

ORIGINAL ARTICLES

Shifts in Exchange Rate Regimes and Inflation Persistence in Vietnam, 1992–2010

Nguyen Tran Phuc, Nguyen Duc Tho, Jen Je Su and Tarlok Singh

A number of studies have found that more flexible exchange rate regimes tend to be associated with greater inflation persistence. This paper investigates whether this finding is applicable to Vietnam from 1992 to 2010. We find no evidence to suggest that inflation persistence in Vietnam was systematically higher under a “soft” peg exchange rate regime than under a “hard” peg. Rolling regressions suggest that inflation persistence peaked during 2004 to 2007, when Vietnam was governed by what may be characterized as a hard-peg regime.

Keywords: Exchange rate regime, inflation persistence, hard-peg, soft-peg, transitional economies, Vietnam.

I. Introduction

Are flexible exchange rates bad for controlling inflation? Do they perpetuate inflation persistence? Economic theory and intuition would appear to suggest that the answer to this question is “yes”. It is generally accepted that inflation will be more persistent if monetary policy is more accommodative in responding to price shocks (Dornbusch 1982, p. 161). Therefore, a “credible lack of accommodation” is often seen as a key requirement for low inflation persistence (Alogoskoufis and Smith 1991, p. 1272). It has been suggested that a pegged exchange rate regime may help to lower the degree of monetary

accommodation. This is because, “exchange rate pegs act as a disciplining device, allowing policy-makers in countries with a high inflation propensity to import credibility and, hence, lower inflation from abroad” (Husain, Mody and Rogoff 2005, p. 45, citing Giavazzi and Giovannini 1989; Dornbusch 2001).

Yet the above reasoning depends critically on the assumption that, in practice, pegged regimes will result in lower monetary accommodation. However, empirical evidence to support this assumption has been mixed. In fact, evidence to support the *overall* relationship between exchange rate regimes and inflation persistence has been

mixed (see, for example, Alogoskoufis and Smith 1991; Anderton 1997; Bleaney 2000; Bleaney and Francisco 2005). Adding to the difficulty in obtaining definitive conclusions about this relationship is the fact that the choice faced by policy-makers is typically not between a perfect float and an immoveable peg. Instead, they have to choose among several forms of a managed float system or between “softer” and “harder” versions of an exchange rate peg.

This uncertainty over the effects of the various types of exchange rate regimes on inflation is of particular importance to Vietnam. Ever since Vietnam began its transition to a market economy (beginning in the latter part of the 1980s), it has undergone a number of shifts in exchange rate regimes. It has also experienced a wide range of inflation rates, from hyperinflation during the early years of the reform process, to moderate inflation during most other years including deflation or minimal inflation over a couple of years and, in recent years, rates of inflation that were high enough to cause widespread concern among the general public.

If it is true that inflation persistence tends to decrease under a less flexible exchange rate regime, the authorities’ apparent preference for a stable VND/USD exchange rate over approximately the last couple of decades (Nguyen Tran Phuc and Nguyen Duc Tho 2009, p. 145) may be justified. In contrast, if there is no clear association between shifts in the exchange rate regime and inflation persistence, arguments underlying official resistance to calls for greater exchange rate flexibility would appear very weak (see, for example, IMF 2005, p. 14; IMF 2007, p. 15; Nguyen Thi Thu Hang et al. 2010, p.22).

In this paper, we investigate the possible links between exchange rate regime shifts and inflation persistence in Vietnam from 1992 to 2010. In so doing, we follow an approach previously adopted by Alogoskoufis and Smith (1991), Alogoskoufis (1992), Anderton (1997) and Huang and Gu (2007). Our findings may be of interest not only to Vietnam, but also to other developing countries faced with similar policy choices.

The rest of this paper is organized as follows: section II contains background information and a brief review of previous findings in this area. Section III describes our methods of analysis and the data used, and section IV reports our main findings. Finally, section V summarizes the analysis and provides a brief discussion of its wider implications.

II. Background and Previous Findings

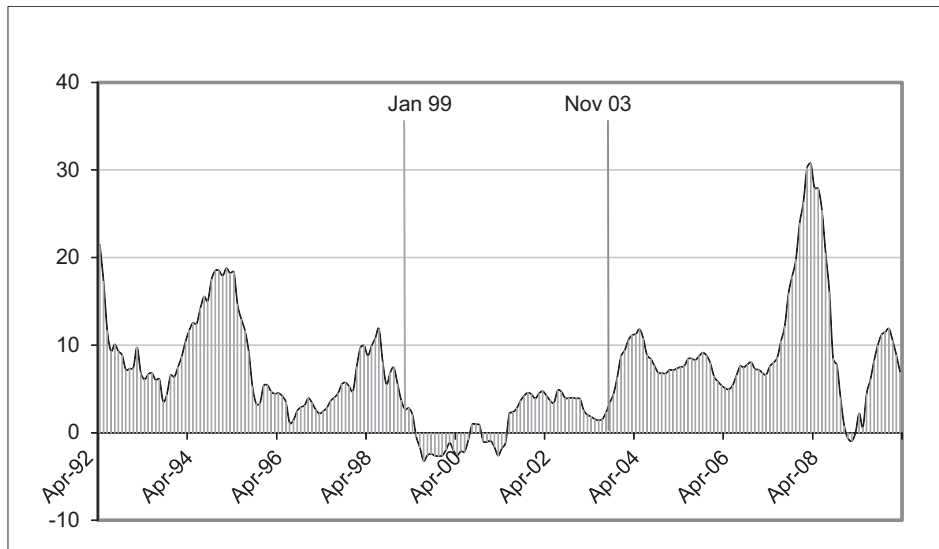
II.1 Vietnam’s Inflation Experiences

Vietnam underwent several years of hyperinflation during the mid-1980s; at its peak, in 1986, inflation was as high as 454 per cent per annum (IMF 2008). By 1993, however, inflation had been sharply reduced to single-digit levels, as shown in Figure 1. Figure 1 also shows that inflation was kept largely under control from 1996 to 2003. Indeed, 2000 and 2001 even saw slight deflation, deemed by some as a lagged effect of the 1997–98 Asian Financial Crisis (AFC) (Le Quoc Ly 2005, p. 141). Since 2004, inflation has again risen, reaching 23 per cent (year-on-year basis) in 2008. Inflation has since subsided, but has remained relatively high by international standards.

In Vietnam, inflation is measured by the rate of change in the consumer price index (CPI), which is the only official measure of the general price level available to the public.¹ As indicated in Table A1 (see Appendix), the CPI basket comprises essentially three main groups of consumer goods and services: (i) food and foodstuff; (ii) housing and construction materials; and (iii) transport, post and telecommunications. Of these, the food and foodstuff group has the largest weightage (40 per cent). An independent study also reports that expenditure on food and foodstuff makes up about 50 per cent of total consumption expenditure (Tran The Sao 2010, p. 58). This explains why the CPI closely tracks the price levels of food and foodstuff (see Figure A1 in the Appendix).

For our purposes, it is useful to separate Vietnam’s inflation experience during the study period (1992–2010) into three sub-periods (see

FIGURE 1
Inflation Rate (%), January 1992–June 2010



NOTE: Inflation rate is calculated as the annualized percentage rate of change over the previous month of the seasonally adjusted consumer price index. The monthly variations have been smoothed via a centred 7-term moving average.
SOURCE: IMF, IFS (online); Nguyen Van Tien (2002, p. 272); SBV; GSO.

