

**Industrial Policy, Capabilities,
and Growth:
Where does the Future of
Singapore lie?**

Jesus Felipe

Asian Development Bank

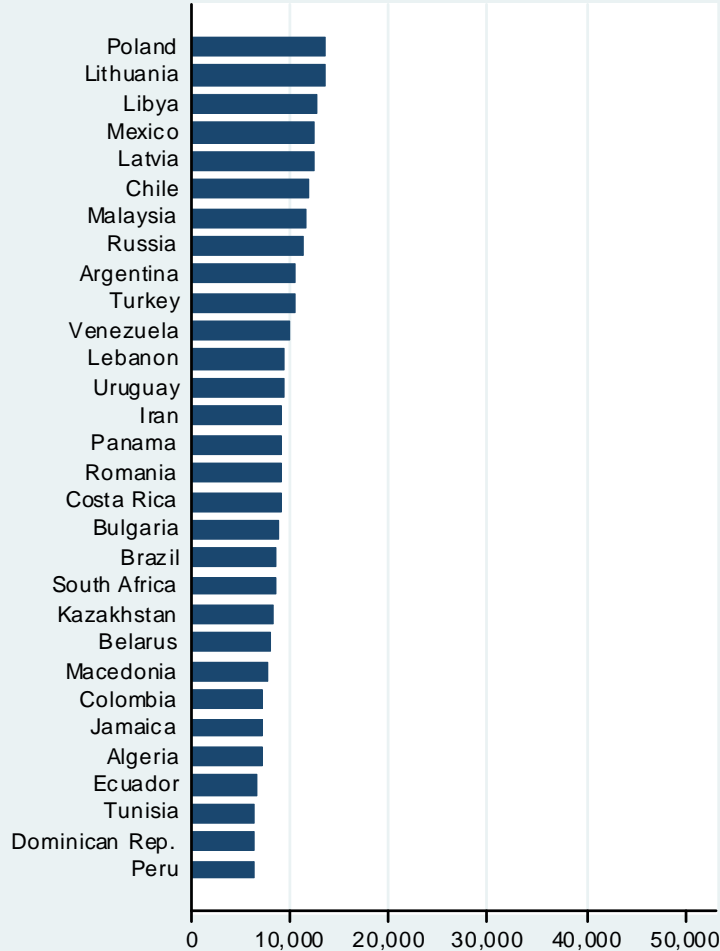
Purpose of the talk

- Understand the economic challenges that Singapore faces
- Discuss policy options for Singapore during the next 20 years
- **Question: Where do you want to be as a nation in 2030?**

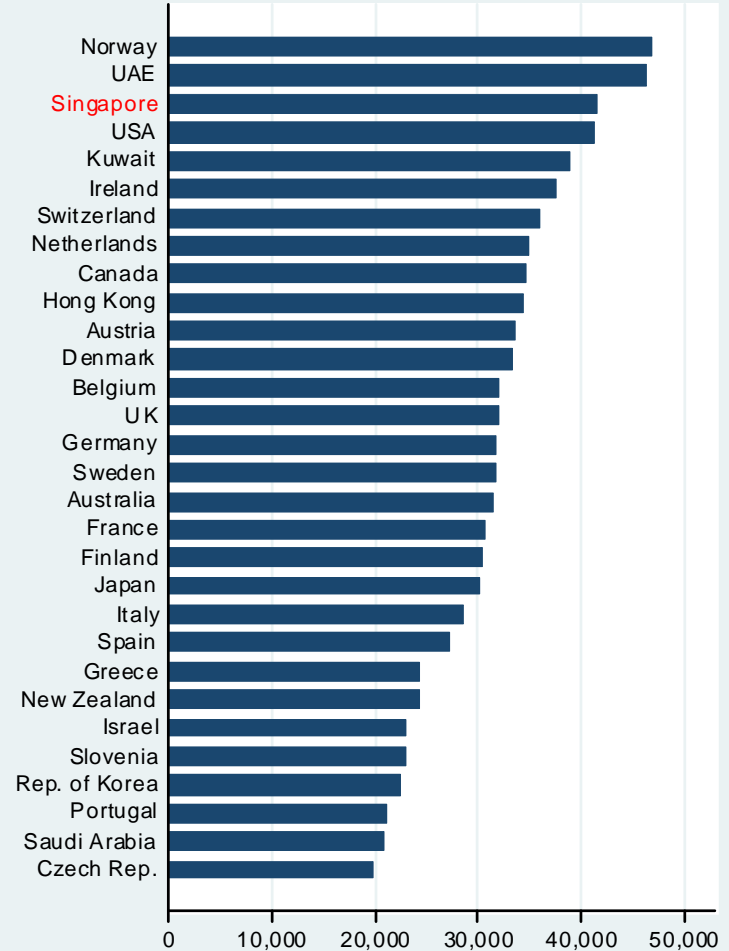
GDP per capita

Average 2001-2007

Panel A: Non-high income countries



Panel B: High income countries



GDP per capita (2005 PPP \$), 2001-2007 Average

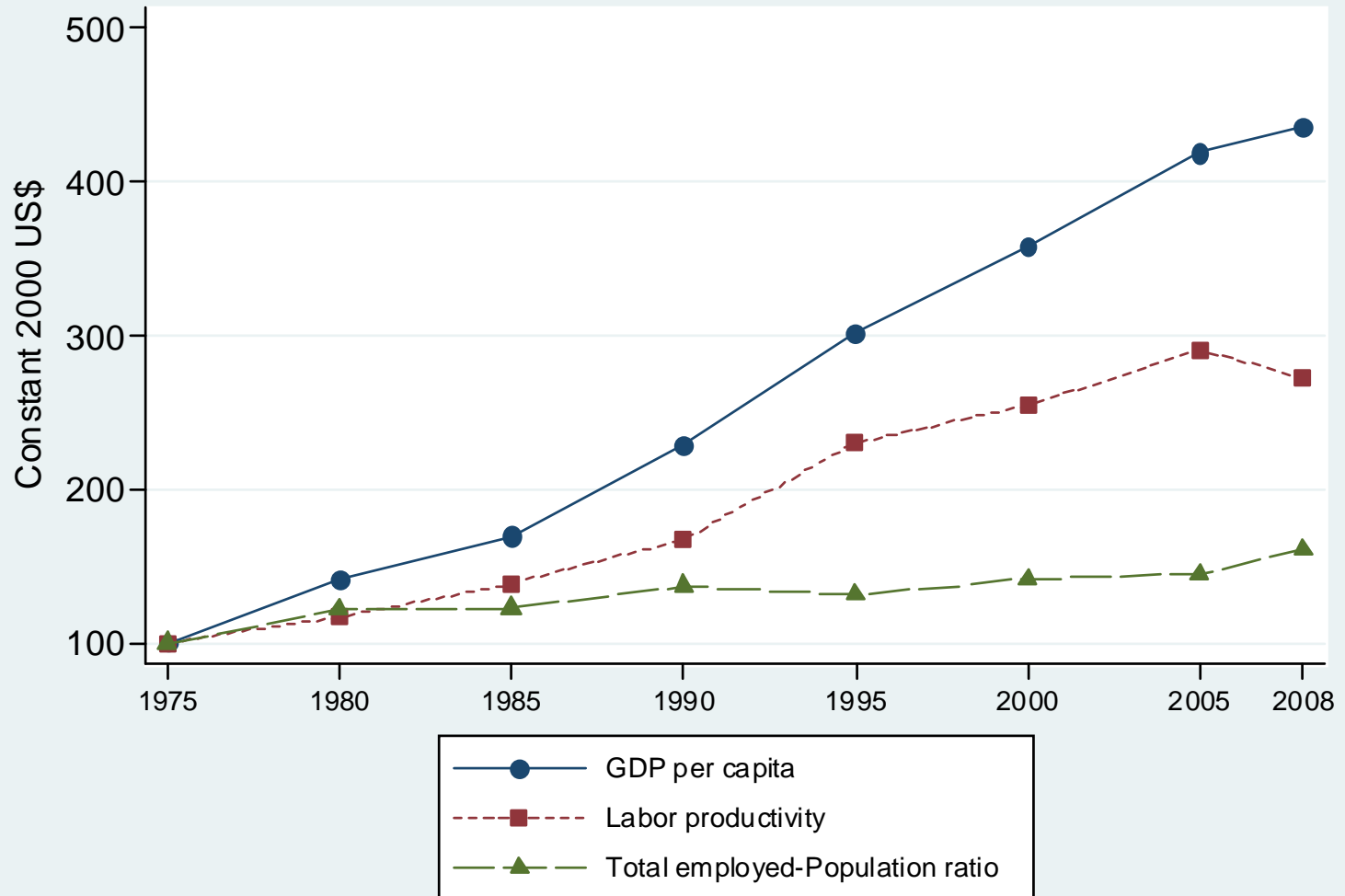
Presentation (I)

- Productivity and Long-Run Growth
- Structural Change: Export Sophistication and Diversification in Singapore
- The Product Space
 - Singapore's Product Space

Presentation (2)

- What to do?
 - Constraints
 - What determines productivity?
 - What new areas?
 - The role of Industrial Policy
- What does the future of Singapore lie?

GDP per capita, labor productivity, and employment



Data source: World Development Indicators and ADB Statistical Database.

