

# TRADE AND THE SKILL-BIAS: TECHNICAL APPENDIX

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Here we provide more details on the construction of our measure Index of Effectiveness of Protection of Intellectual Property (*IEPIP*). We construct this measure in three steps.

## Step 1

We start with country level data on the rule of law and patent protection. Data from the International Country Risk Guide is used to measure the Rule of Law (*ICRGRLW*), and the Index of Global Patent Protection (*IGPP*) from Ginarte and Park (1997) is used to measure the protection of intellectual property codified in the law. The *ICRGRLW* is a survey-based measure that captures the strength and impartiality of the enforcement of the legal system in a country, including respect for property rights. By using this measure, we are assuming that the impartiality and affordability of the enforcement of patent law can be captured by the overall enforcement of the rule of law in the economy. The variable is measured on a scale of 0-6 with higher numbers indicating stronger protection afforded by the rule of law. Since data are available only from 1982 onwards, we use data from 1982 in lieu of 1979. The data for 128 countries for *ICRGRLW* are shown below.

Country Code	Rule of Law (1979)	Rule of Law (1990)	Country Code	Rule of Law (1979)	Rule of Law (1990)
AGO	2	1.17	KWT	2.67	1.75
ALB	4.67	4	LBN	1	1
ARE	2.67	3	LBR	2	1.58
ARG	3	3	LBY	1	2
AUS	6	6	LKA	1	0
AUT	6	6	LUX	6	6
BEL	6	6	MAR	2	2
BFA	3	3	MDG	4	3.42
BGD	1	1	MEX	4	3
BGR	5	5	MLI	2	2
BHR	4	4	MLT	2	2
BHS	4	4	MMR	2	2
BOL	1	1	MNG	1	2.5

BRA	3.58	4	MOZ	3	2
BRN	4	4	MWI	2	2
BWA	5	5	MYS	4.67	3
CAN	6	6	NAM	0	2
CHE	6	6	NCL	2.25	1
CHL	4	4	NER	4	3.17
CHN	2.86	3	NGA	1	1
CIV	3.67	2.58	NIC	1	2
CMR	2.5	3	NLD	6	6
COG	2	2	NOR	6	6
COL	1.67	1	NZL	6	6
CRI	4	4	OMN	3	4
CUB	5	5	PAK	2	1.08
CYP	2	3.92	PAN	2	2
CZE	5	5	PER	1	1
DNK	6	6	PHL	1	1
DOM	3	3	PNG	4	3.08
DZA	2	2.17	POL	4	4
ECU	4	4	PRT	5	5
EGY	2.67	2	PRY	2	2
ESP	4	4	QAT	3	3
ETH	3	2	ROM	2	2.92
FIN	6	6	RUS	2	3.58
FRA	5	5	SAU	3.67	3.58
GAB	2	2	SDN	2	1
GBR	5.67	5	SEN	2	2
GER	5	6	SGP	4.67	5
GHA	1	3	SLE	4	3
GIN	3	3	SLV	1	1
GMB	4	3	SOM	3	2.08
GNB	1	1	SUR	1	1
GRC	3	3.17	SWE	6	6
GTM	1	1	SYR	1.58	2
GUY	1	1	TGO	2	2
HKG	5	4	THA	3	4
HND	1	2	TTO	4	4
HTI	1	1	TUN	2	2
HUN	5	5	TUR	3	2
IDN	1.5	2	TWN	5	5
IND	2.83	1.08	TZA	3	4
IRL	4	5	UGA	1	1
IRN	1.67	1	URY	3	3
IRQ	1	1.58	USA	6	6
ISL	6	6	VEN	3.58	4
ISR	2	1	VNM	3	3.08
ITA	5	5	YEM	3	3

JAM	2	2	YUG	2.42	2
JOR	2	2	ZAF	3	1.25
JPN	5	5	ZAR	1	1
KEN	2.17	3	ZMB	2	1.5
KOR	3	2	ZWE	1	2

The *IGPP* (Ginarte and Park, 1997 and Mahadevanvijaya and Park, 1999) was constructed by examining national patent laws. The index ranges from 0 to 5, with higher numbers reflecting stronger protection levels. The value of the index is obtained (per country, per time period) by aggregating scores in five equally-weighted categories: (1) extent of coverage, (2) membership in international patent agreements, (3) provisions against loss of protection, (4) enforcement mechanisms, and (5) duration. This index is available from 1960 to 1995, at five year intervals so we use the 1980 measure for 1979.

