

23rd Annual Conference on Global Economic Analysis

Costly labor adjustments to trade shocks in CGE analysis

Marinos Tsigas, USITC

and

Jennifer Bernard, University of Nebraska – Lincoln

June 18, 2020

This presentation is solely meant to represent the opinions and professional research of individual authors, and is not meant to represent in any way the views of the U.S.

International Trade Commission or any of its individual Commissioners.

Introduction

- Discuss simulated effects of trade shocks in the presence of costly labor reallocation across sectors.
- Compare this work to analyses obtained under
 - Costless labor reallocation and
 - Imperfect labor mobility across sectors.

Conclusions

- Imperfect labor mobility across sectors is different from accounting for costly labor reallocation.
- In comparative static simulations, costly labor reallocation influences simulated effects for sectoral production and price, employment, wages, and welfare (EV)
 - It has a relatively small influence on trade effects.
- The influence of costly labor reallocation
 - increases under imperfect capital mobility across sectors
 - decreases in long run simulations for most effects.

Model and database

- GTAP model is employed to simulate effects of several scenarios.
- GTAP data for 2014, Version 10 (PR2, 9/2017).
 - Twenty-five economies, including the United States.
 - Fifty-seven sectors.
 - Five primary factors:
 - Land, Other natural resources, Capital, and
 - Two labor types representing different skill levels.
 - Revised data for labor skill shares for U.S. sectors based on data from the U.S. Bureau of Labor Statistics.

Two sets of scenarios with and without costly labor reallocation

- Expansion in U.S. exports of MVH, motor vehicles/parts, is caused by lowering bilateral tariffs on U.S. MVH to level of U.S. tariffs on MVH imports.
- Sector specific, output augmenting technical change in either the United States or the rest of the world.
- Costly labor reallocation applies only in the United States.
- Focus on simulated effects for the United States.

GTAP modeling of primary factor reallocation across sectors

- Three way modeling
 - Perfectly mobile capital and labor,
 - Sector specific other natural resources, and
 - Partially mobile, or sluggish land
 - Modeled with a constant elasticity of transformation (CET) function and elasticity of transformation $\sigma_{Land,r}^T < 0$
 - Equation for land allocation across sectors, in percent change:

$$qoes_{Land,j,r} = \sigma_{Land,r}^T \times (pm_{Land,r} - pmes_{Land,j,r})$$

- Discuss the implications of making either labor or capital sluggish in the United States.

Costly labor reallocation in GTAP

- With 10% labor reallocation costs, a sector hiring 100 workers would increase its effective labor force by 90 workers.
- Demand for labor by U.S. sector j , in percent change:

$$qfe_{Labor,j,USA} = -afe_{Labor,j,USA} + qva_{j,USA} - \sigma_j \times (pfe_{Labor,j,USA} - afe_{Labor,j,USA} - pva_{j,USA}),$$

Constant elasticity of substitution: $\sigma_j > 0$

- $afe_{Labor,j,USA}$ is made an endogenous variable and it reflects the impact of costly labor reallocation on labor productivity,
 $afe_{Labor,j,USA} < 0$ for certain j

Comparative static* effects of U.S. export expansion of MVH

Three GTAP models

Standard, Sluggish labor movements, Costly labor reallocation

U.S. indicators	Standard GTAP (1)	GTAP with $\sigma^T_{\text{Labor,USA}} = -10$ (2)	GTAP with costly labor reallocation (3)
Indicators for MVH sector			
Exports volume, %	29.1	28.6	28.6
Production volume, %	6.55	6.31	6.30
Employment, %	6.56	6.12	6.80
Wage, %	0.448	1.052	0.425
Output price, %	0.314	0.430	0.432
Welfare effects			
Terms of trade, mil. \$	10,147	10,231	9,931
Allocative efficiency, mil. \$	1,016	1,015	884
Labor reallocation, mil. \$	0	0	-1,222
Total welfare, EV, mil. \$	11,163	11,246	9,593
Economy-wide wage, %	0.426	0.431	0.403

* Fixed economy-wide primary factor endowments.

