *Brock & Obst* (2008) broaden the scope of welfare analysis of

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3 In *d’Aspremont et al.* (1990) the analysis is done for imperfect price competition.

mergers by integrating consumer preferences about the desired degree of market concentration, implying that preferences for deconcentrated markets lead to a more rigorous optimal horizontal merger policy. However, effects on unemployment are not considered.

Of course, there is a vast literature on welfare effects of horizontal mergers and we will draw on the landmark contributions of this field.<sup>4</sup> In particular, we consider a standard Cournot setting and our model resembles in parts the model of *Salant et al.* (1983). However, to our best knowledge, no treatment of the welfare effects of (horizontal) mergers *including* the welfare effects from a merger-specific increase in involuntary unemployment is available.

### 3. Synergies, Unemployment and Demand

Procompetitive advantages from a merger for the merging companies result from efficiency gains through synergies. Following the standard view in economics, synergies arise from the combination and integration of specific, hard-to-trade assets of the particular merging firms. This combination allows the new merged firm to produce with lower costs compared to the case of separate independent firms. *Farrell & Shapiro* (2001: 693) state the requirement of combining the firms' assets as follows: "synergies allow output/cost configurations that would not be feasible otherwise." In the literature on business economics, topologies of synergies are used in differing ways. In some studies (e.g. *Chatterjee* 1986; *Seth* 1990; *Fulghieri & Hodrick* 2006), market power effects of horizontal mergers are included, for instance under the label 'price synergies'. However, this received critical reflection as it blurs the distinction between anticompetitive (market power) and procompetitive (efficiencies through synergies) effects of mergers, a distinction that is very useful for analyses from a welfare point of view. In accordance with other industrial economics literature,

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4 Actually, the literature is much too comprehensive to be summarized in a few paragraphs. For elaborate and contemporary overviews see *Kaplow & Shapiro* (2007); *Froeb & Werden* (2008); *Kerber & Schwalbe* (2008); *Kühn* (2008).



we therefore do not consider market power effects to be a type of synergies (inter alia *Clougherty & Duso* 2008). As a consequence, five basic categories of synergies can be identified (*Chatterjee* 1986; *Trautwein* 1990; *Fulghieri & Hodrick* 2006).

| Type of Synergy                    | Kind of Cost Reduction   | Example(s)  |
|------------------------------------|--|---|
| Production Synergies               | economies of scale   | degression of fixed costs; convergence to optimal capital utilization; etc.                       |
| <i>Operational Synergies</i>       | economies of scope   | combining administrative functions; integration of departments; reduction of overhead costs; etc. |
| <i>Administrative Synergies</i>    | improved management skills/techniques (efficient market for corporate control) | replacing the target management by the management of the acquirer; etc.                           |
| <i>Financial Synergies</i>         | capital costs  | lower interest rates on borrowed capital; improved ability to raise additional equity; etc.       |
| <i>Complementarities Synergies</i> | combination of complementary skills / resources                                | combination of research & development competencies; etc.  |

Irrespective of the type of synergy, a merger-specific increase in productivity (efficiency increase) implies that an (assumed) constant output is produced with fewer inputs<sup>5</sup> – at the end of the day with fewer input of factors of production. Looking at the five categories of synergies, this directly relates to the input fac-

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<sup>5</sup> Alternatively, an assumed constant input allows for a higher output.

tor labour in case of production, operational and administrative synergies. In case of financial synergies, there is no obvious relation to the factor labour. In case of complementarities synergies, the implications for labour input are not trivial.

Let us assume horizontal mergers that increase efficiency through production and operational synergies.<sup>6</sup> This stands in line with empirical research on motives and effects of efficiency-enhancing horizontal mergers and acquisitions (inter alia *Seth* 1990; *Mukherjee* et al. 2004).<sup>7</sup> Assuming partially substitutional production functions, the amount of the relative reduction of input factors corresponds to the relative price of the input factors. If the relative price of one input factor (say labour) increases, then productivity gains are especially profitable if they economize on that factor. This mirrors the rationale that business, while seeking to economize on all input factors, puts the strongest efforts behind reducing the most expensive input factor, i.e. increasing its productivity. Regarding mergers and acquisitions, this implies that high relative labour price induces mergers to focus on the elimination of duplicate jobs in order to decrease costs by increasing labour productivity. Typically, deficient labour market institutions (overly high reservation wages, excessive labour rights, overtaxation, overpriced social security, etc.) tend to artificially increase the relative price of labour. This interrelation will be addressed in more detail below.

