

Nomura Asia-Pacific Research

NOMURA

Machinery

Factory Automation in China

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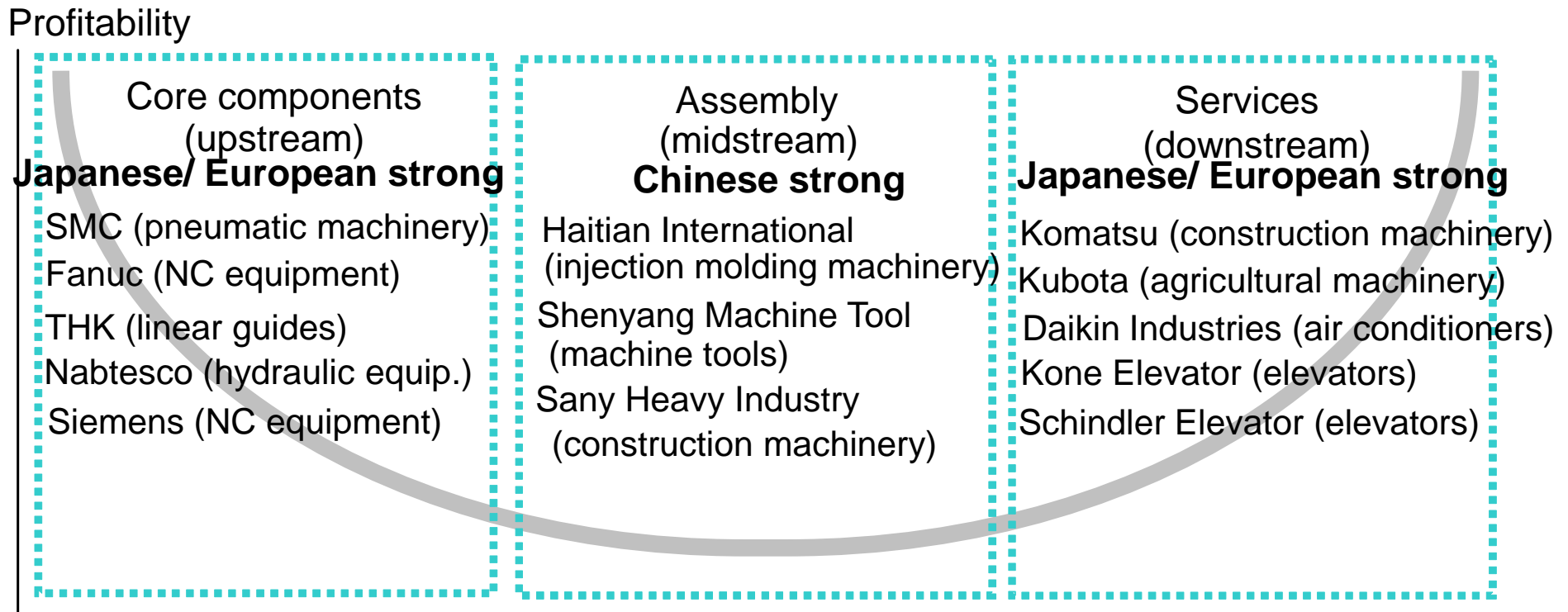
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June 2011

Please read the important disclosures and analyst certifications on pages 41–46 gl.

Value chain: Japanese/European makers competitive in upstream and downstream

Smile curve : Competitiveness of Japanese/Chinese companies



Source: Nomura

Value chain

Global machinery makers: (1) Factory automation

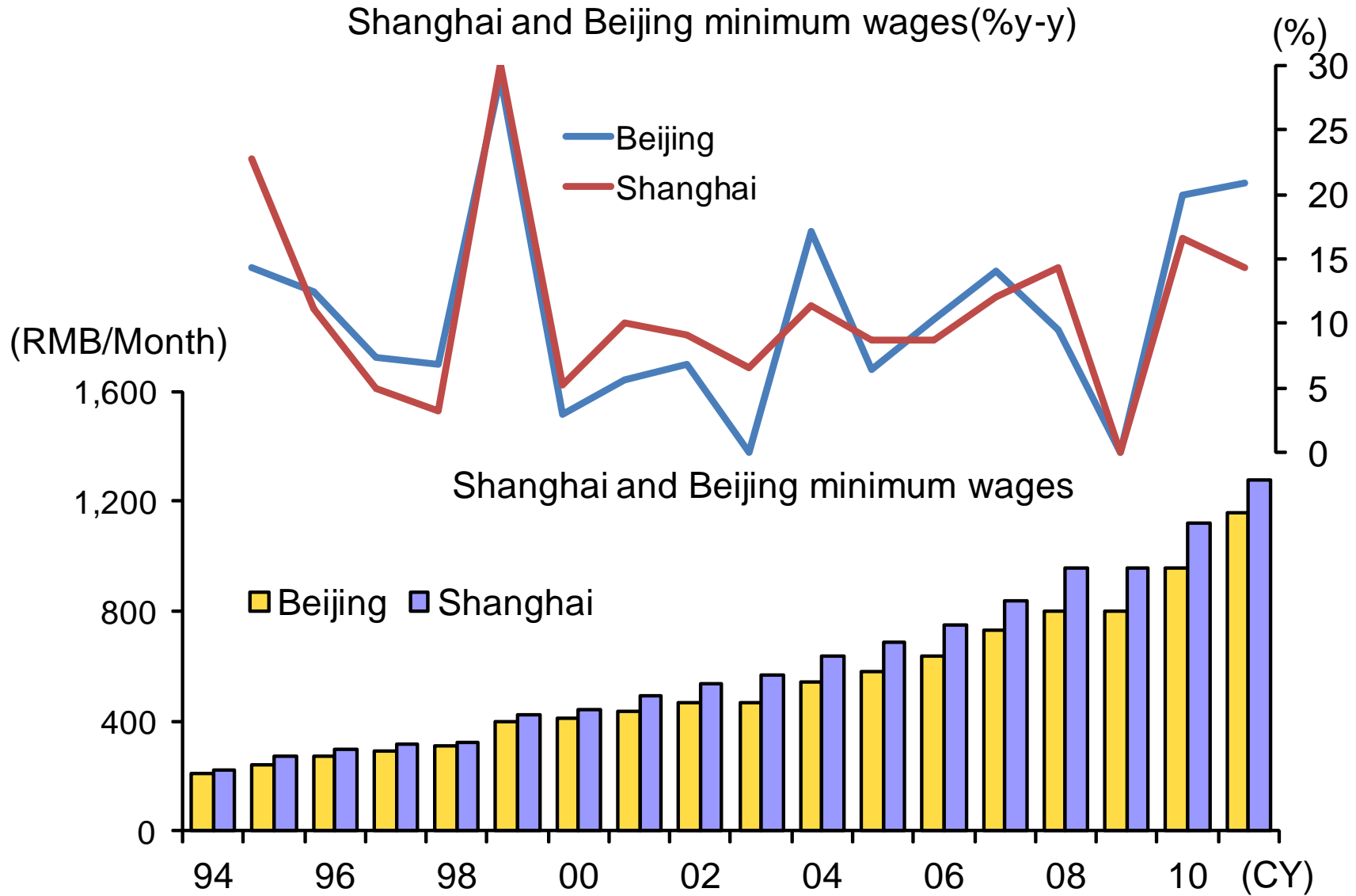
Industry	Japan	Europe/North America	China/Taiwan/Korea
Pneumatic equipment	SMC(6273 JP) CKD(6407 JP)	Festo(Unlisted) Parker Hannifin(PH US)	Airtac(1590 TW)
Ball screws Linear guides	THK(6481 JP) NSK(6471 JP) Nippon Thompson(6480 JP)	Bosh Rexroth(Unlisted) Schneeberger(Unlisted) Schaeffler Technologies(Unlisted)	Nanjing Technical Equipment(Unlisted) Hiwin Technologies(Unlisted)
NC equipment	Fanuc(6954 JP) Mitsubishi Electric(6503 JP)	Siemens(SIE GY)	Wuhan Huazhong Numerical Control(300161 CH) GSK CNC Equipment(Unlisted)
Servomotors	Mitsubishi Electric(6503 JP) Yaskawa Electric(6506 JP) Panasonic(6752 JP) Fanuc(6954 JP)	Siemens(SIE GY) Lenze AC-Tech(Unlisted) Rockwell Automation(ROK US)	Wuhan Huazhong Numerical Control(300161 CH) GSK CNC Equipment(Unlisted) Delta Electronics(2308 TT)
Inverters	Yaskawa Electric(6506 JP) Fuji Electric(6504 JP) Mitsubishi Electric(6503 JP) Toshiba(6502 JP)	ABB(ABB SS) Siemens(SIE GY) Schneider Electric(SU FP) Emerson Electric(EMR US)	Delta Electronics(2308 TT)
Control equipment	Omron(6645 JP) Keyence(6861 JP) Mitsubishi Electric(6503 JP)	Siemens(ABB SS) Schneider Electric(SU FP) Rockwell Automation(ROK US)	Small local firms
Hydraulic equipment	Kawasaki Heavy Industries(7012 JP) Nabtesco(6282 JP) KYB(7242 JP) Toshiba Machine(6104 JP) Fujikoshi(6474 JP)	Bosh Rexroth(Unlisted)	Jiangsu Hengli Highpressure Oilcylinder(Unlisted) Dongyang Mechatronics(013570 KS)
Robots	Fanuc(6954 JP) Yaskawa Electric(6506 JP) Kawasaki Heavy Industries(7012 JP) Fujikoshi(6474 JP)	ABB(ABB SS) KUKA(KU2 GY)	Siasun(300024 CH)