The table below shows the *IGPP* measure for 107 countries

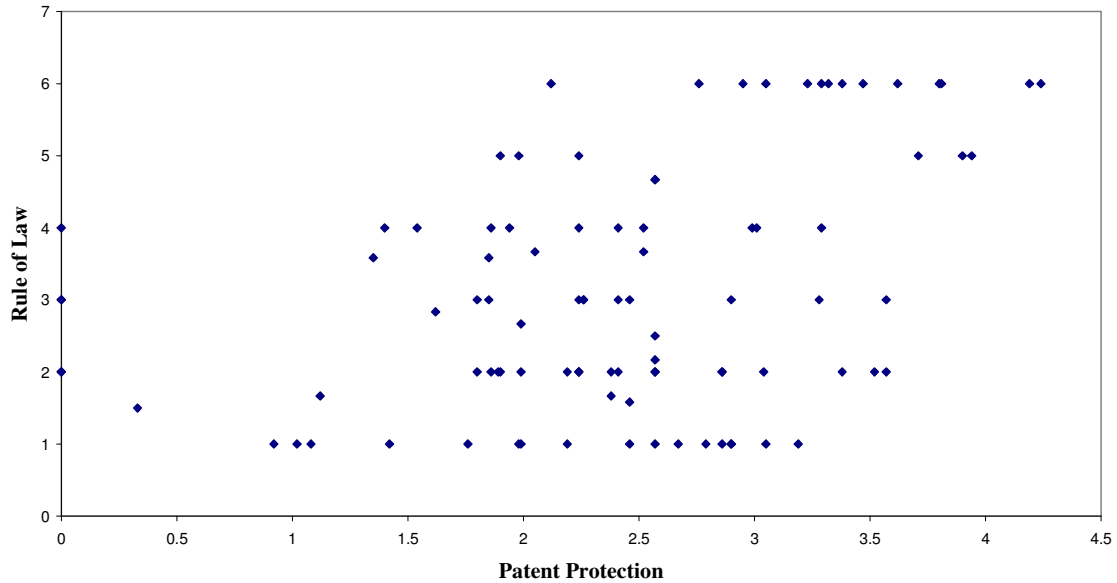
Country Code	Patent Protection (1979)	Patent Protection (1990)	Country Code	Patent Protection (1979)	Patent Protection (1990)
AGO	0	0	KOR	3.28	3.94
ARG	2.26	2.26	LBR	2.19	2.19
AUS	3.23	3.32	LKA	2.79	3.12
AUT	3.81	4.24	LUX	3.05	3.05
BDI	2.86	2.86	MAR	2.38	2.38
BEL	3.38	3.9	MDG	1.86	1.86
BEN	2.52	2.86	MEX	1.4	1.63
BFA	2.24	2.24	MLI	1.9	2.57
BGD	1.99	1.99	MLT	1.89	1.89
BOL	1.98	1.98	MMR	0	0
BRA	1.85	1.85	MOZ	0	0
BWA	1.9	1.9	MRT	2.24	2.57
CAF	2.57	2.57	MUS	2.89	2.89
CAN	2.76	2.76	MWI	3.04	3.24
CHE	3.8	3.8	MYS	2.57	2.37
CHL	2.41	2.41	NER	2.24	2.24
CIV	2.52	2.52	NGA	3.05	3.05
CMR	2.57	2.57	NIC	0.92	0.92
COG	2.57	2.57	NLD	4.24	4.24
COL	1.12	1.12	NOR	3.29	3.29
CRI	1.94	1.47	NPL	2.52	2.52
CYP	2.24	2.24	NZL	3.32	3.32
DEU	3.86	3.71	PAK	1.99	1.99
DNK	3.62	3.9	PAN	2.41	2.41
DOM	2.41	2.41	PER	1.02	1.02

DZA	3.38	3.38	PHL	2.67	2.67
ECU	1.54	1.54	PNG	0	0
EGY	1.99	1.99	PRT	1.98	1.98
ESP	3.29	3.62	PRY	1.8	1.8
ETH	0	0	RWA	2.52	2.86
FIN	2.95	2.95	SAU	2.05	2.05
FJI	2.01	2.61	SDN	2.86	3.52
FRA	3.9	3.9	SEN	2.24	2.57
GAB	2.57	2.57	SGP	2.57	2.57
GHA	2.9	2.9	SLE	2.52	2.52
GRC	2.46	2.32	SLV	2.19	2.19
GRD	1.7	1.7	SOM	1.8	1.8
GTM	1.08	1.08	SWE	3.47	3.9
GUY	1.42	1.42	SWZ	2.19	2.19
HKG	2.24	2.57	SYR	2.46	2.46
HND	1.76	1.76	TCD	2.71	2.71
HTI	3.19	3.19	TGO	2.24	2.24
IDN	0.33	0.33	THA	1.85	1.85
IND	1.62	1.48	TTO	3.01	3.01
IRL	2.99	2.99	TZA	2.9	2.9
IRN	2.38	2.38	UGA	2.57	2.57
IRQ	2.46	2.46	URY	2.26	2.26
ISL	2.12	2.12	USA	4.19	4.52
ISR	3.57	3.57	VEN	1.35	1.35
ITA	3.71	4.05	ZAF	3.57	3.57
JAM	2.86	2.86	ZAR	2.86	2.86
JOR	1.86	1.86	ZMB	3.52	3.52
JPN	3.94	3.94	ZWE	2.9	2.9
KEN	2.57	2.57			

For both measures we find that there is not much variation over time; however, there is considerable variation across countries. The cross-country correlation coefficient between both indices is around 0.41 - a relatively high number, showing that countries with higher protection of IPR also have a strong rule of law. There are, nevertheless, some remarkable outliers, such as African countries, like Nigeria, Ghana or Zambia, where the statutory protection of patents is relatively high, due to the similarity of patent laws with the former European colonizers, but where the rule of law is weak. In contrast, countries like Venezuela, Papua New Guinea, Madagascar, or Mexico show levels of Rule of Law that are above average, whereas their Patent Protection is relatively low.