Following the preceding paragraph, we assume that the reduction of costs  $c$  of the new merged firm compared to its constituent firms is due to a reduction of the input factor labour (in relation to a constant output level). Thus, given a general production function  $f$  with input factors labour ( $L$ ), capital ( $K$ ) and other inputs ( $\varphi$ ), the merger can be expressed in the amount of employed labour pre-

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6 As the quantitative effect of replacing the target management should not be considerable in terms of labour input, we further on neglect this type of synergy.

7 In contrast, *Chatterjee* (1992) finds financial synergies to be more important than operational and production synergies. Notwithstanding, the latter two represent non-negligible ingredients.

merger and post-merger,  $L_{pre}$  and  $L_{post}$ , whereby  $L_{pre}$  encompasses the sum of employed labour of the merger-constituent firms:

$$f_{post}(L_{post}, \bar{K}, \bar{\varphi}) = f_{pre}(L_{pre}, \bar{K}, \bar{\varphi}), \text{ with } L_{post} < L_{pre} \text{ and } c(L_{post}, \bar{K}, \bar{\varphi}) < c(L_{pre}, \bar{K}, \bar{\varphi}).$$

Efficient mergers imply increased labour productivity, i.e. a constant market output is produced with a reduced input of labour, thereby production costs have been reduced. Note that this does not necessarily require the merged company to reduce its labour demand in absolute terms. Due to its increased efficiency, the merged entity might increase its output corresponding to an increased market share. However, this does not contradict our assumption that any given *market* output is produced with less labour input post-merger compared to the pre-merger situation. The merged company merely increases its share within the market at the expense of less efficient (i.e. lower labour productivity) competitors, implying that the average labour productivity of all producers within the relevant market has increased and labour input at any given output has market-wide decreased.

The merger-specific cost reduction is present in standard analysis of the welfare effect of horizontal mergers and will be included in a standard way in our model (section 4). However, the consequent implication on input demand, here: labour demand, is usually neglected. This seems to be justified if a full-employment economy is (implicitly) assumed. Workers and employees that lose their job as a consequence of, for instance, operational synergies (reduction of staff in post-merger integrated overhead departments) will find a new job in another industry. However, labour markets do not always work perfectly. In a considerable number of countries, they are characterized by mismatch problems, deficient institutions as well as tax and social security systems that artificially increase the price of labour – leading to involuntary unemployment. In line with the empirical research discussed in section 2, we demonstrate that dropping the usual (implicit) full employment-economy assumption in favour of an involuntary unemployment-economy assumption alters the welfare impli-

cations of horizontal mergers. In an economy with involuntary unemployment, sclerotic labour markets mean that laid-off workers and employees do not easily find a new job and face considerable periods of unemployment instead. Unemployment usually goes along with losses of income.<sup>8</sup> Increasing unemployment in such a scenario consequently implies a reduction of income of consumers. And thus, by reducing total income  $Y$ , involuntary unemployment affects total demand  $D$ .

To state this more clearly, total income is simply expressed as a function of labour  $L$  and all non-labour income elements  $\theta$ :

$$Y = Y(L, \theta),$$

with  $Y'_L > 0$  denoting the first partial derivative of  $Y$  with respect to  $L$ . The above explanations then allow for the reasoning that the effect of an unemployment-caused reduction of total income on total demand is not passed through one-to-one. In our following model we, therefore, implicitly assume a so called “pass through”-factor  $a$ , capturing the effect on the change of total demand  $D$ :

$$\Delta D = a \cdot \Delta Y,$$

whereby total demand is a function of the price  $p$ , total income  $Y$  and other factors  $R$  that determine total demand. The demand of a given industry or in a given market  $\hat{D}$  is in turn a share of total demand. We assume that  $\hat{D}$  evolves parallel to total demand, i.e. we assume for reasons of simplicity that consumers facing a reduction in income change the size of their shopping basket but not its composition.

