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Real Wage Cyclicality in Hong Kong SAR

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Abstract

The aim of this study is to examine the cyclical patterns of real wages within Hong Kong Special Administrative Region (SAR). Premised on the Hodrick-Prescott (HP) filter technique for detrending, our analysis reveals that, in the examined periods, the real wage in Hong Kong SAR displayed a pro-cyclical relationship with both real GDP and the number of employed individuals. Conversely, employing a linear time trend approach, the real wage demonstrated a counter-cyclical relationship with both real GDP and the employed population. However, it is noteworthy that these findings lack statistical significance.

Keywords: Real wage cyclicality, HP-Filter, Hong Kong SAR

JEL Classification: E24, E32

[1] I am so grateful to Mr. Truong Dang Khoa for rectifying the English sentences. All remaining errors are my responsibility.

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1. Introduction

Hong Kong SAR is known as a region where laissez-faire economic management principles have been practiced over an extended duration. In light of Hong Kong SAR's extensive adherence to this approach, pivotal questions emerge: Can the approach effectively stimulate business activity and underpin sustained long-term economic growth? Will it foster rapid adjustments in prices and wages and thereby facilitate the attainment of full employment? To address these fundamental questions, it is imperative to scrutinize the intricate relationship between real wages, output, and employment. Grounded in this framework, the objective of this paper is to analyze the cyclicality of real wages in Hong Kong SAR.

Section 2 provides an overview of the pertinent literature related to the focus of the paper. Section 3 presents the descriptive statistics pertaining to basic macroeconomic variables, while Section 4 elucidates the provenance of the data. Section 5 delineates the results derived from our analysis of the cyclicality of real wages in Hong Kong SAR. Finally, Section 6 offers concluding remarks that encapsulate the key findings and implications of this study.

2. Related Literature

There exists a notable disparity in theoretical perspectives regarding the cyclicality of real wages. Keynesian economists typically posit a counter-cyclical relationship, suggesting that real wages move inversely to fluctuations in output and employment. In contrast, Real Business Cycle theorists contend that real wages are procyclical and thus assert that changes in output and employment positively influence real wage movements. Mankiw (1989), for instance, underscored the Real Business Cycle assumption that the economy consistently operates along the labor supply curve, which implies a positive correlation between real wages, output, and employment. Miyamoto (2015) contributed to this discourse by highlighting variations in real

wage cyclicality based on different price indices. Specifically, real wages constructed using the Consumer Price Index (CPI) and the Gross Domestic Product (GDP) deflator tend to exhibit procyclical behavior, whereas those constructed using the Producer Price Index (PPI) demonstrate counter-cyclical tendencies. Blanchard and Fischer (1989) observed negligible correlation between economy-wide real wages and output across various time lags, while identifying a significant contemporaneous correlation between manufacturing wages and output. This observation was then reinforced by Cooley and Prescott (1995), who drew on empirical data from the U.S. economy spanning several decades 1954/Q1 to 1991/Q1 to highlight the labor market's central role in manifesting business cycle dynamics. In terms of the labor market flexibility in Hong Kong SAR, Pauwels and Zang (2008) documented remarkable wage and employment flexibility during challenging economic episodes such as the Asian financial crisis, deflationary periods, and outbreaks like SARS over the past decade. In the context of the United States, Abraham and Haltiwanger (1995) undertook a comprehensive analysis of economic fluctuations by employing various methodologies including linear time trends, log first differences, and the Hodrick-Prescott (HP) filter to discern the cyclical components of real wage and employment data spanning several decades. Yang (1993) attributed wage increases in the late 1970s to rapid economic growth and inflationary pressures. Blanchard and Fischer (1989) further noted a generally positive albeit statistically insignificant correlation between changes in real wages and fluctuations in output or employment.

3. Data and method

The data utilized for this study was sourced from the Census and Statistics Department of the Hong Kong SAR Government[2]. Table 1 encompasses an array of variables, including real gross

[2] Available from: https://www.censtatd.gov.hk/en/

domestic product (real GDP), real private consumption expenditure (PCE), real government consumption expenditure (GCE), real gross domestic fixed capital formation (GDFCF), real export of goods and services (EX), imports of goods and services (IM), and the implicit price deflator of GDP (IDP).

