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Labour-Market Effects of Intra-Industry Trade: Evidence for the United Kingdom

by

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Abstract

According to the "smooth adjustment hypothesis", the labour-market adjustment costs entailed by trade liberalisation are lower if trade expansion is intra-industry rather than inter-industry in nature. In this paper, we study the link between trade and labour-market changes in UK manufacturing industries during the 1980s. We use industry-level measures of unemployment duration and wage flexibility as proxies for adjustment costs, and we relate them to various measures of intra-industry trade. Our evidence supports the smooth adjustment hypothesis.

Outline

Non-Technical Summary

The ongoing reduction of trade barriers in the global economy has resulted in a burgeoning literature that examines the welfare effects of product market integration. One strand of this literature has attempted to quantify transitional adjustment costs that result from trade-induced changes in specialisation. It is often suggested that the severity of the adjustment costs experienced by a country or industry depends on the type of change in trade patterns. The claim is that distinguishing between the degree of intra-industry trade (the simultaneous import and export of products from the same industry) and inter-industry trade directly affects the magnitude of factor market adjustment costs.

Empirical work has concentrated principally on the pattern of change in trade flows without establishing directly the link between trade patterns and factor-market changes, and on the similarity of factor requirements within and between industries.

In this paper we suggest that too little emphasis has been given to what is in effect the manifestation of adjustment pressures, the labour market. The concept of labour market adjustment revolves primarily around job gains and losses and the subsequent need for workers to relocate and/or retrain. Economists often treat unemployment and the issue of under-employed resources as a macroeconomic cyclical problem that should be resolved with macroeconomic policy measures. This assumption is the foundation for the majority of simulation estimates of trade liberalisation effects. However, such a view abstracts from the microeconomic costs faced by individuals when industries grow, shrink, restructure or relocate.

This paper employs a number of measures of adjustment costs and of intra-industry trade (IIT) to test the “smooth adjustment hypothesis” in a dataset for UK manufacturing in the 1980s. We introduce three alternative measures of adjustment: average unemployment durations, gross industry-level wage variability and conditional flexibility of industry-level wages. The results seem to offer support for the smooth adjustment hypothesis. In particular we find evidence that, given a certain level of trade exposure, a higher degree of IIT is associated with relatively lower industry-level wage flexibility. This suggests that the IIT tends to entail comparatively smooth adjustment in terms of the costs associated with moving and retraining displaced workers. However, average unemployment durations do not appear to be significantly affected by IIT. This result may indicate that transitional costs of adjustment to structural change in UK manufacturing are due less to inflexibility of wages than to occupational and/or geographical specificity of labour.

I. Introduction

The ongoing reduction of trade barriers in the global economy has resulted in a burgeoning literature that examines the welfare effects of product market integration. One strand of this literature has attempted to quantify transitional adjustment costs that result from trade-induced changes in specialisation. It is often suggested that the severity of the adjustment costs experienced by a country or industry depends on the type of change in trade patterns. The claim is that distinguishing between the degree of intra-industry trade (IIT) and inter-industry trade directly affects the magnitude of factor market adjustment costs.

In recent decades, IIT has been a pervasive and steadily growing phenomenon worldwide. A whole range of models have been developed to explain its existence. These models associate IIT with welfare gains from trade that arise through the exploitation of scale economies, an increase in product variety and the intensification of competitive pressures (see Helpman and Krugman, 1985). In addition to those gains associated to IIT, it is also widely believed that trade expansion of the intra-industry type entails with relatively smooth resource reallocation and hence low transitional adjustment costs. This proposition has become known in the literature as the "smooth adjustment hypothesis" (SAH). This widely invoked hypothesis has until recently been subjected to relatively little theoretical and empirical scrutiny.

Empirical work has concentrated principally on the pattern of change in trade flows without establishing directly the link between trade patterns and factor-market changes, and on the homogeneity of factor requirements within and between industries. Lundberg and Hansson (1986, p. 129) in a study of Swedish trade and factor homogeneity concluded that IIT "poses different and generally less serious problems of adjustment than the 'traditional' inter-industry trade and specialisation." However, in an analysis for the EU, Greenaway and Hine (1991) cautioned that the evidence on the link between IIT and adjustment costs could still not be supported with conclusive empirical evidence.

In this paper we suggest that too little emphasis has been given to what is in effect the manifestation of adjustment pressures, the labour market. The concept of labour market adjustment revolves primarily around job gains and losses and the subsequent need for workers to relocate and/or retrain. Economists often treat unemployment and the issue of under-employed resources as a macroeconomic cyclical problem that should be resolved with macroeconomic policy measures. This assumption is the foundation for the majority of simulation estimates of trade liberalisation effects. However, such a view abstracts from the microeconomic costs faced by individuals when industries grow, shrink, restructure or relocate. These costs are important and well documented in the labour literature (see, e.g., Shin, 1997; and Haynes, Upward and Wright, 1999). The difficulty facing empirical research arises from the need to capture and quantify adjustment costs and to characterise the relationship between adjustment and changing trade patterns, with the specific aim of providing support for or against the SAH.

