Trade Openness and Vulnerability

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OBJECTIVE: Analyze how trade policies, specifically **trade openness**, affect countries’ and people’s **economic stability**.

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"Trade Openness and Developing Countries' Vulnerability: Concepts, Misconceptions, and Directions for Research.“ - Montalbano, P. (2011)
Published in the “World Development” vol.39(9), Elsevier.
OBJECTIVE: Analyze how trade policies, specifically trade openness, affect countries’ and people’s economic stability.

1. Overview on trade openness and vulnerability in developing countries.
3. Analyzing the link between trade openness and vulnerability + some common misconceptions.
4. Overview on trade policy and its links to income risk and welfare, and explanation of how to calculate income risk.
5. Focus on the link between trade policy and income risk.
6. Focus on the link between welfare and income risk.
7. Conclusive notes.
Key Words

• TRADE OPENNESS
• VULNERABILITY: The likelihood that people’s livelihoods deteriorate over time due to the economic system they live in.
• ECONOMIC SHOCK: An event that produces a significant change within an economy, despite occurring outside of it. Shocks are unpredictable and usually impact supply or demand through market.
• ECONOMIC INSTABILITY: A situation of excessive fluctuation of economic variables.
• VOLATILITY: Proxy of fluctuation, reflecting the amount of uncertainty and risk of the economic variable.
• RISK: Predictable component of variability, permits one to assign probabilities to the different outcomes.
• UNCERTAINTY: Unpredictable component of variability, refers to a situation where several outcomes are associated to an event, but the assignment of probabilities to these outcomes may not be possible.
According to theory, trade openness improves the economy of a country and its integration into the global economic system.

The drawbacks to trade openness are acknowledged only in terms of short and medium run adjustment costs.

Is it really like this? Does trade openness only bring benefits for developing countries who adhere to it?

A problem that remains unanswered is if trade openness policies magnify the exposure to possible “destabilizing effects” (e.g. foreign shocks)
The hypothesis of a link between trade openness and developing countries’ instability has some roots:

- the apparent asymmetry between the process of increasing specialization, a key element in open economies, and the presence of random shocks in the export markets;

- the tendency of commodity prices (e.g. oil purchased in barrels), a key element for the specialization process, to be more volatile than those of manufactured goods;

- the possible inconsistency between the shocks prevailing in open markets and traditional coping mechanism and local market structures;
The hypothesis of a link between trade openness and developing countries’ instability has some roots:

- the occurrence of boom-bust cycles of investments induced by trade openness in countries with inadequate infrastructures and shortage of skilled labor;

- the role of open market trade in altering households’ optimal portfolios, substituted by with greater variability in new portfolios options;

- the higher risk of policy mismanagement in response to the greater possibilities given by an open market, in countries contexts where political institutions are weak.
Instability → Fluctuation

Why is fluctuation a problem?

• Lucas’ (1987) initial study → “costs of fluctuation”
  According to Lucas, they had a small impact on welfare.

• Aizenmann and Marion (1999) highlighted how uncertainty has long terms effects since agents are more reluctant to invest in new activities.

• Ramey and Ramey (1995), through empirical cross countries studies, have shown a negative relation between volatility, long-run growth and welfare, especially in developing countries.
Loayza et al. (2007) underpin that in developing countries is faced a higher rate of volatility effects due to:

- intrinsic instability of the developing process;
- the concrete risk of policy mismanagement;
- the absence of strong mitigating and coping mechanism.
When can foreign shocks cause destabilization via trade openness?

Winters (2002):

• when foreign shocks are greater than domestic ones

• when trade liberalization affects governments’ ability to operate price stabilization policies

• when trade reforms change the emphasis among the different activities engaged by households
Applied literature on trade instability

Looking at the literature, two main schools of thought may be found:

• empirical analysis that emphasize the role of trade openness as a key element for aggregate volatility

• empirical analysis that looks at trade openness as a complementary aspect in currency crises.

In both cases empirical results are mixed. Literature on instability is unstable itself.