Long-run growth is about

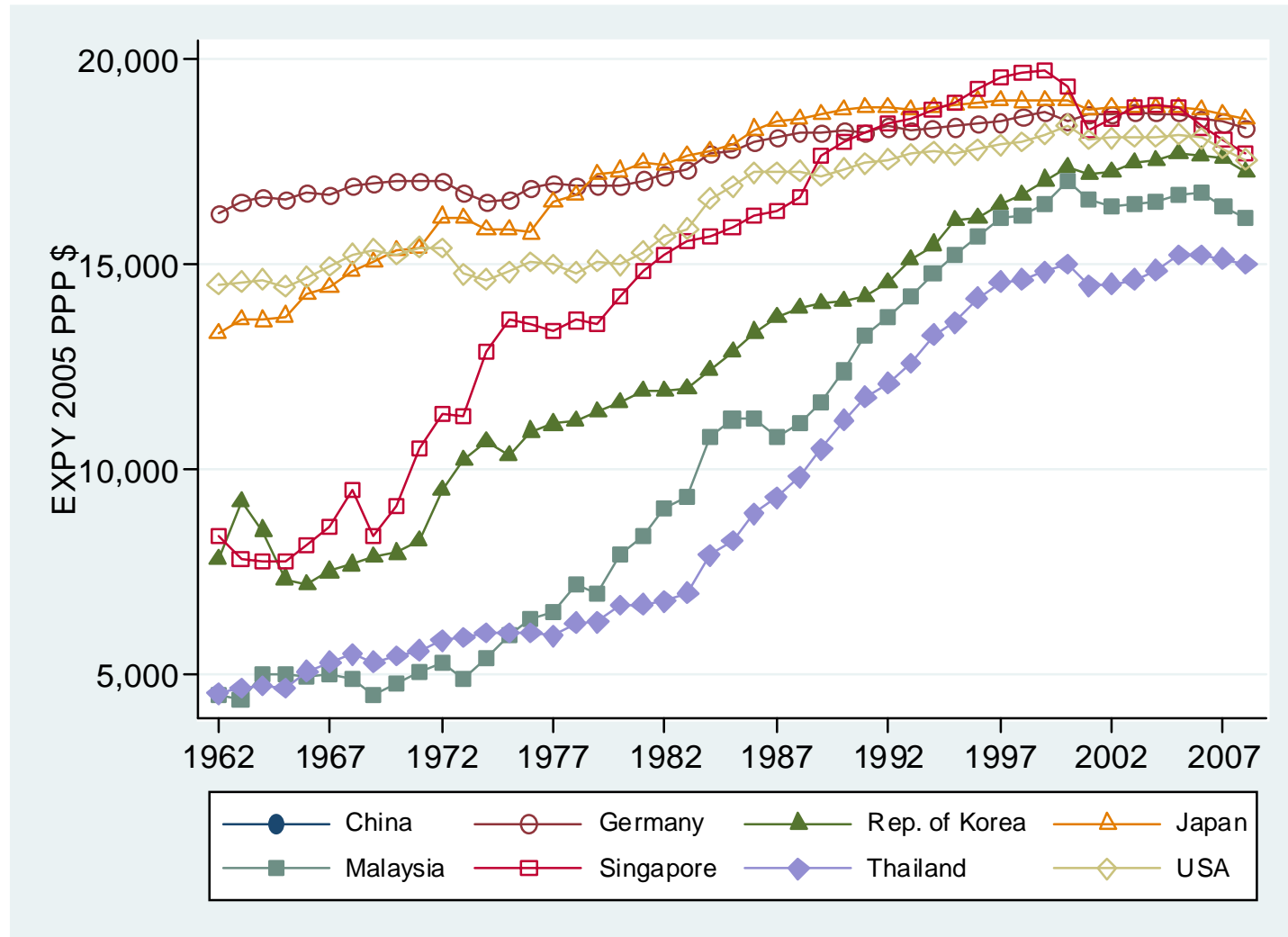
- Structural change: transformation of the production and export structures (*what and how*); technological upgrading
- Intra (S'pore: 50% each ind. and serv.) vs. Inter (S'pore: nothing) sector productivity growth
- Structural change is policy induced (comparative advantage is manufactured) and requires planning

Export sophistication of the top 20 exports in 2007: a single product represents 15% of total exports

Description	Sophistication	1962	1965	1975	1985	1995	2005	2007
Electronic microcircuits	17,281				4.6	11.7	19.8	14.6
Peripheral units, including control and adapting units	18,229				1.1	2.8	9.4	3.7
Parts, nes of and accessories for machines of headings 7512 and 752	18,885				5.4	7.8	7.4	2.9
Crystals, and parts, nes of electronic components of heading 776	23,284				1.0	0.7	2.1	2.4
Oxygen-function amino-compounds	26,407				0.2	0.1	2.0	2.4
Medicaments (including veterinary medicaments)	23,588	0.3	0.2	0.5	0.8	0.2	1.4	2.0
Television, radio-broadcasting; transmitters, etc	21,744			0.0	0.1	0.3	2.5	1.6
Organo-sulphur compounds	27,575				0.0	0.0	1.3	1.2
Cyclic hydrocarbons	19,825				0.3	0.6	1.4	1.0
Heterocyclic compound; nucleic acids	29,365				0.6	0.9	1.4	1.0
Switches, relays, fuses, etc; switchboards and control panels, nes	17,255			0.0	0.8	1.1	1.0	0.8
Parts, nes of and accessories for apparatus falling in heading 76	18,887			0.7	2.0	2.8	1.5	0.8
Complete digital central processing units; digital processors	23,685				0.1	3.1	0.9	0.7
Machinery for specialized industries and parts thereof, nes	23,948				0.3	0.5	0.6	0.7
Other electrical machinery and equipment, nes	17,468	0.1	0.0	1.5	1.2	1.4	1.1	0.7
Diodes, transistors, photocells, etc	15,271			0.0	0.8	0.8	1.3	0.7
Polyethylene	20,811				0.6	0.4	0.8	0.7
Other polymerization and copolymerization products	24,342				0.0	0.2	0.8	0.6
Tugs, special purpose vessels and floating structures	8,070	0.0	0.0	0.6	1.1	0.8	0.6	0.6
Chemical products and preparations, nes	22,738	0.2	0.1	0.2	0.3	0.3	0.6	0.5
	Subtotal	0.5	0.3	3.7	21.0	36.4	58.0	39.7
	Sophistication at the country level	8,369	7,756	13,674	15,922	18,937	18,840	18,050

Note: "Special transactions, commodity not classified according to class" excluded.

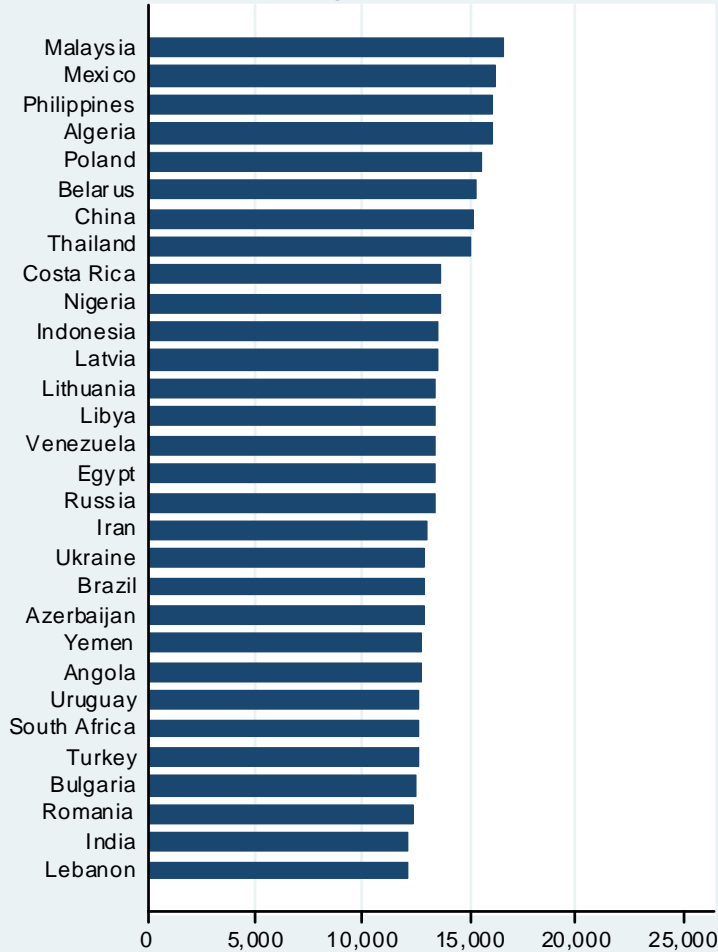
Trend in export sophistication



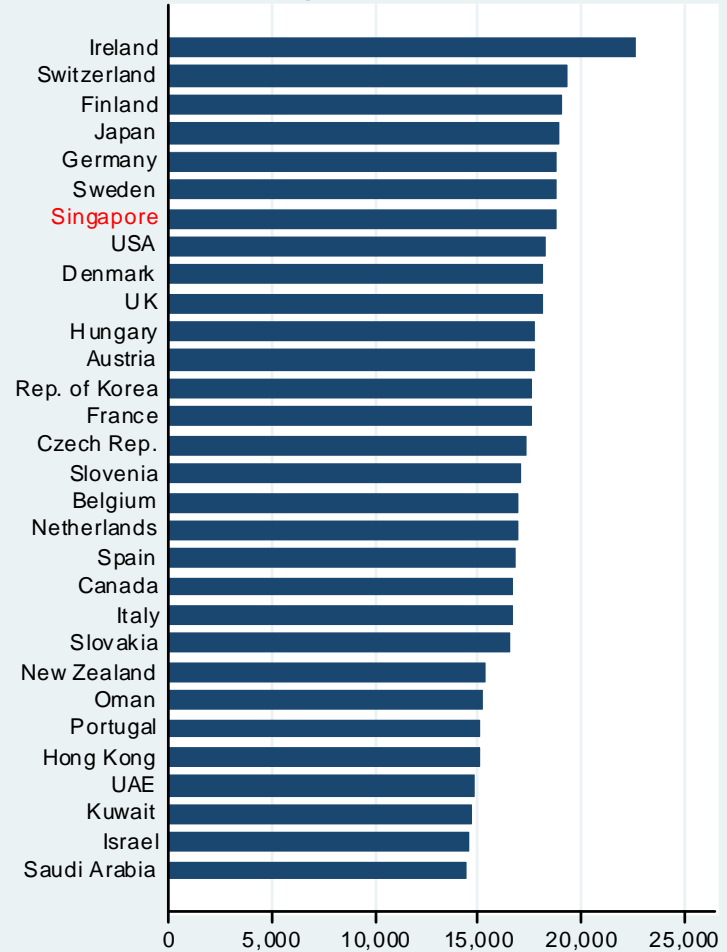
Export Sophistication (EXPY)