The figure shows the two sub-components for the year 1979 along with country labels.

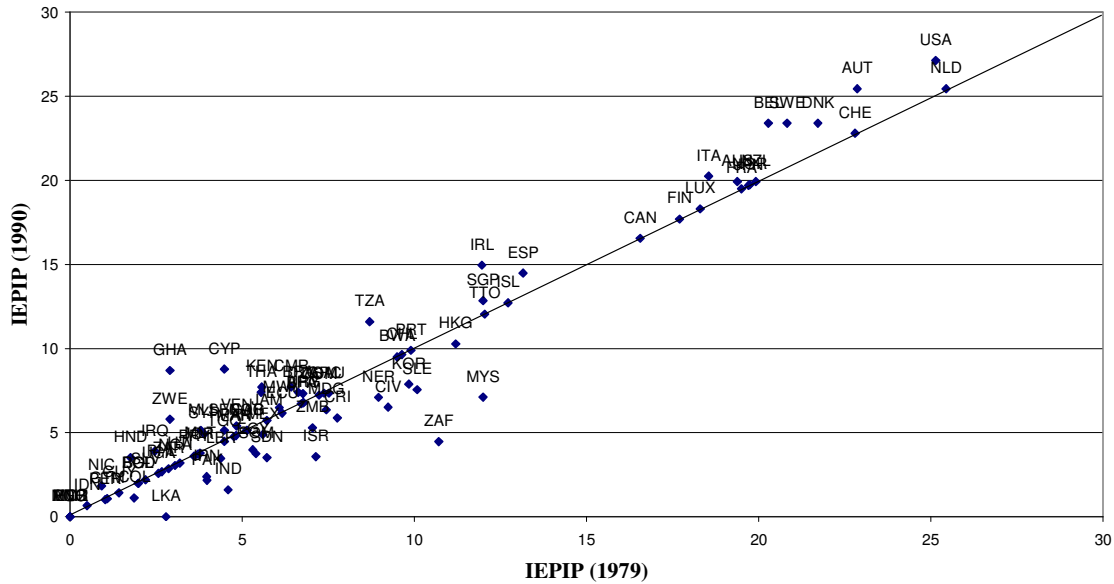
**Figure1: Sub-Components of IEPIP in 1979**



## Step 2

Since the threat of competitive imitation depends on the both legal environment and the enforcement, we define our Index of Effectiveness of Protection of Intellectual Property ( $IEPIP_{it}$ ), for country  $i$  at time  $t$  as simply the product of the Rule of Law measure and the Patent Protection measure. The mean  $IEPIP$  has increased negligibly from 7.96 to 8.00. It has risen for 28 countries (30%) and fallen for 23 (25%) others. The correlation coefficient between changes in the  $IEPIP$  and changes in  $ICRGRLW$  is 0.85, whereas the correlation with changes in  $IGPP$  is 0.19. This implies that countries that have changed their potential for competitive imitation of US firms, for the better or for the worse, have done so mostly due to changes in the rule of law. The chart below shows the  $IEPIP$  index for 1979 and 1990. Almost all data points are along the 45 degree line indicating little or no change over time for this index.

**Figure 2: IIEPIP in 1979 and 1990**



### Step 3

Finally, for each industry  $j$ , we construct an industry-specific measure of *IEPIP* ( $IEPIP_{jt}$ ). To do this, we look at each industry's trading partner, and the *IEPIP* of each trading partner. We construct a weighted average of the country-specific *IEPIP*'s with each country's weight equal to its share in the total trade of industry  $j$ . The differences in the country-weights generate industry-specific variables. Our main independent variable is the average annual change in this variable between 1979 and 1990 (*DIEPIP* in the table below). Note that changes in each industry-specific index can now be due to changes in the original index, at the level of countries, or to changes in the direction of trade flows of US industries.

The SIC code and the change in *IEPIP* for each industry is shown below. 4 industries (SIC codes 2435, 2074, 3142 & 2393) may seem as outliers. However, all our results are unaffected if we drop these 4 industries.