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8 A negative income effect occurs even if social security systems provide a subsistence level of income for the unemployed, financed by taxes or social security contributions, as long as that subsistence level is lower than the wage level. In addition, involuntary unemployment reduces demand by creating negative expectations about future income.

This links employed labour and total demand in a given industry. General involuntary unemployment renders counterbalancing of a discharge of labour within that industry (due to merger-specific synergies) by other industries impossible. Therefore, the merger causes unemployment to rise and total income to fall. The latter, in effect, reduces total demand faced by the merging firms and its competitors.

## 4. The Model

### 4.1. Pre-Merger Equilibrium

We use a simple model of Cournot oligopoly with homogenous goods. Inverse demand  $\hat{D}$  is given by  $p(X) = RY - bX$ , where  $X$  is total industry output,  $p$  is price,  $Y$  is total income,  $R$  denotes all other factors than total income, and  $p'(X) < 0$  denoting the first derivative of price with respect to total industry output. The number of firms is exogenous and given by  $n$ . Firm  $i$ 's output is given by  $x_i$  and  $X = \sum_{i=1}^n x_i$ . It is further assumed that the  $n$  firms have equal marginal costs  $c$  and no fixed costs.<sup>9</sup>

In the standard Cournot equilibrium, every firm  $i$  maximizes its profits,  $\pi_i(x_i, y_i) = [p(X) - c]x_i$ , over its output  $x_i$ , given its rivals' output  $y_i$ . It follows that total industry output and price are given by  $X = \frac{n(RY - c)}{b(n+1)}$  and  $p(X) = \frac{RY + nc}{n+1}$ , respectively. Total welfare ( $W$ ) is the sum of consumer surplus ( $CS$ ) and the profits of the  $n$  firms:

$$(1) \quad CS = \frac{[n(RY - c)]^2}{2b(n+1)^2}, \quad n \cdot \pi_i = \frac{n(RY - c)^2}{b(n+1)^2}, \quad \text{and} \quad W = \frac{n(n+2)(RY - c)^2}{2b(n+1)^2}.$$

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<sup>9</sup> Positive fixed costs do not change the general analysis and implications, besides enforcing the below examined effects.

## 4.2. Post-Merger Equilibrium

Now, two of the previously existing  $n$  firms merge, thereby reducing the marginal costs of the new entity (insider  $I$ ) due to synergies to  $c\varepsilon$ , with  $0 < \varepsilon < 1$ . The marginal costs of the remaining  $n - 2$  firms (outsiders  $O$ ) remain at  $c$ . It is assumed that the synergies rest on the economization of labour input. Due to sclerotic labour markets, involuntary unemployment is increased and this causes total income to fall to  $\tilde{Y} < Y$ . The amount of  $\tilde{Y}$  comprises the “pass through”-effect of an unemployment-caused reduction of total income on demand in the modelled market: the higher is  $\tilde{Y}$ , the lower is the proportion of change in total income passed through onto the relevant market. Thus, inverse demand is now given by  $\tilde{p}(\tilde{X}) = R\tilde{Y} - b\tilde{X}$ , where  $\tilde{X}$  is new total industry output,  $\tilde{p}$  is the new price,  $\tilde{p}'(\tilde{X}) < 0$ , and the other parameters  $R$  stay the same as in the pre-merger case.

In the new Cournot equilibrium, outputs of the insider and the outsiders are given by  $x_I = \frac{R\tilde{Y} + c(\varepsilon - 2) + nc(1 - \varepsilon)}{bn}$  and  $x_O = \frac{R\tilde{Y} + c(\varepsilon - 2)}{bn}$ , respectively, with  $x_I > x_O$ .

Thus, total industry output of  $\tilde{X} = x_I + (n - 2)x_O = \frac{R\tilde{Y}(n - 1) - c(n + \varepsilon - 2)}{bn}$  results in the following new price  $\tilde{p}(\tilde{X}) = \frac{R\tilde{Y} + c(n + \varepsilon - 2)}{n}$ .

