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Welfare cost of inflation in an emerging economy: a case of Pakistan

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Title: Welfare Cost of Inflation in an Emerging Economy: A case of Pakistan

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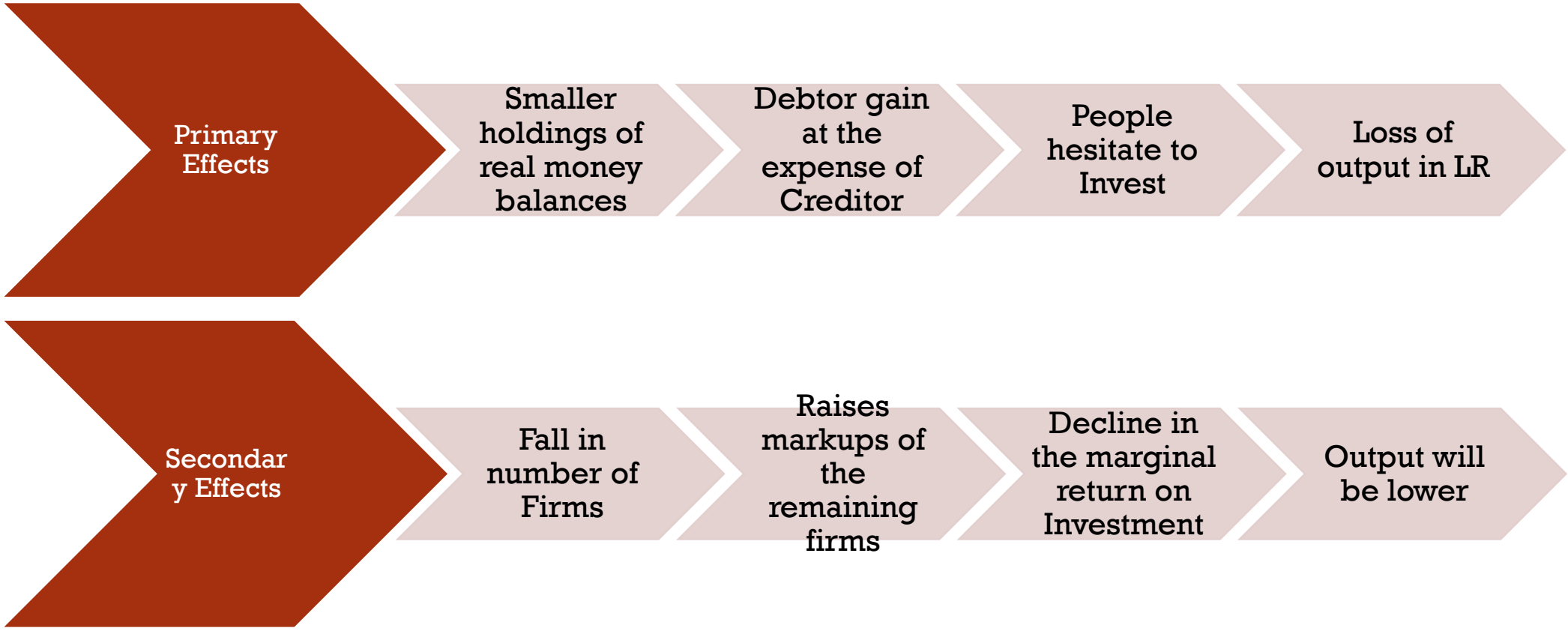
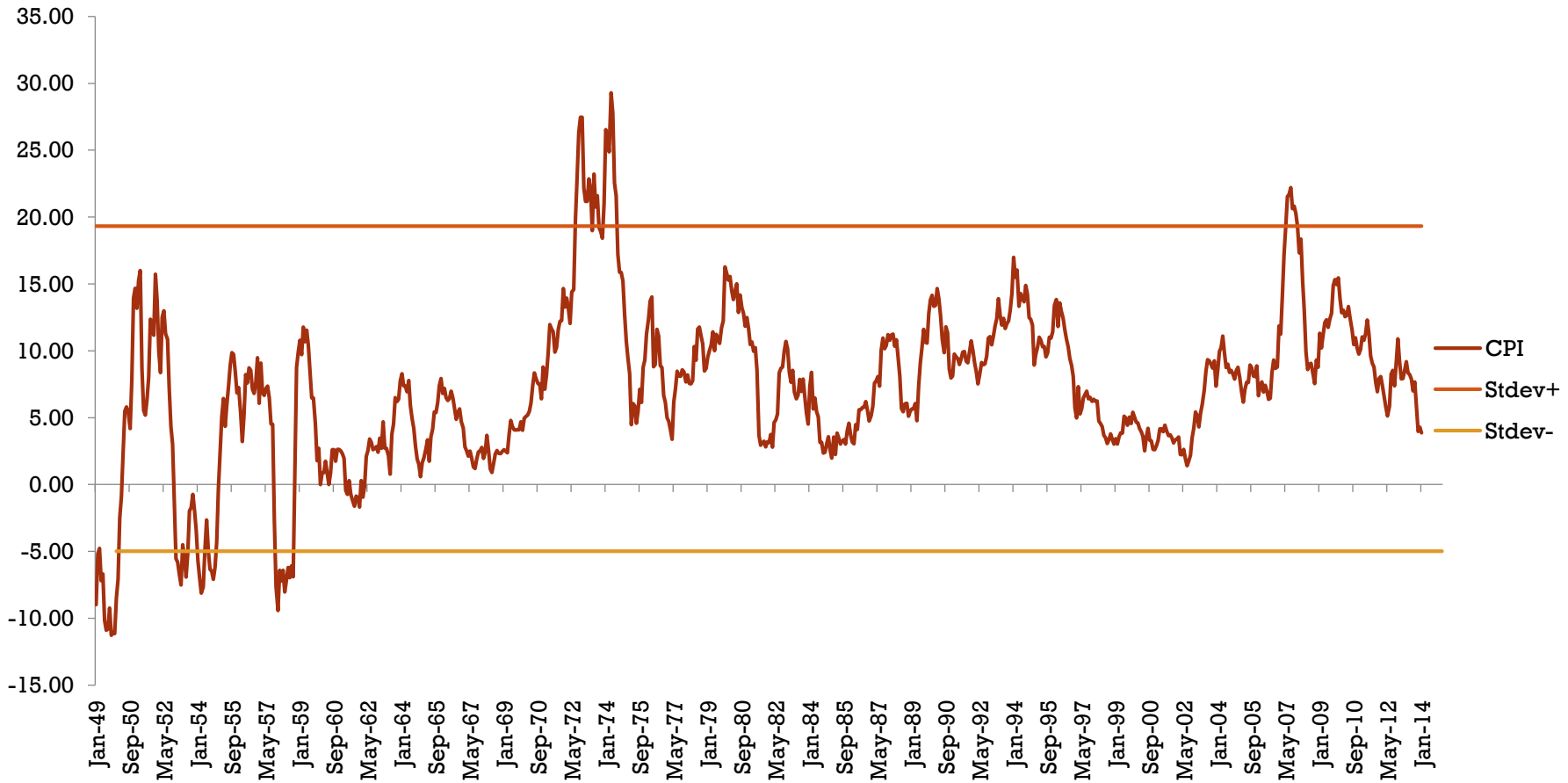
Introduction

