

# The Migration (GMig2) Model

- Developed by Walmsley, Winters and Ahmed
  - Based on GTAP Version 6, but allows bilateral labor migration (skilled/unskilled) and remittances
  - Labor force:  $LF = LF_{\text{home}} + \text{migrants}$
- Extra accounting equations and variables for tracking real incomes (w/PPP-adjustments)
  - Migrant income = wages – remittances (no ownership of land and capital but do pay taxes)
  - Remittances added to income of home region (i.e. non-movers receive this additional income)

# The GMig2 Model (cont.)

- New data:

- Bilateral migration data (Walmsley et al, 2005)
- Matrix of bilateral remittances (Parsons et al, 2007): these determine the share of migrant income that is sent back home
- Labor skill splits (Docquier and Marfouk, 2005)

- Some key assumptions:

- Perfect substitution of foreign and domestic workers in all sectors
- Participation rates for migrants same as in home region
- Migrants respond to wage differentials in different regions according to elasticity  $E_{mig}$
- Database construction assures that wages of migrants are somewhat less than average wages in host country

# Allowing endogenous labor movement

- Examples of closure swaps
  - To allow endogenous movement of workers from exporting to importing regions  
swap  $c\_MIGNOSP(LAB\_COMM, LEXP\_REG, LIMP\_REG) = SLACKENDMIG(LAB\_COMM, LEXP\_REG, LIMP\_REG)$   
 $c\_MIGNOSP$  is the change in the number of migrant people of labor class  $i$  who move from  $LEXP\_REG$  to  $LIMP\_REG$
  - To prevent migration within a given country:  
swap  $c\_MIGNOSP(LAB\_COMM, REG, REG) = SLACKENDMIG(LAB\_COMM, REG, REG)$
  - There are other complications (i.e. dealing with negative return flows)
- One can test either exogenous shocks to migration or factors that might be thought to influence endogenous migration

# Migration Model Sub-Groups

1. Migration shock of unskilled workers (Mexico to US) with and without unemployment
2. Differentiated policies for immigration of skilled and unskilled workers in Germany
3. Interactions of recession (through negative technology shocks) with migration

# Objective / Research questions

- To study the effects of migration (shock of 3 million unskilled workers) from Mexico to USA on both economies
- Two situations:
  1. No unemployment in USA ; all migrants are absorbed (real wage adjusts)
  2. Unemployment in USA (real wage is fixed)
- Assumption: Migrants can return home except Mexico
- Questions:
  - Are Mexicans “stealing” American jobs?
  - How does bilateral migration affect home and host countries, in terms of real wages; GDP; production; investment; trade balance and terms of trade?
  - Are results sensitive to assumptions about employment?
- Study whether the Rybczynski Theorem applies, i.e. does production of output from unskilled labor-intensive sectors increase in the US in this case, and why or why not?

# Closures and shock

## Case 1: No unemployment in the US

LEXP\_REG = all other countries

Standard migration model closure with two swaps: **USA**

1. swap  $c\_MIGNOSP(LAB\_COMM, NONMEX, LIMP\_REG) =$   
 $SLACKENDMIG(LAB\_COMM, NONMEX, LIMP\_REG)$

→ We will only shock  $c\_MIGNOSP$  from Mexico to USA (no extra out-migration from other regions)

2. swap  $c\_SLACKRMIGS(LAB\_COMM, NONMEX, LIMP\_REG) =$   
 $c\_RMIGSP\_C(LAB\_COMM, NONMEX, LIMP\_REG)$

→ Allows negative or positive return migration from USA for non-Mexico regions

## Case 2: Unemployment in the US

One additional swap:

