

**Appendix to  
Globalization and dirty industries:  
any pollution haven?**

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This appendix is in three parts. Section A1 describes the data, transformations and sample representativity. Section A2 gives sectoral tables corresponding to the aggregate results for all polluting products given in tables 2 and 4 in the text. Section A3 does the same for figures 1 to 3 in the text.

**A1. Data sources and sample representativity**

The database is extracted from the Trade and Production website of the World Bank ([www.worldbank.org/research/trade](http://www.worldbank.org/research/trade)) and covers the period 1976-1999 for 67 countries. It includes ISIC 3-digit data on imports, exports and mirror exports. For the first five years and for the last year, of the open-sample period, many countries reported missing values. Moreover, mirror exports are only available since 1980 . Therefore, a closed sample was defined over the years 1981-1998, with 52 countries (5 LINC, 25 MINC, 22 HINC) reporting non-missing values. for the 3digit trade data over this period. Categories of polluting products in table A1.1, and closed-sample countries<sup>1</sup> are listed in table A1.2.

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**Table A1.1: Categories of polluting products**

<b>ISIC code</b>	<b>Description (rank<sup>a</sup> in parenthesis)</b>
341	Paper and products (6)
351	Industrial chemicals (3)
369	Other non-metallic mineral products (5)
371	Iron and steel (1)
372	Non-ferrous metals (2)

<sup>a</sup> Mani and Wheeler (1999, table 8.1). As in Mani and Wheeler, we have excluded petroleum refineries (353) from the sample.

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<sup>1</sup> Income groups were defined on the basis of 1991 GNP per capita figures. Following the World Bank cut-off levels, the sample was split into three income groups: low (LINC, income lower than 635 USD), middle (MINC, between 635 and 7910 USD) and high income (HINC, larger than 7910 USD) countries.

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**Table A1.2: Countries of the closed sample (1981-1998)**

<b>Low-income</b>		<b>Middle-income (ct'd)</b>		<b>High-income (ct'd)</b>	
EGY	Egypt	MAR	Morocco	DNK	Denmark
HND	Honduras	MEX	Mexico	ESP	Spain
IDN	Indonesia	MYS	Malaysia	FIN	Finland
IND	India	PER	Peru	FRA	France
NPL	Nepal	PHL	Philippines	GBR	United Kingdom
<b>Middle-income</b>		POL	Poland	GER	Germany
ARG	Argentina	PRT	Portugal	HKG	Hong Kong
BOL	Bolivia	THA	Thailand	IRL	Ireland
CHL	Chile	TTO	Trinidad and T.	ITA	Italy
COL	Colombia	TUR	Turkey	JPN	Japan
CRI	Costa Rica	URY	Uruguay	KWT	Kuwait
ECU	Ecuador	VEN	Venezuela	NLD	Netherlands
GRC	Greece	ZAF	South Africa	NOR	Norway
GTM	Guatemala	<b>High-income</b>		NZL	New Zealand
HUN	Hungary	AUS	Australia	SGP	Singapore
JOR	Jordan	AUT	Austria	SWE	Sweden
KOR	Korea (Rep.of)	CAN	Canada	TWN	Taiwan
MAC	Macau	CYP	Cyprus	USA	United States

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## **Sample representativity**

### **a) open and closed sample**

With respect to the open sample, and using the 1995-96 average trade shares (the years with the maximum amount of non-missing values), the closed sample represents about 95% of the open sample trade.

Regarding the representativity of the open sample itself, this was estimated using world trade data reported by the World Bank (Economic Indicators 2001). Results are shown in Table A1.3. These figures may appear quite low. However, it should be kept in mind that world trade figures used in these calculations are estimated themselves. As a result, even in the original World Bank data, the sum of exports and imports over 207 countries represent less than 100% of world totals (see last two columns of table A1.3).

**Table A1.3: Representativity of the open and the closed sample**  
(%, using reported world totals by the World Bank)

	open sample		closed sample		original source <sup>a</sup>	
	Exports	Imports	Exports	Imports	Exports	Imports
1981	48.8	44.3	48.7	43.7	81.5	81.3
1990	58.9	59.5	57.3	57.9	86.4	86.2
1998	63.6	66.3	60.5	63.6	94.5	94.5

<sup>a)</sup> sum over the 207 countries reported in the World Bank data base

Source: sample data and World Bank Economic Indicators, 2001.

### b) income groups

Similar world totals were not available for income groups. In this case, world totals were estimated by the sum of exports or imports over all the countries available in the World Bank source. To account for a maximum number of non-missing reporters, these calculations, whose results appear in table A1.4, are limited to year 1998<sup>2</sup>.

**Table A1.4: Representativity of the open and the closed sample by income groups**  
(%, 1998, using calculated world totals<sup>a</sup>)

	open sample		closed sample	
	Exports	Imports	Exports	Imports
<b>LINCS</b>	64.6	61.4	52.1	46.8
<b>MINCS</b>	74.9	72.2	56.4	56.1
<b>HINCS</b>	92.8	92.9	92.8	92.9
<b>All</b>	88.3	87.5	84.1	83.7

<sup>a)</sup> sum over the 207 countries reported in the World Bank data base

Source: sample data and World Bank Economic Indicators, 2001.

Generally speaking, representativity is larger for HINCS (and of course for the open sample). However, even for LINCS and MINCS in the closed sample, the coverage of world trade is larger than 50% (except for LINCS imports).

<sup>2</sup> Accordingly, it is a more recent classification of countries by income groups (based on 1999 GNP figures) that is applied in this particular table.

### c) polluting products

Similar calculations were not possible for polluting products, as world trade data were not available at this level of disaggregation. However, a very crude indicator of the representativity of the sample for these products is simply the ratio of imports over exports, which should be equal to 1.0 in case of complete coverage. These figures, along with their standardized value obtained by dividing them by the import/export ratio for all products in the sample, are reported in table A1.5.

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**Table A1.5: Imports over exports ratios**

	<b>polluting products (1)</b>	<b>all products (2)</b>	<b>(1)/(2)</b>
<b>1981</b>	0.96	0.92	1.04
<b>1990</b>	1.11	1.03	1.08
<b>1998</b>	1.14	1.03	1.10

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Overall, the ratio is reasonably close to one, which suggests an acceptable level of representativity for polluting products.

