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Núcleo de Economia Regional e Urbana
da Universidade de São Paulo

The University of São Paulo
Regional and Urban Economics Lab

Trade in Value-Added: Does MFN Status Matter for Colombian Regions?

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Introduction

This chapter reports on the results of an application with an interregional input-output matrix for Colombia

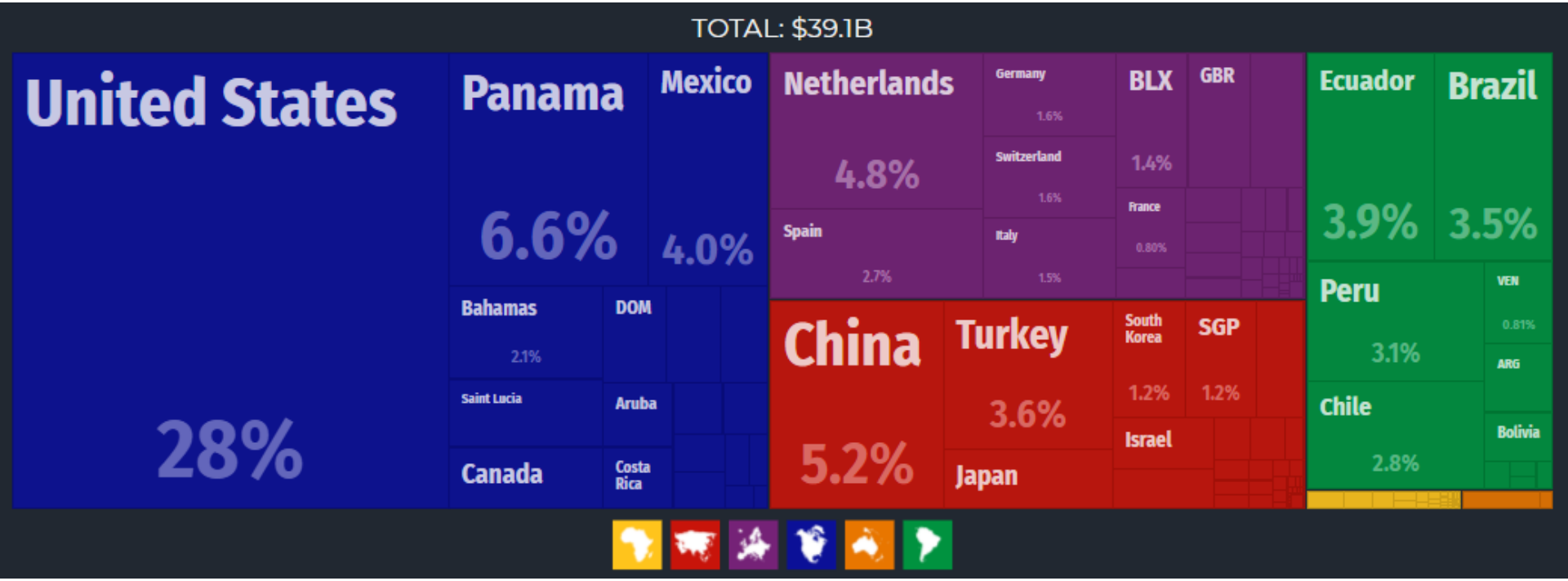
We estimate, for each flow originated in one of the Colombian Departments, measures of trade in value-added

Our measures of trade in value-added reveal different hierarchies of interregional and international trade integration, with implications for regional inequality in the country

The parsimonious approach proposed in Los et al. (2016), based on "**hypothetical extraction**", serves as the methodological anchor

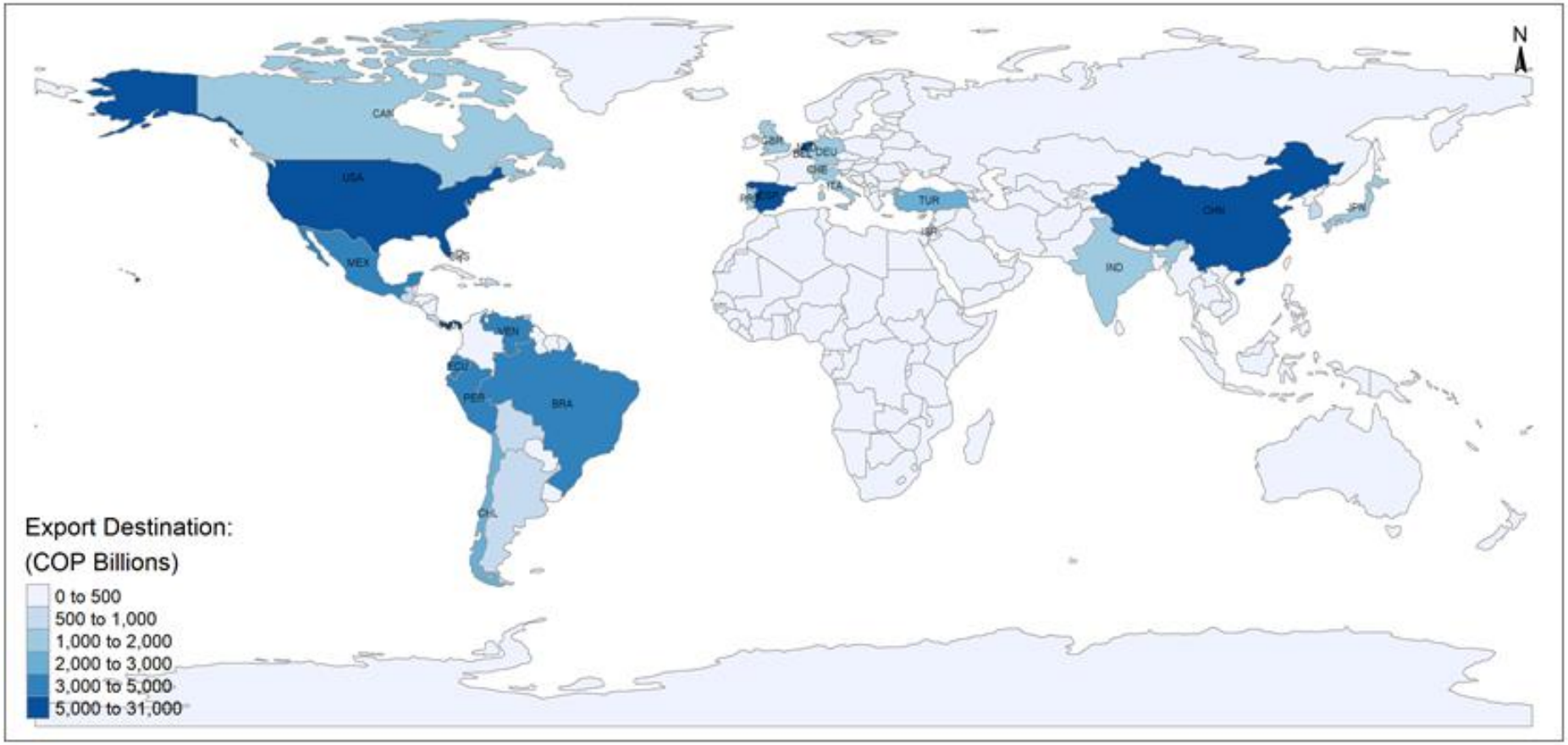
What are the main destinations of Colombian exports?

(2017)

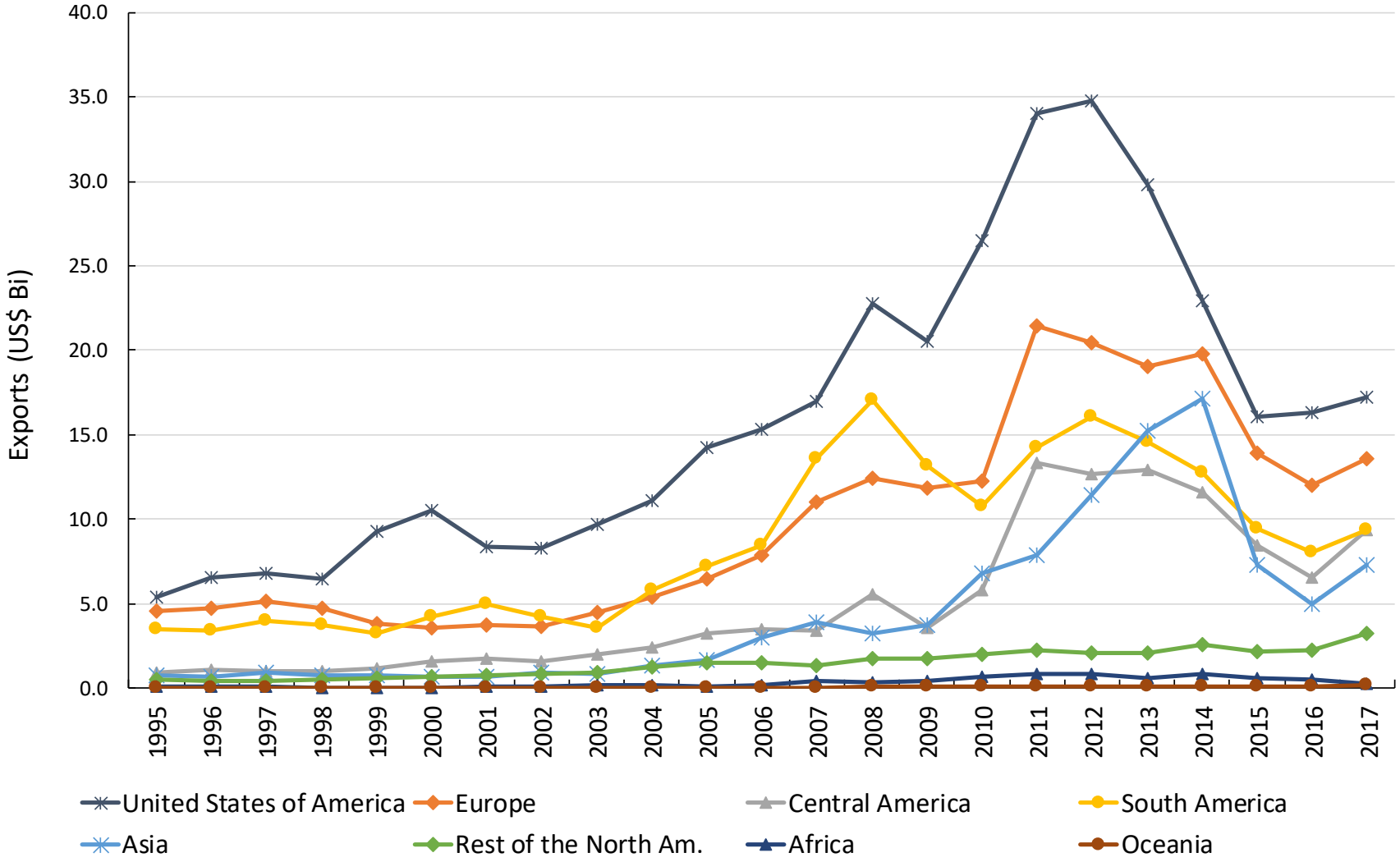


Source: Observatory of Economic Complexity, The MIT Media Lab.