Figure 1). During the first sub-period (1992–98), the annual inflation rate, which had sharply reduced from hyperinflation in the latter part of the 1980s to 17.6 per cent in 1992, began to fluctuate around an average level of about 8 to 9 per cent. Much of the credit for this disinflation can be attributed to structural and institutional adjustments, which began in the late 1980s, and a continuous commitment to a tight monetary policy (Nguyen Tran Phuc and Nguyen Duc Tho 2009, p. 147). According to the International Monetary Fund (IMF) (1996, pp. 2, 26), inflation dynamics during much of this first sub-period can be broadly explained by variations in the growth rate of the money supply, with natural disasters and increases in world prices of staples also playing important roles.

The second sub-period, 1999–2003, featured low and fairly stable inflation. There was even

slight deflation during 2000 and 2001, an aftermath of the AFC (Le Quoc Ly 2005, p. 141). Growth in aggregate demand, especially export and investment demand, slowed considerably. In response, the authorities allowed growth in the money supply and credit availability to increase rapidly, especially in 1999 and 2000 (see Figure A2 in the Appendix). Despite this expansionary policy stance, economic growth during the second sub-period (1999–2003) was weaker than during the first sub-period (1992–98) and the third sub-period (2004–10). Weaker economic growth tended to dampen inflation, thus weakening the usual links between rapid monetary growth and high inflation.

During the third sub-period (2004–10), economic growth returned to a fairly strong pace (averaging around 7 per cent per annum) and inflation increased to an average of around 11 per cent

per annum, peaking at 23 per cent in 2008. The authorities tended to blame supply shocks, such as avian flu outbreaks and bad weather, as significant causes of the resurgence in inflation (Camen 2006, p. 235). However, even after these shocks subsided, inflation remained high. An alternative explanation is that rises in world prices (such as oil prices) were to blame. Yet other countries also endured the same increases in world prices, and many ended up with lower inflation rates than Vietnam's. Indeed, Vu Quang Viet (2009, p. 401) and the IMF (2006, p. 11) argue that movements in world oil prices would have had a smaller inflationary effect on Vietnam than on comparable countries, due to its administered pricing and proportionately lower levels of petroleum consumption. A more plausible explanation is that the high inflation had its roots in the rapid growth of monetary and credit aggregates which continued over several consecutive years in pursuit of high GDP growth rates (Vu Quang Viet 2004; 2009, p. 390).² In line with this interpretation,

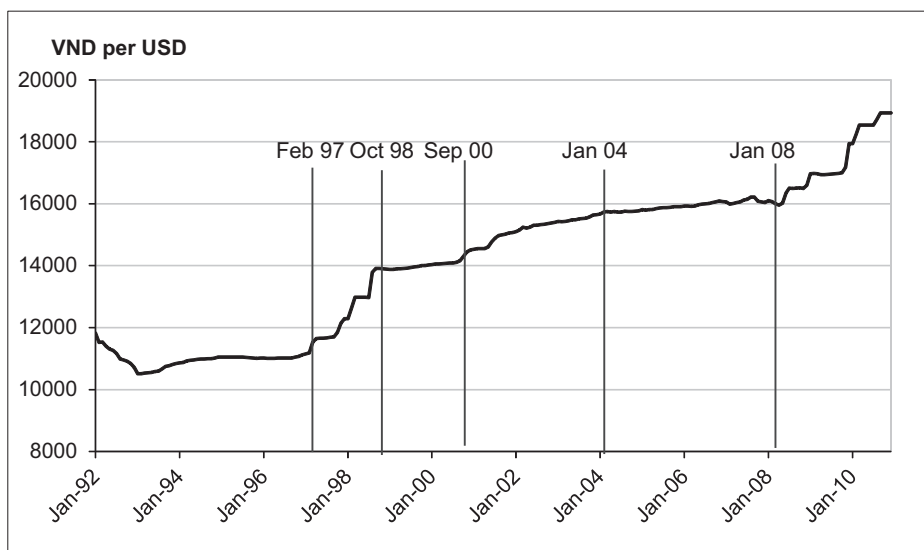
inflationary pressures began to abate soon after the State Bank of Vietnam (SBV) decided to adopt a tightening policy in May to June 2008.

II.2 Vietnam's Exchange Rate Regimes

The bilateral VND/USD exchange rate is the main focus of Vietnam's exchange rate policy and of transactions in the country's foreign exchange market (this is notwithstanding the rise in the market share of transactions involving other bilateral rates in recent years). As Figure 2 shows, the VND/USD has followed a general upward trend (indicating the depreciation of the VND) over the past two decades, but was relatively flat for long periods of time: 1992–96; 1999–2000; and 2004–07.

The exchange rate regime has undergone major changes, evolving from a system of multiple exchange rates (which had been in existence for a number of years prior to the country's reunification

FIGURE 2
Nominal VND/USD Exchange Rate, January 1992–June 2010



NOTE: Data shown are for monthly averages.

SOURCE: IMF, IFS (online).

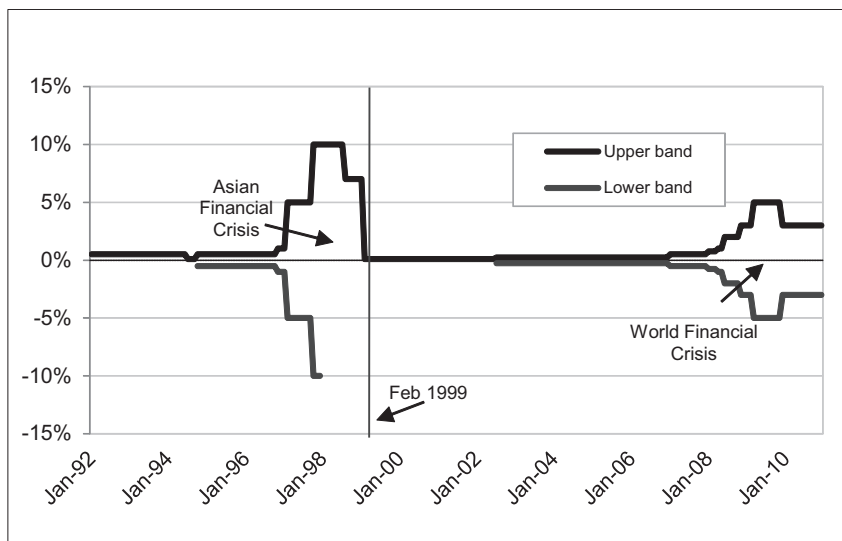
in 1975) to a single (but adjustable) pegged rate in 1989. Since then, the system has comprised an announced official exchange rate and a band of permissible deviations from this rate. Market participants are supposed to trade within this band only. The official exchange rate has been announced on a daily basis since around 1992. As shown in Figure 3, the trading band was quite narrow (less than ± 1 per cent of the announced rate) for most of the study period, with the notable exceptions of the period 1997–99, corresponding to the AFC, and the period 2008–09, corresponding to the more recent Global Financial Crisis (GFC).