## A2. Sectoral results: tables

Table A2.1: Shares of developing countries in world trade

Paper and products (ISIC=341)						
	polluting products		all products		revealed comparative	
	exports	imports	exports	imports	advantage	disadvantage
	(1)	(2)	(3)	(4)	(1)/(3)	(2)/(4)
1981-83	3.70	12.70	9.40	15.73	0.39	0.81
1996-98	9.55	19.92	15.93	18.67	0.60	1.07
rate of growth	6.53	3.05	3.58	1.15		

Industrial chemicals (ISIC=351)						
	polluting products		all products		revealed comparative	
	exports	imports	exports	imports	advantage	disadvantage
	(1)	(2)	(3)	(4)	(1)/(3)	(2)/(4)
1981-83	5.11	21.55	9.40	15.73	0.54	1.37
1996-98	12.12	24.33	15.93	18.67	0.76	1.30
rate of growth	5.92	0.82	3.58	1.15		

Other non-metallic mineral products (ISIC=369)						
	polluting products		all products		revealed comparative	
	exports	imports	exports	imports	advantage	disadvantage
	(1)	(2)	(3)	(4)	(1)/(3)	(2)/(4)
1981-83	11.42	22.33	9.40	15.73	1.22	1.42
1996-98	16.28	19.16	15.93	18.67	1.02	1.03
rate of growth	2.39	-1.02	3.58	1.15		

Iron and steel (ISIC=371)						
	polluting products		all products		revealed comparative	
	exports	imports	exports	imports	advantage	disadvantage
	(1)	(2)	(3)	(4)	(1)/(3)	(2)/(4)
1981-83	9.09	23.63	9.40	15.73	0.97	1.50
1996-98	18.38	26.85	15.93	18.67	1.15	1.44
rate of growth	4.81	0.86	3.58	1.15		

Non-ferrous metals (ISIC=372)						
	polluting products		all products		revealed comparative	
	exports	imports	exports	imports	advantage	disadvantage
	(1)	(2)	(3)	(4)	(1)/(3)	(2)/(4)
1981-83	24.01	10.31	9.40	15.73	2.56	0.66
1996-98	22.91	17.88	15.93	18.67	1.44	0.96
rate of growth	-0.31	3.73	3.58	1.15		

**Table A2.2: Decomposition of aggregate change in RCA for LDCs**

ISIC Category	total change in RCA	composition effect	structural effect	mixed effect
341	0.206	-0.053	0.273	-0.015
351	0.216	-0.043	0.347	-0.088
369	-0.193	-0.255	0.155	-0.093
371	0.187	-0.155	0.550	-0.208
372	-1.118	-0.217	-0.278	-0.623

**Table A2.3 : Gravity equation: Hausman-Taylor estimates**  
**Dependent variable:  $M_{ijt}$  (imports of i from j in period t)**

Independent	$M_{ijt}$					
	POL2-HT	341 <sup>b</sup>	351 <sup>c</sup>	369	371	372
$\ln(Y_{it})$	1.50**	1.26**	1.27**	1.69**	1.82**	1.91**
	(19.4)	(12.6)	(16.39)	(15.4)	(16.5)	(17.8)
$\ln(Y_{jt})$	0.92**	0.58	1.86**	-0.58**	-0.32*	-0.16
	(10.9)	(5.0)	(21.8)	(5.0)	(2.5)	(1.3)
$\ln[(Y_{it}/N_{it}) - (Y_{jt}/N_{jt})]$	0.007	0.08*	0.03	0.12**	0.11**	-0.04
	(0.3)	(2.0)	(1.1)	(3.5)	(2.7)	(1.1)
$\ln \text{DIST}_{ij}$	-1.12**	-1.40**	-1.23**	-1.21**	-1.12**	-0.95**
	(17.7)	(14.4)	(19.1)	(12.9)	(7.9)	(6.8)
$\text{BOR}_{ij}$	1.30**	1.68**	1.15**	1.70**	0.96**	0.87
	(5.5)	(4.01)	(4.6)	(4.2)	(2.8)	(1.6)
$\text{LL}_i$	0.49	0.52	-0.28	1.76**	2.79**	2.26**
	(1.66)	(1.0)	(0.9)	(3.4)	(4.23)	(3.3)
$\text{LL}_j$	-0.42**	-2.48**	-1.99**	-4.39**	-3.79**	-2.48**
	(1.22)	(3.8)	(5.4)	(6.9)	(4.25)	(3.3)
$\ln \text{INF}_{it}$	0.46**	0.48**	0.43**	0.98**	0.51**	0.55**
	(6.43)	(5.1)	(6.1)	(9.3)	(4.4)	(4.9)
$\ln \text{INF}_{jt}$	0.64**	1.19**	0.26**	2.22**	1.43**	0.15
	(7.7)	(9.9)	(3.0)	(18.6)	(9.9)	(1.2)
$\ln \text{RER}_{ijt}$	-0.40*	-0.57**	-0.35**	-0.66**	-0.71**	-0.19**
	(14.3)	(14.3)	(12.6)	(16.3)	(16.6)	(5.1)
Number of obs (NT)	30345	21831	28087	20907	21122	21591
Number of bilateral (N)	2300	2017	2240	1970	1938	1956
R <sup>2</sup>	0.52	0.51	0.52	0.44	0.51	0.35
Hausman test HT vs. GLS	614.7**	413.1**	589.6**	13.7**	97.9**	182.5**
<i>chi-2(K)</i>	<i>Chi-2(25)</i>	<i>Chi-2(25)</i>	<i>Chi-2(25)</i>	<i>Chi-2(25)</i>	<i>Chi-2(25)</i>	<i>Chi-2(25)</i>

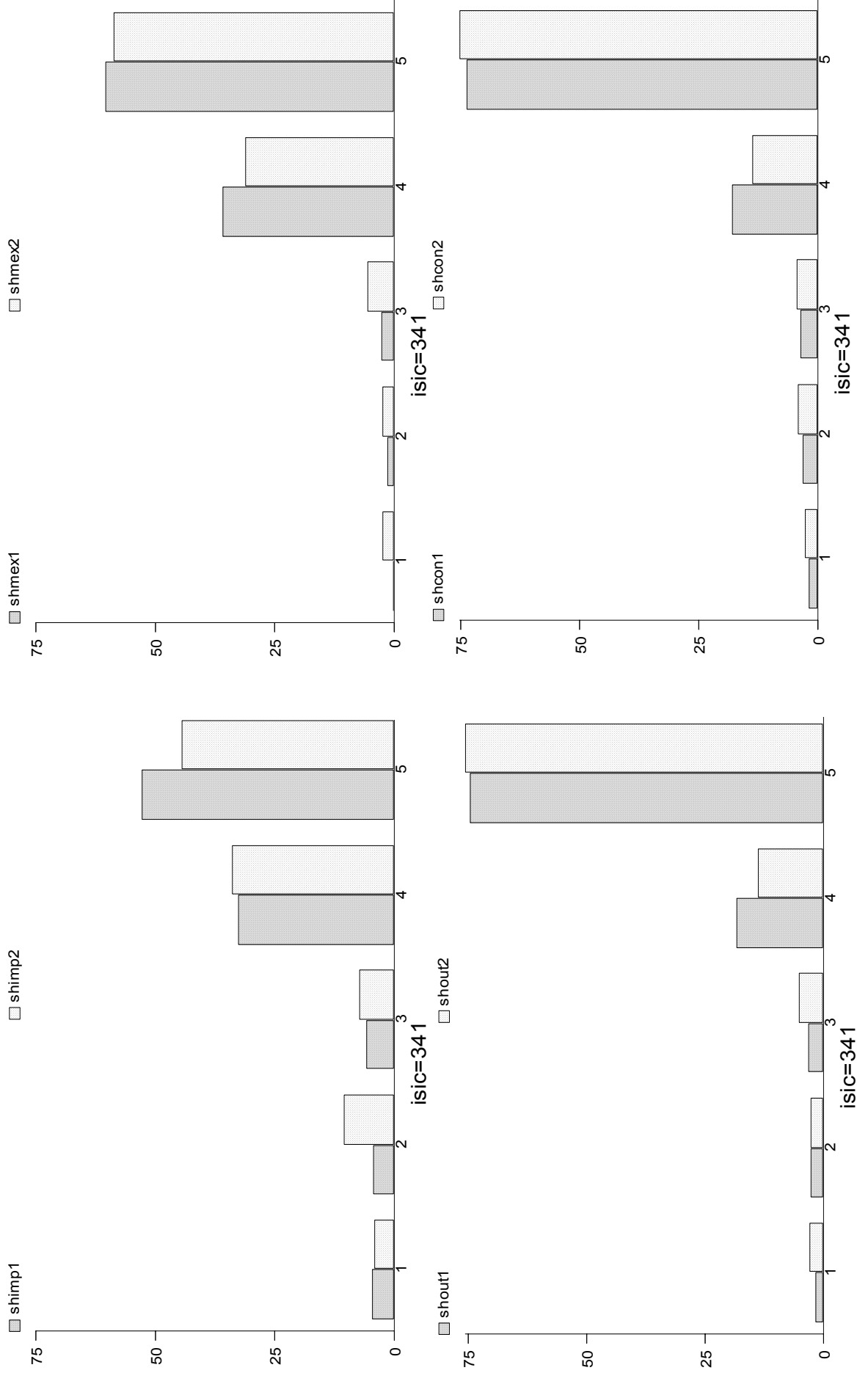
\*\* and \*: significant at 99% and 95% respectively (t-student under the correspondent coefficient)

