America's Online Jobs

Conceptualizations, Measurements, and Influencing Factors

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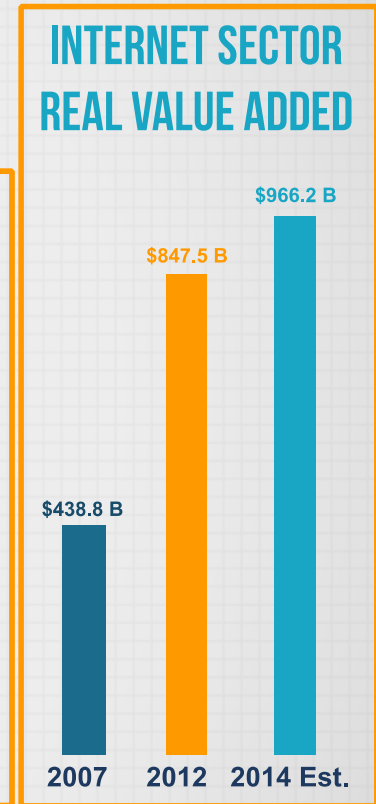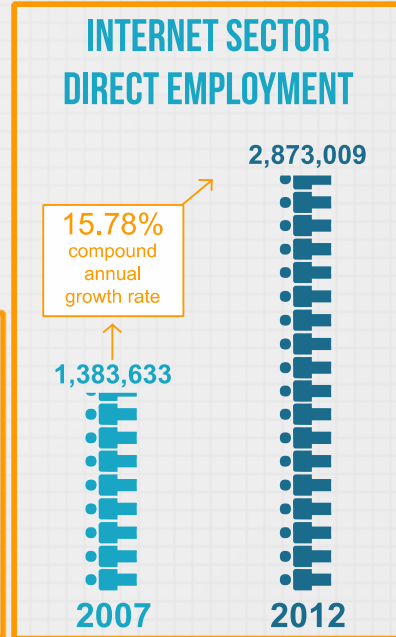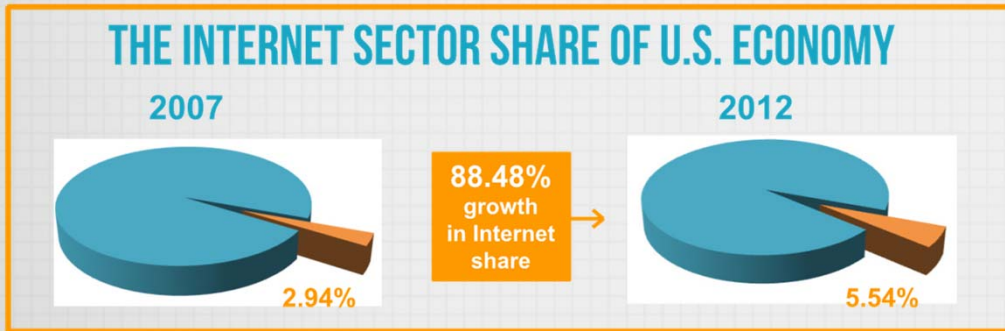Chief Economist & Head of Research, Internet Association
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Internet Sector Macroeconomic

- 6% of US GDP (2014)
- 3.0-3.6 million jobs
- 2007-2014: Internet GDP doubled
- 2007-2012: Internet employment % grew 7x faster than next closest industry

THE INTERNET SECTOR SHARE OF U.S. ECONOMY

2007

2.94%

88.48% growth in Internet share →

2012

5.54%

INTERNET SECTOR DIRECT EMPLOYMENT

2,873,009

15.78% compound annual growth rate

1,383,633

2007   2012

INTERNET SECTOR REAL VALUE ADDED

$966.2 B

$847.5 B

$438.8 B

2007   2012   2014 Est.