Average 2001-2007

Panel A: Non-high income countries



Panel B: High income countries



EXPY (2005 PPP \$), 2001-2007 Average

Export diversification according to Leamer's Classification

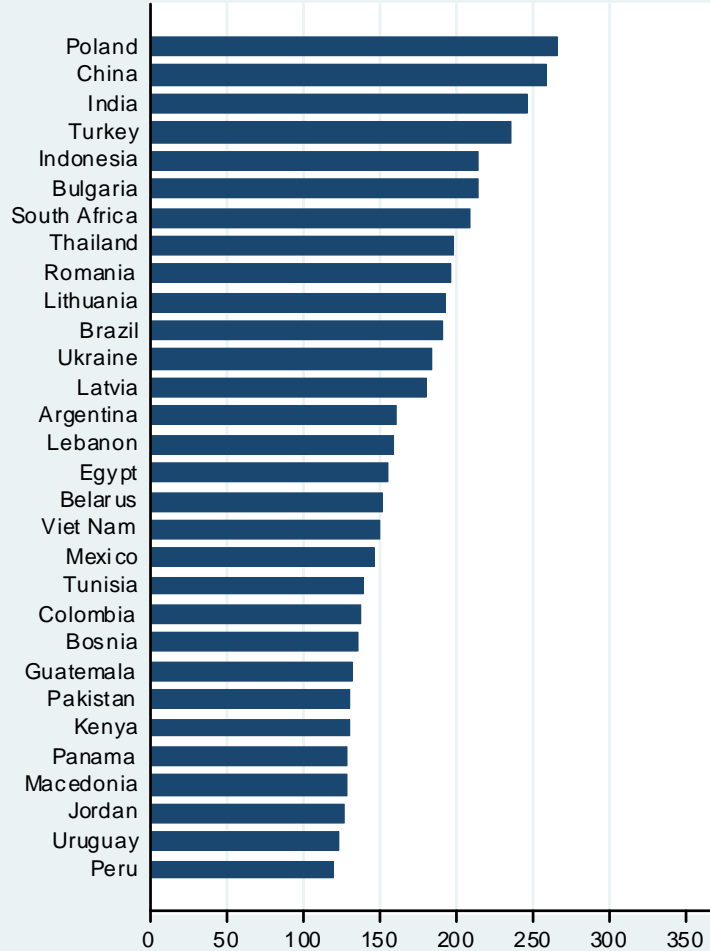
	1962	1965	1975	1985	1995	2005	2007
Petroleum	4	6	7	8	8	3	2
Raw materials	7	4	7	8	5	5	6
Forest products	8	6	10	9	3	1	1
Tropical agriculture	8	9	10	8	6	5	4
Animal products	11	10	14	11	5	5	3
Cereals	12	14	13	13	8	6	4
Labor intensive	12	11	19	17	6	12	9
Capital intensive (exc. Metals)	0	3	9	4	1	2	2
Core products:							
Metal products	6	7	7	5	1	1	0
Machinery	6	3	28	42	44	43	37
Chemicals	5	3	7	12	13	32	25
Total	79	76	131	137	100	115	93

Note: No. products exported with $RCA > 1$

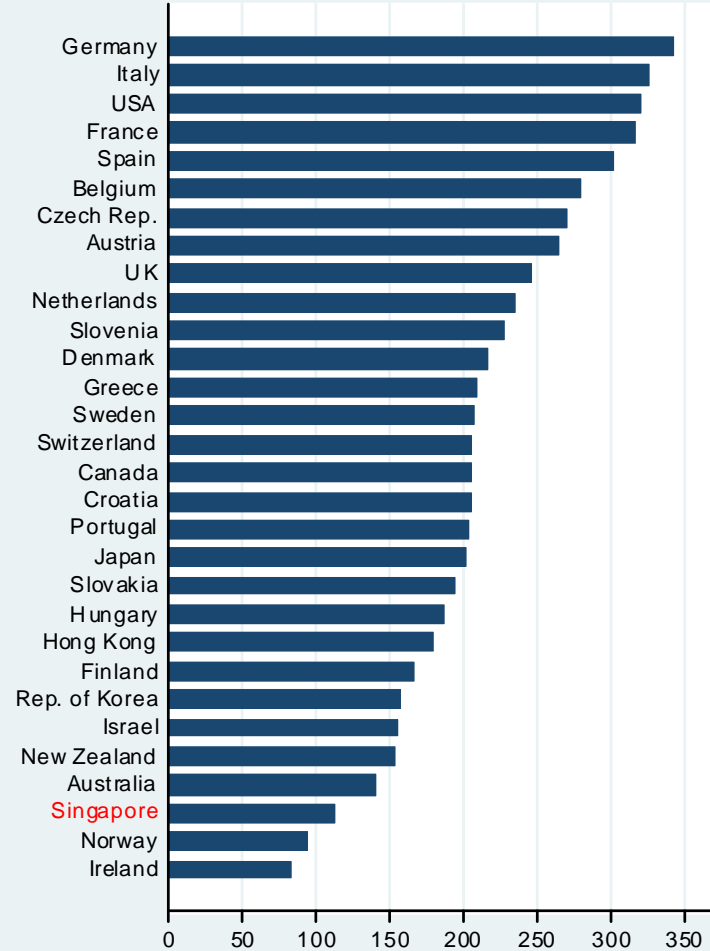
Diversification

Average 2001-2007

Panel A: Non-high income countries



Panel B: High income countries



Diversification, 2001-2007 Average

Standardness and Diversification



Note: Countries with population less than 2 million were excluded. Dashed lines correspond to the respective means of standardness and diversification.