sic	description	DIEPIP	sic	description	DIEPIP	sic	description	DIEPIP
2435	Hardwood veneer and plywood	-7.17	2392	Housefurnishings, except curtains and draperies	-0.02	2999	Products of petroleum and coal, not elsewhere classified	-0.02
2074	Cottonseed oil mills	-3.81	3231	Glass products, made of purchased glass	-0.02	3646	Commercial, industrial, and institutional electric lighting fixtures	-0.02
3142	House slippers	-3.11	2819	Industrial inorganic chemicals, not elsewhere classified	-0.02	3648	lighting equipment, not elsewhere classified	-0.02
3021	Rubber and plastics footwear	-1.98	3728	Aircraft parts and auxiliary equipment, not elsewhere classified	-0.02	3732	Boat building and repairing	-0.02
2075	Soybean oil mills	-1.88	3562	Ball and roller bearings	-0.01	3299	Nonmetallic mineral products, not elsewhere classified	-0.01
2297	Nonwoven fabrics	-1.86	2841	Soap and other detergents, except specialty cleaners	0.00	2794	Electrotyping and stereotyping	0.00
3532	Mining machinery and equipment, except oil field machinery and equipment	-1.79	3411	Metal cans	0.00	2753	Engraving and plate printing	0.00
2083	Malt	-1.77	3952	Lead pencils, crayons, and artists' materials	0.00	2793	Photoengraving	0.00
2044	Rice milling	-1.77	3261	Vitreous china plumbing fixtures and china and earthenware fittings and bathroom accessories	0.00	2795	Lithographic platemaking and related services	0.00
2091	Canned and cured fish and sea-foods	-1.70	2434	Wood kitchen cabinets	0.00	2385	Raincoats and other water-proof outer garments	0.00
3635	Household vacuum cleaners	-1.67	3011	Tires and inner tubes	0.00	3281	Cut stone and stone products	0.00
2131	Tobacco (chewing and smoking) and snuff	-1.64	3832	Optical instruments and lenses	0.01	3489	Ordnance and accessories, not elsewhere classified	0.01
2046	Wet corn milling	-1.61	3143	Men's footwear, except athletic	0.01	3829	Measuring and controlling devices, not elsewhere classified	0.01
2399	Fabricated textile products, not elsewhere classified	-1.55	2891	Adhesives and sealants	0.01	2661	Building paper and building board mills	0.01
3263	Fine earthenware (whiteware) table and kitchen articles	-1.54	2436	Softwood veneer and plywood	0.02	3721	Aircraft	0.02

2652	Set-up paperboard boxes	-1.48	2522	Metal office furniture	0.02	3643	Current-carrying wiring devices	0.02
3914	Silverware, plated ware, and stainless steel ware	-1.45	3533	Oil field machinery and equipment	0.02	3466	Crowns and closures	0.02
2389	Apparel and accessories, not elsewhere classified	-1.42	2038	Frozen specialties	0.03	3623	Welding apparatus, electric	0.03
2782	Blankbooks, looseleaf binders and devices	-1.38	2282	Yarn texturizing, throwing, twisting, and winding mills: cotton, man-made fibers, and silk	0.04	2869	Industrial organic chemicals, not elsewhere classified	0.04
3962	Feathers, plumes, and artificial trees and flowers	-1.37	2824	Synthetic organic fibers, except cellulosic	0.04	3499	Fabricated metal products, not elsewhere classified	0.04
3313	Electrometallurgical products	-1.29	2822	Synthetic rubber (vulcanizable elastomers)	0.05	3579	Office machines, not elsewhere classified	0.05
3199	Leather goods, not elsewhere classified	-1.28	2062	Cane sugar refining	0.05	3275	Gypsum products	0.05
2047	Dog, cat and other pet food	-1.26	2063	Beet sugar	0.05	3341	Secondary smelting and refining of nonferrous metals	0.05
3694	Electrical equipment for internal combustion engines	-1.24	2061	Cane sugar, except refining only	0.05	3951	Pens, mechanical pencils, and parts	0.05
3221	Glass containers	-1.24	3423	Hand and edge tools, except machine tools and hand saws	0.05	3541	Machine tools, metal cutting types	0.05
2284	Thread mills	-1.22	2231	Broad woven fabric mills, wool (including dyeing and finishing)	0.05	3542	Machine tools, metal forming types	0.05
3622	Industrial controls	-1.22	2491	Wood preserving	0.06	3523	Farm machinery and equipment	0.06
3993	Signs and advertising displays	-1.22	2499	Wood products, not elsewhere classified	0.06	3443	Fabricated plate work (boiler shops)	0.06
3295	Minerals and earths, ground or otherwise treated	-1.19	2337	Women's, misses', and juniors' suits, skirts, and coats	0.06	2879	Pesticides and agricultural chemicals, not elsewhere classified	0.06
3031	Reclaimed rubber	-1.19	3711	Motor vehicles and passenger car bodies	0.07	3161	Luggage	0.07
2099	Food preparations, net elsewhere classified	-1.16	3713	Truck and bus bodies	0.07	3535	Conveyors and conveying equipment	0.07
2327	Men's, youths', and boys'	-1.15	3524	Garden tractors and lawn and	0.07	3647	Vehicular lighting equipment	0.07