What can be surely said is that currency crises spread along trade lines networks and, since trade pattern are negatively affected by distance, there is a strong evidence that these crises will first spread regionally.
Vulnerability

I have lied to you in the Key Words section

Vulnerability means many things to different people. It is a complex phenomenon, not easy to define without contextualizing it in different realities.
An attempt to define vulnerability has been made by the World Bank (2001) in its “Social Risk Management” approach. They spotted three basic components of vulnerability analysis:

• a detailed analysis of risk;

• an assessment of the degree of resilience and/or responsiveness (difference will be seen in the following slides);

• a benchmark, a socially accepted minimum norm for each outcome under which households may be considered to be vulnerable to future loss.
A second attempt has been made by the “Sustainable Livelihood Vulnerability” approach:

**VULNERABILITY:** The likelihood that people’s livelihoods deteriorate over time due to the economic system they live in.

It incorporates an evaluation of sensitivity to negative shocks (“livelihood sensitivity”) as well as the endogenous ability to respond and recover (“livelihood resilience”)

The measurement of Vulnerability

Vulnerability = Complex phenomenon $\rightarrow$ Hard to escape CONTEXT-SPECIFIC interpretations

Proliferation of methodologies to analyze it, terminology, definitions and approaches.
≠ Approaches to define vulnerability $\rightarrow$ ≠ Methods of estimation.
Methods and Approaches

- **SRM** approach to Vulnerability Analysis (WB)
- **SLV** approach – Linked to Amartya Sen’s Capabilities Approach = Holistic approach that focuses on the social communities’ reaction strategies in political, socio-economic contexts.
- **Monetary Analyses;** Welfare = Consumption; Consumption Variability = Proxy for economic instability.
- **VER** approach – Vulnerability Exposure to Risks
First classification of the main methods applied in vulnerability analysis

→ 3 main typologies of measures:

- **VEP** – Vulnerability to Expected Poverty (most commonly applied)
- **VEU** – V. as low Expected Utility
- **VFP** – V. as threat of Future Poverty
VEP (Chauduri, 2001)

It provides results in terms of expected values of the common FGT class of decomposable poverty measure.

It permits to assess vulnerability using a single round of cross-sectional data = Convenient in the absence of panel data, as it is the case for most developing countries.

2 main assumptions:

• The variance of log consumption of otherwise equal households captures the impact of covariate and idiosyncratic shocks.

• This variance can be explained with observable household and community characteristics.
The poverty metrics indices $\text{FGT}_0$, $\text{FGT}_1$ and $\text{FGT}_2$ were introduced in a 1984 paper by economists Erik Thorbecke, Joel Greer, and James Foster. The individual indices within the family are derived by substituting different values of the parameter $\alpha$ into the equation.
With $\alpha = 0$, the formula reduces to the headcount ratio: the fraction of the population that lives below the poverty line.

$$FGT_0 = \frac{H}{N}$$

With $\alpha = 1$, the formula reduces to the poverty gap index.

$$FGT_1 = \frac{1}{N} \sum_{i=1}^{H} \left( \frac{z - y_i}{z} \right)$$
\[ FGT_2 = \text{Measure of poverty} + \text{income inequality} \]

\[
FGT_2 = \frac{1}{N} \sum_{i=1}^{H} \left( \frac{z - y_i}{z} \right)^2
\]

Using FGT formula, the VEP method evaluates vulnerability as follows:

\[
V_{ht} = E_t P_{ht+1} = E_t \left[ \left( \frac{z - c_{ht+1}}{z} \right)^a I(z > c_{ht+1}) \right]
\]

\[
V_{ht} = Pr(\ln c_h < \ln z | X_h) = \Phi \left[ \frac{\ln z - \ln \hat{c}_h}{\sqrt{\hat{\sigma}_h^2}} \right]
\]
VEP Drawbacks

- Lack of a solid theoretical background;
- Misses the impact of household-invariant but time-variant shocks;
- Stationary time series;
- Contrasts with empirical evidence on poor’s risk preferences;
- Implies a reduction of vulnerability by increasing the variability of consumption around the poverty line (≠ contrast to poor’s risk aversion);
- No differentiation between idiosyncratic shocks (household level) and covariate shocks (community level) impact.
Methods to disentangle VEP measure

• Sarris, Karfakis (2006)
• Günther, Harttgen (2009) → Multilevel analysis

Unexplained variance in households’ consumption = Lower-level (household) + Higher-level (community) component.