The data for real GDP, real wage, and nominal wage were collected on a quarterly basis, while data for employed persons were gathered monthly. To ensure consistency, quarterly data for employed persons were derived by calculating the three-month moving average. Subsequently, the quarterly data underwent seasonal adjustment using the following equation[3]:

$$y_t^* = \frac{0.5y_{t-2} + y_{t-1} + y_t + y_{t+2} + 0.5y_{t+2}}{4}$$

Accordingly, quarterly data for employed persons were acquired. To extract the cyclical component from the data, we employed two distinct methodologies: the Hodrick-Prescott (HP) filter with a smoothing parameter set to 1,600 applied to the natural logarithm of each dataset, and the method of linear time trend.

4. Notes on Macroeconomic Characteristics of Hong Kong SAR

We conducted a comprehensive analysis of the descriptive statistics pertaining to basic macroeconomic variables within the Hong Kong SAR spanning the period from 1961 to 2022. Yoshikawa and Shioji (1992) previously undertook a similar analysis focusing on Japan's economy, where they derived descriptive statistics for basic macroeconomic variables. Notably, Yoshikawa and Shioji (1990) observed a higher degree of price flexibility during the pre-World War period in Japan compared to the post-war era. Drawing inspiration from the methodological approach outlined by Yoshikawa (1992), we present our findings in Table 1.

[3] As for moving average, see Nishiyama, Shintani, Kawaguchi and Okui (2019), pp.466-469.

Table 1

Descriptive statistics of Basic Macroeconomic variables by 1961-2022 (yearly data)

Period (Year)	Mean (%)	Standard deviation (%)	Coefficient of variation	Maximum value (%)		Minimum value (%)		Autocorrelation coefficient of first order	Autocorrelation coefficient of second order
1962-1980									
Real GDP	8.46	4.86	0.57	16.16	*(1976)*	0.49	*(1975)*	0.15	-0.25
PCE	9.07	4.58	0.51	17.08	*(1978)*	-1.80	*(1974)*	0.12	-0.07
GCE	7.56	2.28	0.30	11.22	*(1966)*	3.06	*(1971)*	0.18	-0.23
GDFCF	9.19	13.97	1.52	34.84	*(1963)*	-17.26	*(1967)*	0.62	0.12
EX	9.12	6.07	0.67	25.52	*(1976)*	-3.40	*(1974)*	-0.05	-0.21
IM	10.23	7.13	0.70	23.60	*(1976)*	-7.63	*(1974)*	0.02	0.16
IDP	6.94	4.67	0.67	17.80	*(1979)*	0.00	*(1966)*	0.53	0.22
1981-2004									
Real GDP	5.01	4.01	0.80	13.40	*(1987)*	-5.88	*(1998)*	0.12	-0.14
PCE	4.87	3.87	0.80	10.65	*(1987)*	-5.50	*(1998)*	0.45	0.20
GCE	5.05	4.18	0.83	21.11	*(1981)*	1.12	*(1998)*	0.22	0.18
GDFCF	3.99	7.33	1.84	14.97	*(1994)*	-16.34	*(1999)*	0.25	-0.14
EX	10.17	7.43	0.73	27.81	*(1987)*	-5.42	*(1998)*	0.19	-0.20
IM	9.97	7.94	0.80	26.86	*(1987)*	-6.94	*(1998)*	0.24	-0.05
IDP	4.44	5.41	1.22	12.39	*(1989)*	-6.02	*-2003*	0.84	0.74
2005-2022									
Real GDP	2.46	3.81	1.55	7.39	*(2005)*	-6.54	*(2020)*	0.03	0.06
PCE	3.10	4.30	1.39	8.65	*(2007)*	-10.60	*(2020)*	0.09	-0.03
GCE	3.41	2.35	0.69	8.15	*(2022 r)*	-2.57	*(2005)*	0.74	0.65
GDFCF	0.63	6.63	10.60	10.23	*(2011)*	-14.94	*(2019)*	0.22	-0.09
EX	2.99	8.17	2.73	17.57	*(2010)*	-12.61	*(2022 r)*	-0.31	-0.06
IM	3.05	8.01	2.63	18.23	*(2010)*	-12.19	*(2022 r)*	-0.26	-0.10
IDP	1.81	1.44	0.80	3.93	*2011*	-0.54	*2006*	0.30	-0.32
1962-2022									
Real GDP	5.36	4.95	0.92	16.16	*(1976)*	-6.54	*(2020)*	0.35	0.15
PCE	5.68	4.98	0.88	17.08	*(1978)*	-10.60	*(2020)*	0.42	0.28
GCE	5.37	3.66	0.68	21.11	*(1981)*	-2.57	*(2005)*	0.47	0.43
GDFCF	4.63	10.49	2.26	34.84	*(1963)*	-17.26	*(1967)*	0.53	0.12
EX	7.70	7.92	1.03	27.81	*(1987)*	-12.61	*(2022 r)*	0.13	0.04
IM	8.00	8.40	1.05	26.86	*(1987)*	-12.19	*(2022 r)*	0.17	0.13
IDP	4.46	4.86	1.09	17.80	*1979*	-6.02	*2003*	0.77	0.63