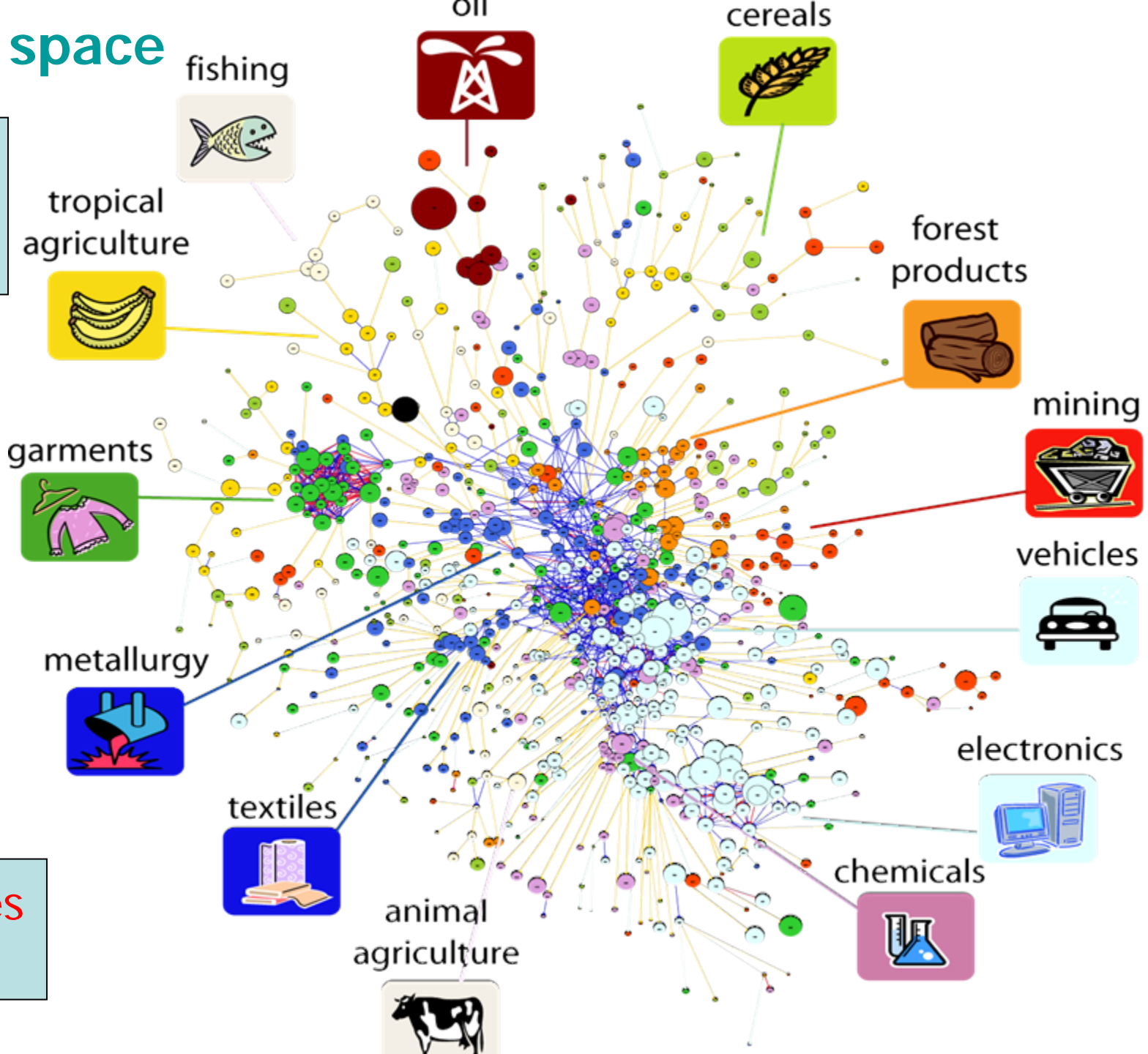
Product space

Periphery
to
center

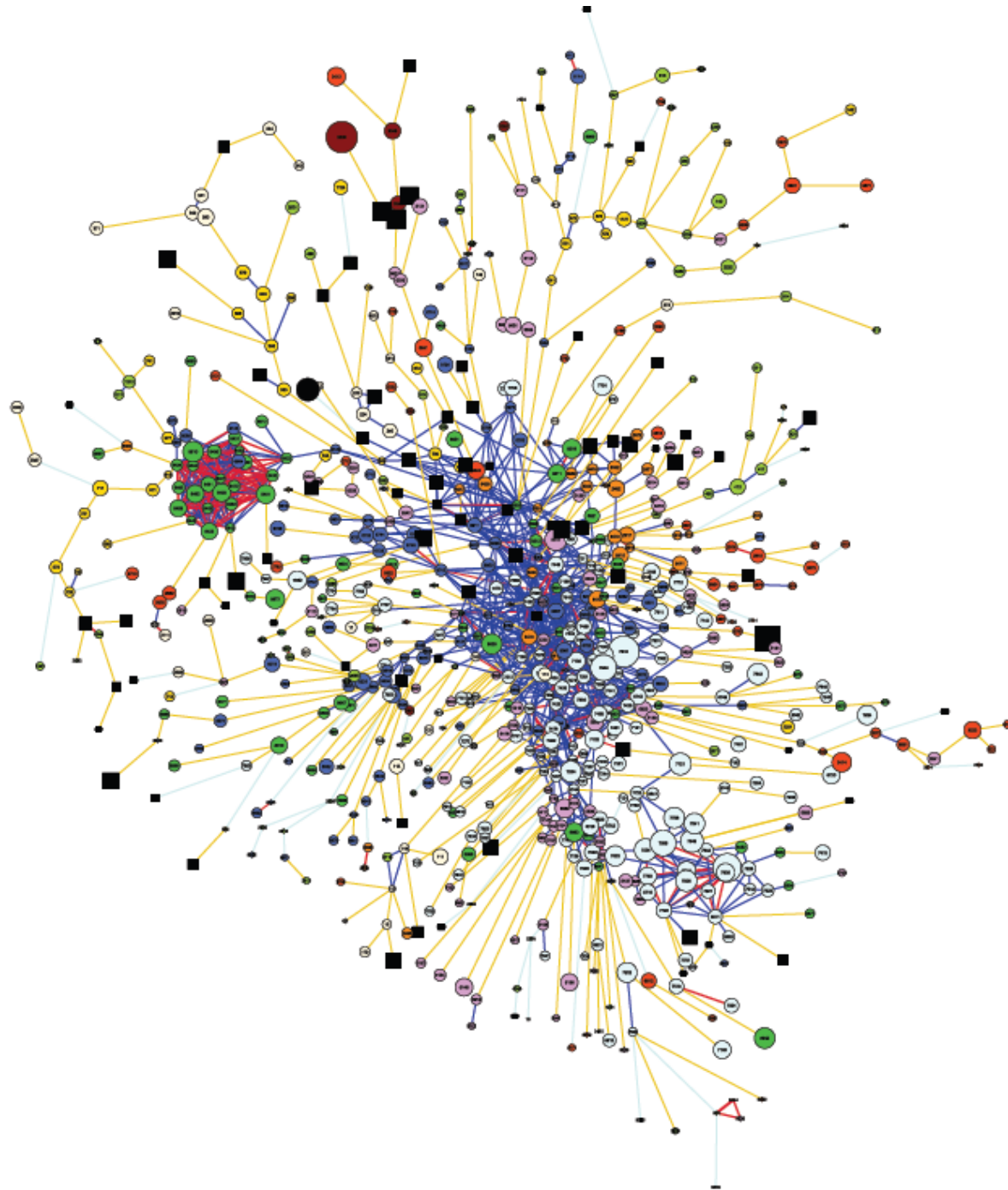
Very
difficult

Capabilities

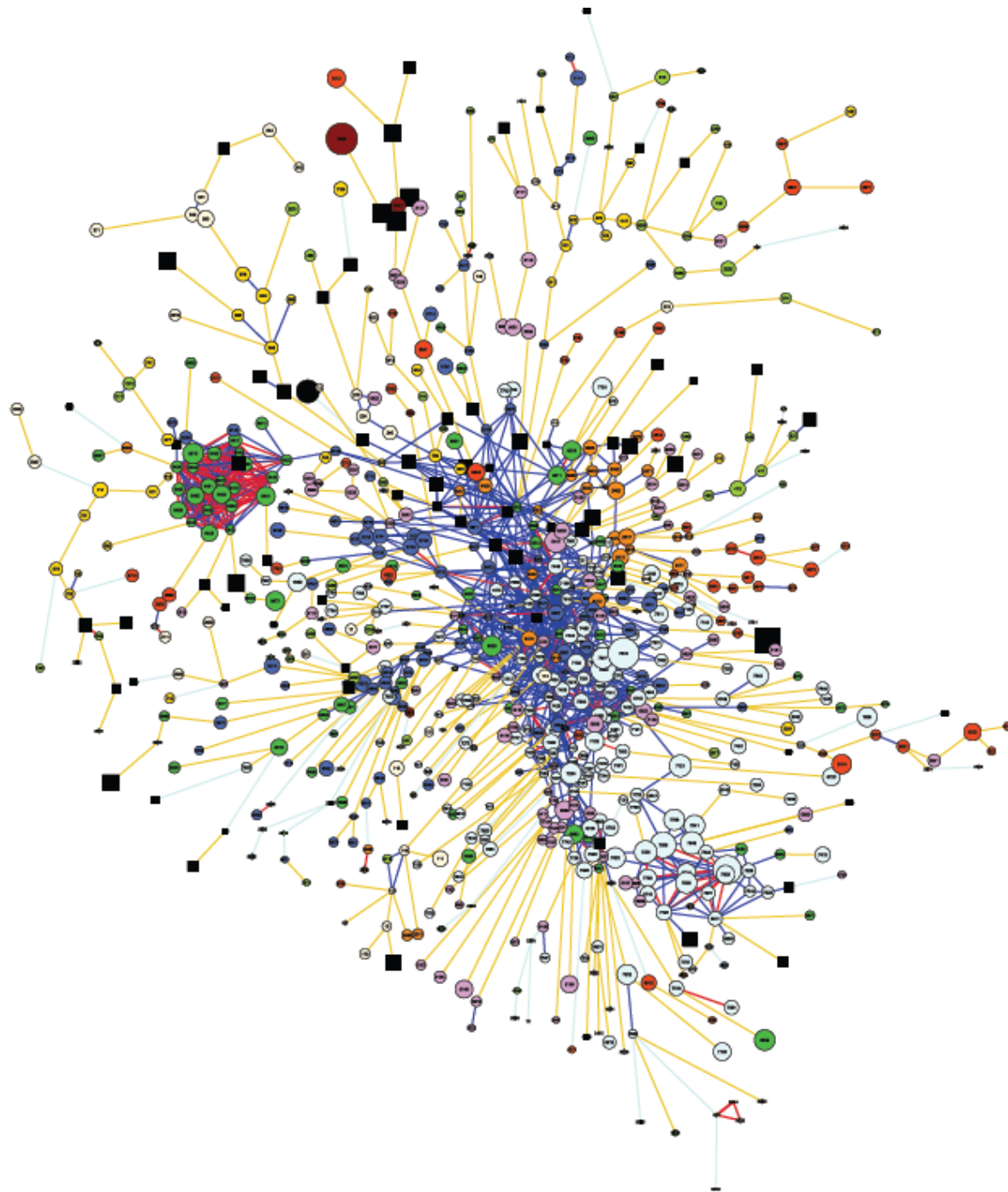
Policy does
matter



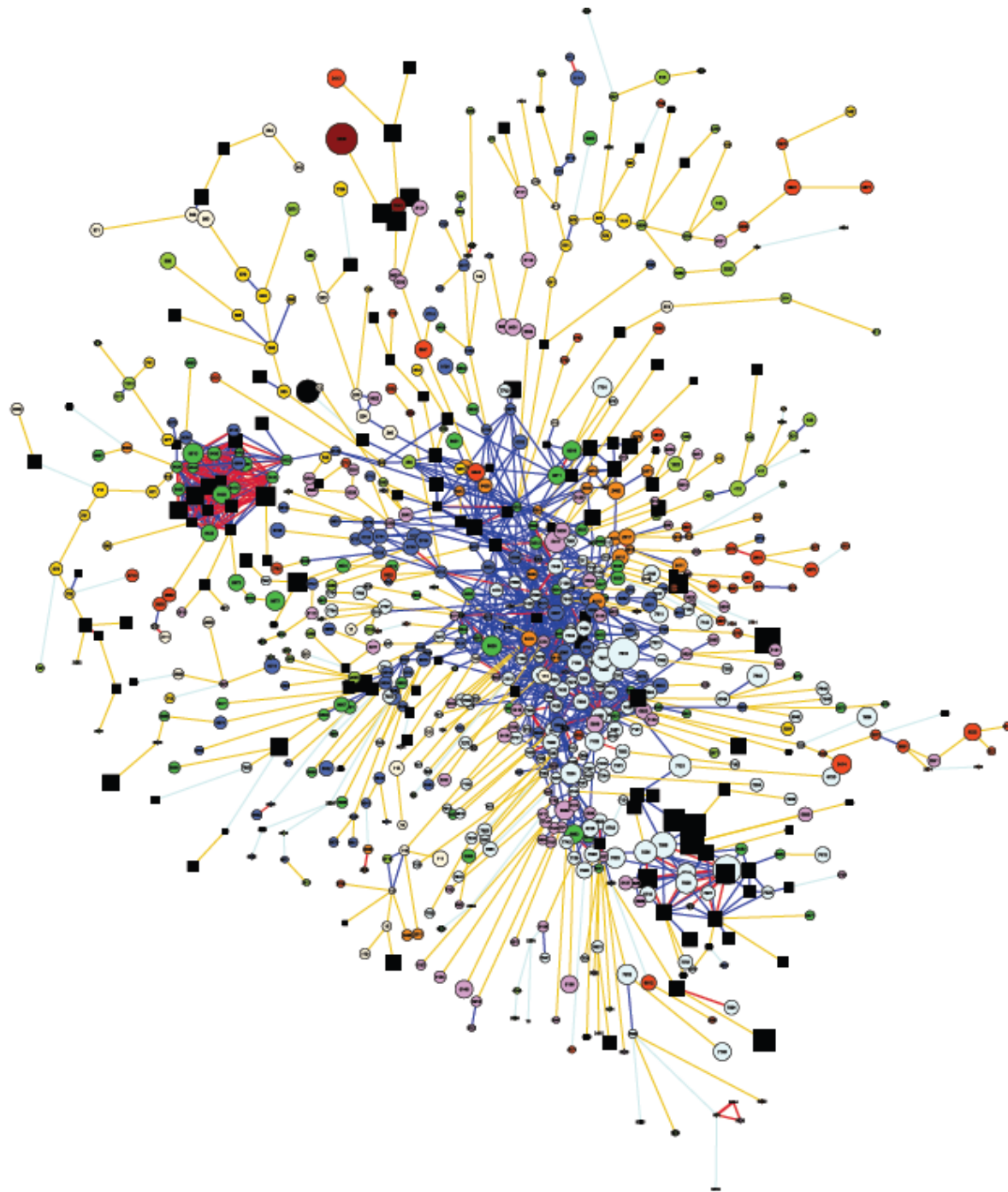
1962



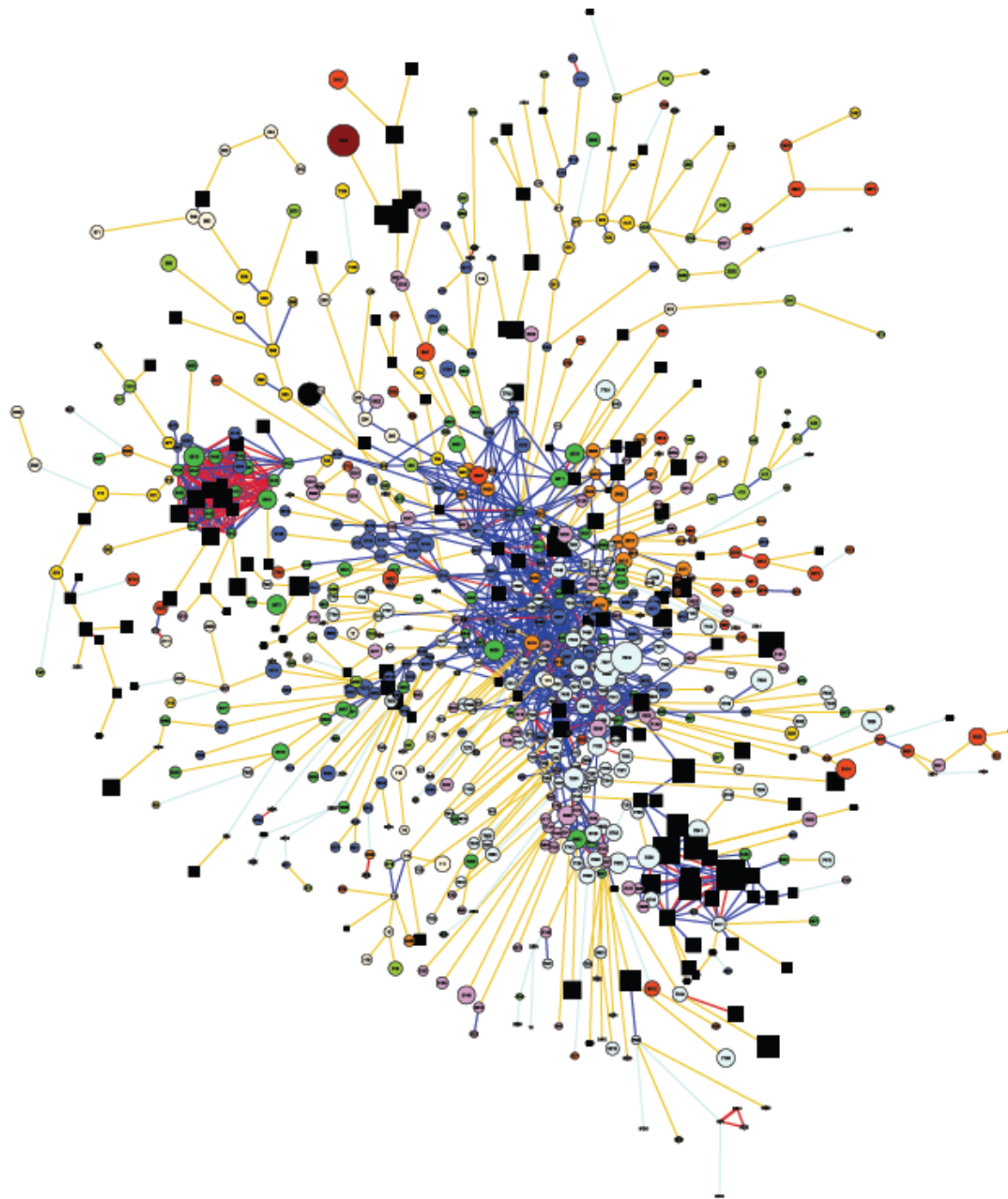
1965



