

Analysis of Commodity Substitution Effect In Hong Kong's CPI

Meeting of the Group of Experts on Consumer Price Indices
30 May – 1 June 2012, Geneva

KL CHAN
Census and Statistics Department
Hong Kong, China



- Background of conducting Household Expenditure Survey (HES) – *Provide data for determining the commodity mix in the CPI basket*
- Salient results of latest round of HES for 2009/10



Monthly CPI in Hong Kong

- Laspeyres formula
- Expenditure weights in the base year compiled from a dedicated Household Expenditure Survey (HES) conducted once every 5 years
- Current price data from a monthly retail price survey



- Latest round of HES was conducted during October 2009 to September 2010 (i.e. 2009/10 HES)
- Results of 2009/10 HES provided essential inputs for updating the CPI weights



- Background of conducting Household Expenditure Survey (HES)
- Salient results of latest round of HES for 2009/10
 - Updating of expenditure ranges



Expenditure Ranges of CPIs

Index series	Monthly Household Expenditure		Percentage of households covered
	2004/05	2009/10	
Composite CPI	\$4,000 - \$59,999	\$4,500 - \$65,999	90%
CPI(A)	\$4,000 - \$15,499	\$4,500 - \$18,499	50%
CPI(B)	\$15,500 - \$27,499	\$18,500 - \$32,499	30%
CPI(C)	\$27,500 - \$59,999	\$32,500 - \$65,999	10%

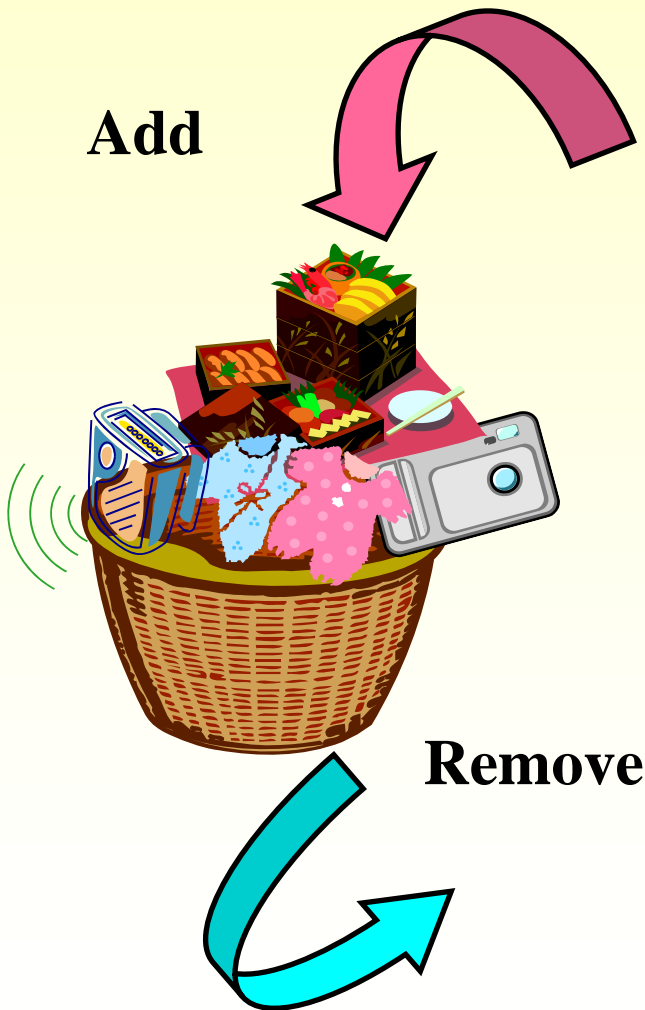


- Background of conducting Household Expenditure Survey (HES)
- Salient results of latest round of HES for 2009/10
 - Updating of expenditure ranges
 - Updating of CPI basket



Updating of CPI Basket

Examples



- **Course fees for Playgroups**
- **Ngong Ping Cable Car fares**
- **Mini warehouses**

- **Repairs service for sound equipment**
- **Cyber café**

- Background of conducting Household Expenditure Survey (HES)
- Salient results of latest round of HES for 2009/10
 - Updating of expenditure ranges
 - Updating of CPI basket
 - Changes in expenditure weights