	separate trousers			garden equipment			Chemicals and chemical preparations, not elsewhere classified	
2328	Men's, youths', and boy's' work clothing	-1.15	2037	Frozen fruits, fruit juices and vegetables	0.08	2899		0.08
3241	Cement, hydraulic	-1.15	3412	Metal shipping barrels, drums, kegs, and pails	0.09	2451	Mobile homes	0.09
2394	Canvas and related products	-1.14	2851	Paints, varnishes, lacquers; enamels, and allied products	0.10	2341	Women's, misses,, children's, and infants' underwear and nightwear	0.10
3511	Steam, gas, and hydraulic turbines, and turbine generator set units	-1.13	2426	Hardwood dimension and flooring mills	0.10	2085	Distilled, rectified, and blended liquors	0.10
2279	Carpets and rugs, not elsewhere classified	-1.11	2034	Dried and dehydrated fruits, vegetables and soup mixes	0.11	3293	Gaskets, packing, and sealing devices	0.11
3632	Household refrigerators and home and farm freezers	-1.11	3652	Phonograph records and pre-recorded magnetic tape	0.11	3431	Enameled iron and metal sanitary ware	0.11
3634	Electric housewares and fans	-1.03	2252	Hosiery, except women's full length and knee length hosiery	0.11	3255	Clay refractories	0.11
3441	Fabricated structural metal	-1.02	2541	Wood partitions, shelving, lock- era, and office and store fixtures	0.12	2648	Stationery, tablets and related products	0.12
2257	Circular knit fabric mills	-1.02	3841	Surgical and medical instruments and apparatus	0.13	3549	Metalworking machinery, not elsewhere classified	0.13
2258	Warp knit fabric mill's	-1.02	3589	Service industry machines, not elsewhere classified	0.14	3792	Travel trailers and campers	0.14
2651	Folding paperboard boxes	-1.02	3639	Household appliances, not elsewhere classified	0.14	3961	Costume jewelry and costume novelties, except precious metal	0.14
2395	Pleating, decorative and novelty stitching, and tucking for the trade	-1.02	3565	Industrial patterns	0.15	2873	Nitrogenous fertilizers	0.15
2397	Schiffli machine	-1.02	2323	Men's, youths', and boys' neckwear	0.16	3566	Speed changers, Industrial high speed drives, and gears	0.16
3651	embroideries	-1.01	3675	Electronic capacitors	0.16	3292	Asbestos products	0.16
2211	Radio and television receiving sets, except communication types	-1.01	2241	Narrow fabrics and other small-	0.17	2448	Wood pallets and skids	0.17

	cotton			wares mills: cotton, wool, silk, and man-made fiber				
	Finishers of broad woven fabrics of cotton	-1.01	3641	Electric lamps	0.17	2754	Commercial printing, gravure	0.17
2291	Felt goods, except woven felts and hats	-1.00	2439	Structural wood members, not elsewhere classified	0.17	2751	Commercial printing, letterpress and screen	0.17
2254	Knit underwear mill's Men's, youths', and boys' underwear	-0.99	2452	Prefabricated wood buildings and components	0.18	3645	Residential electric lighting fixtures	0.18
2322	Men's, youths', and boys' shirts (except work shirts) and nightwear	-0.99	3482	Small arms ammunition	0.18	3563	Air and gas compressors	0.18
2321		-0.99	2429	Special product sawmills, not elsewhere classified	0.22	2335	Women's, misses', and juniors' dresses	0.22
2082	Malt beverages	-0.98	2711	Newspapers: publishing, publishing and printing	0.23	3321	Gray iron foundries	0.23
3996	Linoleum, asphalted-felt- base, 'and other hard surface floor coverings; not elsewhere classified	-0.97	3429	Hardware, not elsewhere classified	0.23	2013	Sausages and other prepared meat products	0.23
3497	Metal foil and leaf Women's footwear, except athletic	-0.96	2421	Sawmills and planing mills, general	0.23	2011	Meat packing plants	0.23
3144		-0.94	3324	Steel investment foundries	0.24	3636	Sewing machines	0.24
2067	Chewing gum	-0.94	3325	Steel foundries, not elsewhere classified	0.24	3446	Architectural and ornamental metal work	0.24
2647	Sanitary paper products Noncurrent-carrying	-0.93	2823	Cellulosic man-made fibers	0.27	3531	Construction machinery and equipment	0.27
3644	wiring devices	-0.93	3677	Electronic coils, transformers and ether inductors	0.27	3297	Nonclay refractories	0.27
3442	Metal doors, sash, frames, molding, and trim	-0.93	2361	Girls', children's, and infants' dresses, blouses, waists, and shirts	0.27	3811	Engineering, laboratory, scientific, and research instruments, and associated equipment	0.27
3131	Boot and shoe cut stock and findings	-0.89	2331	Women's, misses', and juniors' blouses, waists' and shirts	0.29	3621	Motors and generators	0.29
2893	Printing ink	-0.87	3484	Small arms	0.29	2761	Manifold business forms	0.29
3351	Rolling, drawing, and	-0.85	3612	Power, distribution, and specialty	0.29	3536	Hoists, industrial cranes, and	0.29

