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## **The Meaning of Adjustment Costs in the Theory of Firm**

By Josef Windsperger

Adjustment costs refer to three problems in the theory of the firm: First, adjustment costs are the decision criterion to evaluate the economic efficiency of adjustment measures in the disequilibrium of the firm. Second, they are a generalization of the market entry and exit barrier concept in the industrial organization literature. Third, they are the criterion to determine the ratio between the fixed and the variable costs. These three problems are examined in the following.

### **I. Problem**

In the theory of firm the problem of adjustment costs arises in the following way: First, adjustment costs are the decision criterion to evaluate the economic efficiency of adjustment strategies which are carried out to remove the disequilibrium or to improve the competitive position of the firm. By starting off with a certain number of alternatives available as adjustment strategies, the firm will realize such a strategy which minimizes adjustment costs. Second, if the firm carries out intermarket-adjustment strategies, for instance to improve its competitive position, market exit and market entry barriers exist, that result in adjustment costs. In other words, adjustment costs as intermarket mobility costs are a generalization of the market entry and market exit barrier concept used in the industrial organization literature. Third, if the firm is regarded as an institution whose purpose is the production of goods and the coordination of economic transactions, indivisibility as criterion to determine the ratio between fixed and variable costs is no longer adequate. The ratio between economically fixed and variable costs depends not on the degree of indivisibility of input factors but on the extent of adjustment costs resulting from mobility and flexibility barriers. These three problems are analyzed in the following sections.

### **II. Adjustment costs and adjustment strategies of the firm**

Adjustment costs exists both under certainty and uncertainty. Under certainty, adjustment costs arise if for instance the production and sale of goods is carried out in different time periods. Therefore the firm has to maintain a certain stock of goods that causes costs as expenses. On the other

hand, if the firm does not hold enough inventories, opportunity costs as lost revenues arise. Under uncertainty, adjustment costs are higher because higher inventories are necessary to meet the precautionary motive of the firm (Hart [1965], 61).

Generally saying, adjustment costs are positive, if the carrying out of adjustment measures is connected with internal frictions or flexibility barriers and/or with external frictions or mobility barriers. Flexibility concerns the capability of the firm to adjust the input factors to a changing output level; thus it concerns the degree of divisibility of input factors and the degree of adaptability of indivisible input factors (Stigler [1939]). The first refers to the variability of input factors and the latter to the adjustability of indivisible input factors (such as the production and organization structure), if there is an output change. Input factors are adaptable if they can be combined with different intensities and quantities of other input factors (Gutenberg [1979], 355 - 356). On the other hand, mobility refers to the external (i.e. market) adjustability of input factors if there is an output change. That is to say, it concerns the "marketability" of production factors (Blair / Peles [1981], 107).

Now the question to ask is which factors influence (1) the degree of flexibility and (2) the degree of mobility of input factors? Thereby the first determines the flexibility costs and the second the mobility costs (see figure 1).

*ad (1):*

Divisibility as determinant of flexibility depends on technical conditions and adaptability on the degree of firm specificity of input factors. The higher the degree of firm specificity is, the higher is the adaptability of input factors. For instance, if the firm invests in firm specific human capital, the workers are more flexible to carry out different tasks<sup>1</sup>. Consequently, flexibility of input factors is the higher, the higher the degree of adaptability and divisibility of input factors is.

*ad (2):*

On the other hand, the degree of mobility of input factors is negatively correlated with the degree of firm specificity (Caves / Porter [1976]). The higher the degree of firm specificity is, the higher are the mobility barriers (Harrigan [1980], 377) because of the low marketability of input factors, and thus the higher are the adjustment costs (transaction costs and opportunity costs as lost revenues).

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<sup>1</sup> See for instance the internal labor market of Japanese firms, which have "non-specialized career paths" (Ouchi [1981], 58).