Time dummy variables and constant term not reported .

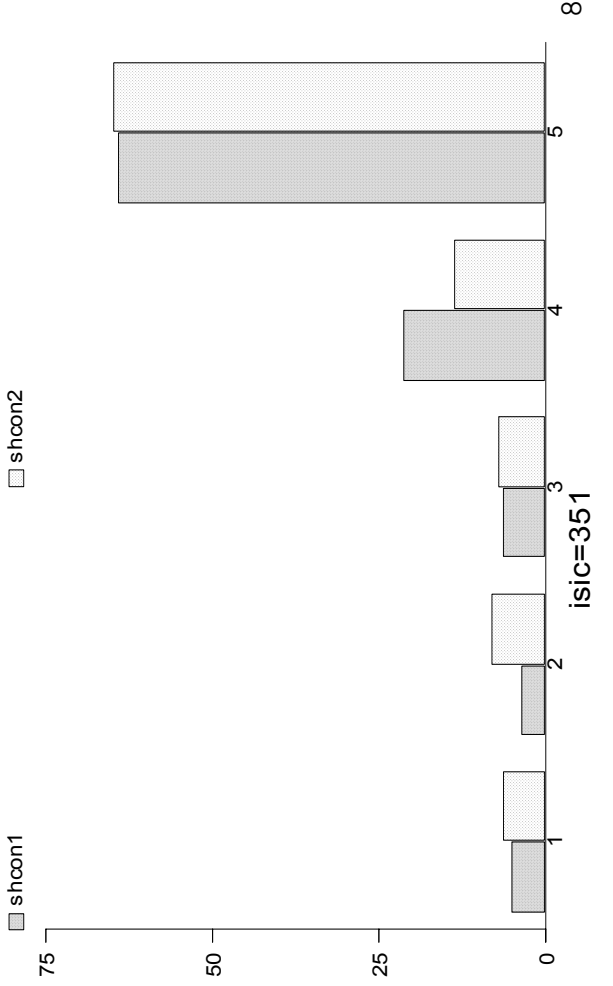
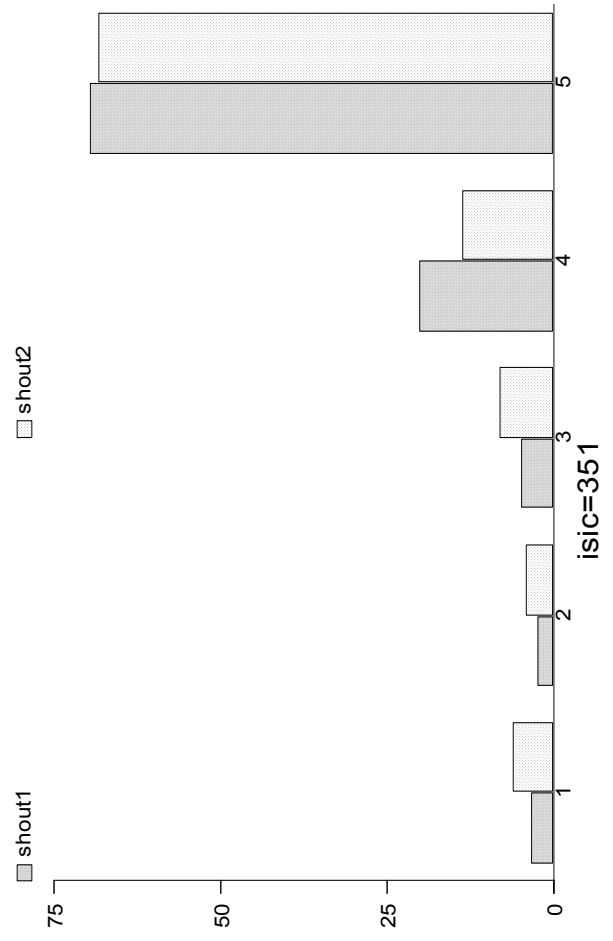
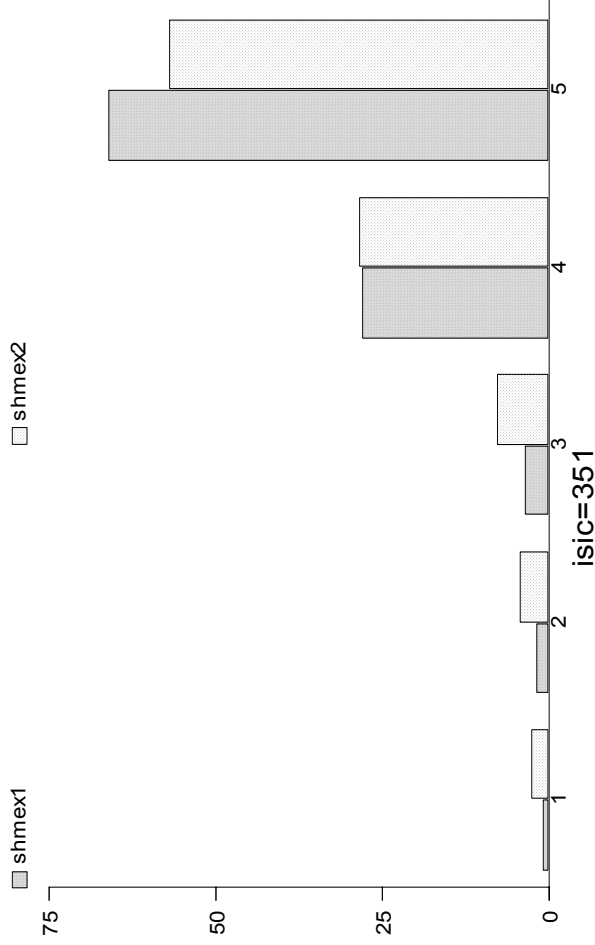
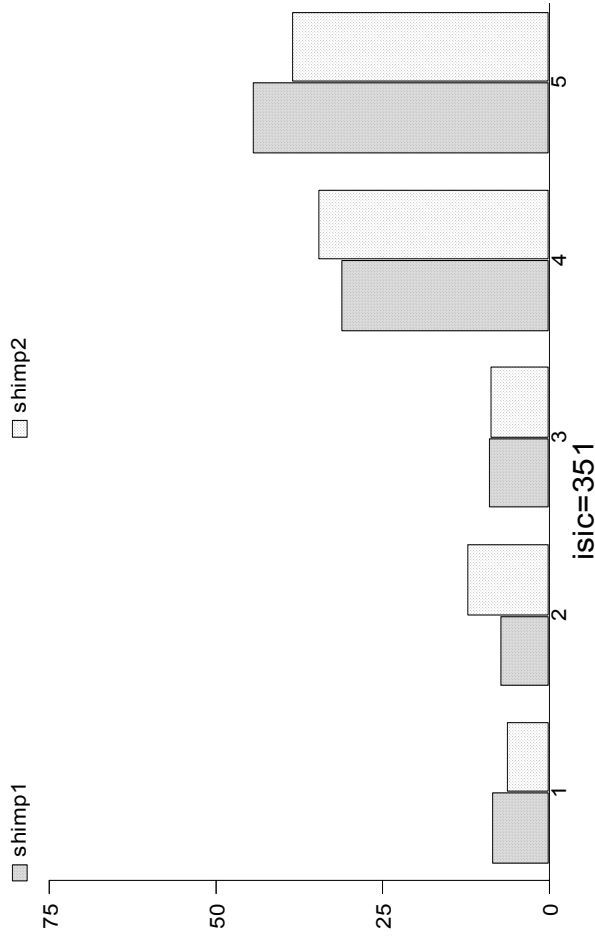
Random effect estimates (endogenous variables :  $Y_i$  and  $Y_j$  and  $(Y_i/N_i - Y_j/N_j)$ )