Destination of Colombian exports

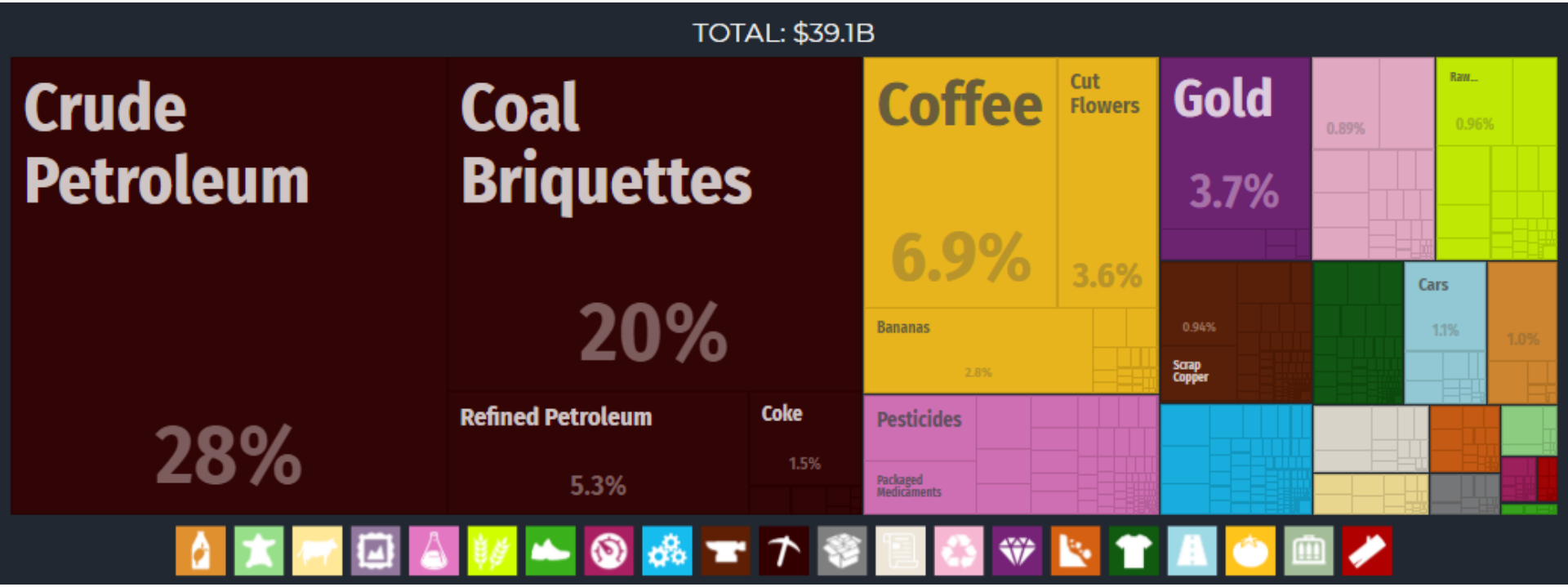


Evolution of Colombian exports: 1995-2017



What does Colombia export?

(2017)



Source: Observatory of Economic Complexity, The MIT Media Lab.

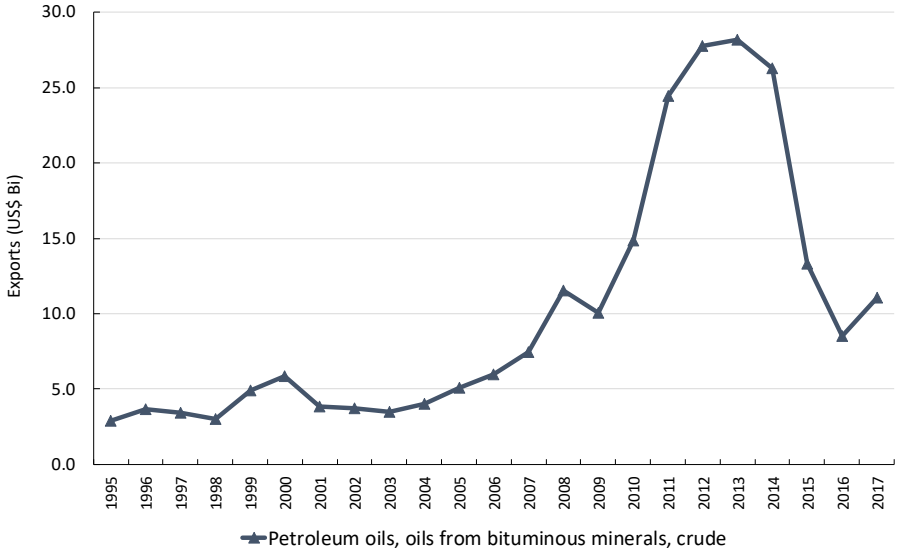
What does Colombia export?

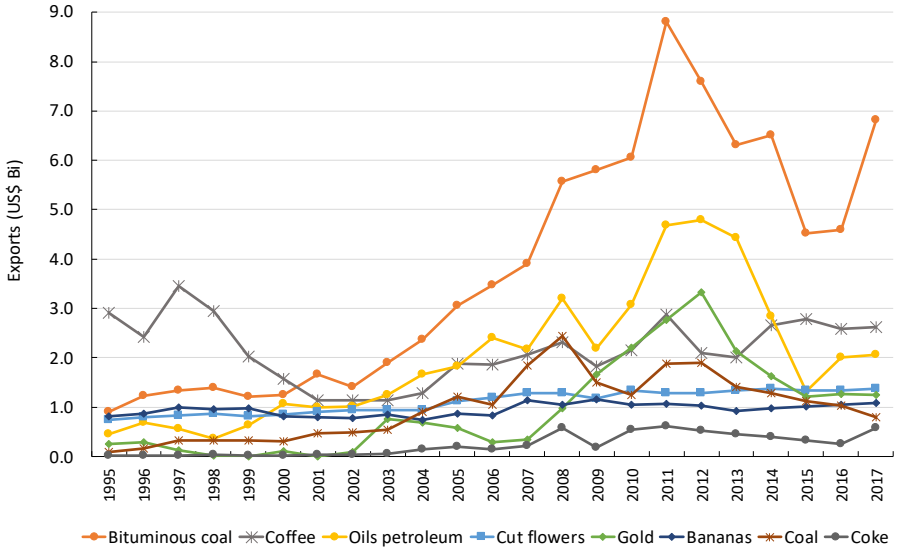
Product	*%*
Petroleum oils, oils from bituminous minerals, crude	28.3
Bituminous coal, not agglomerated	17.5
Coffee, not roasted, not decaffeinated	6.7
Oils petroleum, bituminous, distillates, except crude	5.3
Cut flowers and flower buds for bouquets, etc., fresh	3.5
Gold in unwrought forms non-monetary	3.2
Bananas, including plantains, fresh or dried	2.8
Coal except anthracite or bituminous, not agglomerate	2.0
Coke, semi-coke of coal, lignite, peat & retort carbo	1.5
Sub-total	**70.7**

Where does Colombia export to?