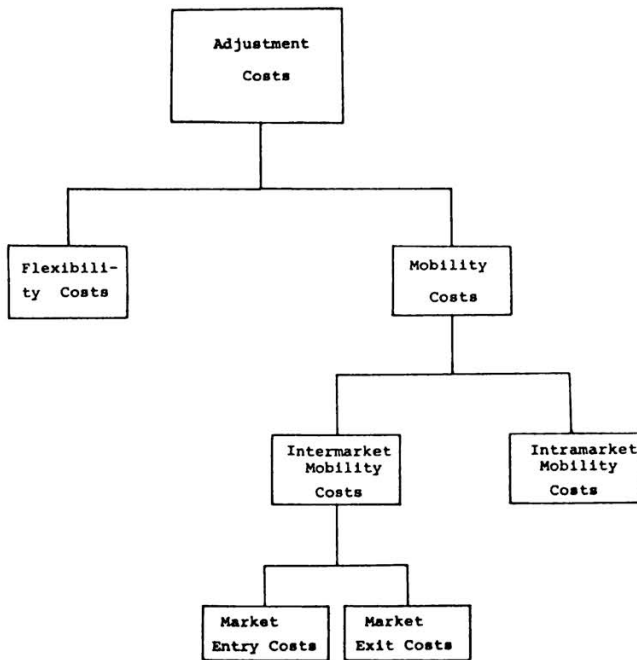


Figure 1: Adjustment Costs in the Theory of Firm

Consequently, a trade-off between the degree of flexibility and mobility exists. The higher the flexibility of input factors because of their firm specificity is, the lower is their degree of mobility and vice versa.

In sum, adjustment costs are the “costs” of carrying out adjustment strategies which result from incomplete flexibility and mobility of input factors. They consist of two components:

(I) Adjustment costs as expenses of the adjustment strategy:

The refer to the actual expenses for carrying out adjustment measures (training costs, transaction costs, inventory costs, interest costs).

(II) Adjustment costs as opportunity costs of the adjustment strategy<sup>2</sup>:

They include lost revenues and higher costs resulting from certain adjustment strategies, such as unrealized learning by doing and lower economies of scale effects because of the lower output rate, as well as lost revenues because of negative goodwill effects.

<sup>2</sup> In the neoclassical theory of firm opportunity costs as part of adjustment costs are frequently neglected (see Gould [1968], Pindyck [1982]).



In the next section, we argue that the concept of adjustment costs is a generalization of the mobility barrier concept of the industrial organization literature.

### III. Adjustment costs and market entry and exit barriers

Thus far mobility costs arose only from intramarket mobility barriers (see figure 1). Thus our analysis was based on the assumption that the firm already exists at the market. Market entry and exit barriers, however, refer to firms entering from one to another market<sup>3</sup>. On the other hand, firms entering the market at the first time only encounter market entry barriers<sup>4</sup>. Market entry barriers lead to market entry costs, as transaction costs in the preentry period (which are sunk costs), additional transaction costs in the postentry period, such as search, information and signalling costs to remove the goodwill disadvantage of the newcomer, and higher capital costs because of the higher risk premium charged by the lenders. Market exit barriers concern only the Old Newcomer; they result in transaction costs and lost revenues in connection with the sale of used assets. Nevertheless, exit costs are inseparably intertwined with entry costs. If for instance market entry costs to set up a certain goodwill are high, market exit costs are high too due to the goodwill loss. Consequently, the higher the entry costs are, the higher are also the exit costs (*Harrigan* [1981, 1982, 1986]; *McGee / Thomas* [1986]).

In sum one can conclude:

(a) The adjustment costs of the Old Newcomer are the higher, the higher the information asymmetry between ON and the potential transactors on the new market is. Furthermore, the extent of information asymmetry is the larger, the more market specific the transactional environment is, i.e. the larger the 'difference' between the characteristics of the old and new market environment is. This will be explained by figure 2:

Adjustment costs rise from (1) to (4), whereby (1) is the position of ON. If it enters the different markets (2, 3, 4), its informational disadvantage rises due to the growing 'distance' between the characteristics of the 'old' and 'new' market environment. Consequently, adjustment costs of ON, consisting of information costs (costs of information transmission and signalling for setting up a goodwill) and capital costs (because of the higher risk premium charged by the lender), are higher than for the incumbent. As a result, adjustment costs rise with growing exit barriers on the "old" market and entry barriers on the "new" market.

<sup>3</sup> These firms are called "Old Newcomers" (ON).

<sup>4</sup> These firms are called "New Newcomers" (NN).

