International Economics

Unit 5

Purchasing Power Parity

The **PPP** is based on the “law of one price”

Law of one price: Arbitrage forces will lead to the equalization of goods prices internationally when the price of goods are measured in the same currency

The idea is that, in the long run, exchange rates should equalise prices across countries

For this to happen, three assumptions need to be fulfilled:

- No barriers to trade
- No transport costs
- Perfect competition

-The law of one price applies not only to individual goods but also to identical bundles of goods. Thus, the PPP is the generalisation of the law of one price to a basket of identical goods between two countries.

Absolute version

$$S = \frac{P}{P^*}$$

Relative version

$$\%\Delta S = \%\Delta P - \%\Delta P^*$$

Generalized version

$$P_T = S\,P_{T^*}$$

$$P_I = \alpha P_N + (1-\alpha)P_T \qquad P_{I^*} = \beta P_{N^*} + (1-\beta)P_{T^*}$$

$$\frac{P_I}{P_{I^*}} = \frac{\alpha P_N + (1-\alpha)P_T}{\beta P_{N^*} + (1-\beta)P_{T^*}}$$

$$\frac{P_I}{P_I{}^*} = S \times \left[\frac{\alpha(P_N/P_T) + (1-\alpha)}{\beta(P_{N^*}/P_{T^*}) + (1-\beta)} \right]$$

$$S = \frac{P_I}{P_{I^*}} \times \left[\frac{\beta(P_{N^*}/P_{T^*}) + (1-\beta)}{\alpha(P_N/P_T) + (1-\alpha)} \right]$$