For  $\tilde{p}(\tilde{X})$  to be higher than  $p(X)$  it must hold that

$$(2) \quad n(R\tilde{Y} - RY) + R\tilde{Y} > (n + 2)c - (n + 1)c\varepsilon.$$

The partial derivatives of the difference given in (2) show that a higher value of  $\tilde{Y}$  and  $\varepsilon$  (i.e. a smaller shift in the demand curve and the insiders' cost function) as well as lower values of  $n$  and  $c$  (i.e. fewer players in the market and lower mar-

ket-wide marginal costs) support a price increase due to the merger.<sup>10</sup> Thereby, (very) low market-wide marginal costs convey a lower price-reducing potential of synergies (compared to the effect of increased market power).

Total welfare ( $\tilde{W}$ ) is now given by the sum of consumer surplus, the profit of the insider and the profits of the  $n-2$  outsider firms. Thus,

$$\tilde{CS} = \frac{[R\tilde{Y}(n-1) + c(2-n-\varepsilon)]^2}{2bn^2}, \quad \pi^I = \frac{\{R\tilde{Y} + c[n(1-\varepsilon) + \varepsilon - 2]\}^2}{bn^2} \quad \text{and}$$

$$(n-2)\pi^O = \frac{(n-2)[R\tilde{Y} + c(\varepsilon - 2)]^2}{bn^2} \quad \text{result in}$$

$$(3) \quad \tilde{W} = \tilde{CS} + \pi^I + (n-2)\pi^O$$

$$= \frac{\frac{1}{2}(R\tilde{Y})^2(n^2 - 1) + cR\tilde{Y}[2 - n^2 + n(1-\varepsilon) - \varepsilon] + c^2[n^2(\frac{3}{2} - 2\varepsilon + \varepsilon^2) - \frac{1}{2}(\varepsilon - 2)^2 - n(\varepsilon - 2)(\varepsilon - 1)]}{bn^2}.$$

### 4.3. Total Welfare Effect

The merger's effect on total welfare is determined by the comparison of post-merger and pre-merger total welfare,  $\Delta W = \tilde{W} - W$ . It is obvious that this comparison will lead to a very complex expression that cannot be interpreted in a trivial way and that does not allow for an easy generalizing condition.<sup>11</sup>

Recalling our aim to show total welfare impacts of mergers that include a negative effect of synergies on total demand, we first should mention that those mergers display the “normal” impact of mergers in such a Cournot-setting, i.e. the mergers' effects on total welfare under the above conditions with the “normal” unaffected demand function (this is due to the partial derivative of  $\tilde{W}$  with

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10 The partial derivatives of the difference in (4) are given by:  $\frac{\partial}{\partial \tilde{Y}} = (n+1)R > 0$ ,  $\frac{\partial}{\partial \varepsilon} = (n+1)c > 0$ ,  $\frac{\partial}{\partial n} = R\tilde{Y} - RY - c(1-\varepsilon) < 0$ ,  $\frac{\partial}{\partial c} = n(\varepsilon - 1) + \varepsilon - 2 < 0$ .

11 The latter is possible if the effect on consumer surplus is isolated:  $\Delta CS = \tilde{CS} - CS > 0 \Leftrightarrow c[n(1-\varepsilon) + 2 - \varepsilon] > n^2(RY - R\tilde{Y}) + R\tilde{Y}$ .

respect to  $\tilde{Y}$ ,  $\partial\tilde{W}/\partial\tilde{Y} > 0$ ).<sup>12</sup> Thus, ignoring effects on total demand attenuates (and possibly reverses) negative total welfare effects and overestimates positive total welfare effects. This emphasizes the importance of an inclusion of demand-side effects into a welfare-maximizing merger policy.

We simulate some welfare effects (with different parameter constellations) of mergers that include demand-side effects in the Appendix. Thereby, the results follow „normal“ Cournot-settings, i.e. it is easier to conclude a negative welfare effect of those mergers. A smaller shift of the demand curve, a higher reduction of marginal costs and a higher number of active firms lower and may offset this negative total welfare effect.

Furthermore, a very steep demand curve (higher values of  $b$ ) leads to a decrease of the absolute value of  $\Delta W$  (this is due to the same qualitative effect of an increased  $b$  on  $W$  and  $\tilde{W}$ ). It should be noted that a positive total welfare effect is based on increased profits of the firms; consumers only do not suffer from those mergers if there is almost no demand-side effect, the number of active firms in the market is very high and the insider realizes an excessive reduction in marginal costs.