Changes in Expenditure Weights between 2004/05 and 2009/10

- Expenditure weights

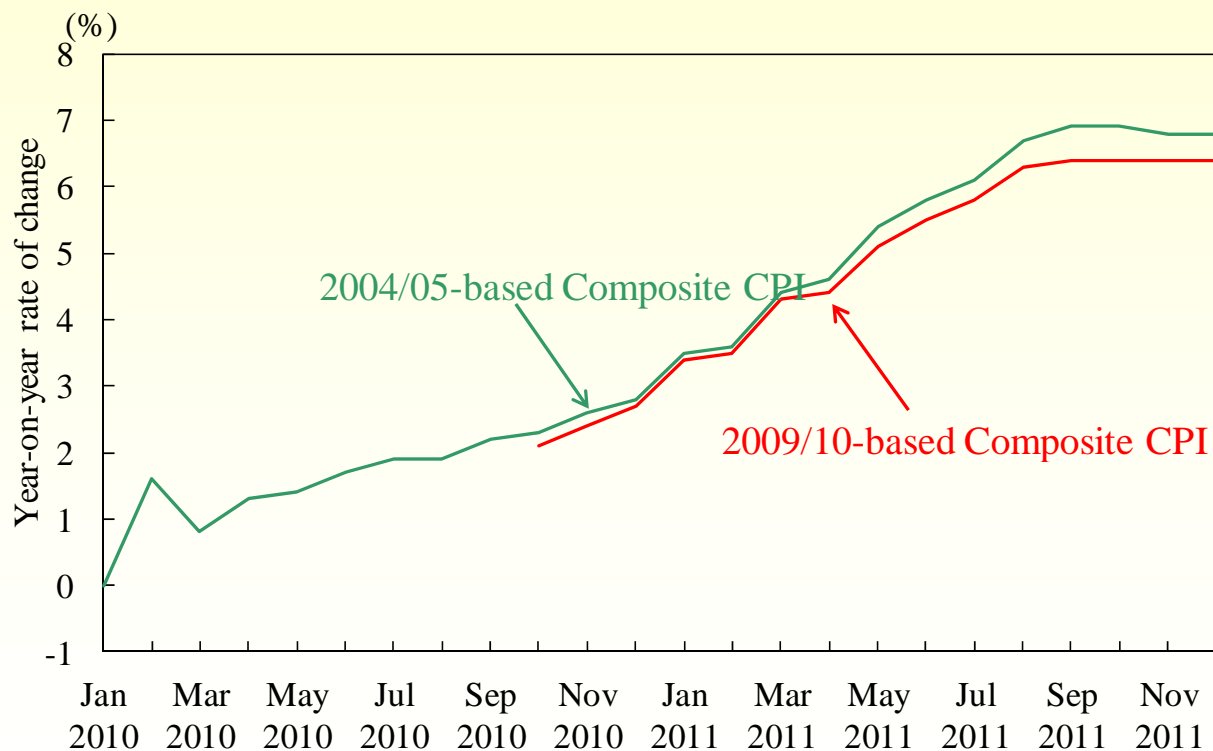
	Expenditure weights (%) in 2004/05-based Composite CPI	Expenditure weights (%) in 2009/10-based Composite CPI	Percentage change (%) in expenditure weight
Food	26.94	27.45	1.9
Housing	29.17	31.66	8.5
Electricity, gas and water	3.59	3.1	-13.6
Alcoholic drinks and tobacco	0.87	0.59	-32.2
Clothing and footwear	3.91	3.45	-11.8
Durable goods	5.5	5.27	-4.2
Miscellaneous goods	4.78	4.17	-12.8
Transport	9.09	8.44	-7.2
Miscellaneous services	16.15	15.87	-1.7
All items	100	100	



Year-on-year rates of change in underlying CPIs in 2004/05 (old series) to 2009/10 (new series)

Composite CPI

Month/year	New	old	Difference
	(%)	(%)	(% point)
01/2011	3.4	3.5	-0.1
02/2011	3.5	3.6	-0.1
03/2011	4.3	4.4	-0.1
04/2011	4.4	4.6	-0.2
05/2011	5.1	5.4	-0.3
06/2011	5.5	5.8	-0.3
07/2011	5.8	6.1	-0.3
08/2011	6.3	6.7	-0.4
09/2011	6.4	6.9	-0.5
10/2011	6.4	6.9	-0.5
11/2011	6.4	6.8	-0.4
12/2011	6.4	6.8	-0.4