This paper furthers the literature in two main ways. First, we develop and compare a number of proxy measures of adjustment costs, namely mean durations of unemployment spells, wage variability and an industry-level measure of conditional wage flexibility. Second, we separately consider the relevance of different conceptions of IIT, concentrating on measures of vertical IIT and marginal IIT.

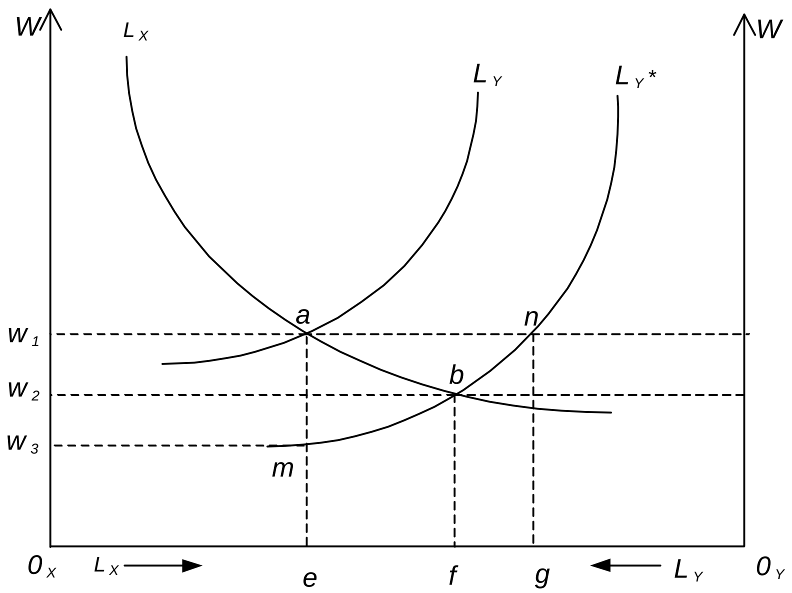
The paper is organised as follows. Section II provides a theoretical background to the SAH. In Section III we develop our proxy measures of adjustment costs and describe the various measures of intra-industry trade. We use these variables, constructed on data for UK manufacturing industries, for an econometric evaluation of the SAH in Section IV. Section V concludes.

II. Theoretical Background

The intuition behind the SAH is straightforward. Consider a small open economy subject to a demand shock induced by the removal of some aspect of trade protection. This alters relative goods prices, which acts as a signal for resources to move from one activity to another. If the shock is an increase in import competition to a particular industry, then there will be a decrease in the demand for that industry's production factors. Labour, which we assume to be the most reactive factor in the short run, will tend to feel the first effects of adjustment pressure. The exact impact depends on the structure of the labour market but will usually be a combination of a change in wages and a change in employment. The SAH simply stipulates that if offsetting contemporaneous import and export shocks occur within a sector, adjustment costs will be lower than if those shocks affect separate industries.

This issue can be explored using the Jones-Samuelson specific-factors version of a neoclassical trade model. Assume that a country produces two goods, X and Y, taking world prices as given. Consider Figure 1, where the production of both goods uses a common factor and a range of factors specific to each good. The law of diminishing returns implies that as more of the variable factor, which we may think of as unskilled labour, is applied to the specific factors its marginal product falls. The curves L_x and L_y illustrate the marginal value product of unskilled labour and therefore the demand for such labour in sectors *X* and *Y*. Point *a* represents the initial competitive equilibrium in the economy. At this point, the aggregate demand for unskilled labour, $0_x e$ from sector *X*, plus $0_y e$ from sector *Y*, is equal to the fixed total supply, $0_x 0_y$. The equilibrium real wage is w_1.

Figure 1 Short-Run Labour Market Disequilibrium in a Specific Factors Model



Imagine a fall in the relative price of the importable good *Y*, and take *X* as the numéraire (implying that price changes have no effect on the location of the L_x curve and that the vertical axis measures the wage rate in terms of *X*). A reduction in the price of *Y* leads to an downward shift in that sector's labour demand schedule from L_y to L_y* to give a new equilibrium at *b*. The restoration of labour market equilibrium requires the wage rate to fall in terms of *X*, causing the *X* sector to expand its output and employment and sector *Y* to contract. The central issue concerns the dynamics of a move between equilibria *a* and *b*. Two extreme scenarios can be envisaged.

