

# Introduction

- Intersection of Politics and Economics
- Policy → Market
- Curious if certain method could measure effects

# Literature Review

- Theoretical basis for trade policy having an effect on exchange rates
- Implementation as a shock in parity (Stockman - 1980)
  - Basic supply/demand argument applies
- Foreign Direct Investment (Baldwin – 1989)
  - Influx of FDI → rise in demand for currency
- Changes in trade flow (Tamirisa – 1999)
- DR-CAFTA example (Yeboah et al. – 2007)

# Research Question

Given a case study, can Data Envelopment Analysis (DEA) provide a measurement of a shock's effect on exchange rate parity?

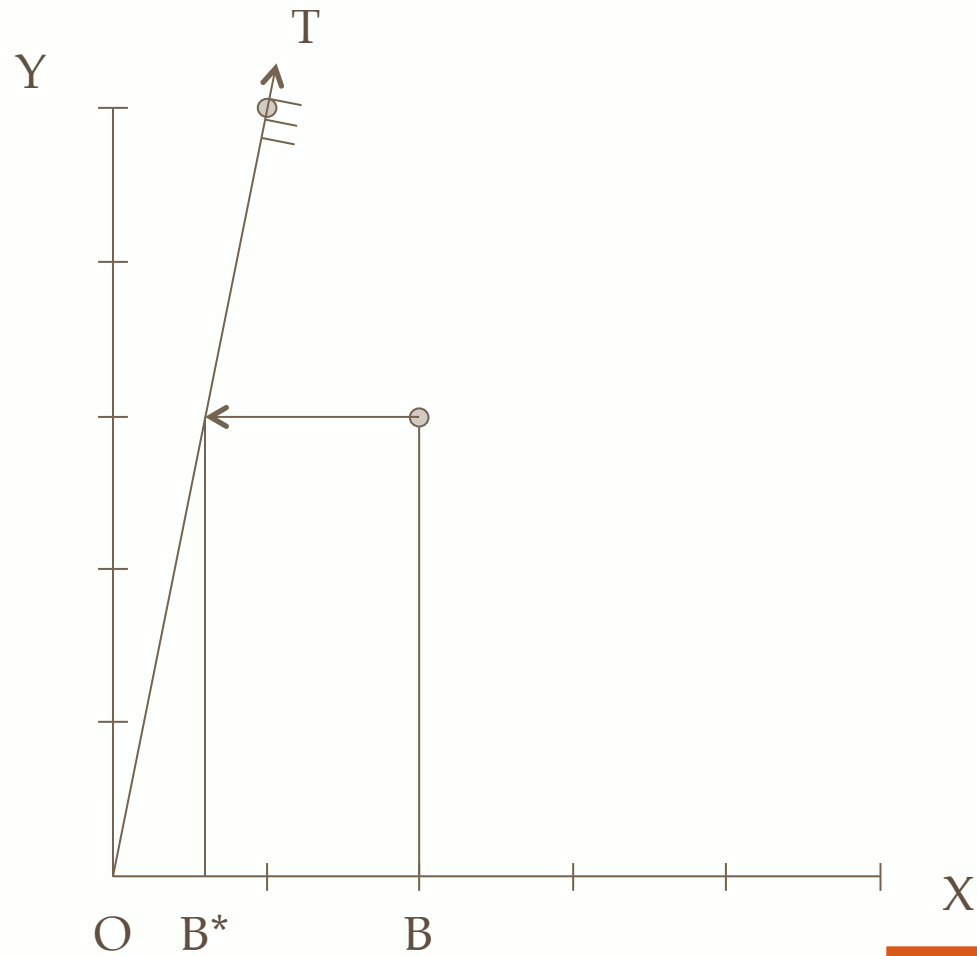
# Data Envelopment Analysis

- Relative benchmark measure
- Meant to be flexible
- Benchmark set by dataset
  - Most efficient unit → Best Practice Frontier

# Methodology

	X	Y
1	1	5
2	2	3

$$F_i = \frac{OB^*}{OB}$$



# Application

- Exchange rates before and after a shock
  - Uruguay Round of World Trade Organization
- Yuan/USD parity
- Yearly data surrounding year of implementation
- Linear Program Model