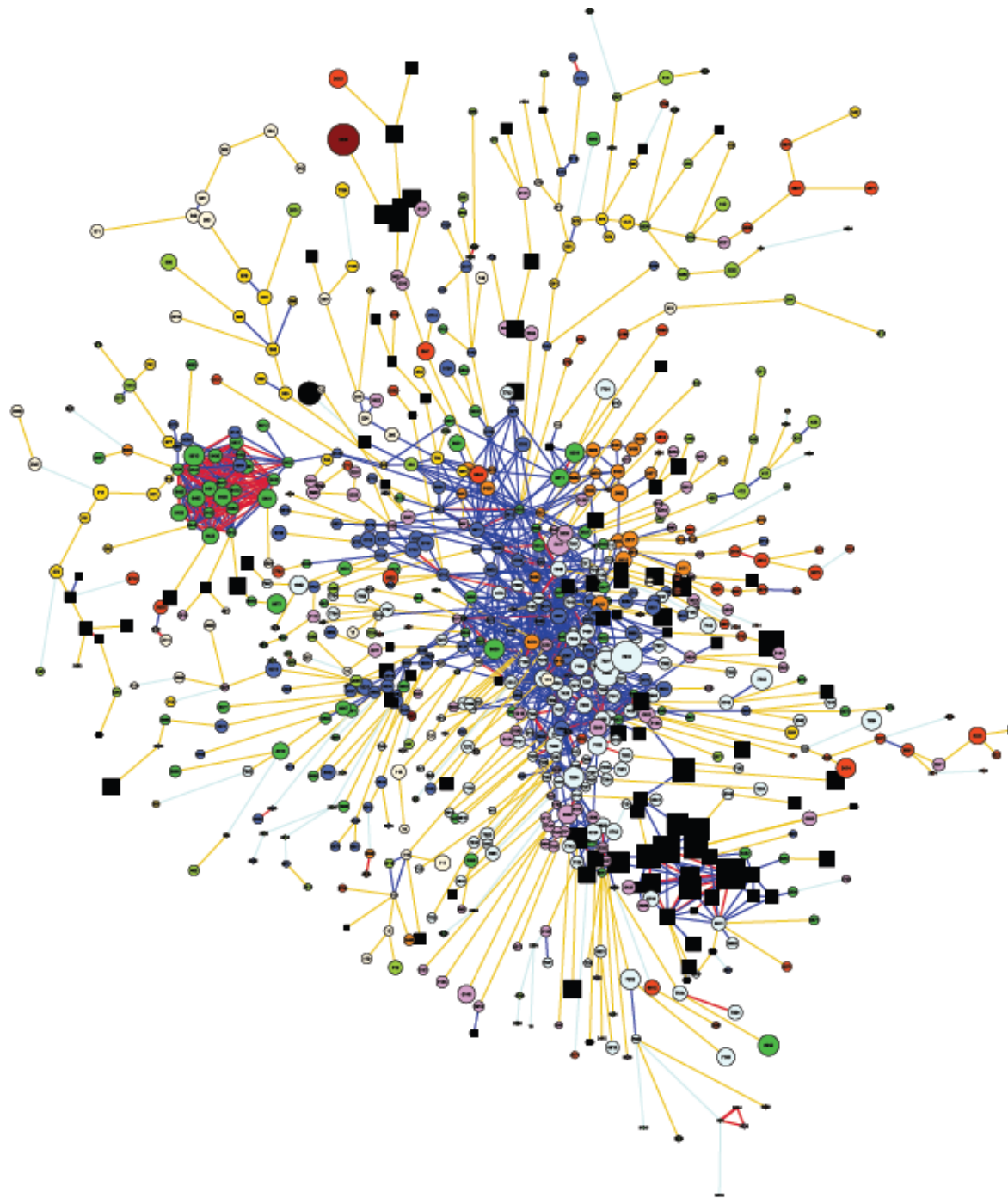
1975



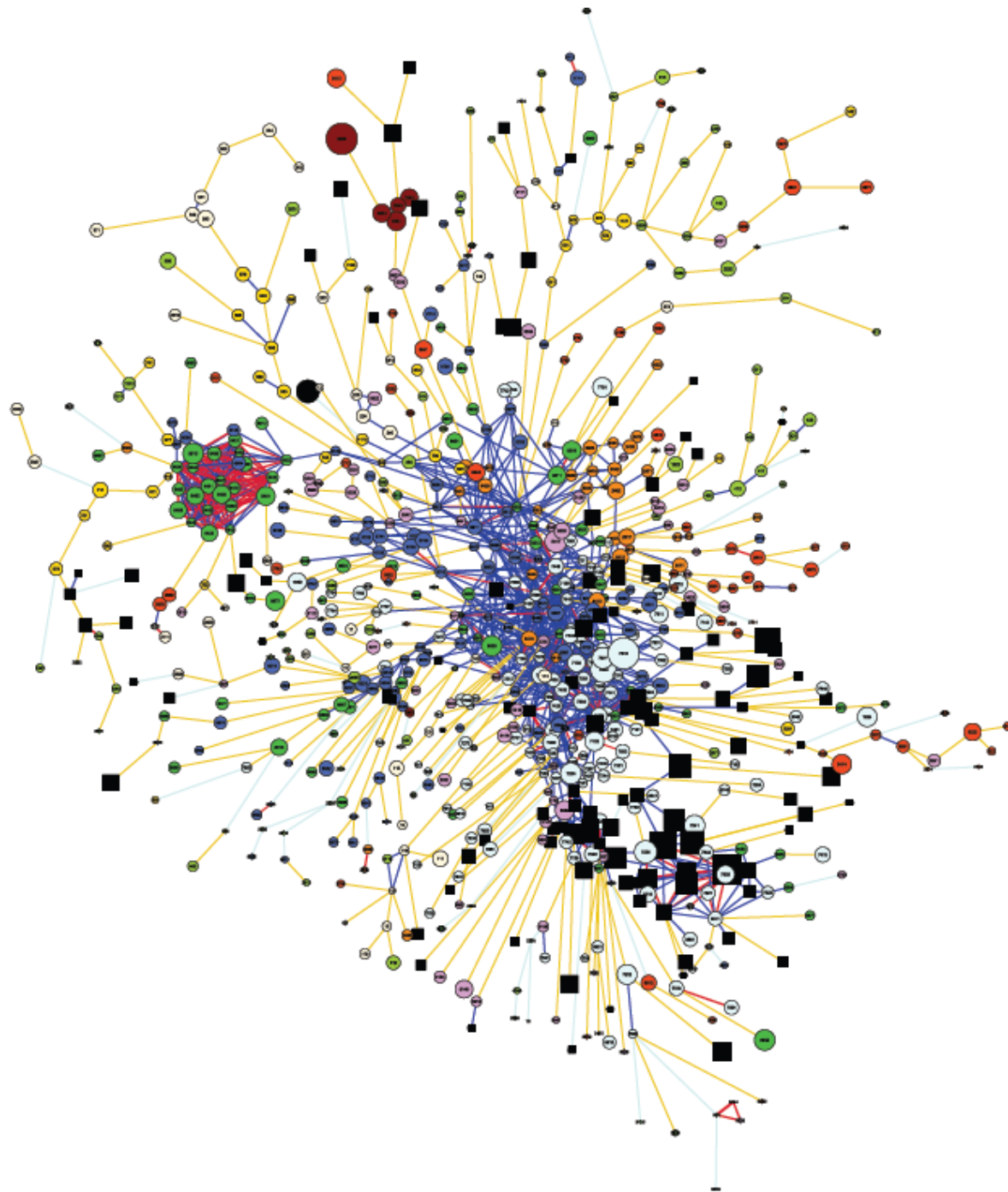
1985



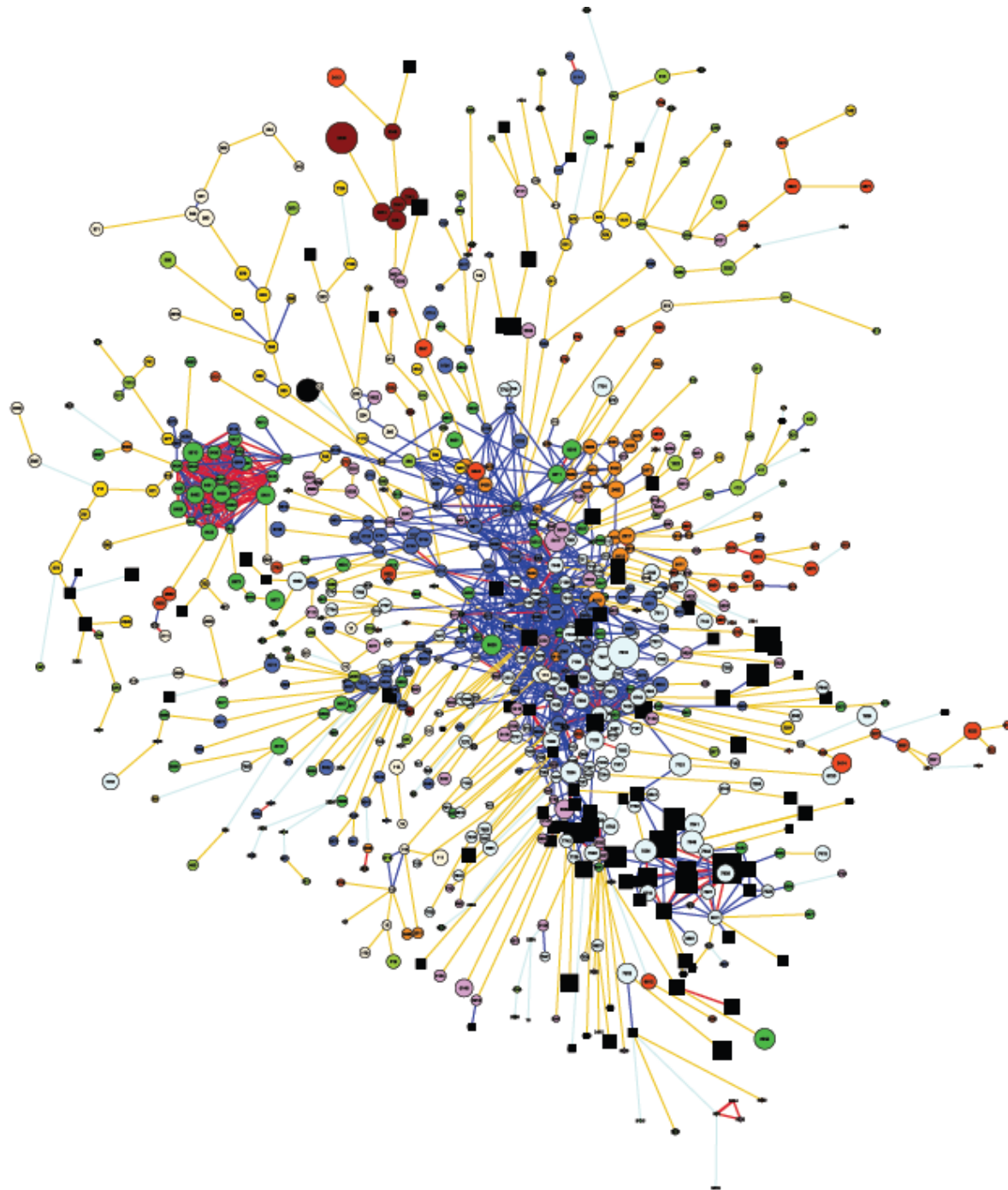
1995



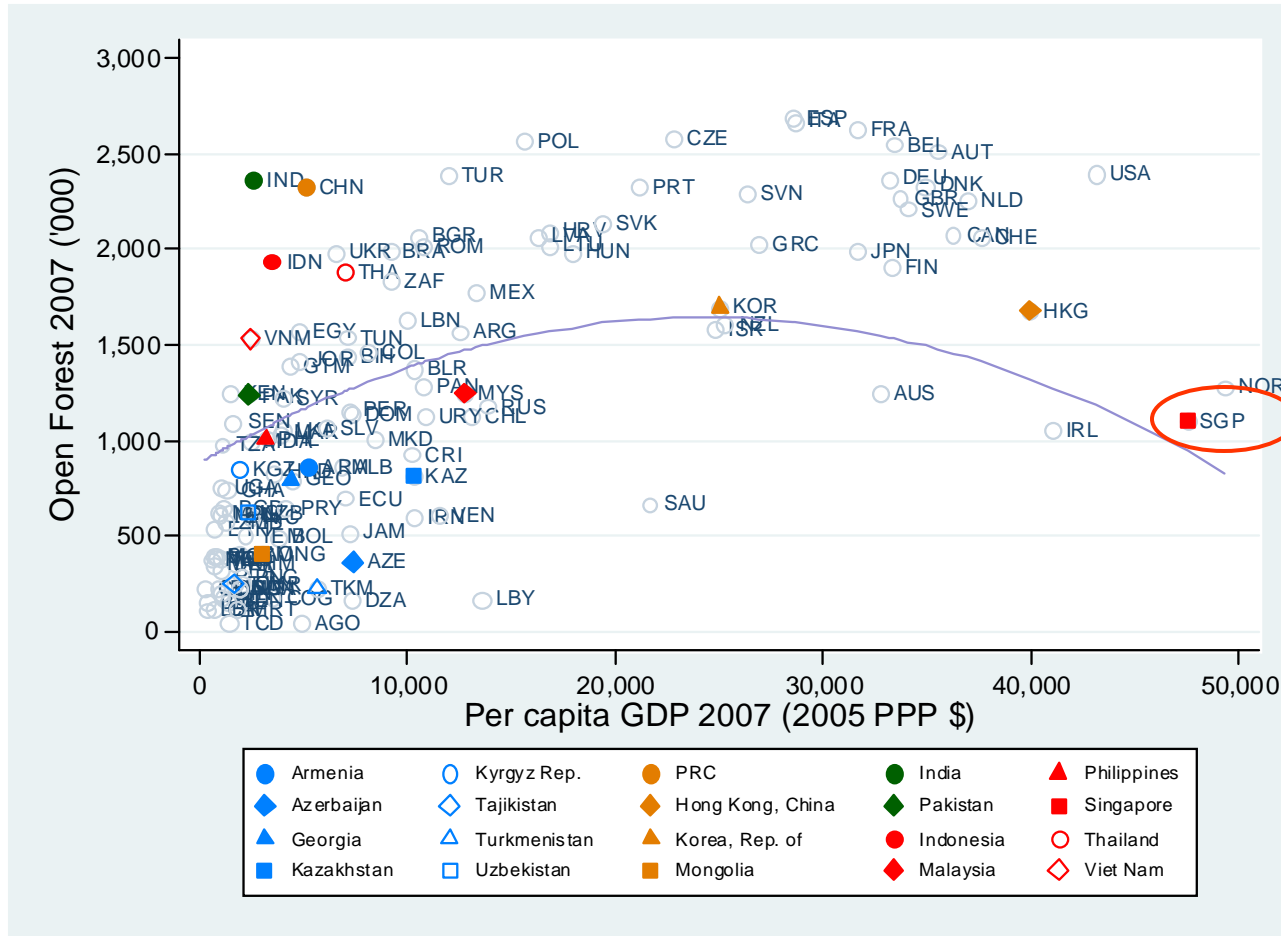
2005



2007



Open Forest and GDP per capita



The estimated regression is:

$$OF = -534.30 + 0.06y - 0.00y^2 + 16.43inv + 8.66ndes$$