## 5. Policy Implications and Further Research Questions

In summary, we find that efficiency benefits from horizontal mergers are substantially decreased, if involuntary unemployment exists. However, in full employment economies, demand-side effects remain negligible. This result stands in line with the available empirical evidence reported in section 2, finding negative employment effects of mergers in unemployment economies but not in full employment economies. Now, what are the implications of our theoretical analysis? We structure them in three categories: (i) policy implications in a nar-

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12 A sufficient condition for  $\partial\tilde{W}/\partial\tilde{Y} > 0$  is given by:  $R^2\tilde{Y}(n^2 - 1) > cRn^2$ .



row sense, (ii) more general policy implications and (iii) demand for further research.

### ***5.1. Narrow Policy Implications***

Our model demonstrates that a welfare-maximising merger control agency should not neglect demand-side effects of mergers in the face of involuntary unemployment. The total welfare effect of a synergy-causing merger where the synergies rely on a post-merger economisation on labour input is systematically decreased in such an economic environment. Mergers that produce a sufficiently small positive welfare effect when ignoring the demand effect can be welfare-reducing when taking demand-side effects into account. Thus, ignoring demand-side effects is likely to cause some false positives (allowances of welfare-reducing mergers) in an unemployment economy.

Since the demand-side effect only affects economies with involuntary unemployment, the policy implications are ‘only’ relevant for merger control authorities in such economies (and not for such in full employment economies). In economies with involuntary unemployment, the consideration of demand-side effects implies caution towards the inclusion of cost-decreasing effects in the evaluation of merger proposals (since they were at least partially eroded by the decrease in demand). In other words, merger control authorities should be more careful to allow an otherwise anticompetitive merger due to (productive) efficiency gains through (labour-input related) synergies than merger control authorities in full employment economies.

Note, however, the counter-argument that it might be more appropriate to attack the labour market deficiencies with economic policy instruments than adjusting merger control. While possessing merit from an ideal perspective, labour market reforms that turn persistently sclerotic labour markets into perfectly workable ones seem to be somewhat unrealistic, probably due to political economy reasons. As a consequence, a merger control authority in an economy character-

ized by involuntary unemployment must deal with the situation as it is and as long as it remains. Under these conditions, neglecting demand-side effects might further decrease welfare.

A point of qualification must be considered. The share of the income loss due to increased involuntary unemployment that actually transfers to demand in the market of the concentration might be rather small and in many cases even look negligible. However, this does not imply that the negative effect does not occur since other industries are adversely affected instead. For reasons of simplicity, we waived an integration of cross-market effects in our theoretical analysis, since it merely scatters the effects (without effecting their total scale) and complicates the analysis but does not change the results.

## **5.2. *More General Policy Implications***

It is a widespread opinion among economists that merger control should focus only on competition effects and exclude other ‘non-competition’ factors like preserving diversity of firms and products, promoting market integration, fairness considerations as well as employment effects (*Motta* 2004: 17-30; *Carlton & Perloff* 2005: 634-637).<sup>13</sup> However, our model shows that an unrestricted welfare goal of antitrust policy cannot exclude employment effects. If involuntary unemployment exists, then the employment effects of a merger influence welfare and, thus, belong into the welfare evaluation of a merger proposal. In this regard, employment effects do not represent a non-competition factor if competition is equalled with (total) welfare!

Taking a total welfare standard for merger control (exemplary for other competition policy areas) seriously, implies that the distinction between ‘competition’ and ‘non-competition’ effects becomes somewhat blurred since (almost) every

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13 These textbooks reflect the mainstream thought on both sides of the Atlantic. For recent and more controversial contributions to this issue see inter alia *Schmidt* 2001; *Fox* 2003; *Foer* 2006; *Heyer* 2006; *Carlton* 2007; *Budzinski* 2008; *Kirchner* 2008; *Kerber* 2009.

merger-specific effect somehow affects welfare. This is particularly visible in our example: technically, the difference between cost efficiencies and unemployment-related income effects is merely that in the first case the supply function is shifted while in the second case the demand function is shifted. There is no obvious or trivial reason to discriminate between these two effects in terms of ‘competition’ versus ‘non-competition’ factor.