- Inflation is costly.
- Policy makers should know:
  - what are the costs of Inflation?
  - how they vary with Inflation?
- Wide gap between the popular view of Inflation and the cost of inflation economists can identify.
- Inflation cost are not well understood for the case of Pakistan.



INFLATION TRENDS IN PAKISTAN



INFLATION DYNAMICS

	Headline Inflation	Food Inflation	Core Inflation
Min	-11.26	-15.99	1.77
Max	29.29	35.58	14.61
Median	7.35	7.65	8.04
Mean	7.14	7.97	7.69
Std.Dev	6.07	7.60	3.05
Mean + Std.Dev	13.21	15.57	10.74
Mean – Std.Dev	1.07	0.36	4.64

Rationale of the study

The welfare cost of Inflation depend on the threshold level of Inflation that maximizes the steady state welfare.
Threshold level of inflation for Pakistan is 9 percent.*

This paper comprehensively investigates the welfare cost/gain of inflation and implications of inflation on other agents of the society not just household in a developing country like Pakistan with large informal sector.*

Cash-in-Advance (CIA) Model by Cooley and Hansen (1989) has been applied because traditional consumer surplus approach fails to incorporate labor-leisure decisions while estimating the welfare loss of inflation.

*Mubarik (2005)
*Reed and Ghossoub (2010) observed that the Inflation costs are higher in developing countries because of higher inflation rate and a higher reliance on cash. Informal sector in developing countries may be as large as 76 percent of the economy.

