Welfare Costs of Raising Tariffs

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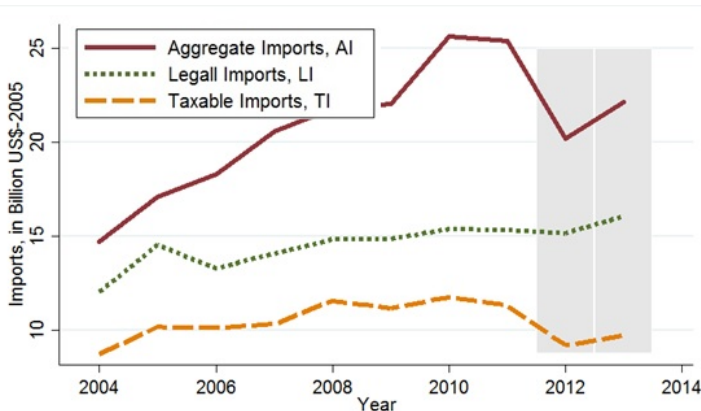
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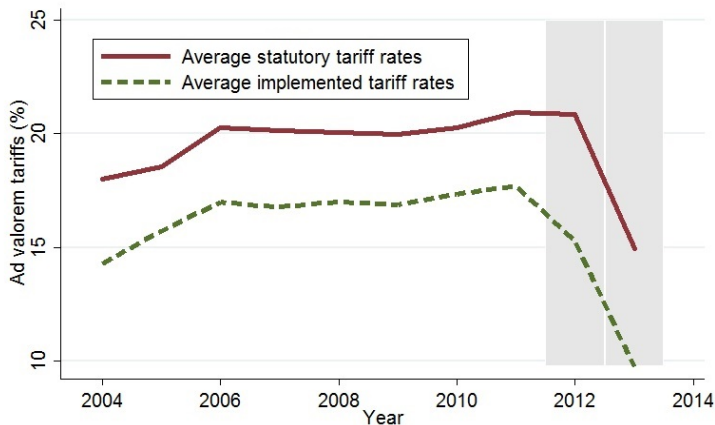Aban 1396

Outline

Stylized fact 1:
World exports, custom imports, and tariff paid imports

- AI=selective partners' exports to Iran
- LI= custom imports from the same partners
- TI= share of custom with fully paid tariffs
- Total trade (see 26)

Stylized fact 2:
Statutory vs. actual tariffs

- Not all the custom imports pay statutory tariffs

Concepts used in this study

- Discrepancy between world's export to Iran and Iran's import
  - measurement errors (Feenstra and Hanson, 2000)
  - **illegal imports** (Fisman and Wei, 2004)
    if, corr(discrepancy, tariffs) $\neq 0$

- Discrepancy between statutory and actual tariffs (Pritchett and Sethi, 1995)
  - mid-year tariff changes
  - **exemptions**
    if, corr(discrepancy, tariffs) $\neq 0$

- In other words, importers have 3 options: legal imports with paying tariffs, exempt imports, illegal imports

Question

- Based on the literature (Ossa 2014) increasing tariffs affects welfare through at least three mechanisms:
  - terms of trade
  - producers surplus
  - government income
- What we add in this study:
  - resource costs to seek for exemptions
  - resource and penalty costs to do illegal import

Question of this study

How large is the welfare loss, when tax noncompliance exists?

How the literature addresses welfare costs with non-compliance

- In the tax literature, we have *Sufficient statistics* which says:
  welfare loss of tax $\equiv \tau \frac{dTI}{d\tau}$
- However, when tax noncompliance induces externality, *sufficient statistics* is not sufficient anymore (Chetty, AEJ 2009)
- This study: quantifies welfare cost of raising tariffs, given the huge noncompliance observed in the Iran's data

More literature review

- Taxation and Development
  - Besley and Persson (2009, 2013)

word of the day...

Bird (2004) the best tax policy in the world is worth little if it cannot be implemented effectively

- Trade Tax Noncompliance
  - Evasion: Fisman and Wei (2004)
  - Avoidance: Pritchett and Sethi (1994)

literature (continue)

- Welfare Implication of Raising Tax Rates
  - Tax Literature:
    - Review: Saez, Slemrod and Giertz (2009)
    - Theoretically recalculation of sufficient statistics,: Chetty (2009a)

  - Trade Literature:
    - Welfare impact of moving from autarky to trade: i.e., Caliendo & Parro, 2014; Ossa, 2014; Costinot & Rodriguez, 2012
    - Welfare impact of raising tariffs: *blank*
    - With noncompliance: *blank*

Model

- There are two goods: domestic and foreign
- Domestic good is numeraire
- HH works in the only home's productive firm
- HH earns labor income + dividends
- Domestic market is competitive and **small** compared to world
- Tariff rate is τ
- Noncompliance could be in two forms:
  - evasion (e)
    encounters transfer cost (z) + resource cost (g)
  - avoidance (a)
    encounters resource costs (g)

Theory (continue)

