

Index

Abernathy and Utterback (1978), 138	BGs (business groups). see also business
aborted catch-up, 135	groups
Abramovitz (1986), xix, 9	catch-up based view of, 111
absorption capacity, 79	double-edged sword, 113
Acemoglu, 22	big businesses (BBs), 6, 13, 41
Achilles, 18	binding factors
ADB	for economic growth, 183
Asian Development Bank, 29	bio-similar, 11
adding up, 52	body shopping, 174
problem, 19, 91	definition, 177
Africa, 204	Bombardier
agency cost. see agency problem	in airline industry, 151
agency problem, 105	Botswana
Amsden (1989), 114	and diamond sector, 206
Anglo-Saxon legal tradition, 67	branding, 18
Apple Co., 92	Brazil, 3, 31, 34, 84
appropriability	big businesses, 42
of knowledge, 80	telephone switches, 59
Argentina, 34	BRIC
patents by, 86	big businesses, 42
Asian	business cycle
style of catching up, 31	as a window of opportunity, 137
asymmetric environment, 137	business cycles, 16
asymmetric protection, 211	business groups, 16
asymmetric tariff, 206	definition, 102
Aurora World, 123	family-owned, 15
automobile industry, 61, 77	in memory chips, 155
automobile sector	business model, 173
in Indonesia, 226	
	camera
backward linkages, 206	catch-up cycles, 146
Balassa, 28	Cannon, 155
Baldwin (2016), xvii, 12, 89	capabilities
balloon	building, 110
flying on a, 134	design, 86
bargaining power, 91	dynamic, 113
basic oxygen furnace method (BOF),	firm-level, 56
152	human, 45
Bell	innovation, 11
Martin, 128	of firms; of sectors, 6
Berle and Means (1932), 103	R&D, 32

270



INDEX 27I

technological, 8	citations
of business groups, 115	patent, 53
capabilities failure, 5	civil wars, 210
capability	client-server systems, 175
building, 8	code division multiple access (CDMA),
innovation, 29	149
R&D, 6, 38	co-development, 58, 61
capability failure, 8, 36	coexistence
capital goods, 28, 79	of old and new leaders, 153
capital markets, 15	cognition failure, 37
internal, 103	cognitive distance, 37
failure, 110	colonial
capital mobility	legacy, 220
free, 213	comparative advantage
capital-labor ratio, 73	latent, 89
carbon lock-in, 203	comparative advantages
cash flow rights, 106	dynamic, 86
cash flows	in trades, 86
in CMS firms, 105	latent, 52
catching-up	complete knock down (CKD), 227
economies. see catch-up	comprehensive theory of economic
catch-up	catch-up, xix
and business groups, 103	condition
comprehensive theory of, 189	necessary, 54
cycles, 16	conglomerates, 14, 112
definition, 9	Consultative Group on International
device for, 14	Agricultural Research (CGIAR), 217
dynamic theory of, 189	consumer electronics, 82
effect, 19, 52	continental legal system, 67
paradox, 9	control rights, 106
Schumpeterian economics of, 190	controlling minority structure (CMS),
stage-skipping, 62	105
theory of, 18	convergence
catch-up cycle	in income levels, 182
policy implications, 180	convergent paths, 2
catch-up cycles, 134	core, 75
catch-up effect, 182	cost advantages
slow-down of, 193	and path-following, 142
cell phone	CREST, 230
and catch-up cycles, 143	crisis
cellphones, 16	1997, 104
chaebol, 102	cross subsidies, 103
chaebols, 14, 16	cross-licensing, 65
Chandler (1990), 41	cross-ownership, 105
Chery, 78, 79	cross-subsidies, 14
China, 7, 14, 28, 79	Cuckoo, 125
big businesses, 7, 42	currency
degree of GVC participation, 93	under-valuation, 180
GVC, 13	value and catch-up cycles, 164
patents by, 84	cycle time of technologies, 76, 81, 100



