



Trade and labor market dynamics: What do we learn from the data?



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HIGHLIGHTS

- The paper studies the short- and long-run effects of trade on labor market dynamics.
- Unemployment reduces mainly through lower job-separations.
- The job-finding rate increases only with a time lag.
- Job-to-job transitions may be crucial for trade models with search frictions.

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ABSTRACT

Recent studies in international trade highlight potential labor market effects of trade liberalization through firm selection. Our empirical study contributes to this recent strand of literature by studying the short- and long-run effects of trade on unemployment in Germany. We employ a structural VAR approach in order to disentangle the total effect of trade on unemployment into job-findings and separations. Our results indicate that the unemployment effect mainly works through a drop in the job-separation rate, which can be explained by job-to-job transitions from contracting towards expanding firms. Thus, our results reinforce the importance of endogenous separations and on-the-job search in models of trade, heterogeneous firms and labor market frictions.

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1. Introduction

Does trade really reduce unemployment? The empirical analysis in Treffler (2004) highlights ambiguous effects in the short and long run of the US–Canada free trade agreement. In line with public sentiments against globalization, he documents employment losses shortly after the establishment of the agreement. Those negative employment effects stand in stark contrast to the positive long-run effects documented in the same study, as well as most of the more recent analyses in this field.

Models with heterogeneous firms and search frictions give rise to a channel in the Melitz (2003) model through which trade

liberalization fosters firm selection but reduces unemployment in the long-run. Felbermayr et al. (2011) show that more productive firms are relatively less efficient in recruiting workers, so that the net-effect on job-creation is positive. Helpman et al. (2008, 2010) show that the results may also be negative depending on the model setup. The crucial assumptions in those theoretical approaches, however, are an exogenous job-separation rate and no channel for job-to-job transitions, which is likely to mask important adjustment processes in the labor market after trade liberalization.

Recent contributions aim to overcome this shortcoming, albeit they focus on introducing on-the-job search into theoretical trade models (see, e.g., Larch and Holzner, 2011; Suverato, 2013). We contribute to the literature by empirically analyzing the impact of trade on labor market dynamics. Our approach goes beyond the established literature as we identify both the short- and long-run effects within a structural VAR approach. This framework

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Table 1
Definition and summary statistics of data.

Time series	Definition	Mean (Std. dev.)
Labor productivity	Real gross domestic product (GDP) divided by total hours worked, index (2000 = 100), logged	4.552 (0.082)
Export share	Exports divided by GDP, index (2000 = 100), logged	4.405 (0.262)
Job-finding rate	Transition rate from unemployment to employment (in %)	4.530 (0.407)
Job-separation rate	Transition rate from employment to unemployment (in %)	0.887 (0.087)
Job-to-job transition rate	Transition rate from one job to another job with a different employer's ID (in %)	0.924 (0.132)

Notes: All series are seasonally adjusted using quarterly data. The transition rates are computed on a monthly basis using the Sample of Integrated Labor Market Biographies (SIAB) provided by the Institute for Employment Research (IAB). A detailed description of the dataset and the transition rates is provided in Nordmeier (2014).

Table 2
Unit root and cointegration tests.

	ADF test			Johansen rank test		
	H_0	Model specification	Test statistic	H_0	Trace statistic	Max. eigenv. statistic
Labor productivity	I(1)	$t, c, L = 0$	-1.659	No CE	19.102*	15.712*
Export share	I(1)	$t, c, L = 1$	-2.540	1 CE	3.390	3.390
Job-finding rate	I(1)	$c, L = 1$	-2.136			
Job-separation rate	I(1)	$c, L = 0$	-2.533			
Job-to-job rate	I(1)	$c, L = 0$	-1.690			

Notes: The augmented Dickey–Fuller (ADF) regressions may include a trend (t), a constant (c) and/or a number of lags (L) according to the Schwarz information criterion. The Johansen rank test evaluates the number of cointegration equations (CE) between labor productivity and the export share.

* Indicates significance at the 5% level.

has the advantage that we avoid a priori assumptions about the transmission channel from trade to unemployment and thus enables us to disentangle job-creation and job-destruction effects. We focus on worker flows as individuals' labor market transitions comprise more information about the reallocation of labor than job flows. The impulse responses of the underlying job-finding and separation rates then determine the reaction of unemployment via its law of motion.

Our empirical analysis builds on German administrative data provided by the Institute for Employment Research (IAB). The administrative data covers all German workers subject to social security contributions and unemployment benefits. Hence, the database ensures a high quality and includes very precise information on labor market transitions as evaluated in Nordmeier (2014). The aggregate worker flows obtained from the micro data are brought together with labor productivity and export-openness measures from the national accounts to identify a trade liberalization shock. Thereby, the productivity–export nexus is specified as a cointegration relationship.

