

Table 1 – Cyclical Behavior of the US Economy

	st dev %	t-4	t-3	t-2	t-1	t	t+1	t+2	t+3	t+4
GNP	1.751	0.224	0.420	0.632	0.806	1.000	0.806	0.632	0.420	0.224
CND	1.517	-0.045	0.135	0.341	0.478	0.647	0.583	0.544	0.405	0.280
CD	4.647	0.429	0.572	0.690	0.775	0.776	0.543	0.370	0.160	-0.014
AVG_H	0.451	0.200	0.342	0.469	0.581	0.576	0.449	0.284	0.136	-0.032
AVG_W	1.099	0.382	0.457	0.491	0.490	0.376	0.290	0.176	0.060	-0.057
Tot_Hours_Worked	1.715	-0.094	0.069	0.276	0.485	0.773	0.740	0.679	0.591	0.472
Employment	1.459	-0.173	-0.028	0.171	0.378	0.688	0.701	0.684	0.633	0.542
Productivity	1.296	0.497	0.599	0.662	0.663	0.576	0.300	0.083	-0.145	-0.308

Table 2 – Business Cycle Statistics for the US Economy

	Standard Deviation	Rel_std_dev	Autocorrelations	Correlations
Y	1.569	1.000	0.771	1.000
C	1.410	0.899	0.719	0.887
I	6.590	4.201	0.833	0.873
N	0.074	0.047	0.708	0.468
Y/N	1.536	0.979	0.770	0.999
w	1.099	0.700	0.856	0.143
G	1.420	0.905	0.820	0.027
r	73.284	46.711	0.804	0.108

ANSWERS POINT B

- ***Consumption is smoother than output.***

Looking at the standard deviation, durable consumption is more volatile than GNP, while non durable consumption is less volatile than GNP.

The intuition here is that when bad times come, individuals reduce the expenses for durable consumption while consumption for non-durable cannot be reduced too much, since it represents goods like food and other basic goods and services daily consumed.

Therefore, durable consumption is not smoother than output; non-durable consumption is smoother than output.

- ***Volatility in GNP is similar in magnitude to volatility in total hours.***

I confirm this fact. GNP's standard deviation is 1.75, while the analogue quantity for Tot_Hours_Worked is 1.71.

- ***Volatility in employment is greater than volatility in average hours. Therefore most labour market adjustments operate on the extensive rather than intensive margin.***

I also confirm this fact. Employment's standard deviation is 1.46, while the analogue quantity for AVG_H is 0.45. This means that labor market adjustments operate on the extensive margin: during changes due to the business cycles, people is more likely to exit and enter the labor market, rather than staying in the labor market and reduce whe working hours.

- ***Productivity is slightly pro-cyclical.***

By looking at the values of the cross-correlation between GNP and Productivity, I can see that values from t-4 to t+2 are all positive, which would imply a pro-cyclical feature. Moreover, taking also into consideration the graph which shows volatility between GNP and Productivity, it's possible to spot a slightly lagged pattern, in which when the productivity increases, then slightly after the GNP increases.

- ***Wages are less variable than productivity.***

Once again, I found confirms in my analysis. In fact standard deviation for AVG_W is 1.098591 while standard deviation for Productivity is 1.29.

- ***There is no correlation between wages and output.***

I had different findings. For both table 1 and table 2 I found a non-negligible correlation between wages and output.

ANSWERS POINT C

- ***Consumption of non-durables is less volatile than output.***

The answer I provided for question1 of pointB is valid here.

- ***Consumer durables are more volatile than output.***

The answer I provided for question1 of pointB is valid here.

- ***Investment is three times more volatile than output.***

To answer this question I look at **table 2**, where I summarized standard deviations for GDP per capita and Investment per capita. The pattern is confirmed, as Investment (per capita) looks four times more volatile than output (per capita). I think the intuition to this pattern is that, as economic outlook turns uncertain or "negative times" are expected to arrive, consumers tend to be more risk averse and for this reason they may reduce their exposition to investments and keep liquidity uninvested.

The idea is that investment decisions are influenced by the business cycle. During economic expansions output and income are expected to grow, and both businesses and consumers (through savings) tend to increase their investment activities. Conversely, during economic contractions or recessions, investment tends to decline as perspectives are worse.

- ***Government expenditures are less volatile than output.***

Still looking at table 2 I found the standard dev. of G per capita to be lower than the same quantity for Output per capita. So the pattern is confirmed, even though the difference is negligible in my data.

- ***Total hours worked are about the same volatility as output.***

To answer this I go back to table 1 and also in this case I confirm the pattern from my data for which the volatility is about the same.

- ***Employment is as volatile as output, while hours per worker are much less volatile than output.***

To answer this I go back to table 1. I found Employment slightly less volatile than output.

Then to compare the volatility of hours per worker and output, I look at table 2 here I found that hours per worker is (a lot) more volatile than output.

- ***Labour productivity is less volatile than output.***

To answer this question, I look at **table 2** and I see that they're on the same level of volatility, where productivity has a (very) slightly lower st. dev

- ***The real wage is much less volatile than output.***

Looking at table 2 I found the same pattern.