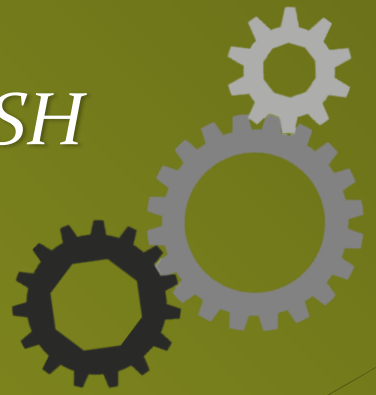
Future of Manufacturing Growth through Investment

AN ECONOMETRIC CASE STUDY OF BANGLADESH



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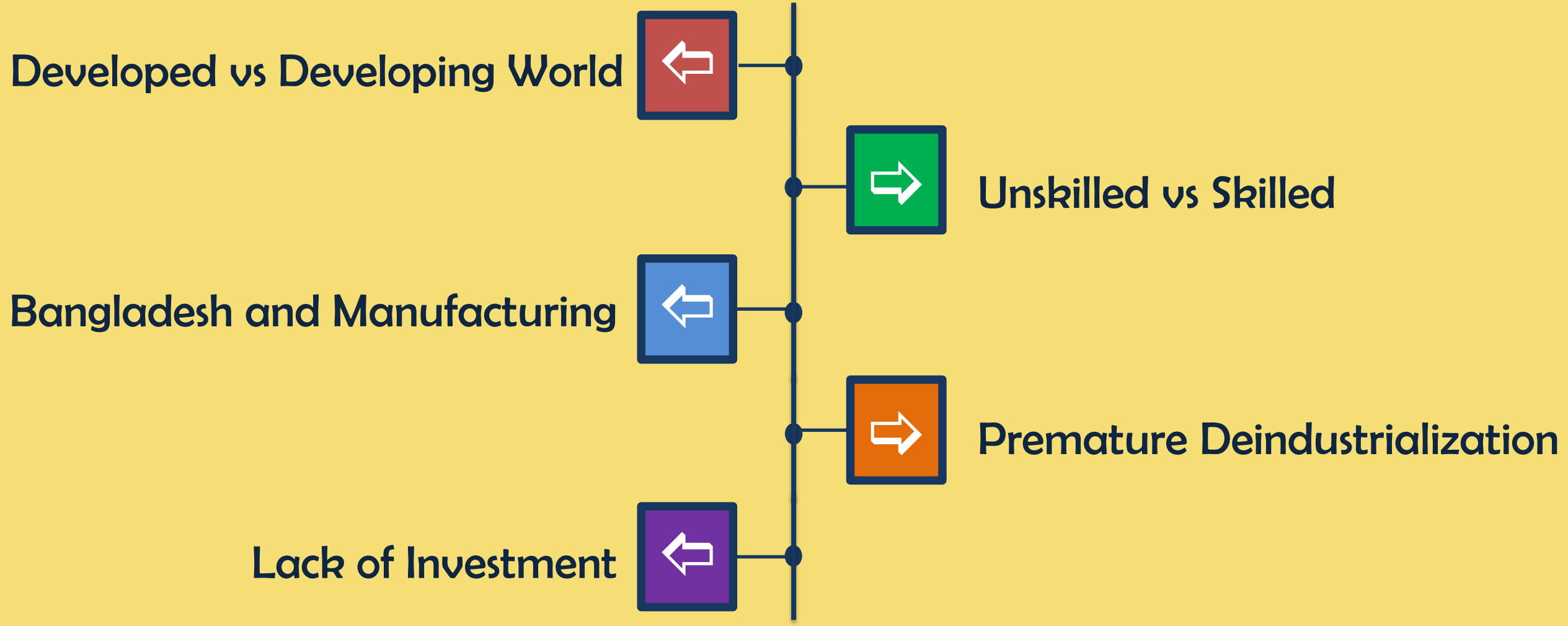
Introduction