	extruding of copper			transformers			monorail systems	
3751	Motorcycles, bicycles, and parts	-0.84	3253	Ceramic wall and floor tile	0.33	3544	Special dies and tools, die sets, jigs and fixtures, and Industrial molds	0.33
3963	Buttons	-0.84	2511	Wood household furniture, except upholstered	0.33	2079	Shortening, table oils, margarine and other edible fats and oils, not elsewhere classified	0.33
2281	Yarn spinning mills: cotton, man-made fibers and silk	-0.83	3724	Aircraft engines and engine parts	0.34	2441	Nailed and lock corner wood boxes and shook	0.34
2077	Animal and marine fats and oils	-0.83	2084	Wines, brandy, and brandy spirits	0.35	3743	Railroad equipment	0.35
2033	Canned fruits, vegetables, pre serves, jams, and jellies	-0.81	2842	Specialty cleaning, polishing, and sanitation preparations	0.35	3296	Mineral wool	0.35
2032	Canned specialties	-0.80	3568	Mechanical power transmission equipment, not elsewhere classified	0.36	3585	Air conditioning and warm air heating equipment and commercial and Industrial refrigeration equipment	0.36
3452	Bolts, nuts, screws, rivets, and washers	-0.79	2653	Corrugated and solid fiber boxes	0.37	2023	Condensed and evaporated milk	0.37
2531	Public building and related furniture	-0.78	2821	Plastics materials, synthetic resins, and nonvulcanizable elastomers	0.38	3576	Scales and balances, except laboratory	0.38
2599	Furniture and fixtures, not else-where classified	-0.78	3339	Primary smelting and refining of nonferrous metals, not elsewhere classified	0.39	3551	Food products machinery	0.39
3421	Cutlery	-0.78	3823	Industrial instruments for measurement, display, and control of process variables; and related products	0.40	3559	Special industry machinery, not elsewhere classified	0.40
3955	Carbon paper and inked ribbons	-0.78	3069	Fabricated rubber products, not elsewhere classified	0.40	2645	Die-cut paper and paperboard and cardboard	0.40
2642	Envelopes	-0.78	3079	Miscellaneous plastics products	0.40	2649	Converted paper and paperboard. products, not elsewhere classified	0.40

3432	Plumbing fixture fittings and trim (brass goods)	-0.77	3999	Manufacturing industries, not elsewhere classified	0.40	3676	Resistors, for electronic applications	0.40
3448	Prefabricated metal buildings and components	-0.76	2831	Biological products	0.40	3824	Totalizing fluid meters and counting devices	0.40
3312	Blast furnaces (including coke ovens), steel works, and rolling mills	-0.75	2611	Pulp mills	0.41	2035	Pickled fruits and vegetables, vegetable sauces and seasonings, and salad dressings	0.41
3317	Steel pipe and tubes	-0.75	2051	Bread and other bakery products, except cookies and crackers	0.41	3674	Semiconductors and related devices	0.41
3316	Cold rolled steel sheet, strip, and bars	-0.75	2052	Cookies and crackers	0.43	3942	Dolls	0.43
2251	Women's full length and knee length hosiery	-0.74	3399	Primary metal products, not elsewhere classified	0.43	3355	Aluminum rolling and drawing, not elsewhere classified	0.43
3964	Needles, pins, hooks and eyes, and similar notions	-0.74	3573	Electronic computing equipment	0.43	3354	Aluminum extruded products	0.43
3911	Jewelry, precious metal	-0.72	3546	Power driven hand tools	0.44	3552	Textile machinery	0.44
2272	Tufted carpets and rugs	-0.72	3291	Abrasive products	0.44	2844	Perfumes, cosmetics, and other toilet preparations	0.44
2861	Gum and wood chemicals	-0.71	2952	Asphalt felts and coatings	0.45	2892	Explosives	0.45
3269	Pottery products, not elsewhere classified	-0.71	3271	Concrete block and brick	0.46	3569	General industrial machinery and equipment, not elsewhere classified	0.46
2641	Paper coating and glazing	-0.70	2515	Mattresses and bedsprings	0.46	3599	Machinery, except electrical, not elsewhere classified	0.46
3353	Aluminum sheet, plate, and foil	-0.70	2741	Miscellaneous publishing	0.46	2816	Inorganic pigments	0.46
3262	Vitreous china table and kitchen articles	-0.69	3822	Automatic controls for regulating residential and commercial environments and appliances	0.46	3111	Leather tanning and finishing	0.46
3671	Radio and television receiving type electron tubes, except cathode ray	-0.69	2646	Pressed and molded pulp goods	0.47	3661	Telephone and telegraph apparatus	0.47
2048	Prepared feeds and feed ingredients for animals and fowls, not elsewhere	-0.69	3825	Instruments for measuring and testing of electricity and electrical signals	0.47	2311	Men's, youths', and boys' suits, coats, and overcoats	0.47

	classified							
3624	Carbon and graphite products	-0.69	3519	Internal combustion engines, not elsewhere classified	0.49	2951	Paving mixtures and blocks	0.49
2293	Paddings and upholstery filling	-0.68	2521	Wood office furniture	0.49	3581	Automatic merchandising machines	0.49
2591	Drapery hardware and window blinds and shades	-0.68	3693	Radiographic X-ray, fluoroscopic X-ray, therapeutic X-ray, and other X-ray apparatus and tubes; electromedical and electrotherapeutic apparatus	0.49	3172	Personal leather goods, except women's handbags and purses	0.49
3274	Lime	-0.67	2731	Books: publishing, publishing and printing	0.51	3547	Roiling mill machinery and equipment	0.51
2492	Particleboard	-0.66	2621	Paper mills, except building paper mills	0.54	2295	Coated fabrics, not rubberized	0.54
3564	Blowers and exhaust and ventilation fans	-0.66	3555	Printing trades machinery and equipment	0.54	2352	Hats and caps, except millinery	0.54
2396	Automotive trimmings, apparel findings, and related products	-0.66	3843	Dental equipment and supplies	0.54	2351	Millinery	0.54
2292	Lace goods	-0.66	2022	Cheese, natural and processed	0.55	3332	Primary smelting and refining of lead	0.55
2262	Finishers of broad woven fabrics of man-made fiber and silk	-0.65	2514	Metal household furniture	0.56	2298	Cordage and twine	0.56
2221	Broad woven fabric mills, manmade fiber and silk	-0.65	3554	Paper industries machinery	0.57	2097	Manufactured ice	0.57
2017	Poultry and egg processing	-0.65	2654	Sanitary food containers	0.59	2449	Wood containers, not elsewhere classified	0.59
2016	Poultry dressing plants	-0.65	3494	Valves and pipe fittings, except plumbers' brass goods	0.60	3553	Woodworking machinery	0.60
2631	Paperboard mills	-0.65	3586	Measuring and dispensing pumps	0.61	3691	Storage batteries	0.61
2411	Logging camps and logging con-tractors	-0.65	2283	Yarn mills, wool, including carpet and rug yarn	0.62	2431	Millwork	0.62
3991	Brooms and brushes	-0.65	3425	Hand saws and saw blades	0.62	3931	Musical instruments	0.62
2363	Girls', children's, and infants' coats and suits	-0.64	2843	Surface active agents, finishing agents, sulfonated oils and	0.62	2519	Household furniture, not elsewhere classified	0.62