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Internet Sector Microeconomic

	44 Members	
	Total	**Average**
Combined Market Capitalization & Valuation	$ 3.351 trillion	$ 76.2
Combined Annual Revenue	$ 504.3 billion	$ 11.5
Combined Annual Profit	$ 196.4 billion	$ 4.5
Combined Number of Employees	751,064	17,070

All figures are estimates based on publicly available, company-reported figures

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How many people participate in the online 'labor market'?
What is the correct conceptualization for online work?

America's Online Jobs

Articles	Term Used	Definition
Farrell & Greig (2016)	Online work platform	"Marketplace for work by unbundling a job into discrete tasks and directly connecting individual sellers with consumers. These flexible, highly accessible opportunities to work generate earnings that are volatile by choice."
Hathaway & Muro (2016); Muro (2016)	Gig economy	"App-based freelancing" (operationalized by the number of non-employer firms)
Harris & Krueger (2015)	Independent worker	Those who can choose their work (like independent contractors) but are restricted by an intermediary on how much they can charge for goods and services
Katz & Krueger (2016)	Alternative work arrangements	Non-traditional work as the individual's main job, such as temporary help, on-call jobs, independent contract work, and freelancers (with emphasis on subset of those direct selling using online intermediaries)
Manyika et al. (2016)	Independent work	Work with 3 distinctive features: 1) high level of control and autonomy, 2) payment by task, assignment, or sale, and 3) short-term duration
Robles & McGee (2016)	Enterprising and informal work activity (online)	Paid work related to 1) completion of online tasks through websites, 2) renting out property through websites, flyers, and ads, 3) selling or new or used goods, and handcrafts through websites, and 4) other online paid activities
Smith (2016)	Shared, collaborative, and on-demand goods and services	Use of one or more of the following services: 1) purchasing used or second-hand goods online, 2) using programs offering same-day or expedited delivery, 3) purchasing tickets from an online reseller, 4) purchasing handmade or artisanal products online, 5) contributing to an online fundraising project, 6) using ride-hailing apps, 7) ordering delivery of groceries online from local store, 8) working in a shared office space, 9) hiring someone online for errand/task, and 10) renting clothing, other products for a short time online
Torpey & Hogan (2016)	Gig work	"Single project or task for which a worker is hired, often through a digital marketplace, to work on demand"
Upwork (2016)	Freelancers	"Individuals who have engaged in supplemental, temporary, project- or contract-based work, within the past 12 months"

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America's Online Jobs

Authors	Percent finding	Applicable population	Volume Estimate
Farrell & Greig (2016)	4% (over 2012-2015) 1% in September 2015	205,354,000*	2.9 million 2.1 million
Harris & Krueger (2015)	0.4%	249,454,440**	1.0 million
Katz & Krueger (2016)	0.453%	249,454,440**	1.1 million
Manyika et al. (2016)	3-5%	165,145,000***	5.0-8.3 million
Robles & McGee (2016)	7%	205,354,000*	14.4 million

*Adults (ages 15-64), OECD
**Adults (ages 18 or older), Census Bureau
***US Labor force (2017), Bureau of Labor Statistics

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Is "How many *people* participate in the online 'labor market'?" the right question?

America's Online Jobs Concept

Popular components:
- ~~The short-term nature of the transactions~~
- ~~High degree of worker autonomy~~
- The use of an online intermediary

Conceptual issues:
- Cannot tie each one to unique 'individuals'
- Current definitions rely on traditional labor market concepts
  - Work, jobs, contract, task, etc.
- Sharing economy terminology
  - Gig, sharing, freelance, etc.

