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Productivity Growth in Singapore

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Outline

- I. Singapore Economic Growth: Prominent Features and Emerging Policy Challenges
- **II.** The Sources of Singapore's Economic Growth
- III. Singapore's Productivity Drive: Policy Framework and Implementation





I. Singapore Economic Growth: Prominent Features and Emerging Policy Challenges

- The Economy's Prominent Features:
 - Active government interventions
 - Vulnerability to external shocks
 - Resilience





Singapore's GDP Growth, 1965-2010







Achievements: Joining the league of wealthiest nations: 3rd rank in 2010 on GDP per capita (PPP\$)

	Per Capita			Per Capita	
Country	GDP (PPP\$)	Rank	Country	GDP (PPP\$)	Rank
Qatar	88,559	1	Ireland	38,550	14
Luxembourg	81,383	2	Sweden	38,031	15
Singapore	56,522	3	Kuwait	37,849	16
Norway	52,013	4	Iceland	36,621	17
Brunei	48,892	5	Denmark	36,450	18
United Arab Emirates	48,821	6	Belgium	36,100	19
United States	47,284	7	Germany	36,033	20
Hong Kong	45,736	8	Taiwan, China	35,227	21
Switzerland	41,663	9	United Kingdom	34,920	22
Netherlands	40,765	10	Finland	34,585	23
Australia	39,699	11	France	34,077	24
Austria	39,634	12	Japan	33,805	25
Canada	39,057	13	Korea, South	29,836	26

Source: International Monetary Fund (IMF) data set





I. Singapore Economic Growth: Prominent Features and Emerging Policy Challenges

Emerging Policy Challenges:

- Average labor productivity (ALP) remains low relative to the US level (at both economy and industry levels).
- GDP growth is relying on employment expansion, while labor productivity growth has stagnated.
- Capital investment intensity is on a declining trend in contrast to increasing employment growth.





Challenges: ALP remains low relative to the US



Data sources: Singapore Department of Statistics (for Singapore); Bureau of Economic 7 Analysis (for the US).





Singapore's growth patterns: GDP, ALP, and Employment



Data sources: DOS, MOM





Singapore's growth patterns in comparisons to Hong Kong's



Data source: Conference Board





Widening gap between capital investment and employment growth



Data source: WDI, DOS





II. The Sources of Singapore's Economic Growth

- GDP growth decomposition
- ALP growth decomposition
- Projections of ALP and GDP growth, 2009-2019





Sources of GDP Growth:

 $\Delta \ln Y = \overline{\nu}_{K_{ict}} \Delta \ln K_{ict} + \overline{\nu}_{K_{nict}} \Delta \ln K_{nict} + \overline{\nu}_{L} \Delta \ln H + \overline{\nu}_{L} \Delta \ln L_{Q} + \Delta \ln A$

- Contribution of capital input
 - ICT capital
 - Non-ICT capital
- Contribution of labor input
 - Hours worked
 - Labor quality
- Contribution of Total Factor Productivity growth



Sources of GDP growth, 1965-2008

	1965-1990			1990-2008				
	65-80	80-90	65-90	90-96	96-02	02-08	90-08	
Growth Contribution in Percentage Points								
Real GDP Growth	9.7	7.2	8.7	8.3	4.1	6.0	6.2	
Capital Inputs	7.9	3.8	6.2	4.5	3.5	2.7	3.6	
 ICT Capital 	-	-	-	1.0	1.1	0.9	1.0	
 Non-ICT Capital 	7.9	3.8	6.2	3.6	2.4	1.8	2.6	
Labor Input	1.9	1.7	1.8	2.1	1.3	3.0	2.1	
Labor Quality	-	-	-	-0.1	0.2	0.9	0.3	
 Hours Worked 	1.9	1.7	1.8	2.2	1.1	2.1	1.8	
TFP	-0.1	1.7	0.6	1.7	-0.7	0.4	0.5	
Growth Contribution in Share (%)								
Real GDP Growth	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
Capital Inputs	81.1	52.8	71.8	54.4	84.5	44.2	57.8	
 ICT Capital 	-	-	-	11.6	25.7	14.5	15.7	
 Non-ICT Capital 	81.1	52.8	71.8	42.8	58.7	29.7	42.1	
Labor Input	20.1	23.8	21.3	25.3	31.3	50.0	34.7	
Labor Quality	-	-	-	-1.3	5.4	15.2	5.6	
 Hours Worked 	20.1	23.8	21.3	26.6	25.9	34.8	29.1	
TFP	-1.2	23.3	6.9	20.3	-15.7	5.8	7.5	





