International Trade and Migration: A Quantitative Framework

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Why international trade?

- Because we are trade economists?
- Academic: Welfare (gains from trade).
- Media and politics: Globalization.
- Interdependence: Multilateral resistance (what others do might affect us (GE)).
Why international migration?

- Because, as an Austrian living in Germany, Mario is a migrant?
- Because international migration is big!
- Even within the OECD-OECD matrix 4% of the population are migrants → much more from the dominant south-north migration.
- Today over 22% of the Swedish population are migrants, about 18% in Germany, about 15% in Switzerland and 10% in the US (depending on the definition: country of birth, citizenship, 2nd generation).
- Migration is always a topic in media and politics!
Why trade and migration? I

- Because Mario is a migrant and we are trade economists?
- Traditional view: H-O-type trade models with migration:
  - Trade substitutes for migration.
  - Signing free trade agreements lowers the pressure of migration.
  - Expected (bilateral) correlation between trade and migration: negative.
- BUT... New trade models with intra-industry trade and north-north migration $\rightarrow$ complementarity of trade and migration (e.g. OECD).
Why trade and migration? II

TRADEFLOWS in logs (normalized)

MIGRATION STOCKS in logs (normalized)
Why trade and migration? III

\[ \text{Residuals of trade gravity} \]

\[ \text{Residuals of migration gravity} \]

\[ \text{corr}(\hat{e}_{\text{trade}}, \hat{e}_{\text{migr}}) = 0.2304 \]
There might be more than just a spurious correlation between trade and migration.

This is not new (Head and Ries (1998)): Migrants also bring along preferential access to the markets of the country of origin.

Migrants are not just a factor but consumers and though they bring their demand! BUT...
Why “A Quantitative Framework”? I

- Quantitative means structural!
- General equilibrium effects are natural to trade shocks!
- The interdependence might be interesting especially for (ex-ante) welfare analysis of migration- and trade-policy evaluations:
  “Gravity has long been applied to empirically model factor movements. As with trade flows, the model always fits well. But, in contrast to the recent development of an economic structural gravity model of trade, there has been little progress in building a theoretical foundation.” (?)
- To the best of our knowledge, there is no structural model with trade AND migration. (Redding (2012), di Giovanni, Levchenko, and Ortega (2012), Behrens, Mion, Murata, and Südekum (2011)).
One of the core issues in empirical international trade is the quantification of the welfare gains from trade liberalization.


All frameworks in the literature so far assume labor to be immobile.

BUT: economic migration or the integration of labor markets might be an issue!

“The exact relationship between trade and migration is potentially important. For example, if the relationship were a complementary one, and if policy makers were to view further reductions in trade barriers as improbable, then in order to facilitate trade, liberalizing migration might make economic sense.” (Gaston and Nelson (2013))
We develop a structural trade model which explicitly accounts for migration.

Therefore we use one of the most simple new trade frameworks for intra-industry trade.

We add a very recent and simple modelling of the migration decision.

So, we propose a framework which enables us to disentangle trade and migration cost reductions in counterfactual analysis (examples: TAFTA, EU single market, ...).
One big question in the migration literature is through which channel migration contributes to the welfare of the destination country. We offer a new one!

Questions we ask:

- Does accounting for economic migration matter for an evaluation of welfare gains from trade?
- Should we also negotiate for free movement of labor within a preferential trade agreement?

Keep in mind: We focus on economic migration, north-north migration! (OECD sample)
... for the moment ...

- unemployment, return migration (dynamics), remittances, heterogeneous migrants, heterogeneous firms, firm-level data, 2nd generation effects, refugee migration ...

Actually this is the second of many steps of a bigger research agenda: Heid and Larch (2012).
From theory
A clear cut link between trade and migration:
real wage differences influence migration decision \(\rightarrow\) increased immigration increases size (respectively nominal GDP) of a country \(\rightarrow\) changes nominal wages and price indices \(\rightarrow\) equilibrium changes
From empirics
Analysis of a hypothetical Transatlantic Free Trade Agreement; once with migration and once without.

Take home messages:
- Signing TAFTA would have positive welfare effects for signers.
- Accounting for migration for such an evaluation matters a lot!
We start with a standard trade model:

- Multi-country perfect competition model (Armington (1969)) with
- differentiated goods at the country-level and
- iceberg type-trade costs.
Representative consumer in country $j$. The quantity of purchased goods from country $i$ is given by $c_{ij}$, leading to the following utility function:

$$U_j = \left[ \sum_{i=1}^{N} \beta_i \frac{1-\sigma}{\sigma} \frac{\sigma^{-1}}{\sigma} c_{ij}^{\frac{\sigma}{\sigma-1}} \right]^{\frac{\sigma}{\sigma-1}}. \quad (1)$$

With iceberg trade costs $t_{ij} > 1$, profit maximization implies that $p_{ij} = p_i t_{ij}$, where $p_i$ is the factory gate price of the good in country $i$. 
The representative consumer maximizes Equation (1) subject to the budget constraint \( Y_j = \sum_{i=1}^{N} p_i t_{ij} c_{ij} \). The value of aggregate sales of goods from country \( i \) to country \( j \) can then be expressed as

\[
X_{ij} = p_i t_{ij} c_{ij} = \left( \frac{\beta_i p_i t_{ij}}{P_j} \right)^{1-\sigma} Y_j, \tag{2}
\]

and \( P_j \) is the standard CES price index.