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America's Online Jobs Definition

Online income positions
The paper defines *online income positions* as registered commercial positions that are 1) facilitated through online intermediaries, which also serve as financial intermediaries in the transactions, and 2) that allow an individual or business to earn revenue.
Online income opportunities
**Online income participants*

America's Online Jobs Methodology

Survey of Internet Association's 40+ member companies in the Spring and Summer of 2017

Targeted set of five variables/indicators for 2012-2017 and for multiple geographic aggregations within the United States

      *Included an indicator for *online income positions*

      **All data anonymized

Explanations for how each of the five variables was conceptualized within the activity type of each specific companies

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America's Online Jobs Methodology

Survey issues:

- Incomplete reporting - the report utilized publicly available data provided exclusively from company-produced and or company-reported materials

- Variation of company-reported data in terms of the years of observation and geographic aggregation

America's Online Jobs Results

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Hooton (2017)	**23.9 million******		

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***US Labor force (2017), Bureau of Labor Statistics
****OIPs, current report

America's Online Jobs Policy Implications

- Much larger number of OIPs exist than have previously been estimated

- OIPs are distributed across all 50 states and the District of Columbia
  - More concentrated in the top states than traditional employment;
  - Less tied to population than traditional employment

- Key drivers
  - Relative income to cost factors
  - Internet accessibility
  - Exposure to the internet sector more broadly
  - Not (un)employment levels

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America's Online Jobs Conclusion

- Using estimates of income per OIP, $72 billion to $478 billion of additional economic activity and income for individuals
  - *Construction Services Industry* sector ~ $1 trillion, but
  - NOT about determining exact economic contributions

- Removal of market barriers

- The main lesson of the paper, and the OIP market more generally, is that our conceptualizations of what work should be like are exceptionally outdated

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Thank you!

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Our Members

Internet Association is the only trade association that exclusively represents leading global internet companies on matters of public policy.

Our mission is to foster innovation, promote economic growth, and empower people through the free and open internet.

We believe the internet creates unprecedented benefits for society, and as the voice of the world's leading internet companies, Internet Association works to ensure legislators, consumers, and other stakeholders understand these benefits.

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TABLE A-4
NAICS INDUSTRY CLASSIFICATIONS THAT INCLUDE INTERNET ACTIVITIES

NAICS CODE	INDUSTRY TITLE
Product Line Receipts	
518210	Data processing, hosting and related services
5171	Wired Telecommunications carriers
5172	Wireless telecommunications carriers (except satellite)
517919	All Other Telecommunications
51913	Internet publishing and broadcasting and Web Search Portals
54151	Computer Systems Design and related services
E-Commerce Retail	
45411	Electronic shopping
454112	Electronic auction
Selected Services	
Various	Selected Services - E-Commerce

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|	Minimum	Median	Mean	Max
Online Income Positions	19,839	206,666	467,972	5,822,078
Internet Employment	3,570	35,982	70,663	529,832
Total Internet-Supported Positions	25,062	246,625	538,635	6,351,911
Total employment (any industry)	265,800	1,894,200	2,818,627	16,923,300
Population	585,501	4,436,974	6,335,834	39,250,017
GDP Per Capita	$35,160	$52,130	$55,950	$159,400
Poverty Rate	8.5%	15.3%	15.0%	22.6%
Unemployment Rate	2.3%	4.2%	4.2%	6.7%