Analysis of Table 1 reveals several noteworthy observations. Firstly, there is a discernible deceleration in the rate of increase across factors which constitute aggregate demand. Particularly striking is the pronounced coefficient of variation (10.6) observed for real gross domestic fixed capital formation (GDFCF) during the 2005-2022 period.

Table 2

Descriptive statistics of real GDP, real wage, nominal wage and employed persons 2005.Q1-2022.Q4

Period 2005.Q1-2022.Q4	Mean (%)	Standard deviation (%)	Coefficient of variation	Maximum value (%)	Minimum value (%)	Autocorrelation coefficient of first order	Autocorrelation coefficient of second order
Real GDP	0.72	0.31	0.43	0.66 *(2006.1)*	-0.74 *(2020.2)*	0.80	0.58
Real wage	0.10	0.43	4.43	1.55 *(2020.3)*	-1.60 *(2014.3)*	0.34	0.20
Nominal wage	0.76	0.39	0.52	1.85 *(2011.3)*	-0.37 *(2009.2)*	0.90	0.70
Employed Persons	0.16	1.85	11.76	3.30 (2011.2)	-5.46 (2020.3)	0.88	0.67

Utilizing quarterly data spanning from 2005/Q1 to 2022/Q4, we constructed Table 2 without applying any detrending techniques. Notably, the coefficient of variation for real wages stood out prominently at 4.43. Similarly, the coefficient of variation for employed persons exhibited a notable level of variability, reaching 11.76. Within the context of Hong Kong SAR, fluctuations in employed persons are deemed to be particularly significant across business cycles. It is widely acknowledged that during periods of economic recession, the labor market in Hong Kong SAR experiences notable adjustments and the termination of workers is commonly perceived as relatively uncomplicated. These observations align closely with the findings reported by Pauwels and Zang (2008), who documented a high degree of flexibility in both wages and employment in the region.

5. Analysis of Real Wage Cyclicality in Hong Kong SAR

In line with the approach adopted by Abraham and Haltiwanger (1995), we applied two distinct detrending methods: a linear time trend and the Hodrick-Prescott (HP) filter, aiming to isolate the cyclical components of macroeconomic variables. Figure 1 illustrates the cyclical component of real wage, while Figure 2 and Figure 3 depict the cyclical components of real GDP and employed persons, respectively. Our analysis encompassed data spanning from the first quarter of 2004 to the fourth quarter of 2022. Upon examination, we observed remarkable consistency between the results obtained from the two detrending methods. However, it is noteworthy that the fluctuations in real wage derived from the HP filter exhibited a comparatively larger amplitude.