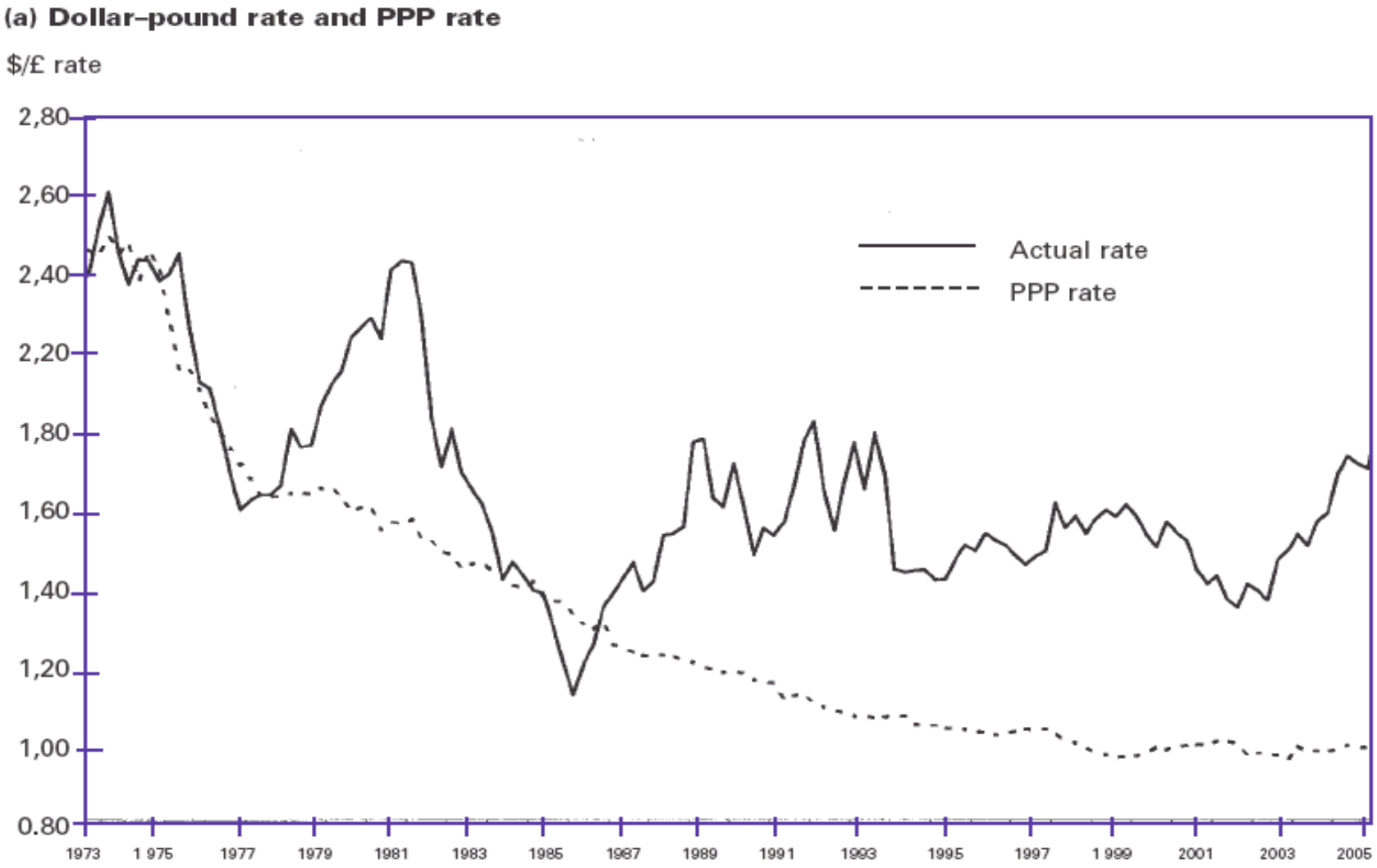
Testing the PPP theory

1. Big Max Index

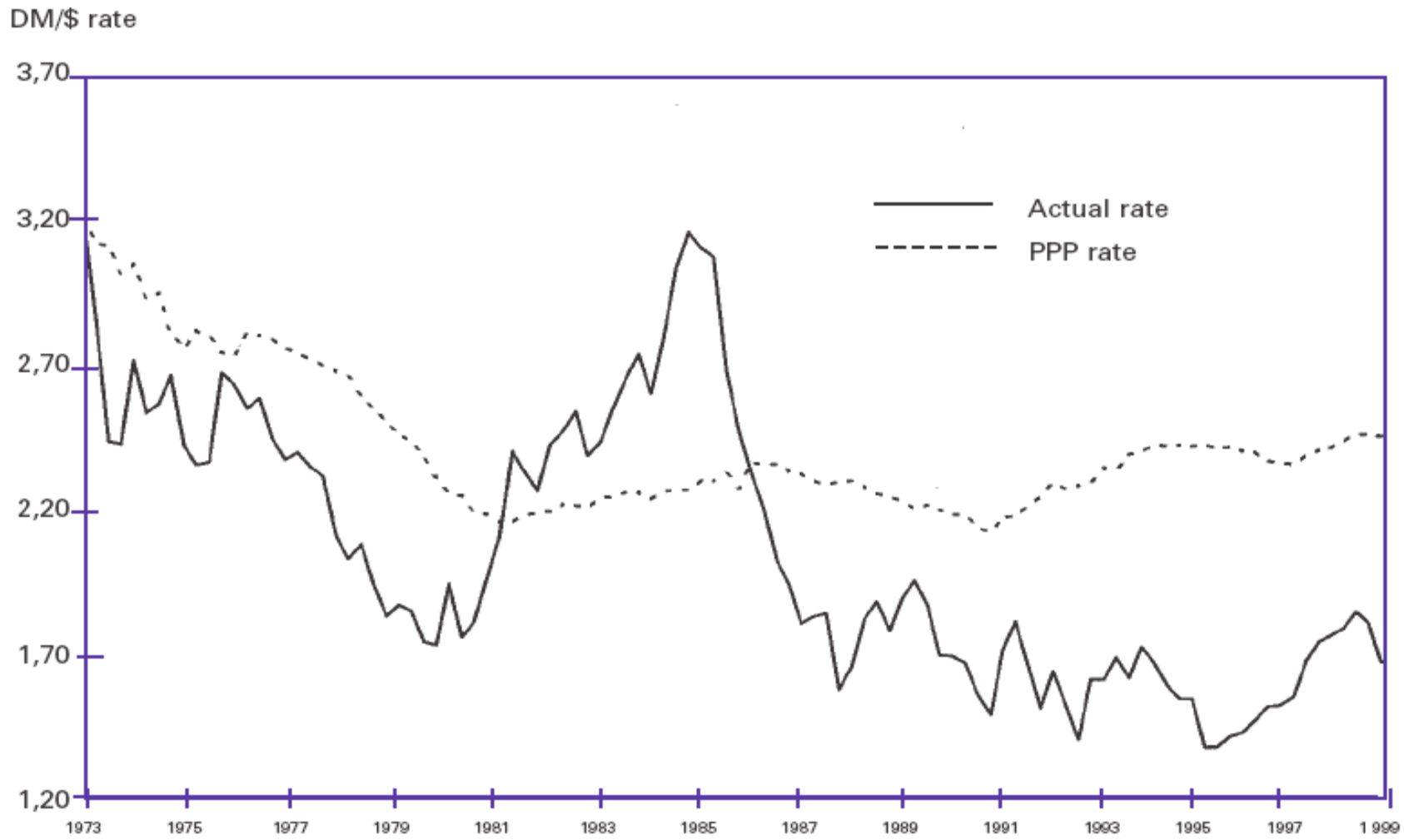
Country	Big Mac prices		Implied PPP of the dollar*	Actual $ exchange rate	Local currency under(–)/over(+) valuation (%)
	in local currency	in dollars			
USA	$2.90	$2.90	–	–	–
Argentina (peso)	4.35	1.48	1.50	2.96	–49
Australia (A$)	3.25	2.27	1.12	1.43	–22
Brazil (real)	5.40	1.70	1.86	3.18	–41
Britain (£)	1.88	3.37	1.54**	1.79	+16
Canada (C$)	3.20	2.33	1.10	1.37	–20
Chile (peso)	1400	2.18	483	642	–25
China (yuan)	10.40	1.26	3.59	8.25	–56
Czech Re (CKr)	56.55	2.13	19.50	26.55	–27
Denmark (DKr)	27.75	4.46	9.57	6.22	+54
Egypt	10.00	1.62	3.45	6.17	–44
Euro Area (€)	2.74	3.28	1.06***	1.20	+13
