

Import penetration and returns to tasks: Recent evidence from the Peruvian labour market

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- increasing low- and middle income countries active participation in global trade and production network (Hanson 2012)
- "trade in tasks", rather than trade in goods (Grossman and Rossi-Hansberg 2006; Baldwin 2006)
- recent work on advanced economies: trade effects shaped by the workers' tasks (Baumgarten et al 2013; Ebenstein et al 2014)

Research question: Is the wage effect of import penetration shaped by labour tasks in developing countries?

Contribution:

- heterogeneous effects of industry/occupation-specific import exposure according to jobs' task intensity in the context of an emerging economy.
- jointly address the potential endogeneity of the import penetration measures and of workers' selection into task intensities
- provide evidence on the Peruvian labour market.

Why Peru?

- among the fastest growing developing economies
- **BUT** decline in the share of manufacturing value added over GDP

Worker level data

- 2004-2009 waves of the Encuesta Permanente de Empleo (EPE). INEI Peru (EPE)

Industry level import penetration

- imports (and exports) WITS-COMTRADE online database at the 3-digit level of the ISIC Rev. 3 classification
- production levels from UNIDO
 - Industry-specific import penetration measure

$$IP_{jt} = \frac{M_{jt}}{Y_{jt} - X_{jt} + M_{jt}}, \quad j = 1, \dots, J, \quad t = 1, \dots, T$$

- Occupation-specific import penetration measure

$$IP_{kt} = \sum_{j=1}^J \alpha_{kj2004} IP_{jt}, \quad k = 1, \dots, K$$

Occupation level task indicators

- O*NET survey from U.S. Department of Labour: 52 abilities required for each O*NET-SOC2010 occupation that we linked to occupations listed in the EPE survey.

$$MS_k = \frac{Manual_k}{Manual_k + Cognitive_k}, \quad k = 1, \dots, K.$$

Indicator	O*NET abilities
<i>Manual</i>	Arm-hand steadiness, Manual dexterity, Finger dexterity, Control precision, Multilimb coordination, Response orientation, Rate control, Reaction time, Wrist-finger speed, Stamina, Speed of limb movement, Extent flexibility, Dynamic flexibility, Gross body coordination, Gross body equilibrium, Static strength, Explosive strength, Dynamic strength, Trunk strength, Perceptual speed, Spatial orientation, Visualization, Selective attention, Time sharing
<i>Cognitive</i>	Fluency of ideas, Originality, Problem sensitivity, Deductive reasoning, Inductive reasoning, Information ordering, Category flexibility, Mathematical reasoning, Number facility, Memorization, Speed of closure, Speech recognition, Speech clarity

	Architects and engineers, nec	Chemical and physical science technicians	Plumbers and pipe fitters	Weavers, knitters and related workers
<i>MS</i>	0.270	0.422	0.646	0.847
<i>Manual</i>	0.195	0.239	0.356	0.279
<i>Cognitive</i>	0.404	0.327	0.195	0.050

For worker i , employed in occupation k , sector j at time t , with $i = 1, \dots, n$, $k = 1, \dots, K$, $j = 1, \dots, J$, and $t = 1, \dots, T$, the log-wage (W) equation we consider is

$$W_{it} = MS_k \gamma_{MS} + IP_{lt-1} \gamma_{IP} + IP_{lt-1} \times MS_k \gamma + \mathbf{X}'_i \beta + \mathbf{D}'_l \alpha_1 + \mathbf{Z}'_t \alpha_2 + \varepsilon_{it} \quad (0)$$

- MS_k , the manual intensity in occupation k ,
- IP_{lt-1} , the import penetration ratio in industry $l = j$ or occupation $l = k$ and year $t - 1$, for $k = 1, \dots, K$, $j = 1, \dots, J$, $t = 1, \dots, T$
- \mathbf{X}_i contains worker i personal characteristics,
- \mathbf{D}_l is a matrix of dummy variables to control for 3-digit occupation ($l = k$) or 3-digit industry ($l = j$) fixed-effects,
- \mathbf{Z}_t is a matrix of dummy variables to control for time fixed effects
- ε_{it} is a zero mean error term.