David, 52	education
De Beers, 207	higher, 23
de-industrialization, 7	tertiary, 29
Delphi, 79	Eichengreen, 29
demand conditions	Embraer Co., 33, 156
as a window of opportunity, 135	emerging economies, 15
downturns, 142	enclave, 91
democracy, 22, 25	entrants
detour, 18, 68, 84	late, 15
GVC-related, 99	entrepreneurship, 41
in evolution of firms, 129	entry barrier, 8, 11, 19, 73
three, 187	low, 99
detours, 8	entry point, 17
three, 193	Environmental Kuznets Curve, 203
devaluation	equilibrium
of currencies, 91	low-technology, 51
development	equity claims
resource-based, 222	in CMS firms, 105
technological, 10, 82	Ericsson Co., 53, 171
diamond	excessive investment
cuttling and polishing, 209	and busines groups, 109
digitalization, 16	excessive investments
dispute settlement mechanism (DSM),	by business groups, 113
234	export growth, 27
diversification, 58, 74	export structure, 87
and business groups, 114	externalities
export, 26	scale, 7
technological, 82, 86	
Dongruan Co., 63	factors
dotcom boom, 175	binding, 23
dual-class share, 105	fallacy of composition, 19
dumping	fast follower, 60
prices, 50	FDI (foreign direct investment), 17, 19, 45
duplicative imitation, 206	financial crisis
dynamic random-access memories	Asian, 14
(DRAMs), 150	financialization, 97
	Finland
East Asia, 27, 31, 54	and Nokia, 154
East Asian economies, 5	firms
economic development	family-owned, 102
human-centered, 184	Japanese, 90
economic growth	Korean, 88
at different stages, 183	latecomer, 111, 128
health and nutrition, 184	stand-alone, 103
economics	flagship firms, 92
development, 39	flying on a balloon, xviii
neo-classical, 190	Ford, 78
neo-classical development, 196	Foreign Exchange Regulation Act (FERA),
Schumpeterian, 197	175
economy of scale, 90	forging-ahead stage, 147



Fortune	GVCs (global value chains), 12, 28, 89
global 500, 41	degree of participation in, 93
big businesses, 92	foreign-dominated, 91
Forward engineering, 63	and global convergence, 194
forward linkages, 206	
fourth industrial revolution (4IR), 229	Ha-Joon Chang (2002), xv, 8, 19
Foxconn, 92	Hausman, 74, 84
frontier	hegemony. see industrial leadership
technological, 10	Hidalgo, 74, 82, 197
fruits	Hidalgo et al (2007), xix
low-hanging, 52, 74	Hobday (1994), 120
FVA (share of foreign value-added in gross	holding company, 102
exports), 12, 93	horizontal integration, 116
- "	Huawei Co., 7, 47, 53
G5	human capital, 29, 183, 185
European, 83	South Korea, 22
GDM	Hynix Co., 64
global-delivery model, 174	Hyundai Co., 80
Geely, 64, 78	Hyundai Heavy Industry, 50
and business groups, 111	Hyundai Motors Co., 61
Germany, 41, 67, 84	,
Gerschenkron-Amsden framework, 192	IBM Co., 64, 177
Girvan and Cortez (2013), 241	IMF, 24
Glaeser, 22	imitation, 11, 57
global convergence	incumbent, 15, 54, 81
and China, 194	interference by, 121
globalization, 14, 41	counter-attacks from, 126
go global, 64	incumbent trap, 134, 160
Goliath, 52	ex-ante, 162
Good African Coffee	India, 14
from Uganda, 208	big businesses, 42
good governance, 201	telephone switches, 59
Google, 149	Indonesia
government activism, 38	paper industry, 123
Granovetter, 102	Industrial leadership, 133
green development, 203	industrial policies, 237
green light, 240	industrial policy, 116
subsidies, 226	evolutionary, 243
Grendene Co.	green, 225
from Brazil, 125	industrial structure, 10, 26, 95
growth	Industrial Technology Research Institute
economic, 22	(ITRI), 60
mechanism, 87	industrialization
mechanisms, 4	in Korea, 184
growth costs	late, 193
in latecomer firms, 128	of latecomers, 89
growth model, 1	industries
growth money, 212	labor-intensive, 82
growth theory, 182	industry
GSM standards, 149	scale-intensive, 78