In the first case, we assume that unskilled labour can move costlessly between *X* and *Y* even in the short run, but that the wage rate is sticky downwards. Following a fall in the relative price of *Y*, entrepreneurs in that sector will be unable to lower the real wage. This results in the *Y* sector laying off workers given by the interval *eg* who become unemployed. Over time, the real wage rate will be bargained down to re-establish a full-employment equilibrium at *b*. Under such a configuration, adjustment costs take the form of temporary unemployment. It has been shown that such adjustment costs might outweigh the gains from trade, hence trade liberalisation might be Pareto inferior.[1] The cost-benefit balance depends on the magnitude of adjustment costs and trade gains as well as on the social discount rate.

The second possibility is that wages are perfectly flexible and ensure full employment at all times; but the transfer of low-skill labour between *X* and *Y* costs real resources in the form of matching costs and/or "adjustment services" such as retraining and geographical relocation costs. Due to these costs, the market for unskilled labour can become segmented in the short term, and thus wages may differ temporarily between the *X* and the *Y* sector. In terms of Figure 1, this scenario would result in a short-run shift of the market equilibrium to point *m*. The *Y* wage falls from w_1 to w_3 to maintain full employment at $0_y e$ and the wage of *X* workers will remain at w_1. Over time workers in the *Y* sector will be tempted to retrain and move to the high-wage *X* sector. Wage levels will gradually converge towards the long-run equilibrium level w_2. Temporary factor-price disparities are thus needed to incite resource use on the adaptation of factors to changed production requirements. This is why intersectoral wage differentials can be taken as an indicator for labour specificity. Adjustment costs of this nature do not lead to an aggregate welfare loss, and their impact is purely distributional.[2] In theory, lump-sum transfers can be designed so as to compensate all individuals for transitional income losses.[3] In practice, however, transitional wage and income disparities often go uncompensated, thus producing net losers and potentially feeding protectionist pressures.

The specific-factors model, therefore, suggests two sources of adjustment costs, factor specificity and factor-price rigidity. Their respective empirical manifestations are factor-price

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[1] see Baldwin *et al*. (1980, p. 408ff.). Brecher and Choudhri (1994) have formalised this proposition in an efficiency-wage model, and Takacs and Winters (1992) have used it for an empirical assessment of British trade policy in the footwear industry.
[2] see Baldwin *et al*. (1980, p. 408).
[3] see Feenstra and Lewis (1994, p. 202). Dixit and Norman (1986) have proposed an incentive-compatible taxation scheme which ensures Pareto gains.

disparities and unemployment. In reality, one is of course likely to find the two phenomena appearing jointly.

Strictly speaking, the specific-factors model represents inter-industry trade. If we accept a definition of an "industry" that allows some heterogeneity in the production functions of constituent goods, however, then we could reinterpret the model in the sense that *X* and *Y* denote two single-product firms that use some firm-specific factors as well as mobile (unskilled) labour. The SAH is about the relative adjustment paths in the scenario where *X* and *Y* represent goods from distinct industries (inter-industry adjustment) and in the scenario where *X* and *Y* represent goods that pertain to the same industry (intra-industry adjustment). According to the SAH, adjustment costs in the form of unemployed resources and of adjustment services will be lower in the latter scenario. This is what we attempt to evaluate empirically below.

III. Measuring Adjustment Costs and Intra-Industry Trade

For an empirical test of the SAH, we must find measures of adjustment costs and IIT. We construct two types of adjustment proxies, unemployment duration and wage flexibility, that are derived directly from the theoretical analysis in Section II. This complements prior work in which labour-market adjustment is modelled on the basis of net sectoral employment changes (Brülhart and Hine, 1999) and of job turnover rates (Andersson, Gustafsson and Lundberg, 2000; Brülhart, 2000). For IIT we have a choice from a range of measures that have been suggested in the literature.

III.1 Adjustment Costs

In a regime with inertia in relative wages, adjustment to demand shocks that are asymmetric across sectors will occur via temporary unemployment. Traditionally, studies such as Bale (1976), Mutti (1978) and Baldwin, Mutti and Richardson (1980) have thus defined adjustment costs as the period of unemployment suffered by displaced workers.

In this paper, we employ data on employment duration to assess the validity of the SAH. Based on the British Labour Force Survey, we have sectoral data on **average unemployment duration** (*DURATION*) for 1984, 1988 and 1991 at the four-digit level of the UK SIC(80) classification (149 industries), which we aggregate to the three-digit level (73 industries) for comparability with the other variables. Individuals are attributed to the industry in which they were employed prior to their unemployment spell. The durations reported are uncompleted durations, i.e. average duration of those still unemployed. Appendix Table 1 reports those average durations. We find that the average duration of unemployment fell significantly over the 1980s, but positive and significant rank correlation coefficients across years suggests that cross-industry differences tend to persist.

In the specific-factors model, adjustment costs can also arise without unemployment, if workers are imperfectly mobile but wages are flexible. In that case adjustment will be reflected in temporary wage disparities. It is thus important to consider both unemployment, which is a direct source of welfare losses, and factor-price variability, which is an indirect measure of costs through the required use of "adjustment services".