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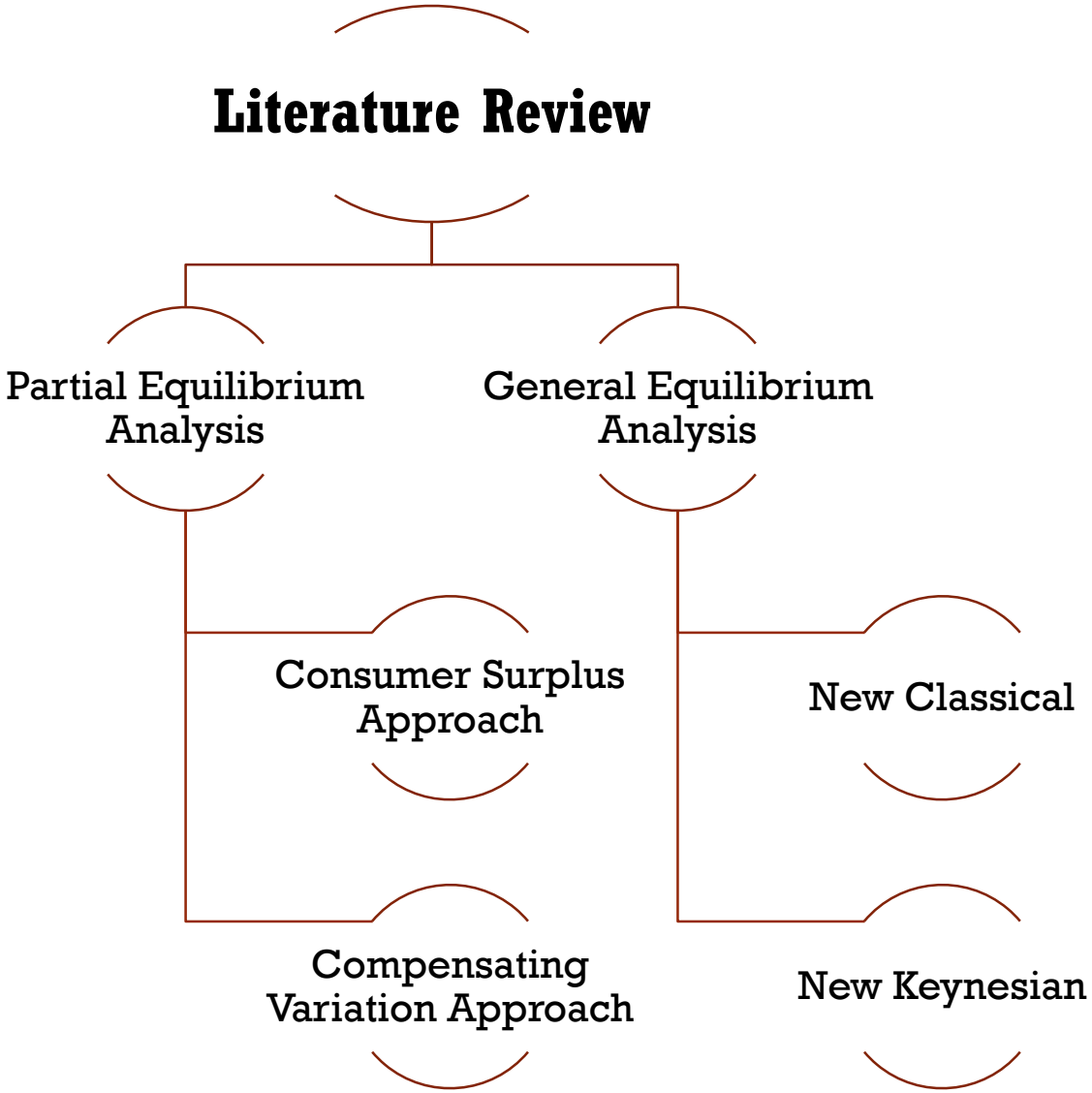

Author (Year)	Journal	Country	Data & Methodology	Findings
Bailey (1956)	Journal of Political Economy	Seven hyper inflation European countries	Cagan's* data(Monthly) & Consumer Surplus	He shows that anticipated inflation cost members of the society more than the government revenue.
Lucas (2000)	Econometrica	United States	Data (1990-94) & General Equilibrium (The Sidrauski Framework)	Gain from reducing the annual inflation rate from 10 % to 0 is equivalent to an increase in real income of slightly less than 1%.
Ben Craig & Guillaume Rocheteau (2008)	Journal of Money, Credit and Banking	United States	A Search theoretic Monetary Approach	The welfare cost associated with 10% inflation is ranging from 0.5% to 1.5%