- HH problem:

$$
\begin{aligned}
&max\ u(c_d, c_f, a, e) = c_d + ln(c_f) - g(a, e)\\
&s.t.\ c_d + X + (1+\tau)(pc_f - a - e) = wl + d - a - e - z(e, \tau)
\end{aligned}
\tag{1}
$$

where,
X is export
c_d is domestic good
c_f is foreign good
a is the tax avoided import (avoidance)
e is the tax evaded import (evasion)
z is transfer cost (a function of e and τ)
g is resource cost

- At equilibrium: $pc_F = X$, $X + c_d = Y$

Theory (continue)

- At equilibrium, total welfare is obtained from HHs' utility plus government income:

$$W(\tau) = \{-X + wl + d - a - e - z(e,\tau) - (1+\tau)(pc_f - a - e) \\ + ln(c_f) - g(a,e)\} \\ + \tau(pc_f - a - e) + z(e,\tau)$$

(2)

- After some algebra (including use of envelope theorem) we'll have:

$$\frac{dW}{d\tau} = \tau[(1-\mu)\frac{\partial AI}{\partial \tau} - (1-\mu)\frac{\partial LI}{\partial \tau} + \frac{\partial TI}{\partial \tau}]$$

(3)

where,

$AI = pc_f$, aggregate imports

$LI = pc_f - e$, legal imports

$TI = pc_f - a - e$, taxable imports

$\mu = \frac{\frac{\partial g}{\partial e}}{\frac{\partial g}{\partial e} + \frac{\partial z}{\partial e}}$

Empirical model

- Our empirical methodology consists of the following two steps:
1. estimate elasticities $\hat{\varepsilon}_{AI}$, $\hat{\varepsilon}_{LI}$, $\hat{\varepsilon}_{TI}$:

    $logXI_{g,i,t} = \alpha_{XI} log\tau_{i,t} + \alpha_2 VAT_t + \alpha_4 X_{g,i,0} + year\ dummies_t + \varepsilon_{g,i,t}$
    where, $XI \in \{AI, LI, TI\}$

2. calculate $\frac{d\hat{W}}{d\tau}(\mu)$, $\forall \mu \in [0, 1]$ from the following formula:

$$\frac{d\hat{W}}{d\tau} = [(1 - \mu)\hat{\varepsilon}_{AI}AI - (1 - \mu)\hat{\varepsilon}_{LI}LI + \hat{\varepsilon}_{TI}TI] \tag{4}$$

Data sources

- UNCOMTRADE
  - Country specific exports to Iran (23 countries selected), in 6 digits HS
- Iran's Custom Administration
  - Iran's import value and custom income, in 8 digits HS-country
- Exports and Imports Regulation Book
  - Statutory tariffs, in 8 digits HS
- Final dataset (after cleaning and merging)
  - In 6 digits of HS code-country-year
  - AI=Custom reported imports+ illegal imports
  - LI= Custom reported imports
  - TI= Custom reported imported which paid statutory tariffs
  - Excluded the followings:
  - Cases with implemented tariff>1.05*statutory tariffs (7% of original data)
  - Country-years without exporter reporting to WITS.

Data statistics

Table: Statistics

	Mean	SD	Min	Max
Statutory tariff rate (%)	19.86	19.08	4	150
Value Added Tax (%)	-	-	0	5
Priorities	-	-	1	10
Nominal values in 2010-Million Dollars:				
Government custom revenue	0.14	1.12	0	109
Aggregate imports(AI)	1.78	11.38	0	729
Legal import (LI)	1.28	7.77	0	424
Taxable import (TI)	0.96	6.15	0	424
Government oil income$\times 10^3$	25.8	12.17	15.91	51.84
Observations	94,491			

Results

Table: Elasticity of governemnt custom income to statutory tariffs (τ_{stat})

	all observations	exclude if $\tau > top$ 1%
Log(Statutory tariff rates)	0.288***	0.335***
	-6.96	-7.78
Partner-HS code fixed effect	yes	yes
N	92,980	92,060

- Dependant var.: $log(government\ custom\ income)$
- Other control variabes: VAT, government oil income, 10 dummies for AI splines in 2004, constant, year dummies, black market premiums
- Robust, fixed effects (per 8dgts HS-exporter) controlled

Table: Elasticity of τ_{actual} w.r.t. τ_{stat}

	all observations	exclude if $\tau >$ top 1%
Log(Statutory tariff rates)	0.571***	0.571***
	-31.37	-30.66
Partner-HS code fixed effect	yes	yes
N	92,980	92,060

- dependant var.: $log(\tau_{actual})$
- Other control variabes: VAT, government oil income, 10 dummies for AI splines in 2004, constant, year dummies, black market premiums
- Robust, fixed effects (per 8dgts HS-exporter) controlled

Table: Elasticity of log(illegal imports) w.r.t. τ_{stat}

	all observations	exclude if $\tau > top\ 1\%$
Log(Statutory tariff rates)	0.225***	0.188***
	(5.87)	(4.72)
Partner-HS code fixed effect	yes	yes
N	94,491	92,060