We use two measures of wage variability. First, we simply compute the **standard deviation of industry-level real wage rates** (*WAGEVAR*) across the 12 sample years contained in our sample period 1979-1991 at the level of three-digit sectors. This yields a measure of the gross intertemporal variability of industry-level wages.

The second measure of wage variability is more sophisticated and draws on Campbell (1989). Here we define **wage flexibility** (*WAGEFLEX*) as the responsiveness of sectoral real wages to changes in the aggregate unemployment rate and to sectoral demand shocks. We use this conditional measure as an alternative representation of the temporary wage dispersion that accompanies asymmetric demand shocks in the model described in Section II when labour reallocation requires "adjustment services".

The first step in the construction of *WAGEFLEX* is to estimate disaggregated Phillips curves at the three-digit level of the UK SIC(80) classification. The dependent variable of the Phillips-curve equation is the change in the log of nominal hourly wages ($\dot{w}_i$) for each industry. The independent variables are a constant, the current and lagged values of the change in the log of the sectoral price level ($\dot{p}_i$) measured with the producer price index, the current and lagged values of a measure of the aggregate unemployment rate (u), and the current and lagged values of a measure of sector demand changes ($\dot{d}_i$) defined as first-differenced log gross value added at factor cost. Thus, we have the following wage equation:

$$\dot{w}_{it} = c_i + \sum_{j=0}^{n} \alpha_{ij} \dot{p}_{i,t-j} + \sum_{j=0}^{n} \beta_{ij} u_{t-j} + \sum_{j=0}^{n} \gamma_{ij} \dot{d}_{i,t-j} + \varepsilon_{it} \qquad (1)$$

where the current and past inflation rate is included to control for purely nominal determinants of measured wage changes. A rise in prices should lead to an equiproportionate rise in nominal wages with no long-run money illusion and *n*-period adaptive expectations. Furthermore, theory predicts a negative coefficient on unemployment and a positive coefficient on industry-level demand changes. We estimated equation (1) for each of the 73 three-digit industries *i* on annual data for 1979-1991. The number of lags *n* is essentially arbitrary. Campbell (1989) has found that seven quarterly lags were sufficient to measure the relevant dynamic effects, hence we opted for two annual lags.[4]

In a second step, we can calculate *WAGEFLEX*:

$$WAGEFLEX = \left(\sum \gamma_{ij}\right)\left(\text{std. of } \dot{D}\right) - \left(\sum \beta_{ij}\right)\left(\text{std. of u}\right) \qquad (2)$$

where $\dot{D}$ represents demand changes for manufacturing as a whole. The *WAGEFLEX* variable is calculated as follows. First, the sum of the coefficients on the unemployment rate (current and lagged) is multiplied by the standard deviation of the unemployment rate. Then, the sum of the coefficients on the demand variable (current and lagged) is multiplied by the standard deviation of the demand variable for all industries, so as to ensure the same shock is applied to all industries. Finally, the first value is subtracted from the second, since positive demand shocks and negative unemployment shocks both tend to exert upward pressure on wages. Hence, *WAGEFLEX* should be positive. Reassuringly, 65 of our 73 three-digit estimates of *WAGEFLEX* have a positive sign (Appendix Table 1).

III.2 Intra-Industry Trade

For an empirical assessment of the SAH we must make the distinction between inter- and intra-industry trade and develop a measure that captures the relevant aspects of trade dynamics.

The most widely employed measure of IIT is the **Grubel-Lloyd index** (*GL*), where the share of IIT in industry *i* for a given country is:

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[4] We have undertaken extensive tests for alternative specifications with respect to the number of lags on the regressors and found that the results are qualitatively unaffected by the inclusion of additional lag terms.

$$GL_i = 1 - \frac{|X_i - M_i|}{(X_i + M_i)} \quad (3)$$

where X_i and M_i are the exports and imports of industry *i* during a particular time period, usually one year. The index can take any value between 0 and 1 where the upper bound represents all trade being intra-industry in nature.[5]

One recent development has concentrated on how IIT can be disentangled into its **vertical and horizontal** components (Greenaway *et al*., 1994a, 1995). The motivation for making this distinction in the context of the SAH is that factors might be relatively less mobile within vertically differentiated industries than in horizontally differentiated ones. Horizontal product differentiation is defined as the simultaneous export and import of goods whose unit values are within a specified range, commonly defined as ±15 percent.[6] Following the logic of the SAH we would expect vertical IIT to imply more severe adjustment implications than horizontal IIT.

We define horizontal and vertical IIT for three-digit SIC industries *i*, based on data for four-digit SIC industries *l*.[7] Each four-digit sector is attributed to the horizontal or vertical class of IIT depending on the relative values of import and export unit values. A four-digit sector is defined as horizontally differentiated if:

$$1 - a \leq \frac{UV_{lik}^X}{UV_{lik}^M} \leq 1 + a \ , \quad (4)$$

where *k* stands for a particular trading partner and a is set to 0.15.