Literature Review

Lewis, 1954

- Expansion of non-agro sector
- Constant agricultural output

Solow, 1956

- Savings and investment incentives
- Liberalization of the market

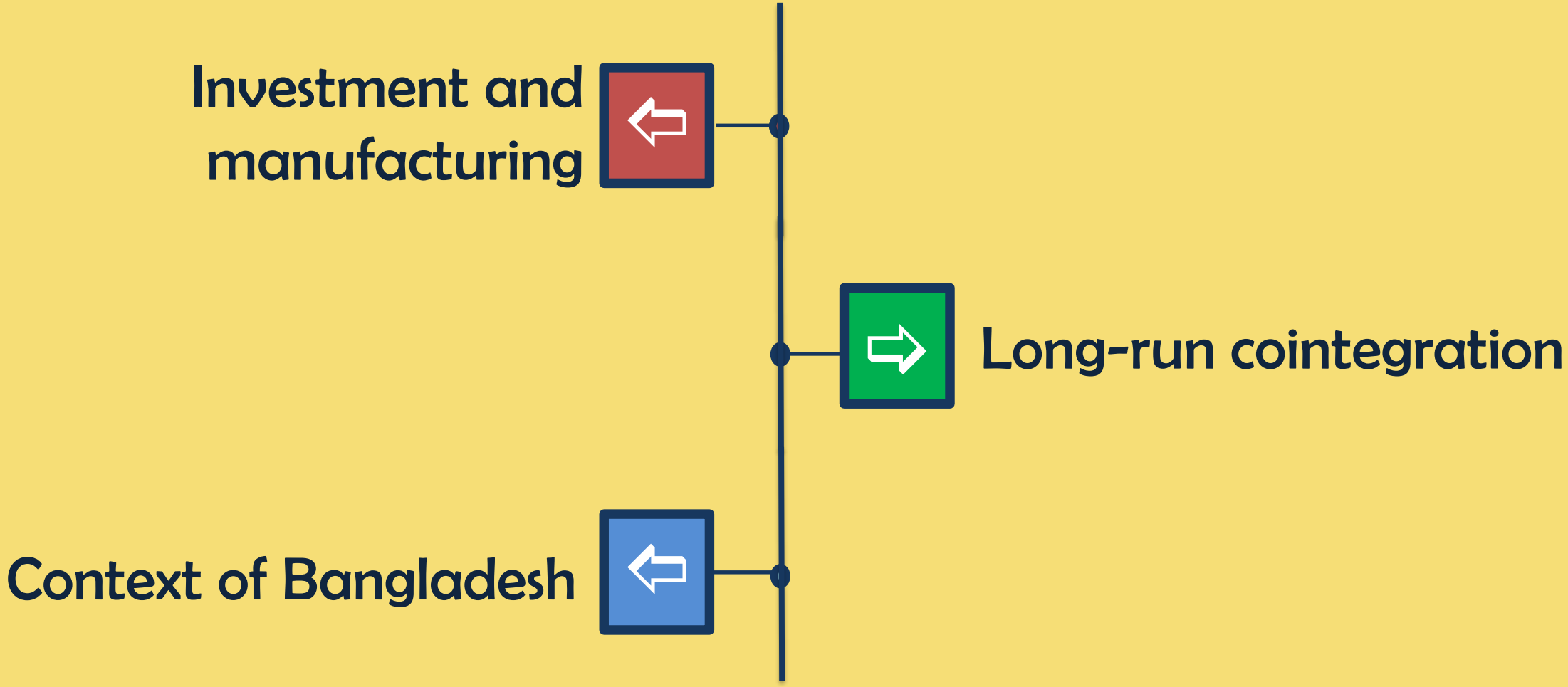
Aghion & Howitt, 1992

- Diversifying the economy
- Sustained growth in the long-run

Acemoglu, Johnson, & Robinson, 2001

- Institutional capabilities
- Growth in different modern sectors

Objectives


Investment and manufacturing
Long-run cointegration
Context of Bangladesh

Methodology

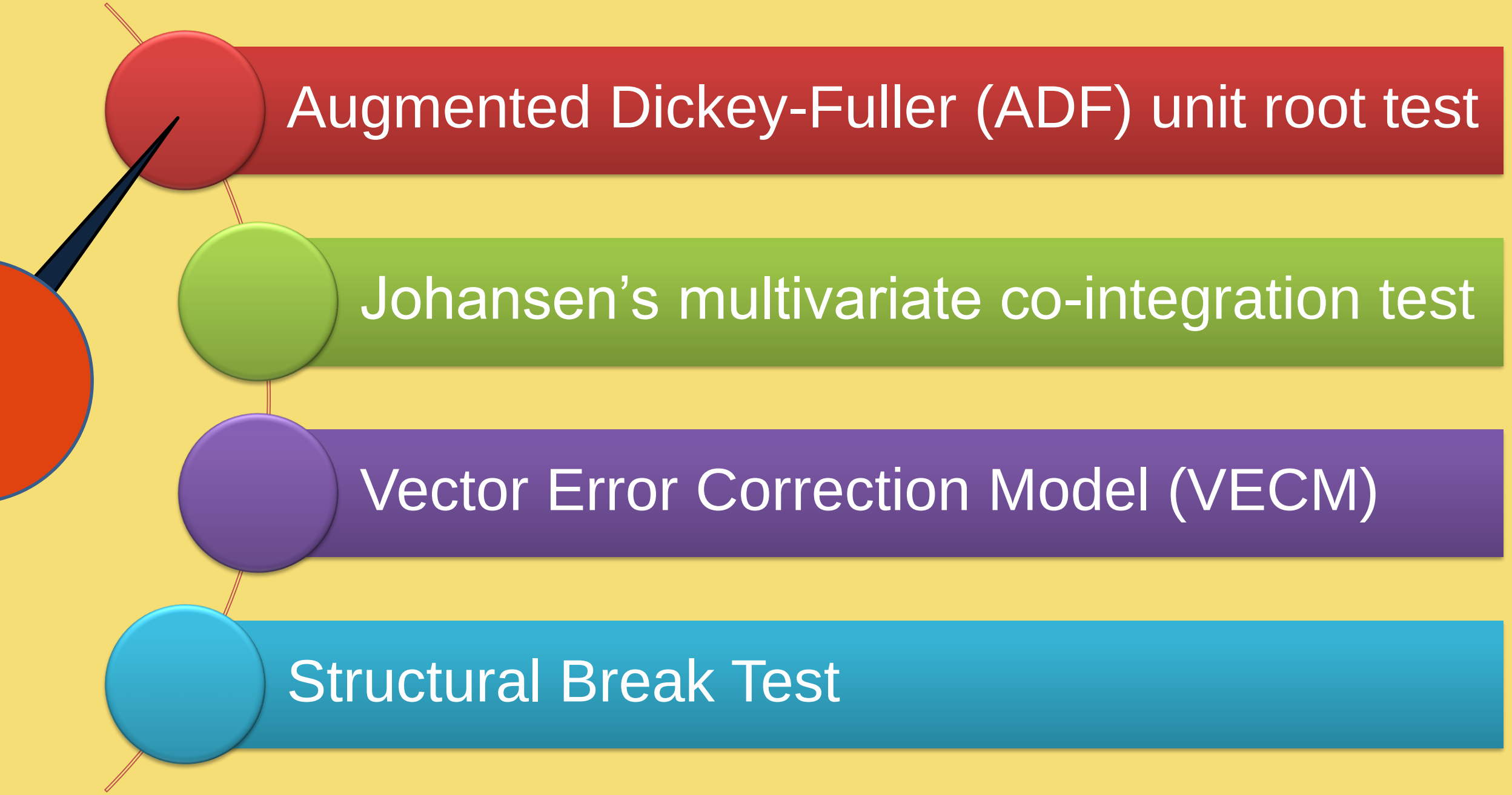
$$manu_t = a_1 PVI_t + a_2 FDI_t + a_3 \ln(PCGDP)_t + a_4 ln(PCGDP)_t^2 + a_5 T_t$$

- manu = Manufacturing share of GDP (output)
- PVI = Real gross domestic private investment (% of GDP)
- FDI = Foreign Direct Investment (% of GDP)
- T = Trade (% of GDP)
- ln (PCGDP) = Per capita income (at constant prices)
- ln (PCGDP)^2 = Per capita income squared (at constant prices)

Data Source

- International Financial Statistics (IFS)
- Direction of Trade Statistics (DOTS) of the International Monetary Fund (IMF)
- World Development Indicators (WDI) database of World Bank (WB)

- Time series data from 1980 to 2016 (Annual)


Augmented Dickey-Fuller (ADF) unit root test
Johansen’s multivariate co-integration test
Vector Error Correction Model (VECM)
Structural Break Test

Augmented Dickey-Fuller Test

Variables	Intercept		Trend and intercept	
	t-Statistic	Prob.	t-Statistic	Prob.
manu	-6.552	0.000	-6.531	0.000
PVI	-4.307	0.002	-4.257	0.009
FDI	-3.126	**0.034**	-3.470	**0.059**
ln(PCGDP)	-2.966	**0.047**	-7.868	0.000
$ln(PCGDP)^2$	-2.966	**0.047**	-7.868	0.000
T	-5.752	0.000	-5.674	0.000

VAR Lag Structure Selection

Endogenous variables: $manu_t$, PVI_t, FDI_t, $\ln(PCGDP)_t$, $\ln(PCGDP)_t^2$, T_t		
Lag	AIC	BIC
0	9.458	9.714
1	**0.535***	**2.327***
2	0.724	4.051