Comparative static effects of US export expansion of MVH under different labor reallocation and capital mobility

U.S. indicators	Perfect capital mobility across sectors		Imperfect capital mobility with $\sigma^T_{\text{Capital,USA}} = -0.5$	
	Costless labor reallocation (1)	Costly labor reallocation (2)	Costless labor reallocation (3)	Costly labor reallocation (4)
Indicators for MVH sector				
Exports volume, %	29.1	28.6	28.1	27.4
Production volume, %	6.55	6.30	6.08	5.77
Employment, %	6.56	6.80	7.24	7.55
Wage, %	0.448	0.425	0.459	0.431
Output price, %	0.314	0.432	0.539	0.685
Welfare effects				
Terms of trade, mil. \$	10,147	9,931	10,164	9,907
Alloc. efficiency, mil. \$	1,016	884	994	854
Labor reallocation, mil. \$	0	-1,222	0	-1,304
Total welfare, EV, mil. \$	11,163	9,593	11,158	9,457
Economy-wide wage, %	0.426	0.403	0.436	0.408

Comparative static effects of US export expansion of MVH under different labor reallocation and capital mobility

	Perfect capital mobility across sectors		Imperfect capital mobility with $\sigma^T_{\text{Capital,USA}} = -0.5$	
	Costless labor reallocation	Costly labor reallocation	Costless labor reallocation	Costly labor reallocation
U.S. indicators	(1)	(2)	(3)	(4)
Indicators for MVH sector				
Exports volume, %	29.1	28.6	28.1	27.4
Production volume, %	6.55	6.30	6.08	5.77
Employment, %	6.56	6.80	7.24	7.55
Wage, %	0.448	0.425	0.459	0.431
Output price, %	0.314	0.432	0.539	0.685
	-5.1%		-6.1%	
Welfare effects				
Terms of trade, mil. \$	10,147	9,931	10,164	9,907
Alloc. efficiency, mil. \$	1,016	884	994	854
Labor reallocation, mil. \$	0	-1,222	0	-1,304
Total welfare, EV, mil. \$	11,163	9,593	11,158	9,457
Economy-wide wage, %	0.426	0.403	0.436	0.408

Long-run* effects of U.S. export expansion of MVH under different labor reallocation and capital mobility, difference from corresponding baseline

U.S. indicators	Perfect capital mobility across sectors		Imperfect capital mobility with $\sigma^T_{\text{Capital,USA}} = -0.5$	
	Costless labor reallocation (1)	Costly labor reallocation (2)	Costless labor reallocation (3)	Costly labor reallocation (4)
Indicators for MVH sector				
Exports volume, %	34.0	33.2	32.1	31.2
Production volume, %	7.58	7.25	6.86	6.47
Employment, %	6.97	7.17	7.60	7.87
Wage, %	0.436	0.424	0.452	0.437
Output price, %	0.262	0.382	0.500	0.647
Welfare effects				
Terms of trade, mil. \$	9,426	9,497	9,708	9,770
Alloc. efficiency, mil. \$	1,578	1,354	1,369	1,133
Growth, mil. \$	1,534	1,311	1,021	823
Labor reallocat., mil. \$	0	-956	0	-1,067
Total welfare, EV, mil. \$	12,538	11,206	12,098	10,659
Economy-wide wage, %	0.415	0.403	0.429	0.414

* Steady-state investment and capital; fixed economy-wide supply of other primary factors.

Long-run* effects of U.S. export expansion of MVH under different labor reallocation and capital mobility, difference from corresponding baseline

	Perfect capital mobility across sectors		Imperfect capital mobility with $\sigma^T_{\text{Capital,USA}} = -0.5$	
U.S. indicators	Costless labor reallocation (1)	Costly labor reallocation (2)	Costless labor reallocation (3)	Costly labor reallocation (4)
Indicators for MVH sector				
Exports volume, %	34.0	33.2	32.1	31.2
Production volume, %	7.58	7.25	6.86	6.47
Employment, %	6.97	7.17	7.60	7.87
Wage, %	0.436	0.424	0.452	0.437
Output price, %	0.262	0.382	0.500	0.647
	-2.8%		-3.3%	
Welfare effects				
Terms of trade, mil. \$	9,426	9,497	9,708	9,770
Alloc. efficiency, mil. \$	1,578	1,354	1,369	1,133
Growth, mil. \$	1,534	1,311	1,021	823
Labor reallocat., mil. \$	0	-956	0	-1,067
Total welfare, EV, mil. \$	12,538	11,206	12,098	10,659
Economy-wide wage, %	0.415	0.403	0.429	0.414

* Steady-state investment and capital; fixed economy-wide supply of other primary factors.

Conclusions

- Imperfect labor mobility across sectors is different from accounting for costly labor reallocation.
- In comparative static simulations, costly labor reallocation influences simulated effects for sectoral production and price, employment, wages, and welfare (EV)
 - It has a relatively small influence on trade effects.
- The influence of costly labor reallocation
 - increases under imperfect capital mobility across sectors
 - decreases in long run simulations for most effects.

Thank you.