### **5.3. Demand for Further Research**

While our model only refers to conditional employment effects, the overall implication might be more far-reaching. The number of effects from mergers that possibly affects welfare in some ways might be quite extensive. For instance in a recent study, *Garmaise & Moskowitz (2006)* find empirical evidence that bank mergers generally yield effects like income reduction and increasing poverty crime – both of which certainly negatively affect total welfare. Similar considerations seem plausible for other so-called ‘non-competition’ factors like preserving diversity of firms and products or promoting market integration whereas in cases of others, like fairness considerations, it might seem more implausible. In any case, theoretical literature on the welfare effects of such kinds of merger consequences is largely missing up to date. Further research is necessary to fill this gap and complete the welfare analysis of mergers.

Given the difficulties of assessing the welfare effects in real-world merger cases even in the currently dominating two-dimensional framework (market power effect and supply-side cost-reduction effect), another research question might gain relevance: do unlimited welfare standards represent an appropriate and wise goal for competition policy in theory and in practice?

## **6. Concluding Summary**

Standard welfare analysis of horizontal mergers usually refers to two effects: the anticompetitive market power effect reduces welfare by enabling firms to

charge prices above marginal costs whereas the procompetitive efficiency effect increases welfare by reducing the costs of production (synergies). However, demand-side effects of synergies are usually neglected. We introduce them into a standard oligopoly model of horizontal merger by assuming a (empirically supported) decrease in labour demand due to merger-specific synergies and derive welfare effects. We find that efficiency benefits from horizontal mergers are substantially decreased, if involuntary unemployment exists. However, in full employment economies, demand-side effects remain negligible. These model results stand in line with existing empirical research.

Policy conclusions include that merger control authorities in economies with involuntary unemployment should be (more) reluctant to allow market power increasing mergers (compared to such in full employment economies) because of supply-side efficiency gains since they might be offset by welfare-reducing demand-side effects. In a more general context, the presented analysis indicates the necessity for a reappraisal of the popular distinction between ‘competition’ and ‘non-competition’ factors in merger control. Furthermore, it shows that additional research about welfare effects of mergers and the effects of unlimited welfare standards on merger control policy is needed.

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## 8. Appendix

| N | c | $\varepsilon$ | R | b    | Y  | $\bar{Y}$ | $\Delta W$ |
|---|---|---------------|---|------|----|-----------|------------|
| 4 | 1 | 0.95          | 1 | 0.75 | 10 | 9.995     | -1.0814    |
| 4 | 1 | 0.8           | 1 | 0.75 | 10 | 9.995     | -0.4833    |
| 4 | 1 | 0.68          | 1 | 0.75 | 10 | 9.995     | 0.0262     |
| 4 | 1 | 0.68          | 1 | 1.75 | 10 | 9.995     | 0.0112     |
|   |   |               |   |      |    |           |            |
| 4 | 1 | 0.75          | 1 | 0.75 | 10 | 9.995     | -0.2744    |
| 5 | 1 | 0.75          | 1 | 0.75 | 10 | 9.995     | 0.067      |
| 5 | 1 | 0.75          | 1 | 1.25 | 10 | 9.995     | 0.0402     |
| 5 | 1 | 0.75          | 1 | 1.75 | 10 | 9.995     | 0.0287     |
|   |   |               |   |      |    |           |            |
| 4 | 1 | 0.75          | 1 | 1.75 | 10 | 9.995     | -0.1176    |
| 4 | 1 | 0.9           | 1 | 1.75 | 10 | 9.995     | -0.3801    |
|   |   |               |   |      |    |           |            |
| 4 | 1 | 0.9           | 1 | 1    | 10 | 9.995     | -0.6651    |
| 4 | 1 | 0.9           | 1 | 1    | 10 | 9.9       | -1.465     |
|   |   |               |   |      |    |           |            |
| 5 | 1 | 0.9           | 1 | 1    | 10 | 9.9       | -1.1328    |
| 5 | 1 | 0.9           | 1 | 1.75 | 10 | 9.9       | -0.6473    |
| 6 | 1 | 0.9           | 1 | 1.75 | 10 | 9.9       | -0.5642    |
| 6 | 1 | 0.9           | 1 | 1    | 10 | 9.9       | -0.9874    |
| 6 | 1 | 0.9           | 1 | 0.75 | 10 | 9.9       | -1.3165    |
|   |   |               |   |      |    |           |            |
| 6 | 1 | 0.83          | 1 | 1.25 | 10 | 9.995     | -0.017     |
| 6 | 1 | 0.83          | 1 | 1.25 | 10 | 9.999     | 0.0111     |
| 6 | 1 | 0.83          | 1 | 0.75 | 10 | 9.999     | 0.0186     |
| 6 | 1 | 0.9           | 1 | 0.75 | 10 | 9.999     | -0.1654    |
| 6 | 1 | 0.9           | 1 | 1.25 | 10 | 9.999     | -0.0992    |
| 8 | 1 | 0.89          | 1 | 0.75 | 10 | 9.999     | 0.0107     |
| 8 | 1 | 0.89          | 1 | 1.25 | 10 | 9.999     | 0.0064     |
|   |   |               |   |      |    |           |            |
| 6 | 1 | 0.98          | 1 | 1.25 | 10 | 9.999     | -0.2175    |