**A3. Sectoral results: figures**

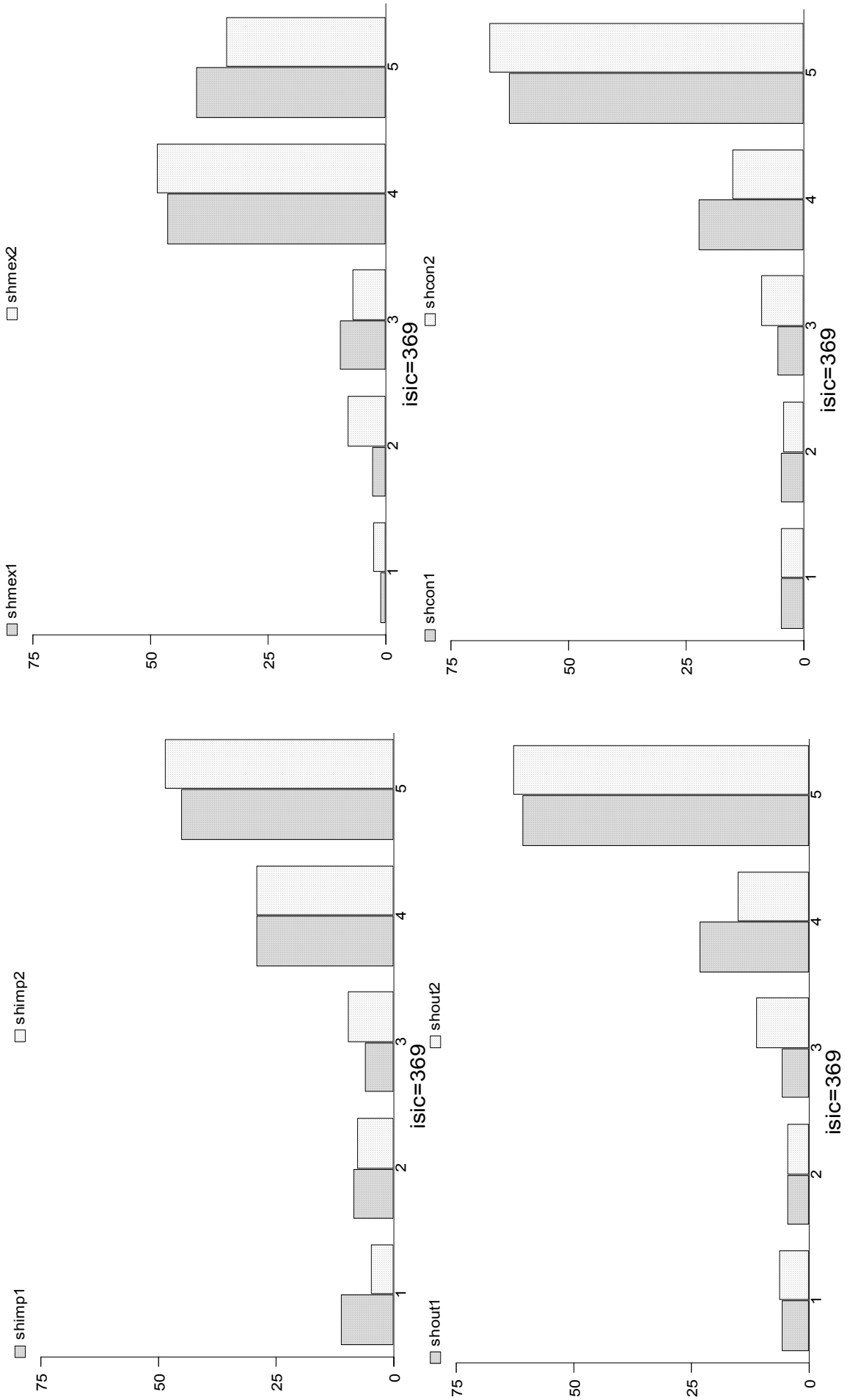
**A3.1: Histograms for Output (shout) Consumption (shcon) Exports (shmex) and Imports (shimp) (1: beginning, 2: end of period)**