Global machinery makers: (2) Other machinery

Industry	Japan	Europe/North America	China/Taiwan/Korea
Chip mounter	Fuji Machine Mfg(6134 JP) Panasonic(6752 JP) Juki(6440 JP) Yamaha Motor(7272 JP)	Siemens(SIE GY) Phillips Topaz(PVH US)	Torch(Unlisted)
Sheet metal processing machines	Amada(6113 JP)	Trumpf(Unlisted)	Jiangsu JinFangYuan CNC Machine(Unlisted) Jiangsu Yawei Machine Tool(002559 CH)
Machine tools	Yamazaki Mazak(Unlisted) Okuma(6103 JP) Moriseiki(6141 JP) Makino Milling Machine(6135 JP) Amada(6113 JP)	Gildemeister(GIL GY) MAG(Unlisted) Schular(Unlisted) Haaz(Unlisted) Heller(Unlisted)	Shenyang Machine Tool(000410 CH) Dalian Machine Tool(Unlisted) Hyundai Wia(011210 KS) Doosan Infracore(042670 KS)
Injection molding machines	Sumitomo Heavy Industries(6302 JP) Nissei Plastic Industrial(6284 JP) Fanuc(6954 JP) Japan Stel Works(5631 JP) Toshiba Machine(6104 JP)	Arburg(Unlisted) Husky(HSE CN)	Haitian International(1882 HK) Zhenxiong(57 HK)
Construction machinery	Komatsu(6301 JP) Hitachi Construction Machinery(6305 JP) Kobe Steel(Kobelco Construction Machinery, 5406 JP)	Caterpillar(CAT US) Volvo(VOLVB SS)	Doosan Infracore(042670 KS) Hyundai Heavy(009540 KS) Sany Heavy Industry(600031 CH) Lonking(3339 HK) Zoomlion(1157 HK)
Agricultural machinery	Kubota(6326 JP) Iseki(6310 JP) Yanmar(Unlisted)	John Deere(DE US) New Holland(Unlisted)	First Tractor(38 HK) Foton Lovol Heavy Industries(Unlisted)

Source: Nomura

What drives China FA?



Source: CEIC, Nomura

Machine tools without NC

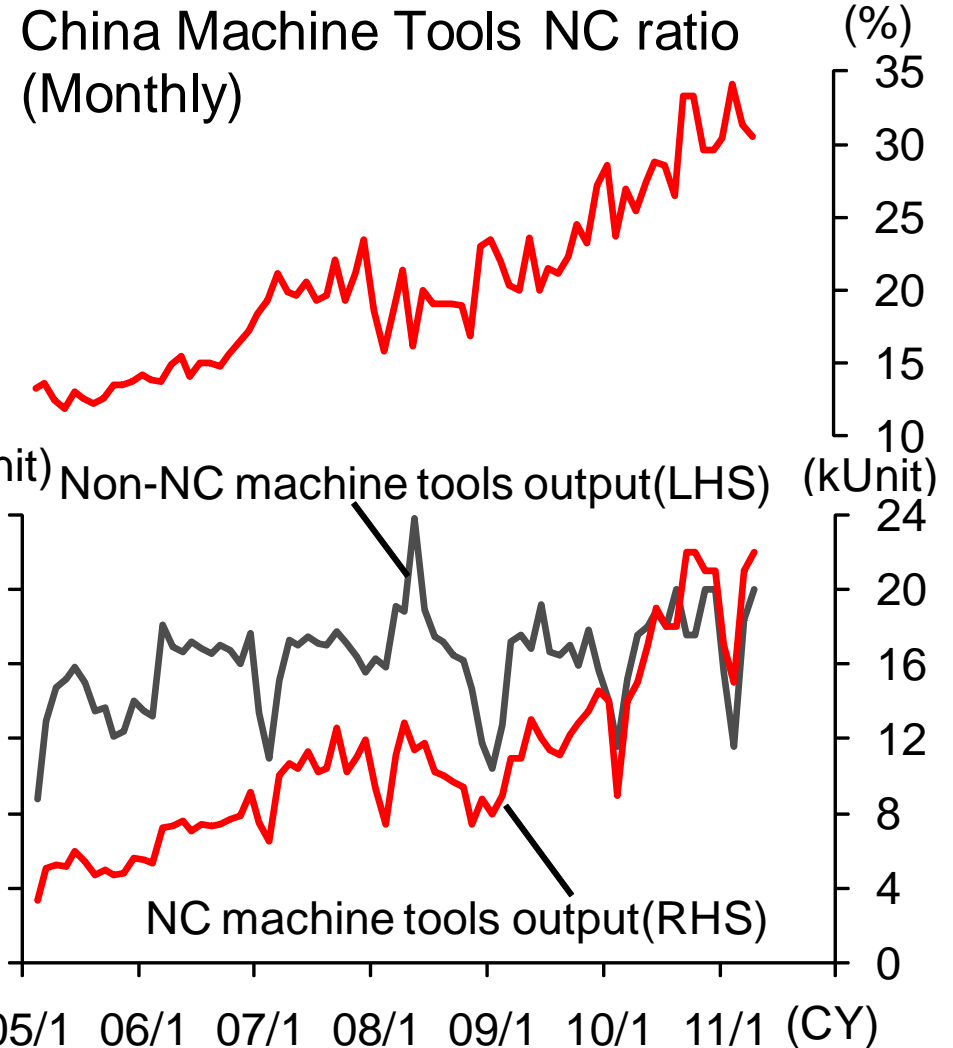
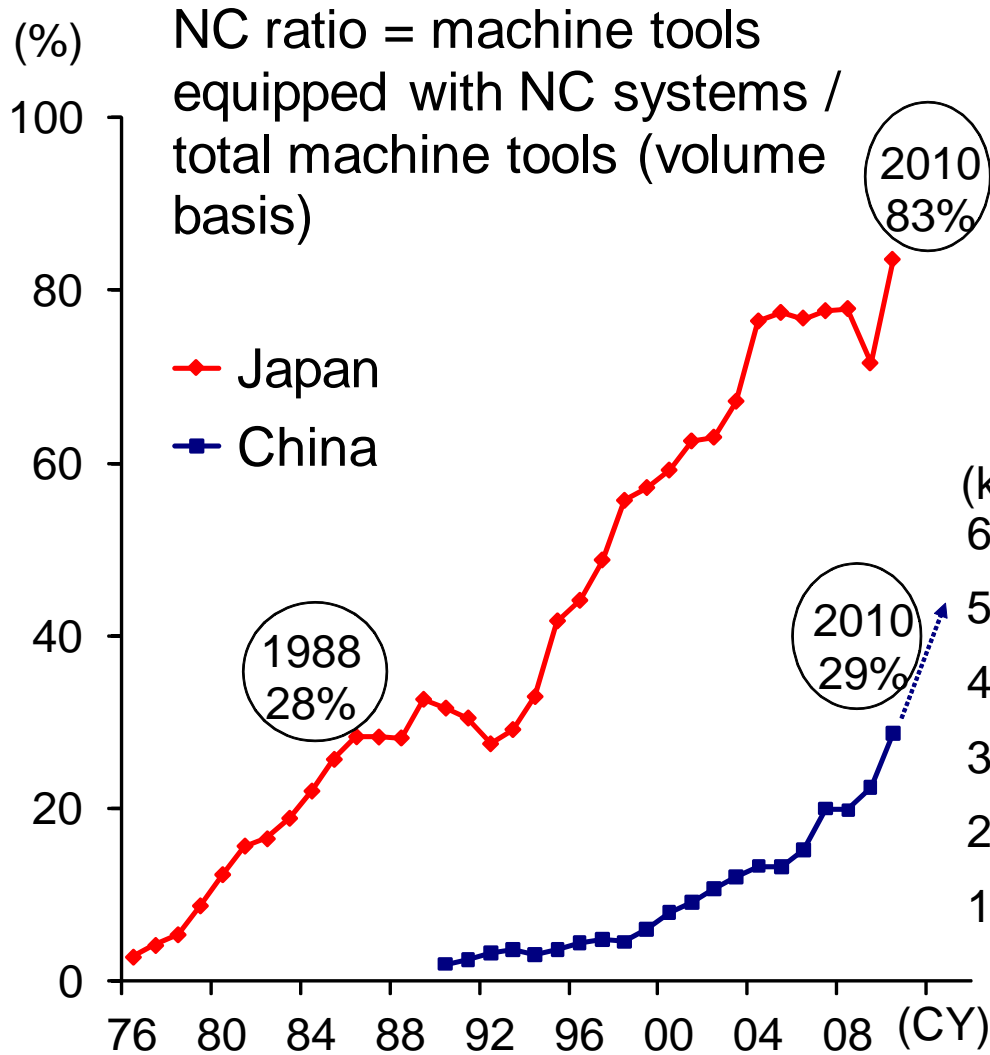