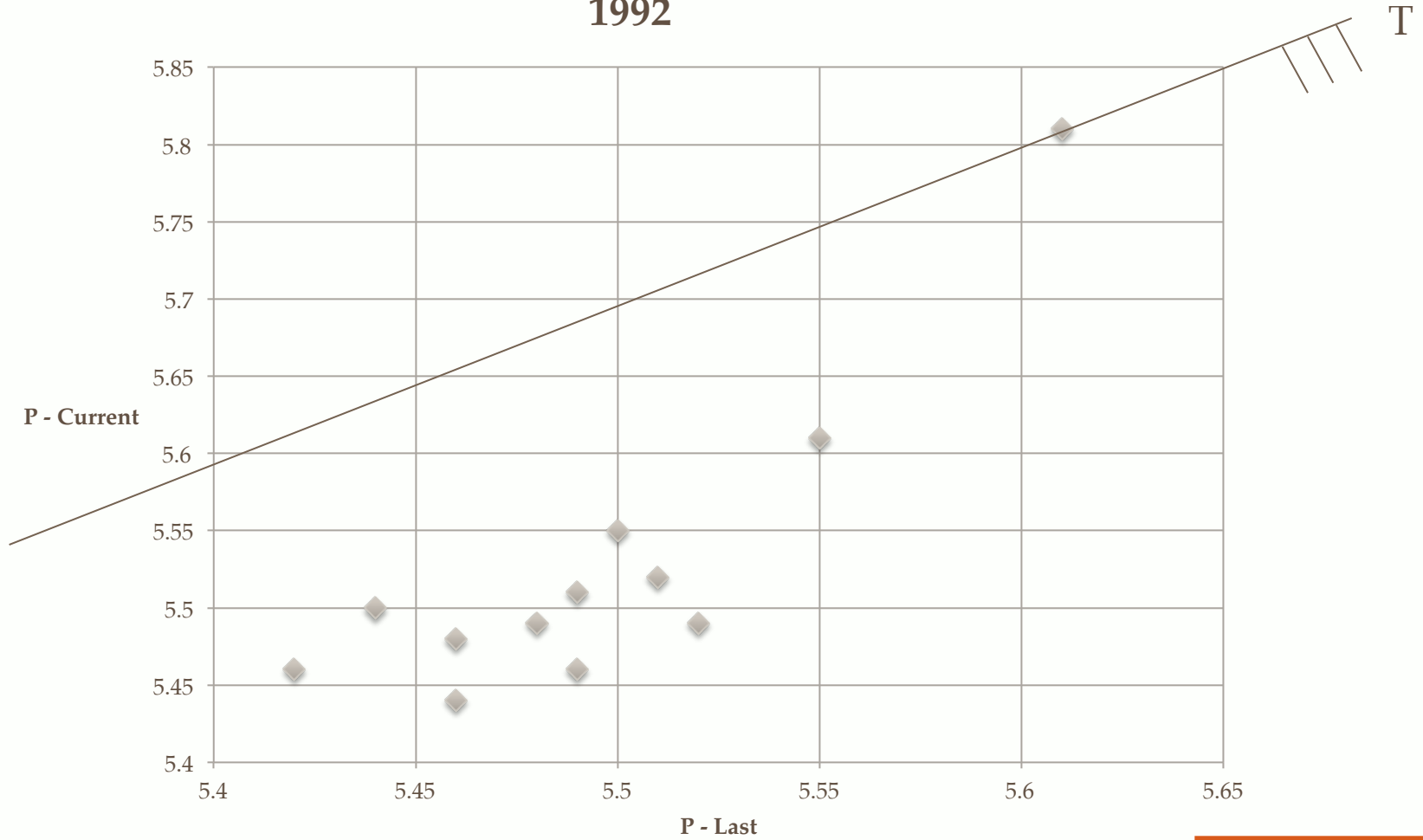
# Application – Single Year

1992		
	$P_L$	$P_C$
	$X$	$Y$
1	Dec	Jan
·		
·		
·		
12	Nov	Dec

Month	Last	Current
1/1/92	5.42	5.46
2/1/92	5.46	5.48
3/1/92	5.48	5.49
4/1/92	5.49	5.51
5/1/92	5.51	5.52
6/1/92	5.52	5.49
7/1/92	5.49	5.46
8/1/92	5.46	5.44
9/1/92	5.44	5.5
10/1/92	5.5	5.55
11/1/92	5.55	5.61
12/1/92	5.61	5.81