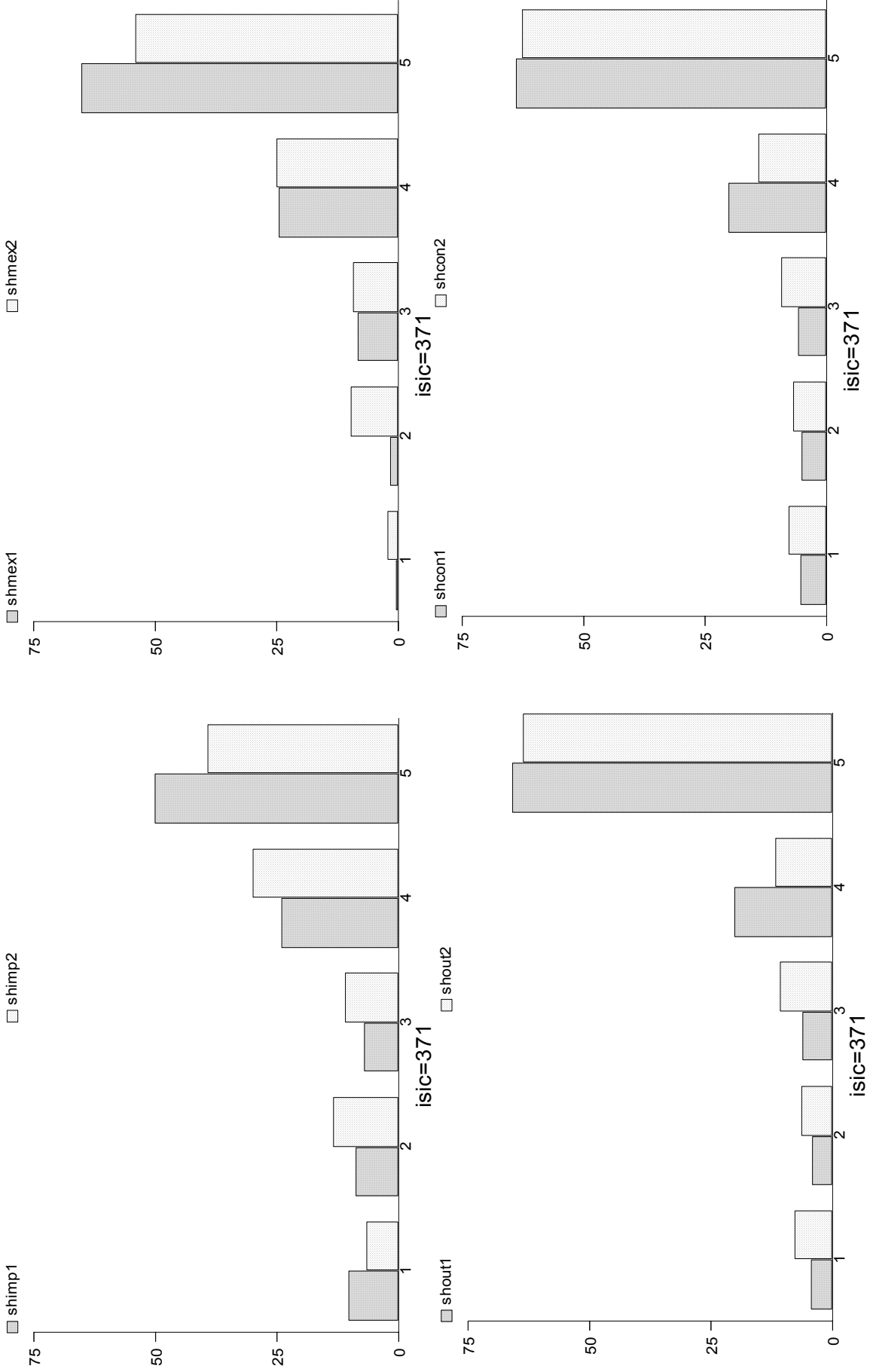
**A3.1: Histograms for Output (shout) Consumption (shcon) Exports (shmex) and Imports (shimp)**  
**(1: beginning, 2: end of period) (cont'd)**



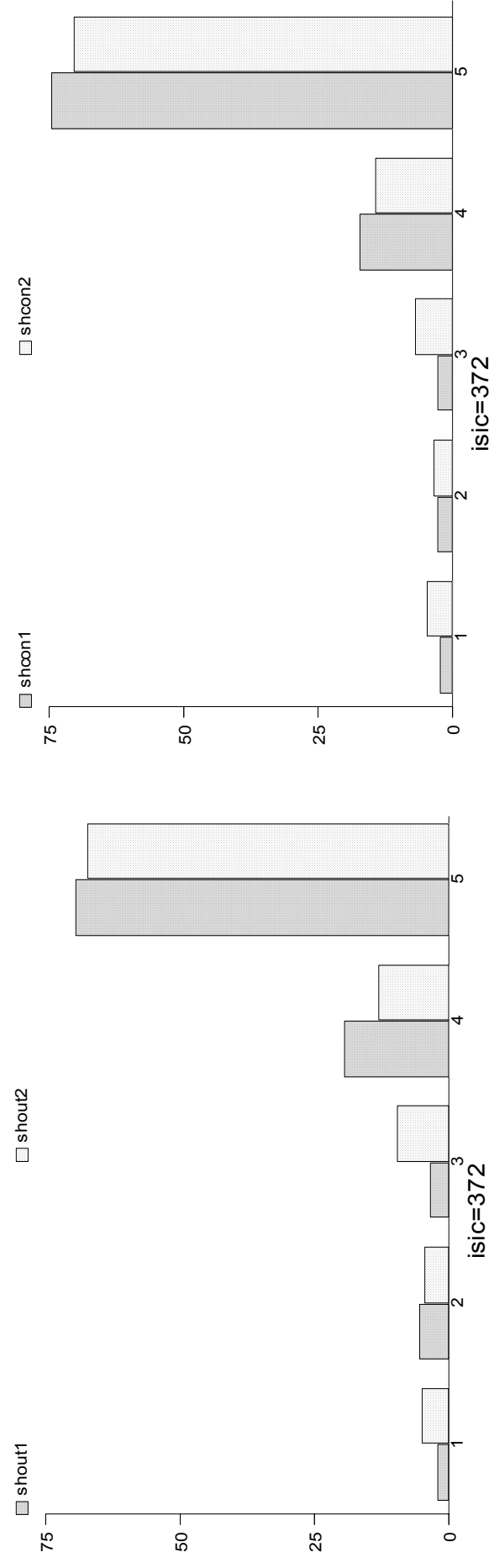
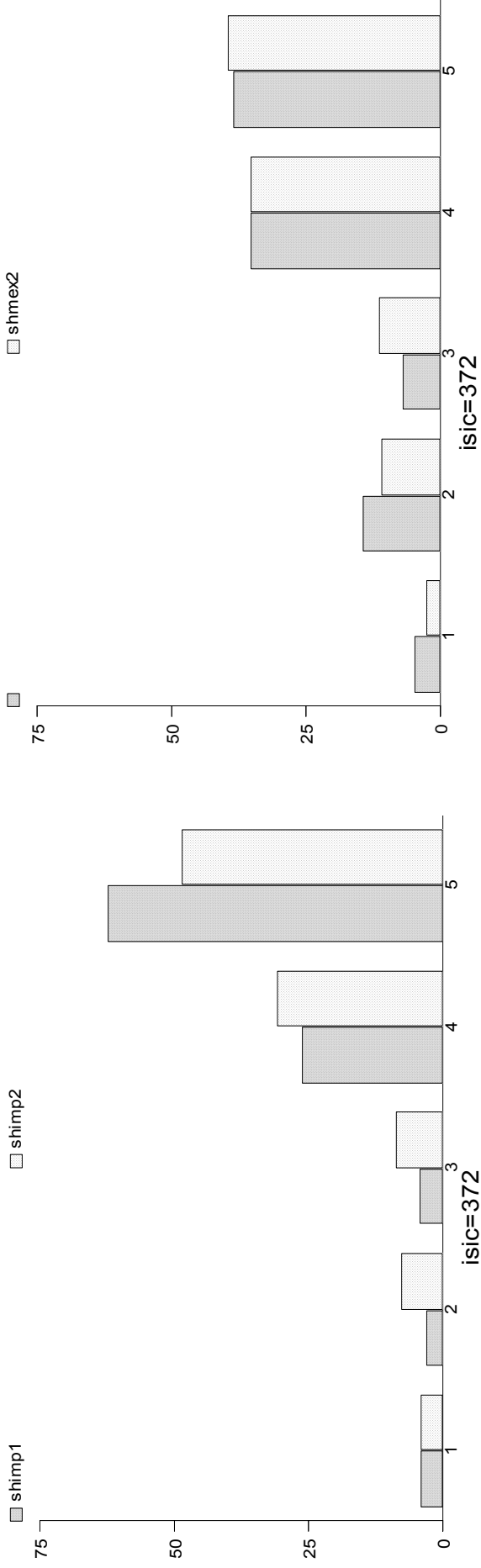
**A3.1: Histograms for Output (shout) Consumption (shcon) Exports (shmex) and Imports (shimp)  
 (1: beginning, 2: end of period) (cont'd)**