Machine tools with NC



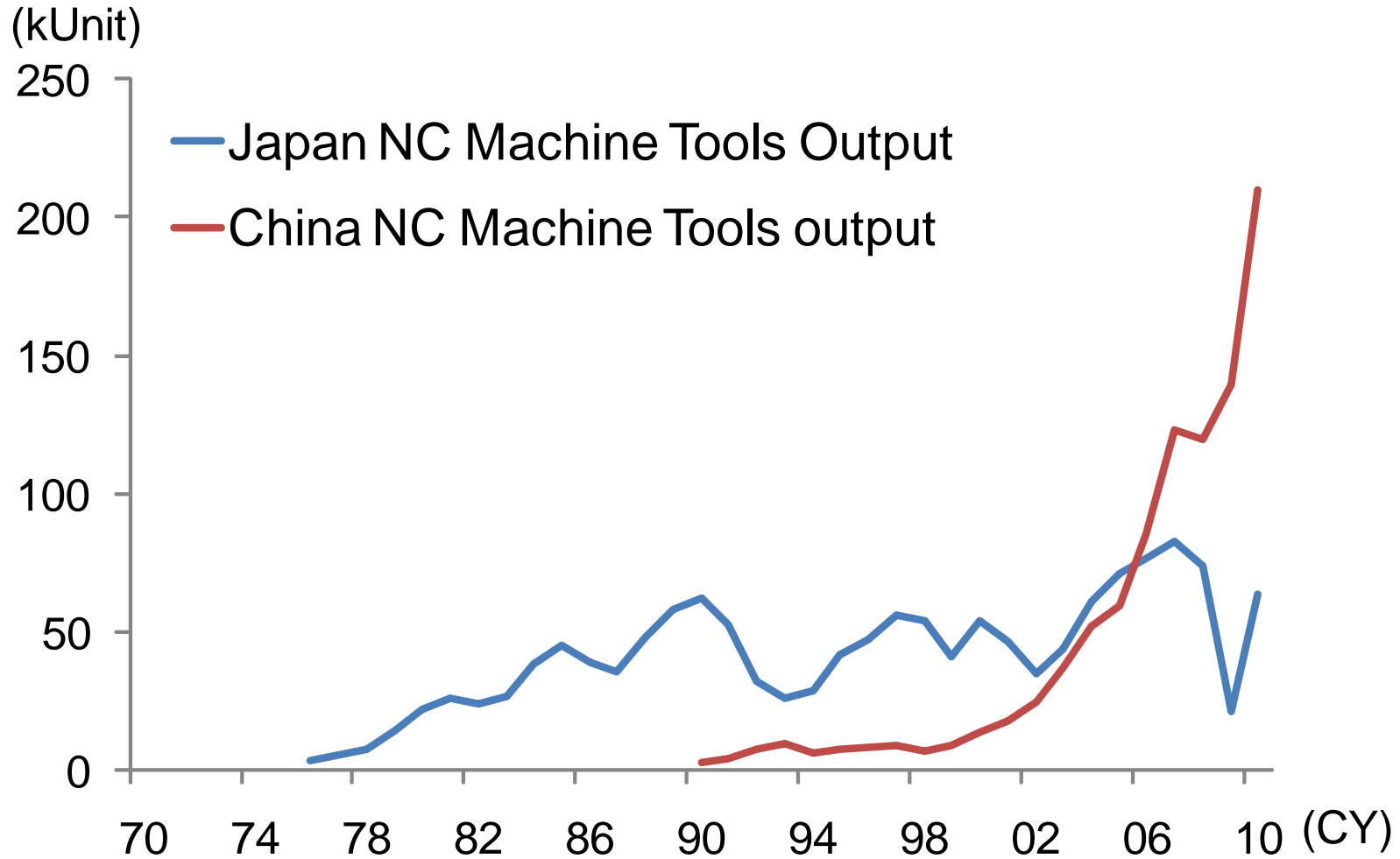
Source: Nomura

FA level in China (NC Ratio)



Source: Japan Machine Tools Association, CEIC, Nomura

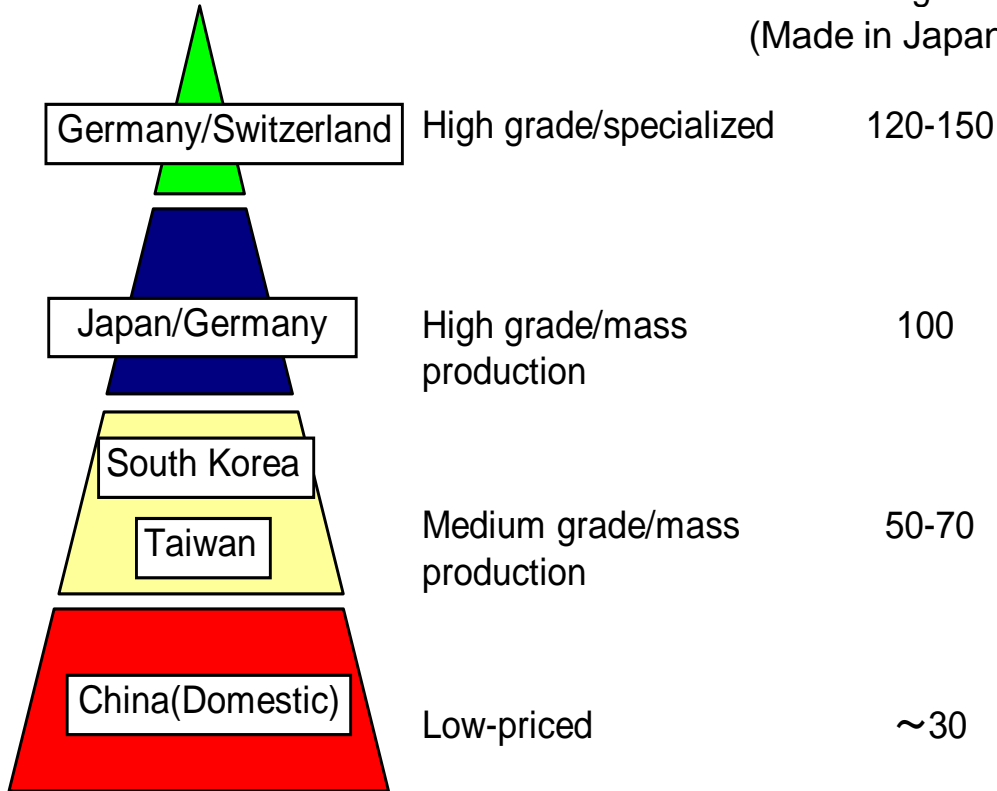
Japan/China NC machine tools output



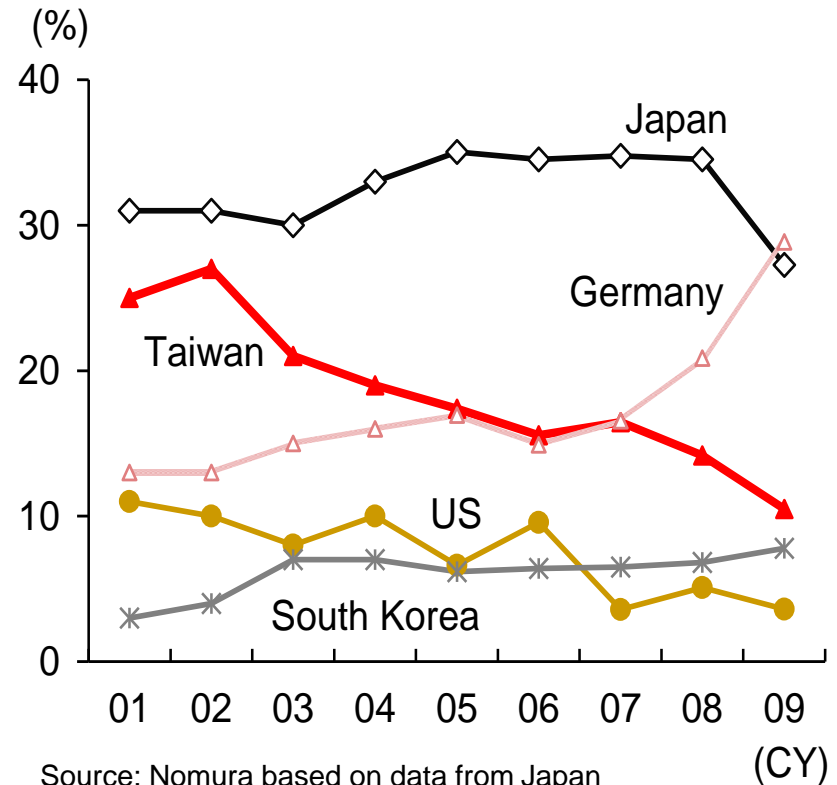
Source: Japan Machine Tools Association, CEIC, Nomura

Japan is the leading exporter of machine tools to China

Demand structure



Chinese imports of machine tools by origin



Source: Nomura based on data from Japan Machine Tools Association

Note: Prices are rough estimates.

Source: Nomura based on interviews

Fanuc: Top share for NC equipment in China

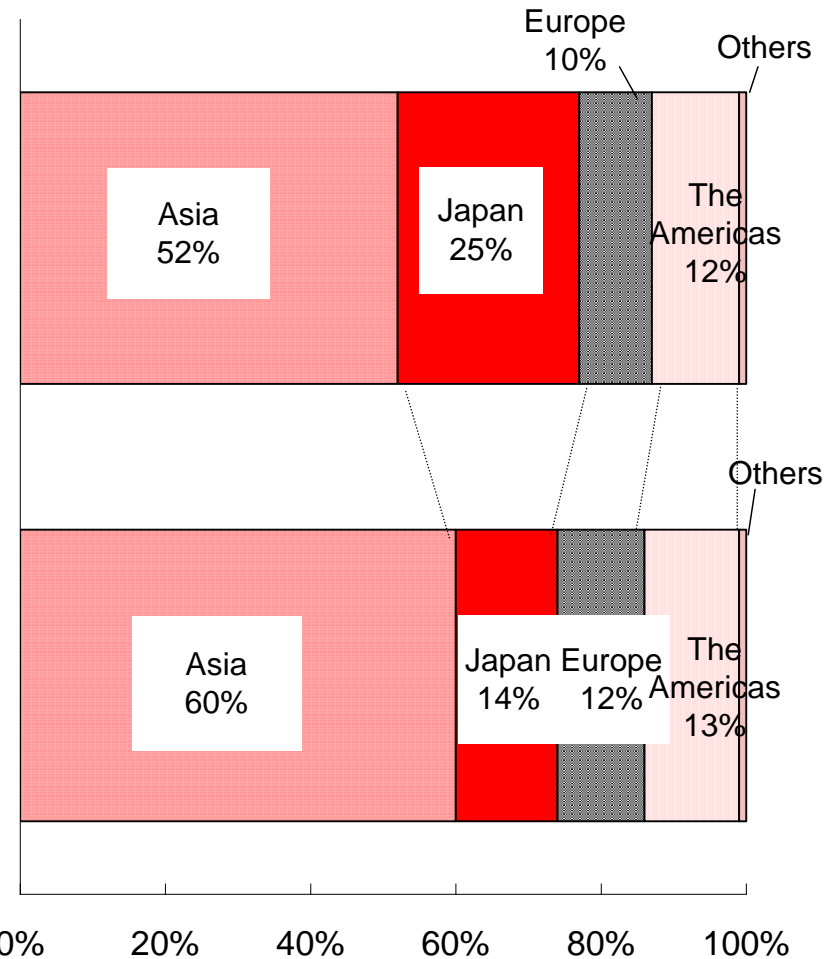
Market share for NC equipment

	Fanuc's share (%)	Major competitors
Japan	70	Mitsubishi Electric
North America	30	Siemens
Europe	36	Siemens, Heidenhain(Germany)
Korea and Taiwan	80	Mitsubishi Electric
China	50	Siemens, Mitsubishi Electric
India	50	Siemens
World total	50	Siemens

Fanuc clients

Factoring in indirect exports by clients

Total sales by region (FY10E)



Note: Volume basis. FY08 Nomura estimates.