# Application - 1992

1992

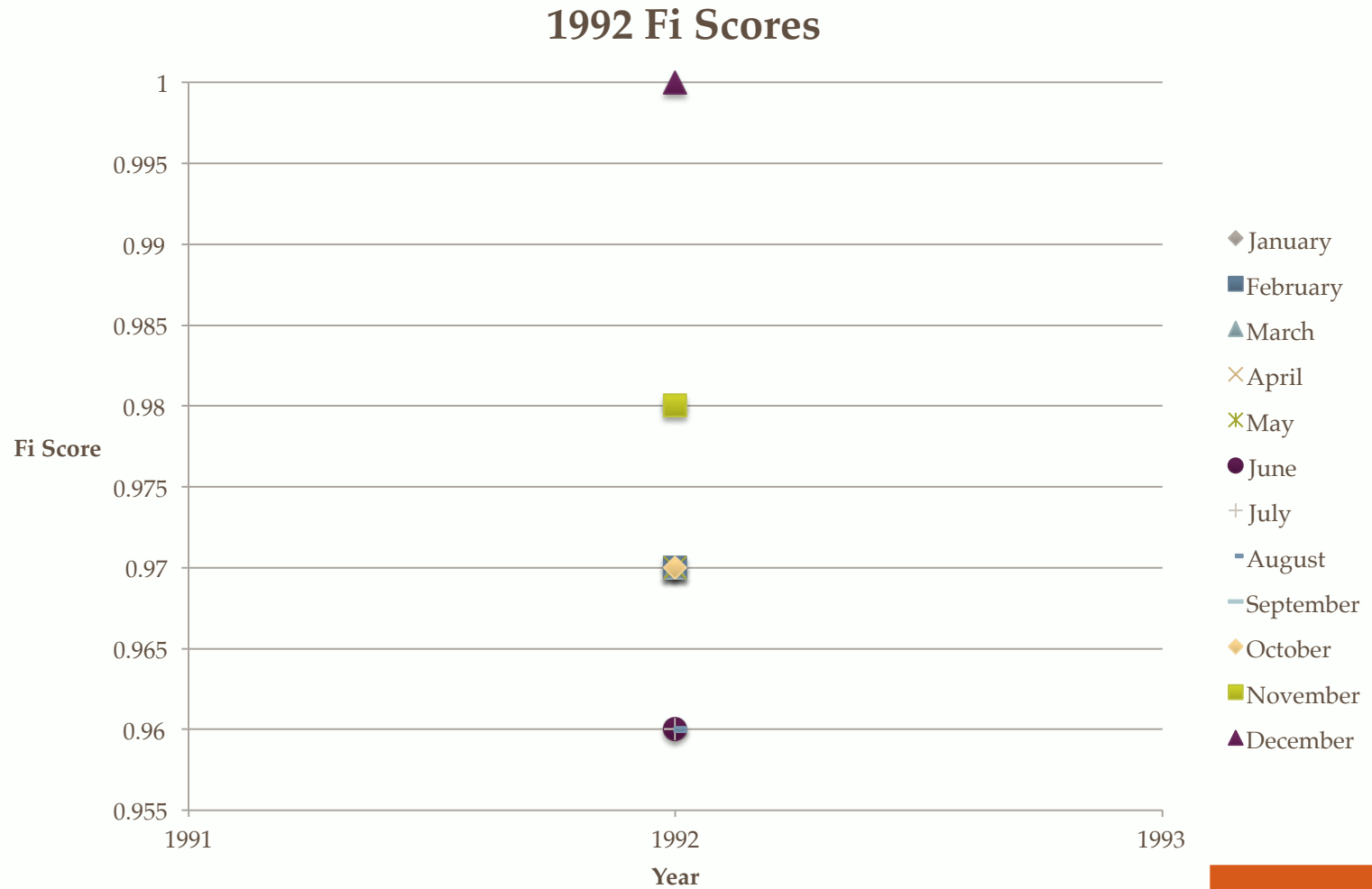




# Application - 1992

Months	Last	Current	Fi
1/1/92	5.42	5.46	0.97
2/1/92	5.46	5.48	0.97
3/1/92	5.48	5.49	0.97
4/1/92	5.49	5.51	0.97
5/1/92	5.51	5.52	0.97
6/1/92	5.52	5.49	0.96
7/1/92	5.49	5.46	0.96
8/1/92	5.46	5.44	0.96
9/1/92	5.44	5.5	0.98
10/1/92	5.5	5.55	0.97
11/1/92	5.55	5.61	0.98
12/1/92	5.61	5.81	1