HongKong (HK$)	12.00	1.54	4.14	7.79	–47
Hungary (forint)	531	2.52	183	210	–13
Indonesia (rupiah)	16,100	1.77	5,552	9,096	–39
Japan (yen)	262	2.33	90.3	112.4	–20
Malaysia (M$)	5.05	1.33	1.74	3.79	–54
Mexico (peso)	24.00	2.08	8.28	11.54	–28
New Zealand (NZ$)	4.35	2.65	1.50	1.64	–9
Peru	9.00	2.57	3.10	3.50	–11
Philippines	69.00	1.23	23.8	56.1	–58
Poland (zloty)	6.29	1.63	2.17	3.86	–44
Russia (rouble)	42.05	1.45	14.5	29.0	–50
Singapore (S$)	3.30	1.92	1.14	1.72	–34
South Africa (rand)	12.40	1.86	4.28	6.67	–36
S.Korea (won)	3,200	2.72	1,103	1,176	–6
Sweden (SKr)	29.90	3.94	10.3	7.59	+36
Switzerland (SFr)	6.30	4.90	2.17	1.29	+68
Taiwan (NT$)	75.10	2.24	25.9	33.5	–23
Thailand (baht)	58.90	1.45	20.3	40.6	–50
Venezuela	4,400	1.48	1,517	2,973	–49