Source: Nomura

Source: Nomura

Chinese largest maker: Shenyang Machine Tool



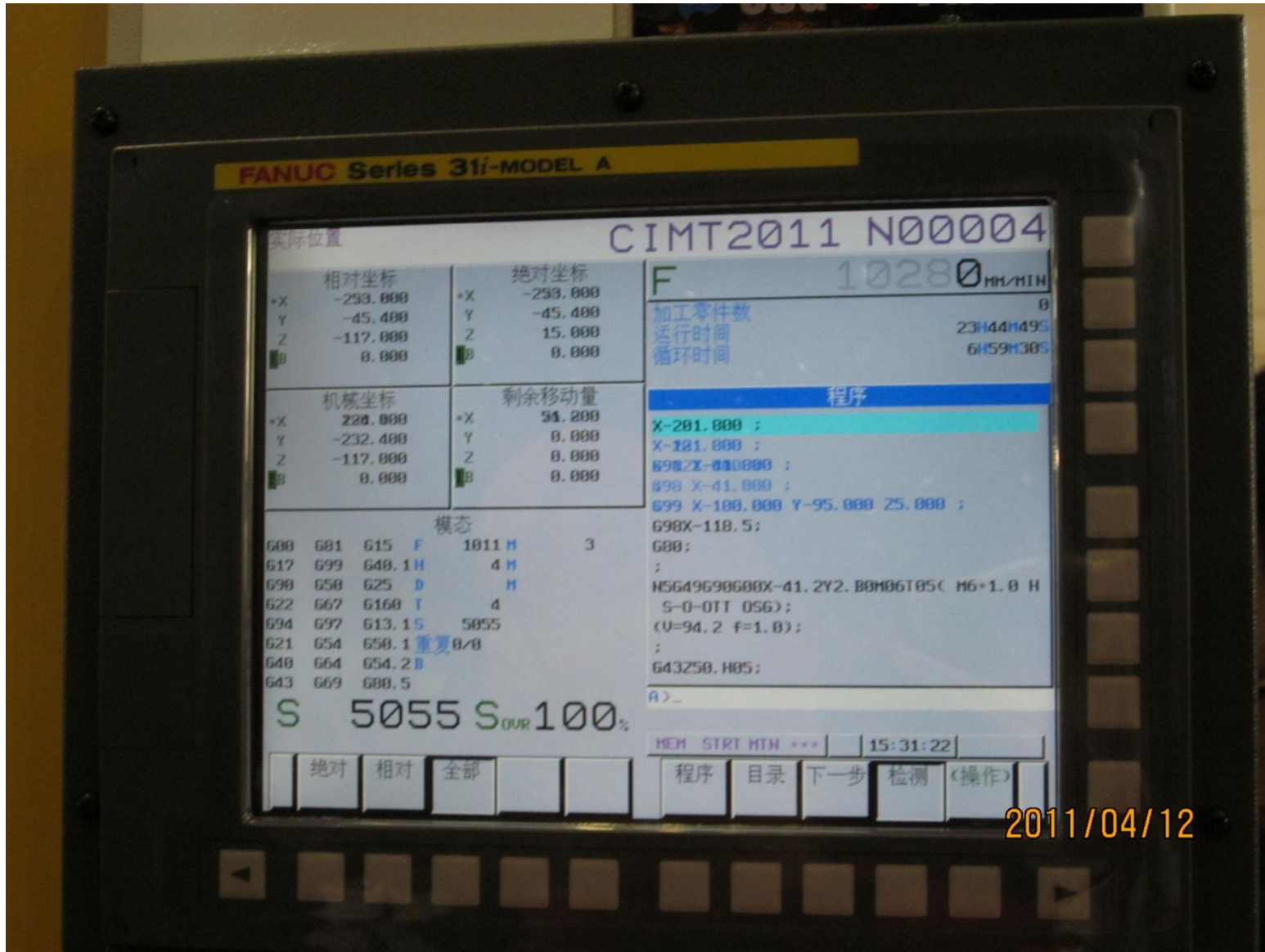
Source: Nomura based on company material

Shenyang Machine Tool: Origin of key components

	名称	厂家	
NC equipment Servo motor	系统	FANUC	Japan
	主电机	FANUC	
	主电机	FANUC	
	X轴电机	FANUC	
	Z轴电机	FANUC	
Linear guide	X轴导轨	INA	Germany
	Z轴导轨	INA	
		INA	
Tool chuck	刀架	DIPLOMATIC	Italy
Ball screw	Z1轴丝杠	THK	Japan
	Z2轴丝杠	THK	
	X1轴丝杠	THK	
	X2轴丝杠	THK	
Hydraulic cylinder	正卡盘	亿川	Taiwan
	正油缸	亿川	
	倒卡盘	亿川	
	倒油缸	亿川	
Bearing	正主轴轴承	NSK	Japan
	正主轴轴承	NSK	
	丝杠轴承	NSK	
	倒主轴轴承	NSK	
	倒主轴轴承	NSK	
	倒主轴轴承	NSK	

Source: Nomura based on company material

Machine Tools: Fanuc NC



Machine Tools



Machine Tools: GSK NC



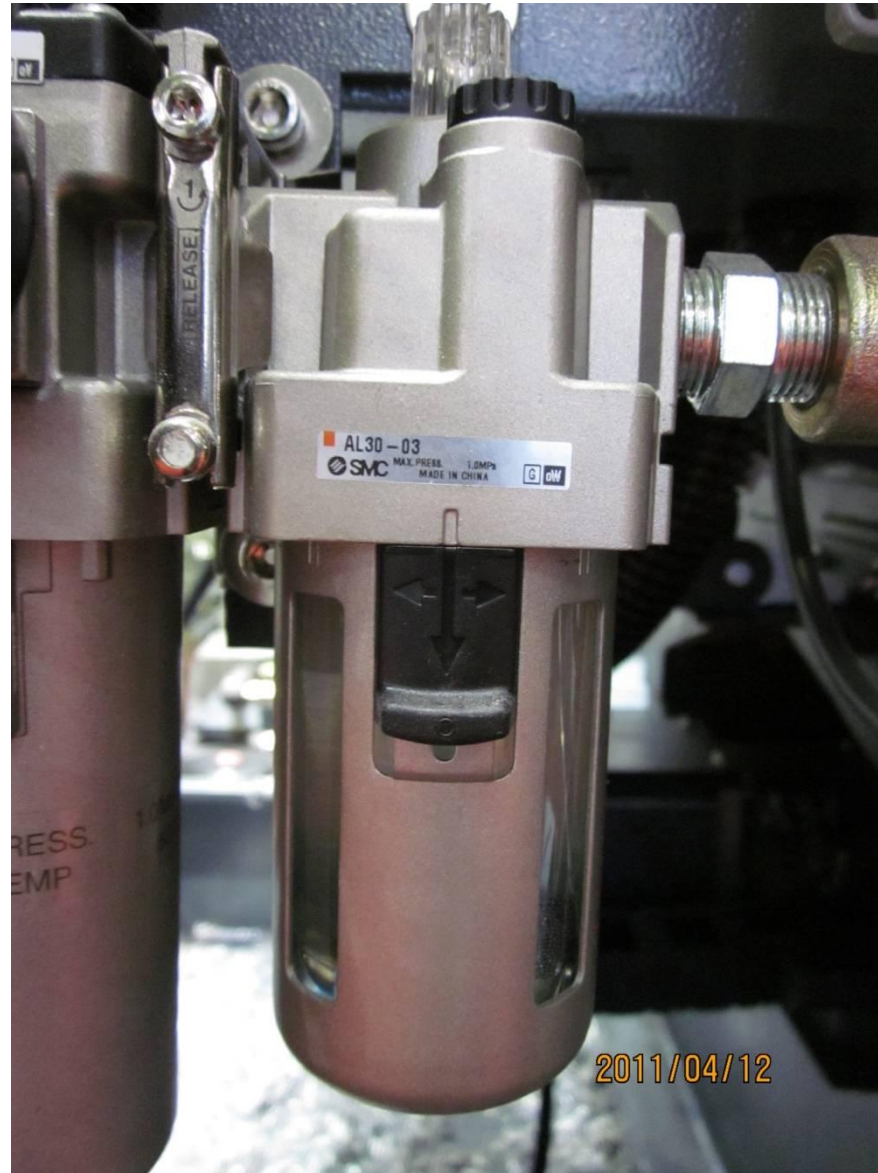
Machine Tools



Machine Tools: Fiyang NC



Machine Tools: Pneumatic Equipment (SMC)



