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

Daniela Nordmeier [a],[*],[1], Hans-Jörg Schmerer [b],[c],[d], Enzo Weber [b],[e]

[a] Deutsche Bundesbank, Wilhelm-Epstein-Straße 14, 60431 Frankfurt am Main, Germany
[b] Institute for Employment Research (IAB), Regensburger Straße 104, 90478 Nuremberg, Germany
[c] University of Hagen, Universitätsstraße 11, 58084 Hagen, Germany
[d] CESifo, Poschingerstraße 5, 81679 München, Germany
[e] University of Regensburg, 93040 Regensburg, Germany

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.

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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* Corresponding author.
E-mail address: Daniela.Nordmeier@bundesbank.de (D. Nordmeier).

[1] The views expressed in this article represent the author's personal opinions and do not necessarily reflect the views of the Deutsche Bundesbank or its staff.

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:

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

where y_t is a vector of n endogenous variables, μ contains the constants, $\alpha \beta' := \Pi$ 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

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[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.