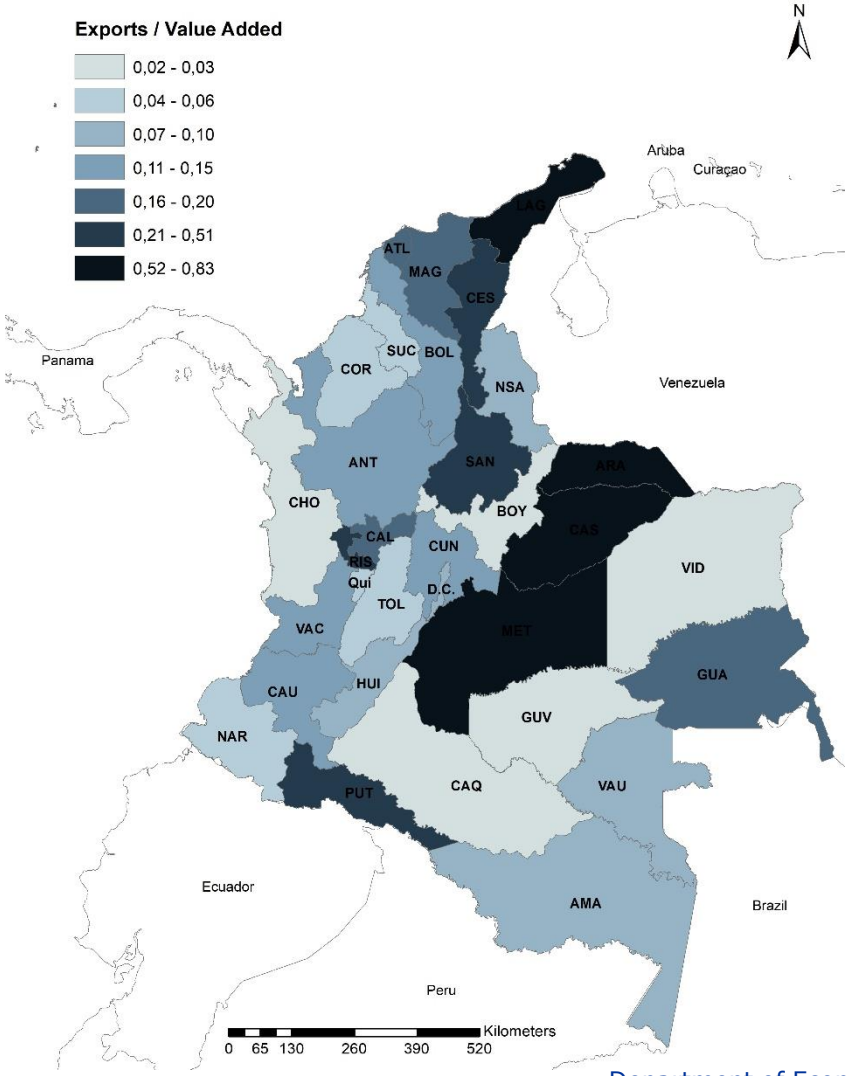
Export Destination	*Product*	*%*
United States of America	**Petroleum oils, oils from bituminous minerals, crude**	11.6
Panama	**Petroleum oils, oils from bituminous minerals, crude**	5.5
China	**Petroleum oils, oils from bituminous minerals, crude**	4.1
Turkey	Bituminous coal, not agglomerated	3.3
United States of America	Coffee, not roasted, not decaffeinated	2.8
United States of America	Cut flowers and flower buds for bouquets, etc., fresh	2.8
Netherlands	Bituminous coal, not agglomerated	2.6
United States of America	Oils petroleum, bituminous, distillates, except crude	2.5
United States of America	Gold in unwrought forms non-monetary	2.2
Bahamas	**Petroleum oils, oils from bituminous minerals, crude**	2.0
Saint Lucia	**Petroleum oils, oils from bituminous minerals, crude**	1.5
Mexico	Bituminous coal, not agglomerated	1.4
Chile	Bituminous coal, not agglomerated	1.3
United States of America	Bituminous coal, not agglomerated	1.1
Spain	Bituminous coal, not agglomerated	1.0
Portugal	Bituminous coal, not agglomerated	1.0
Brazil	Bituminous coal, not agglomerated	0.9
Netherlands	Coal except anthracite or bituminous, not agglomerate	0.9
Belgium	Bananas, including plantains, fresh or dried	0.7
Switzerland	Gold in unwrought forms non-monetary	0.7
Total		**49.9**

Evolution of Colombian exports: 1995-2017

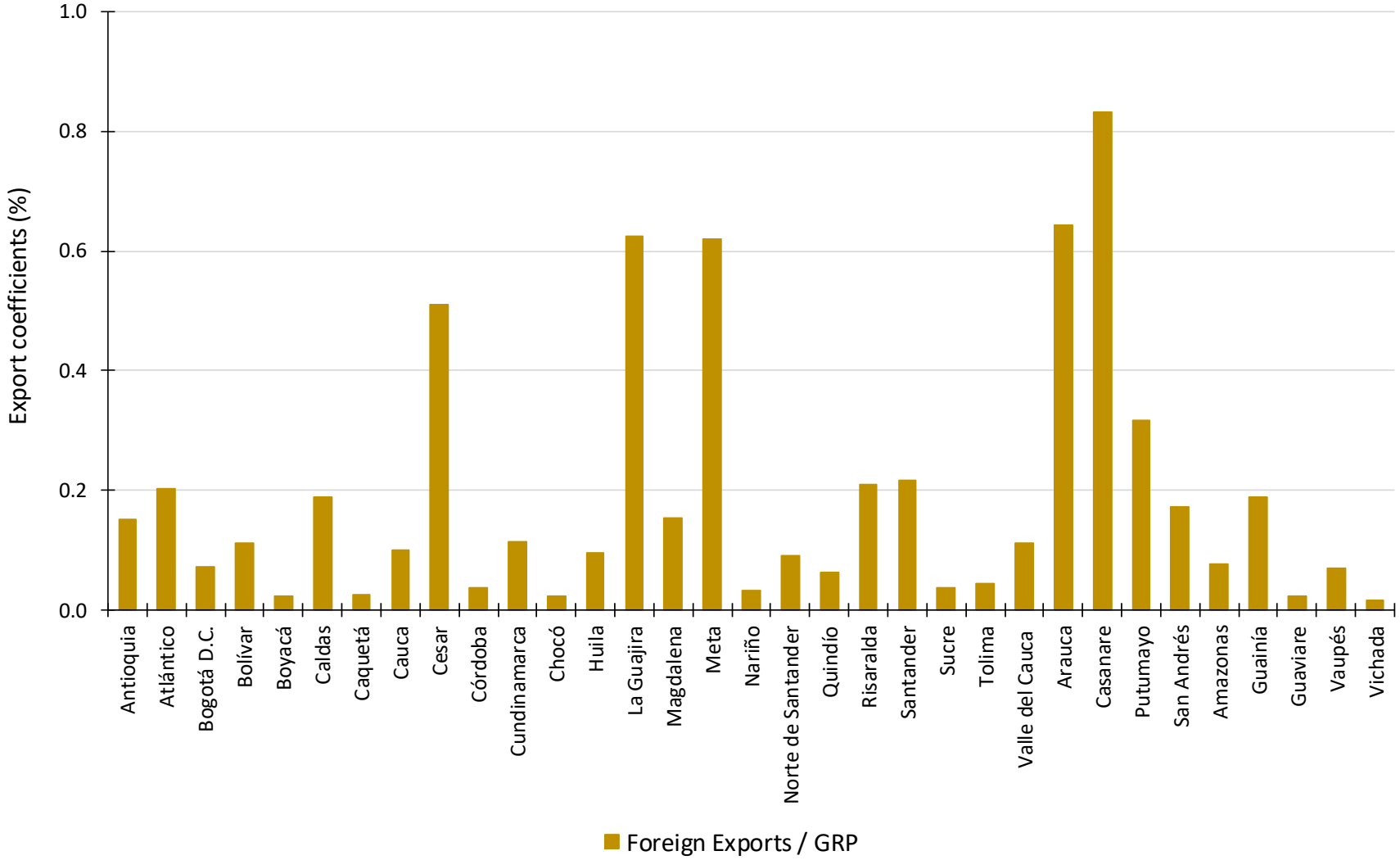




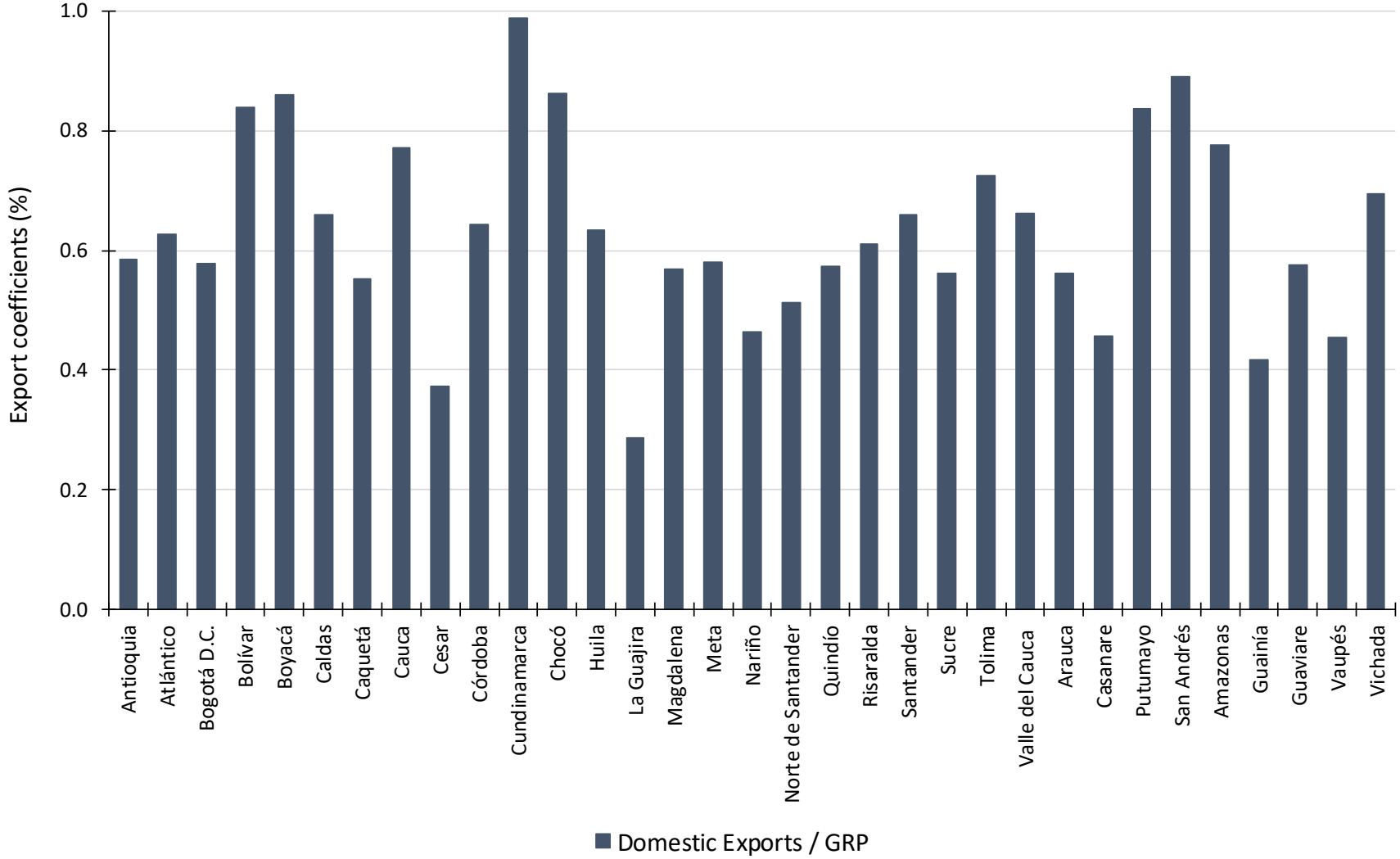
Foreign export coefficient, by Department (2015)