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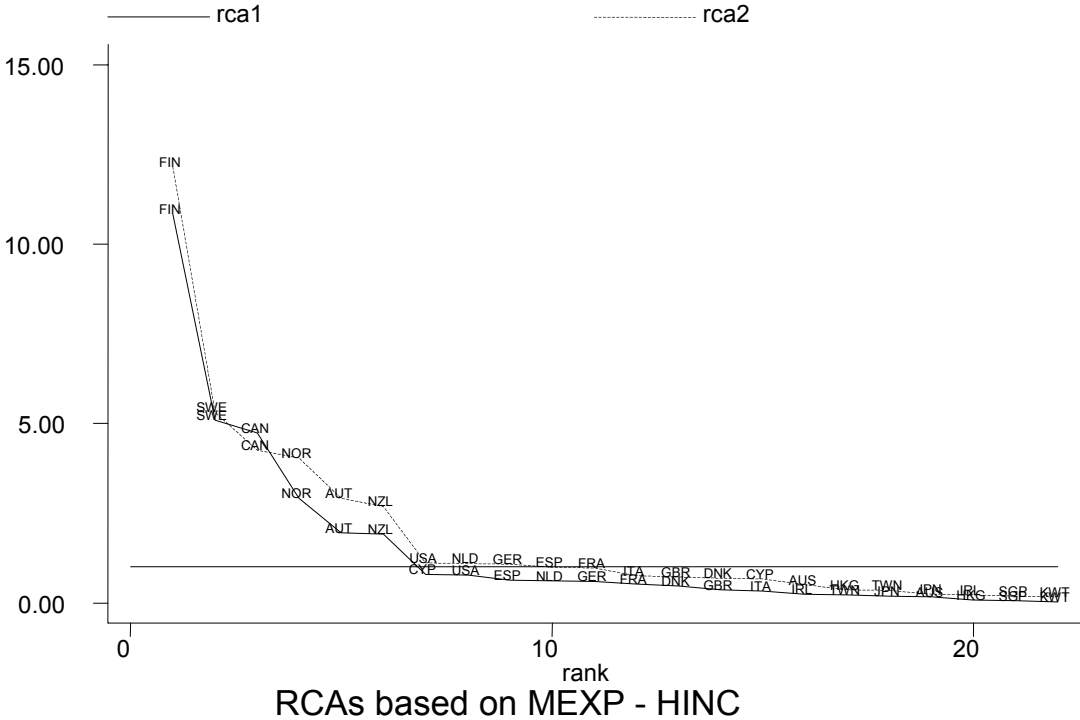
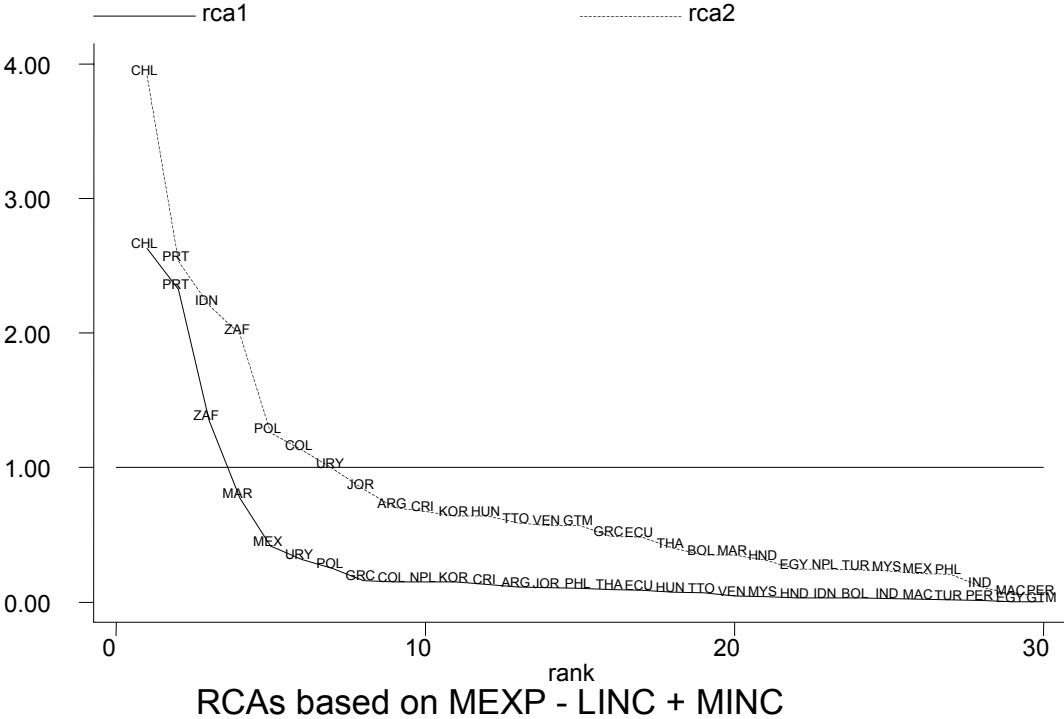