II.3 Previous Findings in the International Literature

Alogoskoufis and Smith (1991, p. 1260) analyse annual data for the United States and the United Kingdom and find that inflation persistence was

significantly lower under gold-based, fixed-exchange-rate regimes (from 1948 to 1967) than under managed-exchange-rate regimes (from 1968 to 1987). In a separate study, Alogoskoufis (1992, p. 472) compares two periods, 1953–71 and 1972–87, for twenty-one OECD economies and finds that a similar conclusion applies to twenty of the countries examined. Similarly, Obstfeld (1995, p. 159) compares the periods 1953–72 and 1973–94 for twelve OECD countries, and finds that inflation persistence was higher under floating regimes (i.e., the latter period) for all of the countries studied except the United States.³ More recently, Huang and Gu (2007, pp. 1839, 1840) adopted the approach used by Alogoskoufis and Smith (1991) and Alogoskoufis (1992) to analyse data for China during 1991 to 2006, and report that they have found evidence suggesting that shifts to a more flexible exchange rate regime will induce a rise in inflation persistence.

FIGURE 3
Allowable Variations around Official Exchange Rate
January 1992–June 2010



NOTE: There was no stipulated lower band for the periods Jan 92–Sept 94 and Jan 98–Jun 02.
SOURCE: Various Decisions by the SBV from 1989 to 2010.

The main thrust of the above findings has been challenged by a number of authors. For example, using a model similar to that of Alogoskoufis and Smith (1991), Anderton (1997, pp. 28–31) examines inflation dynamics in a number of countries that were members of the European Exchange Rate Mechanism (ERM) and compares their experiences with those of selected non-ERM countries during the years 1970 (Q1) to 1992 (Q3). Anderton concludes that the adoption of less accommodative policies played a crucial role in reducing inflation persistence, but also that “membership of the ERM is not necessary or sufficient for achieving this objective” (Anderton 1997, p. 33).

Bleaney (2000, p. 393) argues that allowances should be made for possible shifts over time in the mean inflation rate, which can have a substantial impact on the estimates of inflation persistence. After controlling for this, he finds no evidence of higher inflation persistence from 1984 to 1999 in eight developed countries with floating rates, compared to seven countries, which were either members of the European Monetary System (EMS) or had their currencies pegged. He also reports that he found no evidence that monetary policy in OECD countries became more accommodative under floating exchange rate regimes.

Burdekin and Siklos (1999, p. 236) suggest that attributing the post-1967 shift in inflation persistence to changes in the exchange rate regimes (i.e., the very claims made by Alogoskoufis and Smith [1991]) may be an overstatement of the impact of exchange rate regimes. Burdekin and Siklos (1999, p. 240) point out that other factors—such as wars, oil price shocks, and central bank reforms—could also account for changes in inflation persistence.

Conventionally, a fixed regime is said to induce greater fiscal discipline which, in turn, may result in lower inflation persistence. However, Tornell and Velasco (1998, pp. 2, 3; 2000, p. 400) argue that making the choice to adopt a fixed exchange rate regime alone may not help to provide fiscal discipline. If a central bank has only imperfect credibility or limited independence, the selection of an exchange rate regime would be a mere

representation of the “choice of when to collect the inflation tax” (Tornell and Velasco 1998, p. 26). Under a fixed regime, the costs of imprudent fiscal policies (in the form of higher inflation rates) are simply delayed, and left to emerge in the future. In contrast, under a flexible regime, these costs arise immediately through movements in the exchange rate and are spread across time. Thus, Tornell and Velasco (1998, p. 26; 2000, p. 430) suggest that the adoption of a fixed regime to make up for the initial absence of fiscal discipline will not guarantee the introduction or reinforcement of greater fiscal discipline. Instead, a flexible regime may help to achieve this objective because these costs have to be paid upfront. Empirically, Tornell and Velasco (1998, pp. 21, 22) find that the mean improvement in fiscal balance under money-based stabilization programmes is greater than under exchange rate-based stabilization programmes. Their finding is based on an analysis of twenty-two major stabilization episodes in Latin America from 1960 to 1994. In a related paper, Tornell and Velasco (2000, p. 429) find evidence that flexible regimes provide more fiscal discipline than fixed regimes using data from the 1980s from countries in sub-Saharan Africa.

III. Methods and Data

Following Alogoskoufis and Smith (1991, pp. 1270, 1271), Alogoskoufis (1992, pp. 471–73), Anderton (1997, pp. 26, 27) and Huang and Gu (2007, p. 1839), we assume that the process of inflation in Vietnam during the period of study (1992 to 2010) can be represented by the following equation:

$$\pi_t = \alpha + \sum_{k=1}^p \beta_k \pi_{t-k} + \varepsilon_t \quad (1)$$

where π_t is the CPI inflation rate, α denotes an intercept term, and ε_t indicates serially uncorrelated shocks. Following standard practice (see, for example, Marques 2004, p. 10; O’Reilly and Whelan 2005, p. 711; Zhang and Clovis 2009, p. 460), inflation persistence is measured as the sum of the autoregressive coefficients:

$$\rho = \sum_{k=1}^p \beta_k \quad (2)$$

Equation (1) can be rewritten to incorporate the measure of inflation persistence as:

$$\pi_t = \alpha + \rho\pi_{t-1} + \sum_{k=1}^{p-1} \phi_k \Delta\pi_{t-k} + \varepsilon_t \quad (3)$$

where $\Delta\pi_t = \pi_t - \pi_{t-1}$.

If $\rho=1$, the inflation process is non-stationary, which would indicate an economic environment where inflation is badly controlled (Gerlach and Tillmann 2010, p. 5).

It can be shown that the conventional approach to the estimation of equation (3) is equivalent to running ordinary least squares (OLS) regressions based on the following equation:

$$\pi_t - \bar{\pi} = \rho(\pi_{t-1} - \bar{\pi}) + \sum_{k=1}^{p-1} \phi_k \Delta\pi_{t-k} + \varepsilon_t \quad (3a)$$

where $\bar{\pi} = T^{-1} \sum_{t=1}^T \pi_t$ is the sample mean.

It is well known that an OLS estimation of ρ in (3a) tends to produce underestimates and the magnitude of underestimation increases as ρ increases and approaches unity (see Andrews 1993, p. 140, Andrews and Chen 1994, p. 187). To alleviate this problem, Shin and So (2001, p. 597) suggest deploying a recursive mean adjustment (RMA), such that regressions would be based instead on the following equation:

$$\pi_t - \bar{\pi}_{t-1} = \rho(\pi_{t-1} - \bar{\pi}_{t-1}) + \sum_{k=1}^{p-1} \phi_k \Delta\pi_{t-k} + \varepsilon_t \quad (4)$$

where $\bar{\pi}_{t-1} = (t-1)^{-1} \sum_{s=1}^{t-1} \pi_s$ is the recursive mean at $t-1$.

Following this suggestion, we shall use equation (4) to conduct some regressions.

To determine the appropriate lag length p in the main regressions where monthly data are used, we allow for up to twelve lags and select regressions

with high R^2 , low Akaike information criterion (AIC), low Schwarz information criterion (SIC) and low standard error of regression (SER). To obtain an initial indication of the stability (over time) of the intercept term α , which indicates the mean inflation rate, and the slope coefficient ρ , which measures inflation persistence, we estimate rolling regressions of (3) and (4), each with a window of four years of data.