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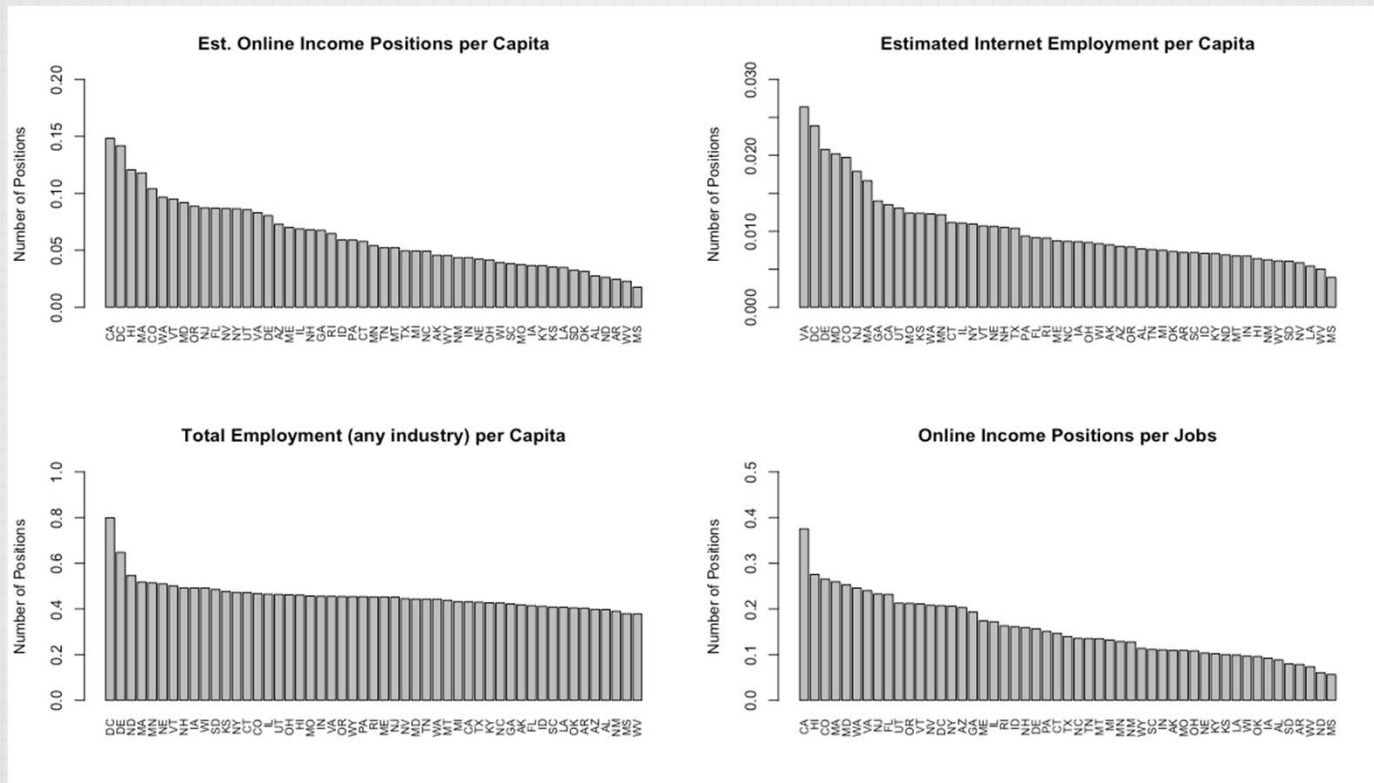IA **Internet** Association