Local currency prices and actual exchange rates are inferred by the author from data presented in *The Economist*. 'Euro Area' is a weighted average price based on the price in the 12 Eurozone countries. * PPP is the local price divided by the price in the United States, ** dollars per pound, *** dollars per euro.
Source: *The Economist*, 27 May 2004.

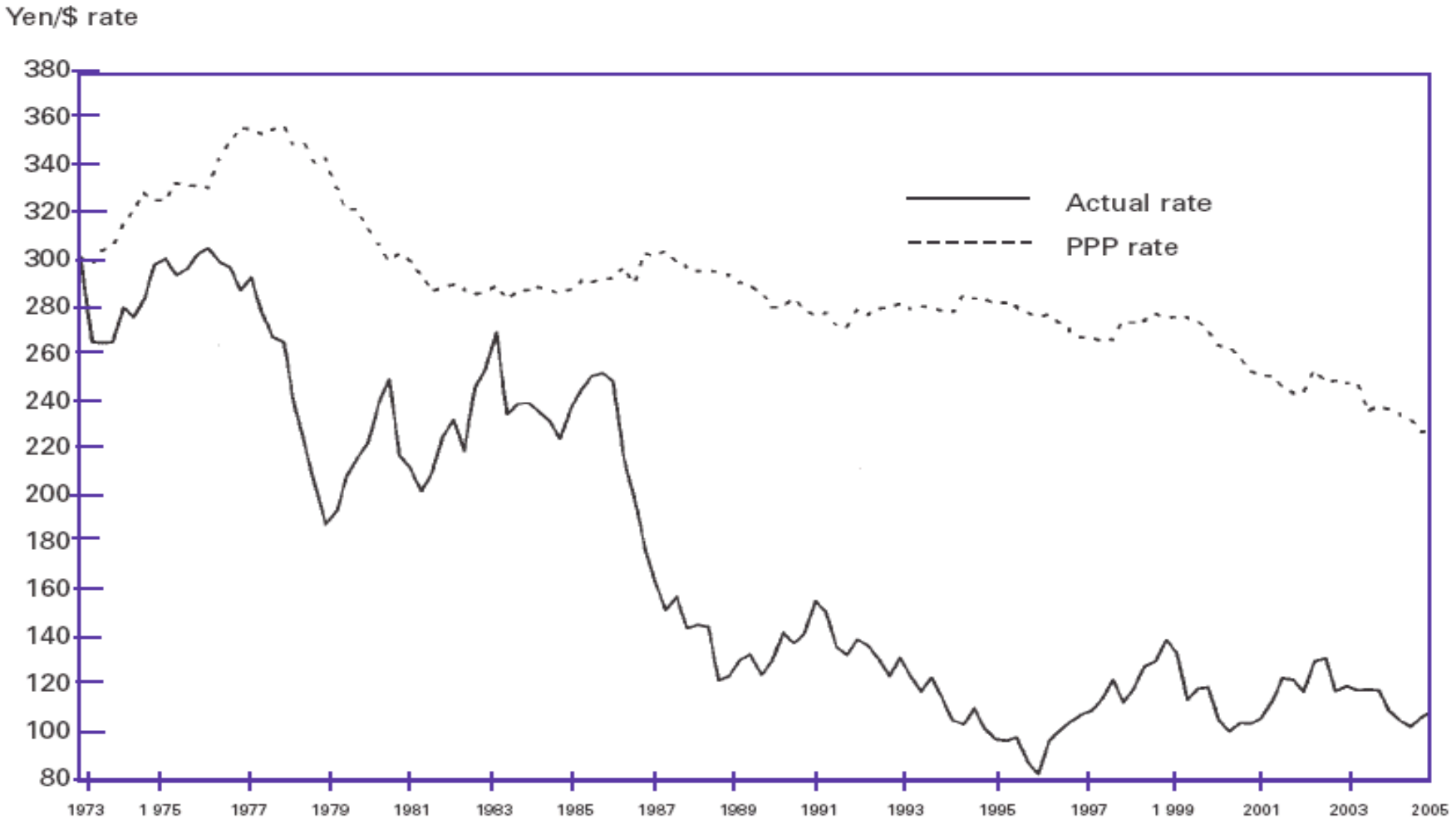
2. Plots: The actual exchange rate and the PPP exchange rate for different currency pairs