Industry 4.0 (smart factory), 230	utility models, 69
infant industry, 60	Japanese. see Japan
information technology, 10, 82	Japanese firms. see Japan
Infosys, 173	Joosung Co., 48
initial conditions	Joseph Stiglitz, 2
for catch-up, 147	Joule
for catch-up cycles, 153	in South Africa, 223
innovation, 11	
competence-destroying, 151	Keiretsu, 14, 102
definition by Schumpeter, 190	in memory chips in Japan, 163
endogenous, 142	Kia Motors
follow-on, 142, 152, 168	and Indonesia, 227
incremental, 142	knowledge
product, 142	accessing, 78
innovation capabilities, 5	base, 76
innovation paradox, 6, 8	explicit, 80
innovation system, 56	externality of, 5
variable, 96	local creation of, 96
innovation systems, 9	localization, 96
and catch-up cycle, 134	scientific, 32, 54
sectoral, 8, 72	spillover, 14, 36
innovations	tacit, 38, 80
competence-destroying, 15	tacitness, 71, 76
competence-enhancing, 166	technological, 34
demand-driven, 151	Korea, 5
disruptive, 133	big businesses, 7
minor, 64	business groups, 102
Institution	Fortune 500 companies, 92
political, 25	FVA in, 93
institutional voids, 14, 104	GVC, 13, 90
institutions, 22	income level, 3
integration	number of the US patents, 91
international, 12	OECD entry, 26
intellectual property rights (IPR), 7	petit patents, 67
intermediate goods, 51	public-private R&D consortium, 6, 38
internal transactions	short cycle technologies, 10
and resource sharing, 108	South, 22
International Rice Research Institute	specialization, 82
(IRRI), 217	US patent applications, 34
inventiveness, 66	Korea Fair Trade Commission (KFTC), 105
IPR, 8, 11, 46, 64	Korean Air Co., 111
dispute, 82	Krueger, 28
litigation, 7	Krugman, 90
violations, 47	
IT service	labor market
and catch-up cycles, 172	and business groups, 105
Ivory tower, 31, 32	internal, 105
	late entrants, 72, 111
Japan	late entry, 110
business groups, 102	latecomer, 11, 12



countries, 8	Malaysia, 3, 67
economies, 9	electronics cluster, 230
Latin America, 26, 30, 31	managerial capitalism, 103
and triple traps, 221	market failure, 5, 14, 15, 36
business groups, 131	and business groups, 104, 107
long cycle technologies, 88	market share, 134
law	market transactions, 108
rule of, 22, 25	marketing
leadership	capabilities in SMEs, 122
industrial, 15	Mathews, 60
leapfrog. see leapfrogging	Mathews (2002), 111
leapfrogging, xviii, 15, 75, 82	memory chip, 15, 82
and path-creation, 140	and Samsung, 112
definition, 133	and slow catch-up by China, 169, 172
in IT-service, 173	catch-up cycles, 143
manufacturing-based, 222	mergers and acquisitions (M&As), 58
learning	Mexico, 3, 31
modes of, 58	Fortune 500 companies, 92
learning by doing, 122	GVC participation, 94
in SMEs, 126	in middle-incom trap, 90
learning channels, 97	middle income trap
learning failure, 38	and global convergence, 182
least-developed countries (LDCs),	middle-income
204	stage, 10, 84
Lee and Lim (2001), 154, 158, 205	middle-income trap (MIT), xvi, 2, 7, 10, 23,
Lee and Malerba (2017), 134	38, 50
Lenovo Co., 63	in Southeast Asia, 231
LG Co.	and GVCs, 92
diversification, 117	mid-sized jet
liberalization, 60	in Brazil, 148
market, 14	millennium development goals (MDGs), 201
financial, 26	misalignment, 37
licensing, 38, 58	system-level, 163
collective, 152	mismatch, 37, 57
in memory chips, 154	Mitsubishi, 61, 79
Lin	M-Kopa, 218
Justin, 89	MNCs (MNCs), 32, 60
Lin (2012), 52	for lower wages, 91
lock-in	subsidiaries of, 92
and catch-up cycles, 160	mobile phone, 78
long cycle	catch-up strategies, 158
times, 8	modularity, 76
sectors, 11	modularization, 78
technologies, 83	most favored nation (MFN), 235
long jumps, xix, 82, 133	M-Pesa
Lundvall, xxi, 8, 30	in Kenya, 218
machine tools, 83	NAFTA, 91
macro variables	and GVC, 94
and catch-up cycles, 164	Namibia, 218