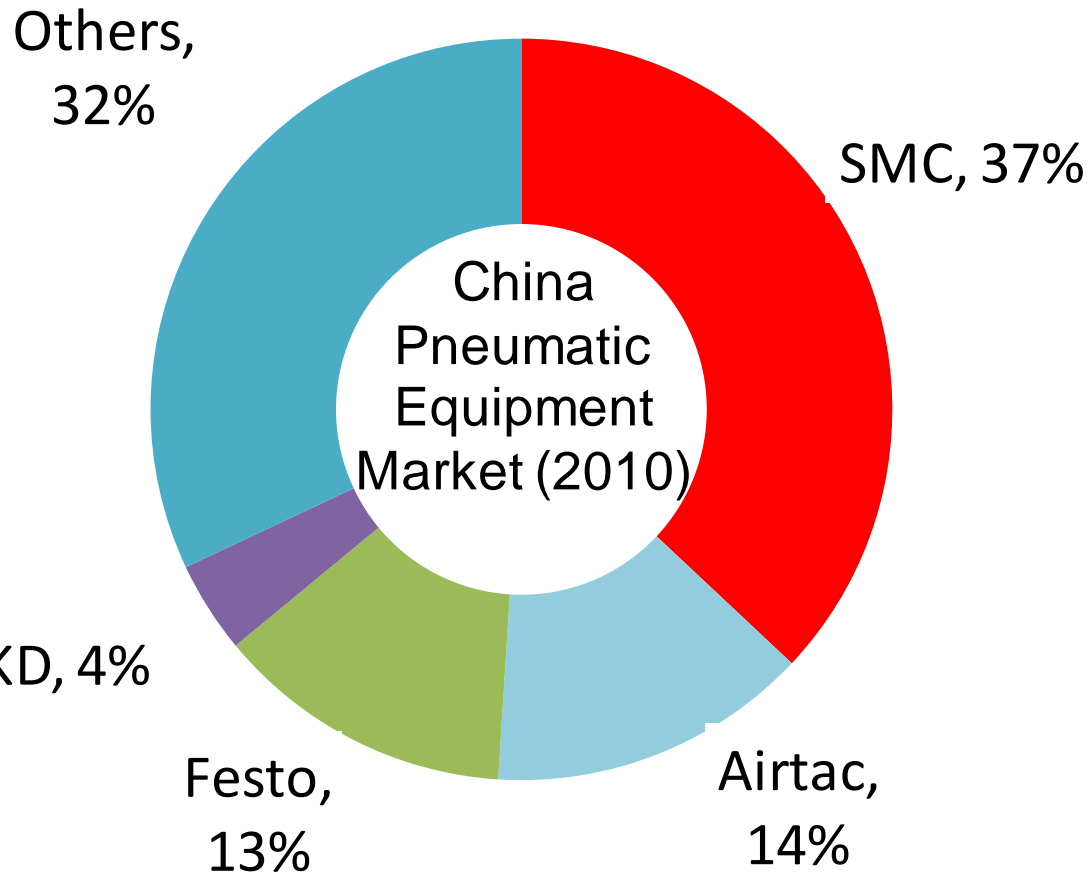
Machine Tools: Pneumatic Equipment (AirTac)



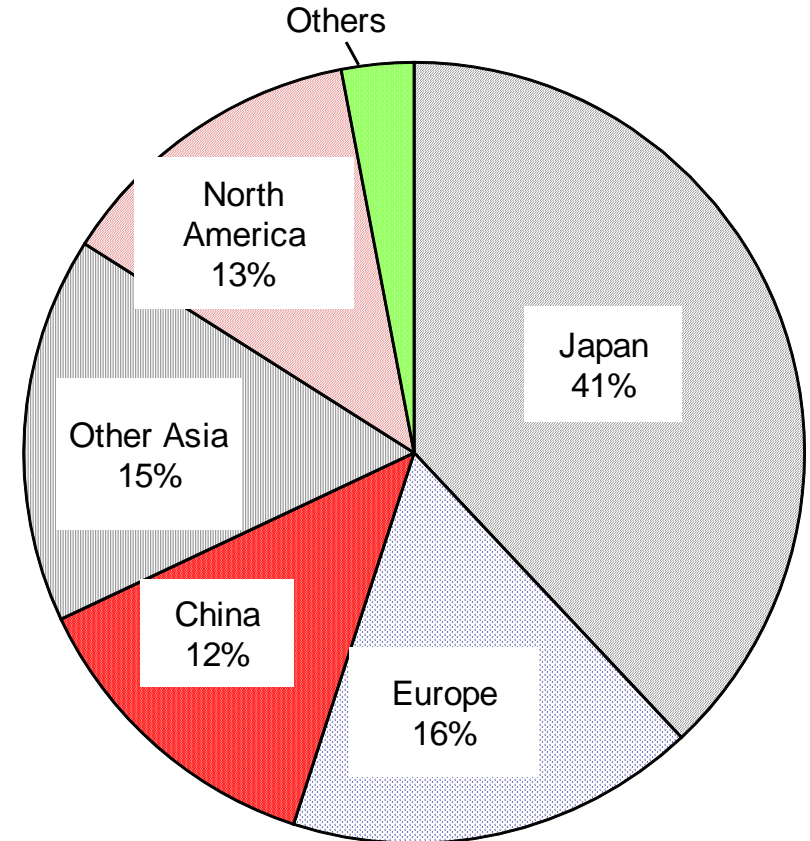
Source: Nomura

SMC: Top share for pneumatic equipment in China

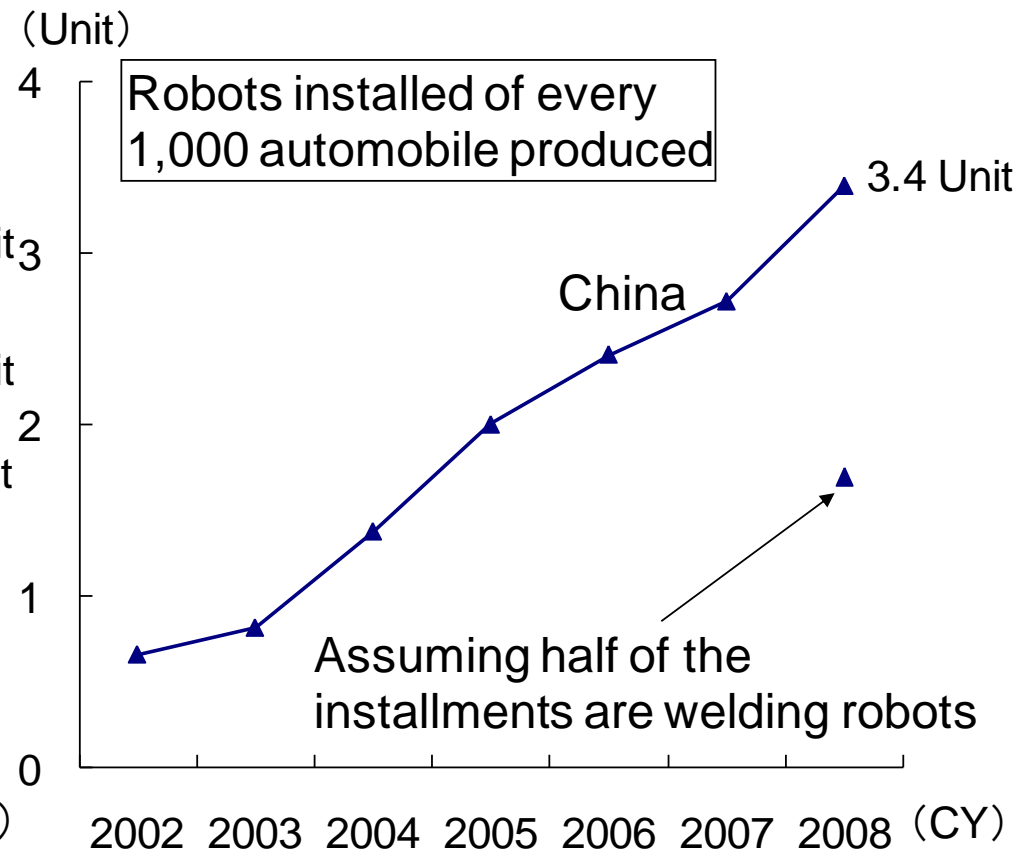
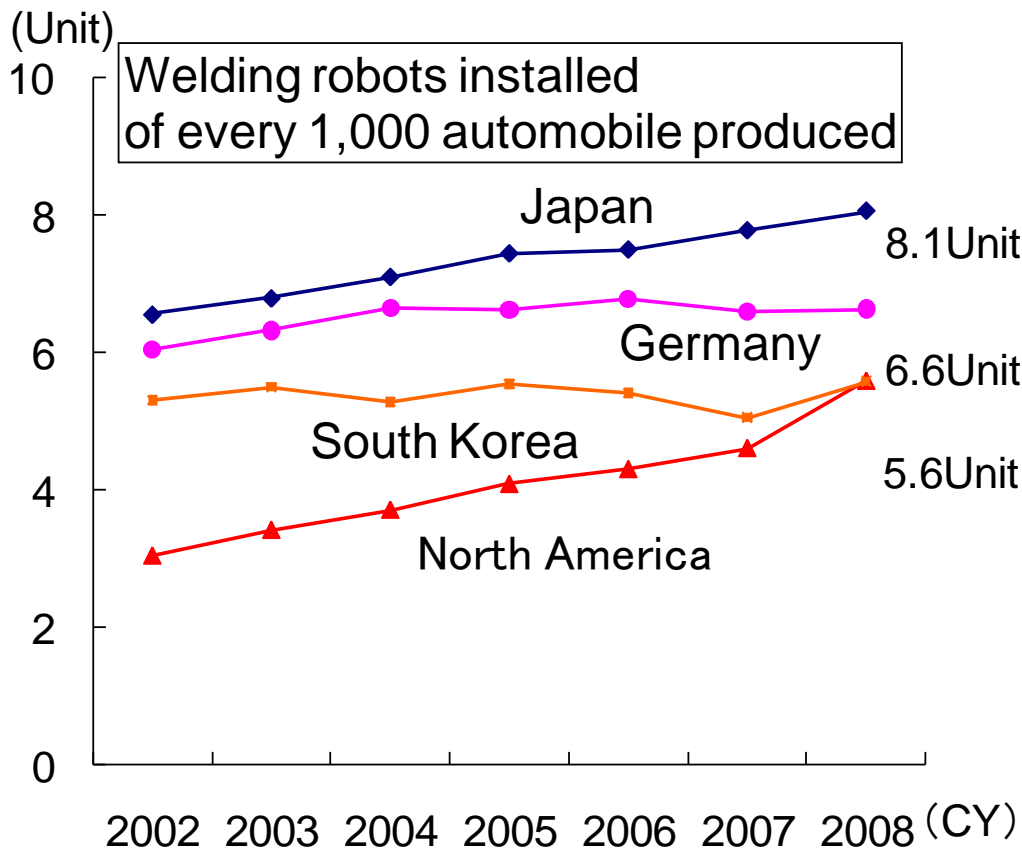
Market share in China (FY 10)



Sales by region (FY11E)



FA level in China (Robots)