+ Decompose vulnerability estimates into sources:
  - Poverty induced vulnerable;
  - Risk induced vulnerable.
VEU

(Ligon, Schechter 2003)

\[ V_h = U_h(z_{ce}) - EU_h(c_h) \]

- Counteract the weak VEP theoretical background;
- Measure of Vulnerability based on Expected Utility
- Establishes the Zce benchmark as a level of consumption analogous to the poverty line
- Enables vulnerability decomposition into distinct components:

\[ V_h = [U_h(z_{ce}) - U_h(Ec_h)] + [U_h(Ec_h) - EU_h(c_h)] \]
VEU Drawbacks

• The choice of a particular functional form of the Utility function directly affects the magnitude of the phenomenon;
• Difficulty in transforming VEU measures into actual economic policy targets;
• VEU measures are sensitive overall to *ex ante* changes in welfare, even those above the poverty line which have no direct incidence on future poverty.
VFP
(Calvo, Dercon, 2003)

• Vulnerability = Burden of threat of future poverty – Uncertain future
• Endogenously combine Poverty + Risk measures
• Emphasis on the sensitivity to risk of the vulnerability measure
• Avoids Vulnerability to depend from outcome changes above the poverty line = overcomes the main VEU weakness.
VFP Set of axioms

- Focus axiom;
- Symmetry over states;
- Continuity and differentiability of the vulnerability function;
- Scale invariance;
- Probability-dependent effect of outcomes;
- Risk sensitivity;
- Constant relative risk sensitivity.
\[ V_a = 1 - E[x^a] \]

- with \( 0 < \alpha < 1 \)
- \( 0 < x < 1 \) = Rate of coverage of basic needs
- \( a = \) Risk sensitivity (as it increases to 1, household approaches risk-neutrality)

→ People are vulnerable to the extent that poverty cannot be safely excluded as a possible future scenario;

→ General uncertainty is related to poverty.
VFP Drawbacks

• Limited empirical applicability
• Need of copious households’ panels to retrieve predictions of the rate of coverage of basic needs + distribution of random idiosyncratic shocks;
• Risk of spurious correlation poverty/vulnerability;
• Misspecifications and measurement errors;
• Assumes a time-invariant uniform distribution of shocks.
Conclusions

- Stationary environment $\rightarrow$ VEP
- Risk-sensitive Vulnerability measure (consumption is measured w.error) $\rightarrow$ VEU, VFP
- Lack of a single and generally agreed measurement method + common approach to uncertainty
- Methods all focus on households and don’t distinguish observable shocks’ nature
- Poverty line as common benchmark = Narrows Vulnerability/Vulnerability to Poverty.
- Trade off accurate V. estimates / amount of data required worldwide
COMMON MISCONCEPTIONS ABOUT VULNERABILITY

➢ VULNERABILITY vs. POVERTY

Poverty is the *ex post* realization of a state, whereas vulnerability is its *ex ante* probability.

Standard poverty assessments provide information on “how often” a household is poor.

Vulnerability analyses provides further information on the “sources” of poverty.
RESILIENCE vs. RESPONSIVENESS

Resilience (or adaptability) refers to the capacity of a system, community or society potentially exposed to hazards to adapt, by resisting or changing in order to reach and maintain an acceptable level of functioning or structure.

Responsiveness (or coping capacity) measures the availability of policy tools and institutions to cope with, mitigate or avoid the negative effects of external shocks.