national innovation systems (NIS), 8, 30, 33, 37	paradox three, 17, 18
and technological specialization, 99	passage, 13
variable of localization of knowledge, 95	narrow, 12
Nelson Richard, 8, 30	patents, 45, 64
neo-classical	corporate, 33
economics, 39	petit, 11
	US, 34
approach, 36	path
new trade theory, 90	-
niche, 88 Nikon	a new, 9
	alternative, 19
initial conditions for catch-up, 155	following, 18
Nokia, 154	path creating, 138
in catch-up cycles, 149	path creation
non-tariff barriers, 211	in regional jets, 159
Nooteboom, 37	in wine, 159
North (2005), 1	path following, 138
0777/ 1 1 1 1 1 1	catch-up in memory chips, 154
OBM (own brand manufacturing), 18	Penang
firms in Taiwan, 92	in Malaysia, 230
river, 124	Penrose (1959), 107
ODM (own design manufacturing), 18	Perez (2008), 221
by Taiwan, 92	Perez and Soete (1988), xviii, 165
OECD	Petit Patents, 65
Korea as a member of, 93	pharmaceuticals, 11, 82
OEM (original equipment manufacturing),	policies
17, 204	technological, 33
-based exports, 93	policy space, 8
in SMEs, 120	POSCO, 111
Trap, 123	and catch-up cycle, 139, 152
offshoring, 174	poverty traps, 182
online gaming markets	predatory pricing, 50
case in WTO dispute, 238	private benefits, 106
openness, 26, 28	private-public joint R&D
Oppo Co., 169	in Japan, 151
opportunistic behavior, 106	privatization, 26, 60
originality	product differentiation, 29
low, 86	product life cycle, 134, 180
outsourcing, 78	product space, 74
R&D, 78	production function
overtaking, 9, 54	and convergence, 183
ownership	module-based, 79
firm, 15	productive capacity, 204
ownership and control	profit rate, 88
separation of, 103	profitability, 81
, , , , ,	project execution capability, 114
Panasonic	Proton
acquired by Foxxcon, 92	in Malaysia, 90
paradigms	PT Timor Putra Nasional (TPN), 226
techno-economic, 15	public procurements of innovations (PPI), 233



public research organizations (PROs),	IPR disputes, 7
214	SEM, 118
public-private R&D, 59	Samsung Electronics. see Samsung
public-private R&D consortium, 6, 38	scale economies, 41
in digital TV in Korea, 223	Schumpeter, 41, 45
	Schumpeterian
R&D, 45	concept, 15, 37
and big businesses, 101	economics, 72
corporate, 34	notion, 134
in-house, 58	perspective, 56
investment, 41	Schwab (2016), 231
outposts, 58	science, 31, 33
subsidies, 235	science, technology, and innovation
R&D/GDP ratio, 96	(STI), 201
regional jets	SCM agreement
catch-up cycles, 146	and policy space, 236
regulation	in WTO, 227
as a window of opportunity, 135	scope clause, 151
Reinvention, 142	in airline industry, 148
Renewable energies, 225	S-curves
rents, 45	theory of, 141
rent-seeking behavior	sector
by business groups, 116	capital-intensive, 73
resource curse, 220	definition, 136
resource sharing, 14	Sectoral Innovation System
resource-based theory of the firm, 107	and catch-up cycles, 162
resources	sectors
a bundle of, 108	long-cycle, 83
lumpy, 108	short-cycle, 88
responses	segments
by firms and sectors, 135	low-end, 17
retaliatory power, 240	Semiconductor Trade Agreement (STA),
reverse engineering, 63, 78	150
Ricardo, 61	semiconductors, 84
rice intensification (SRI), 216	servicization
risk taking, 30	pre-mature, 7
Rodrik, 1, 26, 31	Shanghai Bell Co., 62
Rodrik (1996), 51	shareholder
Rodrik (2006), 22	in CMS, 105
role of government	Shimro Musical Instruments Co., 125
in catch-up cycles, 170	short-cycle technologies, xviii, 10
Russia	and catch-up in memory, 172
big businesses, 42	sixth industry, 213
	size failure, 6, 13, 101
Sachs (2015), 3, 201	skills
Samsung Co., 10, 11, 14, 15, 47, 54, 84	tacit, 16
as a business group, 107	smart specialization, 222
diversification, 117	SMEs, 6, 13, 40, 47
in China, 118	competitiveness, 119
in memory chips, 155	stages of growth, 126



