

A Decomposition Analysis of Singapore's Unit Labour Cost

Unit Labour Cost (ULC) is a measure of a country's cost competitiveness. ULC increases can be decomposed into changes in Total Labour Cost (TLC) per worker and labour productivity.

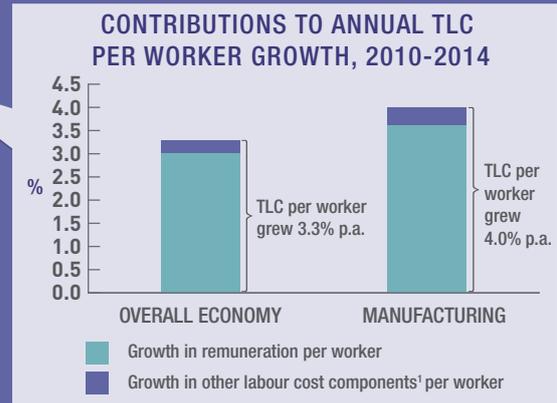
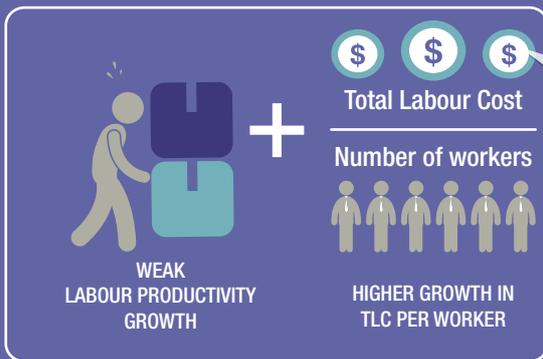
Singapore's ULC has increased over the past few years.



FINDINGS

Finding 1: The recent increase in ULC was a result of weak labour productivity growth coupled with rising TLC per worker.

Finding 2: TLC per worker growth was driven by the growth in remuneration per worker amidst a tight labour market.



¹ Includes foreign worker levy, skills development levy, wage subsidies, and recruitment and net training cost.

It remains vital to press on with our productivity drive, so as to mitigate the impact of wage cost increases, and ensure that Singaporeans' wages and living standards continue to improve.



This article examines the drivers of recent trends in Unit Labour Cost (ULC) for the overall economy and the manufacturing sector. In particular, the changes in ULC are decomposed into the contributions of changes in labour productivity¹ and Total Labour Cost (TLC) per worker.² Changes in TLC per worker are in turn further decomposed into the contributions of different labour cost components.

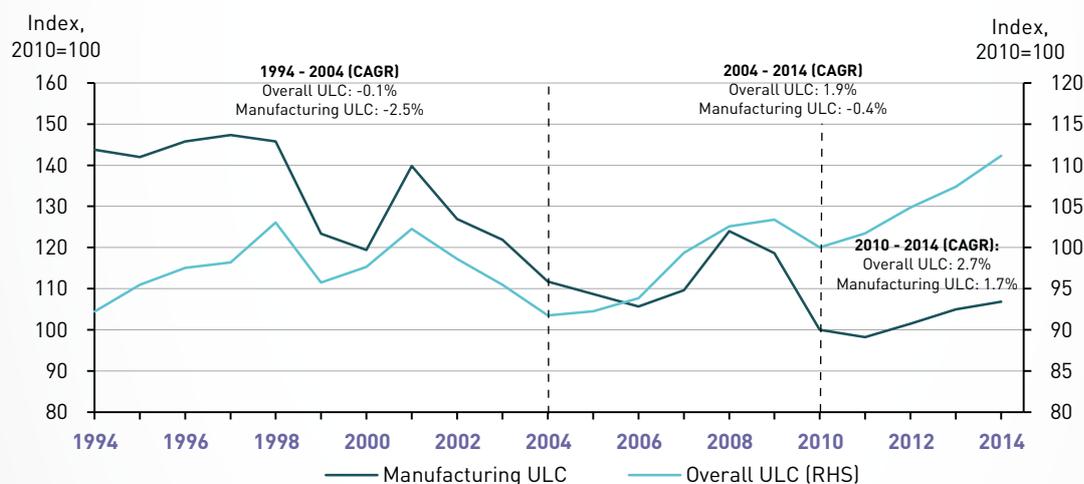
Singapore's ULC has increased in recent years

ULC is defined as the TLC per unit of gross real valued-added (VA), and is commonly seen as a measure of cost competitiveness. In Singapore, the ULC is collected at the economy-wide level and also for the manufacturing sector.