Sources of Average Labor Productivity (ALP) Growth:

$$\Delta \ln y = \overline{v}_{K_{ict}} \Delta \ln k_{ict} + \overline{v}_{K_{nict}} \Delta \ln k_{nict} + \overline{v}_L \Delta \ln L_Q + \Delta \ln A$$

- Contribution of capital deepening
 - ICT capital
 - Non-ICT capital
- Contribution of labor quality
- Contribution of Total Factor Productivity growth





Sources of ALP growth, 1965-2008

	1965-1990			1990-2008				
	65-80	80-90	65-90	90-96	96-02	02-08	90-08	
Contribution in Percentage Points								
Labor Productivity Growth	5.9	3.8	5.1	4.2	2.2	1.9	2.7	
Capital Deepening	6.0	2.2	4.5	2.6	2.6	0.6	1.9	
 ICT Capital 	-	-	-	0.8	1.0	0.6	0.8	
 Non-ICT Capital 	6.0	2.2		1.8	1.6	0.0	1.1	
Labor Quality	-	-	-	-0.1	0.2	0.9	0.3	
TFP	-0.1	1.7	0.6	1.7	-0.7	0.4	0.5	
Growth Contribution in Share (%)								
Labor Productivity Growth	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
Capital Deepening	102.0	56.4	88.2	62.4	119.7	31.8	70.6	
 ICT Capital 	-	-	-	18.9	45.3	32.2	28.9	
 Non-ICT Capital 	102.0	56.4		43.5	74.5	-0.4	41.7	
Labor Quality	-	-	-	-2.5	10.2	49.3	12.6	
TFP	-2.0	43.6	11.8	40.1	-30.0	18.9	16.8	



Projections of Singapore's ALP and GDP growth, 2009-2019: The Model

$$\Delta \ln y = \left(\frac{1 - \overline{v_L}}{\overline{v_L}}\right) \Delta \ln K_Q + \left(\frac{1 - \overline{v_L}}{\overline{v_L}}\right) \tau + \Delta \ln L_Q + \left(\frac{1}{\overline{v_L}}\right) \Delta \ln A$$

where K_Q denotes the quality of capital input, which is defined as the ratio of the capital service flow *K* to the productive capital stock *S*. Growth in K_Q captures the dynamics of capital stock structure shifting towards ICT; \overline{v}_L is the average income share of labor; and τ represents the gap between the growth rates of the productive capital stock *S* and GDP *Y*.

Source: Jorgenson and Vu (2010)



Projections of Singapore's ALP and GDP growth, 2009-2019: The Results

	Actual	Pessimistic	Base Case	Optimistic
	1998-2008			
Labor share, \overline{V}_L	0.532	0.539	0.539	0.539
Labor quality growth, $\Delta \ln L_Q$	1.24	0.53	0.53	0.53
$\tau = \Delta \ln K - \Delta \ln S$	0.08	0.25	0.50	1.20
Capital quality growth, $\Delta \ln K_Q$	0.29	0.44	0.53	0.67
TFPG, $\Delta \ln A$	0.51	0.43	0.51	0.63
Employment growth	2.92	0.50	0.75	1.00
Productivity growth	2.52	1.91	2.35	3.29
GDP Growth	5.45	2.41	3.10	4.29





III. Singapore's Productivity Drive: Policy Framework and Implementation

- Recommendations made by the 2009 Economic Strategies Committee (ESC)
- Policy frameworks for promoting ALP growth
- Implementation



The 2009 Economic Strategies Committee (ESC) Report on Productivity Drive: Objectives and Directions

- Main Objective: Achieving 2 to 3 percent growth per year in productivity over the next ten years
- Strategic Directions:
 - 1. Deepen skills and expertise within every sector of our economy.
 - 2. Restructure our economy, to provide more room for rapidly growing and more efficient enterprises.
 - 3. Expand abroad and capture new growth activities in order to grow high-value added activities in Singapore.



The 2009 Economic Strategies Committee (ESC) Report on Productivity Drive: Key Recommendations

- Seizing Growth Opportunities
- Developing a Vibrant SME Sector and Globally Competitive Companies
- Attracting and Rooting MNCs and global SMEs
- Growing Knowledge Capital
- Making Singapore A Leading Global City
- Fostering Inclusive Growth
- Ensuring Energy Resilience and Sustainable Growth
- Maximising Value from Land as a Scarce Resource





Promoting ALP Growth: Transformation versus Incremental improvement







Thank you for your attention!