Thus, IIT is measured as

$$IIT_{ik}^p = \frac{\sum_l \left(X_{lik}^p + M_{lik}^p\right) - \sum_l \left|X_{lik}^p - M_{lik}^p\right|}{\sum_l \left(X_{lik} + M_{lik}\right)}, \quad (5)$$

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[5] The properties of this index are discussed extensively in Greenaway and Milner (1986).

[6] The width of the wedge that is used to define horizontal IIT has been the subject of some controversy. However, Greenaway *et al*. (1994) undertook an extensive sensitivity analysis and found that the main results were not sensitive to the choice of interval bounds. Specifically, a widening of the wedge tends to increase the average share of horizontal IIT, but it was found to have only a weak effect on relative shares across industries and over time.

[7] We reclassified 5-digit SITC trade data to 4-digit SIC80 categories.

where *p* denotes horizontally (H) or vertically (V) differentiated four-digit products. This index can be aggregated across trade partners. Vertical and horizontal IIT add up to total IIT as measured by the GL index: $GL_i = IIT_i^H + IIT_i^V$.

It has been argued that the conventional indices of IIT are static in nature, because they relate to trade flows in one year only, whilst adjustment is a dynamic phenomenon that might span a longer time period (Hamilton and Kniest, 1991). To address this issue, measures of **marginal IIT** (MIIT) have been developed to describe the dynamics of trade patterns. We use the measure proposed in Brülhart (1994), which is a transposition of the GL formula to first-differenced trade flows:

$$MIIT_i = 1 - \frac{|\Delta X_i - \Delta M_i|}{|\Delta X_i| + |\Delta M_i|}, \qquad (6)$$

where Δ is the difference operator. This index, like the GL index, is always defined and varies between 0 and 1, where 0 indicates marginal trade in the particular industry to be completely of the inter-industry type, and 1 represents marginal trade to be entirely of the intra-industry type.[8] The intuition underlying MIIT is that parallel increases or decreases of imports and exports in an industry will have a neutral effect on employment. For example, if exports contract, jobs may be threatened but if imports contract by the same amount, domestic sales may expand so as to offset lost market share in export markets.[9]

Finally, we use an **unscaled measure** of the change in IIT between two time periods, which has been suggested by Greenaway *et. al*. (1994b):

$$\Delta IIT_i = \Delta[(X_i + M_i) - |X_i - M_i|]. \qquad (7)$$

This measure may be useful, since it does not express IIT as a share and thus it varies with the size of an industry's trade exposure as well as with the amount of IIT. Note that although this measure compares trade patterns of two years it is not a measure of MIIT in the strict sense. While the MIIT relates to the share of IIT in trade changes, ΔIIT measures the change in IIT, which is a conceptually different dimension.

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[8] The properties of MIIT index differ in some subtle ways from those of the GL index. For a discussion, see Oliveras and Terra (1997).

[9] This assumes that productivity and world market size of the industry remain unchanged. Lovely and Nelson (2000) show that MIIT can be associated with inter-industry reallocation of factors if productivity is also allowed to change.

IV. Empirical Results

We computed all measures described in Section III on SIC(80) three-digit data for the UK, yielding a cross-section dataset with 73 observations. *WAGEVAR* and *WAGEFLEX* are estimated on the basis of annual data, and the remaining variables relate to data for 1979 and 1991. *GL*, IIT^H and IIT^V are averaged over those two years. Duration data are taken from the UK Labour Force Survey, wage data are based on the UK New Earnings Survey, and trade data are from the OECD, concorded to the SIC classification from the five-digit SITC.

A useful first impression of the relations among our variables can be gleaned from a simple correlation matrix (Table 1). Three observations stand out. First, our three adjustment proxies are uncorrelated. Those measures thus capture different aspects of the complex process of labour-market adjustment. Second, whilst most of the six IIT measures are significantly correlated, those correlations are far from perfect. The correlations seem to support the usefulness of the *GL* index, since this measure is significantly correlated with all other IIT measures. Note, however, that the first-differenced GL index is completely uncorrelated with the MIIT coefficient, which underscores the importance of differentiating empirically as well as conceptually between, on the one hand, changes in IIT and, on the other hand, IIT in trade changes. The third noteworthy feature of Table 1 is that the correlations between the adjustment variables and the IIT variables are negative in the majority of cases. This is consistent with the SAH. Yet, except for two cases these correlations are not statistically significant. Hence, bivariate analysis does not allow us to make any firm inferences on the link between adjustment and IIT.