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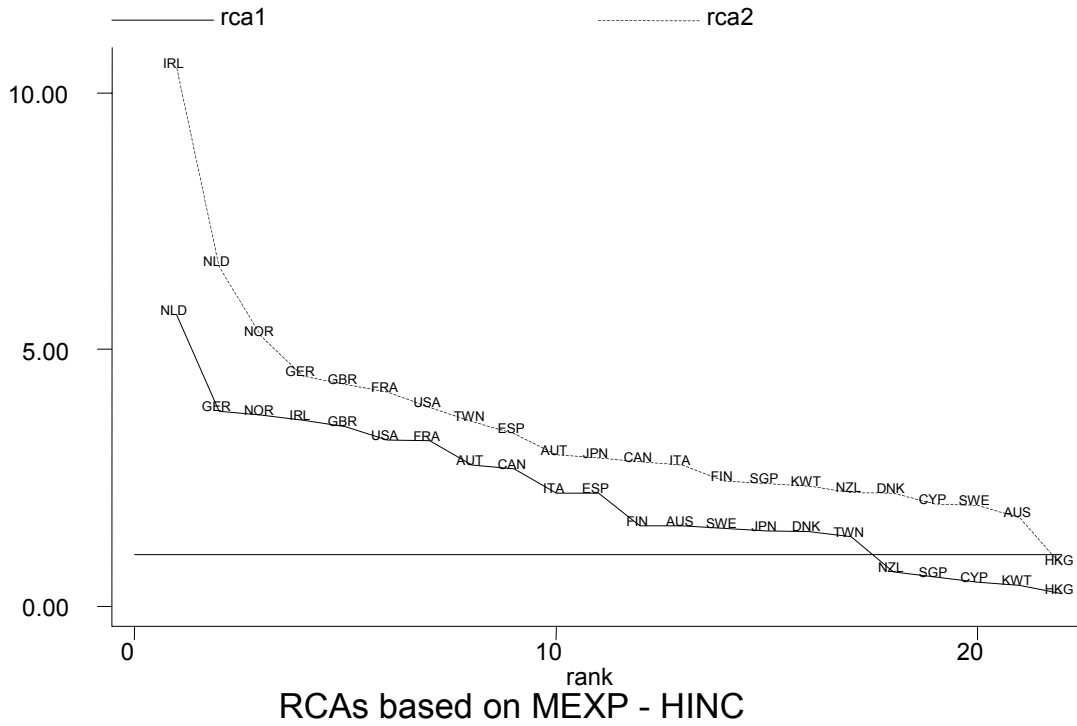
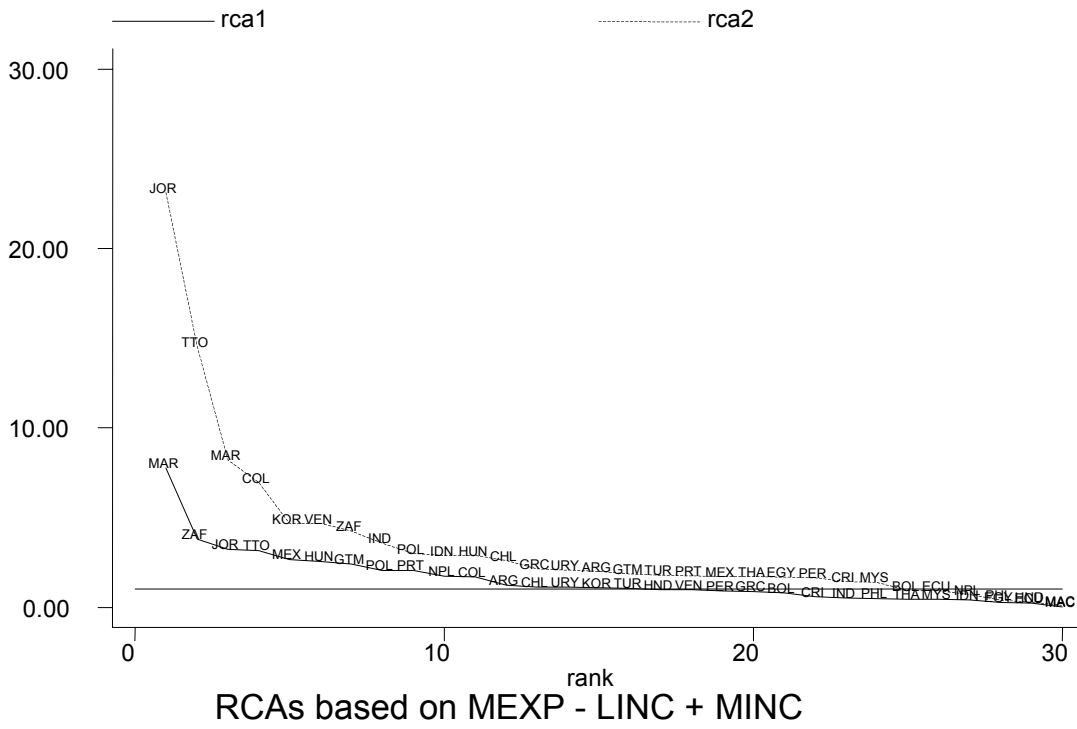
A3.2: Beginning(1) and End(2) of period RCAs, by country group

ISIC = 341



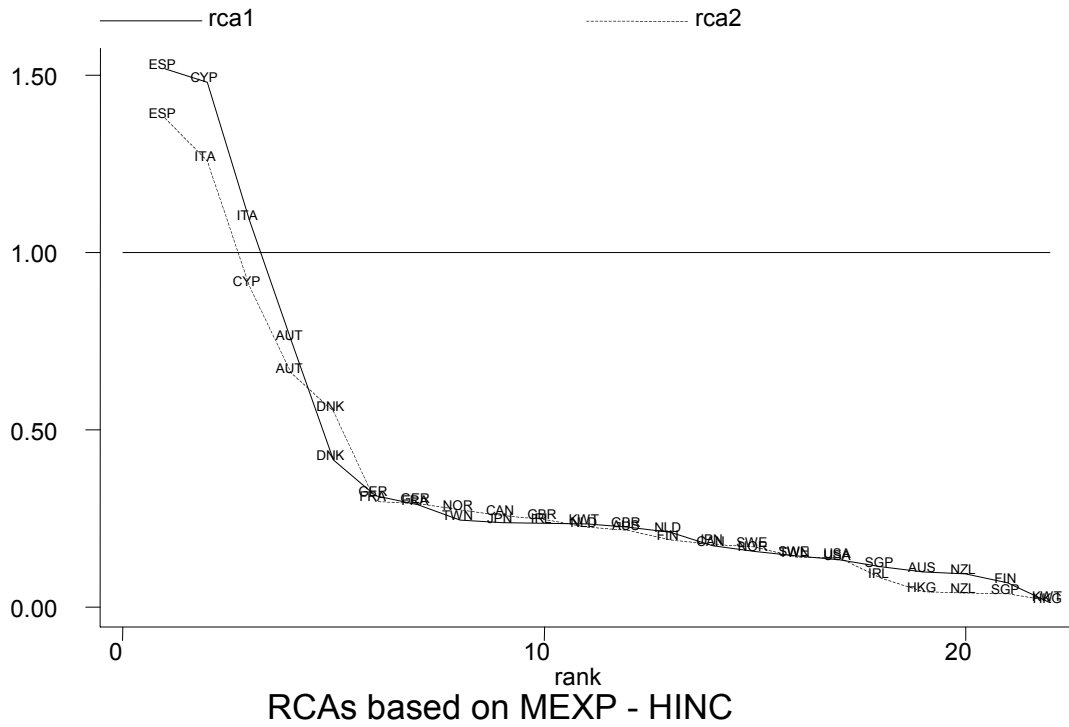
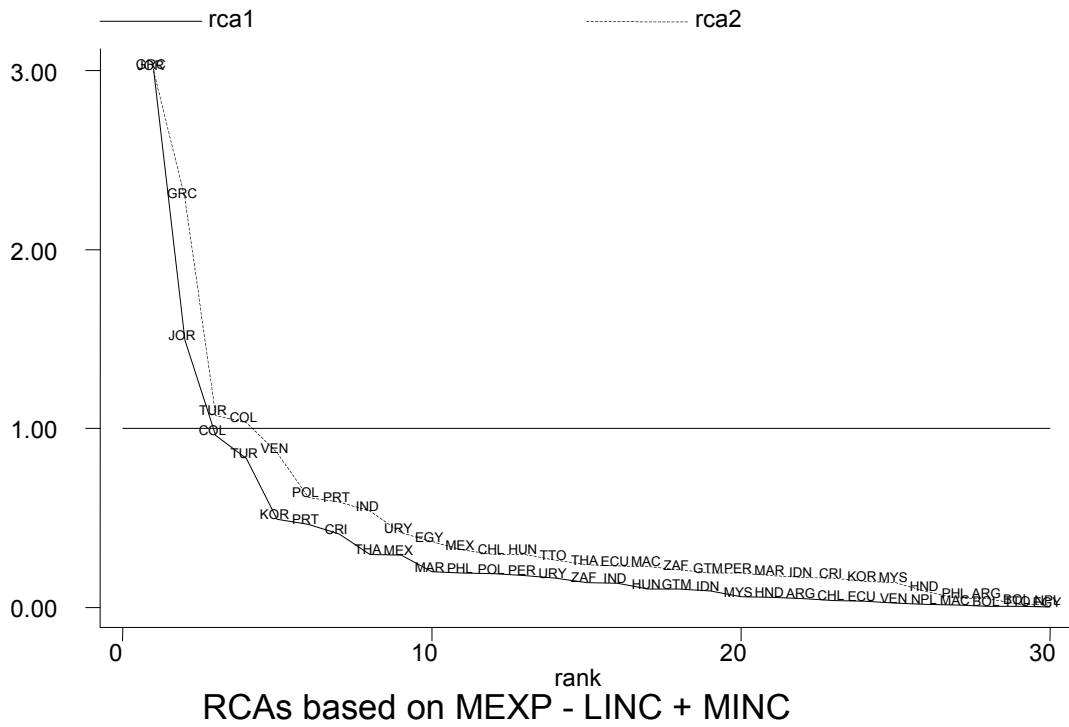
A3.2: Beginning(1) and End(2) of period RCAs, by country group  
(cont'd)