This distinction has been enhanced at the macro level, by separating three important issues:
- structural vulnerability
- policy vulnerability
- state fragility
VULNERABILITY vs. EX POST WELFARE LOSS

Experiencing an *ex post welfare loss* is neither necessary nor sufficient to be classified as vulnerable.

**Vulnerability** is an *ex ante* condition that only potentially may lead to negative outcomes. Therefore, it cannot be directly observed but only predicted. Since vulnerability is not observable, it needs both a *factual analysis* and a *counterfactual*. The latter is the most problematic issue in vulnerability analysis because individuals cannot easily or accurately quantify the extent/cost of welfare losses from shocks. This explains the necessity to rely on indirect estimation methods.
VULNERABILITY FROM TRADE: THREE DIRECTIONS FOR FUTURE RESEARCH

Several studies support the hypothesis of a link between trade and vulnerability:

• Dercon (2001) underlines the role of openness as a vehicle for a “new set” of shocks and incentives able to destabilize traditional mechanisms and hamper standard management strategies.

• Winters et al. (2004) argue that trade openness could alter households’ optimal portfolios, so that their current portfolios become sub-optimal, especially for the poor, which are less able to bear new risks and face adverse impacts.
Highlighting the main weaknesses of current applied literature on the “destabilizing effects” of trade openness, Montalbano suggests three directions for future research within three levels of investigation:

1. **Macro** ➔ evaluates the pervasive and differentiated impact of covariate shocks caused by trade openness.
2. **Micro** ➔ assesses the welfare impact of covariate and idiosyncratic shocks induced by trade openness at household level.
3. **Meso** ➔ highlights the economic geography and socio-political determinants of “vulnerability from trade openness” as well as the pervasive role of industrial and competition policies in order to explain external shocks at the subnational level.
1. MACRO APPROACH

- It focuses on aggregate variables and deals with covariant macro shocks at country level.

- In the current wave of global trade integration, it is becoming more and more important.

- However, a more comprehensive **aggregate vulnerability analysis** is still needed. It should give a narrower definition of “aggregate vulnerability” and assess the permanent effect on welfare of foreign shocks and uncertainty, and their macro links with trade openness and global imbalances.

2. MICRO APPROACH

• It takes into account the differences in observable household characteristics and income distributions.

• It assesses the cost and the probability of changes in households’s behaviour induced by risk exposure linked to trade openness that generates uncertainty → In order to carry out such an assessment, it is necessary:
- a **counterfactual analysis**: to estimate the expected level of consumption expenditure in the absence of uncertainty

- a **factual analysis**: to evaluate the diversified effects on households’ welfare produced by behavioral changes as a consequence of trade reforms.

3. MESO APPROACH

• It combines the outcomes of macro and micro approaches

• Two main strands:

1. The “vulnerability of subnational regions approach” underlines the role of regional-level shocks as a source of covariate risk to households’ income and stresses fragility in various domains (economic fragility, fragility related to governance and local institutions etc.)

2. The “industry level volatility approach” studies the impact of shocks on poverty, focusing the attention on the production sector and examining volatility across industries.

Montalbano et al. (2005) *Risk and vulnerability assessments, from a macro to a meso approach: The case of Morocco.*

3. MESO APPROACH

• It combines the outcomes of macro and micro approaches

• Two main strands:
The economic benefits and costs of trade openness are now being actively debated.
The paper “Trade policy, income risk, and welfare” by T. Krebs, P. Krishna, and W. Maloney studies empirically effects of trade policy on individual income risk, using the following approach:

1. For each industry the authors use longitudinal data on individual earnings to estimate time-varying parameters of individual risk;
2. Then they focus on the relationship between trade policy and the persistent component of income risk;
3. Finally, this paper provides a quantitative evaluation of the welfare consequences of any changes in income risk brought about by changes in income policy.
Limitation of the analysis:

1. The authors focus exclusively on the link between trade policy and individual risk and therefore neglect other channels through which trade policy may affect the economy;

2. Their welfare calculations do not allow the possibility that an increase in income risk might lead to a simultaneous rise in insurance opportunities;

3. The households survey they use is a rotating panel that follows individual workers for 5 quarters over time which means that the panel dimension of their income data is somewhat limited.
Authors define income risk as the variance of unpredictable changes in individual income and distinguish between transitory and persistent income shocks.