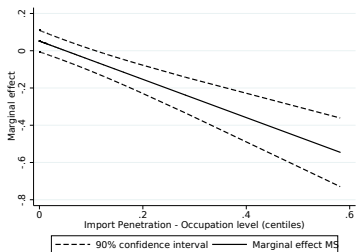
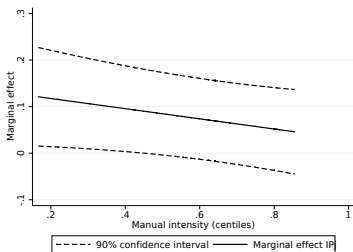
- **Endogeneity of IP_{it} :** $IV_{it} = EXP_{it}^{US}$ - sectoral share of U.S. exports going to non Latin American and Caribbean (LAC) countries on total U.S. production. TSLS.
- **Endogeneity of MS_k :** Klein and Vella (2010) - exploiting heteroskedasticity as a source of additional exogenous variation; KV estimator: control function approach where ρ_{MS} captures the unobserved correlation between the intensity of manual tasks workers perform on the job and the level of earnings they receive.
- **Endogeneity of IP_{it} and MS_k** Jointly addressed by the KV-IV estimator. In addition to ρ_{MS} , ρ_{IP} captures the correlation arising from the reverse causality between earnings and the degree of import competition.

Wage equation - Industry-specific IP baseline model

	OLS [1]	OLS [2]	TSLS [3]	TSLS [4]	KV [5]	KV-IV [6]
IP	0.064 [0.051]	0.139* [0.072]	0.049 [0.071]	0.128 [0.106]	0.132* [0.073]	0.132* [0.072]
$IP \times MS$		-0.109 [0.077]		-0.101 [0.094]	-0.099 [0.078]	-0.098 [0.078]
MS	0.044*** [0.013]	0.063*** [0.018]	0.044*** [0.013]	0.061*** [0.021]	0.056*** [0.026]	0.056*** [0.021]
ρ_{IP}						0.000 [0.000]
ρ_{MS}					0.004 [0.004]	0.004 [0.004]
No. Obs.	15678	15678	15678	15678	15678	15678

Wage equation - Occupation-specific IP baseline model

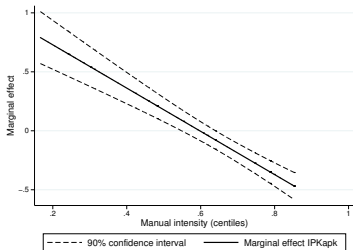
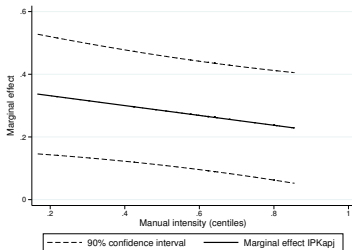
	OLS [1]	OLS [2]	TSLS [3]	TSLS [4]	KV [5]	KV-IV [6]
IP	0.002 [0.038]	0.570*** [0.123]	0.313 [0.206]	2.271*** [0.504]	0.571*** [0.130]	0.752*** [0.207]
$IP \times MS$		-0.851*** [0.203]		-2.717*** [0.591]	-0.852*** [0.203]	-1.026*** [0.291]
MS	0.016 [0.044]	0.023 [0.043]	-0.020 [0.048]	0.103* [0.056]	0.024 [0.043]	0.052 [0.045]
ρ_{IP}						-0.005*** [0.001]
ρ_{MS}					-0.000 [0.000]	0.000 [0.000]
No. Obs.	78281	78281	78281	78281	78281	78281



Marginal effects *IP* - (a) Industry-specific and (b) Occupation-specific baseline models, EPE 2004 - 2009

Extension: Assessing the role of capital and intermediate imports

	Industry-specific <i>IP</i>	Occupation-specific <i>IP</i>
	KV-IV [1]	KV-IV [2]
IP_{Kap}	0.363*** [0.124]	1.096*** [0.312]
$IP_{Kap} \times MS$	-0.157 [0.104]	-1.834*** [0.467]
IP_{Oth}	0.023 [0.076]	0.118 [0.488]
$IP_{Oth} \times MS$	-0.024 [0.074]	-0.202 [0.655]
MS	0.062*** [0.021]	0.063 [0.046]
ρIP_{Kap}	-0.001 [0.001]	-0.000 [0.000]
ρIP_{Oth}	-0.001 [0.001]	-0.000** [0.000]
ρMS	0.003 [0.004]	-0.000 [0.000]



Marginal effects IP_{Kap} - (a) industry and (b) occupation-specific baseline models, EPE 2004 - 2009

- Instrumental variables: relative change of U.S. comparative advantage and market access *vis-à-vis* that of Peru (Autor, Dorn and Hanson, 2013) and predicted transport costs from US data (Hummels, 2014).
- Model misspecification: drop 2009; pure cross-section; quadratic terms of IP and MS; Heckman two-step.
- Omitted variables: technological change; exports; informal labour.
- Alternative specification: relative wage.

- sizeable effect of occupation-specific import exposure
- task intensity of occupations turns relevant and reveals higher gains for workers in cognitive intensive occupations and small losses for a tiny share of highly manual intensive jobs
- evidence is mainly driven by the evolution of capital and intermediate imports

Thank you!