In exploring our data beyond bivariate analysis, we face the fundamental problem that theory does not equip us with a set of priors on what control variables to include in a fully specified model of labour-market adjustment. While labour economists have studied the determinants of individual unemployment spells and unemployment turnover rates extensively (see, e.g., Hildreth and Pudney, 1998), we cannot draw on an established empirical model of what determines average unemployment durations at the industry level. The determinants of industry-level wage variability is likewise underresearched. Since our aim is not to develop a fully specified model of the determinants of labour-marked adjustment costs, we concentrate on those variables that feature explicitly in the SAH and report test statistics on the null hypothesis that the errors are orthogonal to the regressors. Specifically, we compute the

RESET test, which estimates the joint significance of the second, third and fourth powers of the OLS predicted values in an auxiliary regression. Failure to reject the significance of these auxiliary regressors is a strong indicator of omitted-variable bias.

We thus proceeded by regressing each of the three adjustment proxies on a constant, a measure of trade intensity (*TRADE*) calculated as the share of imports plus exports in sectoral gross value added, and each of our six IIT measures in turn. The estimated coefficients of this additive model are reported in Table 2. Omitted-variable problems do not seem pervasive, since the RESET test statistic is significant in only three of the 18 regressions. We find the expected negative parameter estimates on the IIT variables in 13 out of the 18 runs, but only two of them are statistically significant. The only IIT variable for which we consistently find the expected negative coefficient is the MIIT index.

We need not be surprised by the weakness of the results reported in Table 2, since the additive model is unlikely to be the most appropriate representation of the SAH. The importance of the structure of trade flows for labour-market adjustment will vary across industries according to the importance of international trade to each sector. The more open an industry, the more we would expect IIT to matter. We have therefore augmented our specification with an interaction term between *TRADE* and the IIT variables. The estimation results of this interaction model are reported in Table 3.

As expected, we find that the addition of an interaction term improves our estimates. This is particularly true for the two adjustment proxies based on wage variability. In those cases, the interaction term always produces the expected negative coefficient, and statistical significance is found in nine of the 12 runs. The RESET test rejects the hypothesis of omitted-variable bias in 11 of the 12 runs. If we use *DURATION* as the measure for adjustment, however, our model is less successful. The interaction of IIT with *TRADE* is never statistically significant, and omitted-variable problems are indicated in three of the six regressions. It appears that the degree of IIT is most strongly related to *WAGEFLEX*. Hence, our results confirm the SAH in the sense that IIT entails relatively small need for "adjustment services", and physical adjustment costs appear to be a more prominent feature of trade-related structural adjustment in the UK than temporary unemployment due wage rigidities.

Among the different measures of IIT, we find that the distinction between vertical and horizontal IIT does not seem to impact on results in the way that might have been anticipated. Our results suggest that vertical IIT is more strongly negatively related to adjustment costs than horizontal IIT, which runs against established priors. Of all the IIT measures, only the MIIT index has the expected sign across all specifications. In terms of R^2 the interaction model with *WAGEFLEX* as the adjustment measure and the MIIT index as the IIT measure has the greatest explanatory power. These results support the SAH in the sense of the MIIT literature.

V. Conclusions

This paper employs a number of measures of adjustment costs and of IIT to test the "smooth adjustment hypothesis" in a dataset for UK manufacturing in the 1980s. We introduce three alternative measures of adjustment: average unemployment durations, gross industry-level wage variability and conditional flexibility of industry-level wages. The results seem to offer support for the smooth adjustment hypothesis. In particular we find evidence that, given a certain level of trade exposure, a higher degree of IIT is associated with relatively lower industry-level wage flexibility. This suggests that the IIT tends to entail comparatively smooth adjustment in terms of the costs associated with moving and retraining displaced workers. However, average unemployment durations do not appear to be significantly affected by IIT. This result may indicate that transitional costs of adjustment to structural change in UK manufacturing are due less to inflexibility of wages than to occupational and/or geographical specificity of labour. Finally, we find that on the whole the strongest support for the SAH is found if IIT is measured with an index of marginal IIT.

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TABLE 1: Raw Correlations Among Variables
(73 observations)

	DURATION	*WAGEVAR*	*WAGEFLEX*	*TRADE*	*GL*	*DGL*	*VIIT*	*HIIT*	*MIIT*	*ΔIIT*
DURATION	1.00									
WAGEVAR	-0.08	1.00								
WAGEFLEX	-0.15	-0.01	1.00							
TRADE	-0.24**	0.14	0.25**	1.00						
GL	-0.12	0.06	-0.11	-0.08	1.00					
DGL	0.06	-0.23**	0.13	0.13	-0.22*	1.00				
VIIT	-0.12	0.11	-0.12	-0.16	0.89***	-0.15	1.00			
HIIT	-0.02	-0.08	-0.01	0.12	0.56***	-0.20*	0.12	1.00		
MIIT	-0.17	-0.02	-0.03	-0.01	0.40***	-0.004	0.37***	0.21*	1.00	
ΔIIT	-0.16	0.22*	-0.12	0.34***	0.42***	0.03	0.29**	0.38***	0.39***	1.00

***/**/* denotes statistical significance at the 99/95/90 percent level.

TABLE 2: Adjustment and Trade Exposure: Additive Model

(OLS with heteroskedasticity-consistent standard errors, 73 obs.)