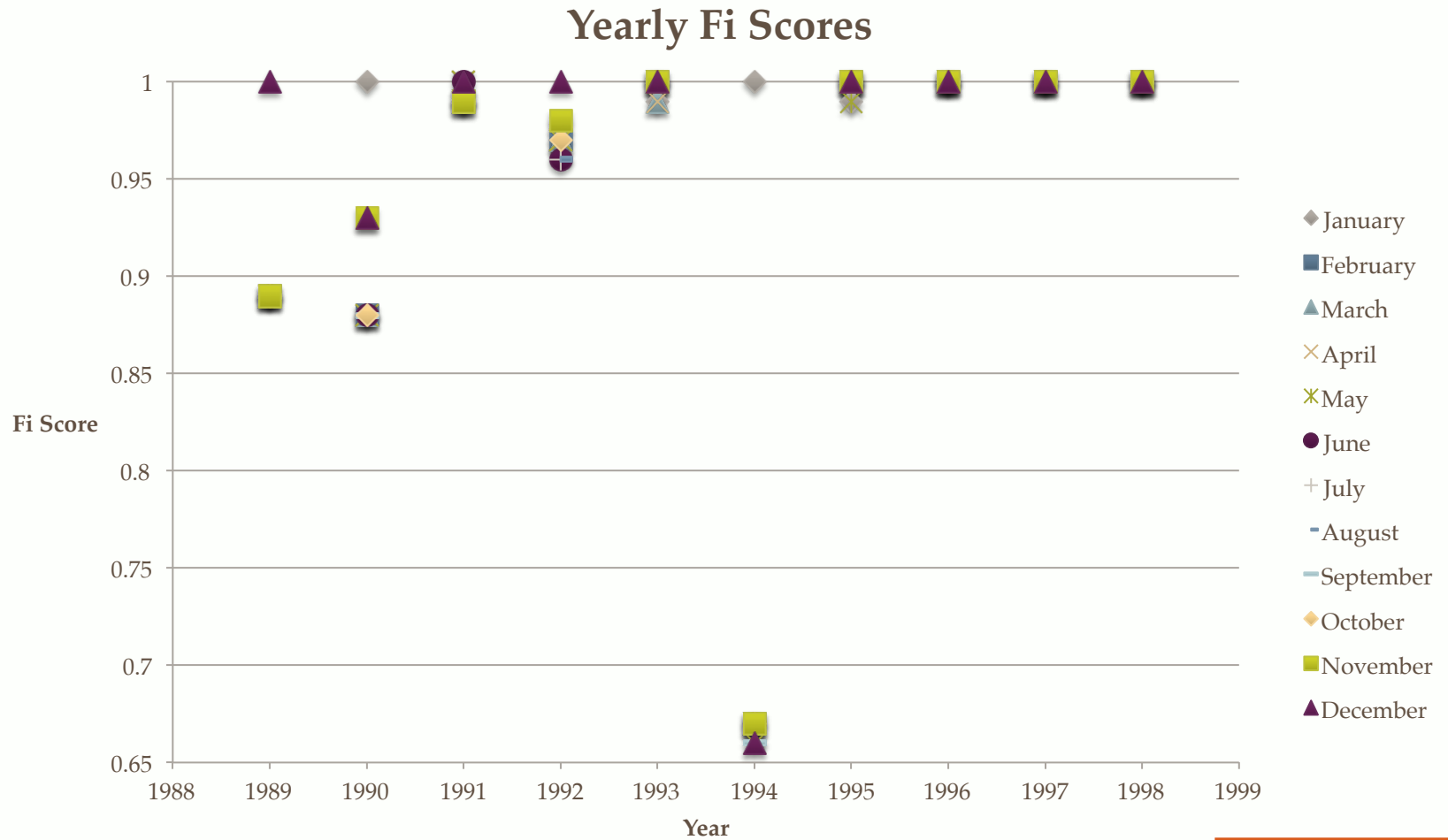
# Application - 1992



# Application – 1989 to 1998

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
January	0.89	1	0.99	0.97	0.99	1	0.99	1	1	1
February	0.89	0.88	0.99	0.97	1	0.67	1	1	1	1
March	0.89	0.88	0.99	0.97	0.99	0.67	1	1	1	1
April	0.89	0.88	1	0.97	0.99	0.67	1	1	1	1
May	0.89	0.88	1	0.97	1	0.66	0.99	1	1	1
June	0.89	0.88	1	0.96	1	0.67	1	1	1	1
July	0.89	0.88	0.99	0.96	1	0.67	1	1	1	1
August	0.89	0.88	0.99	0.96	1	0.66	1	1	1	1
September	0.89	0.88	0.99	0.98	1	0.66	1	1	1	1
October	0.89	0.88	0.99	0.97	1	0.67	1	1	1	1
November	0.89	0.93	0.99	0.98	1	0.67	1	1	1	1
December	1	0.93	1	1	1	0.66	1	1	1	1