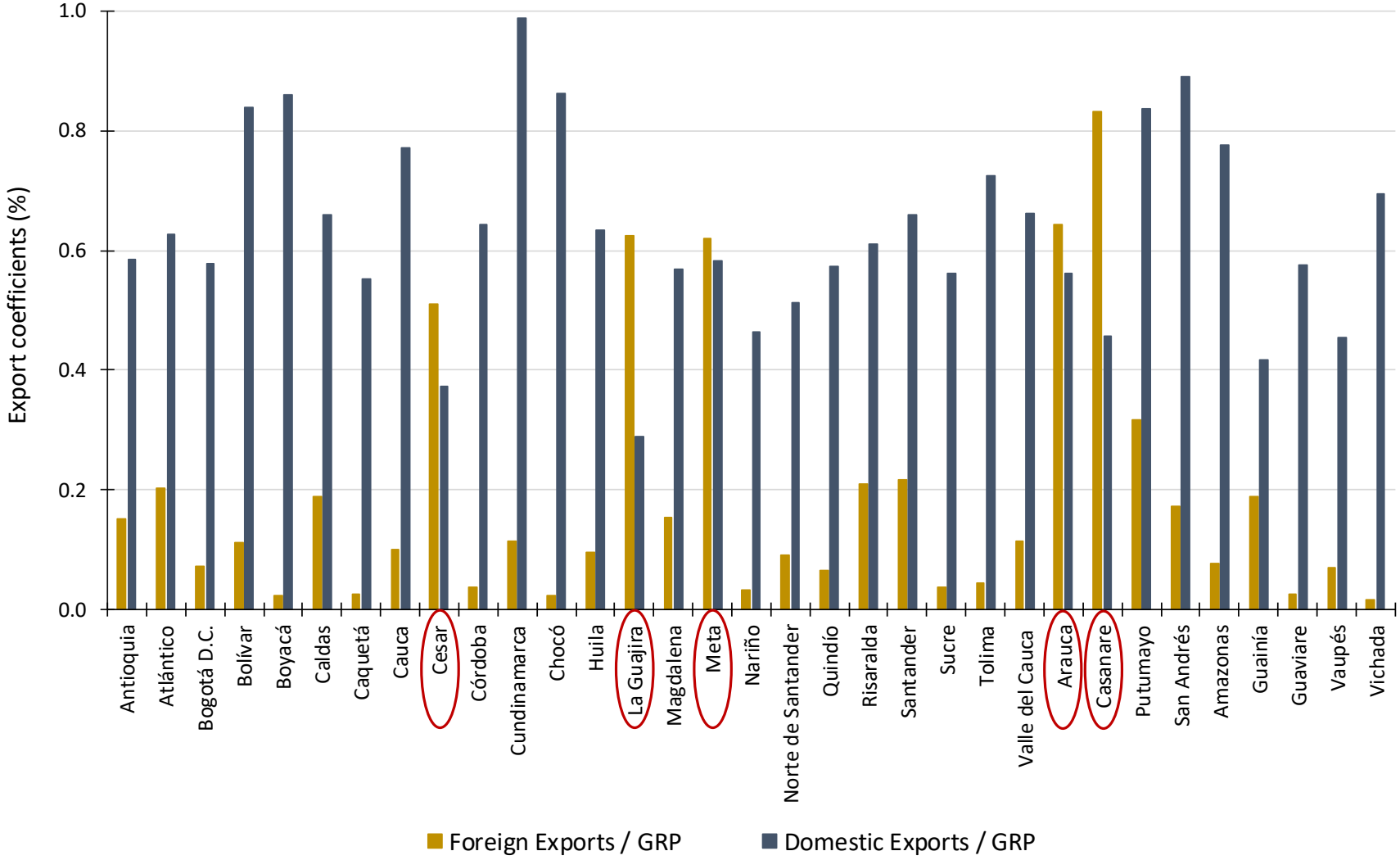
Foreign export coefficient, by Department (2015)



Domestic export coefficient, by Department (2015)



Foreign *vs.* Domestic export coefficient



Measurement of regional value-added in interregional and international trade flows

The national interregional input-output model can be expressed as

$$\begin{bmatrix} \mathbf{x}^1 \\ \vdots \\ \mathbf{x}^n \end{bmatrix} = \begin{bmatrix} \mathbf{A}^{11} & \cdots & \mathbf{A}^{1n} \\ \vdots & \ddots & \vdots \\ \mathbf{A}^{n1} & \cdots & \mathbf{A}^{nn} \end{bmatrix} \begin{bmatrix} \mathbf{x}^1 \\ \vdots \\ \mathbf{x}^n \end{bmatrix} + \begin{bmatrix} \mathbf{f}^{11} & \cdots & \mathbf{f}^{1n} & \mathbf{f}^{\mathbf{1row}} \\ \vdots & \ddots & \vdots & \vdots \\ \mathbf{f}^{n1} & \cdots & \mathbf{f}^{nn} & \mathbf{f}^{\mathbf{nrow}} \end{bmatrix} \mathbf{i}$$

Following Los et al. (2016), the value-added in region 1 (VA_1) can be expressed as

$$VA_1 = \mathbf{v}_1(\mathbf{I} - \mathbf{A})^{-\mathbf{1}}\mathbf{f}\mathbf{i}$$

where $\mathbf{v}_1$ is a row vector with ratios of value-added to gross output in industries in region 1 as first elements ($\tilde{\mathbf{v}}_1$) and zeros elsewhere ($\mathbf{v}_1 = [\tilde{\mathbf{v}}_1 \;\; 0]$); **A** is a technical coefficient matrix; **I** is an identify matrix; **f** is a final demand matrix; **i** is a summation vector

Measurement of regional value-added in interregional and international trade flows (cont.)

In order to attribute the amount of domestic/regional value-added in exports from region 1 to region *n*, we consider a hypothetical world where region 1 does not export anything to region *n*. In this case, the new *VA* or hypothetical *VA* can be represented by

$$VA^*_{1,n} = \mathbf{v}_1(\mathbf{I} - \mathbf{A}^*_{1,n})^{-1}\mathbf{f}^*_{1,n}\mathbf{i}$$

In addition, in order to attribute the amount of domestic/regional value-added in exports from region 1 to the RoW, we consider a hypothetical world where region 1 does not export to the RoW. In this case, the hypothetical VA can be represented as:

$$VA^*_{1,row} = \mathbf{v}_1(\mathbf{I} - \mathbf{A})^{-1}\mathbf{f}^*_{1,row}\mathbf{i}$$

Measurement of regional value-added in interregional and international trade flows (cont.)

We can define the domestic value-added in exports (*DVA*) from region 1 to region *n* as follows:

$$DVA_{1,n} = VA_1 - VA^*_{1,n}$$

We can define DVA in exports from region 1 to the RoW as

$$DVA_{1,row} = VA_1 - VA^*_{1,row}$$

Domestic/regional value-added in trade flows (DVA)

n-countries
(1, 2, …, *n*)

Hypothetical no export	to					
from	R_1	R_2	…	R_{n-1}	R_n	RoW
R_1		$DVA_{1,2}$	…	$DVA_{1,n-1}$	$DVA_{1,n}$	$DVA_{1,row}$
R_2	$DVA_{2,1}$		…	$DVA_{2,n-1}$	$DVA_{2,n}$	$DVA_{2,row}$
⋮	⋮	⋮		⋮	⋮	⋮
R_{n-1}	$DVA_{n-1,1}$	$DVA_{n-1,2}$	…		$DVA_{n-1,n}$	$DVA_{n-1,row}$
R_n	$DVA_{n,1}$	$DVA_{n,2}$	…	$DVA_{n,n-1}$		$DVA_{n,row}$

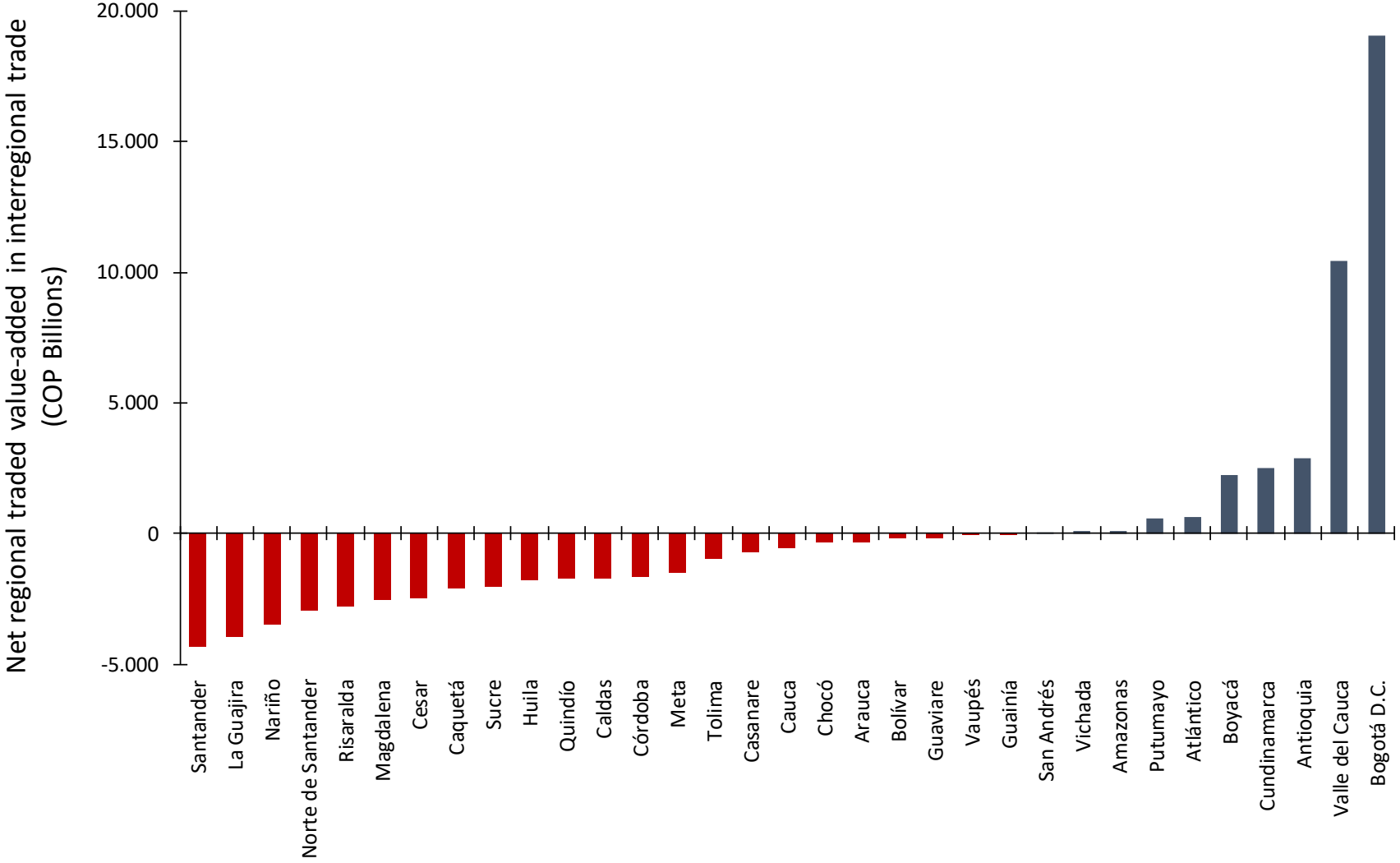
Regional total traded value-added in trade flows: Colombia, 2015 (COP Billions)