	CONST	***TRADE***	**IIT**	***R2***	***RESET*** *(P values)*
dep. var. = *DURATION*					
IIT = *GL*	10.94***	-0.49***	-3.65	*0.08*	*0.70*
IIT = Δ*GL*	10.18***	-0.45***	-1.15	*0.06*	*0.21*
IIT = IIT^V	10.97***	-0.52***	-4.98	*0.08*	*0.94*
IIT = IIT^H	10.17***	-0.46***	0.22	*0.06*	*0.04*
IIT = *MIIT*	10.64***	-0.46***	-0.99	*0.08*	*0.75*
IIT = Δ*IIT*	10.22***	-0.40**	-0.001	*0.06*	*0.00*
dep. var. = *WAGEVAR*					
IIT = *GL*	0.43***	0.02	0.16	*0.02*	*0.70*
IIT = Δ*GL*	0.47***	0.03*	-0.81**	*0.08*	*0.24*
IIT = IIT^V	0.41***	0.03	0.37	*0.04*	*0.24*
IIT = IIT^H	0.49***	0.03	-0.47	*0.03*	*0.75*
IIT = *MIIT*	0.47***	0.02	-0.01	*0.02*	*0.65*
IIT = Δ*IIT*	0.46***	0.01	0.0002	*0.05*	*0.42*
dep. var. = *WAGEFLEX*					
IIT = *GL*	0.21***	0.03*	-0.16	*0.07*	*0.09*
IIT = Δ*GL*	0.18***	0.03	0.27	*0.07*	*0.13*
IIT = IIT^V	0.21***	0.03*	-0.17	*0.07*	*0.46*
IIT = IIT^H	0.19***	0.03*	-0.17	*0.06*	*0.67*
IIT = *MIIT*	0.19***	0.03*	-0.01	*0.06*	*0.68*
IIT = Δ*IIT*	0.19***	0.05***	-0.0002**	*0.11*	*0.94*

***/**/* denotes statistical significance at the 99/95/90 percent level.

TABLE 3: Adjustment and Trade Exposure: Interaction Model

(OLS with heteroskedasticity-consistent standard errors, 73 obs.)

	CONST	*TRADE*	*IIT*	*TRADE*IIT*	*R2*	*RESET (P values)*
dep. var. = *DURATION*						
IIT = *GL*	11.10***	-0.61**	-4.49	0.64	*0.08*	*0.64*
IIT = Δ*GL*	10.07***	-0.28	1.71	-4.11	*0.07*	*0.04*
IIT = IIT^V	10.93***	-0.48**	-4.73	-0.25	*0.08*	*0.90*
IIT = IIT^H	10.37***	-0.62**	-3.58	2.70	*0.06*	*0.03*
IIT = *MIIT*	10.60***	-0.43*	-0.92	-0.06	*0.08*	*0.46*
IIT = Δ*IIT*	10.28***	-0.47**	-0.002	0.0003	*0.06*	*0.00*
dep. var. = *WAGEVAR*						
IIT = *GL*	0.36***	0.08***	0.53	-0.29***	*0.07*	*0.27*
IIT = Δ*GL*	0.46***	0.04	-0.66	-0.20	*0.09*	*0.42*
IIT = IIT^V	0.34***	0.08***	0.82**	-0.44***	*0.09*	*0.10*
IIT = IIT^H	0.46***	0.04*	-0.01	-0.32	*0.09*	*0.62*
IIT = *MIIT*	0.44***	0.05*	0.05	-0.05*	*0.03*	*0.78*
IIT = Δ*IIT*	0.43***	0.04	0.0004**	-0.0001**	*0.09*	*0.44*
dep. var. = *WAGEFLEX*						
IIT = *GL*	0.14**	0.09***	0.23	-0.30***	*0.14*	*0.06*
IIT = Δ*GL*	0.17***	0.03**	0.43	-0.24	*0.08*	*0.29*
IIT = IIT^V	0.15**	0.08***	0.23	-0.40***	*0.13*	*0.15*
IIT = IIT^H	0.13***	0.08***	0.99*	-0.83***	*0.14*	*0.81*
IIT = *MIIT*	0.13***	0.08***	0.09	-0.09***	*0.15*	*0.36*
IIT = Δ*IIT*	0.17***	0.07***	-0.00004	-0.0001**	*0.14*	*0.72*