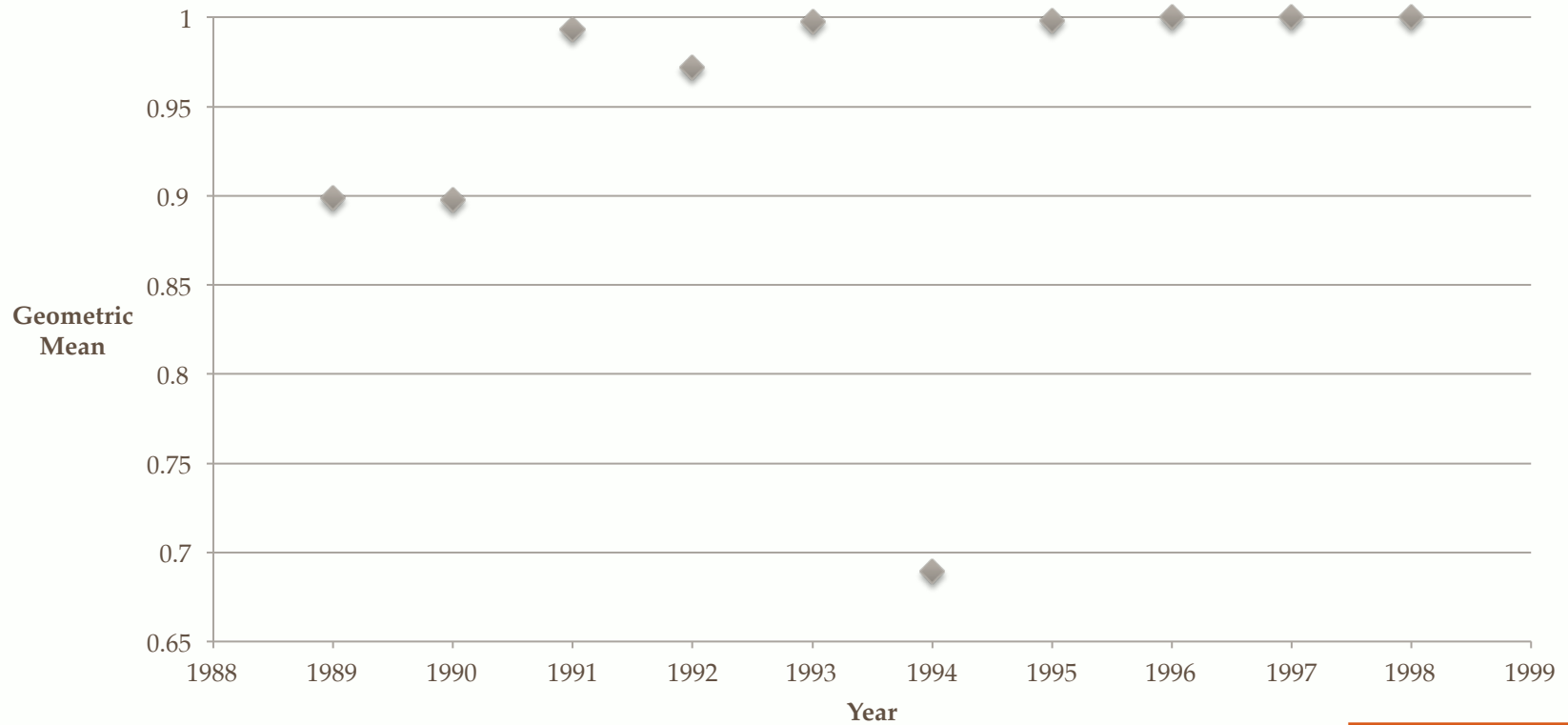
# Application - 1989 to 1998



# Application - 1989 to 1998

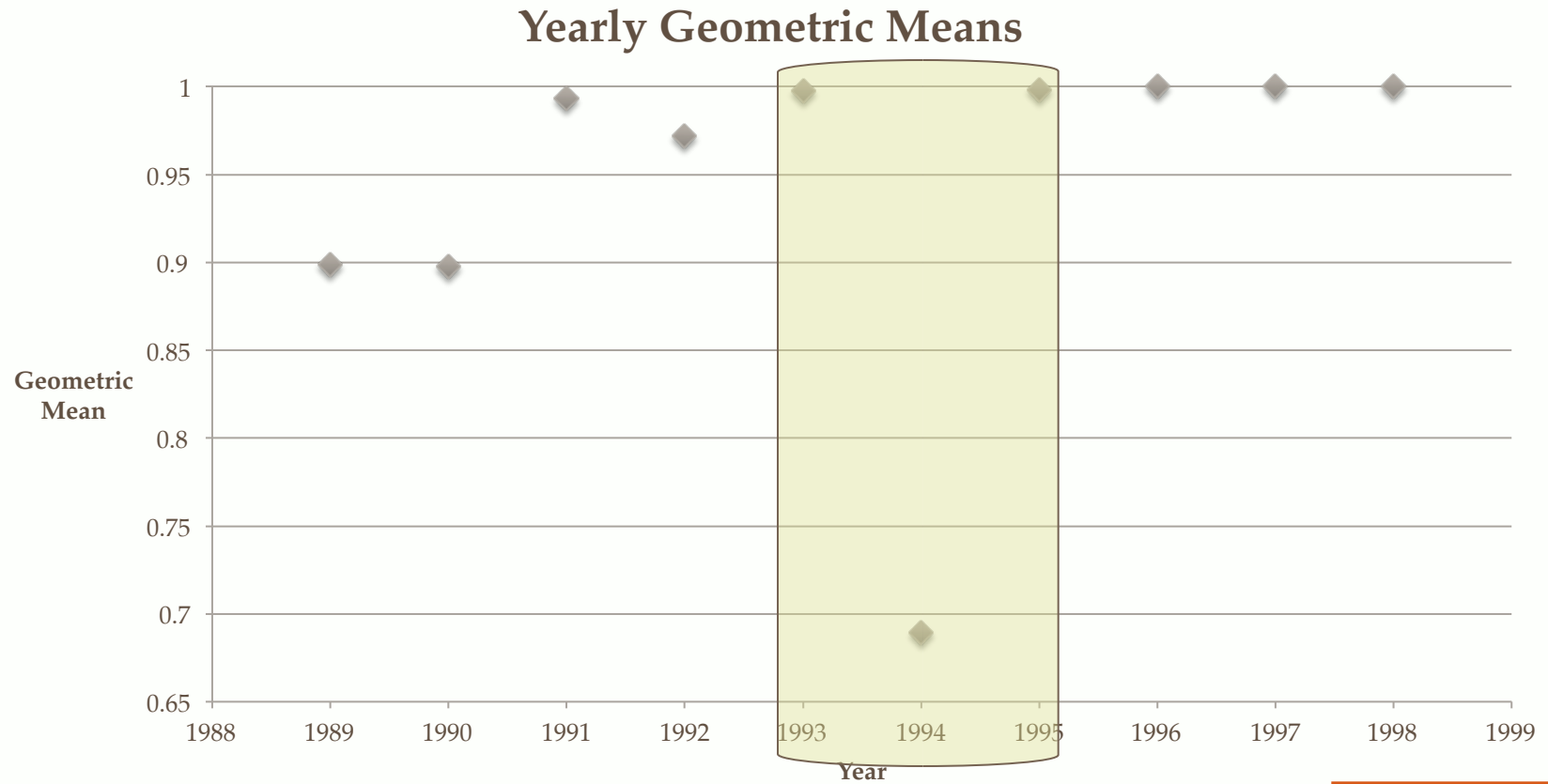
	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
GM	0.89869	0.89765	0.99332	0.97161	0.99749	0.68927	0.99833	1	1	1