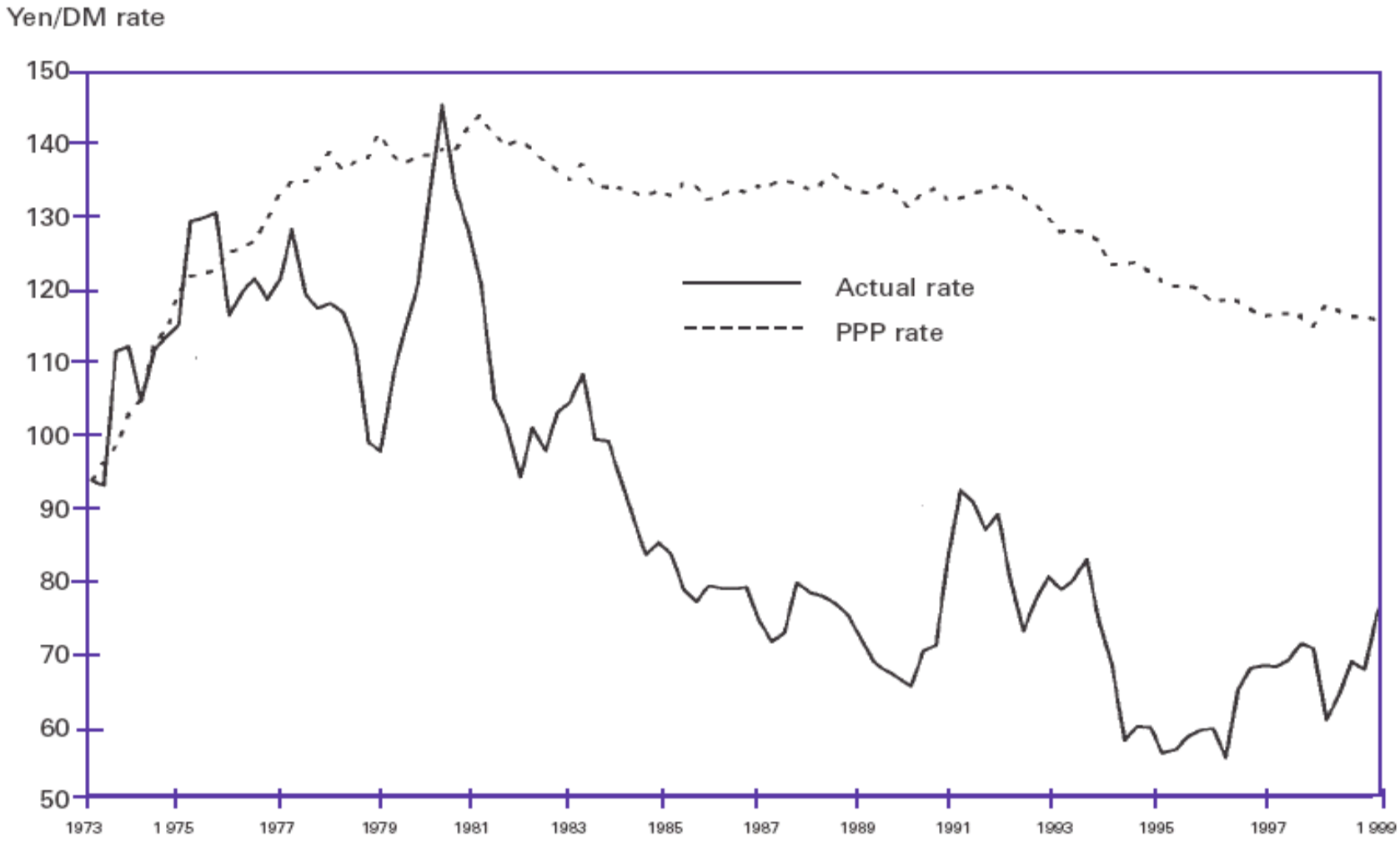
(b) Deutschmark–dollar rate and PPP rate