Our results suggest positive labor market effects of trade liberalization—both in the short and long run. The unemployment rate declines immediately due to lower job-separations at expanding firms and higher job-to-job transitions from contracting firms. After the impact effect, there is also a positive contribution from a higher job-finding rate of unemployed, though this effect is relatively small compared to the changes in the job-to-job transition and separation rates.

2. Econometric specification and data

We estimate a cointegrated VAR model of the following form:

$$\Delta y_t = \mu + \alpha \beta' y_{t-1} + \Gamma(L) \Delta y_t + v_t, \quad (1)$$

where y_t is a vector of n endogenous variables, μ contains the constants, $\alpha \beta'$:= Π describes the long-run levels matrix of the cointegrated variables, $\Gamma(L) = -\sum_{i=1}^{p-1} A_i L^i$ denotes a lag-polynomial of the coefficient matrices A_i of order $p - 1$, and v_t are the residuals. In our baseline specification, the endogenous variables are labor productivity (a_t), exports as share of GDP (x_t), the job-separation rate (s_t) and the job-finding rate (f_t). In addition, we investigate the response of job-to-job transitions as robustness

check.² We use quarterly averages of the monthly transition rates described above to obtain time series on the same frequency as the data from the national accounts. Furthermore, we focus on the period between 1993 and 2010 in order to avoid a structural break due to the German reunification. Summary and test statistics of our data are provided in Tables 1 and 2.

Augmented Dickey–Fuller (ADF) tests cannot reject nonstationarity of the variables, which makes specification (1) reasonable. The Johansen test indicates a cointegration relationship between labor productivity and the export share at the 5% significance level with cointegrating vector $\beta = (1, 0.3)$.³ Thus, an increase of the German export share by 1% goes along with a rise of domestic productivity by 0.3%. The standard Melitz (2003) model explains the positive long-run relationship between exports and productivity by firm selection in a monopolistic competition framework: Due to trade liberalization more domestic firms participate in international trade. The efficiency gains in production then lead to a lower price level in the domestic market and the least productive firms are forced to exit the market. Consequently, the average productivity of domestic firms rises.

Our identification strategy for economically interpretable innovations involves short- and long-run restrictions. In closed-economy approaches, the technology shock is typically assumed to be the only long-run driver of productivity (see, e.g. Gali, 1999). Hence, we set the long-run effects of the labor market innovations on productivity to zero. The export share is assumed to be contemporaneously affected only by the trade shock. This can be justified by the fact that exports are governed by foreign demand in the short run (see, e.g. Weber, 2009). These five restrictions exactly identify the shocks of interest.

The estimation procedure and the determination of the unemployment response follow Nordmeier and Weber (2013).

3. Results

Our results are based on a lag order of $p = 2$ as suggested by standard information criteria. The impulse responses of a trade

² Instead of adding the job-to-job transition rate (j_t) to the baseline specification we estimate a small VAR model with $y_t = [a_t, x_t, j_t]$ due to multicollinearity of the worker flows.

³ The job-finding and separation rates can clearly be excluded from the cointegration relation following an LR-test.