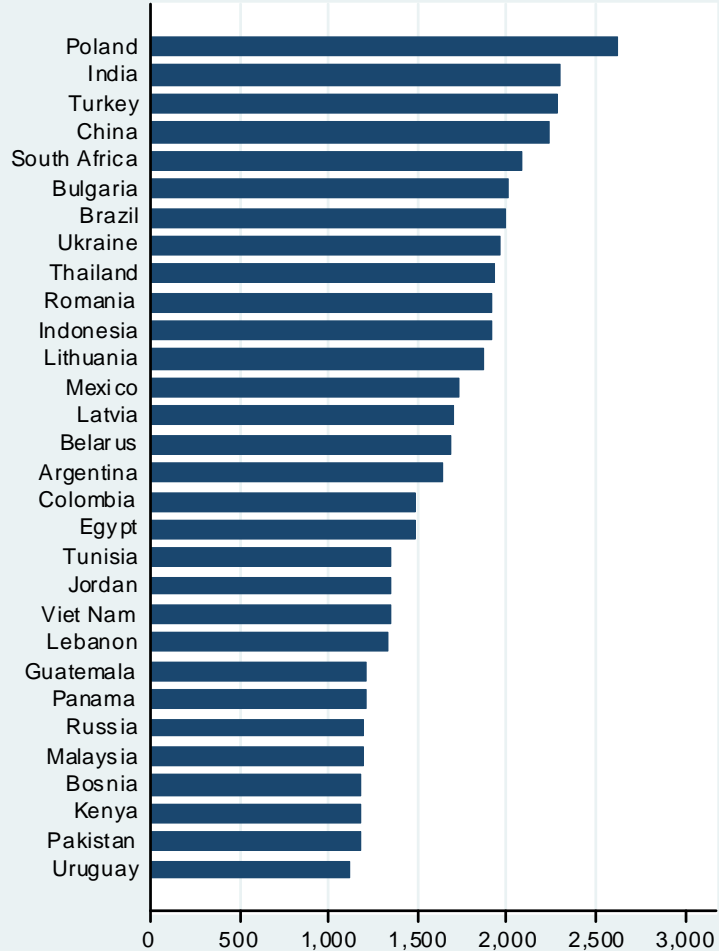
t-stat: (-4.71) (5.12) (-4.99) (3.75) (10.61)

where OF=open forest; y=GDP per capita; inv=investment-output ratio; and ndes=no. of export destinations of products exported with comparative advantage. Predicted Open Forest is maximum at GDP per capita equal to PPP\$ 24,254.