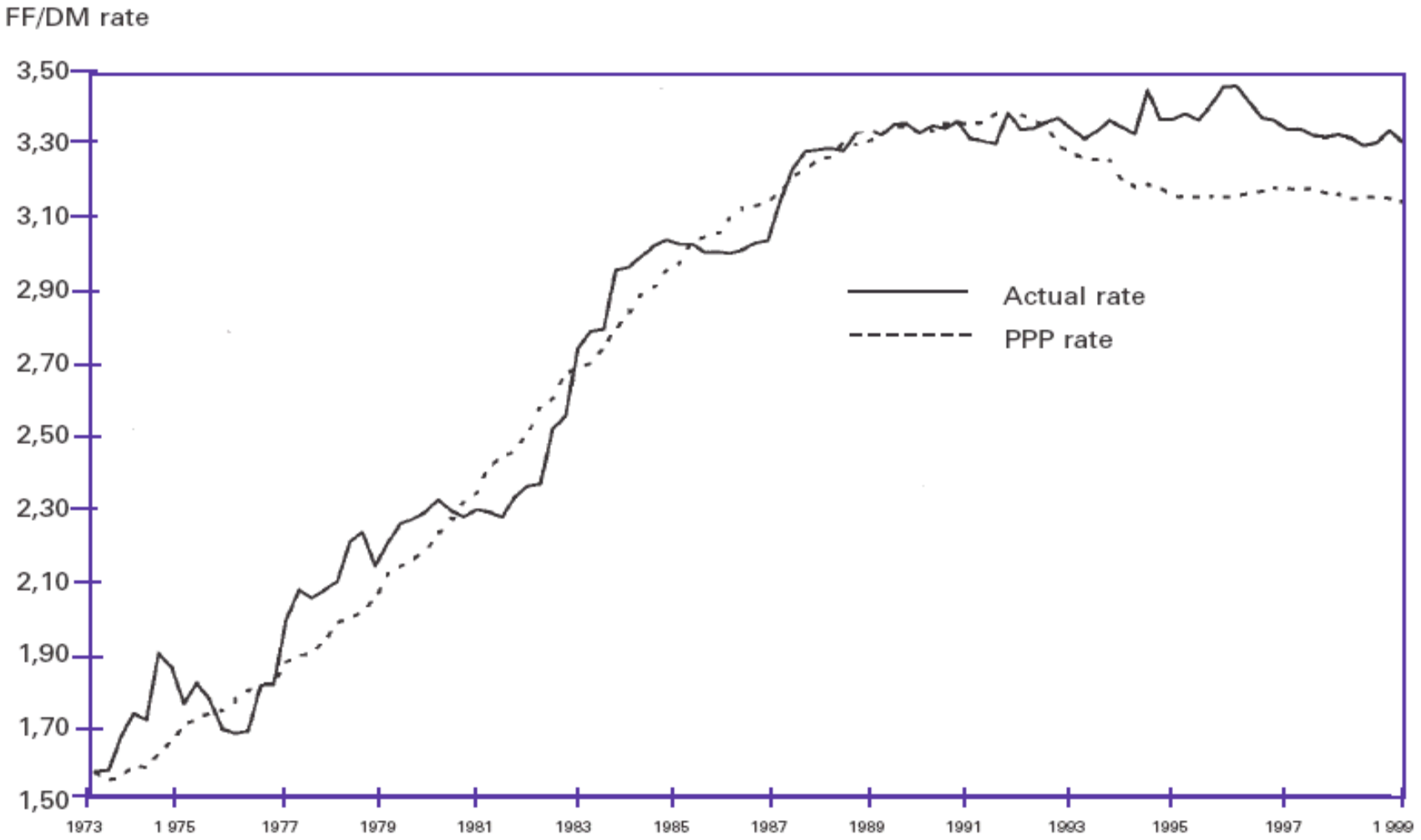
(c) Yen–dollar rate and PPP rate



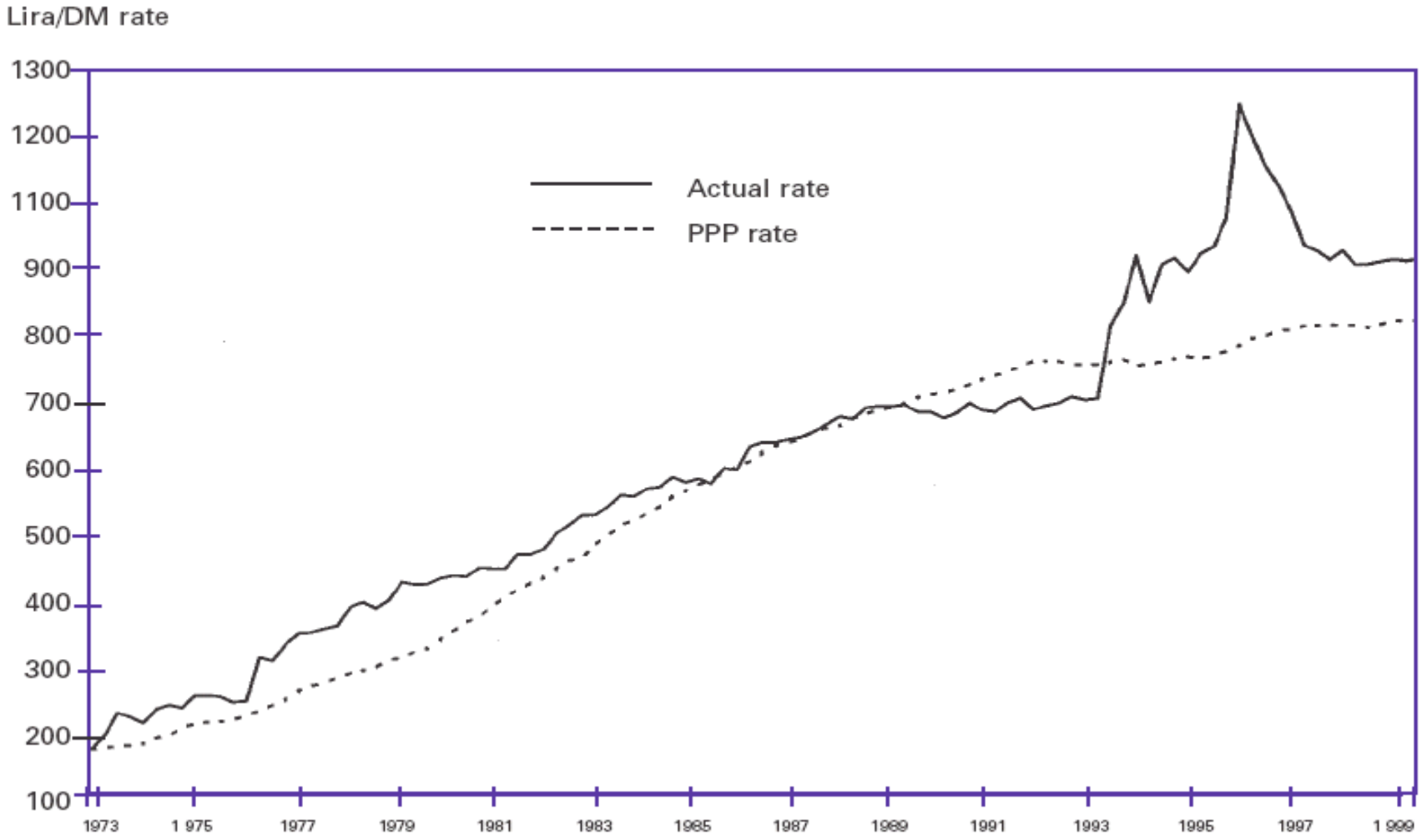