To formally test for possible links between exchange rate regimes and inflation persistence, we follow the example set by Alogoskoufis and Smith (1991, pp. 1270, 1271) and introduce a slope dummy variable, D , which represents periods when the exchange rate regime can be described as being more flexible than usual (for more details, see below). We also take our cues from Bleaney (2000, p. 394) and introduce intercept dummy terms to represent periods when the mean inflation rate was higher than usual. The inclusion of these dummy variables yields the following equations which correspond to (3) and (4), respectively:

$$\begin{aligned} \pi_t = & \alpha + \gamma_1 dms_{1t} + \gamma_2 dms_{2t} + \rho_2 \pi_{t-1} \\ & + (\rho_1 - \rho_2)(\pi_{t-1} \times D) + \sum_{k=1}^{p-1} \phi_k \Delta\pi_{t-k} \\ & + \sum_{k=1}^{p-1} \psi_k (\Delta\pi_{t-k} \times D) + \varepsilon_t \end{aligned} \quad (5)$$

$$\begin{aligned} \pi_t - \bar{\pi}_{t-1} = & \rho_2 (\pi_{t-1} - \bar{\pi}_{t-1}) + \\ & (\rho_1 - \rho_2)[(\pi_{t-1} - \bar{\pi}_{t-1}) \times D] \\ & + \sum_{k=1}^{p-1} \phi_k \Delta\pi_{t-k} + \sum_{k=1}^{p-1} \psi_k (\Delta\pi_{t-k} \times D) \\ & + \varepsilon_t \end{aligned} \quad (6)$$

where D is a dummy variable taking the value 1 for periods when the VND/USD exchange rate was more flexible than usual (i.e., a “softer” peg was in effect) and zero elsewhere; and ρ_1 and ρ_2 are measures of inflation persistence during periods of “softer” and “harder” pegs, respectively. The

intercept dummies dms_{1t} and dms_{2t} are meant to capture the mean shifts in two sub-periods (1992–98 and 2004–10) when the mean rate of inflation was higher than usual. The exact dates of these sub-periods depend on the relevant regression (e.g., whether monthly or annual data were used); further details are provided in the main text below as well as in Tables 1 and 2. Regressions based on equations (5) and (6) allow us to test whether $\rho_1 - \rho_2 > 0$; i.e., whether greater inflation persistence is associated with softer peg regimes. The null hypothesis is that $\rho_1 - \rho_2 = 0$.

There is, to our knowledge, no consistent and convincing classification of Vietnam's exchange rate regimes for the entire period being studied. For example, the classification proposed by Ilzetzki, Reinhart and Rogoff (2008, p. 78) covers only January 1990 to December 2001. Further, in their classification, Vietnam's exchange rate regime is considered to be a "crawling peg" during the aforementioned period despite the fact that the VND/USD rate experienced very large movements during 1997–98. Similarly, the IMF classified Vietnam's exchange rate regime in 2003 and 2004 as a "managed float", even though variations in the VND/USD rate during this period were extremely small (typically less than 1 per cent on a monthly basis). In 2006, the IMF revised its classification, placing Vietnam in the category "conventional fixed peg".

For the purposes of this paper, we follow the example set by authors such as Shambaugh (2004, pp. 316, 317) and Klein and Shambaugh (2006, p. 4) and propose a number of rules to differentiate, at a de facto level, periods when the exchange rate regime in Vietnam may be described as being "more flexible" (this would correspond to a "softer peg"), in contrast to other periods which may be described as being "less flexible" ("harder peg"). Rule (i) focuses on the width of the permissible trading band within which market participants are allowed to vary their exchange rates. Under rule (i), periods during which trading may deviate from the official exchange rate by more than 1 per cent would be classified as operating under a "softer peg".

Rules (ii) to (iv) focus on the *actual* month-end (E_t) and monthly average (A_t) values of the exchange rate, in the absence of daily data. Variations of 1 per cent or more per month are considered representative of a soft-peg regime. Accordingly, rule (ii) specifies that a month t would be a candidate for classification as part of a soft-peg period if $\ln(E_t/A_t) > 1$ per cent. Rules (iii) and (iv) are similar rules based on $\ln(E_t/E_{t-1})$ and $\ln(A_t/A_{t-1})$, respectively. Judgement is to be exercised to ensure that each soft- or hard-peg regime covers a multi-month period rather than isolated monthly observations.

Monthly data for the CPI and the VND/USD exchange rate are obtained for the period January 1992 to June 2010 from the International Financial Statistics (IFS) online database, the State Bank of Vietnam (SBV), the General Statistics Office of Vietnam (GSO) and Nguyen Van Tien (2002, p. 272).⁴ Data for the CPI are seasonally adjusted while data for the exchange rate are not. Data for the period prior to January 1992 are fragmentary and are considered insufficiently reliable for our analysis, which is discussed below.

IV. Empirical Analysis

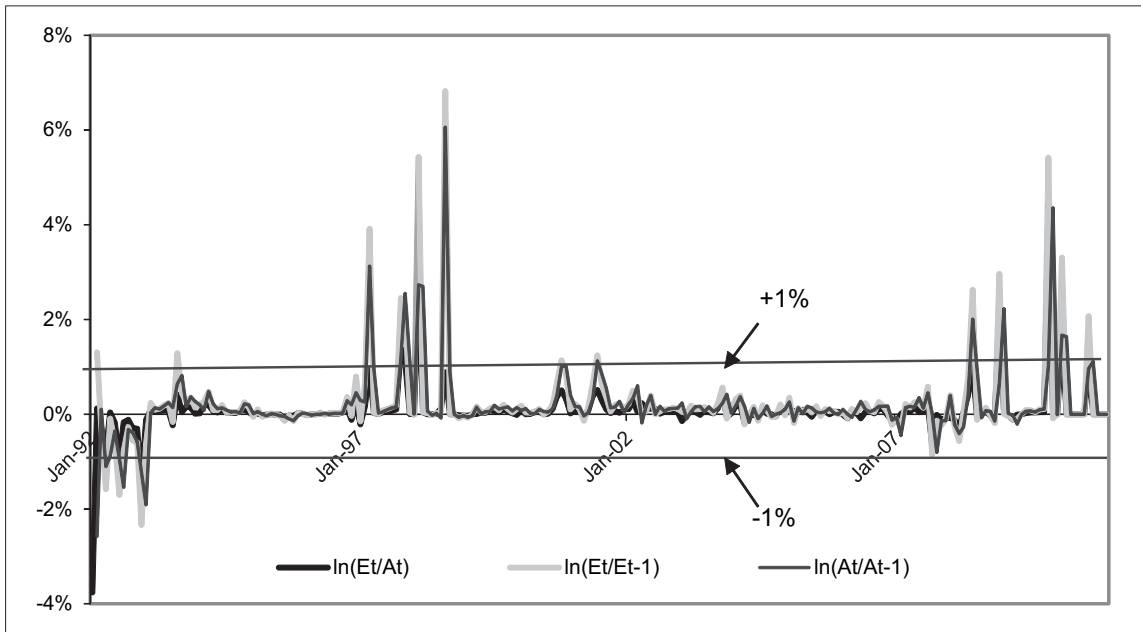
IV.1 Classification of Exchange Rate Regimes

Applying rule (i) to daily data based on the trading band that has been set for the official VND/USD exchange rate (see Figure 3) yields the following classifications:

- Periods governed by more flexible exchange rate regimes (softer pegs) are: February 1997 to January 1999 (inclusive); and July 2008 to June 2010.
- Periods governed by less flexible exchange rate regimes (harder pegs) are: January 1992 to January 1996; and February 1999 to June 2008.