Source: International Federation of Robotics, Nomura

Automobile Assembly Line



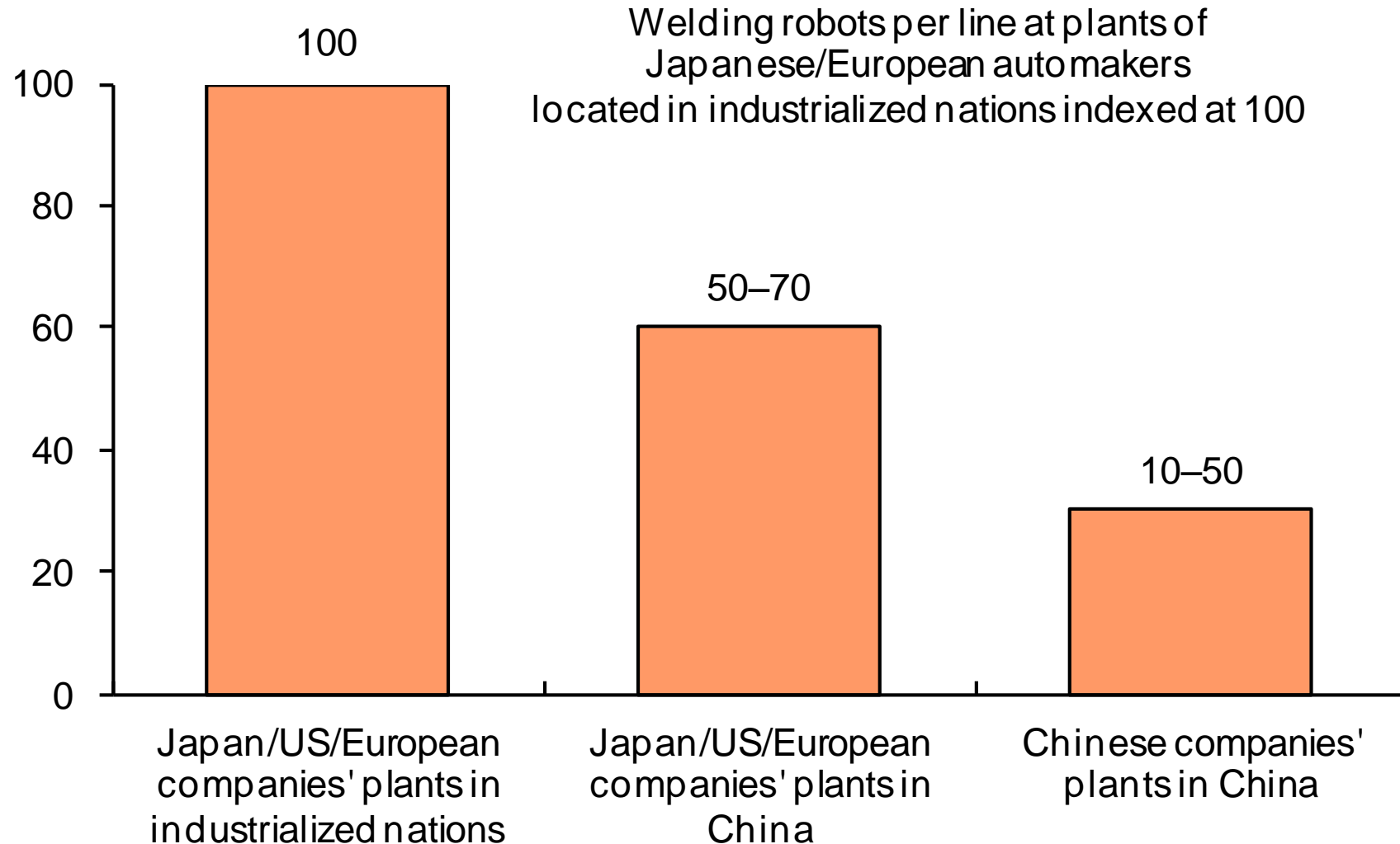
Source: Nomura

Automobile Assembly Line



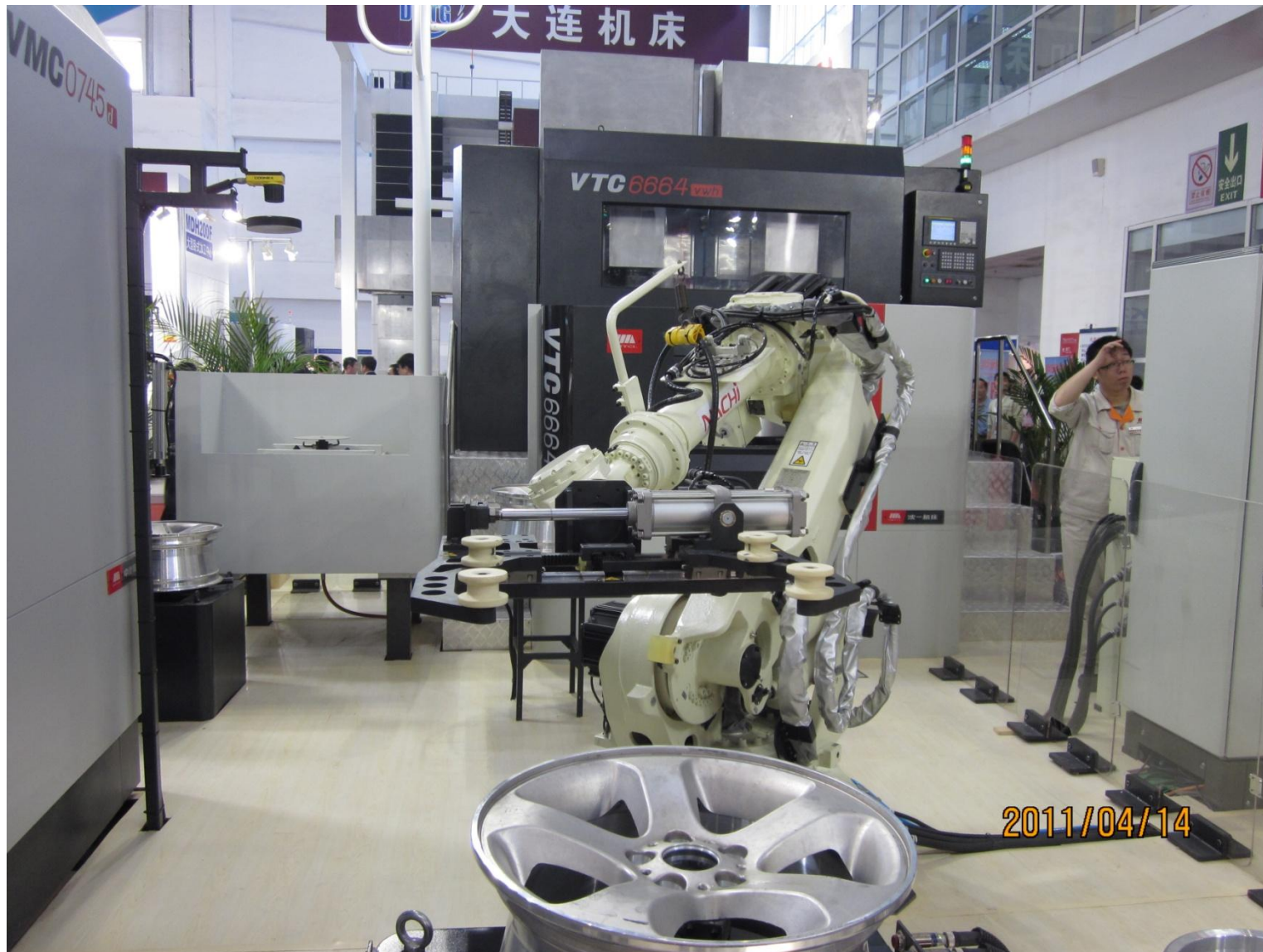
Source: Nomura

FA level in China (Robots)