(d) Yen–deutschmark rate and PPP rate



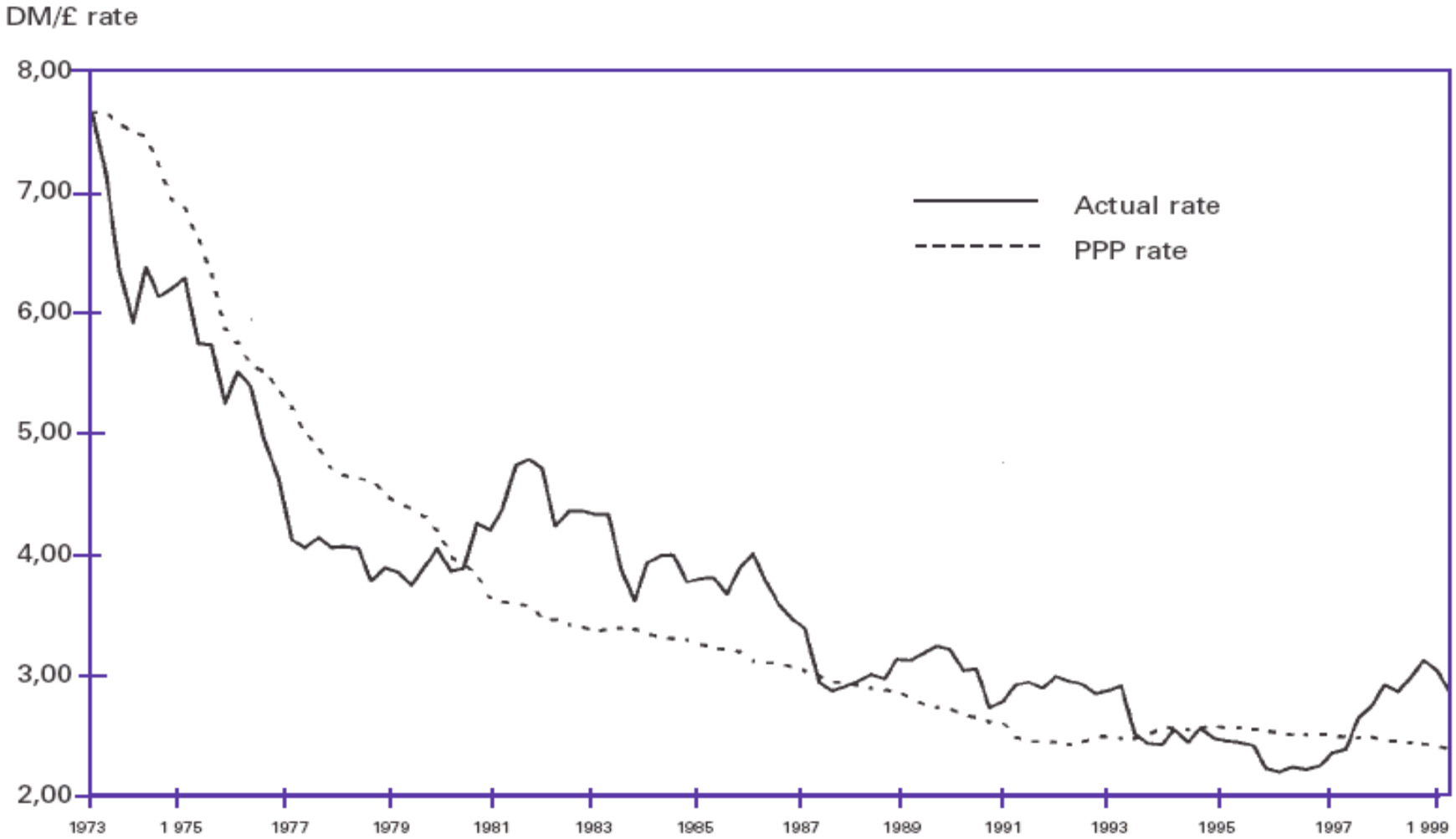
(e) French franc–deutschmark rate and PPP rate