	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15	R16	R17	R18	R19	R20	R21	R22	R23	R24	R25	R26	R27	R28	R29	R30	R31	R32	R33	USA	CHN	PAN	ESP	ROW
R1	0	1589	8515	1540	1188	1198	437	860	842	1400	1655	654	1012	736	820	1689	1123	1091	620	1176	3996	737	1147	3600	256	580	175	0	47	31	67	44	61	3958	165	433	223	4691
R2	1356	0	1887	1795	189	124	111	149	510	480	268	61	160	563	1011	528	243	331	91	133	985	415	194	549	103	143	52	0	10	10	17	1	1	1062	97	405	34	1673
R3	9593	2259	0	2287	4437	1639	1089	1794	1547	1890	15369	639	2782	1475	1457	3962	1959	2045	1036	1679	5755	1023	3400	4710	465	1274	269	268	60	50	150	64	92	1647	112	523	48	5342
R4	1452	1639	1883	0	199	111	72	122	358	425	246	41	157	334	408	418	156	230	71	114	937	363	158	534	72	130	36	58	0	6	11	9	0	229	108	79	26	1115
R5	1307	357	3901	375	0	113	43	130	125	121	782	2	164	109	117	946	162	168	74	103	936	86	221	648	66	319	28	0	0	0	8	0	0	117	0	0	38	174
R6	992	118	868	89	97	0	40	115	67	75	154	38	81	56	62	137	111	76	130	405	270	42	127	551	21	38	16	0	2	2	6	0	0	117	31	39	23	551
R7	175	42	217	26	14	22	0	41	15	23	61	4	52	11	18	22	36	17	10	22	56	7	30	121	4	7	7	0	1	0	0	0	0	11	4	3	1	27
R8	1004	166	1165	134	60	213	94	0	65	81	239	23	204	52	74	160	303	86	68	252	338	28	144	1447	27	55	38	0	5	4	3	0	0	107	25	42	11	488
R9	515	344	552	183	51	58	25	45	0	125	118	0	46	182	158	93	48	84	25	56	283	80	60	221	19	24	8	0	0	2	3	0	0	1191	444	172	1285	2248
R10	1068	391	995	317	68	77	43	75	138	0	180	38	52	99	138	131	62	112	49	83	363	286	93	390	25	24	11	0	0	3	5	0	0	50	27	16	7	181
R11	1883	396	16476	284	592	259	144	245	194	224	0	103	365	167	187	513	297	282	160	277	755	107	444	1001	70	131	42	0	0	0	21	0	6	419	214	237	71	2187
R12	631	104	520	28	0	13	5	21	0	26	154	0	0	4	5	19	17	7	10	58	72	8	18	305	0	0	0	0	0	0	0	0	0	10	5	3	1	26
R13	855	134	1235	130	81	225	90	178	64	60	210	27	0	36	67	347	127	49	73	252	281	29	223	493	25	85	61	0	0	0	6	0	0	214	92	69	40	406
R14	211	148	290	89	23	20	13	16	84	38	45	1	15	0	91	49	22	31	11	22	128	25	24	91	10	9	4	0	0	1	1	0	1	1152	431	166	135	1885
R15	476	607	658	220	49	48	25	25	158	98	101	0	41	192	0	85	40	69	24	45	268	58	53	164	16	18	6	0	2	1	0	0	0	131	81	94	27	671
R16	1448	507	2111	942	336	115	50	147	255	160	437	91	196	201	120	0	132	261	64	122	1302	78	190	815	192	703	86	39	7	6	23	5	10	3485	1431	939	669	5340
R17	602	128	700	81	133	106	43	209	43	48	162	22	85	34	40	82	0	43	41	111	199	30	84	629	9	12	23	0	3	2	0	0	0	47	17	16	5	126
R18	582	186	729	146	81	62	29	62	89	90	125	15	56	69	83	162	60	0	29	64	559	51	67	260	64	51	11	0	2	2	3	0	4	77	29	142	12	235
R19	380	51	368	35	30	118	18	63	27	34	83	23	46	22	25	49	44	27	0	216	93	16	82	373	7	13	6	0	0	1	0	0	0	45	9	10	5	102
R20	810	103	724	85	54	336	40	122	60	75	128	50	103	53	57	127	106	71	207	0	231	42	141	570	19	38	17	0	0	2	5	0	0	102	37	86	14	539
R21	3144	847	3213	651	524	301	143	278	424	401	699	87	338	306	382	873	304	722	152	292	0	239	374	1115	150	310	71	0	16	11	24	0	0	1046	144	355	217	2420
R22	378	196	352	182	31	26	0	15	101	224	59	9	22	47	51	43	31	47	15	26	153	0	31	117	0	0	4	0	0	0	0	0	0	31	12	10	5	85
R23	1177	217	1939	186	154	246	73	159	102	107	359	33	283	82	101	268	131	109	131	307	459	55	0	738	32	77	28	0	4	3	0	0	6	109	35	30	24	229
R24	4888	995	5723	802	598	987	450	2067	504	652	1118	406	828	480	507	1157	1558	626	865	1281	1688	380	1014	0	172	383	200	185	39	25	49	24	0	606	205	193	58	3431
R25	224	82	362	53	35	21	10	23	27	31	91	0	13	24	28	81	15	74	11	21	118	0	27	122	0	29	3	11	1	1	2	1	1	494	203	133	95	760
R26	502	131	914	122	135	45	28	64	58	52	207	11	48	52	41	463	49	84	22	35	308	25	77	254	56	0	11	0	0	0	3	2	3	1964	805	529	376	3023
R27	227	59	386	114	31	20	29	41	29	22	50	0	58	23	15	157	73	28	14	22	166	0	36	171	11	27	0	5	0	1	1	0	1	191	78	51	36	299
R28	0	0	391	0	0	0	3	0	0	0	0	0	0	45	0	35	0	0	0	0	0	0	29	120	0	0	2	0	1	0	0	6	1	27	10	8	4	66
R29	64	0	86	0	4	0	6	11	0	0	0	4	0	0	0	9	12	0	0	0	34	0	8	35	2	2	1	12	0	0	0	2	1	6	2	2	1	14
R30	14	4	25	3	0	1	1	1	1	2	3	0	1	1	1	2	2	2	1	1	6	0	1	7	0	0	0	0	0	0	0	0	0	9	3	2	1	22
R31	42	15	66	8	6	4	2	0	0	7	13	0	0	3	6	17	0	5	2	5	16	0	5	27	0	1	0	0	0	0	0	0	0	2	1	1	0	5
R32	14	0	25	2	0	0	1	0	0	0	0	0	0	0	0	3	2	0	0	0	6	0	0	5	0	0	0	9	0	0	0	0	0	2	1	1	0	5
R33	0	7	162	5	0	0	1	15	0	0	4	0	0	7	0	25	0	0	0	0	0	0	13	11	0	7	1	6	1	0	0	0	0	1	0	0	0	3

Regional total traded value-added in trade flows: Colombia, 2015 (%)