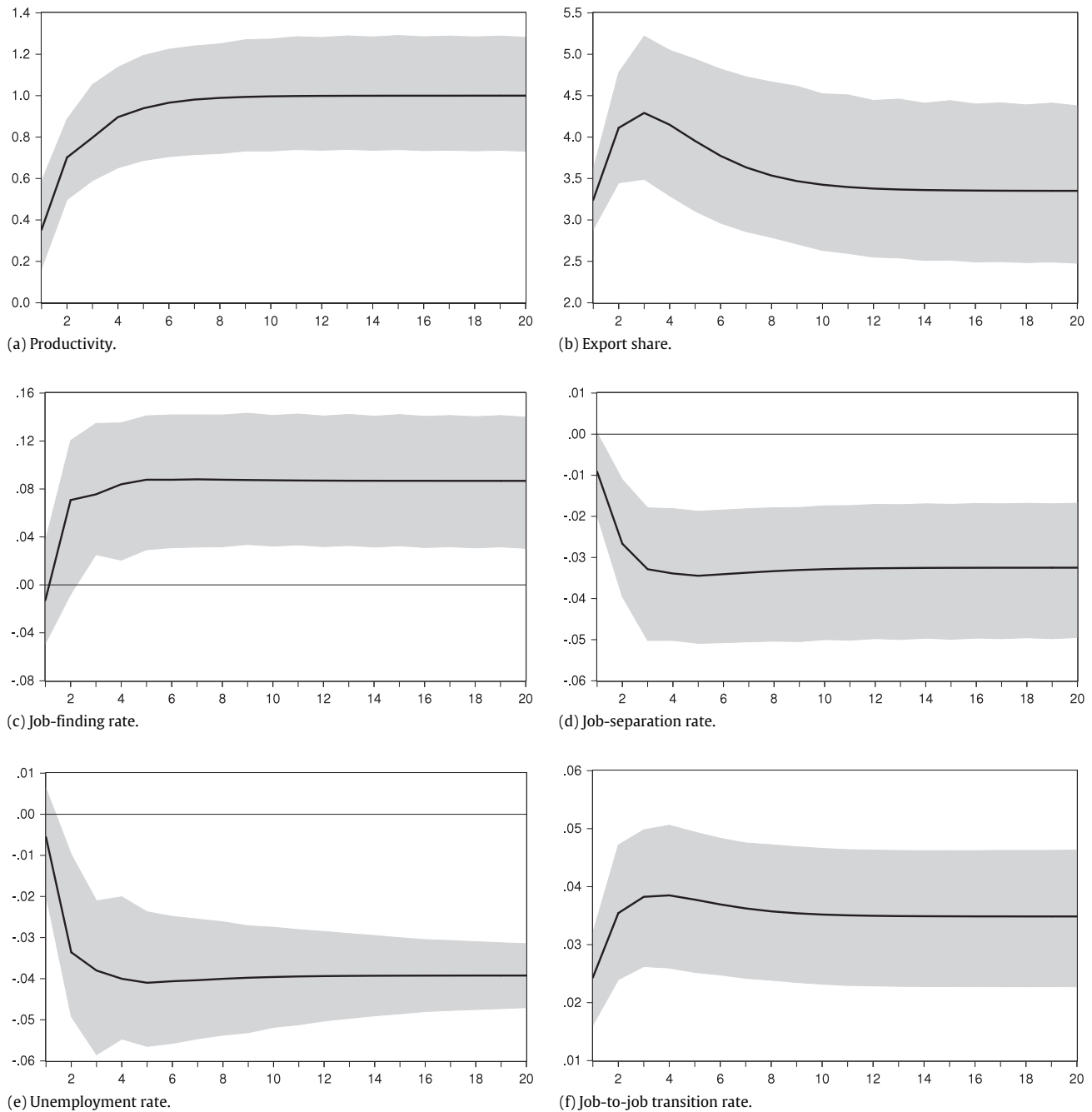


Fig. 1. Results for a trade liberalization shock. Notes: Impulse responses are normalized to a permanent increase in productivity by 1%. The responses of the labor market variables are presented in percentage points. The black line shows the point estimates, and the gray area demonstrates the 84% confidence intervals from 1000 residual-based bootstrap replications. The abscissa accounts for the quarters after an impulse. Panels (a)–(d) are the results from the baseline VAR specification, Panel (e) is derived according to the law of motion of unemployment, and Panel (f) refers to the robustness check based on a 3-dimensional VAR.

liberalization shock are shown in Fig. 1. Both labor productivity and the export share converge to a higher level in line with their long-run relationship. Regarding labor turnover, only the job-separation rate reacts on impact and significantly decreases by around 0.01 percentage points (corresponding to 1.1% in relation to its mean). This result is at odds with the theories discussed in the introduction because trade liberalization reduces unemployment via a drop in job-separations without having an immediate effect on the job-finding margin. Thus, expanding firms have an incentive to lower the workers' ability-threshold when deciding about potential layoffs because more workers are needed to produce for additional demand from abroad. Unemployed workers appear to benefit from higher trade with a time lag. The job-finding rate of unemployed

workers increases after some quarters by around 0.08 percentage points (1.8%), whereas the job-separation rate decreases by more than 0.03 percentage points (3.4%) in the long run.

The observation that higher demand from abroad induces firms to keep less productive workers before hiring additional workers from the unemployment pool could be explained by turnover costs. However, the job-finding and separation measures used in the baseline specification do not include job-to-job transitions. It may be the case that trade liberalization boosts labor productivity through selection towards more productive firms. These firms expand to foreign markets and absorb workers at shrinking plants job-to-job. This effect is indeed indicated by higher job-to-job transitions in our robustness check. The job-to-job transition

rate reacts immediately to the trade shock and significantly increases by more than 0.03 percentage points (3.2%). Thus, workers at contracting plants would not go through a period of unemployment and therefore do not appear as separations.

4. Conclusion

Our analysis of the impulse–response relationship between trade liberalization and labor market dynamics yields interesting insights. Besides the decline of unemployment, we do not find an impact effect on the job-finding rate. The short-run adjustment of unemployment predominantly works through lower job-separations. Put differently, although we find positive long-run effects on unemployment in line with most of the existing empirical studies on trade and unemployment, the adjustment mechanism seems to work through different channels as discussed in the established literature. Endogenous separations and job-to-job transitions are ingredients that could bring theory much closer to the empirical findings; more productive firms have an incentive to keep workers with ability below the initial ability-threshold and workers at shrinking firms would move directly to expanding firms.

Appendix

See [Tables 1](#) and [2](#) and [Fig. 1](#).

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