<table>
<thead>
<tr>
<th>INCOME SHOCKS:</th>
<th>TYPE</th>
<th>REACTION</th>
<th>EFFECT</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRANSITORY</td>
<td>Borrowing or using the savings</td>
<td>Quite small</td>
<td></td>
</tr>
<tr>
<td>PERSISTENT</td>
<td>No effective reaction</td>
<td>A substantial effect on the present value of future earnings and consumption</td>
<td></td>
</tr>
</tbody>
</table>

Intro trade openness and vulnerability in developing countries  
Measurement of vulnerability  
Link between trade openness and vulnerability  
Intro trade policy, income risk and welfare  
Link between trade policy and income risk  
Link between welfare and income risk  
Conclusive notes
Income risk. Data. Table 1.

In Mexico, The National Urban Employment Survey (ENEU) conducts extensive quarterly household interviews in the sixteen major metropolitan areas and is available from 1987.

Table 1 provides the full list of manufacturing industries.
Table 2 presents a summary description of the workers surveyed by the ENEU.

Note: Age and education are average age and education of the labor force measured in years. Wage denotes the average monthly wage in thousands of pesos.
Income risk. Data. Figure 1

**Figure 1** presents tariff data on Mexican industries that are the multilateral tariffs rates applied by Mexico.
Income risk. Specification

The log of the labor income of individual \( i \) employed in industry \( j \) in period \( t \) is given by:

\[
\log y_{ijt} = \alpha_{jt} + \beta_t * x_{ijt} + u_{ijt}
\]

Where:
- \( \alpha_{jt} \) and \( \beta_t \) denote time-varying coefficients,
- \( X_{ijt} \) is a vector of observable characteristics (such as age and education),
- \( u_{ijt} \) is a stochastic components of earnings.
Income risk. Specification

We assume that the stochastic term is the sum of two components:

\[ u_{ijt} = \omega_{ijt} + \eta_{ijt} \]

Where:
- \( \omega_{ijt} \) is a permanent component,
- \( \eta_{ijt} \) is a transitory component.
Income risk. Specification

*Permanent component* follows a random walk:

\[ \omega_{ij,t+1} = \omega_{ijt} + \varepsilon_{ij,t+1} \]

Where:

- \( \varepsilon_{ijt} \) is innovation term, \( \varepsilon_{ijt} \sim N(0, \sigma_{\varepsilon_{ij,t+1}}^2) \).

*Transitory component* captures both temporary income shocks and measurement error:

\[ \eta_{ijt} \sim N(0, \sigma_{\eta_{jt}}^2) \]
Income risk. Estimation

The change in the residual of income of individual \( i \) between period \( t \) and \( t+n \):

\[
\Delta_n u_{ijt} = u_{ij,t+n} - u_{ijt} = \epsilon_{ij,t+1} + \ldots + \epsilon_{ij,t+n} + \eta_{ij,t+n} - \eta_{ijt}
\]

We have the following expression for the variance of these income changes:

\[
\text{var}[\Delta_n u_{ijt}] = \sigma^2_{\epsilon_j,t+1} + \ldots + \sigma^2_{\epsilon_j,t+n} + \sigma^2_{\eta_j,t+n} + \sigma^2_{\eta_j,t+n}
\]
Income risk. Estimation

Suppose that risk is time invariant, \( \sigma^2_{\varepsilon_{jt}} = \sigma^2_{\varepsilon_j} \) and \( \sigma^2_{\eta_{jt}} = \sigma^2_{\eta_j} \):

\[
\text{var}[\Delta_n u_{ijt}] = 2\sigma^2_{\eta_j} + n\sigma^2_{\varepsilon_j}
\]