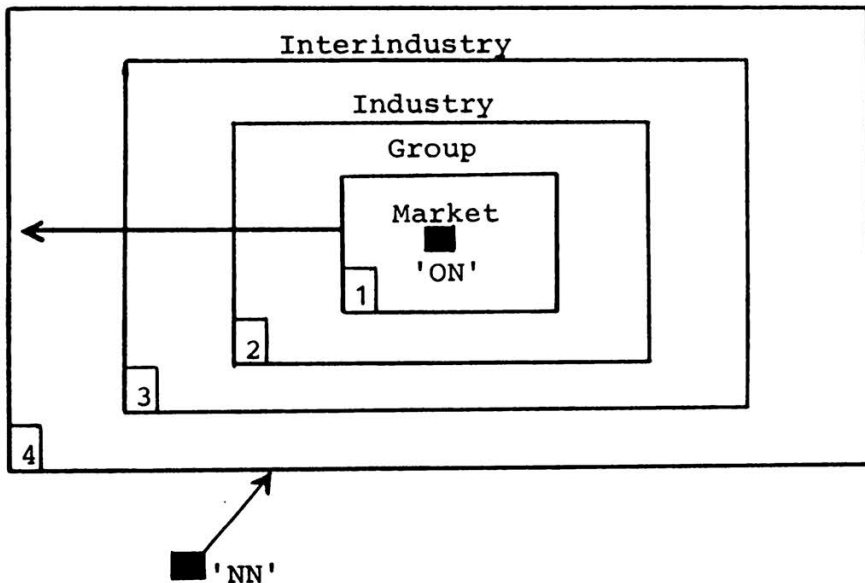


Figure 2: Adjustment Costs and Intermarket Mobility Barriers

(b) Entry barriers of NN are higher than of ON, because the extent of information asymmetry between NN and potential transactors at the new market (customers, banks, suppliers) is higher than for ON (see figure 2). For instance, NN has no “reputation for quality” which can be transmitted to another market (Lieberman / Montgomery [1987], 9). Although NN has not to bear any exit costs, it has an information disadvantage, resulting in higher entry costs (Hines 1957).

As a result, ON has an adjustment cost disadvantage because of the existence of exit barriers, and NN an adjustment cost disadvantage because of the higher entry barriers. Which firm realizes a competitive advantage depends on the relation between ON's exit costs disadvantage and NN's entry costs disadvantage. On the other hand, compared to the incumbents on the new market both have a competitive disadvantage, because they have to bear higher adjustment costs in the pre- and postentry period (including the lower economies of learning by doing)<sup>5</sup> (Caves / Porter [1977], 256; Williamson [1977], 313).

Finally, we show that adjustment costs are the decision criterion to differentiate between economically fixed and variable costs in the theory of firm.

<sup>5</sup> This argument applies to newcomers imitating the incumbents and not to innovators entering the market.

#### **IV. Adjustment costs and the differentiation between fixed and variable costs**

##### **a) Fixed and variable costs in the neoclassical theory of firm**

The demarcation between fixed and variable costs in the neoclassical theory of firm is based exclusively on technical indivisibility as decision criterion. Therefore all adjustment costs results from the technical indivisibilities of input factors. However, if technical indivisibility does not exist, the distinction between fixed and variable costs can be only made ad hoc (*Schneider* [1944], 307). Additionally, this decision criterion also leads to a coincidence between economically fixed and variable costs, on the one hand, and longrun and shortrun costs, on the other hand (*Viner* [1932]). What is the reason?

Generally, the differentiation between longrun and shortrun is based on the congruency between the structure of firm (production and coordination mechanism) and its external transactional environment (*MacKenzie* [1981]). This means that congruency refers to the economic efficiency of the firm structure in the profit maximizing sense. For instance, in the longrun equilibrium of firm the production and the organization structure are economically efficient. However, in the neoclassical theory the firm exists only as a production mechanism (*Knight* [1921]) characterized by technical indivisibilities. Therefore the production mechanism is the only structural characteristic that determines the longrun costs of the firm. Additionally, since exclusively technical indivisibility of the production mechanism leads to adjustment costs under a change of output, it determines also the ratio between fixed and variable costs. Consequently, fixed costs correspond with longrun cost and variable costs with shortrun costs (see figure 3).

##### **b) Fixed and variable costs in the firm as a production and coordination mechanism**

Contrary to the neoclassical theory of firm, in reality the firm is an economic institution that consists not only of the 'production mechanisms but also of the coordination mechanisms as additional structural characteristic of the firm<sup>6</sup>. In this case adjustment costs resulting from flexibility and mobility barriers are the criterion for determining the ratio between economically fixed and variable costs<sup>7</sup>.