			assistants					
3361	Aluminum foundries (castings)	-0.64	3629	Electrical industrial apparatus, not elsewhere classified	0.62	2066	Chocolate and cocoa products	0.62
3534	Elevators and moving stairways	-0.63	3699	Electrical machinery, equipment and supplies, not elsewhere classified	0.62	2065	Candy and other confectionery products	0.62
3041	Rubber and plastics hose and belting	-0.62	3715	Truck trailers	0.63	3151	Leather gloves and mittens	0.63
3333	Primary smelting and refining of zinc	-0.62	2833	Medicinal chemicals and botanical products	0.63	3567	Industrial process furnaces and ovens	0.63
2643	Bags, except textile bags	-0.62	3334	Primary production of aluminum	0.64	3633	Household laundry equipment	0.64
2076	Vegetable oil mills, except corn, cottonseed, and soybean	-0.61	3211	Fiat glass	0.64	3582	Commercial laundry, dry cleaning, and pressing machines	0.64
2895	Carbon black	-0.60	2381	Dress and work gloves, except knit and all-leather	0.65	3561	Pumps and pumping equipment	0.65
3545	Machine tool accessories and measuring devices	-0.60	3357	Drawing and insulating of non-ferrous wire	0.70	2111	Cigarettes	0.70
3315	Steel wire drawing and steel nails and spikes	-0.58	3873	Watches, clocks, clockwork operated devices, and parts	0.70	2834	Pharmaceutical preparations	0.70
3496	Miscellaneous fabricated wire products	-0.58	3495	Wire springs	0.71	2812	Alkalies and chorine	0.71
3692	Primary batteries, dry and wet	-0.57	3493	Steel springs, except wire	0.74	2874	Phosphatic fertilizers	0.74
3631	Household cooking equipment	-0.56	3469	Metal stampings, not elsewhere classified	0.74	2875	Fertilizers, mixing only	0.74
3433	Heating equipment, except electric and warm air furnaces	-0.55	2752	Commercial printing, lithographic	0.75	3331	Primary smelting and refining of copper	0.75
2086	Bottled and canned soft drinks and carbonated waters	-0.55	3861	Photographic equipment and supplies	0.77	2294	Processed waste and recovered fibers and flock	0.77
3842	Orthopedic, prosthetic, and surgical appliances and supplies	-0.54	2024	Ice cream and frozen desserts	0.78	2026	Fluid milk	0.78
2771	Greeting card publishing	-0.54	3463	Nonferrous forging.	0.85	2992	Lubricating oils and greases	0.85

3149	Footwear, except rubber, not elsewhere classified	-0.54	3679	Electronic components, not elsewhere classified	0.85	2911	Petroleum refining	0.85
2342	Brassieres, girdles, and allied garments	-0.54	3678	Connectors, for electronic applications	0.94	2095	Roasted coffee	0.94
2542	Metal partitions, shelving, lock-era, and office and store fixtures	-0.53	2721	Periodicals: publishing, publishing and printing	0.96	3662	Radio and television transmitting, signaling, and detection equipment and apparatus	0.96
2329	Men's, youths', and boys' clothing, not elsewhere classified	-0.53	2655	Fiber cans, tubes, drums, and similar products	1.20	2296	Tire cord and fabric	1.20
2369	Girls', children's, and infants' outerwear, not elsewhere classified	-0.53	2384	Robes and dressing gowns	1.22	3944	Games, toys, and children's vehicles; except dolls and bicycles	1.22
3949	Sporting and athletic goods, not elsewhere classified	-0.53	3229	Pressed and blown glass and glassware, not elsewhere classified	1.29	2098	Macaroni, spaghetti, vermicelli, and noodles	1.29
2371	Fur goods	-0.53	3613	Switchgear and Switchboard apparatus	1.37	3171	Women's handbags and purses	1.37
2253	Knit outerwear mills	-0.51	2043	Cereal breakfast foods	1.49	2386	Leather and sheep lined clothing	1.49
2339	Women's, misses', and juniors' outerwear, not elsewhere classified	-0.51	3272	Concrete products, except block and brick	1.50	2299	Textile goods, not elsewhere classified	1.50
3264	Porcelain electrical supplies	-0.51	3465	Automotive stampings	1.62	2041	Flour and other grain mill products	1.62
3444	Sheet metal work	-0.51	3714	Motor vehicle parts and accessories	1.62	2045	Blended and prepared flour	1.62
3537	Industrial trucks, tractors, trailers, and stackers	-0.50	3592	Carburetors, pistons, piston rings and valves	1.68	3251	Brick and structural clay tile	1.68
2512	Wood household furniture, up-holstered	-0.50	3574	Calculating and accounting machines, except electronic computing equipment	1.69	3449	Miscellaneous metal work	1.69
2271	Woven carpets and rugs	-0.49	3851	Ophthalmic goods	1.69	3259	Structural clay products, not elsewhere classified	1.69
3915	Jewelers' findings and	-0.49	3799	Transportation equipment, not	1.71	2087	Flavoring extracts and	1.71