## Yearly Geometric Means



# Results

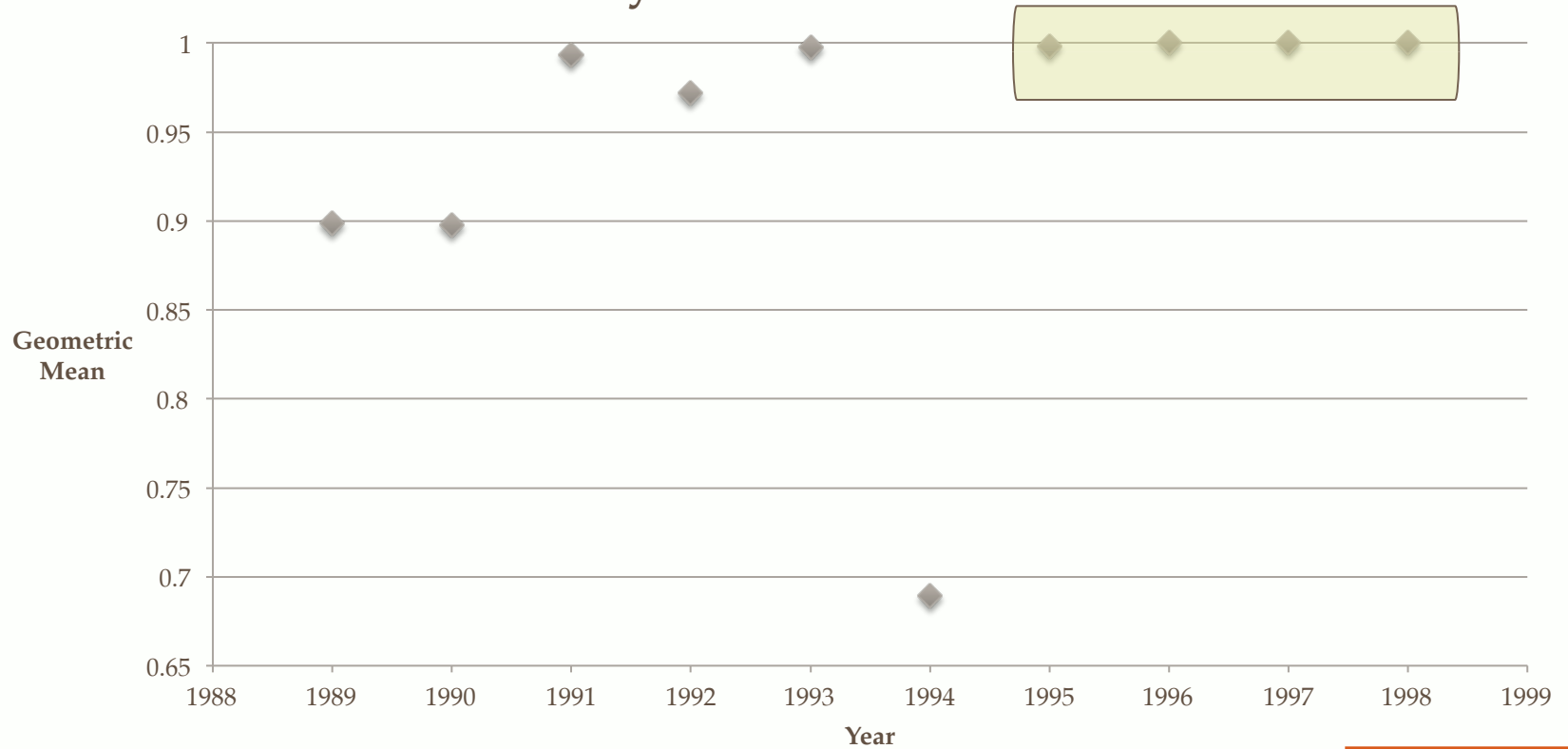
## The shock



# Results

## Stabilization of scores after implementation

### Yearly Geometric Means



# General Volatility Measure

- Canadian Dollar / Euro Parity
  - Floating exchange rate

	Yuan/USD				CAD/Euro				
	1996	1997	1998		2011	2012	2013	2014	2015
January	1	1	1	January	1	0.94	0.95	1	0.9
February	1	1	1	February	0.99	0.95	0.96	0.97	1
March	1	1	1	March	0.95	0.93	0.92	0.98	1
April	1	1	1	April	0.97	0.93	0.96	1	0.96
May	1	1	1	May	0.93	0.95	0.95	1	0.94
June	1	1	1	June	0.99	1	0.96	1	0.94
July	1	1	1	July	0.96	0.94	0.95	1	0.96
August	1	1	1	August	0.97	0.98	0.95	1	0.96
September	1	1	1	September	0.94	0.96	0.94	0.98	0.98
October	1	1	1	October	0.95	0.94	1	1	1
November	1	1	1	November	0.98	0.95	0.97	0.97	0.98
December	1	1	1	December	0.93	0.95	0.92	0.96	0.96
GM	1	1	1	GM	0.96306	0.95147	0.95228	0.98822	0.96458



# General Volatility Measure

- Largest upward change receives  $F_i = 1$
- Upward change  $F_i >$  Downward change  $F_i$  of equal size