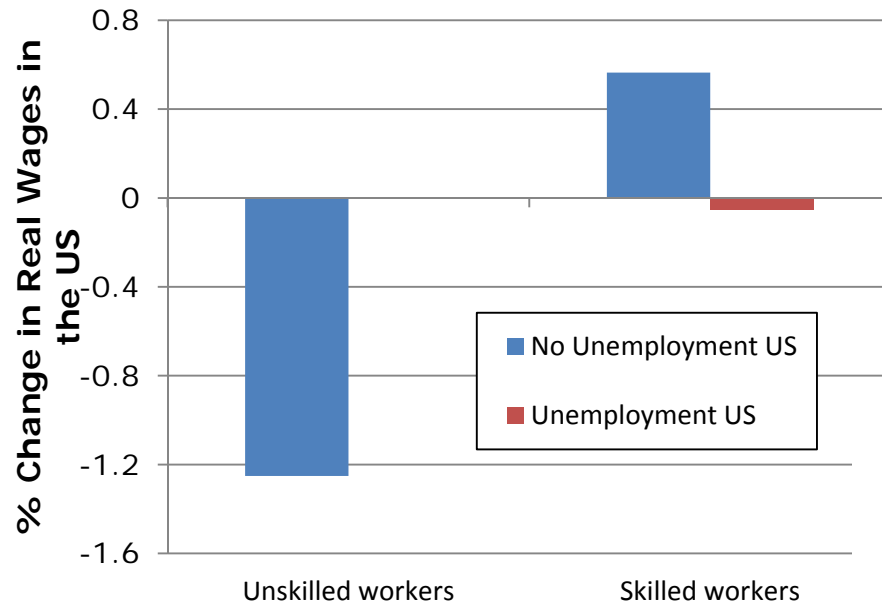
swap  $c\_shiftlf("unsklab", "USA", LIMP\_REG) =$   
 $p\_RWAGE("unsklab", "USA", LIMP\_REG)$

→ Fixed wages for unskilled labor in the US

## Shock: Unemployment in the US

shock  $c\_MIGNOSP("unsklab", "Mexico", "USA") = 3$

# Results: Changes in income



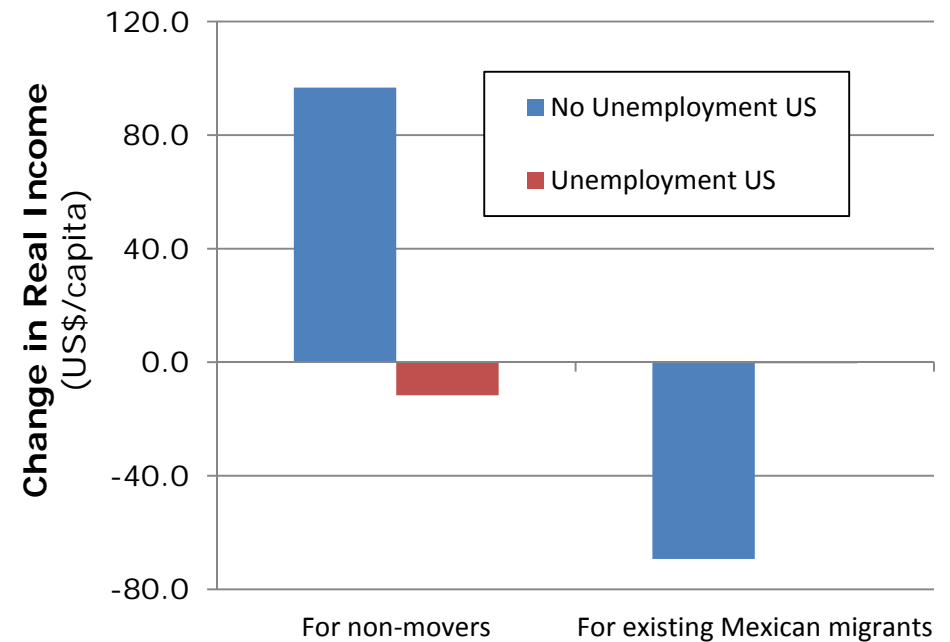
## Second-order effects

W/unemployment in the US:

Real wages increasing in most other parts of the world

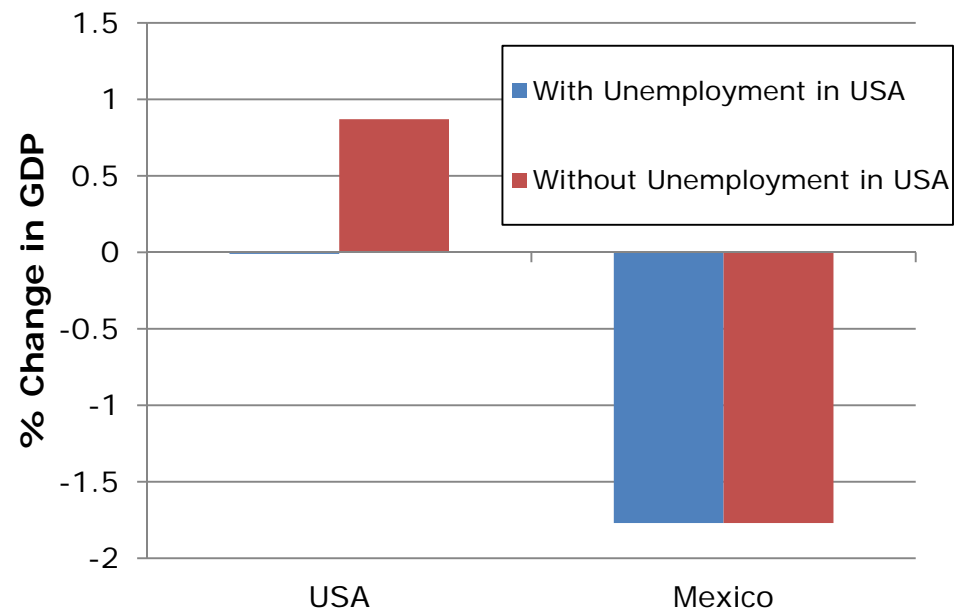
W/o unemployment in the US:

Real wages changes are variable, depending on shares of skilled / unskilled



# Results: Changes in Macroeconomic Variables (GDP)

	USA		Mexico	
	% Change	Ordinary Change (US\$ MI)	% Change	Ordinary Change (US\$ MI)
With Unemployment in USA	<b>-0.01</b>	<b>-1472</b>	<b>-1.77</b>	<b>-10953</b>
Without Unemployment in USA	<b>0.87</b>	<b>87608</b>	<b>-1.77</b>	<b>-10949</b>



## Explanation:

With unemployment in the USA, overall GDP decreases, despite the influx of migrants. The US economy cannot absorb all migrants; production goes down. Without US unemployment, production and GDP increase in the US.

For Mexico, 3 million unskilled workers to migrate, so GDP decreases.



# Results: Changes in Macroeconomic Variable (Other Variables)

## % Change in Savings

	USA	Mexico
unempusa	-0.20359	0.33243
empusa	0.89567	0.32643

## Change in Investment

qcgds	USA	Mexico
unempusa	-0.06229	-2.33683
empusa	1.06799	-2.64196

## Change in Trade Balance (\$MI)

DTBAL	USA	Mexico
unempusa	10015.25	-6334.26
empusa	-5706.59	-5716.26

## Change in Current Acct Balance (\$MI)

DTBALY	USA	Mexico
unempusa	272.1006	3532.825
empusa	-15164	3907.861

## By Mexican Workers in USA (\$MI)

unempusa	9902.051
empusa	9659.396

## Change in ToT

tot	USA	Mexico
unempusa	-0.23822	0.99833
empusa	-0.1986	1.05364

## Explanation:

With unemployment in USA: Savings and investment declined in USA but with migration, US becomes more competitive in production and change in trade balance is positive. ToT falls.

Without unemployment in USA: Trade balance is negative for USA, though terms of trade falls implying US becomes more competitive. WHY? (Does Rybczinski Theorem work? Does it imply that more production in sectors which are unskilled-labour intensive such as agriculture and replacing some skilled workers in skilled-labour intensive sector as well?)

In case of Mexico, due to migration, wage rate increases as does cost of production, ToT goes up and there is a fall in Trade balance. However, increased remittances neutralize the negative effect and change in current account becomes positive.