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	OIPs (2017)	Total Employment (2017)	Unemployment (2017)	Internet Employees (2014)	Population (2016)	OIPs per Employee	OIPs per capita
CA	5,822,078	16,923,300	4.7%	529,833	39,250,017	0.34	0.15
FL	1,792,347	8,538,900	4.3%	188,525	20,612,439	0.21	0.09
NY	1,707,212	9,332,500	4.4%	216,478	19,745,289	0.18	0.09
TX	1,381,564	11,974,700	4.8%	289,774	27,862,596	0.12	0.05
IL	880,321	5,947,600	4.6%	141,714	12,801,539	0.15	0.07
MA	802,837	3,530,400	4.2%	113,538	6,811,779	0.23	0.12
NJ	780,719	4,042,100	4.1%	160,060	8,944,469	0.19	0.09
PA	754,369	5,799,800	5.0%	119,861	12,784,227	0.13	0.06
WA	703,701	3,227,900	4.5%	89,637	7,288,000	0.22	0.10
VA	698,013	3,831,600	3.8%	221,801	8,411,808	0.18	0.08
CO	576,781	2,588,600	2.3%	109,250	5,540,545	0.22	0.10
ND	19,839	414,400	2.5%	5,224	757,952	0.05	0.03
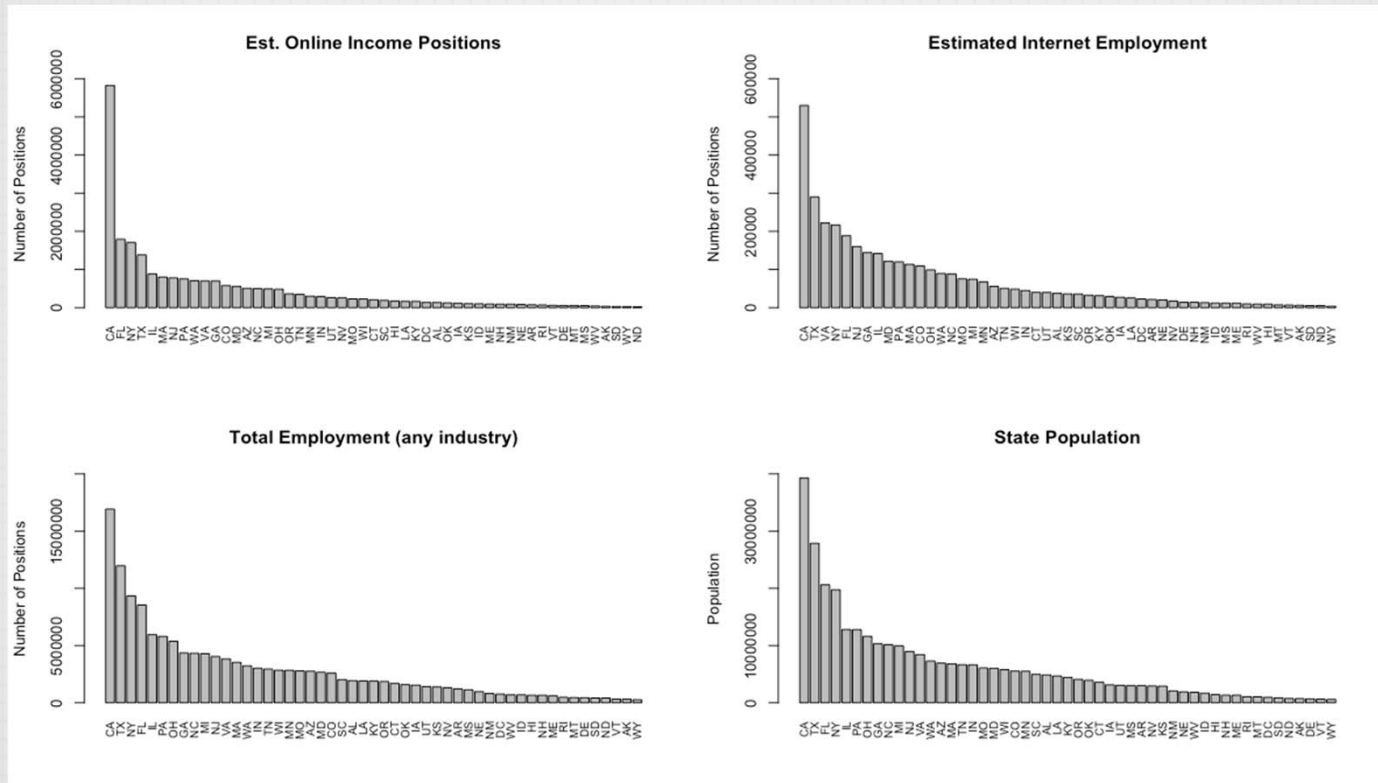
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Internet Association Results

Internet Association Results

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Rank-Size Distributions for US States*

Rank-Size Distributions for Population and Employment in US States*

*(Online Income: Slope = -1.30, r^2 = 0.884; Employment: slope = -1.05, r^2 = 0.8536, Internet Employment: slope = -1.25, r^2 = 0.8576)