	materials, and lapidary work Rolling, drawing, and extruding 'of nonferrous metals, except copper and aluminum		elsewhere classified			flavoring sirups, not elsewhere classified	
3356		-0.49	2813 Industrial gases	1.79	2121	Cigars	1.79
			Cyclic (coal tar) crudes, and cyclic intermediates, dyes, and organic pigments (lakes and toners)				
2391	Curtains and draperies	-0.48	2865	7.18	2393	Textile bags	7.18



## Trade with New Partners vs. Shift in Trade Patterns within Same Set of Partners

Our index  $\Delta IEPIP$  is calculated using shift in trade weights between 1972 and 1990. The shift in weights may be attributed either due to the initiation of industry-level trade with new trading partners (where industry-partner trade was zero in 1972 and strictly positive in 1990) or to a change in relative shares between the same set of trading partners for each industry.<sup>1</sup> When we examine the summary statistics, we see that in 1990, 20% of industry-partner observations in 1990 may be attributed to this initiation of trade with new partners. Out of these observations, 10 countries account for 28% of new trade – China, Thailand, Malaysia, Costa Rica, Chile, Indonesia, South Korea, Venezuela, New Zealand and Philippines. All except New Zealand score low on the  $IEPIP$  index. In other words, the rise in new trades is also overwhelmingly skewed towards countries with weak  $IEPIP$  protection.

In the table below we show how the coefficient on  $\Delta IEPIP$  changes if we restrict each industry's trading partners to exactly the same ones in 1990 as the ones in 1979. Columns 1 and 2 reproduce the results from Table 3a in the paper without any restrictions on trading partners. Columns 1' and 2' use the same specifications in Columns 1 and 2 but restrict the sample to the same set of trading partners in each industry. First, we see that  $\Delta IEPIP$  continues to remain negative and significant so our main empirical results continue to be supported. Second, since the absolute value (and significance) of the coefficient on  $\Delta IEPIP$  is larger in the full sample, it indicates that the switch from zero to positive trade has occurred mainly in countries with weak IPR regimes. This further strengthens our empirical contention of skill-deepening driven by a rise in trade with weak patent laws and their enforcement.

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<sup>1</sup> . For the US manufacturing sector as a whole, the number of trading partners in 1972 is the same as the number of trading partners in 1990. In other words, the set of countries with whom at least one industry had strictly positive trade flows are the same in 1972 and 1990.

**Effect of Change in Effectiveness of Protection of Intellectual Property of Trading Partners on Change in Nonproduction Wage Share (1979-90)**

	(1)	(1')	(2)	(2')
	All	Restricted	All	Restricted
<i>effectiveness of protection of intellectual property</i> ( $\Delta IEP$ )	-0.447** (0.181)	-0.322** (0.156)	-0.400** (0.168)	-0.284* (0.146)
$\Delta \ln(K/Y)$	0.075*** (0.015)	0.068*** (0.013)	0.051*** (0.014)	0.045*** (0.013)
$\Delta \ln(Y)$	0.043*** (0.010)	0.038*** (0.009)	0.021** (0.009)	0.018** (0.009)
<i>outsourcing (narrow)</i>	0.270*** (0.058)	0.268*** (0.055)	0.195*** (0.056)	0.195*** (0.053)
<i>outsourcing (other)</i>	0.044 (0.069)	0.054 (0.066)	-0.086 (0.070)	-0.074 (0.067)
<i>computer investment</i>			0.024*** (0.004)	0.024*** (0.004)
<i>Constant</i>	0.082 (0.074)	0.127** (0.065)	0.030 (0.072)	0.074 (0.064)
<i>Observations</i>	418	418	418	418
<i>Overall model test</i>	12.97***	13.80***	16.78***	17.93***

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.

All regressions and means are computed over 418 four-digit SIC industries and are weighted by the average industry share of the manufacturing wage bill.  $\Delta \ln(K/Y)$  is the average annual change in the log capital-shipments ratio, and  $\Delta \ln(Y)$  is the average annual change in log real shipments. The imitation threat, outsourcing variables, income and openness measures are in annual changes. The instruments are based on trading partners' tariffs, import duties, and sectoral export share in world exports.