Thus, the variance of observed n-period income changes is a linear function of n, where the slope coefficient is equal to \( \sigma^2_{\varepsilon_j} \).
Income risk. Results

In Table 3 they provide the average estimate of $\sigma^2_\varepsilon$ and $\sigma^2_\eta$ for each year (average across industries).
Income risk. Results

In Table 4 they provide the average estimate of $\sigma^2_\varepsilon$ and $\sigma^2_\eta$ for each industry (average across time).
Trade Policy and Income risk

\[ \sigma^2_{\varepsilon_{jt}} = \text{Estimates of individual income risk for each industry "j" at time "t"} \]

\[ \tau_{jt} = \text{Trade policy (openness)} \]

To understand the relation between Income risk and Trade openness it is used a Linear Regression Model.

\[ \sigma^2_{\varepsilon_{jt}} = \alpha_0 + \alpha_j + \alpha_{\tau} + \alpha_{\tau_{jt}} + \alpha_{\Delta\tau_{jt}} + \alpha_{\Delta\tau_{jt}D_{jt}} + \nu_{jt} \]
Estimates of individual income risk

\[ \sigma^2_{\varepsilon_{jt}} = \alpha_0 + \alpha_j + \alpha_t + \alpha_{\Delta \tau_{jt}} + \alpha_{\Delta \tau_{jt}D_{jt}} + \nu_{jt} \]

Constant
Industry fixed effect
Time dummy that captures general macroeconomic trends in economy
Coefficient: effect of the tariff level on income risk
Tariff level in each sector

Change in tariff over the preceding year
Coefficient: effect of tariff changes on income risk

Change in tariff interacted with an indicator variable = 1 if the import penetration ratio is greater than sample median

Standard errors

The inclusion of **industry dummy** allows to control any fixed industry-specific factors that may affect the level of riskiness of income in that industry.

The inclusion of **time dummy** controls for any changes in macroeconomic conditions that affect the level of income risk.
Given this model, it is needed to investigate the sources of variation in risk over time.

The time dummy is substituted by two macroeconomic variables: real exchange rate depreciation over the preceding year ($\Delta e$) and GDP growth ($g$).

Also included are interaction terms which measure the extent to which the relationship between income risk and the previous two macroeconomic factors is affected by trade policy: $(1 + \tau_{jt})\Delta e_t$ and $(1 + \tau_{jt})g_t$. 
Intro trade openness and vulnerability in developing countries

Measurement of vulnerability

Link between trade openness and vulnerability

Intro trade policy, income risk and welfare

Link between trade policy and income risk

Link between welfare and income risk

Conclusive notes

\[ \alpha_t \]

\[ \beta_e \Delta e_t + \beta_g g_t + \phi_e (1 + \tau_{jt}) \Delta e_t + \phi_g (1 + \tau_{jt}) g_t \]

\[ \sigma_{\varepsilon_{jt}}^2 = \alpha_0 + \alpha_j + \alpha_{\tau} \tau_{jt} + \alpha_{\delta_1} \Delta \tau_{jt} + \alpha_{\delta_2} \Delta \tau_{jt} D_{jt} + (\beta_e \Delta e_t + \beta_g g_t + \phi_e (1 + \tau_{jt}) \Delta e_t + \phi_g (1 + \tau_{jt}) g_t) + \nu_{jt} \]
### Table 5.—Trade Policy and Income Risk: Panel Estimates