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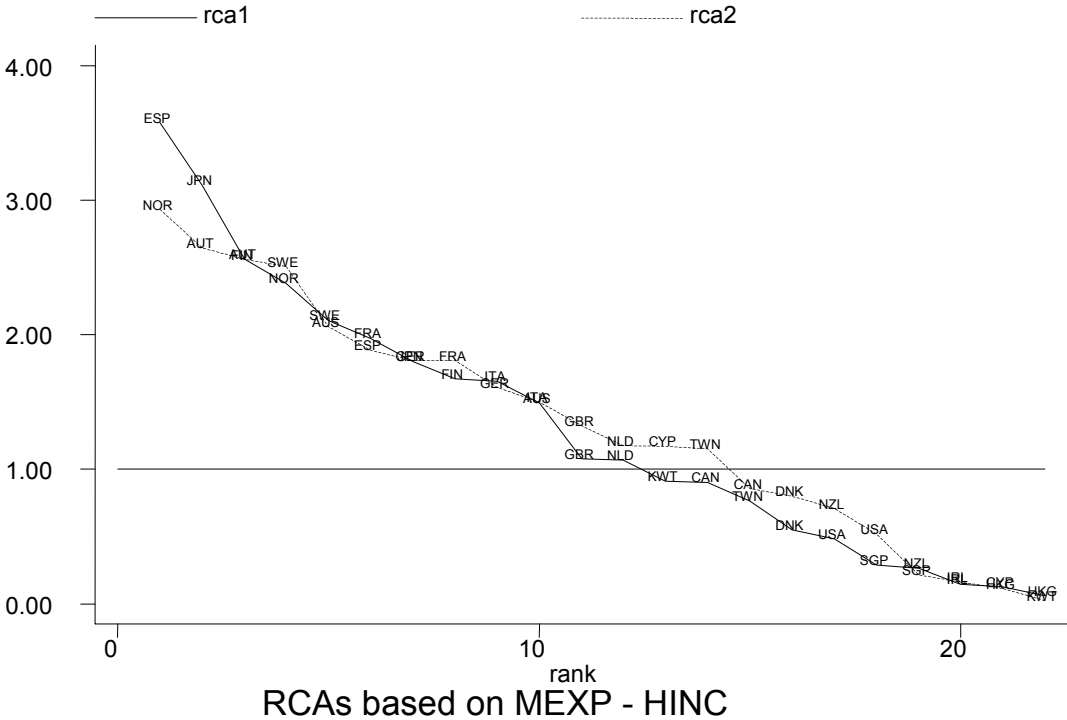
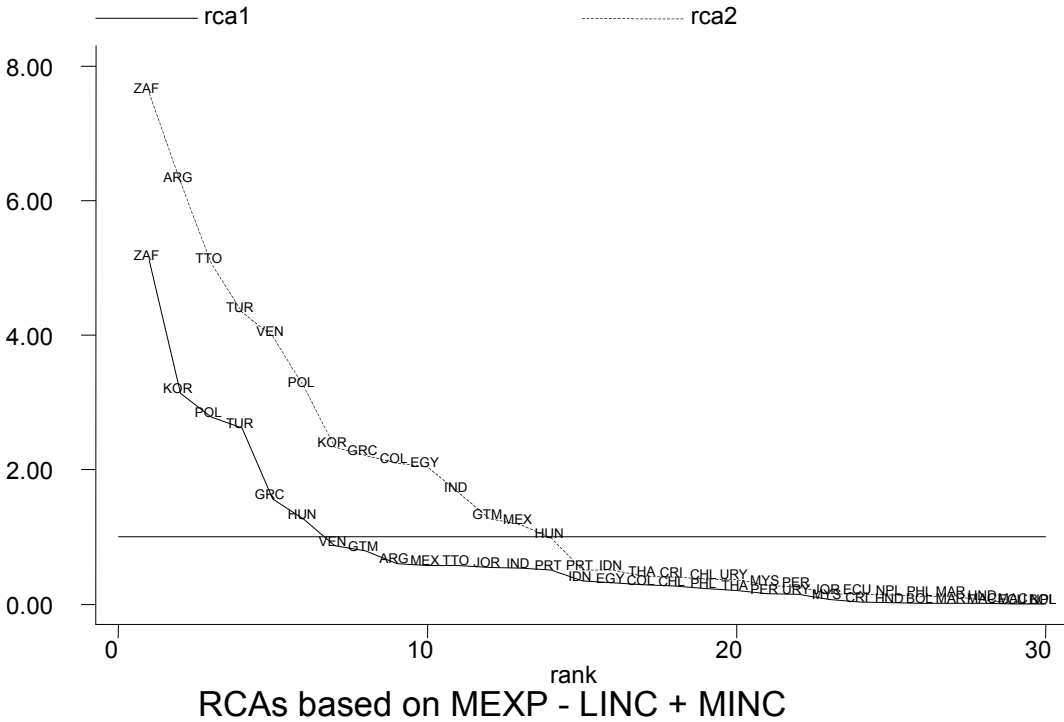
A3.2: Beginning(1) and End(2) of period RCAs, by country group  
(cont'd)

ISIC = 369



**A3.2: Beginning(1) and End(2) of period RCAs, by country group  
(cont'd)**

**ISIC = 371**



**A3.2: Beginning(1) and End(2) of period RCAs, by country group (end)**

**ISIC = 372**