- Inflation rate increased since late 2009
- Major contributors
 - Food prices and private housing rents
 - Weighting dominated by food and private housing rent
 - Food (27.45% in 2009/10-based Composite CPI)
 - Private housing rent (27.14% in 2009/10-based Composite CPI)



- Across 2004/05-based and 2009/10-based Composite CPI, expenditure weights in
 - Food
 - Increased from 26.94% to 27.45%
 - Private housing rent
 - Increased from 23.93% to 27.14%



Factors Explaining Changes in Expenditure Weights

- Expenditure
Price (P) x Consumption Volume (Q)
- Changes in expenditure weights (W)
Combined effect of
 1. Changes in P
 2. Changes in Q
- Changes in W
Driven by P factor, Q factor or both factors



- In Laspeyres formula, the CPI basket is fixed for the base period in terms of quantity (Q)

$$I_{O,t} = \sum \left[\frac{P_{O,k} Q_{O,k}}{\sum P_{O,k} Q_{O,k}} \cdot \frac{P_{t,k}}{P_{O,k}} \right] \cdot 100$$

$$= \frac{\sum P_{t,k} Q_{O,k}}{\sum P_{O,k} Q_{O,k}} \cdot 100$$

Expenditure weight (base year)

Price relatives

Total expenditure on fixed basket **at current price**

Total expenditure on fixed basket **at base year price**

Factors Explaining Changes in Expenditure Weights (con't)

- The new weight (i.e. 2009/10-based) can be expressed as

$$\begin{aligned}
 W_{N,k} &= \frac{P_{N,k} Q_{N,k}}{\sum P_{N,k} Q_{N,k}} \\
 &= \frac{(P_{O,k} \times \frac{P_{N,k}}{P_{O,k}}) (Q_{O,k} \times \frac{Q_{N,k}}{Q_{O,k}})}{\sum P_{N,k} Q_{N,k}} \\
 &= \frac{(P_{O,k} Q_{O,k} \times \frac{P_{N,k}}{P_{O,k}} \times \frac{Q_{N,k}}{Q_{O,k}})}{\sum P_{N,k} Q_{N,k}} \\
 &= \left(\frac{P_{O,k} Q_{O,k}}{\sum P_{O,k} Q_{O,k}} \times \frac{P_{N,k}}{P_{O,k}} \times \frac{Q_{N,k}}{Q_{O,k}} \right) \frac{\sum P_{N,k} Q_{N,k}}{\sum P_{O,k} Q_{O,k}}
 \end{aligned}$$

Expenditure weight in old base period → $\left(\frac{P_{O,k} Q_{O,k}}{\sum P_{O,k} Q_{O,k}} \right)$
Price factor: (1+Change in P) → $\frac{P_{N,k}}{P_{O,k}}$
Quantity factor: (1+Change in Q) → $\frac{Q_{N,k}}{Q_{O,k}}$
Change in total expenditure → $\frac{\sum P_{N,k} Q_{N,k}}{\sum P_{O,k} Q_{O,k}}$



Commodity / service section	Price change between 2009/10 and 2004/05 lower than change in the all-items index	Price change between 2009/10 and 2004/05 higher than change in the all-items index
Implied quantity increased in 2009/10 compared with 2004/05	<ul style="list-style-type: none"> • Meals bought away from home • Durable goods • Transport 	<ul style="list-style-type: none"> • Housing
Implied quantity decreased in 2009/10 compared with 2004/05	<ul style="list-style-type: none"> • Electricity, gas and water • Clothing and footwear 	<ul style="list-style-type: none"> • Food (excluding meals bought away from home) • Alcoholic drinks and tobacco

Analysis by commodity/service sections:

Food

Increased preference to dining out despite rise in price.