	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15	R16	R17	R18	R19	R20	R21	R22	R23	R24	R25	R26	R27	R28	R29	R30	R31	R32	R33	USA	CHN	PAN	ESP	ROW
R1	0.0	3.3	17.6	3.2	2.5	2.5	0.9	1.8	1.7	2.9	3.4	1.4	2.1	1.5	1.7	3.5	2.3	2.3	1.3	2.4	8.3	1.5	2.4	7.4	0.5	1.2	0.4	0.0	0.1	0.1	0.1	0.1	0.1	8.2	0.3	0.9	0.5	9.7
R2	8.6	0.0	12.0	11.4	1.2	0.8	0.7	0.9	3.2	3.1	1.7	0.4	1.0	3.6	6.4	3.4	1.5	2.1	0.6	0.8	6.3	2.6	1.2	3.5	0.7	0.9	0.3	0.0	0.1	0.1	0.1	0.0	0.0	6.7	0.6	2.6	0.2	10.6
R3	11.4	2.7	0.0	2.7	5.3	1.9	1.3	2.1	1.8	2.2	18.3	0.8	3.3	1.8	1.7	4.7	2.3	2.4	1.2	2.0	6.8	1.2	4.0	5.6	0.6	1.5	0.3	0.3	0.1	0.1	0.2	0.1	0.1	2.0	0.1	0.6	0.1	6.3
R4	11.8	13.3	15.3	0.0	1.6	0.9	0.6	1.0	2.9	3.5	2.0	0.3	1.3	2.7	3.3	3.4	1.3	1.9	0.6	0.9	7.6	2.9	1.3	4.3	0.6	1.1	0.3	0.5	0.0	0.0	0.1	0.1	0.0	1.9	0.9	0.6	0.2	9.1
R5	11.1	3.0	33.2	3.2	0.0	1.0	0.4	1.1	1.1	1.0	6.7	0.0	1.4	0.9	1.0	8.1	1.4	1.4	0.6	0.9	8.0	0.7	1.9	5.5	0.6	2.7	0.2	0.0	0.0	0.0	0.1	0.0	0.0	1.0	0.0	0.0	0.3	1.5
R6	17.9	2.1	15.6	1.6	1.7	0.0	0.7	2.1	1.2	1.4	2.8	0.7	1.5	1.0	1.1	2.5	2.0	1.4	2.3	7.3	4.9	0.8	2.3	9.9	0.4	0.7	0.3	0.0	0.0	0.0	0.1	0.0	0.0	2.1	0.6	0.7	0.4	9.9
R7	15.8	3.8	19.6	2.3	1.3	1.9	0.0	3.7	1.4	2.1	5.5	0.4	4.7	1.0	1.6	2.0	3.3	1.5	0.9	2.0	5.1	0.7	2.7	10.9	0.3	0.6	0.6	0.0	0.1	0.0	0.0	0.0	0.0	1.0	0.4	0.3	0.1	2.4
R8	13.9	2.3	16.2	1.9	0.8	3.0	1.3	0.0	0.9	1.1	3.3	0.3	2.8	0.7	1.0	2.2	4.2	1.2	0.9	3.5	4.7	0.4	2.0	20.1	0.4	0.8	0.5	0.0	0.1	0.0	0.0	0.0	0.0	1.5	0.3	0.6	0.2	6.8
R9	5.9	3.9	6.3	2.1	0.6	0.7	0.3	0.5	0.0	1.4	1.3	0.0	0.5	2.1	1.8	1.1	0.6	1.0	0.3	0.6	3.2	0.9	0.7	2.5	0.2	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	13.6	5.1	2.0	14.7	25.7
R10	19.1	7.0	17.8	5.7	1.2	1.4	0.8	1.3	2.5	0.0	3.2	0.7	0.9	1.8	2.5	2.3	1.1	2.0	0.9	1.5	6.5	5.1	1.7	7.0	0.4	0.4	0.2	0.0	0.0	0.0	0.1	0.0	0.0	0.9	0.5	0.3	0.1	3.2
R11	6.5	1.4	57.3	1.0	2.1	0.9	0.5	0.9	0.7	0.8	0.0	0.4	1.3	0.6	0.6	1.8	1.0	1.0	0.6	1.0	2.6	0.4	1.5	3.5	0.2	0.5	0.1	0.0	0.0	0.0	0.1	0.0	0.0	1.5	0.7	0.8	0.2	7.6
R12	30.5	5.0	25.1	1.4	0.0	0.7	0.3	1.0	0.0	1.3	7.4	0.0	0.0	0.2	0.2	0.9	0.8	0.3	0.5	2.8	3.5	0.4	0.9	14.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.3	0.1	0.1	1.2
R13	13.6	2.1	19.7	2.1	1.3	3.6	1.4	2.8	1.0	1.0	3.4	0.4	0.0	0.6	1.1	5.5	2.0	0.8	1.2	4.0	4.5	0.5	3.6	7.9	0.4	1.4	1.0	0.0	0.0	0.0	0.1	0.0	0.0	3.4	1.5	1.1	0.6	6.5
R14	4.0	2.8	5.5	1.7	0.4	0.4	0.2	0.3	1.6	0.7	0.8	0.0	0.3	0.0	1.7	0.9	0.4	0.6	0.2	0.4	2.4	0.5	0.5	1.7	0.2	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	21.8	8.1	3.2	2.6	35.7
R15	10.5	13.3	14.5	4.8	1.1	1.1	0.5	0.5	3.5	2.2	2.2	0.0	0.9	4.2	0.0	1.9	0.9	1.5	0.5	1.0	5.9	1.3	1.2	3.6	0.3	0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	2.9	1.8	2.1	0.6	14.7
R16	6.3	2.2	9.2	4.1	1.5	0.5	0.2	0.6	1.1	0.7	1.9	0.4	0.9	0.9	0.5	0.0	0.6	1.1	0.3	0.5	5.7	0.3	0.8	3.5	0.8	3.1	0.4	0.2	0.0	0.0	0.1	0.0	0.0	15.1	6.2	4.1	2.9	23.2
R17	15.4	3.3	17.9	2.1	3.4	2.7	1.1	5.3	1.1	1.2	4.1	0.6	2.2	0.9	1.0	2.1	0.0	1.1	1.0	2.8	5.1	0.8	2.1	16.1	0.2	0.3	0.6	0.0	0.1	0.0	0.0	0.0	0.0	1.2	0.4	0.4	0.1	3.2
R18	13.6	4.3	17.0	3.4	1.9	1.4	0.7	1.4	2.1	2.1	2.9	0.4	1.3	1.6	1.9	3.8	1.4	0.0	0.7	1.5	13.0	1.2	1.6	6.1	1.5	1.2	0.3	0.0	0.1	0.0	0.1	0.0	0.1	1.8	0.7	3.3	0.3	5.5
R19	15.7	2.1	15.2	1.4	1.2	4.9	0.8	2.6	1.1	1.4	3.4	1.0	1.9	0.9	1.0	2.0	1.8	1.1	0.0	8.9	3.8	0.7	3.4	15.4	0.3	0.5	0.2	0.0	0.0	0.0	0.0	0.0	0.0	1.9	0.4	0.4	0.2	4.2
R20	15.7	2.0	14.0	1.7	1.1	6.5	0.8	2.4	1.2	1.4	2.5	1.0	2.0	1.0	1.1	2.5	2.1	1.4	4.0	0.0	4.5	0.8	2.7	11.1	0.4	0.7	0.3	0.0	0.0	0.0	0.1	0.0	0.0	2.0	0.7	1.7	0.3	10.5
R21	15.3	4.1	15.6	3.2	2.5	1.5	0.7	1.4	2.1	2.0	3.4	0.4	1.6	1.5	1.9	4.2	1.5	3.5	0.7	1.4	0.0	1.2	1.8	5.4	0.7	1.5	0.3	0.0	0.1	0.1	0.1	0.0	0.0	5.1	0.7	1.7	1.1	11.8
R22	16.4	8.5	15.3	7.9	1.3	1.1	0.0	0.7	4.4	9.7	2.6	0.4	0.9	2.0	2.2	1.9	1.4	2.0	0.7	1.1	6.7	0.0	1.3	5.1	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.5	0.4	0.2	3.7
R23	14.7	2.7	24.3	2.3	1.9	3.1	0.9	2.0	1.3	1.3	4.5	0.4	3.5	1.0	1.3	3.4	1.6	1.4	1.6	3.8	5.7	0.7	0.0	9.2	0.4	1.0	0.4	0.0	0.1	0.0	0.0	0.0	0.1	1.4	0.4	0.4	0.3	2.9
R24	13.9	2.8	16.3	2.3	1.7	2.8	1.3	5.9	1.4	1.9	3.2	1.2	2.4	1.4	1.4	3.3	4.4	1.8	2.5	3.6	4.8	1.1	2.9	0.0	0.5	1.1	0.6	0.5	0.1	0.1	0.1	0.1	0.0	1.7	0.6	0.5	0.2	9.8
R25	6.9	2.5	11.2	1.6	1.1	0.7	0.3	0.7	0.8	1.0	2.8	0.0	0.4	0.8	0.9	2.5	0.5	2.3	0.3	0.6	3.6	0.0	0.8	3.8	0.0	0.9	0.1	0.3	0.0	0.0	0.1	0.0	0.0	15.3	6.3	4.1	2.9	23.6
R26	4.8	1.3	8.7	1.2	1.3	0.4	0.3	0.6	0.6	0.5	2.0	0.1	0.5	0.5	0.4	4.4	0.5	0.8	0.2	0.3	2.9	0.2	0.7	2.4	0.5	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	18.7	7.7	5.0	3.6	28.8
R27	9.2	2.4	15.6	4.6	1.3	0.8	1.2	1.6	1.2	0.9	2.0	0.0	2.4	0.9	0.6	6.4	2.9	1.1	0.6	0.9	6.7	0.0	1.5	6.9	0.5	1.1	0.0	0.2	0.0	0.0	0.0	0.0	0.0	7.7	3.1	2.1	1.5	12.1
R28	0.0	0.0	52.3	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	6.0	0.0	4.6	0.0	0.0	0.0	0.0	0.0	0.0	3.9	16.1	0.0	0.0	0.3	0.0	0.1	0.0	0.0	0.8	0.2	3.6	1.3	1.0	0.5	8.8
R29	20.3	0.0	27.3	0.0	1.2	0.0	1.8	3.6	0.0	0.0	0.0	1.2	0.0	0.0	0.0	3.0	3.9	0.0	0.0	0.0	10.9	0.0	2.4	11.0	0.7	0.5	0.2	3.6	0.0	0.0	0.0	0.5	0.2	1.8	0.7	0.5	0.2	4.5
R30	12.1	3.0	20.8	2.2	0.0	1.1	0.7	1.0	1.0	1.4	2.7	0.0	0.9	0.8	1.2	1.9	1.5	1.5	0.7	1.1	5.2	0.0	1.2	6.0	0.2	0.0	0.1	0.0	0.2	0.0	0.0	0.0	0.0	7.5	2.8	2.1	1.0	18.1
R31	16.3	5.9	25.4	3.2	2.4	1.5	0.6	0.0	0.0	2.7	4.9	0.0	0.0	1.3	2.5	6.5	0.0	2.0	0.8	1.8	6.2	0.0	1.9	10.3	0.0	0.5	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.3	0.2	0.1	2.0
R32	18.5	0.0	32.8	2.1	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.5	2.5	0.0	0.0	0.0	8.4	0.0	0.0	7.3	0.3	0.0	0.1	12.3	0.2	0.0	0.0	0.0	0.1	2.5	0.9	0.7	0.3	6.1
R33	0.0	2.6	60.2	2.0	0.0	0.0	0.6	5.5	0.0	0.0	1.4	0.0	0.0	2.4	0.0	9.2	0.0	0.0	0.0	0.0	0.0	0.0	4.8	4.1	0.0	2.7	0.5	2.1	0.2	0.0	0.0	0.0	0.0	0.4	0.2	0.1	0.1	1.0