Johansen Tests for Co-integration (λ Trace Test)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	Critical Value (0.05)	Prob.**
None *	*0.949*	*206.850*	*95.753*	*0.000*
At most 1 *	*0.697*	*94.029*	*69.819*	*0.000*
At most 2 *	*0.546*	*48.624*	*47.856*	*0.042*
At most 3	0.269	18.644	29.797	0.518
At most 4	0.157	6.741	15.495	0.608
At most 5	0.006	0.241	3.841	0.623
Trace test indicates 3 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				

Johansen Tests (Maximum Eigenvalue Test)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	Critical Value (0.05)	Prob.**
None *	0.949	112.821	40.078	0.000
At most 1 *	0.697	45.404	33.877	0.001
At most 2 *	0.546	29.980	27.584	0.024
At most 3	0.269	11.903	21.132	0.557
At most 4	0.157	6.450	14.265	0.550
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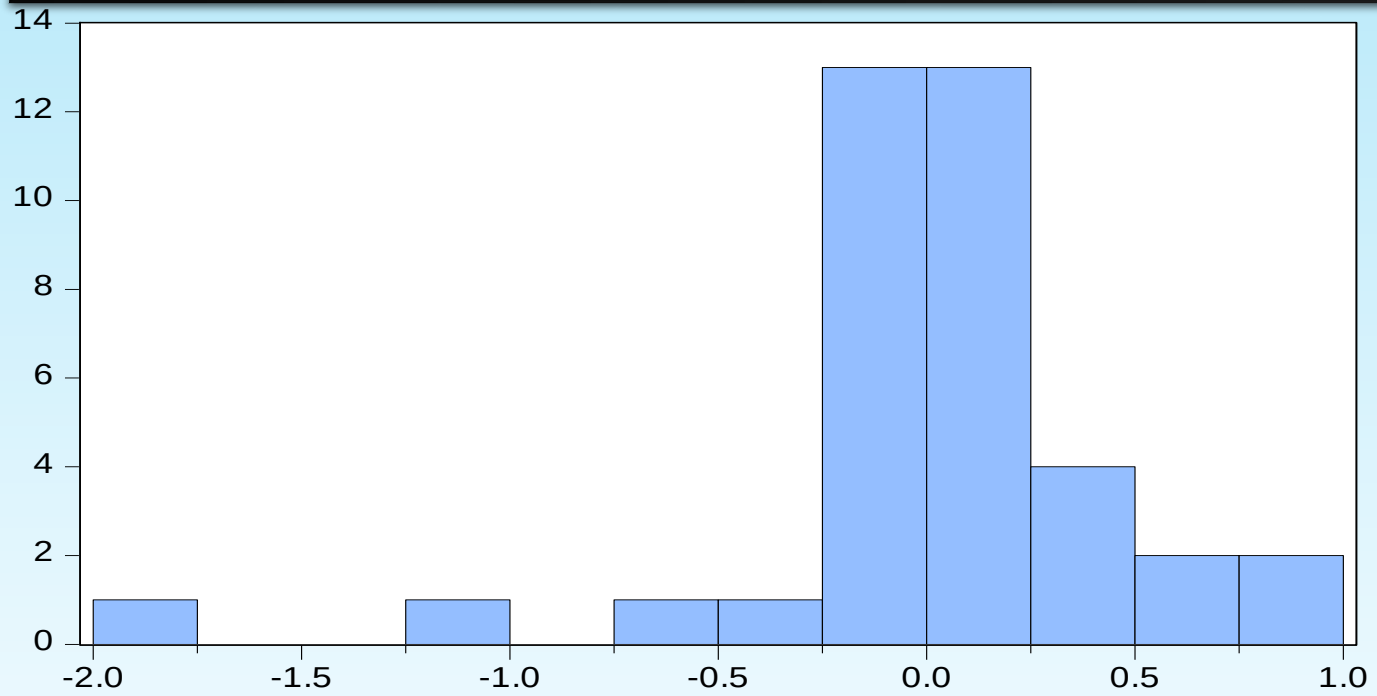
Vector of Long Run Coefficients

Variables	Coefficients	(Std. error)
Long-run	-0.398	0.057
PVI	0.907 ***	0.082
FDI	4.790 ***	0.901
ln(PCGDP)	-7.958 ***	2.030
$ln(PCGDP)^2$	-3.979 ***	1.015
T	-0.503 ***	0.068