In general equilibrium, total sales correspond to nominal income, i.e., \( Y_i = \sum_{j=1}^{N} X_{ij} \).

Assuming labor to be the only factor of production and full employment, GDP is given by total factor income, i.e., \( Y_i = w_i L_i \).

\( \Rightarrow \) nothing new here!
Migration is a choice from a
- menu of locations with
- individual/idiosyncratic costs of migration.
- Bilateral migration costs are equal to all migrants from $i$ to $j$ and we end up with
  $\Rightarrow$ comparable to ?
So we start with the log utility from migration from $i$ to $j$ for a worker $h$

$$V_{ij} = \ln(U_i^*) - \ln(U_j^*) + \ln(\varepsilon_{ijh}) - \ln(\delta_{ij}),$$  \hspace{1cm} (3)

where $U_j^*$ and $U_i^*$ are the indirect utility functions taken from the trade system, $\varepsilon_{ijh}$ captures idiosyncratic, individual specific utility from migration and $\delta_{ij}$ are migration costs. The migration flow from $i$ to $j$ is given by

$$M_{ij} = G(V_{ij})N_i,$$  \hspace{1cm} (4)

where $N_i$ is the number of natives in $i$ and $G(V_{ij})$ gives the proportion of migrants from $i$ to $j$. When $\varepsilon_{ijh}$ is assumed to be i.i.d. this proportion is given by the probability as in McFadden (1974)

$$G(V_{ij}) = \frac{\exp(V_{ij})}{\sum_k \exp V_{ik}},$$  \hspace{1cm} (5)
since $U^*_j = \frac{w_j}{P_j}$ and $U^*_i = \frac{w_i}{P_i}$ for one worker, we get

$$V_{ij} = \ln\left(\frac{w_i}{P_i}\right) - \ln\left(\frac{w_j}{P_j}\right) + \ln(\varepsilon_{ijh}) - \ln(\delta_{ij}).$$ (6)

Inserting (6) in (4) gives

$$M_{ij} = \frac{w_j P_i \frac{1}{\delta_{ij}}}{\sum_k \left(\frac{w_k P_i}{w_i P_k} \frac{1}{\delta_{ik}}\right)} N_i$$ (7)$$

= \frac{w_j \frac{1}{P_j} \frac{1}{\delta_{ij}}}{\sum_k \left(\frac{w_k}{P_k} \frac{1}{\delta_{ik}}\right)} N_i.$$ (8)
The new and very simple channel is:
migration is driven by real wage differences $\rightarrow$ migration changes demand/size of a country $\rightarrow$ changes wages (nominal) and price indices $\rightarrow$ again changes real wage differences
We started with two very clean data sets in a cross section for the year 2000.

- CEPII bilateral trade data from Head, Mayer, and Ries (2010) with many geographical information.
- “Where on Earth is everybody”-data from Özden, Parsons, Schiff, and Walmsley (2011).
  - International bilateral migration stock data (censuses and official registers).

We just keep the OECD sample to avoid zero migration cells (remember: no volume decision! → north-north migration).
We estimate

- a standard trade gravity with importer and exporter fixed effects (Head, Mayer, and Ries (2010) JIE)

- and a standard migration gravity with importer and exporter fixed effects (Grogger and Hanson (2011) JDE).
Estimation stage and fit of the model II
Estimation stage and fit of the model III

![Graph showing migration in logs model vs. migration in logs observed.](image)
Counterfactual Analysis I

What would happen if TAFTA would be signed?
That means, we will have a PTA equal to one between the USA and the EU in addition to existing PTAs.

- First step: We look at the inception of TAFTA at all, i.e. we change the PTA vector.
- Second step: We do the same in a framework without migration, i.e. Anderson and van Wincoop (2003).

Other, more differentiated counterfactuals possible and of highest interest: EU single market, other reduction of migration cost, ...
Changes from inception of TAFTA with migration:

- world migration: +0.46%
- world trade: +0.96%
- average welfare change at country level: +1%

Top and bottom three country-level results (welfare):

- EST +5.9%, PRT +2%, SVK +2%
- TUR -0.1%, CHL -0.1%, MEX -0.2%
- Sweden is top 10: +1.5%
Changes from inception of TAFTA without migration:
- average welfare change at country level: +0.6%

Top and bottom three country-level results (welfare):
- EST +4.5%, IRL +1.6%, PRT +1.3%
- CHE -0.37%, NOR -0.39%, ISL -0.4%
- Sweden is still top 10: +0.9%

Comparison:
- accounting for migration almost doubles the welfare effects (up to 120% difference for single countries!)
Quantitative framework for international trade and migration.

- Demand effect of migrants contributes to welfare.
- Signing TAFTA would have positive effects for signers.
- Migration matters for a welfare analysis of trade cost reductions.
Thank’s a lot for your attention and your comments!