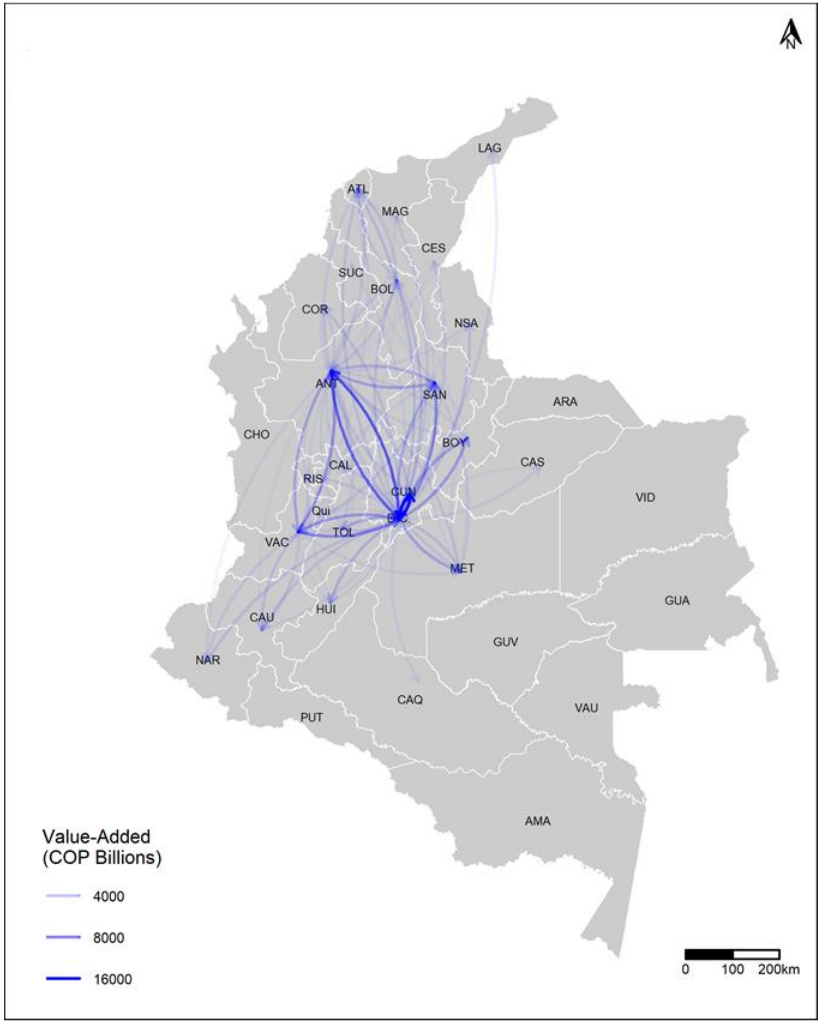
Net balance of traded value-added in interregional trade (COP Billions)



Regional value-added embedded in export flows, by destination

Source	VA (COP Bi)	Share (%)
Interregional Trade	**300,088**	**81.1**
Foreign Exports	**70,160**	**18.9**
United States	18,659	5.0
China	4,860	1.3
Panama	4,790	1.3
Spain	3,490	0.9
Others	38,361	10.4
Total	**370,247**	**100.0**

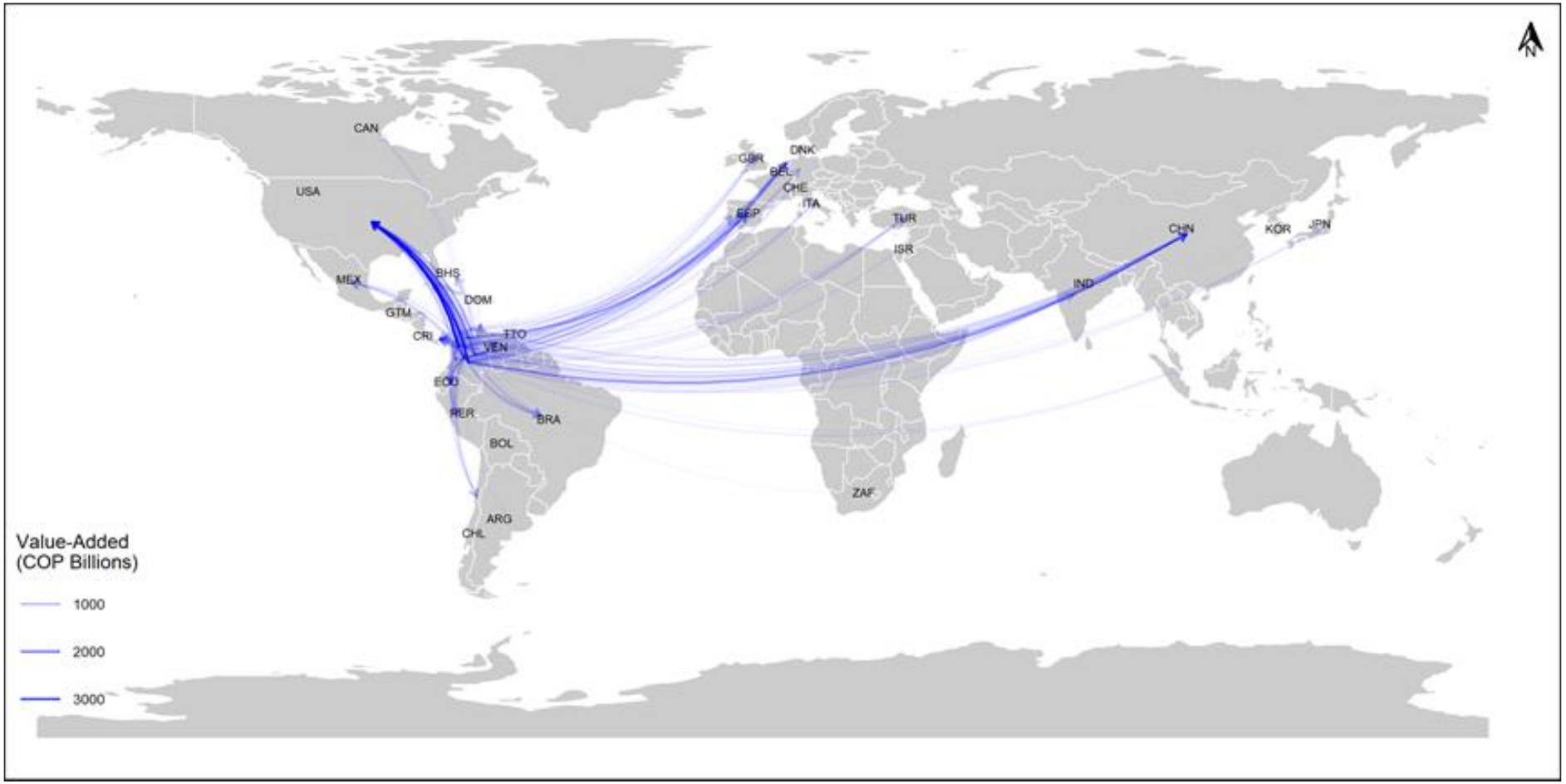
Regional value-added embedded in domestic export flows



Largest value-added in domestic export flows

Location	Partner	VA (COP Bi)
Cundinamarca	Bogotá D.C.	16,476
Bogotá D.C.	Cundinamarca	15,369
Bogotá D.C.	Antioquia	9,593
Antioquia	Bogotá D.C.	8,515
Bogotá D.C.	Santander	5,755

Regional value-added embedded in foreing export flows



Largest value-added in foreign export flows

Location	Partner	VA (COP Bi)
Antioquia	United States	3,958
Meta	United States	3,485
Casanare	United States	1,964
Bogotá D.C.	United States	1,647
Meta	China	1,431

Value-added embodied in Colombian foreign exports by Department

Department	USA	CHN	PAN	ESP	ROW
Antioquia	21.2%	3.4%	9.0%	6.4%	12.2%
Atlántico	5.7%	2.0%	8.4%	1.0%	4.4%
Bogotá D.C.	8.8%	2.3%	10.9%	1.4%	13.9%
Bolívar	1.2%	2.2%	1.7%	0.7%	2.9%
Boyacá	0.6%	0.0%	0.0%	1.1%	0.5%
Caldas	0.6%	0.6%	0.8%	0.7%	1.4%
Caquetá	0.1%	0.1%	0.1%	0.0%	0.1%
Cauca	0.6%	0.5%	0.9%	0.3%	1.3%
Cesar	6.4%	9.1%	3.6%	36.8%	5.9%
Córdoba	0.3%	0.6%	0.3%	0.2%	0.5%
Cundinamarca	2.2%	4.4%	5.0%	2.0%	5.7%
Chocó	0.1%	0.1%	0.1%	0.0%	0.1%
Huila	1.1%	1.9%	1.4%	1.1%	1.1%
La Guajira	6.2%	8.9%	3.5%	3.9%	4.9%
Magdalena	0.7%	1.7%	2.0%	0.8%	1.7%
Meta	18.7%	29.4%	19.6%	19.2%	13.9%
Nariño	0.3%	0.3%	0.3%	0.1%	0.3%
Norte de Santander	0.4%	0.6%	3.0%	0.3%	0.6%
Quindío	0.2%	0.2%	0.2%	0.1%	0.3%
Risaralda	0.5%	0.8%	1.8%	0.4%	1.4%
Santander	5.6%	3.0%	7.4%	6.2%	6.3%
Sucre	0.2%	0.3%	0.2%	0.1%	0.2%
Tolima	0.6%	0.7%	0.6%	0.7%	0.6%
Valle del Cauca	3.2%	4.2%	4.0%	1.7%	8.9%
Arauca	2.6%	4.2%	2.8%	2.7%	2.0%
Casanare	10.5%	16.6%	11.1%	10.8%	7.9%
Putumayo	1.0%	1.6%	1.1%	1.0%	0.8%
San Andrés	0.1%	0.2%	0.2%	0.1%	0.2%
Amazonas	0.0%	0.0%	0.0%	0.0%	0.0%
Guainía	0.0%	0.1%	0.1%	0.0%	0.1%
Guaviare	0.0%	0.0%	0.0%	0.0%	0.0%
Vaupés	0.0%	0.0%	0.0%	0.0%	0.0%
Vichada	0.0%	0.0%	0.0%	0.0%	0.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%