Section / Group	Average monthly expenditure (\$)		Rate of change (%) [(a)/(b) - 1] x 100%	Change in price (%) (from Composite CPI)	Implied change in volume (%)
	2009/10 (a)	2004/05 (b)			
Food	5,859	4,863	20.5	20.5	*
<i>Meals bought away from home</i>	<i>3,695</i>	<i>3,078</i>	<i>20.0</i>	<i>13.2</i>	<i>6.0</i>
<i>Other food items</i>	<i>2,164</i>	<i>1,785</i>	<i>21.3</i>	<i>32.8</i>	<i>-8.7</i>
<i>Poultry</i>	86	75	13.6	64.3	-30.8
<i>Pork</i>	242	184	31.1	44.1	-9.0
<i>Beef</i>	49	32	55.8	73.1	-10.0

* less than 0.05



Analysis by commodity/service sections: Rent, including rates and government rent

Section / Group	Average monthly expenditure (\$)		Rate of change (%) [(a)/(b) - 1] x 100%	Change in price (%) (from Composite CPI)	Implied change in volume (%)
	2009/10 (a)	2004/05 (b)			
Rent	6,699	5,123	30.8	23.0	6.3
<i>Public housing</i>	<i>447</i>	<i>447</i>	<i>-0.1</i>	<i>-10.2</i>	<i>11.2</i>
<i>Private and subsidized housing</i>	<i>6,252</i>	<i>4,675</i>	<i>33.7</i>	<i>26.4</i>	<i>5.8</i>

Analysis by commodity/service sections: Alcoholic drinks and tobacco

Foreign style wine - Increased popularity of red wine probably associated with price reduction upon government's tax waiver since financial year 2007/08

Cigarettes – Notable decline in consumption

Group	Average monthly expenditure (\$)		Rate of change (%) [(a)/(b) – 1] x 100%	Change in price (%) (from CCPI)	Implied change in volume (%)
	2009/10 (a)	2004/05 (b)			
Foreign-style wine	30	22	39.3	-13.0	60.1
Cigarettes	84	106	-20.9	27.0	-37.7

Analysis by commodity/service sections: Durable goods

Computers and telecommunications equipment - Increased popularity of portable items (e.g. Smartphone, Netbook/notebook); PC sets and traditional domestic telephone sets became less popular

Watches, clocks, cameras and optical goods - Increased popularity of digital single-lens reflex (DSLR) cameras

Group	Average monthly expenditure (\$)		Rate of change (%)	Change in price (%) (from CCPI)	Implied change in volume (%)
	2009/10 (a)	2004/05 (b)	$[(a)/(b) - 1] \times 100\%$		
Computers and telecommunications equipment	181	227	-20.5	-45.9	47.1
Watches, clocks, cameras and optical goods	132	113	17.0	-1.9	19.3



Analysis by commodity/service sections: Miscellaneous Services

School fees - Increased demand of tuition; receipts of tertiary education; enrolment in Direct Subsidy Schools

Medical services - Increased average household expenditure on medical insurance, body check and in-patient services in private hospitals (people become more health-conscious)

Package tours - Increased expenditure and consumption on transport and hotel packages as well as package tours (especially the former)

Group	Average monthly expenditure (\$)		Rate of change (%)	Change in price (%)	Implied change in volume (%)
	2009/10 (a)	2004/05 (b)	$[(a)/(b) - 1] \times 100\%$	(from CCPI)	
School fees	996	852	16.9	-5.2	23.4
Medical services	590	432	36.6	9.8	24.4
Package tours	424	252	68.3	39.4	20.8

Lower year-on-year rates of change in the new Composite CPI series

	Year-on-year rates of change (in 2004/05-based CPIs) for Dec 2010	% point contribution to YoY for Dec 2010 (in <u>2004/05-based weights</u> and <u>YoYs</u> at section level)	Year-on-year rates of change (in 2009/10-based CPIs) for Dec 2010	% point contribution to YoY for Dec 2010 (in <u>2009/10-based weights</u> and <u>YoYs</u> at section level)	Difference (in % point)
Food	4.3	1.24	4.1	1.11	-0.13
Housing	2.5	0.75	2.6	0.83	+0.08
Electricity, gas and water	13.0	0.39	12.0	0.35	-0.04
Alcoholic drinks and tobacco	0.7	0.01	0.3	0.00	-0.01
Clothing and footwear	3.4	0.14	3.9	0.14	*
Durable goods	-2.9	-0.12	-4.7	-0.25	-0.13
Miscellaneous goods	2.8	0.14	2.1	0.09	-0.05
Transport	3.0	0.25	3.2	0.27	+0.02
Miscellaneous services	1.9	0.29	2.3	0.37	+0.08
Overall		3.1		2.9	



Thank You!