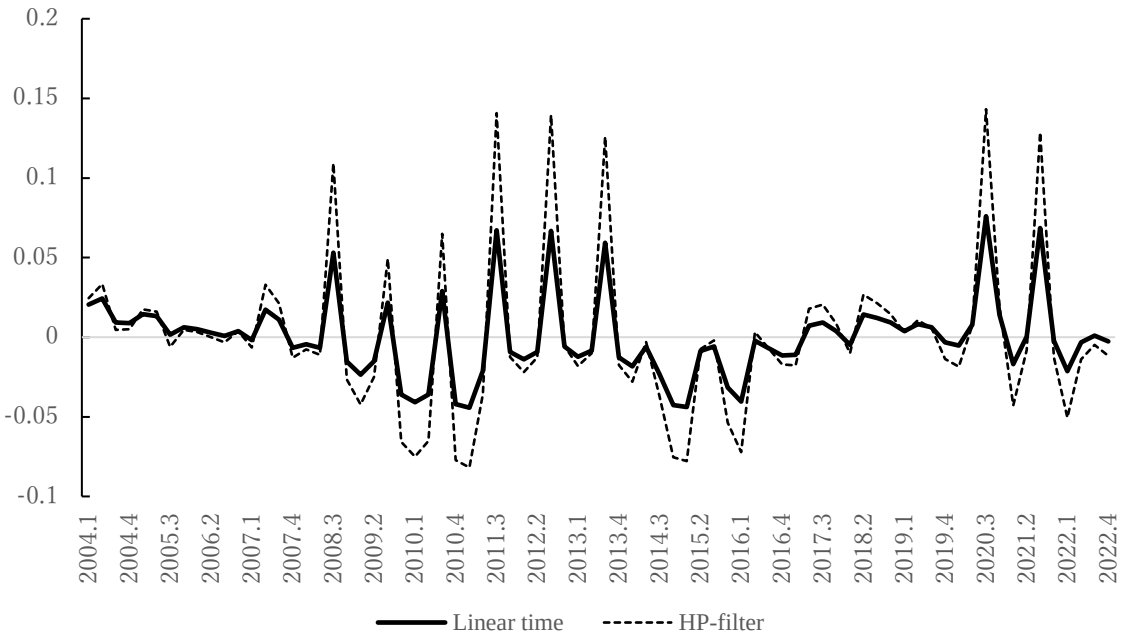

Figure 1. Real Wage

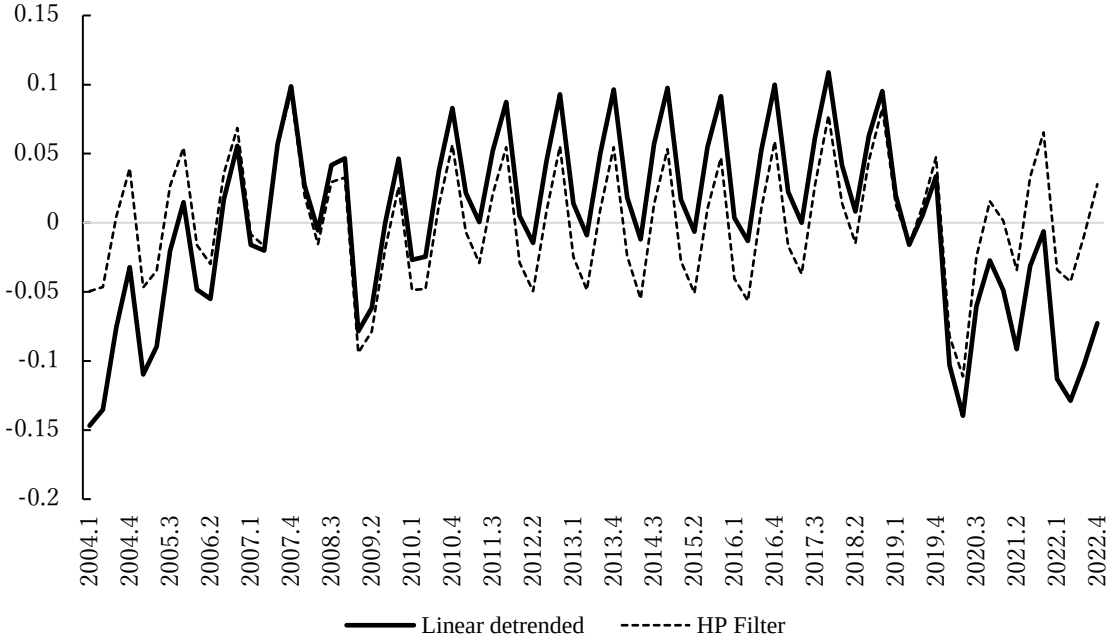

Figure 2. Real GDP

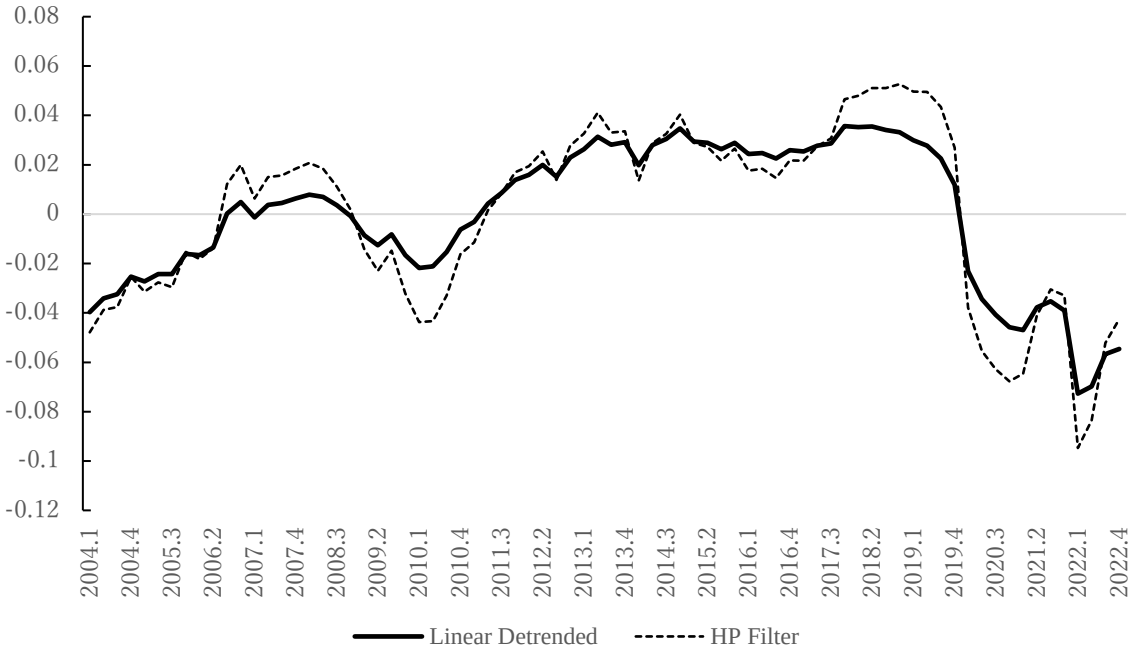

Figure 3. Employed persons

Subsequently, in accordance with the methodologies outlined by Cooley and Prescott (1995) and Miyamoto (2015), we computed correlation coefficients between real GDP and real wage, as well as between real GDP and employed persons, and between real wage and employed persons at various lead and lag intervals in the context of Hong Kong SAR. The findings of these analyses are presented in Table 3 and Table 4.