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<sup>6</sup> The firm is a "productive combination possessing a given unit of coordination ability" (*Kaldor* [1934], 69).

<sup>7</sup> Already *Henzel* (1936), 151, mentioned a similar argument when he discussed the problem of variability of input factors.

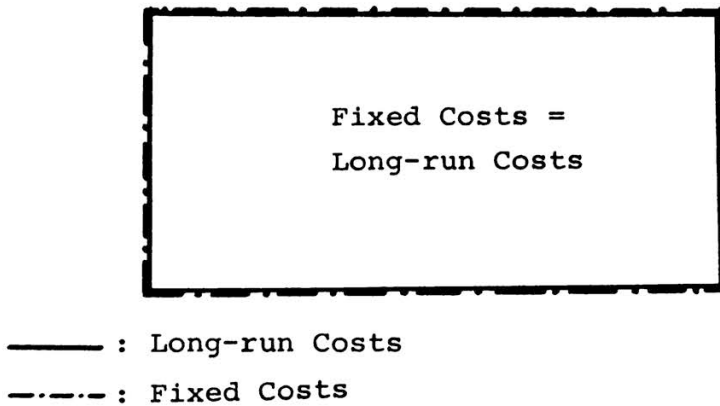


Figure 3: Fixed and Long-run Costs in the Neoclassical Theory of Firm

The following relation exists between the amount of adjustment costs and the degree of fixity of input factors:

- (1) If the adjustment costs are zero, all input factors are economically and technically variable.
- (2) If the adjustment costs rise because of a decrease in mobility, the degree of economic variability declines, although all factors are completely divisible in the technical sense.
- (3) If the adjustment costs rise due to rising mobility and flexibility barriers, the degree of economic variability lowers in comparison to (2).

As a result, no clear-cut distinction can be made between economically fixed and variable costs, because the degree of variability rises gradually from (1) to (3)<sup>8</sup>. Fixed and variable costs can be only differentiated in an idealtypical sense:

- (1) Variable costs are connected with all input factors characterized by a high degree of mobility and flexibility. Consequently, adjustment costs are low.
- (2) Fixed costs refer to all input factors showing a relatively low degree of flexibility and/or mobility.
  - (2a) Flexible and immobile input factors (Quasi-fixed input factors): These input factors show a high degree of firm specificity, such as firm specific input goods or firm specific human capital (Oi [1962]; Watkins [1915], 772).

<sup>8</sup> "Fixity and variability are matters of degree" (Stigler, 1966, 135); see also Knight (1967), 157.



- (2b) Inflexible and mobile input factors: They show a high degree of indivisibility (minimum efficient scale), but they have a low degree of firm specificity (standardized capital goods).
- (2c) Inflexible and immobile input factors: They consists of factors showing a high degree of indivisibility and firm specificity, i.e. firm specific technology with minimum efficient scale or organizational technology.

From this differentiation the following can be concluded:

- (I) No difference exists between economically variable (or fixed) and technically variable (or fixed) input factors, if the adjustment costs result only from (2b), i.e. from their indivisibility.
- (II) (a) The differentiation between variable and fixed costs, on the one hand, and short- and longrun costs, on the other hand, coincides only, if (1) the structure of firm is characterized by high flexibility and/or mobility barriers and (2) all other input factors show a high degree of flexibility and mobility. (1) implies that flexibility and/or mobility costs are high, so that the structure of firm is the fixed input factor. (2) means that all other input factors not belonging to the structure of the firm cause low adjustment costs. Thus they are economically variable input factors.
- (b) But the fixed costs are higher than the longrun costs, if, compared to (a), some of the input factors not belonging to the firm structure show a high degree of firm specificity, which results in high mobility costs. Although they are economically fixed input factors (the so-called quasi-fixed input factors), they do not belong to the firm structure (see figure 4).
- (c) On the other hand, the fixed costs are lower than the longrun costs, if at least some of the structural input factors cause low flexibility as well as mobility costs and if at the same time all input factors not belonging to the firm structure are variable (see figure 5).