Vector of Error Correction Coefficients

Variables	Coefficients	(Std. error)
D(PVI)	**-0.295 *****	0.048
D(FDI)	**-0.002 *****	0.024
D(ln(PCGDP))	**0.005 *****	0.001
$D(\ln(PCGDP)^2)$	**0.010 *****	0.002
D(T)	-0.025	0.328
D(PVI)	**-0.295 *****	0.048

Diagnostics



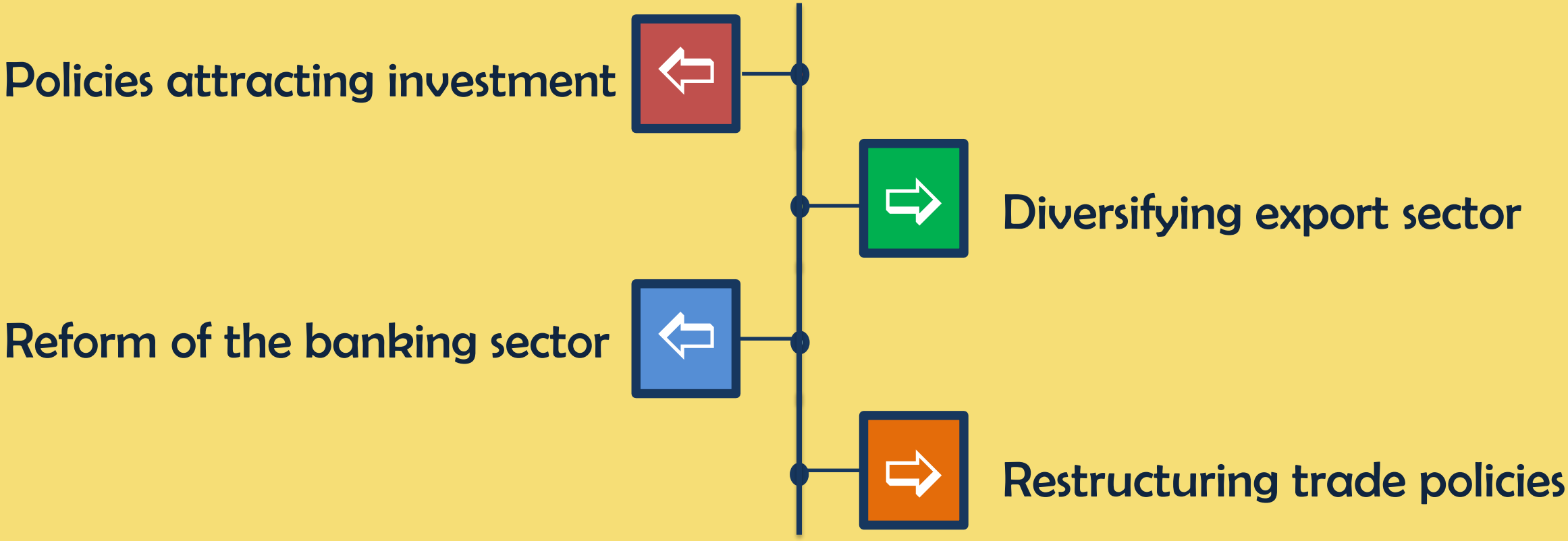
Series: Residuals
Sample 1980 2017
Observations 38

Mean	2.05e-16
Median	0.028316
Maximum	0.836804
Minimum	-1.911742
Std. Dev.	0.471247
Skewness	-1.772351
Kurtosis	9.040379
Jarque-Bera	77.66423
Probability	0.000000

Breusch-Godfrey Serial Correlation LM Test		
Statistics	**Value**	**Prob.**
F – statistics (2,22)	**0.632**	0.541
Obs*R-squared, Chi-Square(2)	2.063	0.356


Stable long-run relationship
Investment positively related to manufacturing
GDP negatively related to manufacturing
Trade negatively related to manufacturing

Policy Suggestions



Scope of Further Studies

Interactive Dummy Test for Structural Break (1992)		
Variable	**Coefficient**	**Std. Error**
C (α_1)	2.839	1.698
D_t (Differential intercept)	**8.366*** **	2.151
X_t (β_1)	0.685***	0.109
$D_t X_t$ (Differential slope)	**-0.515*** **	0.121

Questions ?

Scope of Further Studies

$$Y_t = \alpha_1 + \alpha_2 D_t + \beta_1 X_t + \beta_2 D_t X_t + u_t$$