Mirroring the trends in other developed economies, the overall ULC in Singapore has risen in recent years.³ From 2004 to 2014, the overall ULC rose at a compounded annual growth rate (CAGR) of 1.9 per cent, compared to the 0.1 per cent per annum (p.a.) decline in the earlier decade (Exhibit 1). Notably, the pace of increase in the overall ULC accelerated to 2.7 per cent p.a. in the most recent four years following the Global Financial Crisis, i.e., from 2010 to 2014.

Similarly, the manufacturing ULC has risen in recent years (1.7 per cent p.a. from 2010 to 2014), in contrast to the declines of 2.5 per cent p.a. and 0.4 per cent p.a. from 1994 to 2004 and 2004 to 2014 respectively.

Exhibit 1: Changes in overall and manufacturing ULC, 1994 – 2014



Source: Singapore Department of Statistics

¹ In this article, labour productivity is proxied by gross real value-added (VA) per worker.

² The decomposition framework used follows the earlier work done by Kaonang and Teo (2009).

³ Other developed economies and China have also seen their ULC increase over the past 10 years. For example, the ULC in the United States and United Kingdom rose by 1.5 per cent p.a. and 1.9 per cent p.a. respectively between 2004 and 2014. China's ULC increased by 5.2 per cent p.a. over this period.

The ULC increases can be decomposed into changes in TLC per worker and labour productivity

Mathematically, the ULC can be decomposed into TLC per worker and the inverse of gross real VA per worker (a proxy of labour productivity)⁴:

$$ULC = \frac{TLC}{Gross\ Real\ VA} \quad [Equation\ 1a]$$

$$ULC = \frac{TLC}{Worker} \times \frac{Worker}{Gross\ Real\ VA} \quad [Equation\ 1b]$$

$$ULC = TLC\ per\ worker \times Inverse\ of\ Real\ Labour\ Productivity$$

From Equation 1b, a change in the ULC can be approximated as the sum of the change in TLC per worker and the change in the inverse of labour productivity:

$$\% \Delta ULC \approx \% \Delta \frac{TLC}{Worker} + \% \Delta \frac{Worker}{Gross\ Real\ VA} \quad [Equation\ 2]$$

$$\% \Delta ULC \approx Change\ in\ TLC\ per\ worker + Change\ in\ Inverse\ of\ Labour\ Productivity$$

Based on the above equation, a rise in the ULC can be due to an increase in TLC per worker and/or a decline in labour productivity. Conversely, a decline in the ULC can be driven by a fall in TLC per worker and/or an increase in labour productivity.

Using this decomposition framework, we can see that the increase in ULC in recent years has been mainly caused by rising TLC per worker amidst a tight labour market

The results of the decomposition analysis for both the overall ULC and manufacturing ULC over the period of 1994 to 2014 are presented in Exhibit 2A and Exhibit 2B respectively.

Exhibit 2A: Decomposition of annual changes in overall ULC, 1994 – 2014

Period	ULC growth (%) (a) ≈ (b)+(c)	Contribution to ULC growth (pp)	
		TLC/Worker	Inverse of Gross Real VA/Worker ¹
		(b)	(c)
1994 – 1999	0.7	2.2	-1.5
1999 – 2004	-0.9	3.0	-3.9
2004 – 2009	2.4	1.4	1.0
2009 – 2014	1.5	4.3	-2.8
2010 – 2014 ²	2.7	3.3	-0.6

⁴ Gross real VA at 2010 basic prices (i.e., excluding taxes on products) is used for the computation of ULC. The official labour productivity (real VA per worker) statistics for the overall economy are computed based on GDP at 2010 market prices (i.e., including taxes on products). Growth in gross real VA per worker is similar to the growth in real VA per worker, and hence can be used to approximate labour productivity growth.

Exhibit 2B: Decomposition of annual manufacturing ULC growth, 1994 – 2014

Period	ULC growth (%) (a) ≈ (b)+(c)	Contribution to ULC growth (pp)	
		TLC/Worker (b)	Inverse of Gross Real VA/Worker ¹ (c)
1994 – 1999	-3.0	3.3	-6.5
1999 – 2004	-2.0	2.3	-4.3
2004 – 2009	1.2	-0.4	1.6
2009 – 2014	-2.1	5.5	-7.7
2010 – 2014 ²	1.7	4.0	-2.3

Notes for Exhibits 2A and 2B:

1. Calculated based on gross VA at 2010 basic prices. As Worker/VA is approximately the inverse of labour productivity, a negative (positive) rate of growth in Worker/VA implies a rise (decline) in labour productivity.