***/**/* denotes statistical significance at the 99/95/90 percent level.

APPENDIX TABLE 1: Adjustment Variables

SIC	Description	*DURATION*	*WAGEVAR*	*WAGEFLEX*
222	steel tubes	13.32	0.46	0.38
223	drawing, cold rolling & cold forming of steel	6.75	0.48	0.14
224	non-ferrous metals industry	12.09	0.51	0.41
231	extraction of stone, clay, sand & gravel	11.47	0.42	0.25
241	structural clay products	13.28	0.47	-0.28
242	cement, lime & plaster	12.65	0.89	-0.10
243	building products of concrete, cement or plaster	8.42	0.56	0.15
244	asbestos goods	13.01	0.36	0.01
245	working of stone & other non-metallic minerals n.e.c.	8.63	0.50	0.28
246	abrasive products	12.83	0.39	0.24
247	glass & glassware	10.63	0.39	0.20
248	refractory & ceramic goods	9.92	0.36	0.18
255	paints, varnishes & printing ink	9.68	0.66	0.27
256	specialised chemical products mainly for industrial & agricultural purposes	11.85	0.73	0.28
257	pharmaceutical products	11.35	0.95	0.26
258	soap & toilet preparations	8.12	0.54	0.36
259	specialised chemical products mainly for household & office use	9.92	0.62	0.12
311	foundries	13.02	0.45	-0.03
312	forging, pressing & stamping	12.13	0.39	0.15
313	misc. metal products	10.61	0.42	0.38
316	hand tools & finished metal goods	8.31	0.47	0.24
320	industrial plant & steelwork	8.84	0.53	0.24
321	agricultural machinery & tractors	7.53	0.47	0.33
322	metal-working machine tools & engineer’s tools	10.53	0.48	0.02
323	textile machinery	5.61	0.52	0.01
324	machinery for the food, chemical & related industries; process engineering contractors	6.88	0.64	0.14
325	mining machinery, construction & mechanical handling equipment	10.89	0.59	0.21
326	mechanical power transmission equipment	9.92	0.51	0.10
327	machinery for the printing, paper, wood, leather, rubber, glass & related industries; laundry & dry cleaning equipment	9.40	0.70	0.37
330	manufacture of office machinery & data processing equipment	7.68	0.72	-0.06
341	insulated wires & cables	9.25	0.24	0.44
342	basic electrical equipment	10.27	0.42	0.21
343	electrical equipment for industrial use & batteries & accumulators	9.77	0.53	0.25
344	telecommunication equipment, electrical measuring equipment, electronic capital goods & passive electronic components	8.92	0.65	0.26
346	domestic-type electric appliances	9.74	0.32	0.34
347	electric lamps & other electric lighting equipment	11.00	0.44	0.10

352	motor vehicle bodies, trailers & caravans	6.70	0.47	0.13
353	motor vehicle parts	10.56	0.42	0.12
371	measuring, checking & precision instruments & apparatus	5.13	0.58	-0.05
372	medical & surgical equipment & orthopaedic appliances	11.80	0.47	0.38
373	optical precision instruments & photographic equipment	6.83	0.51	0.22
411	organic oils & fats (other than crude animal fats)	7.81	1.25	0.55
412	slaughtering of animals & production of meat & by-products	8.15	0.28	0.32
413	preparation of milk & milk products	9.68	0.43	0.31
414	processing of fruit & vegetables	5.63	0.36	0.27
415	fish processing	10.12	0.22	0.10
416	grain milling	7.77	0.58	0.30
419	bread, biscuits & flour confectionery	8.56	0.43	0.26
421	ice cream, cocoa, chocolate & sugar confectionery	8.97	0.57	-0.03
422	animal feeding stuffs	9.57	0.77	0.21
424	spirit distilling & compounding	9.26	0.68	0.22
426	wines, cider & perry	8.10	0.81	0.53
427	brewing & malting	10.42	0.37	0.29
428	soft drinks	11.66	0.68	-0.01
431	woollen & worsted industry	12.92	0.34	0.29
432	cotton & silk industries	13.21	0.36	0.15
434	spinning & weaving of flax, hemp & ramie	11.53	0.26	0.23
435	jute & polypropylene yarns & fabrics	14.16	0.51	0.05
436	hosiery & other knitted goods	7.62	0.25	0.23
438	carpets & other textile floor coverings	9.81	0.53	-0.02
451	footwear	8.59	0.15	0.02
455	household textiles & other made-up textiles	10.70	0.26	0.36
461	sawmilling, planing, etc of wood	9.48	0.31	0.27
462	manufacture of semi-finished wood products & further processing & treatment of wood	10.83	0.42	0.36
463	builders' carpentry & joinery	11.58	0.26	0.22
464	wooden containers	12.15	0.23	0.31
466	articles of cork & plaiting materials, brushes & brooms	8.71	0.38	0.27
467	wooden & upholstered furniture and shop & office fittings	9.67	0.23	0.37
471	pulp, paper & board	10.57	0.53	0.22
472	conversion of paper & board	9.21	0.52	0.23
483	processing of plastics	9.55	0.54	0.22
492	musical instruments	5.30	0.30	0.34
494	toys & sports goods	6.06	0.32	0.34

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