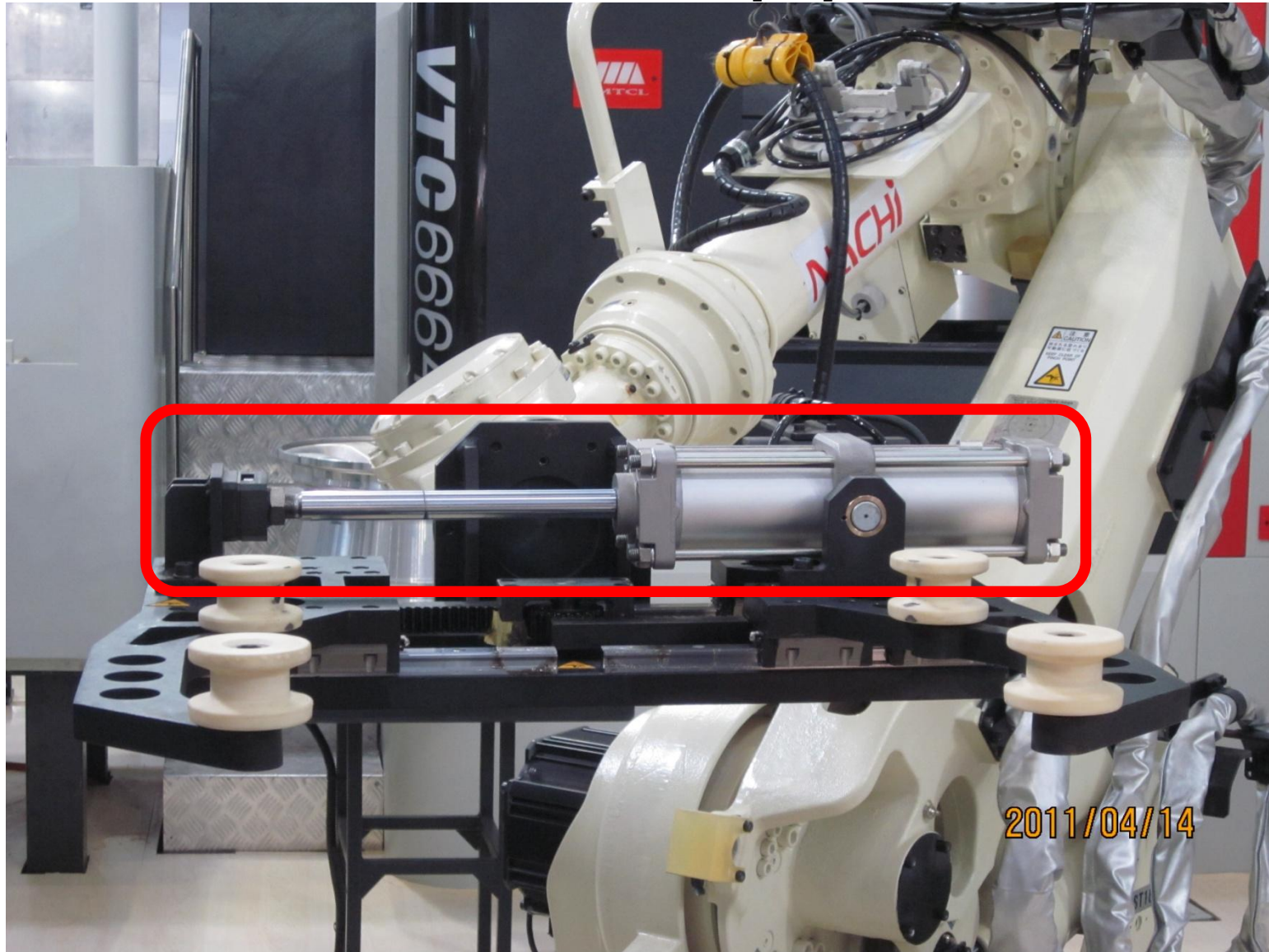


Source: Nomura based on interviews

Collaboration between Machine tools and Robot



Industrial Robot: Pneumatic equipment



Industrial Robot(Siasun): China local brand



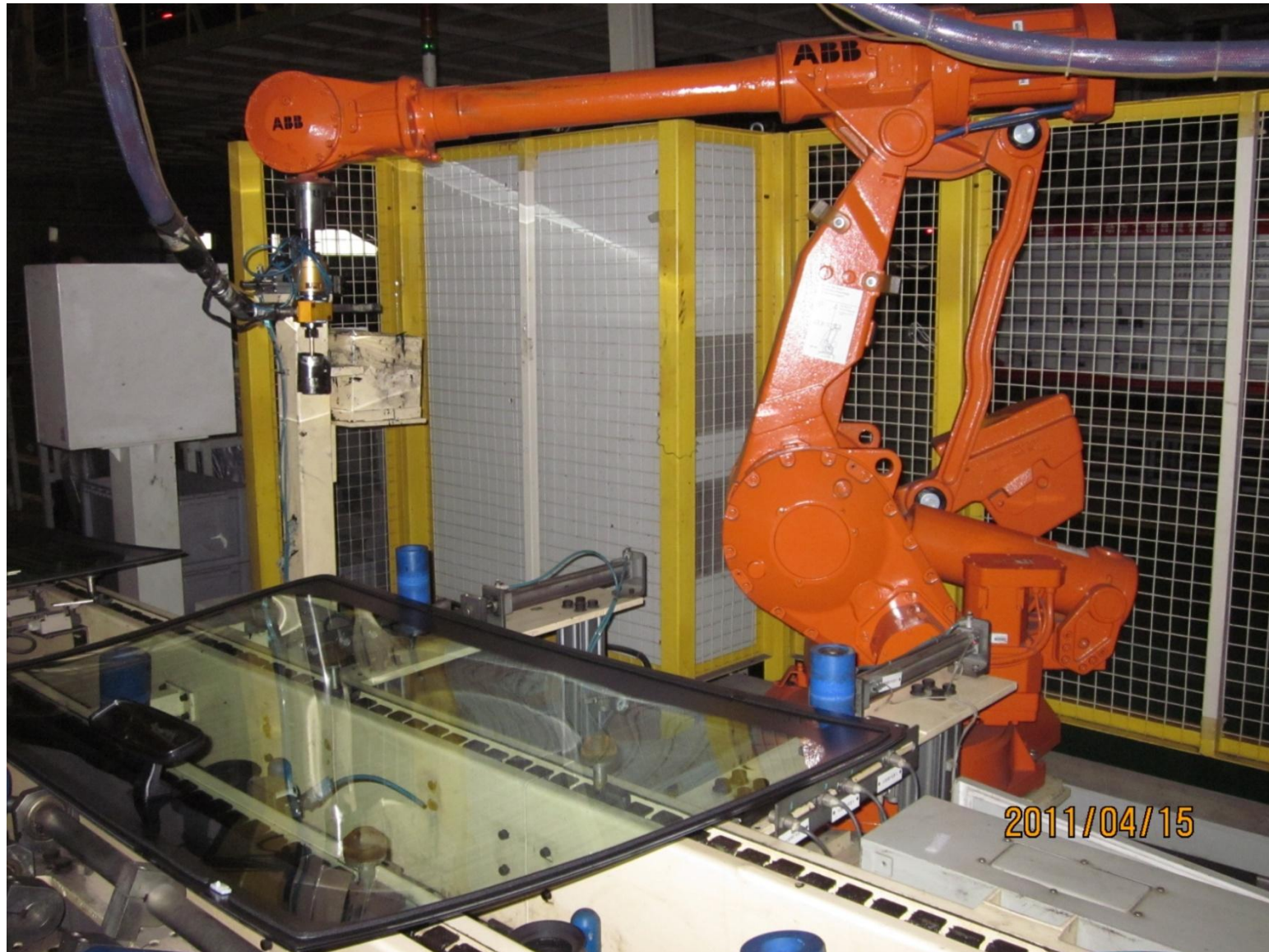
Industrial Robot(Siasun): Components are from Japan



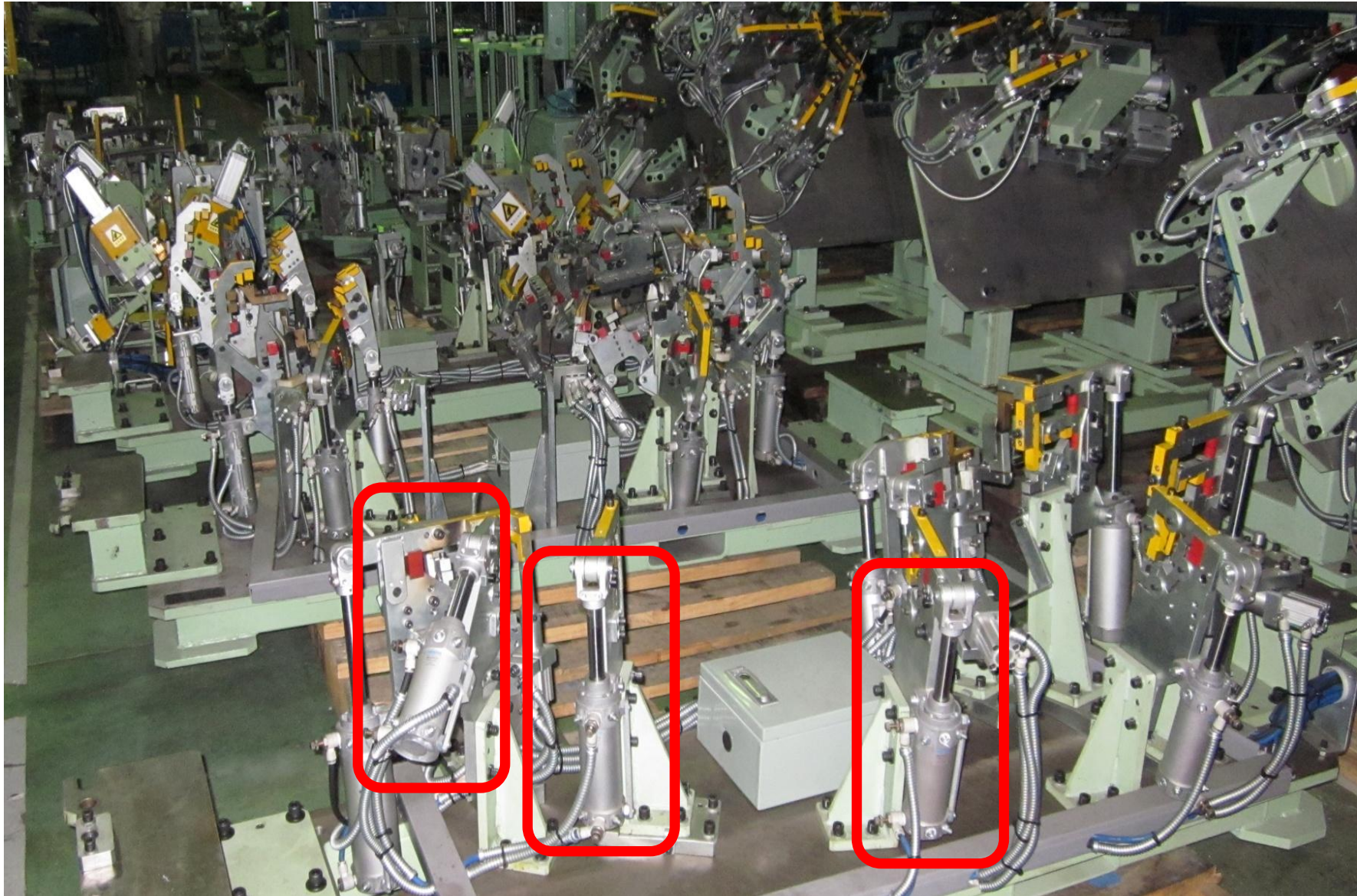
Industrial Robot used in Auto industry(1)



Industrial Robot used in Auto industry(2)