|   |   |      |   |      |    |       |         |
|---|---|------|---|------|----|-------|---------|
| 6 | 1 | 0.98 | 1 | 1.75 | 10 | 9.999 | -0.1554 |
| 5 | 1 | 0.98 | 1 | 1.75 | 10 | 9.999 | -0.2629 |
|   |   |      |   |      |    |       |         |
| 3 | 1 | 0.98 | 1 | 1.75 | 10 | 9.999 | -1.0837 |
| 3 | 1 | 0.9  | 1 | 1.75 | 10 | 9.999 | -0.8975 |
| 3 | 1 | 0.9  | 1 | 1    | 10 | 9.999 | -1.5707 |
|   |   |      |   |      |    |       |         |
| 3 | 1 | 0.9  | 1 | 1    | 10 | 9.9   | -2.3626 |
| 3 | 1 | 0.53 | 1 | 1    | 10 | 9.999 | 0.0381  |
| 3 | 1 | 0.53 | 1 | 1.75 | 10 | 9.999 | 0.0217  |
|   |   |      |   |      |    |       |         |
| 3 | 1 | 0.53 | 1 | 1.75 | 10 | 9.995 | 0.003   |
| 3 | 1 | 0.75 | 1 | 1.75 | 10 | 9.995 | -0.5549 |

For our simple simulation of the welfare effects of mergers that include demand-side effects, we generally concentrate on the variation of the parameters  $n$ ,  $\varepsilon$ ,  $b$  and  $\tilde{Y}$ . All other parameters are held constant.

In the above table the last column indicates the net total welfare effect and positive (negative) values of  $\Delta W$  indicate a positive (negative) welfare effect of those mergers. The simulation is partitioned in several parts to isolate some effects of the respective parameters:

- At first, increased efficiencies due to the merger (i.e. reducing marginal costs) lower and may offset (for very high efficiencies) a negative welfare effect. The last row indicates that the absolute value of  $\Delta W$  decreases according to a steeper demand curve.
- A higher number of active firms raise the critical level of efficiency gains, and, accordingly, a positive welfare effect may be reached more ‘easily’.

- The third part, again, shows the effect of a steeper demand curve on the absolute value of  $\Delta W$  (these values must be compared with the corresponding values of the first part).
- Increasing the demand-side effect, i.e. lowering  $\tilde{Y}$ , has an unambiguously negative effect on total welfare. Increasing the number of firms (see the fifth part) only attenuates this effect that, again, also holds for a steeper demand curve.
- In the sixth part it is demonstrated that even for a negligible shift of the demand curve and a ‘normal’ oligopoly situation the efficiency effects crucially determine the possibility of a positive total welfare effect. Even for such a number of firms the reduction in marginal costs must be comparatively high. The last two parts indicate the extreme magnitude needed to positively affect total welfare if the number of active firms is very low.

In summary, a smaller shift of the demand curve, a higher reduction of marginal costs and a higher number of active firms lower and may offset a negative total welfare effect. Furthermore, a very steep demand curve (higher values of  $b$ ) leads to a decrease of the absolute value of  $\Delta W$ .

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