- $F_i$  ordered by largest decrease to largest increase

Months	Previous	Current	$F_i$	GM
12/30/15	0.71	0.66	0.9	0.96458
11/30/15	0.69	0.71	1	
10/30/15	0.67	0.69	1	
9/30/15	0.68	0.67	0.96	
8/31/15	0.7	0.68	0.94	
7/30/15	0.72	0.7	0.94	
6/30/15	0.73	0.72	0.96	
5/29/15	0.74	0.73	0.96	
4/30/15	0.73	0.74	0.98	
3/30/15	0.71	0.73	1	
2/27/15	0.7	0.71	0.98	
1/30/15	0.71	0.7	0.96	

# Linear Program Model

$T = \{(x, y) :$

$$\sum_{k=1}^k z_k y_k \geq Y,$$

$$\sum_{k=1}^k z_k x_k \leq X,$$

$$z_k \geq 0, k = 1, \dots, 12\}$$

$$z_1 y_1 + z_2 y_2 + z_3 y_3 + z_4 y_4 + z_5 y_5 + z_6 y_6 + z_7 y_7 + z_8 y_8 + z_9 y_9 + z_{10} y_{10} + z_{11} y_{11} + z_{12} y_{12} \geq Y,$$

$$z_1 x_1 + z_2 x_2 + z_3 x_3 + z_4 x_4 + z_5 x_5 + z_6 x_6 + z_7 x_7 + z_8 x_8 + z_9 x_9 + z_{10} x_{10} + z_{11} x_{11} + z_{12} x_{12} \leq X,$$

$$z_1 \geq 0, z_2 \geq 0, z_3 \geq 0, z_4 \geq 0, z_5 \geq 0, z_6 \geq 0, z_7 \geq 0, z_8 \geq 0, z_9 \geq 0, z_{10} \geq 0, z_{11} \geq 0, z_{12} \geq 0$$

# Works Cited

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