- dependant var.:
  illegal imports$\equiv log(export_{partenrs}) - log(import_{Iran})$
- Other control variables: VAT, government oil income, 10 dummies for AI splines in 2004, constant, year dummies, black market premiums
- Robust, fixed effects (per 8dgts HS-exporter) controlled

Welfare implications

Remind that, calculating welfare implications requires the following two steps:

1- estimate elasticities $\hat{\varepsilon}_{AI}$, $\hat{\varepsilon}_{LI}$, $\hat{\varepsilon}_{TI}$:

2- calculate $\frac{d\hat{W}}{d\tau}$:

$$\frac{d\hat{W}}{d\tau} = [(1-\mu)\hat{\varepsilon}_{AI}AI - (1-\mu)\hat{\varepsilon}_{LI}LI + \hat{\varepsilon}_{TI}TI]$$

Table: Step-1: Estimation of $\hat{\varepsilon}_{AI}$, $\hat{\varepsilon}_{LI}$, $\hat{\varepsilon}_{TI}$

	log(AI)	log(LI)	log(TI)
Log(Statutory tariff rate)	-0.0294**	-0.215***	-0.668***
	(-2.19)	(-5.34)	(-15.51)
Partner-HS code fixed effect	Yes	Yes	Yes
N	92,060	92,060	92,060
Behavioral effect	Yes	Yes	Yes
Evasion effect	No	Yes	Yes
Avoidance effect	No	No	Yes

Figure: Step 2: Calculate $\Delta Welfare$ w.r.t. $\Delta\tau_{statutory}$
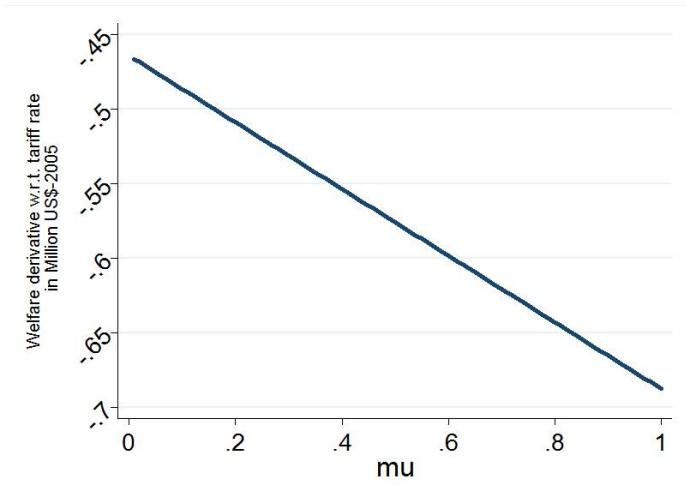
- ΔWelfare is calculated for $\forall\mu \in [0, 1]$

Welfare Implications

As a results of 1 unit tariff increase, welfare reduces by about 450^k to 650^k, for an average importing basket of $1,780^k$.

Conclusion-2

- $G = \tau_{imp} \times LI$ implies that:

Government Income

$$\underbrace{\Delta\%custom\ income}_{\hat{\varepsilon}_{GovInc}=0.28} \approx \underbrace{\Delta\%implemented\ tariffs}_{\hat{\varepsilon}_{\tau,imp}=0.57} + \underbrace{\Delta\%legal\ imports}_{\hat{\varepsilon}_{LI}=-0.25}$$

- The slop of **Laffer** curve is positive
- However, only 1/3rd of change in τ_s ends up in custom income
- The rest is neutralized by decrease in aggregate imports due to behavioral impact (3 %), increase in evasion (19 %) and discrepancy between actual and statutory tariffs (43 %).

Open Questions to be Left for Future Studies

- Extending the model for large economies
  - where, impact of tariffs on *terms of tariffs* matters
- Relaxing the assumption of home's perfect competition
  - where, *tariff protection* matters
- Exploring sources of discrepancy between implemented and statutory tariffs
- Financing of this huge amount of illegal imports

Thank you

Total imports
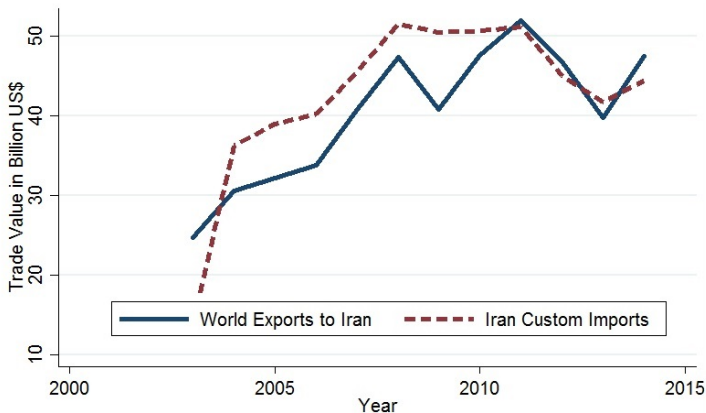
Figure: Import values are obtained from Iran's custom; world's exports is from UNCOMTRADE; values in real $2005.

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