socialism	techno-economic paradigm, 133
in capital market, 112	technological development
SOEs, 60, 78	a latecomer model of, 214
and business groups, 110	technological regimes, 78
Sony Co., 10	technologies
South Africa, 3	analogue, 16
big businesses, 42	different generations of, 138
electric cars, 223	digital, 10
Southeast Asia, 229	emerging, 222
Spain, 78	foreign, 67
specialization, 57	trajectory of, 138
by small firms, 127	technology
in short-cycle technologies, 96	obsolute, 10
sectoral, 9, 72	technology life cycle, 138
technology-based, 86	technology transfer
trade-based, 86	embodied, 76
Spence (2011), 19	Teece, 113
SSI (sectoral systems of innovation)	telephone switches, 59
in catch-up cycle, 136	tertiary education, 2
stage skipping, 138	Thailand, 7, 38, 68
in memory chips, 158	automobile sector/cluster, 90, 230
standard cycle	big businesses, 42
as a catch-up cycle, 135	in middle-income trap, 90
steel	theory of the firm
catch-up cycles, 146	evolutionary; knowledge-based, 107
steel industry	three paradoxes, xx
follow-on innovation, 142	time horizon
Stiglitz, 36	long, 15
stock pyramids, 105	Tobin-Q, 106
subcontracting, 17	total factor productivity (TFP), 211
subsidies for R&D, 5	Toyota Co., 90
Substance patents, 68	trade, 26
Sunstar Co., 47	free, 46
suppliers	protection, 47
independent, 91	structure, 26
Supply chains, 89	surplus, 199
sustainable development, 201	trademarks, 69
sustainable development goals (SDGs), 201	trade-off, 11
System failure, 37	Trade-Related Aspects of Intellectual
	Property Rights (TRIPS), 46, 240
Taiwan, 5, 6	trading the (domestic) market for (foreign)
big businesses, 7, 42	technology, 62
GVC, 13	transaction cost economics, 14
income level, 3	transaction costs, 14
short cycle technologies, 10	and business groups, 102
US patents, 34	transition, 4, 7, 27, 88
target	of firms, 15
moving, 9, 19	variables, 23
TCS, 173	transition economies, 104
TD-SCDMA, 170	transmission, 80



trap	vertical integration
incumbent, 15	and business groups, 116
development, 210	Very Large Scale Integration (VLSI), 150
TRIMs (local content requirement), 227	vicious circle, 32
triple traps, 221	visible hands, 15
Tsinghua, 63	Volkswagen Co., 78
Turkey, 7	
big businesses, 42	Wade (2012), 234
turning point, 83	Washington Consensus, 1, 22, 30, 31
technological, 84	and Latin America, 221
two black boxes	Williamson, 14, 102
in economics, 190	wind power
two failures and one barrier, xvii, 8	in China, 228
	windows
UK (United Kingdom), 67	technological, 16
undervaluation, 212	windows of opportunity, xviii, 15, 133
pro-cyclical effect of, 220	and catch-up cycles, 147
UNIDO/UNCTAD (2011), 242	exogenous, 165
upgrading, 12	three types of, 138
Uruguay, 222	wine
US (the United States), 7, 41	catch-up cycles, 147
US International Trade Commission	Wipro, 173
(US ITC), 47	World Bank, 3, 6, 29, 68
utility models, 11, 66	survey, 185
	World Economic Forum, 229
value chain, 17	World Trade Organization (WTO), 7, 46, 62
value-added	governance, 234
domestic, 13	rules on subsidies, 226
local, 95	
high, 7	Xenon, 18, 52
low, 12	Xiaomi Co., 169
variety, 90	•
Vernon (1966), 134	Y2K, 175