2. Strong gross real VA per worker growth in 2010 for the overall economy (12.0 per cent), due to the recovery from the Global Financial Crisis, resulted in a lower ULC growth rate. To exclude the impact of the recovery year, ULC growth from 2010 to 2014 was included in the Exhibits.

3. Numbers may not sum due to rounding and as this is a first-order approximation.

Source: Singapore Department of Statistics and Ministry of Manpower

As can be seen, the increase in ULC in recent years for both the overall economy and the manufacturing sector was primarily due to a rise in the TLC per worker, even as labour productivity growth remained weak.

From 2010 to 2014⁵, the overall ULC increased by 2.7 per cent p.a. (Exhibit 2A). More than 84 per cent⁶ of this can be attributed to the increase in TLC per worker. In particular, TLC per worker rose by 3.3 per cent p.a. over this period, higher than the growth rates of 1.4 to 3.0 per cent p.a. seen in the earlier 5-year periods (i.e., 1994-1999, 1999-2004 and 2004-2009). This has in turn come on the back of tight labour market conditions, with the unemployment rate remaining low and vacancies remaining high during this period. At the same time, labour productivity growth (as approximated by gross real VA per worker growth) has been weak, coming in at only 0.6 per cent p.a. from 2010 to 2014.⁷

For the manufacturing sector, the pace of increase in TLC per worker similarly accelerated to 4.0 per cent p.a. between 2010 and 2014, from -0.4 to 3.3 per cent p.a. in the earlier 5-year periods (Exhibit 2B). The increase in TLC per worker outpaced the productivity gains of 2.3 per cent p.a., resulting in the manufacturing ULC increasing by 1.7 per cent p.a. over the same period.

The increase in TLC per worker can be further decomposed into the contributions from remuneration and other labour-related cost increases

The TLC comprises remuneration and other labour-related costs, including the skills development levy (SDL)⁸, foreign worker levy (FWL), wage subsidies⁹, and recruitment and net training cost. A change in the TLC can thus be derived as the sum of the changes in each of these cost components (Equation 3):

⁵ This time period excludes the strong rebound experienced in 2010 following the Global Financial Crisis.

⁶ Computed as $|b|/(|b|+|c|)$, where b and c respectively refer to the growth contributions of (i) TLC per worker, and (ii) inverse of real labour productivity to the increase in ULC respectively.

⁷ Based on the official VA per worker statistics, labour productivity grew by 0.3 per cent p.a. over this period.

⁸ The SDL is paid by employers for all their employees up to the first \$4,500 of the employees' gross monthly salary. All SDL collected are channelled to the Skills Development Fund (SDF), which is used, among other things, to support workforce upgrading programmes and provide training grants to employers when they send their employees for training subsidised by the Workforce Development Agency (WDA).

⁹ Wage subsidies refer to subsidies provided to companies to reduce labour cost. Examples of wage subsidies include the Special Employment Credit and Temporary Employment Credit. These subsidies lower the TLC.

$$\Delta\text{TLC} = \Delta\text{Remuneration} + \Delta\text{SDL} + \Delta\text{FWL} + \Delta\text{Wage subsidies} + \Delta\text{Recruitment and net training cost} \quad [\text{Equation 3}]$$

From Equation 3, changes in TLC per worker can be further decomposed as follows:

$$\% \Delta \frac{\text{TLC}}{\text{Worker}} = \frac{\Delta\text{TLC}}{\Delta\text{TLC}} \times \% \Delta \frac{\text{TLC}}{\text{Worker}} \quad [\text{Equation 4a}]$$

$$\% \Delta \frac{\text{TLC}}{\text{Worker}} = \sum_i \frac{\Delta(\frac{X_i}{\text{worker}})}{\Delta(\frac{\text{TLC}}{\text{worker}})} \times \% \Delta \frac{\text{TLC}}{\text{Worker}} \quad [\text{Equation 4b}]$$

where X_i references each of the five components that make up the TLC, and $\frac{\Delta(\frac{X_i}{\text{worker}})}{\Delta(\frac{\text{TLC}}{\text{worker}})} \times \% \Delta \frac{\text{TLC}}{\text{Worker}}$ refers to the percentage-point (pp) contribution of each of these components to TLC per worker growth.