The application of rules (ii) to (iv) to monthly data produces results that are very similar to one another, as can be seen in Figure 4. Using these

FIGURE 4
Monthly Variations in the VND/USD Rate, 1992–2010



NOTE: E_t and A_t denote the month's-end and monthly-average observations, respectively, of the VND/USD exchange rate.

SOURCE: IMF, IFS (online).

results as a guide, and resolving to use the term exchange rate *regime* only to describe a period of some reasonable length rather than brief and/or isolated monthly observations, we identify the following periods as episodes where the exchange rate regime is more flexible (softer pegs): January 1992 to January 1993; March 1997 to August 1998; and June 2008 to June 2010.

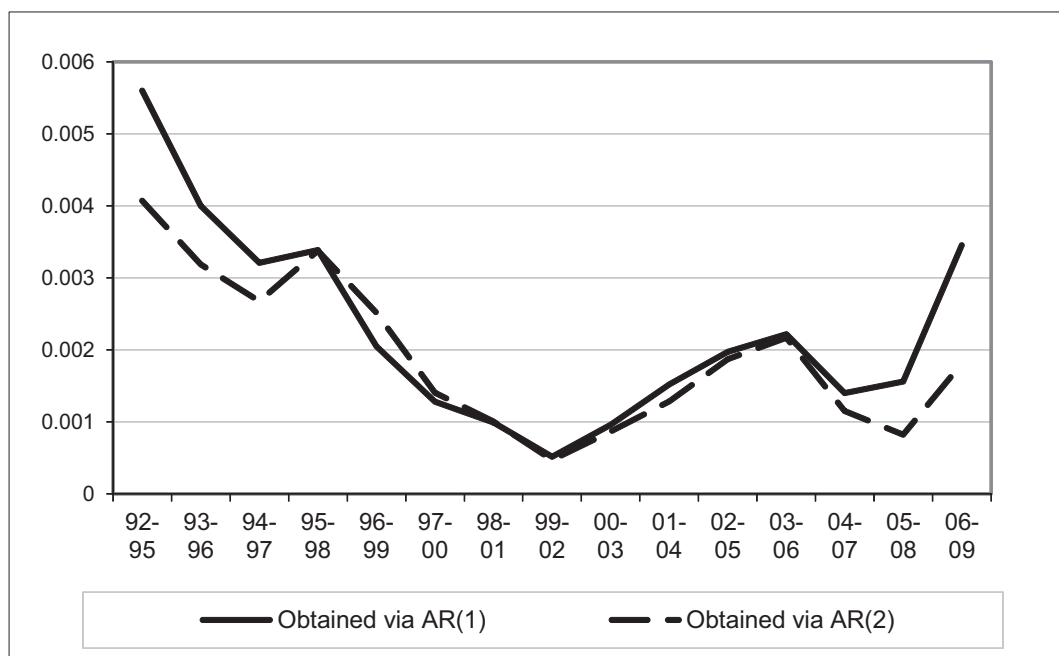
Combining the abovementioned date ranges (using the union rule) yields the following, preferred classifications, where January 1992 to January 1993, February 1997 to January 1999, and June 2008 to June 2010 are periods with more flexible exchange rate regimes, while the remaining periods are classified as having less flexible exchange rate regimes.

IV.1 Preliminary Estimation: Rolling Regressions

As a first step, we estimate autoregressive (AR) versions of equations (3) and (4), using monthly data and a moving four-year window, in order to obtain an indication of the stability of both the mean inflation rate α and of the measure of inflation persistence ρ . For simplicity, at this stage, we only consider lag lengths of 1 and 2 months. The data provide fifteen rolling samples, for the years 1992 to 1995 (inclusive), 1993 to 1996, ..., and 2006 to 2009.

As shown in Figure 5, rolling estimates of α suggest that the mean inflation rate was much higher during the initial and final years of our study period than the middle years. Indeed, closer

FIGURE 5
Rolling 4-year Estimates of α



NOTE: Estimates relate to regressions based on equation (3) in the main text.

inspection (see Figure 1) suggests that there were two structural breaks, one occurring around the beginning of 1999, which heralded a period of very low inflation, and another occurring around the end of 2003 which signalled a period of resurgent inflation.

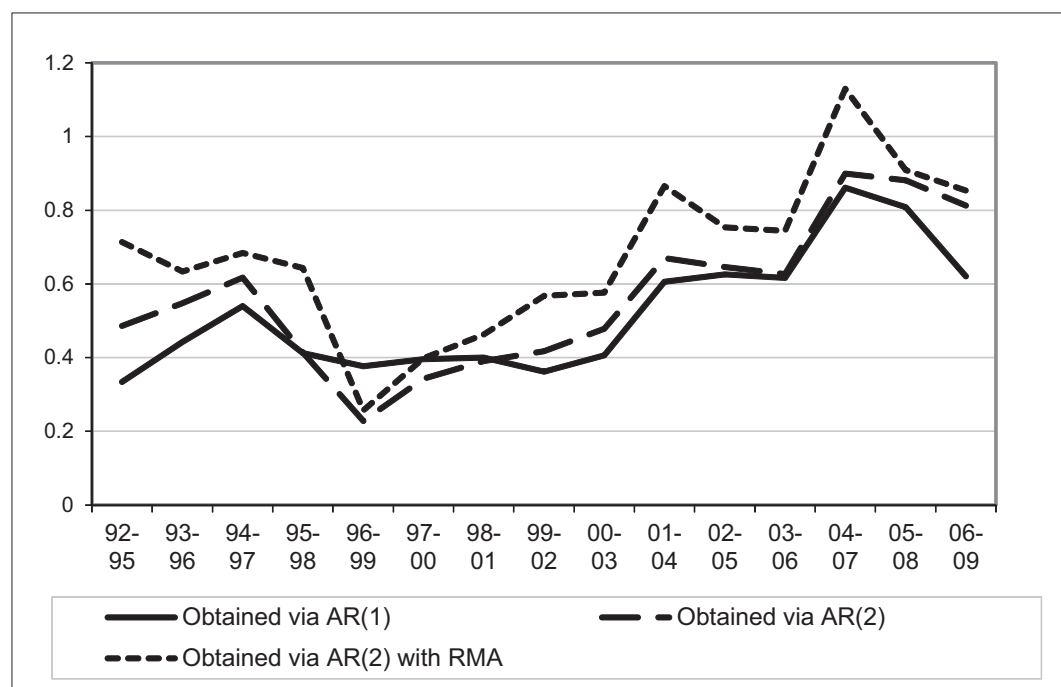
Figure 6 illustrates some rolling estimates of ρ . To reduce clutter, we have shown only estimates obtained via AR(1) and AR(2) without RMA, and AR(2) with RMA.⁵ The estimates suggest that inflation persistence became higher in the latter part of the study period. In particular, the sub-period 2004–07 appears to be associated with the highest levels of measured inflation persistence. Interestingly, this sub-period falls under the less flexible exchange rate regime category according to our analysis in sub-section IV.1.