<table>
<thead>
<tr>
<th>Variables</th>
<th>$\sigma^2_\epsilon$</th>
<th>$\sigma^2_{\tilde{\epsilon}}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\tau$</td>
<td>0.043</td>
<td>-0.140</td>
</tr>
<tr>
<td>(0.060)</td>
<td>(0.051)</td>
<td></td>
</tr>
<tr>
<td>$\Delta \tau$</td>
<td>-0.035</td>
<td>0.027</td>
</tr>
<tr>
<td>(0.044)</td>
<td>(0.031)</td>
<td></td>
</tr>
<tr>
<td>$\Delta \tau \times D_n$</td>
<td>-0.090</td>
<td>-0.109</td>
</tr>
<tr>
<td>(0.047)</td>
<td>(0.047)</td>
<td></td>
</tr>
<tr>
<td>$\Delta e$</td>
<td>-0.621</td>
<td></td>
</tr>
<tr>
<td>(0.207)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$g$</td>
<td>-1.208</td>
<td></td>
</tr>
<tr>
<td>(0.414)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\tau \times \Delta e$</td>
<td>0.539</td>
<td></td>
</tr>
<tr>
<td>(0.184)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\tau \times g$</td>
<td>1.055</td>
<td></td>
</tr>
<tr>
<td>(0.370)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time effects</td>
<td>Included</td>
<td></td>
</tr>
<tr>
<td>Industry fixed effects</td>
<td>Included</td>
<td>Included</td>
</tr>
<tr>
<td>$N$</td>
<td>945</td>
<td>945</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.058</td>
<td>0.044</td>
</tr>
</tbody>
</table>

Note: Figures in parentheses are robust standard error estimates obtained by allowing for heteroskedasticity, contemporaneous correlation of errors across industries, and serial correlation within industries. In the table, $\tau$ denotes the tariff rate, $g$ denotes the growth rate of GDP, and $\Delta e$ denotes the percentage appreciation of the exchange rate.
The effect of tariff level on income risk is insignificant: it can not be rejected the mean effect of tariff level on income risk is $=0$

Trade policy changes have a significant negative effect on income risk (-0.125 with estimated standard error=0.05), especially in industries with high levels of import penetration (D=1).
The effect of tariff level on income risk, and the effect of Trade policy on income risk (-0.092 with estimated standard error=0.045) are similar to the ones obtained in previous estimation.

Effect of tariff level on income risk is now given by 
\[ \hat{\alpha}_\tau + \hat{\delta}_e \Delta e + \hat{\delta}_g \bar{g} = 0.02 \] therefore insignificant.
The coefficients of real exchange rate depreciation and of GDP growth are both negative and significant.

What is interesting is to see how the tariff level alters the effect of macroeconomic variables on income risk. Coefficients of \((1 + \tau_{jt})\Delta e_t\) and \((1 + \tau_{jt})g_t\) are both positive and significant.

### Table 5: Trade Policy and Income Risk: Panel Estimates

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<tr>
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</tr>
<tr>
<td>(\Delta \tau)</td>
<td>0.027 (0.031)</td>
</tr>
<tr>
<td>(\Delta \tau \times D_n)</td>
<td>-0.109 (0.047)</td>
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<tr>
<td>(\Delta e)</td>
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<tr>
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<td>(\tau \times g)</td>
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</tbody>
</table>

**Time effects**
- Industry fixed effects: Included

**Other statistics**
- \(N = 945\)
- \(R^2 = 0.044\)

\[
\sigma^2_{\epsilon} = \alpha_0 + \alpha_t \tau_{jt} + \alpha_{\delta_1} \Delta \tau_{jt} + \alpha_{\delta_2} \Delta \tau_{jt} D_{jt} + \beta_e \Delta e_t + \beta_g g_t + \phi_e (1 + \tau_{jt}) \Delta e_t + \phi_g (1 + \tau_{jt}) g_t + \nu_{jt}
\]
Estimates suggest that the magnitude of short-run effects of macroeconomic shocks on income risk is significantly altered by the tariff level.
**TABLE 5.—TRADE POLICY AND INCOME RISK: PANEL ESTIMATES**