Growth in remuneration per worker accounted for the bulk of the increase in TLC per worker over the past two decades

From the decomposition analysis, the increase in TLC per worker for the overall economy over the past 20 years was largely driven by a rise in remuneration per worker (Exhibit 3A).¹⁰ The growth in remuneration per worker alone accounted for 92 per cent¹¹ of the increase in TLC per worker between 1994 and 2014. More recently, from 2010 to 2014, it contributed 3.0-pp (or 82 per cent) to the 3.3 per cent increase in TLC per worker, while FWL contributed only 0.5-pp to the increase. In addition, wage subsidies reduced TLC per worker by 0.2-pp over the same period.

For the manufacturing sector, the increase in remuneration per worker was similarly the main driver of the rise in TLC per worker over the past 20 years, accounting for about 93 per cent of its increase (Exhibit 3B). In the most recent period, from 2010 to 2014, the increase in remuneration per worker contributed 3.6-pp (or 83 per cent) to the 4.0 per cent growth in TLC per worker in the sector. Comparatively, the increase in FWL contributed a far lower 0.5-pp to the rise in TLC per worker.

Exhibit 3A: Decomposition of annual growth in TLC per worker for the overall economy, 1994 – 2014

Period	TLC/Worker growth (%) (a) = sum of (b) to (f)	Contribution to TLC/Worker growth (pp)				
		Remuneration /Worker (b)	SDL/Worker (c)	FWL/Worker (d)	Wage subsidies/ Worker (e)	Recruitment & net training cost/Worker (f)
1994 – 1999	2.2	2.2	0.0	0.0	0.0	0.1
1999 – 2004	3.0	3.1	0.0	-0.2	0.0	0.0
2004 – 2009	1.4	2.0	0.0	0.1	-0.7	0.0
2009 – 2014	4.3	3.6	0.0	0.4	0.3	0.0
2010 – 2014	3.3	3.0	0.0	0.5	-0.2	0.0

¹⁰ The increases in SDL per worker and recruitment and net training cost per worker were found to have a negligible impact on the increase in TLC per worker.

¹¹ Computed as $|b|/(|b|+|c|+|d|+|e|+|f|)$, where b, c, d, e and f respectively refer to the growth contributions of (i) remuneration per worker, (ii) SDL per worker, (iii) FWL per worker, (iv) wage subsidies per worker, and (v) recruitment and net training cost per worker to TLC per worker growth respectively.

Exhibit 3B: Decomposition of annual growth in TLC per worker for the manufacturing sector, 1994 – 2014

Period	TLC/Worker growth (%) (a) = sum of (b) to (f)	Contribution to TLC/Worker growth (pp)				
		Remuneration /Worker (b)	SDL/Worker (c)	FWL/Worker (d)	Wage subsidies/ Worker (e)	Recruitment & net training cost/Worker (f)
1994 – 1999	3.3	3.6	0.0	-0.4	0.0	0.1
1999 – 2004	2.3	2.3	0.0	0.0	0.0	0.0
2004 – 2009	-0.4	0.2	0.0	0.2	-0.7	0.0
2009 – 2014	5.5	4.5	0.0	0.5	0.4	0.1
2010 – 2014	4.0	3.6	0.0	0.5	-0.1	0.1

Note for Exhibits 3A and 3B:

1. Numbers may not sum due to rounding.

Source: Singapore Department of Statistics, Ministry of Manpower and MTI Staff estimates

Productivity-driven growth remains vital in ensuring sustainable wage increases for Singaporeans

In summary, the ULC increases in recent years were largely due to the rise in TLC per worker, which had outpaced the gains in labour productivity. The increase in TLC per worker was in turn primarily due to wage increases amidst a tight labour market. By contrast, the contributions of other labour cost components like FWL, SDL and recruitment and net training cost to increases in TLC per worker were small.

Going forward, wage cost pressures are likely to persist, given continuing tight labour market conditions. As such, it remains vital for us to press on with our productivity drive, as it is only by raising productivity that we will be able to mitigate the impact of wage cost increases and remain competitive. Over the longer term, raising productivity is also the key to sustaining wage growth for Singaporeans.

The Government will continue to work with businesses, unions and workers to boost productivity growth in the economy, and enhance the quality of our workforce through various SkillsFuture initiatives, so as to ensure that the wages and living standards of Singaporeans continue to improve.

Reference

Kaonang, R. and Teo E. (2009), "Box Article: Trends in Singapore's Unit Labour Cost During Recessions", Economic Survey of Singapore First Quarter 2009, pp. 11-16.

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