IV.2 Full-Sample Estimation and Significance Tests

Our main regressions are based on equations (5) and (6), with monthly data for the full sample period. For the regressions that are based on (5), i.e., without RMA, we experiment with lags order of up to 12. The best results are those obtained with 12 lags. For regressions of equation (6), i.e. with RMA, we experiment with a smaller set of alternative AR models, focusing on AR(1), AR(2) and AR(12). Again, the best results are obtained for 12 lags. Table 1 presents estimates obtained for selected regressions.⁶

The dependent variable in each of the regressions shown in Table 1 is the monthly rate of inflation, calculated as $\ln(CPI_t/CPI_{t-1})$. With

FIGURE 6
Rolling 4-year Estimates of ρ



NOTE: Estimates relate to regressions based on equations (3) and (4) in the main text.

one lag, the sample is reduced to 220 observations (for March 1992 to June 2009 inclusive), and with 12 lags it is further reduced to 209 observations (starting from February 1993). Regressions 1.1, 1.2 and 1.3, all of which are based on equation (5), incorporate two dummy intercept terms to account for the sub-periods (see Table 1) of high mean inflation in the early and latter parts of the sample period. Regression 1.4, which is based on equation (6) and, therefore, incorporates RMA, does not have such intercept dummies because RMA has already taken account implicitly of changes in the mean inflation rate. Indeed, if intercept dummies were included anyway, their estimated coefficients would typically be insignificantly different from zero.

Estimates of ρ_2 in Table 1 relate to inflation persistence during periods of less flexible exchange rate regimes (harder pegs). Estimates of the coefficient for the dummy variable, D , i.e., $\rho_1 - \rho_2$, allow us to formally test the hypothesis that $\rho_1 > \rho_2$, i.e., that inflation persistence is higher under more flexible exchange rate regimes, against the null hypothesis that $\rho_1 = \rho_2$. As shown clearly in Table 1, the estimated values of $\rho_1 - \rho_2$ do not have the “expected” sign. Indeed, in all relevant regressions, the estimated value indicates that $\rho_1 - \rho_2$ is negative and this result is typically significant at the 1 per cent level.

We have experimented with small variations in the end date of the intercept dummy term dms_{1t} , and the start date of dms_{2t} . Selection of the preferred

TABLE 1
Regressions of Month-on-Month Inflation Rate
(Data coverage: Jan 1992–June 2010)

<i>Regression</i>	<i>1.1</i>	<i>1.2</i>	<i>1.3</i>	<i>1.4</i>
Number of lags	12	1	10	12
Sample period (adjusted)	02/93–06/10	03/92–06/10	12/92–06/10	02/93–06/10
Number of observations	209	220	211	209
Dates of 1 st mean	02/93–01/99	03/92–01/99	12/92–01/99	N/A
Dates of 3 rd mean	11/03–06/10	11/03–06/10	11/03–06/10	N/A
Recursive mean adj.	No	No	No	Yes
$\alpha \times 10^2$	0.06 (0.84)	0.03 (0.47)	0.04 (0.52)	
$\gamma_1 \times 10^2$	0.34 (3.32**)	0.33 (3.39**)	0.27 (2.70**)	
$\gamma_2 \times 10^2$	0.40 (3.75**)	0.35 (3.54**)	0.32 (-3.01**)	
ρ_2	0.51 (5.17**)	0.59 (9.57**)	0.63 (6.93**)	0.85 (7.78**)
$\rho_1 - \rho_2$	-0.40 (-2.63**)	-0.30 (-3.59**)	-0.36 (-2.54*)	-0.64 (-4.25**)
R-squared	0.565	0.429	0.538	0.553
Adjusted R-squared	0.503	0.419	0.484	0.498
SER $\times 10^2$	0.49	0.52	0.49	0.50
Akaike info. criterion	-7.70	-7.64	-7.69	-7.66
Schwarz criterion	-7.27	-7.57	-7.32	-7.28
Durbin-Watson stat.	1.94	2.27	2.03	1.93

NOTES:

- Dependent variable in the above regressions is $p_t = \ln(CPI_t/CPI_{t-1})$, where CPI_t is the consumer price index for month t .
- Estimates relate to regressions of equations (5) and (6) in the main text.
- Figures in brackets are t-statistics.
- N/A indicates “Not Applicable”.
- (**) and (*) indicate that the relevant coefficient is significant at the 1% and 5% levels, respectively.

regression in each case is based on a comparison of R^2 , AIC, SIC, and SER.

IV.3 Regressions with Alternative Measures of Inflation

We recognize that there are alternatives to the measure of inflation used in the above analysis. To check for robustness, a second monthly measure

is used, namely $\ln(CPI_t/CPI_{t-12})$, as well as an annual measure, namely $\ln(CPI_t/CPI_{t-1})$, where CPI_t is the average CPI for the year t . Regressions 2.1 and 2.2 shown in Table 2 relate to the second measure of inflation, while regressions 2.3 and 2.4 relate to the third measure. As before, while regressions 2.1 and 2.3 are conducted without RMA, regressions 2.2 and 2.4 are obtained with RMA.

TABLE 2
Regressions with Alternative Measures of Inflation Rate
(Data coverage: Jan 1992–June 2010)

<i>Regression</i>	2.1	2.2	2.3	2.4
Data frequency	Monthly	Monthly	Annual	Annual
Number of lags	12	12	1	1
Sample period (adjusted)	01/94–06/10	01/94–06/10	1994–2010	1994–2010
Number of observations	198	198	17	17
Dates of 1 st mean	01/94–03/99	NA	1994–1998	NA
Dates of 3 rd mean	11/03–06/10	NA	2004–2010	NA
Recursive mean adj.	No	Yes	No	Yes
$\alpha \times 10^2$	0.03 (0.30)		1.35 (0.60)	
$\gamma_1 \times 10^2$	0.58 (3.20**)		6.6 (2.01#)	
$\gamma_2 \times 10^2$	0.65 (3.57**)		6.4 (1.75)	
ρ_2	0.93 (48.98**)	0.997 (63.36**)	0.35 (0.63)	0.83 (2.11#)
$\rho_1 - \rho_2$	-0.01 (-0.58)	-0.05 (-1.75#)	-0.33 (-0.75)	-0.78 (-1.49)
R-squared	0.986	0.985	0.438	0.228
Adjusted R-squared	0.984	0.983	0.251	0.176
SER $\times 10^2$	0.72	0.74	4.6	5.2
Akaike info. criterion	-6.90	-6.96	-3.08	-2.98
Schwarz criterion	-6.45	-6.46	-2.83	-2.88
Durbin-Watson stat.	1.98	2.05	2.19	1.96

NOTES:

- Dependent variable in regressions 2.1 and 2.2 is $p_t = \ln(CPI_t/CPI_{t-12})$, where CPI_t is the consumer price index for month t .
- Dependent variable in regression 2.3 and 2.4 is $p_t = \ln(CPI_t/CPI_{t-1})$, where CPI_t is the average consumer price index for year t .
- Estimates relate to regressions of equations (5) and (6) in the main text.
- Figures in brackets are t-statistics.
- N/A indicates “Not Applicable”.
- (**) and (#) indicate that the relevant coefficient is significant at the 1% and 10% levels, respectively.