# Changes in demand

(Largest effects are seen in private demand)

$Q_p$  = private hhld demand for commodity i in region r

Without unemployment

	USA	Mexico
1 Crops	2.17	-3.03
2 Livestock	1.27	-1.70
3 meat	1.46	-1.77
4 Dairy	1.42	-1.76
5 Food	1.37	-1.84
...		
10 metals	0.89	-1.04
11 autos	1.06	-0.60
...		
14 HH Utilities	1.16	-1.16
15 Construction	0.94	-0.45
16 Trade	1.14	-0.60
17 Transport	1.06	-0.53
18 Communications	0.97	-0.39
19 Financial	0.99	-0.51
20 Insurance	0.35	1.32

Demand for all goods increases in the US; **especially unskilled labor-intensive goods**

Demand for nearly all goods decreases in Mexico

With unemployment

	USA	Mexico
1 Crops	0.74	-2.97
2 Livestock	0.19	-1.63
3 Meat	0.23	-1.74
4 Dairy	0.24	-1.73
5 Food	0.23	-1.81
...		
10 metals	-0.04	-0.58
11 autos	-0.08	-0.52
...		
14 HH Utilities	-0.2	1.37
15 Construction	-0.16	0.34
16 Trade	-0.18	1.17
17 Transport	-0.09	-0.08
18 Communications	-0.07	-0.09
19 Financial	-0.23	2.5
20 Insurance	-0.14	0.5

Only demand for unskilled labor-intensive goods increases in the US

Demand for unskilled labor-intensive goods falls in Mexico, but demand for **capital-intensive goods** increases

# Changing Demand for Endowments in USA

## Without Unemployment

USA		
unskilled	Skilled	Capital
1.21	0.77	0.74
1.79	1.35	1.31
1.93	0.62	0.52
2.15	0.86	0.76
2.80	0.72	0.56
0.75	0.38	0.35
2.51	0.18	0.00
2.80	0.47	0.29
2.54	0.21	0.03
2.35	0.02	-0.16
2.42	0.10	-0.08
2.67	0.34	0.16
2.63	0.30	0.12
2.80	0.46	0.28
2.12	-0.46	-0.65
2.39	-0.69	-0.93
2.52	-0.57	-0.81
2.85	0.52	0.34
2.56	0.23	0.05
2.31	-0.02	-0.20
2.84	0.50	0.32
2.22	-0.10	-0.28
2.34	0.50	0.35

## With Unemployment

	USA		
	unskilled	Skilled	Capital
1 Crops	0.74	0.32	0.32
2 Livestock	0.19	0.33	0.33
3 meat	0.23	0.26	0.26
4 Dairy	0.24	0.19	0.18
5 Food	0.23	0.22	0.21
6 OthPrimary	0.01	0.13	0.12
7 woodpap	-0.02	0.13	0.12
8 texwap	-0.02	0.53	0.51
9 pchemineral	-0.06	0.22	0.21
10 metals	-0.04	0.34	0.33
11 autos	-0.08	0.20	0.19
12 Electronics	-0.11	0.71	0.70
13 othmnfcs	-0.09	0.46	0.45
14 hhutilities	-0.20	-0.13	-0.14
15 Construction	-0.16	-0.03	-0.05
16 Trade	-0.18	-0.02	-0.04
17 Transport	-0.09	0.14	0.13
18 Communicatns	-0.07	-0.02	-0.03
19 Financial	-0.23	-0.08	-0.09
20 Insurance	-0.14	-0.07	-0.08
21 Busservices	-0.23	-0.02	-0.04
22 Otherservice	-0.22	-0.13	-0.14
Total	-0.31	-0.04	-0.04

Explanation: Demand for unskilled workers increased more in the primary sectors. In case of without unemployment the demand has gone up even in the secondary and tertiary sectors. So there is a tendency to use more unskilled workers when wages go down (in case of no unemployment).

# Summary

- Sensitivity analysis: Modified the parameter  $E_{\text{mig}}$  → no real change (except small changes for other countries)
- Rybczynski's Theory appears to hold in this case
- Republican politicians may be “right”!