Pneumatic equipment used in Auto Parts Assembly



Automation line

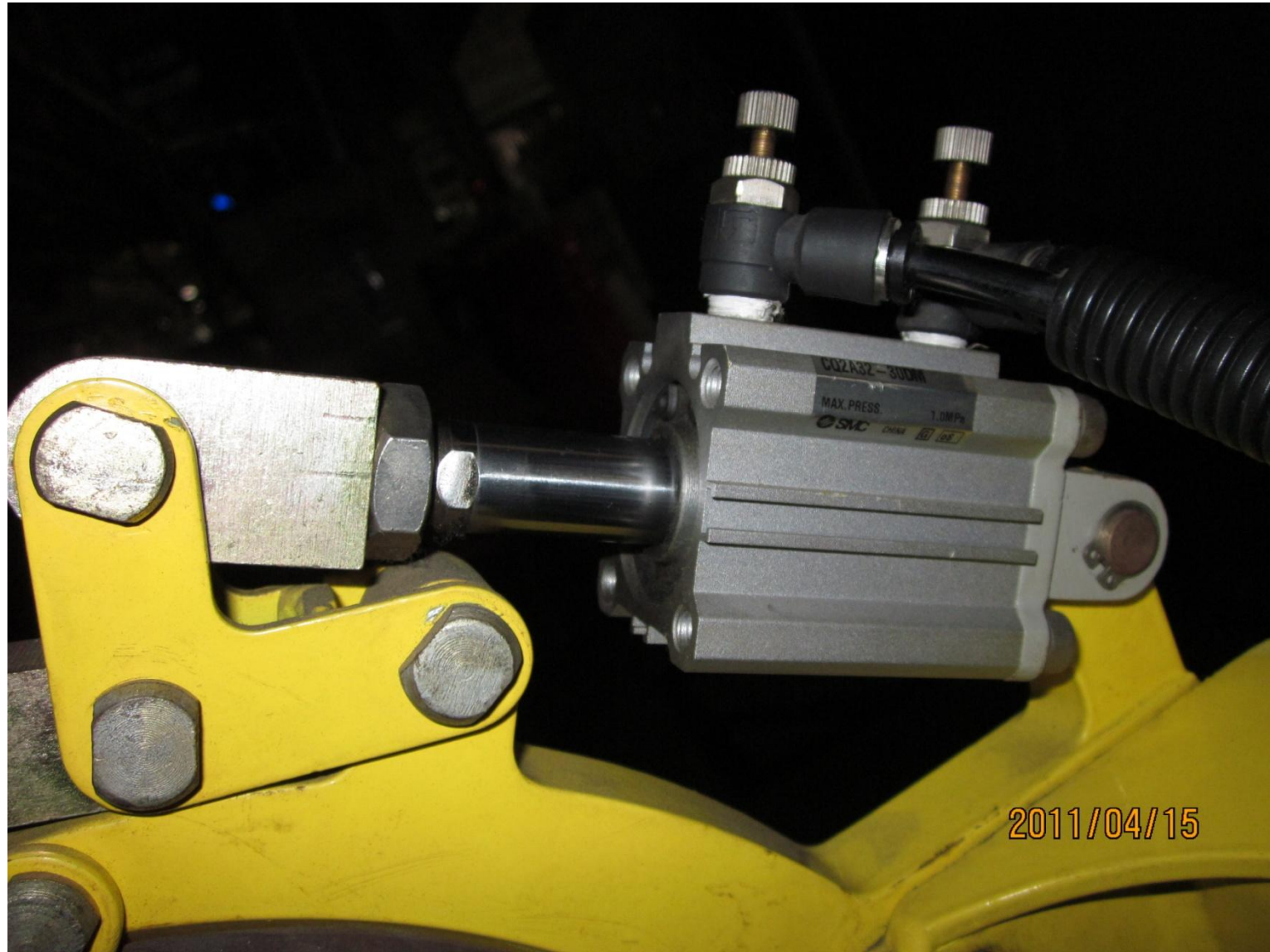


Automobile Assembly Line



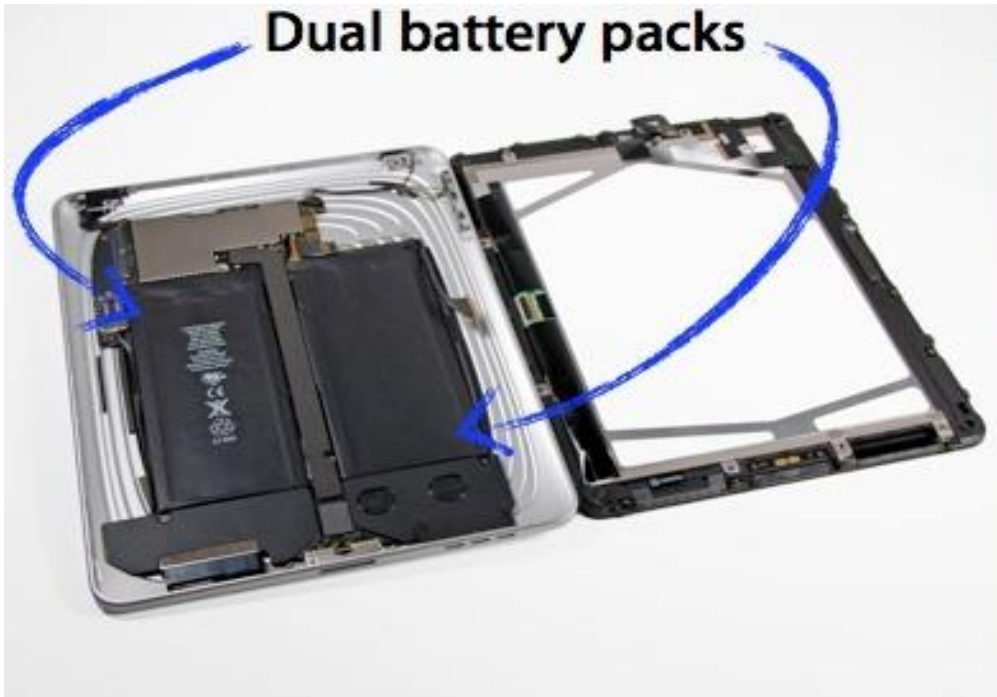
Source: Nomura

Zoom up: Pneumatic equipments are from Japan



Appendix: iPad aluminum body is machined by Fanuc machine tool

Dual battery packs



Rear WiFi antenna



Source: Nomura

Fanuc: Robo-drill



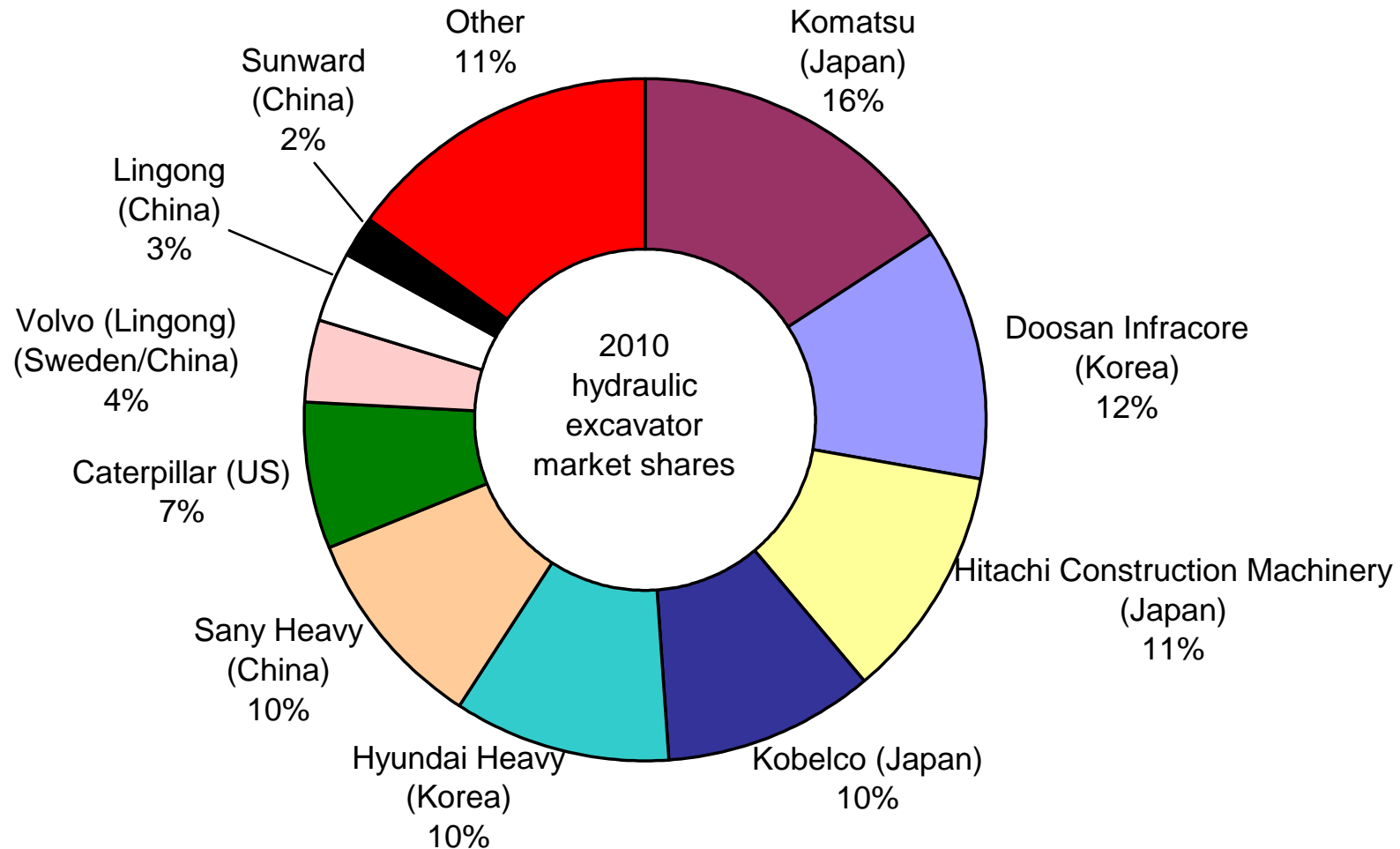
Fanuc: Fist robot



Source: Nomura

Excavators in China: Komatsu is #1 with premium prices

Excavator market share in China (over 6t, CY2010)



Hydraulic equipment controls the movement of hydraulic excavators