Author (Year)	Journal	Country	Data & Methodology	Findings
Wing Leong Teo & Po Chieh Yang (2011)	Pacific Economic Review	United States	New Keynesian DSGE Model	An annual Inflation rate of 10% entails the welfare cost of 1.8% of the steady state consumption.
Mushtaq et al. (2012)	Pakistan Development Review	Pakistan	Annual data (1960-2007) Consumer Surplus Approach and Compensating Variation Approach	The welfare loss associated with the inflation rate of 7% is 0.64% of income.
Riaz & Ahmad	Pensee Journal	Pakistan	Consumer Surplus Approach	Reducing the inflation rate from 10 % to 0 % gives a welfare gain equivalent to an increase of 0.027% in annual income.

Econometric Estimation

This paper considers two specifications for money demand following Lucas (2000): the log–log specification and Semi log specification:

$$\ln(m) = \alpha - \eta \ln(r)$$
$$\ln(m) = \beta - \xi r$$

Where m is the monetary aggregate divided by the real GDP and r is the short term interest rate. The welfare cost measure (w(r)) as described by Lucas for both money demand specifications respectively:

$$w(r) = \alpha \frac{\eta}{1-\eta} r^{1-\eta}$$
$$w(r) = \frac{\beta}{\xi} [1 - (1 + \xi r) e^{-\xi r}]$$

For the semi log money demand specification, quadratic approximation is used to measure the welfare cost of Inflation:

$$w(r) = \frac{1}{2} m(0) \eta r^2$$

For the double log money demand specification, square root formula is used to measure the welfare cost of Inflation:

$$w(r) = \left[1 - (e^{\alpha}) r_t^{1-\beta}\right]^{\frac{\beta}{\beta-1}} - 1$$

Data on variables like Monetary Aggregates(Currency in circulation, M_1, and M_2), the nominal income(nominal gdp), cpi, and short term interest rate (money market rate) is taken from International Financial Statistics (IFS) for the period 1960-2007.

	Semi-Log Model		Double-Log Model		
Interest Rate	Consumer's Surplus Approach	Compensating Variation Approach	Consumer's Surplus Approach	Compensating Variation Approach	
0.10	0.495	0.013	0.637	0.007	Using Currency in Circulation
0.10	0.510	0.018	0.669	0.007	Using M1
0.10	0.717	0.063	1.018	0.011	Using M2

Estimation through Macroeconomic Model

The model provides a setting in which the welfare costs of inflation can be assessed for the reason that money can have important real effects:

- ❑ It allows inter-temporal substitution among cash and credit good.
- ❑ This framework permits the interaction of inflation and taxation*

Welfare in the steady state is:

$$W = \sum_{t=0}^{\infty} \beta^t (lnC + BH) = (1-\beta)^{-1}(lnC + BH)$$

$$where, B = \left[\frac{Aln(1-h_0)}{h_0}\right]$$

*the CIA constraint applies only to consumption good and during higher inflationary period household can only reduce cash holding by reducing consumption.

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Findings

	0%	4%	8%	25%	100%	400%
Corresponding g	1	1.0099	1.0194	1.0574	1.1892	1.4142
Output	1.4486	1.4345	1.421	1.37	1.2181	1.0243
Consumption	1.2387	1.2266	1.2151	1.1715	1.0416	0.8759
Investment	0.2099	0.2079	0.2059	0.1985	0.1765	0.1484
Capital Stock	8.3971	8.3152	8.2371	7.9415	7.0611	5.9377
Hours Worked	0.344	0.3406	0.3374	0.3253	0.2893	0.2432
Welfare Loss %	0	0.968	1.9134	5.7007	19.1608	42.2179

Conclusion and Recommendations

- In general, results derived from varying growth rate of money supply show that there is substantial welfare gain by reducing the inflation rate to zero.
- Specifically, it is found that the welfare loss of 8 percent inflation is 1.9 percent.
- The results from the macroeconomic model display a larger variance as compared to econometric estimation of welfare cost of inflation.
- It is recommended that price stability should be the key objective of monetary policy for the case of Pakistan since the estimated gains of reducing inflation are positive.

Drawback of the study

- The model used in the paper ignores other cost of inflation like its variability, and impact on relative prices.

- The framework used in this paper doesn't provide the role of monopolistic competition and nominal price and wage rigidities