<table>
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<tr>
<th>Variables</th>
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<tr>
<td>$\Delta \tau \times D_n$</td>
<td>-0.090</td>
<td>-0.109</td>
</tr>
<tr>
<td></td>
<td>(0.047)</td>
<td>(0.047)</td>
</tr>
<tr>
<td>$\Delta e$</td>
<td>-0.621</td>
<td>(0.207)</td>
</tr>
<tr>
<td>$g$</td>
<td>-1.208</td>
<td>(0.414)</td>
</tr>
<tr>
<td>$\tau \times \Delta e$</td>
<td>0.539</td>
<td>(0.184)</td>
</tr>
<tr>
<td>$\tau \times g$</td>
<td>1.055</td>
<td>(0.370)</td>
</tr>
<tr>
<td>Time effects</td>
<td>Included</td>
<td></td>
</tr>
<tr>
<td>Industry fixed effects</td>
<td>Included</td>
<td>Included</td>
</tr>
<tr>
<td>$N$</td>
<td>945</td>
<td>945</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.058</td>
<td>0.044</td>
</tr>
</tbody>
</table>

Note: Figures in parentheses are robust standard error estimates obtained by allowing for heteroskedasticity, contemporaneous correlation of errors across industries, and serial correlation within industries. In the table, $\tau$ denotes the tariff rate, $g$ denotes the growth rate of GDP, and $\Delta e$ denotes the percentage appreciation of the exchange rate.
INCOME RISK AND WELFARE

Quantitative evaluation of the welfare consequences of any changes in income risk caused by trade policy reforms.

Changes in income risk alter consumption volatility and therefore workers’ welfare.

To explain such a link, the authors use a dynamic general equilibrium model.
The model features long-lived workers that make consumption-versus-saving choices in the face of uninsurable income shocks. These income shocks are permanent, which implies that “self-insurance” through borrowing or own saving cannot smooth out income fluctuations. It follows that, income shocks translate into consumption changes.

The model, through a series of expressions, proves that:

- if workers are already exposed to a large amount of income risk, then increasing income risk is increasingly costly.
The model features long-lived workers that make consumption-versus-saving choices in the face of uninsurable income shocks. These income shocks are permanent, which implies that “self-insurance” through borrowing or own saving cannot smooth out income fluctuations. It follows that, income shocks translate into consumption changes.

The model, through a series of expressions, proves that:

- the more risk averse the workers are, the stronger is the welfare effect of a change in income risk.
The model features long-lived workers that make consumption-versus-saving choices in the face of uninsurable income shocks. These income shocks are permanent, which implies that “self-insurance” through borrowing or own saving cannot smooth out income fluctuations. It follows that, income shocks translate into consumption changes.

The model, through a series of expressions, proves that:

- the welfare effects are the same for all workers regardless of their wealth.
“Trade openness and developing countries’ vulnerability: Concepts, Misconceptions, and Direction for research.” by P. Montalbano.

Three levels of analysis:

- **macro.** Improving our capacity to assess the “vulnerability hazard” of different trade reform options, at different levels of analysis, has evident policy implications.

- **micro.** Evaluation of the impact of covariate shocks induced by trade openness is of major interest to international economic policy; assessment of trade related idiosyncratic shocks will help national policymakers to set priorities and calibrate domestic coping mechanisms and safety nets;

- **meso.** The “meso” analysis sheds lights on the economic geography and socio-political determinants of “vulnerability from trade openness” as well as on the role of industrial and competition polices.

<table>
<thead>
<tr>
<th>Intro trade openness and vulnerability in developing countries</th>
<th>Measurement of vulnerability</th>
<th>Link between trade openness and vulnerability</th>
<th>Intro trade policy, income risk and welfare</th>
<th>Link between trade policy and income risk</th>
<th>Link between welfare and income risk</th>
<th>Conclusive notes</th>
</tr>
</thead>
</table>

Empirical results for the study of the relationship between trade policy and individual income risk:

1. For industries with high levels of import penetration, trade policy changes have a significant short-run effect on income risk.
2. The effect of the tariff level on income risk is insignificant.
3. While the tariff level has an insignificant mean effect, it nevertheless changes the degree to which macroeconomic shocks affect income risk.
4. The welfare costs associated with the estimated increases in income risk are substantial.
THANKS FOR THE ATTENTION