*(Online Income: Slope = -1.23, r^2 = 0.7967; Employment: slope = -1.04, r^2 = 0.8471, Internet Employment: slope = -1.19, r^2 = 0.7721)
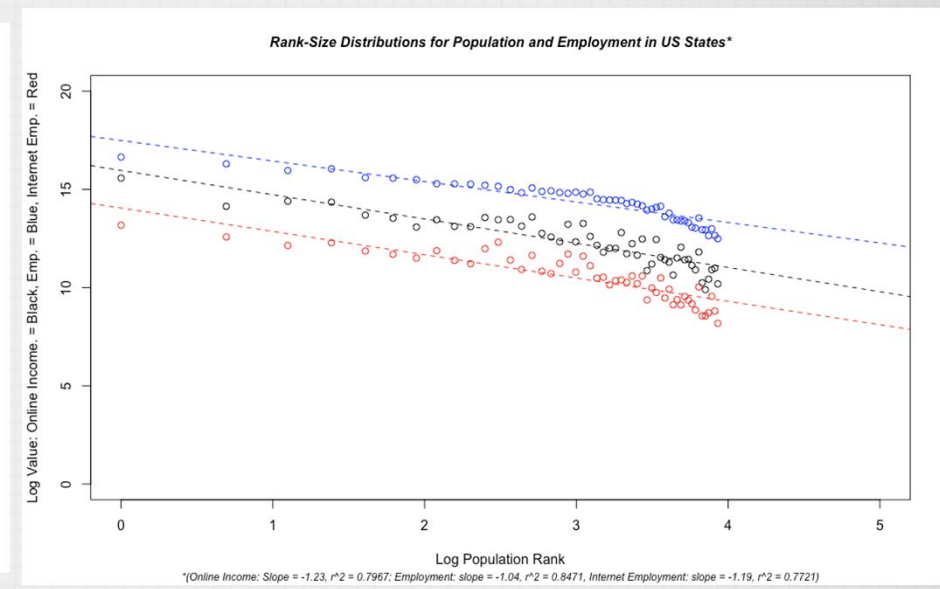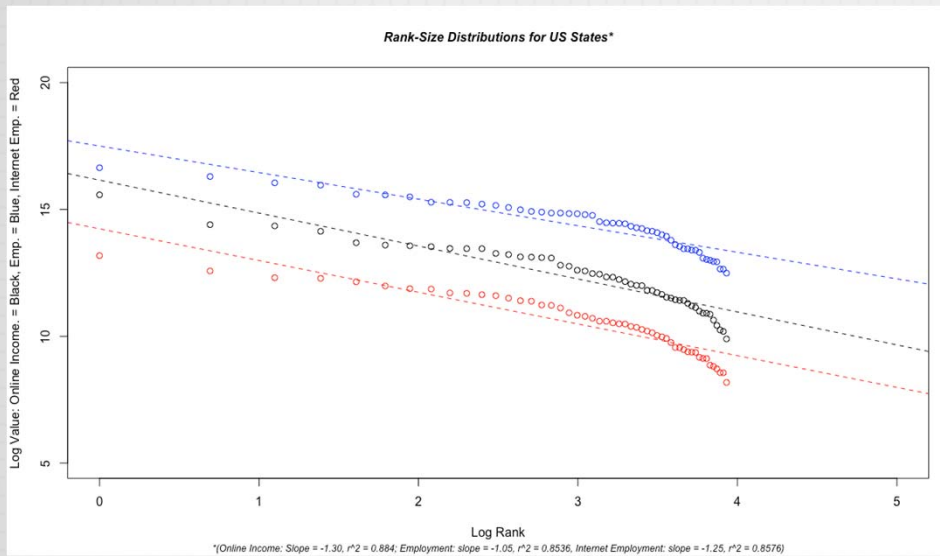
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$$y_i = \beta_{i,0} + \beta_1 x_{i,1} + \beta_2 x_{i,2} + \ldots + \beta_p x_{i,p} + \varepsilon_i$$