## V. Concluding remarks

The aim of this study was to clarify the meaning of adjustment costs in the theory of firm. First, we showed that the adjustment costs as 'costs' of incomplete flexibility and mobility of input factors are the decision criterion to determine the efficiency of adjustment measures that are carried out to remove the disequilibrium of firm or to improve its competitive position. Second, we argued that, in the case of intermarket adjustment strategies, they are a generalization of the market entry and market exit concept used

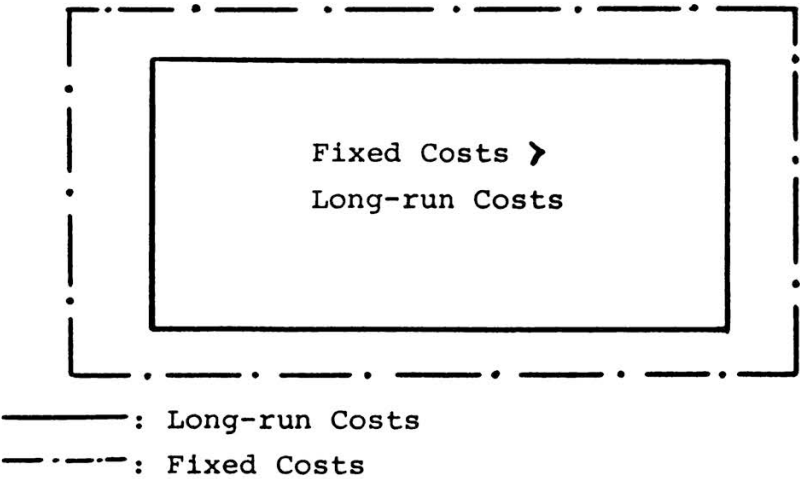


Figure 4: Fixed Costs are higher than Long-run Costs

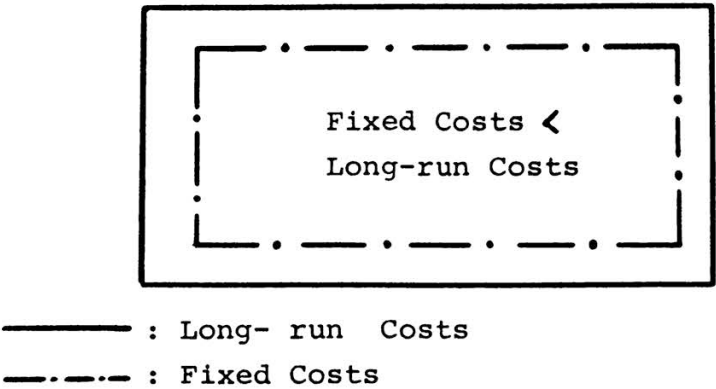


Figure 5: Fixed Costs are lower than Long-run Costs

in the industrial organization literature. Third, we also showed that the adjustment costs are the decision criterion to determine the ratio between fixed and variable input factors, if the firm is regarded as a combination of the production and coordination mechanism.

Summary

Adjustment costs as ‘costs’ of incomplete flexibility and mobility of input factors are the decision criterion to evaluate the economic efficiency of adjustment strategies

in the disequilibrium of the firm. Further, under intermarket adjustment strategies adjustment costs as intermarket mobility costs are a generalization of the market entry and market exit barrier concept used in the industrial organization theory. Moreover, if the firm is regarded as a production and coordination mechanism, the ratio between economically fixed and variable costs depends on the extent of adjustment costs resulting from mobility and flexibility barriers.

### Zusammenfassung

Anpassungskosten als ‚Kosten‘ der unvollständigen Flexibilität und Mobilität der Inputfaktoren sind das Kriterium für die Effizienz von Anpassungsmaßnahmen im Ungleichgewicht der Unternehmung. Die Unternehmung führt jene Anpassungsmaßnahmen zur Behebung des Ungleichgewichtes durch, die die geringsten Anpassungskosten verursachen. Ferner sind sie als Mobilitätskosten bei Intermarktanpassungsstrategien eine Verallgemeinerung des in der Theorie der Industrial Organization verwendeten Markteintritts- und Marktaustrittskonzeptes. Darüber hinaus sind sie das Kriterium für die Bestimmung des Verhältnisses zwischen ökonomischen fixen und variablen Kosten, wenn man von der Unternehmung als Produktions- und Koordinationsmechanismus ausgeht. In diesem Fall ist das Unteilbarkeitskriterium als Abgrenzungskriterium zwischen fixen und variablen Kosten nicht mehr anwendbar.

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