Estimates from regressions 2.1 and 2.2 (alternative monthly measure of inflation) suggest that $\rho_1 - \rho_2$ may be negative, but this result is not statistically significant. Regressions 2.3 and 2.4 (annual measure of inflation) yield a similar finding.

V. Conclusion

In this paper, we investigated the possible association between periods of more flexible exchange rate regimes and higher inflation persistence, using monthly and annual data for Vietnam over the period January 1992 to June

2010. While we adopted the basic approach used by Alogoskoufis and Smith (1991, pp. 1270, 1271) and Huang and Gu (2007, p. 1839), we also allowed for changes in the mean inflation rate via either recursive mean adjustment (Shin and So 2001, p. 597) or intercept dummy terms.

We found no evidence that inflation persistence in Vietnam was higher under more flexible exchange rate regimes (softer pegs to the U.S. dollar). On the contrary, estimates from many of our full-sample regressions suggest that such “softer-peg” periods may have coincided with *lower* inflation persistence. Further, rolling regressions suggest that inflation persistence reached its highest level during the sub-period 2004–07, which was identified as a period during which the peg to the U.S. dollar was rather rigid. Whatever the merits of the authorities’ apparent preference for a stable bilateral VND/USD exchange rate may be, they do not appear to have contributed to reducing inflation persistence.

Our findings are consistent with those of Anderton (1997, p. 31), Bleaney (2000, p. 395) and others who have found, in the context of various countries, that a more rigid exchange rate regime is neither a necessary nor a sufficient condition for a decrease in inflation persistence. However, our findings are not in accordance with the findings of Alogoskoufis and Smith (1991, p. 1260), Alogoskoufis (1992, p. 472), and Huang and Gu (2007, p. 1840) or with standard theoretical predictions. One possible way to reconcile our findings with these theoretical predictions is to focus on the theoretically presumed link between a more rigid exchange rate regime and a less accommodating stance in monetary policy. Anderton (1997, p. 31) and Bleaney (2000, p. 395) have found that this potential link does not, in practice, apply to various *developed* countries. While an in-depth investigation of whether such a link existed in Vietnam, a developing country, is beyond the scope of the present paper, clear patterns in the conduct of exchange rate and monetary policies suggest that any links which may have been intended or promoted by the

authorities between a stable VND/USD exchange rate and a non-accommodating monetary policy were simply not working during much of the study period.

First, as pointed out by Nguyen Tran Phuc and Nguyen Duc Tho (2009, pp. 145, 155), even though the bilateral VND/USD exchange rate might be stable, that by itself would not be sufficient to guarantee a stable external value of the VND in an *overall* sense — as measured by the nominal *effective* exchange rate. For example, during much of the period 2002–09, the U.S. dollar itself was depreciating. As the VND was pegged against the U.S. dollar, it (the VND) also depreciated against the currencies of many of Vietnam’s trading partners. Thus, the peg against the U.S. dollar failed to produce a rigid exchange rate regime overall.

Second, it appears that the central bank of Vietnam has not enjoyed a great deal of autonomy in conducting monetary policy. For example, as discussed in section II above, an expansionary monetary stance was adopted after 2001, in line with the government’s stimulus programmes at the time, which were designed to counteract the economic recession following the AFC. This expansionary stance was then continually maintained during the 2004–07 period, in pursuit of high economic growth targets. The money supply (M2) growth rate increased from around 21 per cent in 2001 to more than 30 per cent from 2004 to 2006, and to more than 50 per cent in 2007 (see Figure A2 in the Appendix). Growth in domestic credit accelerated from about 20 per cent in 2001 to more than 35 per cent in 2004 and 2005, and 50 per cent in 2007.⁷ Observers have suggested that, of the two major economic policy objectives, the authorities have often given less priority to their inflation objective than their economic growth objective (Cam Van Kinh 2007). In any case, it can be seen clearly that the above accommodating monetary stance was adopted at a time when the VND/USD exchange rate was highly stable (see Figures 2–4), thus contradicting the above presumed link.

Anderton (1997, p. 27), and Burdekin and Siklos (1999, p. 237) point out that the analysis by Alogoskoufis and Smith (1991) as well as similar analyses by other authors, do not take into account other important factors — such as oil price shocks, wars, political crises and institutional changes — which could have a material impact on inflation persistence. In Vietnam’s case, several country-specific factors, related to its transition to a market economy, may have influenced changes in inflation persistence. For example, since 2001, given the rapid structural transformation of the economy, processes such as the liberalization of administered prices have occurred (IMF 2006, pp. 20, 26). Moreover, the intensification of economic openness combined with a remarkable increase in the world prices of most imported production inputs/materials would have added to inflation persistence. To a certain extent, an increase in world prices would have been further compounded by the import tax policies of a developing economy like Vietnam’s (Nguyen Dinh Bich 2005).

Future research could make use of more detailed models of inflation. Alternatively, future research could continue to gather evidence from analyses like ours, but relate them to other sets of circumstances. Such studies would shed additional light on the role of other factors that exert strong influence over inflation persistence.

In response to our findings, some advocates of “hard” pegs might argue that the results would have been different had the authorities stuck resolutely to the hardest possible pegs. In other words, the counter argument would claim that the benefits of a pegged exchange rate regime would materialize only if the peg itself was nearly, or totally, immovable. The results of Bleaney and Francisco (2005, p. 1459) provide some “in principle” support for this argument. It can be argued, however, that on a number of occasions over the past two decades, international financial conditions were such that the authorities in Vietnam would have found it exceedingly difficult to enforce greater rigidity in the VND/USD exchange rate.