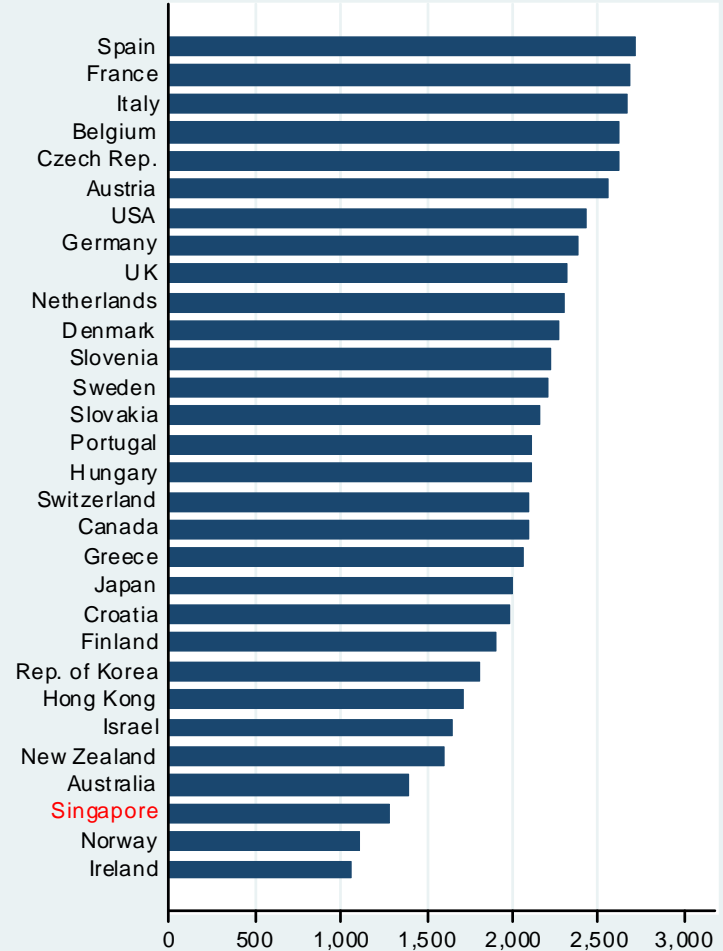
Open Forest

Average 2001-2007

Panel A: Non-high income countries



Panel B: High income countries



Open Forest ('000, 2005 PPP \$), 2001-2007 Average

Index of Opportunities (I)

Country	Rank	Country	Rank	Country	Rank	Country	Rank
Germany	1	Brazil	18	Turkey	35	Uruguay	52
USA	2	Mexico	19	Israel	36	Lebanon	53
China	3	Indonesia	20	Ireland	37	Greece	54
Japan	4	Hungary	21	Croatia	38	Georgia	55
India	5	Rep. of Korea	22	Portugal	39	Panama	56
France	6	Slovakia	23	Argentina	40	Kenya	57
Italy	7	Denmark	24	Canada	41	Costa Rica	58
Switzerland	8	Ukraine	25	Jordan	42	Tunisia	59
Czech Rep.	9	Finland	26	Egypt	43	Pakistan	60
United Kingdom	10	Netherlands	27	Viet Nam	44	Nepal	61
Austria	11	South Africa	28	Russian Federation	45	Kyrgyzstan	62
Sweden	12	Malaysia	29	Latvia	46	New Zealand	63
Spain	13	Romania	30	China, Hong Kong SAR	47	Syria	64
Poland	14	Philippines	31	Bosnia Herzegovina	48	Rep. of Moldova	65
Thailand	15	Bulgaria	32	Lithuania	49	Guatemala	66
Belgium	16	Singapore	33	Sierra Leone	50	Sri Lanka	67
Slovenia	17	Belarus	34	Colombia	51	Venezuela	68

What to do?

- Be aware of your constraints
- Understanding productivity
- What new areas can Singapore get into?
- The role of Industrial Policy

I. Constraints (I)

- City state (size) that depends on trade: vulnerable to external shocks and markets abroad
 - As a small open economy, specialization makes Singapore vulnerable to market volatility
 - Sparseness of agglomeration economies
- Mature economy: The aging problem requires a long-term approach
 - Larger population? Immigration?

I. Constraints (2)

- Is there a research base grounded in local universities and research institutions?
- What is the quality of the technical workforce?
- Are there Singaporean firms that can take the lead?

MNCs and Domestic Firms(3)

- What do you know about MNCs' spillovers?
- Are there backward linkages, i.e., MNCs transfer knowledge to their local suppliers; contacts between domestic suppliers of intermediate inputs and their MNC clients)
- Or through horizontal channels, i.e., the effect of the MNC on domestic firms in the same sector?
- **What about countries like Ireland or Switzerland?**
- What is the typical Singaporean firm?
- Needed: policies to develop local capabilities

2. The determinants of productivity growth (I)

- Factors that operate within businesses:
 - Managerial Talent
 - Quality of general labor and capital inputs
 - Information technology and R&D
 - Learning-by-Doing
 - Product Innovation
 - Firm structure decisions

2. The determinants of productivity growth (2)

- Elements external to the firm:
 - Productivity spillovers
 - Competition
 - Deregulation or proper regulation
 - Flexible input markets

The Productivity Dilemma

- Imbalance between productivity growth and demand growth: If productivity keeps increasing while the demand for new goods and services reaches a saturation point, an imbalance will arise
- Bottleneck for economic development: the consequence of the imbalance is the displacement of labor
- Solution: the economy has to continuously create new goods and services, i.e., a change in the composition leading to a growth in variety

3. What new areas?

- Out of electronics?...Need new knowledge
- Find new “niches”, areas in manufacturing & services that:
 - Are subject to increasing returns to scale
 - Have high income elasticity of demand
 - Are produced under imperfect competition
- Key: Capabilities

Potential exports with the highest strategic values in 2007 (ordered by PRODY)

	Commodity Description	Leamer's Classification	PRODY	Strategic Value	RCA
"Nearby"	Phenoplasts	Chemicals	18,380	17,406	0.388
	Air pumps, vacuum pumps and air or gas compressors	Machinery	19,930	17,347	0.946
	Polyamides	Chemicals	24,246	16,521	0.885
	Chemical products and preparations, nes	Chemicals	22,738	16,110	0.726
	Inorganic esters, their salts and derivatives	Chemicals	20,600	16,017	0.040
	Pins, needles, etc, of iron, steel; metal fittings for clothing	Metal products	18,345	15,662	0.770
	Other chemical derivatives of cellulose; vulcanized fibre	Chemicals	25,845	14,879	0.096
	Machinery, accessories for type-setting, for printing blocks, etc	Machinery	24,641	14,820	0.353
	Photographic film, plates and paper (other than cinematograph film)	Machinery	25,859	14,751	0.389
	Organic chemicals, nes	Chemicals	24,709	14,624	0.513
"Middle"	Glazes, driers, putty etc	Chemicals	20,195	19,995	0.182
	Parts, nes of the machines falling within headings 7435 and 7436	Machinery	24,110	19,406	0.304
	Shaft, crank, bearing housing, pulley and pulley blocks, etc	Machinery	20,463	18,719	0.244
	Parts, nes of pumps and liquids elevators falling in heading 742	Machinery	22,827	18,591	0.476
	Abrasive power or grain, on a base of woven fabrics	Labor intensive	24,313	18,467	0.124
"Far Away"	Miscellaneous articles of plastic	Labor intensive	18,059	19,246	0.446
	Parts, nes of the machinery falling within heading 7442	Machinery	21,189	18,963	0.378
	Tube and pipes fittings, of iron or steel	Metal products	18,582	18,863	0.611
	Other parts and accessories, for vehicles of headings 722, 781-783	Machinery	20,358	18,818	0.075
	Harvesting and threshing machines; fodder presses, etc; parts nes	Machinery	20,640	18,789	0.019

“Far away” Products Singapore (2007)

Commodity Description	Leamer's Classification	PRODY	Strategic Value	RCA
Miscellaneous articles of plastic	Labor intensive	18,059	19,246	0.446
Parts, nes of the machinery falling within heading 7442	Machinery	21,189	18,963	0.378
Tube and pipes fittings, of iron or steel	Metal products	18,582	18,863	0.611
Other parts and accessories, for vehicles 722, 781-783	Machinery	20,358	18,818	0.075
Harvesting and threshing machines; fodder presses, etc	Machinery	20,640	18,789	0.019
Cocks, valves and similar appliances, for pipes boiler shells, etc	Machinery	21,910	18,728	0.393
Felt, articles of felt, nes, whether or not impregnated or coated	Capital intensive*	22,528	18,561	0.145
Central heating equipment, not electrically heated, parts, nes	Capital intensive*	19,293	18,528	0.026
Engines and motors, nes (wind, hot air engines, water wheel)	Machinery	21,198	18,391	0.412
Other hand tools	Metal products	20,662	18,150	0.260
Lifting, handling, loading machinery, telphers and conveyors	Machinery	20,702	18,018	0.454
Wool; expanding or insulating mineral materials, nes	Labor intensive	20,275	17,798	0.046
Correspondence stationary	Forest products	21,476	17,756	0.341
Rolling mills, rolls therefor, and parts, nes of rolling mills	Machinery	19,334	17,733	0.008
Safety glass consisting of toughened or laminated glass	Labor intensive	19,903	17,653	0.056
Coated or impregnated textile fabrics and products, nes	Capital intensive*	19,534	17,652	0.056
Centrifugal pumps (other than those of heading 74281)	Machinery	19,873	17,618	0.411
Printing paper and writing paper, in rolls or sheets	Forest products	27,779	17,285	0.029
Locksmiths wares, safes, etc, and hardware, nes, of base metal	Metal products	18,524	17,273	0.268
Fabrics of glass fibre (including narrow, pile fabrics, lace, etc)	Capital intensive*	20,242	17,269	0.064