Table 3

Correlation coefficient between real GDP with each variable at different leads and lags in Hong Kong (2004.Q1-2022.Q4)

Period	Correlation of real GDP with each variable at different leads and lags										
2004.Q1-2022.Q4	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
Real Wage											
HP- filter	0.49	0.04	-0.45	-0.09	0.54	0.09	-0.44	-0.08	0.57	0.13	-0.43
Linear time trend	0.09	-0.21	-0.51	-0.26	0.16	-0.13	-0.46	-0.2	0.25	-0.03	-0.4
Employed persons											
HP- filter	-0.14	-0.06	-0.13	-0.03	0.26	0.47	0.32	0.26	0.36	0.36	0.09
Linear time trend	0.36	0.46	0.49	0.56	0.67	0.74	0.7	0.66	0.65	0.6	0.51

Table 3 reveals several notable observations. When employing the HP filter for detrending, the contemporaneous correlation between real GDP and real wage was 0.09, indicating a slight negative association, albeit statistically insignificant. Similarly, when utilizing a linear time trend for detrending, the contemporaneous correlation between real GDP and real wage was -0.13, again suggesting a slight negative correlation lacking statistical significance.

Table 4

Correlation coefficient between real wage with employed persons at different leads and lags in Hong Kong (2004.Q1-2022.Q4)

Period	Correlation of real wage with employed persons at different leads and lags										
2004.Q1-2022.Q4	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
Employed persons											
HP- filter	-0.03	0.09	0.14	0.04	0.08	0.14	0.17	0.01	0.09	0.18	0.17
Linear time trend	-0.1	-0.07	-0.07	-0.13	-0.14	-0.14	-0.14	-0.22	-0.21	-0.22	-0.25

From Table 4, several key observations emerge. Utilizing the HP filter for detrending, the contemporaneous correlation between real wage and employed persons was 0.14, indicative of a slight positive correlation that lacked statistical significance. Conversely, employing a linear time trend for detrending yielded a contemporaneous correlation between real wage and employed persons of -0.14, indicating a slight negative correlation also devoid of statistical significance. These findings align with those of Abraham and Haltiwanger (1995), suggesting that the cyclicality of real wage is contingent upon the chosen detrending methodology.

Subsequently, we computed the autocorrelation of each variable at different leads and lags, as presented in Table 5. A notable observation from Table 5 is that there was a gradual diminution in the autocorrelation of employment over time, whereas the autocorrelation of real GDP and real wage exhibited more pronounced fluctuations.

Table 5

Auto correlation of each variable in Hong Kong (2004.Q3-2022.Q2)

Period	Auto correlation of each variable at different leads and lags										
2004.Q1-2022.Q4	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
HP- filter											
Real GDP	-0.05	0.7	0.03	-0.56	0.21	1	0.21	-0.56	0.03	0.7	-0.05
Real Wage	-0.11	0.66	-0.07	-0.32	0.01	1	0.01	-0.32	-0.07	0.66	-0.11
Employed persons	0.01	0.2	0.32	0.53	0.8	1	0.8	0.53	0.32	0.2	0.01
Linear time trend											
Real GDP	0.32	0.76	0.44	0.18	0.61	1	0.61	0.18	0.44	0.76	0.32
Real Wage	-0.01	0.67	0.05	-0.16	0.14	1	0.14	-0.16	0.05	0.67	-0.01
Employed persons	0.67	0.76	0.83	0.9	0.96	1	0.96	0.9	0.83	0.76	0.67

6. Conclusion

This paper analyzed the cyclicality of real wages within Hong Kong SAR. Our analysis revealed contrasting relationships between real wages and key economic indicators, namely real GDP and employed persons, depending on the detrending method employed. Utilizing the HP filter for detrending, we observed a pro-cyclical association between real wages and both real GDP and employed persons. In contrast, employing a linear time trend for detrending indicated a counter-cyclical relationship between real wages and these economic variables. However, it is important to note that these findings lacked statistical significance. Our results are consistent with the observations made by Abraham and Haltiwanger (1995), underscoring the sensitivity of real wage cyclicality to the chosen detrending approach.

Several avenues for future research merit consideration. Firstly, it is imperative to delve into the theoretical implications of our findings by elucidating the underlying economic mechanisms driving the observed cyclical patterns in real wages within the context of Hong Kong SAR.

Secondly, further investigation is warranted into the relationship between real GDP and real wage dynamics, particularly through the application of methodologies such as the first-order difference of natural logarithms. This prospective research may offer deeper insights into the nature of their interplay over time.

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