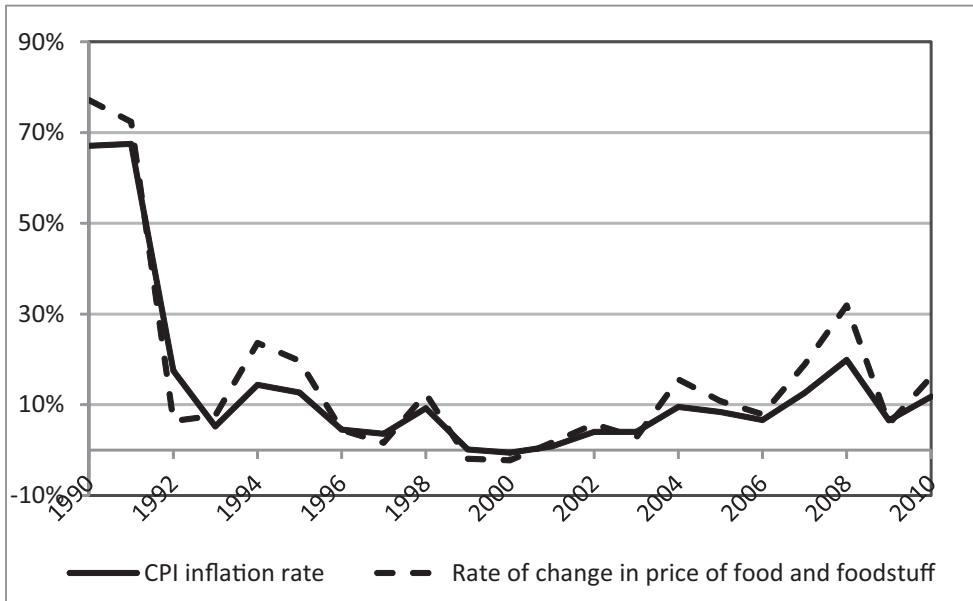
Appendix

TABLE A1
Weights of commodities in the Vietnam’s CPI Basket

<i>Groups of goods and services</i>	<i>Weights (per cent)</i>			
	<i>1998</i>	<i>2001</i>	<i>2006</i>	<i>2009</i>
1. Food and foodstuff	60.86	49.9	42.85	39.93
2. Beverage and cigarette	4.09	4.5	4.56	4.03
3. Garment, footwear, hat	6.63	7.63	7.21	7.28
4. Housing and construction materials	2.9	8.23	9.99	10.01
5. Household equipment and goods	4.6	9.2	8.62	8.65
6. Medication and health service	3.53	2.41	5.42	5.61
7. Transportation, post and telecommunications	7.23	10.07	9.04	8.87–2.73(*)
8. Education	2.5	2.89	5.41	5.72
9. Culture, sport and entertainment	3.79	3.81	3.59	3.83
10. Other goods and services	3.86	3.36	3.31	3.34

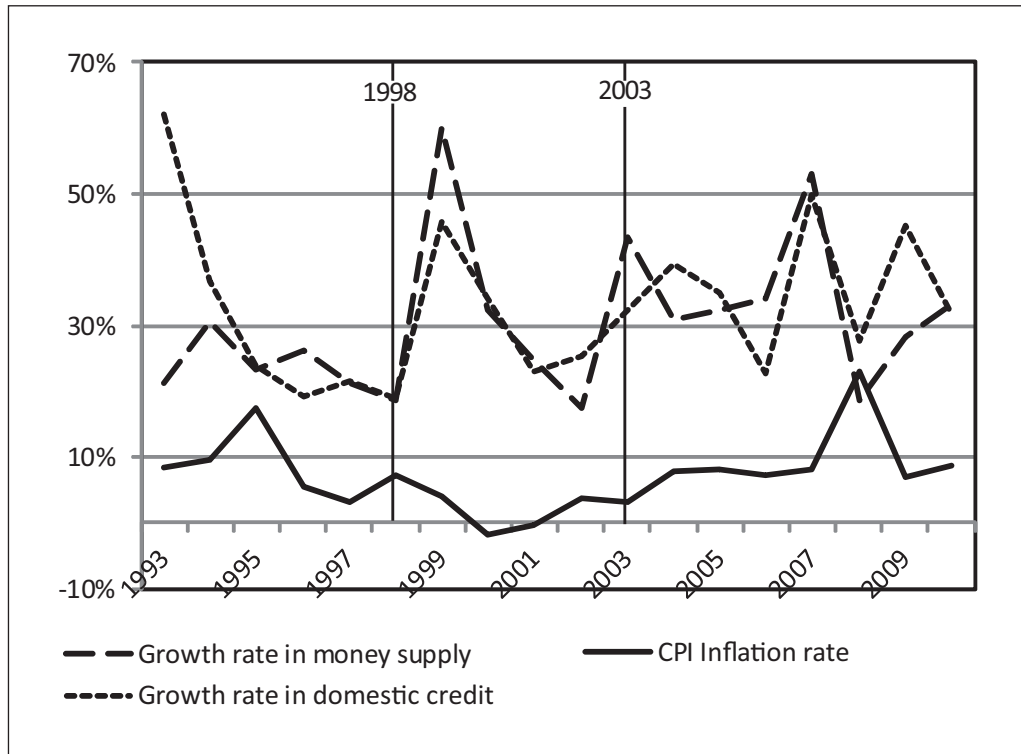
NOTES: (*) There are 11 groups of goods and services since 2009. Group 7 has been divided into two groups: (i) Transportation; and (ii) Post and telecommunications.
SOURCE: GSO

FIGURE A1
CPI Inflation Rate and Growth Rate in Price of Food and Foodstuff, 1990–2010



NOTE: The inflation rate is computed as the rate of change in the end-of-period CPI.
SOURCE: GSO

FIGURE A2
 Growth Rate in Money Supply M2, Growth Rate in Domestic Credit and
 CPI Inflation Rate, 1993–2010



NOTES: The inflation rate is computed as the rate of change in the year-average CPI.
 Data on the growth rate in domestic credit for years 1993-1995 are obtained from IMF (1998), p. 23.
 SOURCE: IMF, IFS (online); IMF (1998), p. 23.

NOTES

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1. The General Statistics Office of Vietnam (GSO) does not provide separate estimates of tradeable and non-tradeable prices as components of the CPI. Nor is there any official distinction between core and headline CPI.
2. Consistent with this, capital investment was intensively conducted, increasing year by year from 29.6 per cent of GDP in 2000 to an extremely high level of 41.7 per cent in 2007 (Vu Quang Viet 2009, p. 396). However, inefficiency made Vietnam's incremental capital output ratio (ICOR) considerably high as compared to a number of other Asian countries (Vu Quang Viet 2009, p. 396).
3. Under the Bretton Woods system, the United States was allowed considerable freedom in conducting monetary policy, because it was the reserve centre (Obstfeld 1995, p.159). Data for some countries were only available till the year 1993.
4. Monthly data for the consumer price index are available from the International Financial Statistics online database only from 1995 onwards. Data for this variable for the earlier years are obtained from Nguyen Van Tien (2002, p. 272), the State Bank of Vietnam (SBV) and the GSO.
5. The full results of rolling regressions for equations (3) and (4) with AR(1) and AR(2) are available upon request.
6. The full set of regression results for equations (5) and (6) are available upon request.
7. Nguyen Duc Thanh (2007) compares China and Vietnam to show that Vietnam experienced remarkably high growth in monetary and credit aggregates during 2001 to 2005.

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Nguyen Tran Phuc is a Lecturer in the Department of Postgraduate Studies, Banking University of Ho Chi Minh City, 36 Ton That Dam Str., Ben Nghe Ward, District 1, Ho Chi Minh City, Vietnam; email: n_t_phuc2003@yahoo.com, phuont@buh.edu.vn

Nguyen Duc Tho is Professor of Economics in the Department of Accounting, Finance and Economics, Nathan campus, Griffith Business School, Griffith University, 170 Kessels Road QLD 4111, Australia; email: t.nguyen@griffith.edu.au.

Jen Je Su is Senior Lecturer in the Department of Accounting, Finance and Economics, Nathan campus, Griffith Business School, Griffith University, 170 Kessels Road QLD 4111, Australia; email: j.su@griffith.edu.au.

Tarlok Singh is Senior Lecturer in the Department of Accounting, Finance and Economics, Nathan campus, Griffith Business School, Griffith University, 170 Kessels Road QLD 4111, Australia; email: Tarlok.Singh@griffith.edu.au.