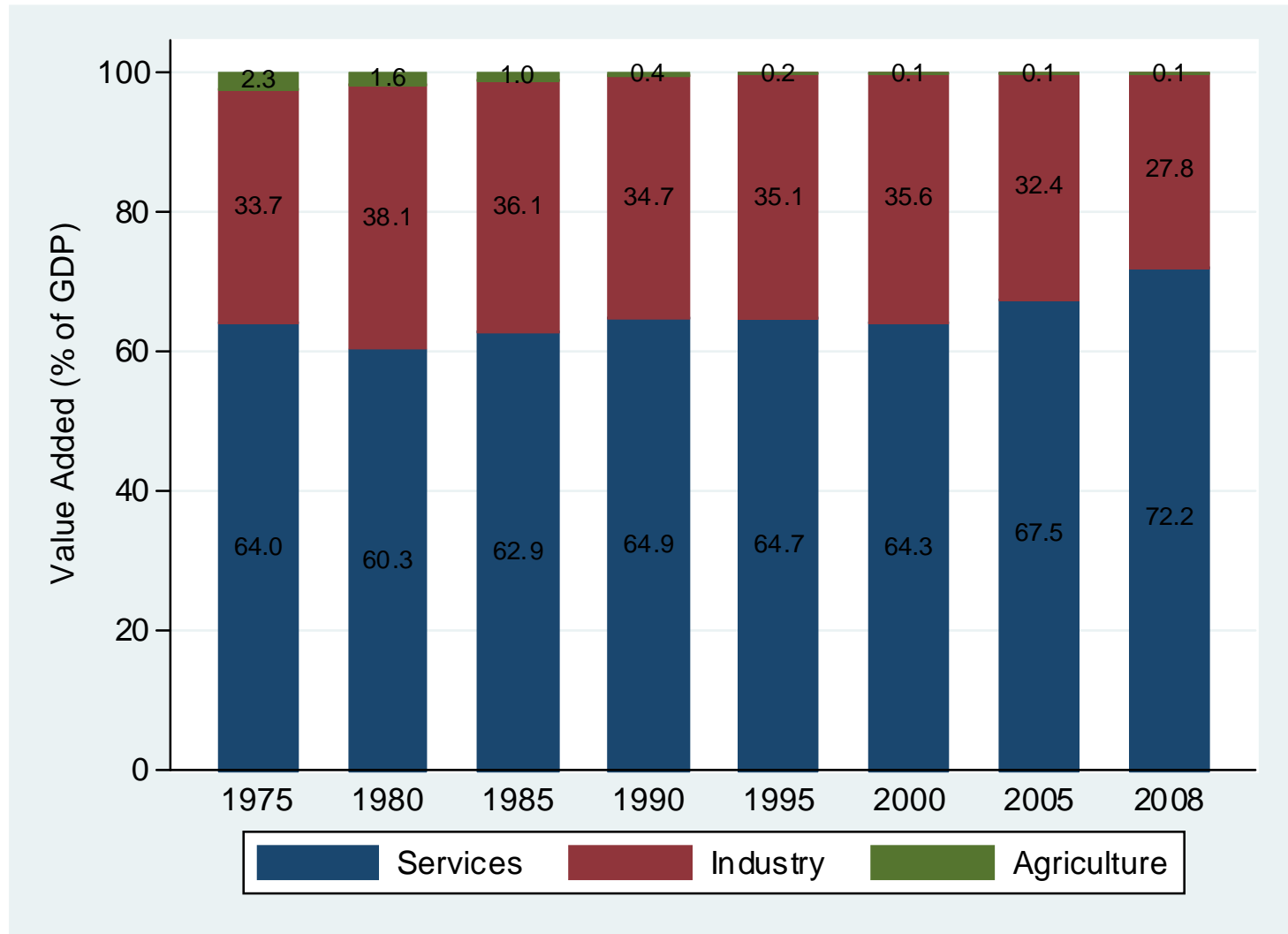
*excluding Metals

What else?

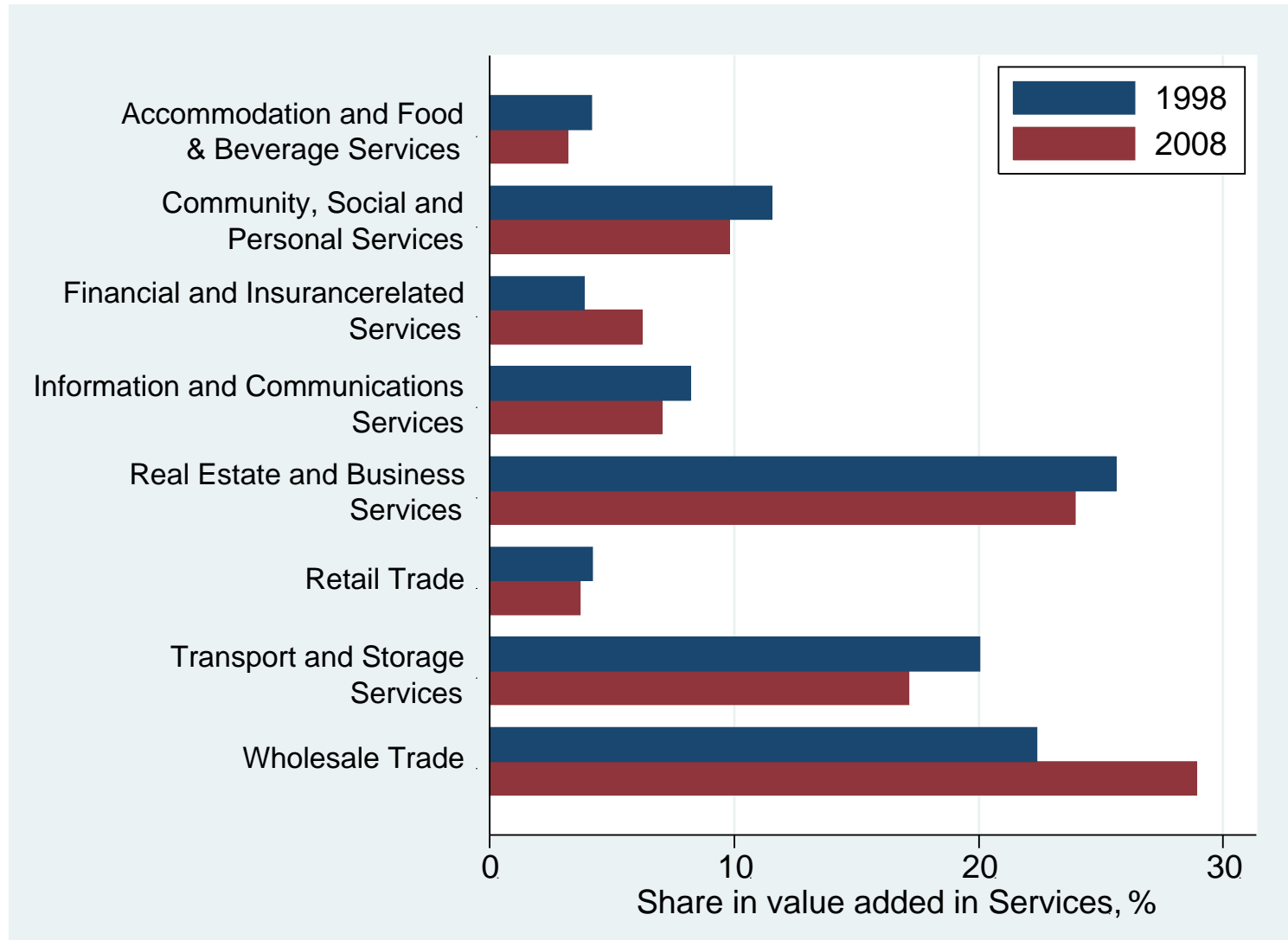
- Do not disregard services (70% of the economy), e.g., tourism: (i) numbers vs. spending; (ii) employment generation
 - e.g., target the highest spending per tourist in the world
 - What package do you have to offer? Theme park catering to Asia's new middle class?
 - What professionals do you have to train? Set up the best hotel management and hotel school in the world

- Key: Capabilities

Singapore is a service economy with a large manufacturing sector



Singapore's Service Sector



Source: Singapore's Yearbook of Statistics, 2010

4. The role of Industrial Policy

- IP is not about the provision of subsidies and rent-seeking
- It is about facilitating structural transformation & developing internationally competitive sectors
- IP deals with economic transformations that require the concerted action of multiple players, within and across sectors
- Key: Coordination of firms and government to jointly build a “competitive industry” (the rate of return of individual investments is low. But the rate of return to *coordinated* investments is high)

Where does the future of Singapore lie?

- Deliver outstanding services to your citizens
- Avoid the misery that unemployment brings along (be the first country in the world to eliminate unemployment and brag about it!)
- Innovate and be creative
- Question yourself constantly

WHAT SHOULD POLICY MAKERS CARE ABOUT?

The role of public policy in promoting inclusive growth

Today most Governments are evaluated based on their performance, not ideology

Objective of Public Policy: **Inclusive growth**, defined as “growth with equal opportunities”

Three components:

- Effective delivery of public goods and services (market failures), e.g., health, education, water, power (under your control), especially for the poor
- Elimination of inequalities
- Achievement of full (productive and decent) employment (under your control !). Be the first Government to target it and to achieve it

Future of Singapore

- Bright.....provided:
 - Understand constraints
 - Set clear and meaningful policy objectives (is GDP growth what you want?; what about employment?)
 - Yes, push yourself ahead, but be realistic about the new areas you can get into (your capabilities)
- Growth is about the gradual build-up in firms' capabilities. This is what raises the economy-wide real wage rate

GDP growth 2010-2030

Country	Growth projection 2010- 2030 (%)	Average growth rate 1990-2007 (%)	Country	Growth projection 2010- 2030 (%)	Average growth rate 1990-2007 (%)
Australia	0.79-1.27	3.2	Malaysia	4.01-5.03	6.07
Austria	0.47-0.87	2.22	Netherlands	1.45-1.71	2.67
Belgium	1.65-2.17	1.93	New Zealand	1.97-2.29	3.01
Canada	1.38-2.01	2.78	Norway	0.5-1.32	3.09
China	4.15-5.12	10.34	Philippines	5.85-7.06	3.94
Denmark	1.65-1.99	2.24	Portugal	1.45-2.68	2.13
Finland	1.56-2.42	2.38	Russian Federation	1.04-1.23	0.28
France	1.98-2.26	1.95	Saudi Arabia	2.08-3.69	4.02
Germany	1.44-1.94	1.73	Singapore	0.63-2.72	6.62
Greece	0.92-1.76	2.89	Spain	1.87-2.83	2.35
Hong Kong, China	1.11-1.47	4.37	Sri Lanka	3.54-4.29	5.27
Hungary	0.93-1.51	1.94	Sudan	5.66-5.97	6.49
Indonesia	5.11-6.49	4.69	Suriname	2.45-4.09	2.25
Ireland	1.44-2.98	6.05	Sweden	1.66-2.64	2.23
Israel	2.67-3.87	4.67	Switzerland	0.38-1.26	1.28
Italy	1.83-2.12	1.25	Thailand	4.14-4.99	4.7
Japan	0.82-2.53	1.37	United Arab Emirates	1.01-1.64	5.65
Korea, Rep.	1.64-2.63	5.47	United Kingdom	1.82-2.53	2.46
Kuwait	0.22-2.53	6.31	United States	2.11-2.64	2.9

**WHAT DO YOU WANT TO BE
AS A NATION IN 2030?**

What do you want to achieve?

THANK YOU