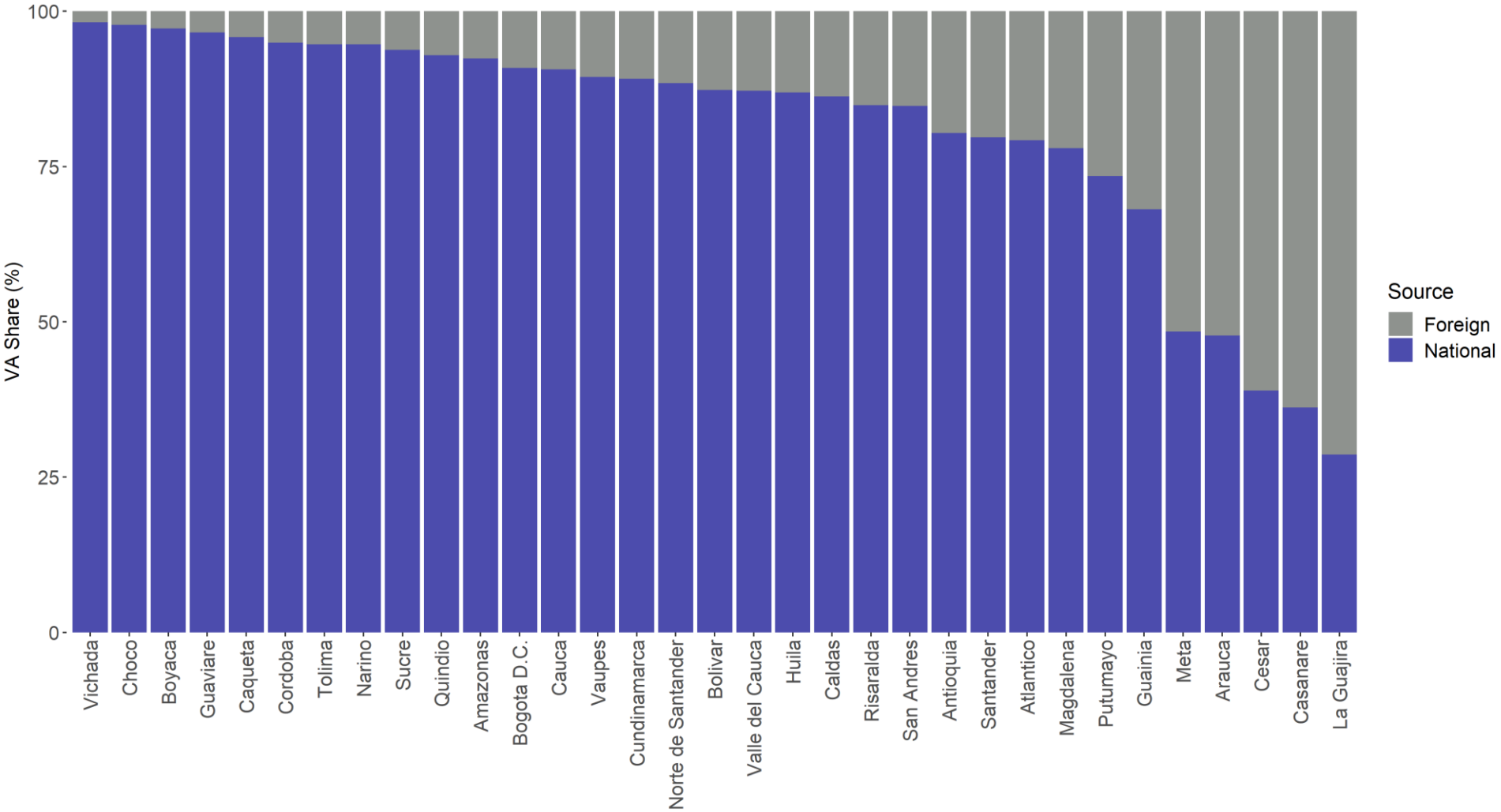
Most important trade partners, by contribution to regional value-added

Location	Domestic			Foreign		
	Partner	Value-Added (COP Billions)	Share	Partner	Value-Added (COP Billions)	Share
Antioquia	Bogotá D.C.	8,515	17.6%	United States	3,958	8.2%
	Santander	3,996	8.3%	Ecuador	575	1.2%
	Valle del Cauca	3,600	7.4%	Germany	564	1.2%
	Meta	1,689	3.5%	Peru	537	1.1%
	Cundinamarca	1,655	3.4%	Netherlands	443	0.9%
Bogotá D.C.	Cundinamarca	15,369	18.3%	United States	1,647	2.0%
	Antioquia	9,593	11.4%	Ecuador	1,160	1.4%
	Santander	5,755	6.8%	Peru	689	0.8%
	Valle del Cauca	4,710	5.6%	Venezuela	678	0.8%
	Boyacá	4,437	5.3%	Panama	523	0.6%
Casanare	Bogotá D.C.	914	8.7%	United States	1,964	18.7%
	Antioquia	502	4.8%	China	805	7.7%
	Meta	463	4.4%	Panama	529	5.0%
	Santander	308	2.9%	Spain	376	3.6%
	Valle del Cauca	254	2.4%	Netherlands	305	2.9%
Cundinamarca	Bogotá D.C.	16,476	57.3%	United States	419	1.5%
	Antioquia	1,883	6.5%	Panama	237	0.8%
	Valle del Cauca	1,001	3.5%	China	214	0.7%
	Santander	755	2.6%	Ecuador	174	0.6%
	Boyacá	592	2.1%	Venezuela	167	0.6%
Meta	Bogotá D.C.	2,111	9.2%	United States	3,485	15.1%
	Antioquia	1,448	6.3%	China	1,431	6.2%
	Santander	1,302	5.7%	Panama	939	4.1%
	Bolívar	942	4.1%	Spain	669	2.9%
	Valle del Cauca	815	3.5%	Netherlands	540	2.3%

Most important trade partners, by contribution to regional value-added: Caribbean region

Location	Domestic			Foreign		
	Partner	Value-Added (COP Billions)	Share	Partner	Value-Added (COP Billions)	Share
Atlántico	Bogotá D.C.	1,887	12.0%	United States	1,062	6.7%
	Bolívar	1,795	11.4%	Panama	405	2.6%
	Antioquia	1,356	8.6%	Ecuador	234	1.5%
	Magdalena	1,011	6.4%	Venezuela	202	1.3%
	Santander	985	6.3%	Aruba	143	0.9%
Bolívar	Bogotá D.C.	1,883	15.3%	United States	229	1.9%
	Atlántico	1,639	13.3%	China	108	0.9%
	Antioquia	1,452	11.8%	Netherlands	85	0.7%
	Santander	937	7.6%	Panama	79	0.6%
	Valle del Cauca	534	4.3%	Ecuador	69	0.6%
Cesar	Bogotá D.C.	552	6.3%	Spain	1,285	14.7%
	Antioquia	515	5.9%	United States	1,191	13.6%
	Atlántico	344	3.9%	China	444	5.1%
	Santander	283	3.2%	Portugal	280	3.2%
	Valle del Cauca	221	2.5%	Chile	205	2.3%
Córdoba	Antioquia	1,068	19.1%	United States	50	0.9%
	Bogotá D.C.	995	17.8%	China	27	0.5%
	Atlántico	391	7.0%	Panama	16	0.3%
	Valle del Cauca	390	7.0%	Netherlands	14	0.3%
	Santander	363	6.5%	Venezuela	13	0.2%
Magdalena	Bogotá D.C.	658	14.5%	United States	131	2.9%
	Atlántico	607	13.3%	Panama	94	2.1%
	Antioquia	476	10.5%	China	81	1.8%
	Santander	268	5.9%	Ecuador	57	1.3%
	Bolívar	220	4.8%	Venezuela	43	0.9%

Value-added embedded in export flows, by destination



Final remarks

At the sub-national level, the export base theory provides the foundations to different models of regional development

The role of interregional trade to the Colombian Departments should not be relegated to a secondary place

One should consider interregional interactions for a better understanding of how the regional economies are affected, both in the international and in the domestic markets, once for the smaller economies the performance of the more developed regions may play a crucial role

For some of the Colombian Departments, the future is not only tied with its ability to compete in the international export market, but also with its articulation with other domestic markets

Next steps (room for collaboration)

Would those Colombian Departments that are poorly linked to foreign markets be fated to an archaic structure of trade, based on the export of less elaborated products directed to specific domestic markets?

How does the Colombian economy adjust to a commodity boom?

How do regions absorb oil price shocks?

Use the CEER ICGE model to look at long-run effects of Colombia's further integration to foreign markets

- Does domestic trade act as a shock absorber for some regions?

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Regions

Code	*Name*
R1	Antioquia
R2	Atlántico
R3	Bogotá D.C.
R4	Bolívar
R5	Boyacá
R6	Caldas
R7	Caquetá
R8	Cauca
R9	Cesar
R10	Córdoba
R11	Cundinamarca
R12	Chocó
R13	Huila
R14	La Guajira
R15	Magdalena
R16	Meta
R17	Nariño
R18	Norte de Santander
R19	Quindío

Code	*Name*
R20	Risaralda
R21	Santander
R22	Sucre
R23	Tolima
R24	Valle del Cauca
R25	Arauca
R26	Casanare
R27	Putumayo
R28	San Andrés
R29	Amazonas
R30	Guainía
R31	Guaviare
R32	Vaupés
R33	Vichada
USA	United States
CHN	China
PAN	Panama
ESP	Spain
ROW	Rest of the World