Theoretical component	Potential corollary	Expected correlation	Rationale
Traditional labor market health	Population	Positive	Larger number of people who may choose to use OIPs
	Unemployment	Positive	Larger number of people who may need an alternative to a traditional job
Relative costs and incomes	Poverty Rate	Positive	Larger number of people who may desire supplemental income
	GDP per Capita	Negative	
	Cost of Living	Positive	
Access and exposure	Internet sector employment	Positive	Greater familiarity with OIPs and greater willingness to use
	IA Ease of Doing Internet Business Index	Positive	Lower restrictions on the participation in OIP markets
	IA General Business Governance Index	Positive	
	IA Internet Access Index	Positive	

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	Dependent: Log Online Income Positions Per Capita				
	(1)	(2)	(3)	(4)	(5)
Constant	-7.5068***	-1.3843	-7.8453***	-5.8681***	-5.4839***
	(1.8157)	(1.6125)	(1.8586)	(1.5946)	(1.4052)
Log Unemployment Rate	-0.1564	0.3422	-0.1287	-0.0935	
	(0.2083)	(0.2482)	(0.2111)	(0.1781)	
Log Poverty Rate	0.3264	0.1954	0.3099	0.5105**	0.4503**
	(0.2693)	(0.3107)	(0.2705)	(0.2335)	(0.2018)
Log Cost of Living Index	1.9480***		2.0379***	1.3138***	1.2819***
	(0.3309)		(0.3465)	(0.3191)	(0.3108)
Log GDP Per Capita	-0.2947	-0.1844	-0.3334	-0.3034	-0.3244*
	(0.2160)	(0.2490)	(0.2208)	(0.1841)	(0.1782)
Log Internet Sector Employment Per Capita	0.6653***	0.3026*	0.6766***	0.4191***	0.4141***
	(0.1250)	(0.1725)	(0.1259)	(0.1213)	(0.1199)
IA Ease of Int. Bus. Index		0.0278***			
		(0.0072)			
IA General Bus. Governance Index			0.0056		
			(0.0063)		
IA Internet Access Index				0.0126***	0.0127***
				(0.0030)	(0.0029)
Observations	51	51	51	51	51
R^2	0.6787	0.5725	0.6844	0.7719	0.7705
Adjusted R^2	0.6430	0.5251	0.6414	0.7408	0.7450
Residual Std. Error	0.2938 (df = 45)	0.3388 (df = 45)	0.2944 (df = 44)	0.2503 (df = 44)	0.2483 (df = 45)
F Statistic	19.0096*** (df = 5; 45)	12.0549*** (df = 5; 45)	15.9047*** (df = 6; 44)	24.8148*** (df = 6; 44)	30.2091*** (df = 5; 45)

Note: $^{*}p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$

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VIF Scores of Specification 5	
Independent Variable	VIF Score
Log Poverty Rate	1.5343
Log Cost of Living Index	1.8961
Log GDP Per Capita	1.7460
Log Internet Sector Employment Per Capita	2.0083
IA Internet Access Index	2.6137

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Table 8: Bootstrap Error Results (specification 5)							
	R	original	bootBias	bootSE	bootMed	p-value*	95% CI
Constant	2000	-0.6642	0.1129	1.3299	-0.5328	0.4648	(-3.3837, 1.8295)
Poverty Rate	2000	0.4320	-0.0046	0.2161	0.4365	0.4893	(0.0130, 0.8601)
Cost of Living	2000	0.0110	-0.0005	0.0030	0.0110	0.5092	(0.0056, 0.0174)
GDP Per Capita	2000	-0.3375	-0.0150	0.2240	-0.3644	0.5417	(-0.7615, 0.1166)
Internet Sector Employment	2000	0.4205	0.0053	0.1350	0.4257	0.4748	(0.1505, 0.6798)
Internet Access	2000	0.0130	0.0001	0.0030	0.0133	0.4708	(0.0070, 0.0188)

*Difference between sample estimated coefficients and boot estimated coefficients; H0: there is no difference between the original estimate and the bootstrap estimate; no bootstrap estimates values are statistically different from original model estimates

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