(f) Lira–deutschmark and PPP rate



(g) Deutschmark–pound rate and PPP rate



3. Econometric approach. Relative PPP tests

Rate	Period	Relative PPP $\Delta \ln S_t = a_1 + a_2(\Delta \ln P_{t^*} - \Delta \ln P_t) + u_t$ a_1	a_2	SE	DW
Pound/dollar	73Q1–81Q4	0.01	–0.17	0.050	1.83
		(0.56)	(–0.46)		
	81Q4–90Q3	0.00	–0.21	0.059	1.85
		(0.03)	(–0.26)		
	73Q1–90Q3	0.00	–0.01	0.054	1.87
		(0.41)	(–0.04)		
Deutschmark/dollar	73Q1–81Q4	0.00	0.53	0.069	1.79
		(–0.25)	(0.89)		
	81Q4–90Q3	–0.01	0.48	0.062	1.96
		(–0.76)	(0.59)		
	73Q1–90Q3	–0.01	0.46	0.064	1.88
		(–0.80)	(1.00)		
Yen/dollar	73Q1–81Q4	0.00	0.82	0.051	1.94
		(–0.43)	(1.82)		
	81Q4–90Q3	0.01	2.79	0.063	2.01
		(0.93)	(3.67)		
	73Q1–90Q3	0.00	1.22*	0.058	1.95
		(–0.26)	(3.15)		
Lira/dollar	73Q1–81Q4	0.01	0.68*	0.053	1.99
		(0.74)	(2.25)		
	81Q4–90Q3	–0.01	0.78*	0.055	1.90
		(–0.70)	(1.07)		
	73Q1–90Q3	0.00	0.73*	0.055	1.98
		(–0.05)	(2.36)		
French franc/deutschmark	73Q1–81Q4	0.00	0.77*	0.034	1.89
		(0.21)	(1.29)		
	81Q4–90Q3	0.00	0.76*	0.021	1.91
		(0.59)	(1.35)		
	73Q1–90Q3	0.00	0.71*	0.027	2.00
		(0.53)	(1.90)		
Lira/deutschmark	73Q1–81Q4	0.01	0.51*	0.054	1.80
		(1.32)	(1.64)		
	81Q4–90Q3	0.00	0.55*	0.017	1.88
		(0.56)	(2.39)		
	73Q1–90Q3	0.00	0.68*	0.040	1.79
		(0.87)	(3.51)		
Pound/deutschmark	73Q1–81Q4	0.01	0.16	0.057	1.95
		(0.91)	(0.39)		
	81Q4–90Q3	–0.01	1.32*	0.045	1.97
		(–0.71)	(2.63)		
	73Q1–90Q3	0.01	0.40	0.051	1.96
		(0.83)	(1.32)		
Yen/deutschmark	73Q1–81Q4	0.00	0.90*	0.061	1.99
		(–0.25)	(1.84)		
	81Q4–90Q3	0.00	1.18*	0.039	1.97
		(0.10)	(2.81)		
	73Q1–90Q3	0.00	0.93*	0.050	1.99
		(–0.15)	(2.78)		

Notes: Hypothesis is $a_2 = 1$. An asterisk by a variable indicates that it is both of the correct sign and statistically equal to its hypothesized value. The *t*-statistics are in parentheses.
Source: Author's own estimates.

The Balassa-Samuelson model

$$P_N = W_N/Q_N \quad \text{and} \quad P_T = W_T/Q_T$$

$$P_{N^*} = W_{N^*}/Q_{N^*} \qquad P_{T^*} = W_{T^*}/Q_{T^*}$$

$$W_N = W_T \quad \text{and} \quad W_{N^*} = W_{T^*}$$

$$Q_{T^*} > Q_T \quad \text{and} \quad Q_{N^*} = Q_N$$

$$S = P_T/P_{T^*}$$

$$\frac{P_N}{P_T} = \pi \qquad \frac{P_{N^*}}{P_{T^*}} = \pi^* \qquad \pi^* > \pi$$

$$\frac{SP_{N^*}}{SP_{T^*}} = \pi^* \qquad SP_{N^*} > P_N$$